Draft Technical Support Document
for
CAP 2000 Proposal

I. Introduction

The purpose of this report is to supply supplemental information to support EPA's proposed rulemaking regarding compliance programs for light-duty vehicles and trucks (CAP 2000) rulemaking. Some of the data referenced in the this report are claimed by the manufacturer to be confidential. In those cases, non-confidential summaries of the data are included to assist commenters in understanding the basis for the Agency's actions in the rulemaking.

The bulk of the report is a review of the revised durability program (RDP) which is a current regulatory option to obtain certification. To date, thirteen manufacturers have Agency approval to use the RDP provisions for certification. To a large extent the proposed CAP 2000 durability procedures are built upon the RDP procedures.

Other topics included in this staff report are:

(1) A discussion of the correlation procedures used by the Agency to assure that accurate tests are run by manufacturers,

(2) A discussion of the information collected from manufacturers which is not directly used in reaching the decision to grant a Certificate of Conformity,

(3) A discussion of the effect of ambient weather patterns (warm versus cold climates) on in-use deterioration and recalls in support of the CAP 2000 requirement that some vehicles tested be recruited from cold weather locales, and

(4) A discussion of the rationale used in proposing a durability group concept for CAP 2000 rather than the current engine family definition.

This report has been placed in the docket number A-96-50 associated with the CAP 2000 rule.

II. Review of the Revised Durability Program (RDP)

A. Background

The Clean Air Act (CAA) prohibits manufacturers of new motor vehicles from selling or introducing new motor vehicles into commerce unless the vehicles are covered by a certificate of conformity. EPA is charged with the responsibility of issuing certificates of conformity based on testing which verifies compliance with the appropriate emission standards over the vehicles' useful life. This necessitates a prediction of the durability or rate of deterioration of the vehicle's useful life emission levels before actual production begins.

Light Duty Vehicle Durability.

The process of demonstrating emission durability for the purpose of certification begins well in advance of production. For light-duty vehicles, EPA's current standard durability process requires manufacturers to accumulate mileage on a pre-production vehicle over a prescribed driving cycle for 100,000 miles to simulate deterioration over the useful life. These vehicles are termed durability data vehicles (DDVs); the mileage accumulation cycle, specified in 40 CFR Part 86, is commonly referred to as the AMA cycle.

In this process, emission data are generated at periodic intervals during AMA mileage accumulation and a linear regression of the data is performed to calculate a multiplicative deterioration factor (DF)[1] for each exhaust constituent. In the current certification program, low mileage vehicles (referred to as "emission data vehicles," or EDVs) are tested with calibrations that the manufacturer intends to produce. The emissions from these tests are multiplied by the DFs to calculate the projected emissions levels (referred to as the "certification

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[1]A multiplicative DF is calculated by performing a least-squares regression of the emission versus mileage data for each exhaust emission constituent and dividing the 100,000-mile emission level by the 4,000-mile emission level. The DF is than used with other test vehicles to determine compliance with the standards. The product of the emissions multiplied by the DF (referred to as the certification level) must be less than or equal to the emission standard to receive a certificate of conformity.

levels") at 100,000 miles. The certification levels must be at or below the applicable emission standards in order to obtain a certificate of conformity.

Light Duty Truck Durability

Beginning with the 1984 model year, EPA durability regulations[2] for light-duty trucks (LDTs) have permitted manufacturers to use their own methods, based on good engineering judgment and targeted to represent in-use performance, to determine DFs subject to review by EPA. Although EPA had concerns initially regarding the accuracy of the DFs generated by this method,[3] the manufacturers improved their processes after discussions between EPA and industry. As a result of these discussions, manufacturers now generally base their light truck dfs on actual AMA or RDP durability test data and, in some cases, in-use data collected by the manufacturers. Also several manufacturers combine data from several truck engine families into groups (not unlike the durability groups proposed in CAP 2000) to expand the data pool and minimize the effect of outlier data. The additional data collected under some of these truck deterioration programs coupled with the incorporation of in-use data represents an improvement over single AMA durability tests run under the standard AMA durability process. Targeting a process to represent in-use emission performance rather than running a standard AMA cycle also represents an improvement over AMA based durability. The Agency now believes that the light-duty truck DFs generated by manufacturers using their own methods are on the whole at least as representative as those based on AMA mileage accumulation and in some cases represent an improvement over AMA due to the addition of in-use data.

EPA has been concerned about the ability of any fixed cycle - including the AMA cycle - to accurately predict in-use deterioration for all vehicles. In fact, EPA has particular concerns that the AMA does not represent the driving patterns of today and does not appropriately age current design vehicles. As a result, EPA believes that the AMA may have become outdated.

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[2] Reference CFR 86.092-24 (c) (2) prior to the 1994 model year. Reference 40 CFR 86.094-13 (e).

[3] See 57 FR 18545 NPRM (April 30, 1992) on RDP 1.

The AMA cycle, which was developed before vehicles were equipped with catalytic converters, contains a substantial portion of low speed driving to address concerns about engine deposits (which were a major source of deterioration in pre-catalyst vehicles). However, since the advent of catalytic converters, better fuel control, and the use of unleaded fuel, causes of deterioration have shifted from low speed driving to driving modes which include higher speed/load regimes that cause elevated catalyst temperatures. The AMA driving cycle does not adequately focus on these higher catalyst temperature driving modes and contains numerous driving modes which do not significantly contribute to deterioration but do make the process longer with little added benefit.

Instead of requiring an alternative mileage accumulation procedure, EPA began a voluntary program in the 1994 model year for light-duty vehicles which allows manufacturers to develop and use their own procedures to evaluate durability and deterioration (subject to prior Agency approval), provided that the manufacturer conduct or fund an in-use "reality check" test program to evaluate the effectiveness of its predictions. The initial program, referred to as revised durability program I (RDP I), was an interim program scheduled to expire after the 1995 model year and was intended to serve as a bridge to an anticipated complete revision to the durability process (RDP II). The provisions of RDP I have since been extended in a series of regulatory actions.[4]

Although EPA investigated developing a standard mileage accumulation procedure[5] to replace the AMA as part of the RDP II development, EPA was concerned about the appropriateness of any single durability program to effectively predict in-use emission deterioration for the entire range of automobile products. Different catalysts formulations may have different sensitivity to temperature extremes. Fuel control differences and different catalyst placements could impact the amount of high catalyst

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[4]59 FR 36368 (July 18, 1994), 62 FR 11082 (March 11, 1997), 62 FR 11138 (March 11, 1997) and 62 FR 44872 (August 22, 1997).

[5]Presented at an April 26, 1994 EPA workshop. See Appendix II for details.

temperatures that would occur in use. Vehicle engine, exhaust system and drive train differences could cause the vehicle to achieve different catalyst temperature exposures during identical vehicle operation.

The Agency has now decided to address the revisions it was considering in RDP II as part of the comprehensive redesigned certification process, the CAP 2000 Program, for which this staff paper provides supplementary information.

B. Types of Revised Durability Programs

Two major types of durability processes have emerged from the RDP I experience: whole vehicle mileage accumulation cycles and bench aging procedures.

The whole vehicle aging concept involves driving vehicles on a track or dynamometer on an aggressive driving cycle of the manufacturer's design. Typically, the speed, acceleration rates, and/or vehicle load are significantly increased compared to the AMA cycle or normal in-use driving patterns. The vehicle can be driven either for full useful-life mileage, or, for a higher stress cycle, the vehicle can be driven for a reduced number of miles (e.g., 1 mile on the high speed cycle equals 2 miles in use). In either case, the vehicle is tested periodically and a DF is calculated. By choosing the profile of the cycle carefully, manufacturers have been able to meet or exceed the in-use deterioration goals of the program (based on the limited in-use verification data receive to date) while taking significantly less time to complete the durability process. Such a program could take a quarter to half the time to complete as the AMA cycle with the attendant cost savings.

The second type of RDP is bench aging. The bench aging procedures involve the removal of critical emission components (such as the catalyst and oxygen sensor) and the accelerated aging of those components on an engine dynamometer bench.[6]

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[6]An engine dynamometer bench consists of an engine dynamometer, a "slave" engine, and required controllers and sensors to achieve the desired operation of the engine on the dynamometer.

During the aging process important engine/catalyst parameters are controlled to assure proper aging. Typically, elevated catalyst temperatures are maintained while fuel is controlled to include lean and rich spikes and stoichiometric control. Typical bench aging periods are 100-200 hours. Even with the setup time of the engine test bench, the cost savings of such bench aging procedures are very significant.

These bench aging procedures are based on the implicit assumptions that (1) most emission deterioration on light-duty vehicles and trucks is due to catalyst and oxygen sensor deterioration, (2) that catalyst deterioration is largely due to high thermal exposure during typical fuel control (including lean and rich spikes), (3) other sources of deterioration can be covered by additional aging of the catalyst.[7] Through a series of tests and measurements, manufacturers determine the amount of time needed to bench-age a catalyst the equivalent of 100,000 miles. Other sources of deterioration (including any engine-out deterioration) can be accounted for by aging the catalyst for an additional amount of time. The overall effectiveness of the RDP program is supported by the data presented by manufacturer during the approval process.

C. EPA's RDP Review Process

EPA has been approving manufacturer alternative durability programs under RDP-I since 1992 (starting in the 1994 model year for Federal certification) and has provided guidance to assist manufacturers in the approval process[8]. To receive approval under RDP I, manufacturers are required to show that their durability processes are designed to cover a significant majority

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[7]To obtain approval to use this process, manufacturers supply evidence that these assumptions are valid for their vehicles. Additional sources of deterioration (such as engine-out deterioration and catalyst poisoning) may be accounted for by over-aging the catalyst to account for these sources.

[8]Refer to the Agency's July 29, 1994 guidance letter "Alternative Durability Guidance for MY 94 through MY 98", reference number: CD-94-13.

of deterioration rates experienced by vehicles in actual use.[9] The requirement that the procedure cover a significant majority of the deterioration experienced by vehicles in use, rather than the entire population, is not intended to relax the goal of the program but is to allow for the uncertainty inherent in any sampling plan.

D. Summary of RDP Programs Approved by EPA

The Agency has approved 17 RDP programs for 13 different manufacturers and is actively reviewing five additional programs. The RDP regulations became effective in the 1994 model year for Federal applications and in the 1993 model year for California applications.

The Agency has influenced manufacturers to make improvements to their aging procedures and identified and corrected some manufacturer mistakes. Table 1 contains a summary of the RDP plans which were influenced by Agency review. In eleven of the thirteen approved RDP process the Agency comments on the RDP or the in-use reality check program resulted in improvements to the manufacturers program. Based on this statistic, the Agency believes that the review process by the Agency has been important.

The Agency guidance[10] for acceptance of RDP programs requires (among other requirements) that the manufacturer demonstrate that the RDP plan cover a "significant majority" of the in-use deterioration of their vehicles. Table 1 contains a summary of the manufacturers estimate of the percent of the in-use data covered by their RDP. This percent coverage ranges from 75% to 99.9% percent. Most manufacturers (7 of 10) indicated that their durability programs cover ninety percent of more of the distribution of deterioration rates experienced by drivers in

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[9]Manufacturers have typically shown that their durability programs cover ninety percent or higher of the distribution of deterioration rates experienced by vehicles in actual use. See Table 1 in this report for further details.

[10] Refer to the Agency's July 29, 1994 guidance letter "Alternative Durability Guidance for MY 94 through MY 98".

actual use.

The Agency guidance also requires that the manufacturer supply a comparison of catalyst temperatures and times at those temperatures measured during their RDP cycle and during the AMA cycle using identical vehicles. Using this time-at-temperature data the Agency has compared the two cycles prior to approval. The results of these comparisons are contained in Table 1. In all cases, the Agency concluded that the net thermal exposure that leads to catalyst deterioration was higher on the manufacturers' RDP cycle that the AMA cycle. Based on these data, the Agency believes that the approved RDP processes are more severe for emission deterioration than the AMA cycle.

The current truck deterioration programs require the manufacturer to develop its own deterioration program which is designed to represent in-use deterioration. Durability procedures used for trucks are often similar to those approved under the RDP program for light duty vehicles. In some cases, in-use data is collected and used for the truck deterioration program. Because of these similarities to the RDP's, the Agency believes that the truck deterioration programs are also more severe than the AMA in most circumstances.

For bench aging RDP programs, EPA asked several manufacturers to collect data on the engine-out deterioration characteristics of their vehicles. Stable engine-out emissions support the concept of bench-aging catalysts and oxygen sensors off the vehicle. However, proof of stable engine-out emission is not absolutely necessary for RDP approval since the catalyst may be over-aged to include other sources of deterioration. The Agency's requirement to match a significant majority of in-use deterioration rates is the pertinent data that supports the validity of the manufacture's RDP. Consequently, the Agency did not request supporting data from all manufacturers. The manufacturers with data showing essentially no engine-out deterioration are summarized in Table 1. Engine-out data for GM and Chrysler (which provided more complete data) are contained in Appendix I.

Table 2 contains a summary of reality check data which have completed Agency review. Four manufacturers are represented on the table. More manufacturers have promised to collect reality

check data which is pending or have submitted preliminary data which is undergoing Agency review. The collected data show that the vast majority of the time (125 of 131 tests) the test vehicles comply with the certification standards (which in most cases are more severe that the applicable in-use standards with which the manufacturers must comply during recall testing in-use). In the cases where an individual vehicle failed the in-use standards, additional data was usually provided by the manufacturer to explain the cause of the failure. The details of data summarized in the Table I are contained in Appendix III.

Based on the data provided by the manufacturers showing that their RDP covers typically ninety percent of the distribution of deterioration rates experienced by drivers in actual use, the Agency believes that these RDP cycles would be a good predictor of deterioration in actual use. When coupled with the in-use reality check, any significant shortfalls in the predictive ability of a manufacturer's RDP could be identified. The Agency requires that manufacturers agree to remedy any significant shortfall uncovered by the in-use reality check data by making corrections to their RDP for future model years. Also the Agency can use the reality check data to direct its recall investigations which could lead to more recalls. The identification and repair of failing vehicles in-use (through the recall process) would lead to lower in-use emissions under the RDP program than under AMA durability protocols which lack the in-use data. Ultimately, this will lead to a lower level of emission non-compliance in use. Because the CAP 2000 proposal is based on the RDP durability provisions coupled with other improvements discussed in the preamble, the Agency expects that under CAP 2000 the level of emission non-compliance will also be reduced in use.

III. Correlation Testing Between EPA and Manufacturer Labs

EPA's test laboratory in Ann Arbor has been confirming manufacturers' certification and fuel economy testing for over 20 years. The preponderance of data shows that EPA and manufacturers correlate very well. Because EPA has total control over the quality of its own test facility, including dynamometers, calibration gases, analyzers, and all the other aspects which are needed to perform a test in accordance with CFR

requirements, it is assured of its level of accuracy. When a manufacturer's vehicle is tested at the EPA lab, the results are compared to the manufacturer's own test data (known as "paired data). EPA has a vast amount of paired data, which has shown overwhelmingly that manufacturers are indeed capable of running accurate tests. When a correlation problem is identified, EPA may require the manufacturer to take corrective action until the offset is eliminated. Ongoing correlation programs are also conducted by manufacturer assocications (such as AAMA and JAMA). The data from these programs are used by EPA and manufacturers to quantify individual laboratory offsets. All certification test data, both manufacturer and EPA-run, is published annually per the CAA requirement, and may be inspected at the EPA-OMS web site, given in the Preamble to the proposal.

IV. Information Used for Granting Certificate of Conformity.

EPA's experience over the past 20 years in certifying vehicles has been that it does not normally need such information as technical descriptions of emission control components, part numbers, and calibration specifications to make certification decisions. The emphasis at the time of certification is compliance with the emission standards: did the manufacturer demonstrate that the vehicles it plans to produce are capable of meeting the emission standards? The above-mentioned items, while important for making future in-use compliance/enforcement determinations, are not usually needed during the certification process to determine compliance with the emission standards. In the rare instance where such information may be needed, EPA has the authority to request it prior to certification.

V. Warm Weather less Harsh Durability Conditions than Cold Weather.

EPA believes that vehicles operated in colder climates may be subject to harsher durability conditions based on our engineering judgement of the impact of various conditions such vehicles are exposed to that are not present, or present to a lesser degree, in warmer areas. These factors include such things as increased corrosion due to road de-icing chemicals, increased exhaust condensation, longer operation in cold enrichment mode, and

longer idle time(vehicle warm-up). We do not consider these factors to be atypical or improper use; however, they could contribute to deterioration patterns not observed in warmer climates. There have been several EPA-influenced emission recalls which included only vehicles located in colder areas.

VI. Engine Family to Durability Group Rationale.

EPA's decision to change from the "engine family" concept to the "durability group" concept is based upon its 20-year experience certifying vehicles. Two factors went into the decision to do so: first, as stated in the Preamble, the engine family criteria in the current regulations were focussed primarily on engine-design parameters. EPA believed that since the promulgation of those regulations, a combination of emission control technology advancements and engine design improvements made the "engine family" designated somewhat outdated. The "durability group" accounts for both important engine design features and adds more emphasis on the emission control elements which are subject to deterioration over time. The second factor which played into the decision was one of burden. Performing durability testing for each engine family is one of the highest costs to manufacturers in the certification process. The proposed durability group criteria coincidentally result in fewer durability demonstrations for the manufacturer.

Table 1
Approved Revised Durability Plans

Mfr	Yr of Approval	Type of RPD	Mfr Est of % of In-Use Dist Covered by RDP	More Cat Temp Exposure than AMA	RDP Improved in response to EPA review	Mfr data shows almost no Engine-out Deterioration
BMW	1993	Track - accel mi	"More than 75%" [75% +10 to 30% safety factor]	yes	yes, miles run incr.by 60%	N/A (not a bench cycle)
Chry	1996	Bench	75%	yes	Yes, safety factor added	Yes
Ford	1995	Bench & Track	95-98%	yes	yes, aging incr 20%	Oral Presentation
GM	1992-3	Bench	95-98%	yes	yes, reality check	yes
Honda	1996	Bench & Track	99.9%	yes	yes, reality check	not required
Mazda	1994	Track	99.9% in-use driving patterns	yes	yes, reality check	N/A Track proc
Daewoo	1998	Track	95%	yes	yes	N/A Track proc

Table 1, page 2

Mfr	Yr of Approval	Type of RPD	Mfr Est of % of In-Use Dist Covered by RDP	More Cat Temp Exposure than AMA	RDP Improved in response to EPA review	Mfr data shows almost no Engine-out Deterioration
Nissan	1993 & 1996	Track & Bench	up to 94%	yes	yes	yes
Porsche	1997 uses VW RDP	Track	not avail	yes	No, uses VW	N/A Track proc
Saab	1998 uses GM RDP	Bench	GM 95-98%	yes	No, uses GM	Yes with GM
Suzuki	1996	Bench + Vehicle aging	Driving patterns exceed all 113 in-use vehicles surveyed	yes	Yes	Not provided, vehicle is aged in addition to bench aging
Toyota	1993 & 1995	Track & Bench	above 90%	yes	Yes, analytical errors corrected and bench aging time increased	No
VW	1996	Track, accel mi	In-Use data provided, but percent coverage not calculated	yes	yes	No data provided

Table 2
Summary of In-Use Reality Check Testing

Manufacturer	Program	Test Program Year of Service	No of vehicles passing/run
GM	'93 - 1	3	5/5
		4	5/5
	'94 - 1	2	5/5
		3	5/5
		4	3/5
	2	2	6/7
		3	7/7
		4	6/7
	3	2	5/5
		3	5/5
		4	5/5
	'95 - 1	2	5/5
		3	3/3
	2	2	3/3
		3	3/3
	3	2	0/1, passed retest
		3	1/1
	'96 - 1	2	5/5
Ford	'96 - 1	2	7/7
	2	2	5/5
Honda	'97 - 1	2	5/5
	2	2	5/5
Toyota	'95-1	2	7/7
		3	5/5
	'95-2	2	5/5
		3	5/5
	'96-1	2	2/2
	'96-2	2	2/2

Table 3
Revised Durability Plans Pending Approval

Mfr	Yr of Approval	Type of RPD	Mfr Est of % of In-Use Dist Covered by RDP	More catalyst temp exposure than AMA?	RDP Improved in response to EPA review	Mfr data shows almost no Engine-out Deterioration
Mercedes	Under develop	Track		yes	Yes - added cold starts	N/A
Hyundai	Under develop	Vehicle/ Bench combo	Target 90%	TBD	EPA part of development	
KIA	Early develop	Bench & Track	Target 90%	TBD	EPA part of development	TBD
Subaru	Under develop	Bench				
Volvo	Under considera-tion	Bench/ Poison combo				yes

Appendix I

GM POWERTRAIN

October 23, 1996

ML-GM495

GM does not consider this letter & eng out data to be GM Confidential (as the pages were originally marked).

J. Kourt to D. Good (8/14/98 phone conversation)

Mr. D. J. Good, Team Coordinator
Certification Branch
Certification Division
Mobile Source Air Pollution Control
U.S. Environmental Protection Agency
2565 Plymouth Rd.
Ann Arbor, MI 48105

Dear Mr. Good:

Subject: Notification of Change to the GM Alternate Durability Process (ADP)

One of the original assumptions of the GM ADP is that engine-out emissions are stable over the useful life of the vehicle. In the original ADP agreement reached between GM and the CARB, GM agreed to conduct engine-out emission testing on the ADP durability data vehicle (DDV) and the reality check vehicles. The subsequent GM/EPA ADP agreement was not specific regarding engine-out emission testing; however, GM elected to follow the CARB-approved protocol for the EPA ADP.

Recently, GM requested and received the CARB approval to eliminate engine-out emission testing of ADP DDV's and reality check vehicles (reference attached GM letters ML-GM489 and ML-GM494 and CARB letter C-96-072).

Because engine-out emission testing of vehicles was not addressed in the GM/EPA ADP agreement and because the CARB has approved elimination of this requirement, GM is officially notifying the EPA of this change to the ADP. Effective with this letter, GM will eliminate engine-out emission testing on all subsequent ADP DDV's and reality check vehicles for both CARB and EPA certification programs.

GM is currently negotiating with the CARB to eliminate the requirement to remove and test oxygen sensors from fourth year of service reality check vehicles. Upon approval of this CARB ADP process change, GM will notify the EPA. However, it should be noted that it was not GM's intention to perform this oxygen sensor procedure on EPA-only ADP's.

Please call if you have any questions regarding this matter.

Sincerely,

J. M. Kourt

J. M. Kourt
Project Manager
Powertrain Control Center

JMK/ks
Attachments

Powertrain Control Center • M/C 483-331-500 • GM Proving Ground • Milford, Michigan 48380-3726

ADDT. 1

ATTACHMENTS TO GM LETTER ML-GM495:

GM LETTER ML-GM489

CARB LETTER C-96-072

GM LETTER ML-GM494

Add to:

GM POWERTRAIN

September 30, 1996 ML-GM489

Mr. D. Nguyen
Mobile Source Division
Air Resources Board
9480 Telstar Avenue
Suite #4
El Monte, CA 91731

Dear Mr. Nguyen:

Subject: Reality Check Engine-Out Emission Testing

One of the original assumptions of the ADP program is engine-out emissions are stable over the useful life of the vehicle. General Motors agreed to conduct engine-out testing on ADP program customer vehicles to prove this assumption.

As part of our ADP reality check process agreement, GM has been conducting engine-out testing on our 1992-94 California certified engine families. Based on 1992-94 model year reality check data (attached), GM believes it is now appropriate to discontinue this engine-out testing requirement.

The elimination of engine-out testing would save us test time and allow for quicker turnaround of the customer vehicle.

We request CARB to please respond with your approval for allowing us to discontinue the engine-out testing of reality check vehicles.

If you have any questions, please feel free to call me at your convenience on 810/685-6976.

Sincerely,

R. C. Harvey

R. C. Harvey
Project Manager
Powertrain Control Center

RCH/SAF/ks
Attachments

Powertrain Control Center • M/C 483-331-500 • GM Proving Ground • Milford, Michigan 48380-3726

ADP T.o 3

GM REALITY CHECK - CUSTOMER CARS

09-04-1995

ENGINE FAMILY P1G2.0W8JF15

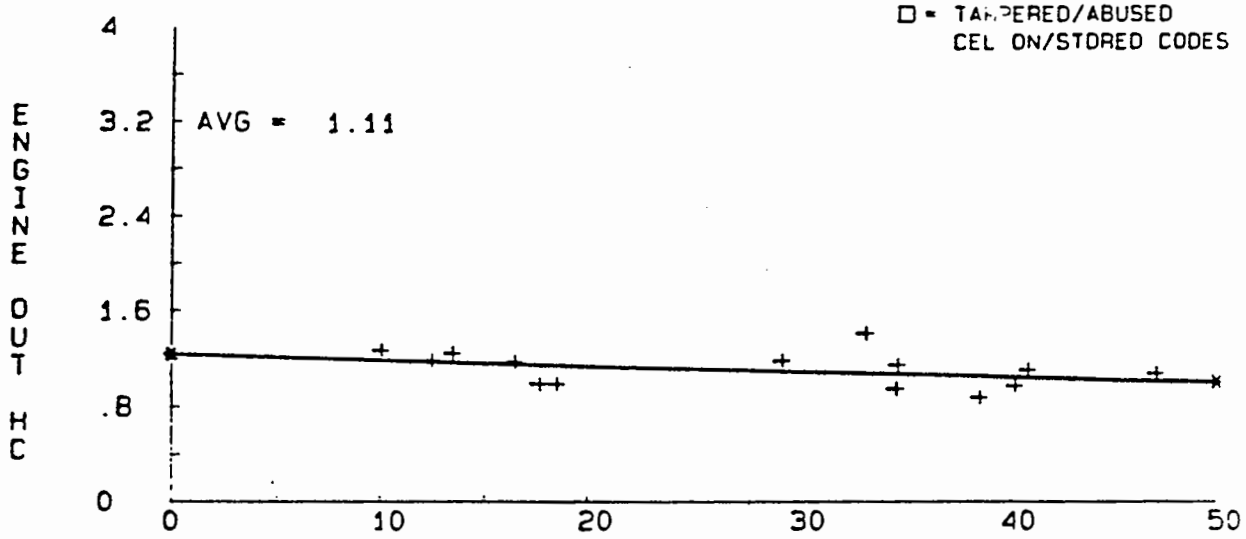
TESTED AT VAN NUYS

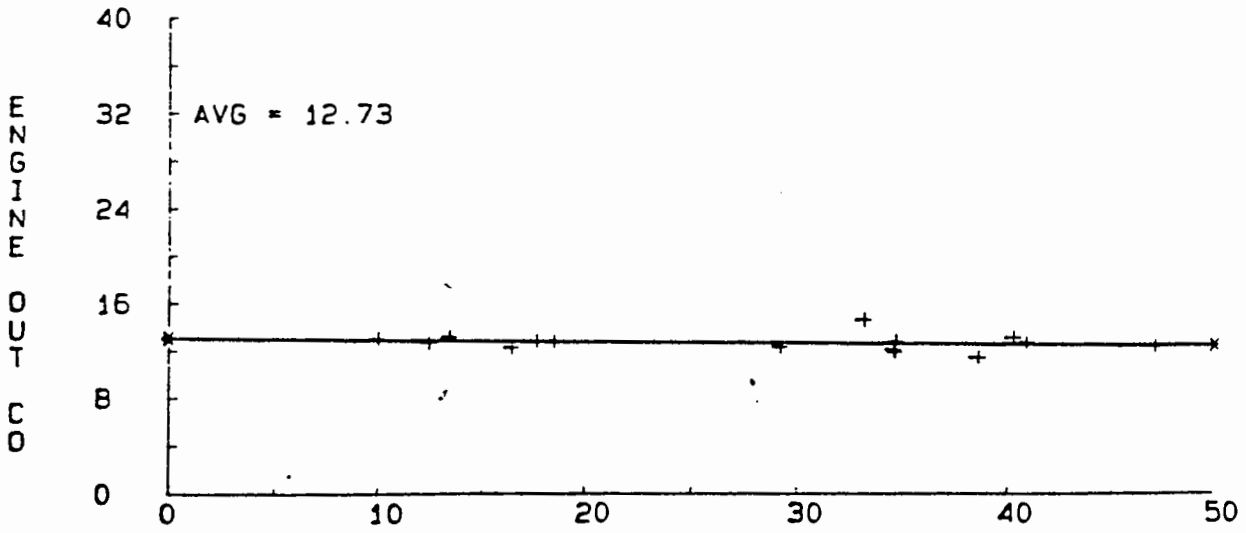
2ND/3RD/4TH YEARS OF SERVICE

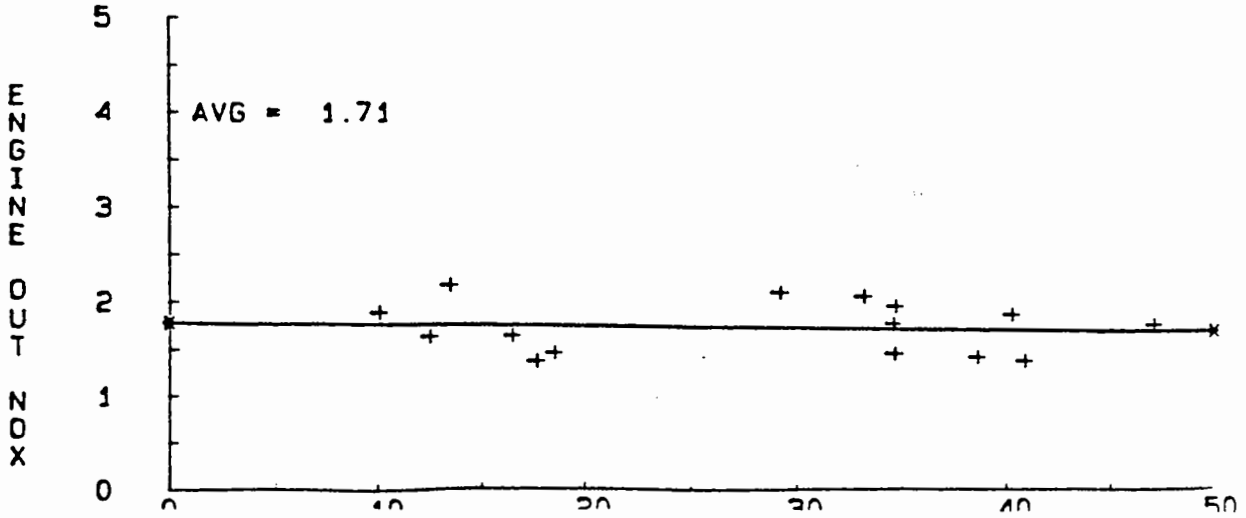
15 OBSERV.

GM CONFIDENTIAL

□ = TAMPERED/ABUSED
CEL ON/STORED CODES







Appl d

GM REALITY CHECK - CUSTOMER CARS

09-04-1996

ENGINE FAMILY P1G3.1W8MCF5

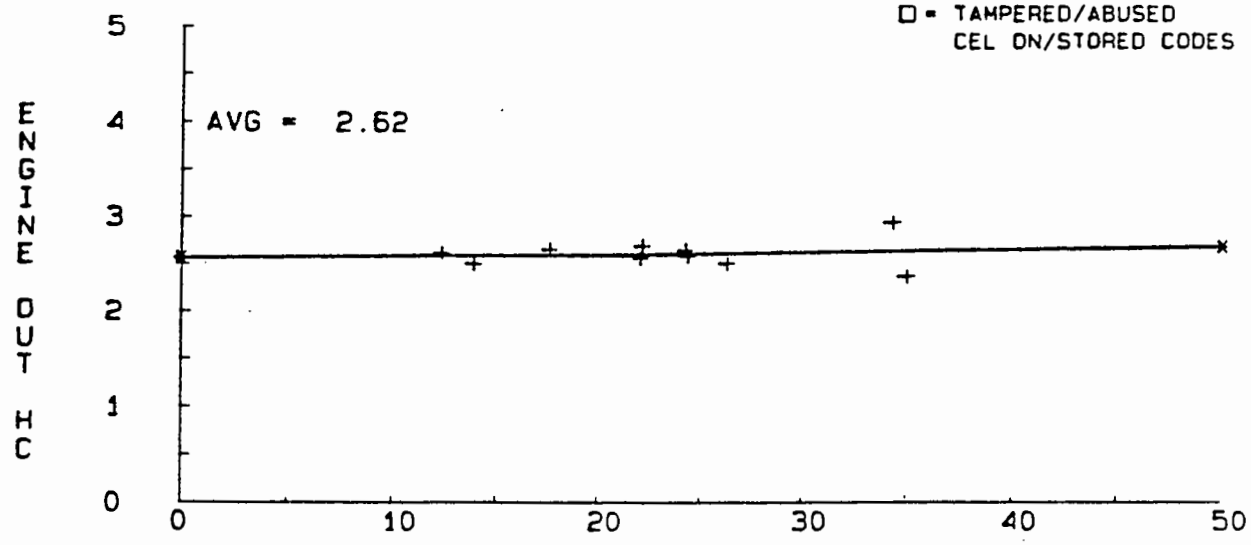
TESTED AT VAN NUYS

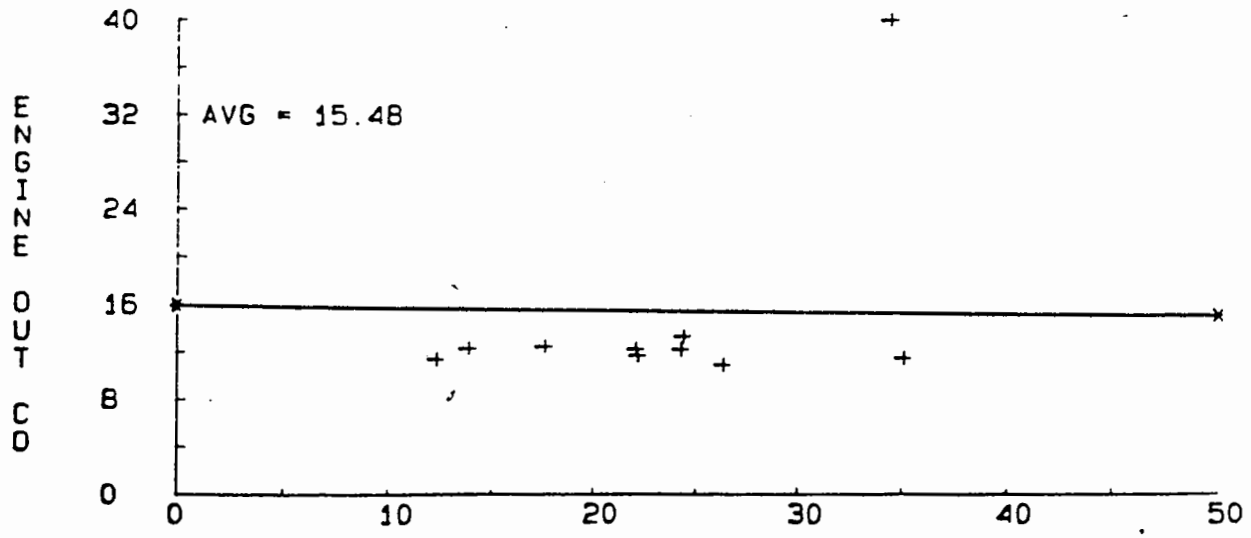
2ND/3RD YEARS OF SERVICE

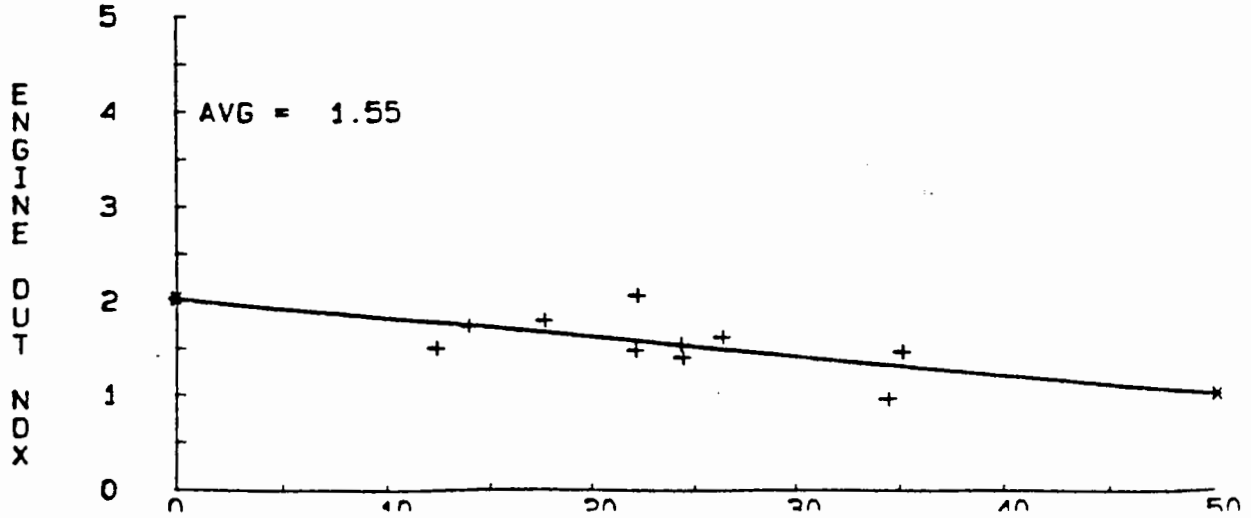
10 OBSERV.

GM CONFIDENTIAL

□ = TAMPERED/ABUSED
CEL ON/STORED CODES







AVG!

GM REALITY CHECK - CUSTOMER CARS

09-04-1995

ENGINE FAMILY P1G4.6W8XEB8

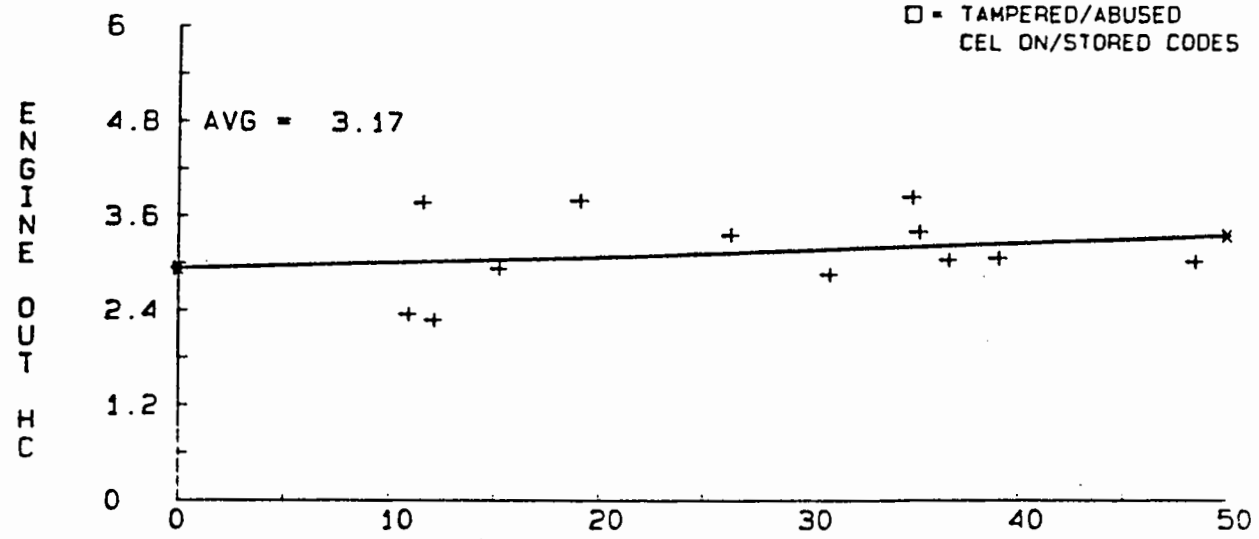
TESTED AT VAN NUYS

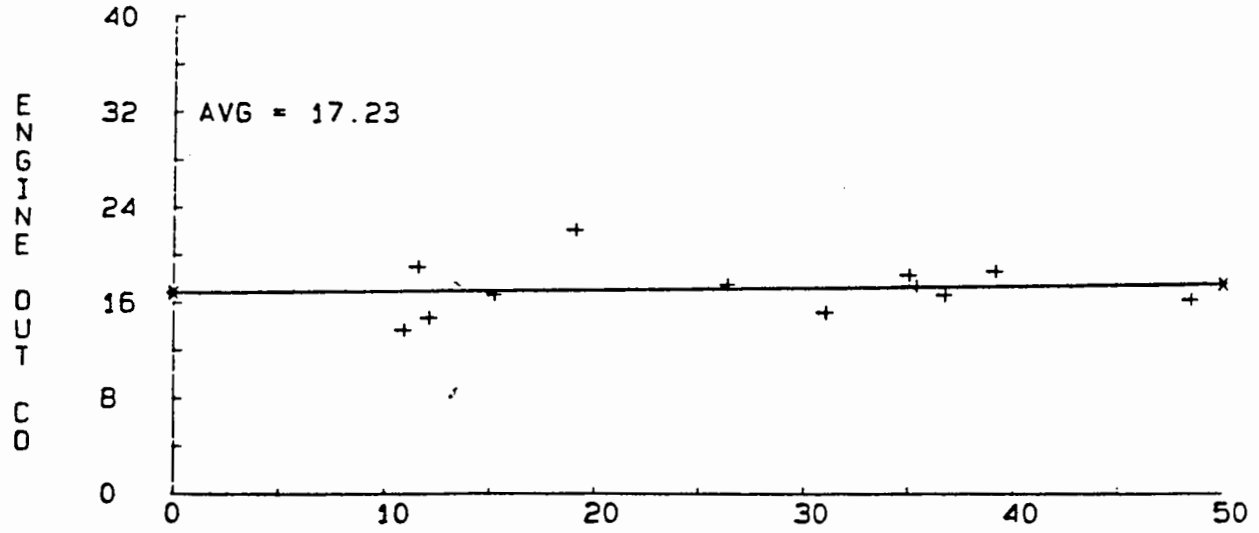
2ND/3RD/4TH YEARS OF SERVICE

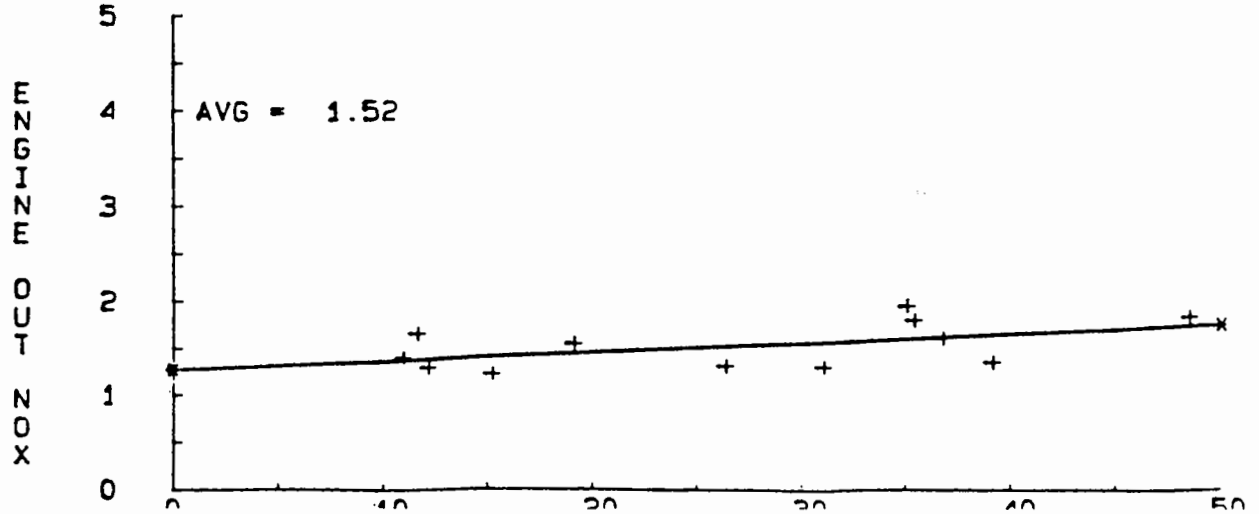
12 OBSERV.

GM CONFIDENTIAL

□ = TAMPERED/ABUSED
CEL ON/STORED CODES







App Tab 6

GM REALITY CHECK - CUSTOMER TRUCKS

09-04-1996

ENGINE FAMILY P3G4.3X5XG3B

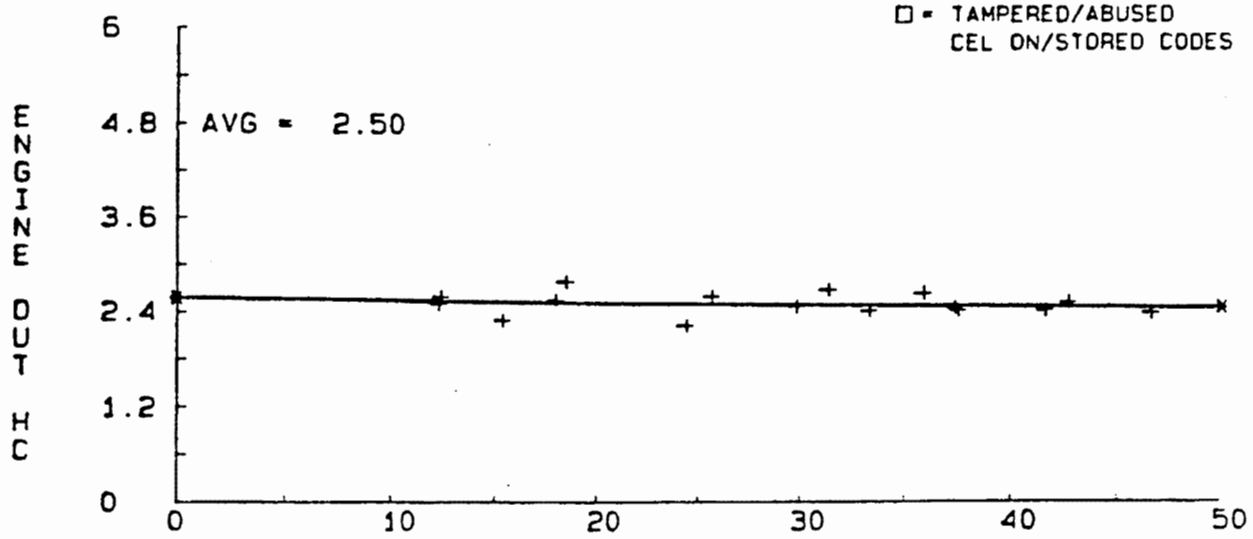
TESTED AT VAN NUYS

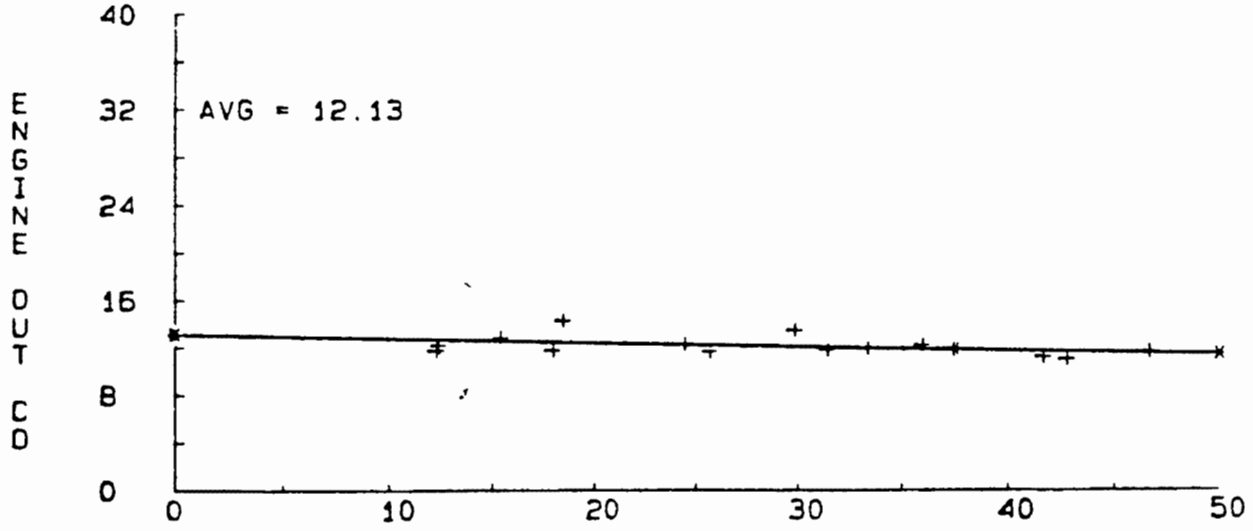
2ND/3RD/4TH YEARS OF SERVICE

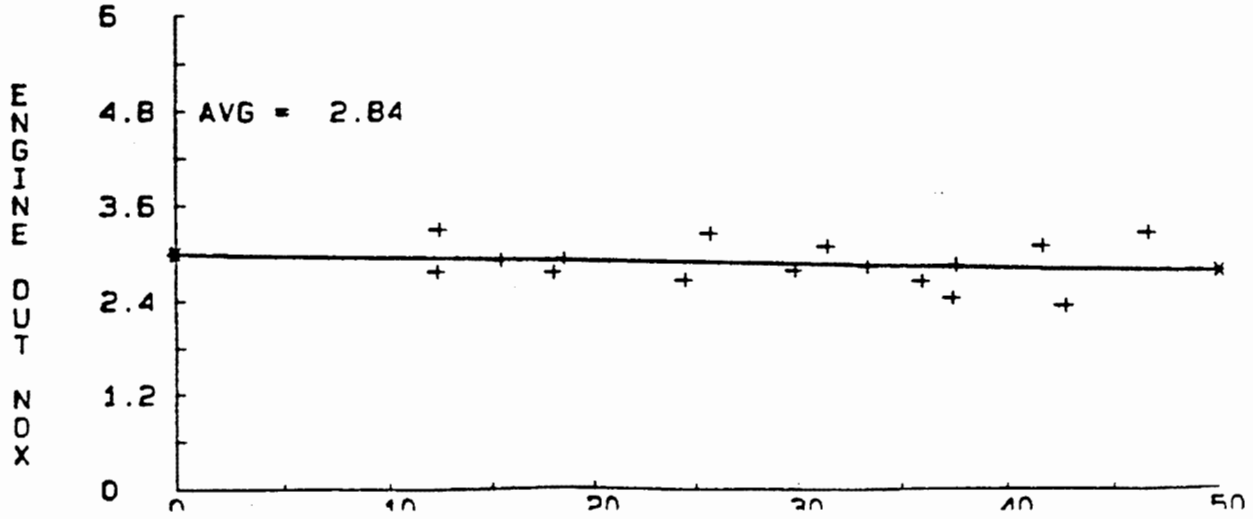
16 OBSERV.

GM CONFIDENTIAL

□ = TAMPERED/ABUSED
CEL ON/STORED CODES







A007

GM REALITY CHECK - CUSTOMER TRUCKS 09-05-1995

ENGINE FAMILY P3G5.7X5XG59

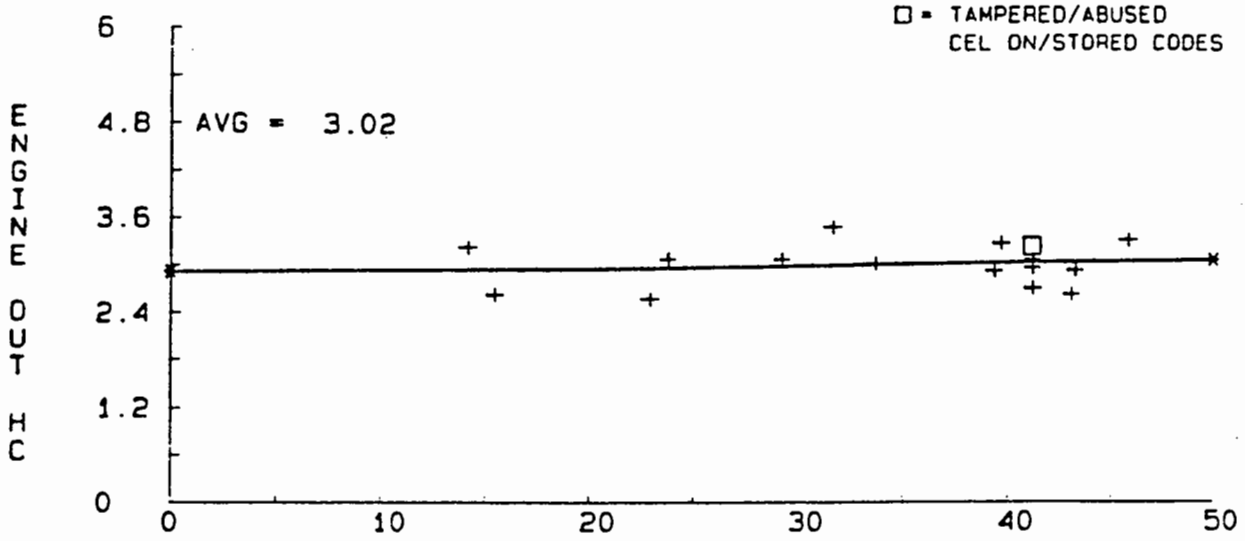
TESTED AT VAN NUYS

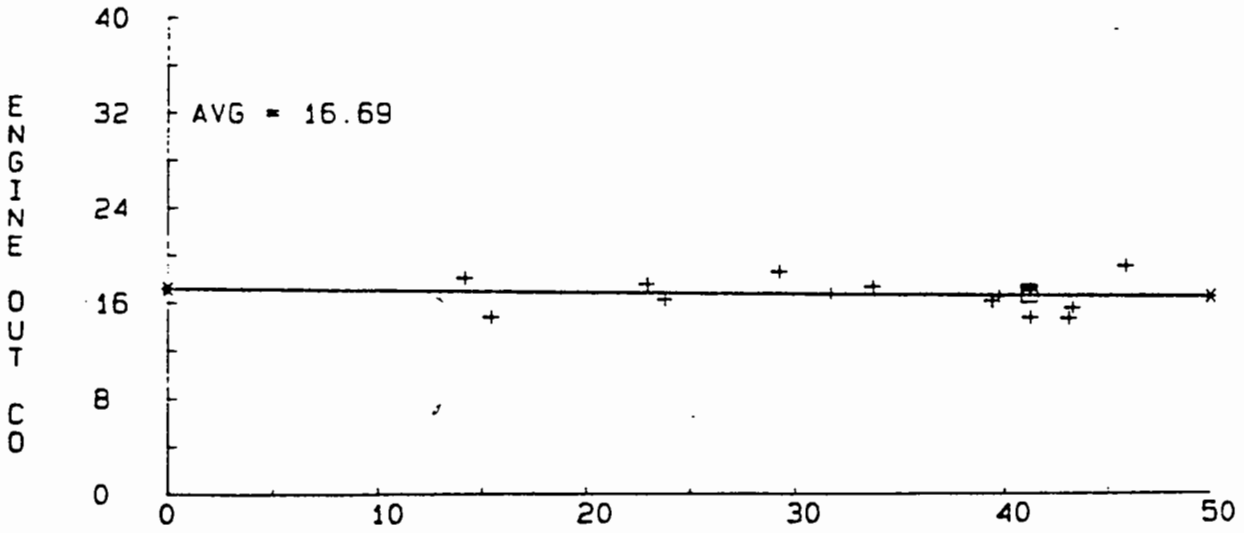
2ND/3RD/4TH YEARS OF SERVICE

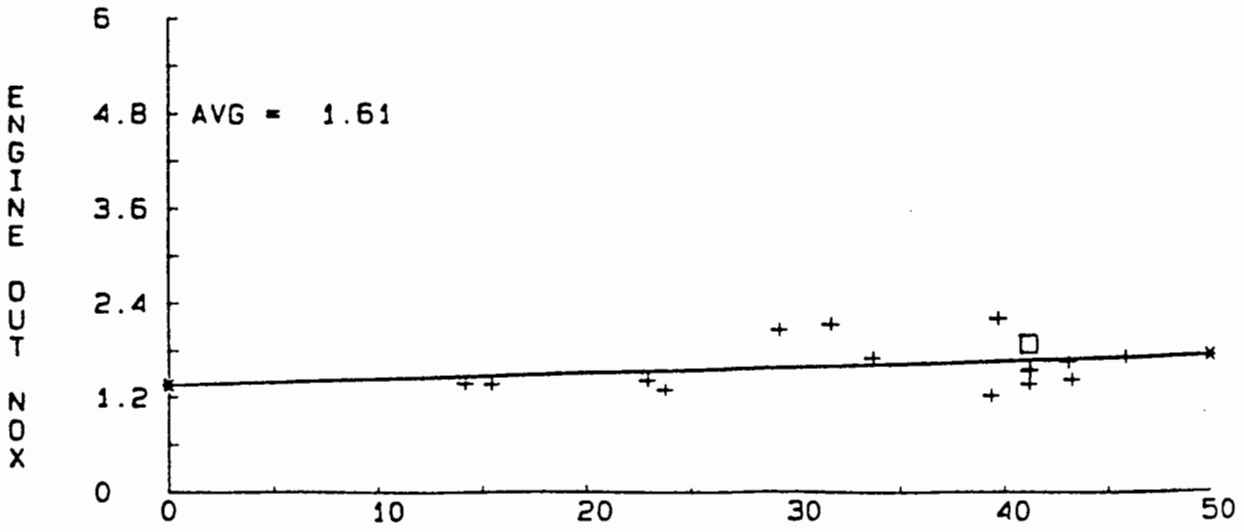
16 OBSERV.

GM CONFIDENTIAL

□ = TAMPERED/ABUSED
CEL ON/STORED CODES







AppTo8

GM REALITY CHECK - CUSTOMER CARS

09-04-1996

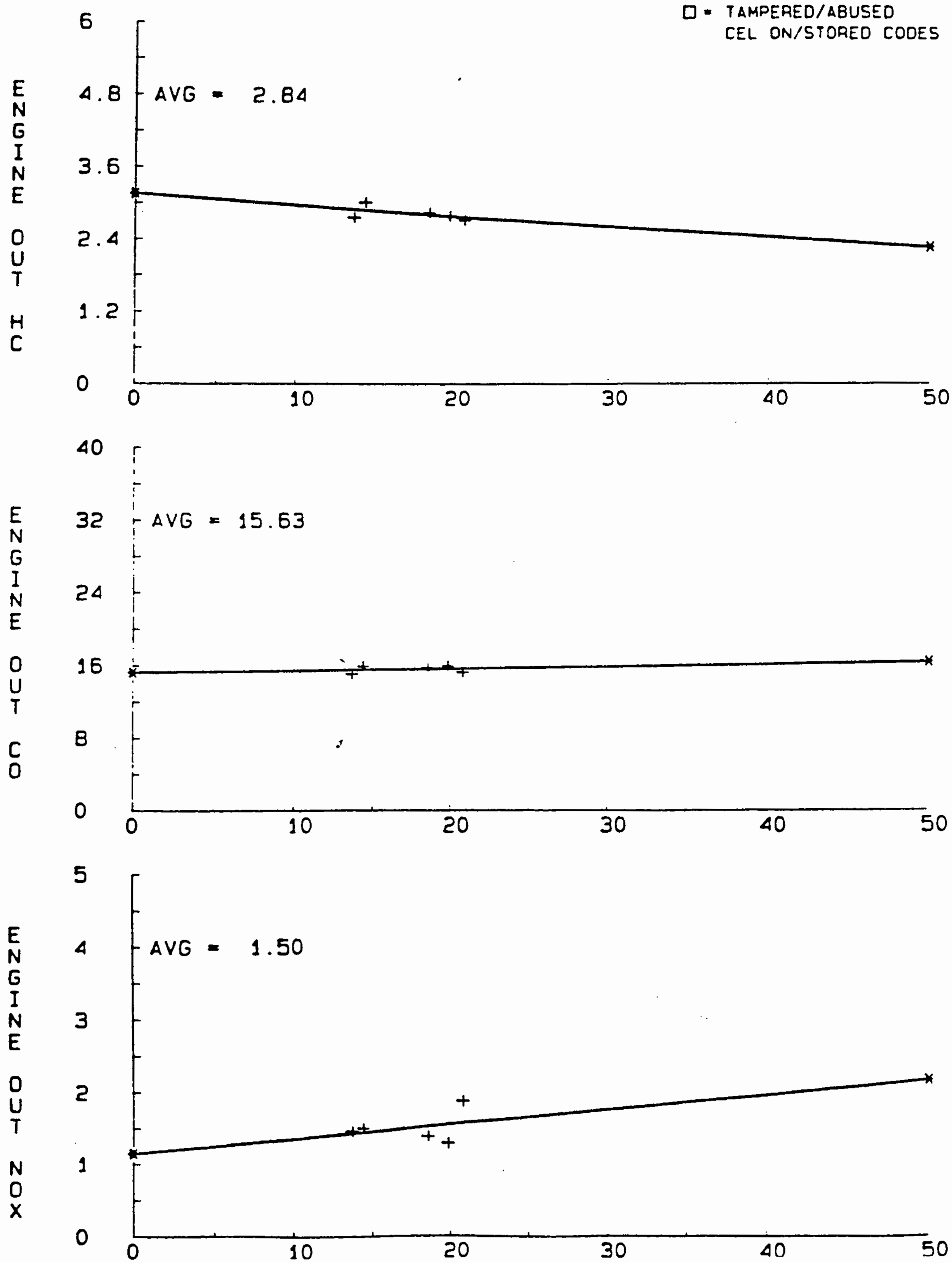
ENGINE FAMILY R1G4.9V8G1EA

TESTED AT VAN NUYS

2ND YEAR OF SERVICE

5 OBSERV.

GM CONFIDENTIAL



App I p 9

GM REALITY CHECK - CUSTOMER CARS

09-04-1996

ENGINE FAMILY R1G2.2V7G2EA

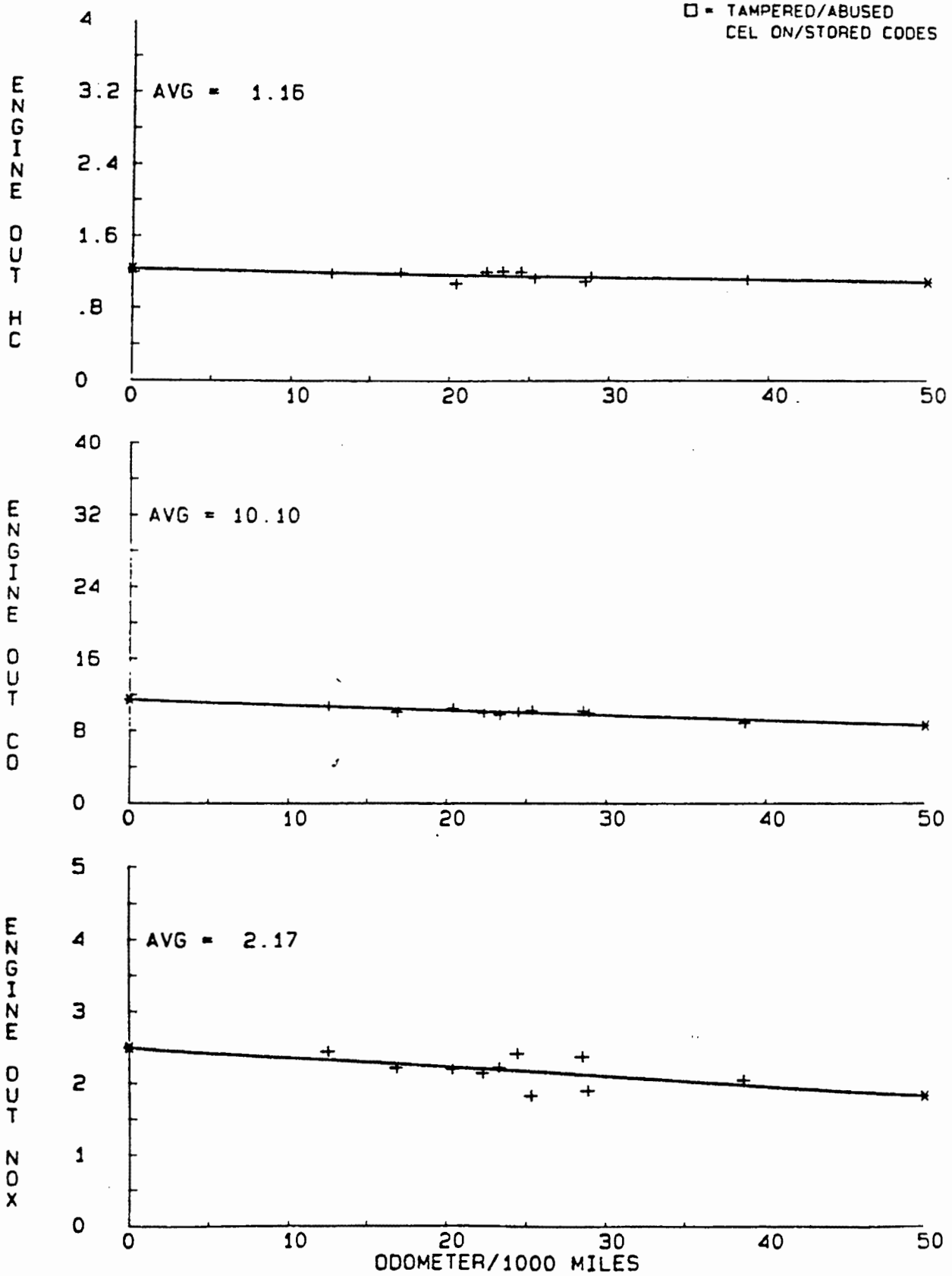
TESTED AT VAN NUYS

2ND/3RD YEARS OF SERVICE

10 OBSERV.

GM CONFIDENTIAL

□ = TAMPERED/ABUSED
CEL ON/STORED CODES



Appl.D

GM REALITY CHECK - CUSTOMER CARS

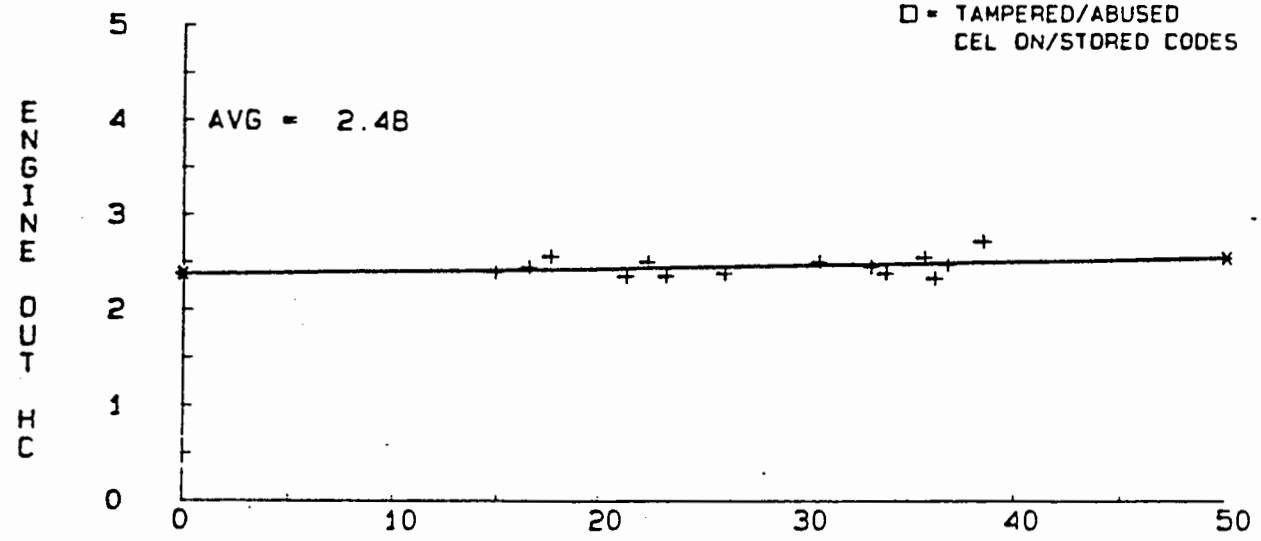
09-05-1996

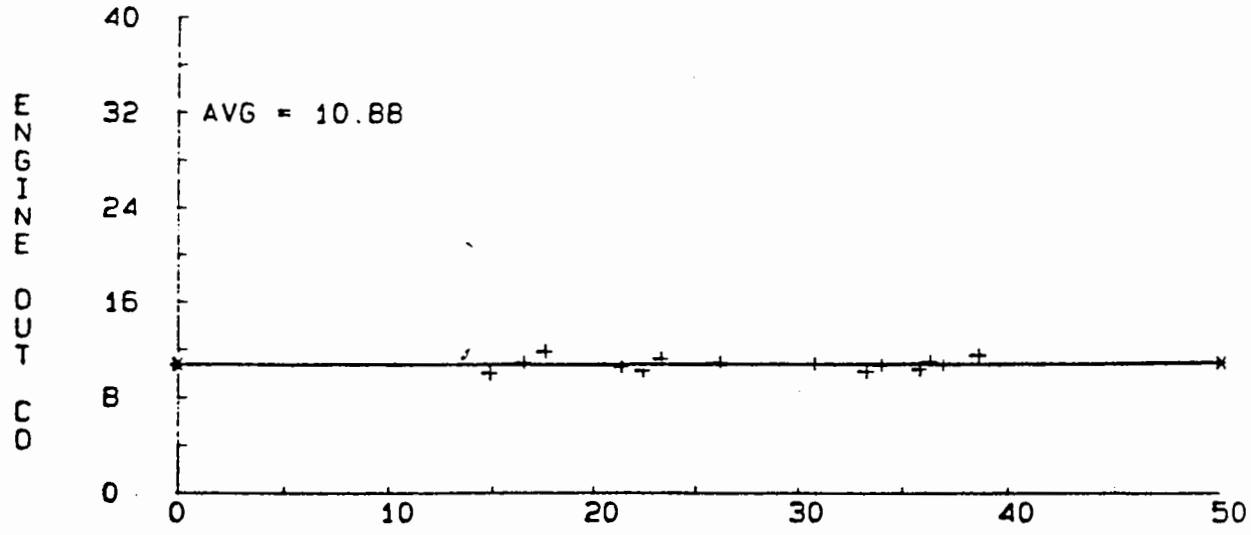
ENGINE FAMILY R1G3.1V8GFEA
TESTED AT MILFORD / VAN NUYS
2ND/3RD YEARS OF SERVICE

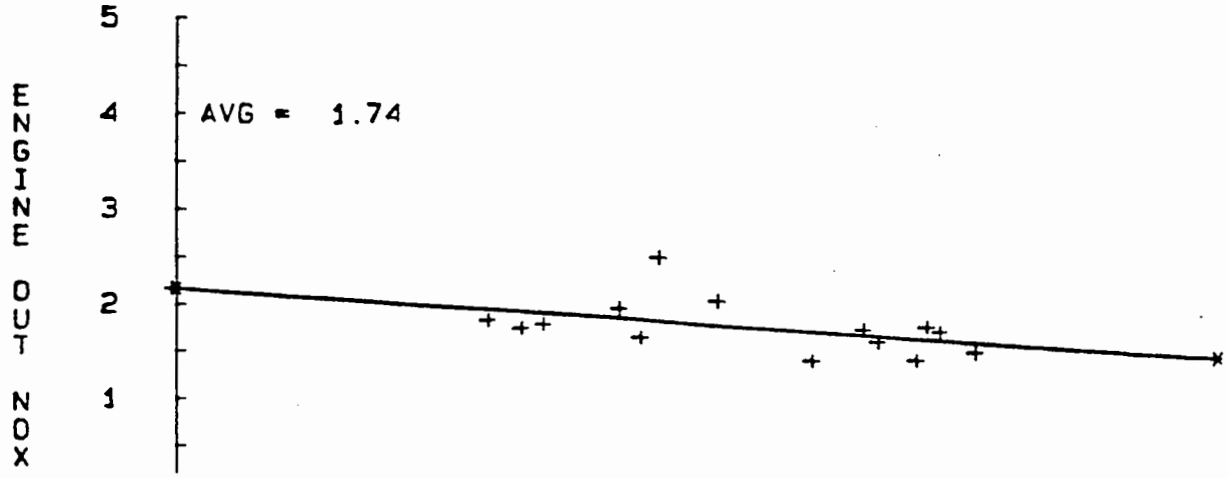
14 OBSERV.

GM CONFIDENTIAL

□ = TAMPERED/ABUSED
CEL ON/STORED CODES







Rod Ball

GM REALITY CHECK - CUSTOMER CARS

09-04-1996

ENGINE FAMILY R1G4.6VJG1EA

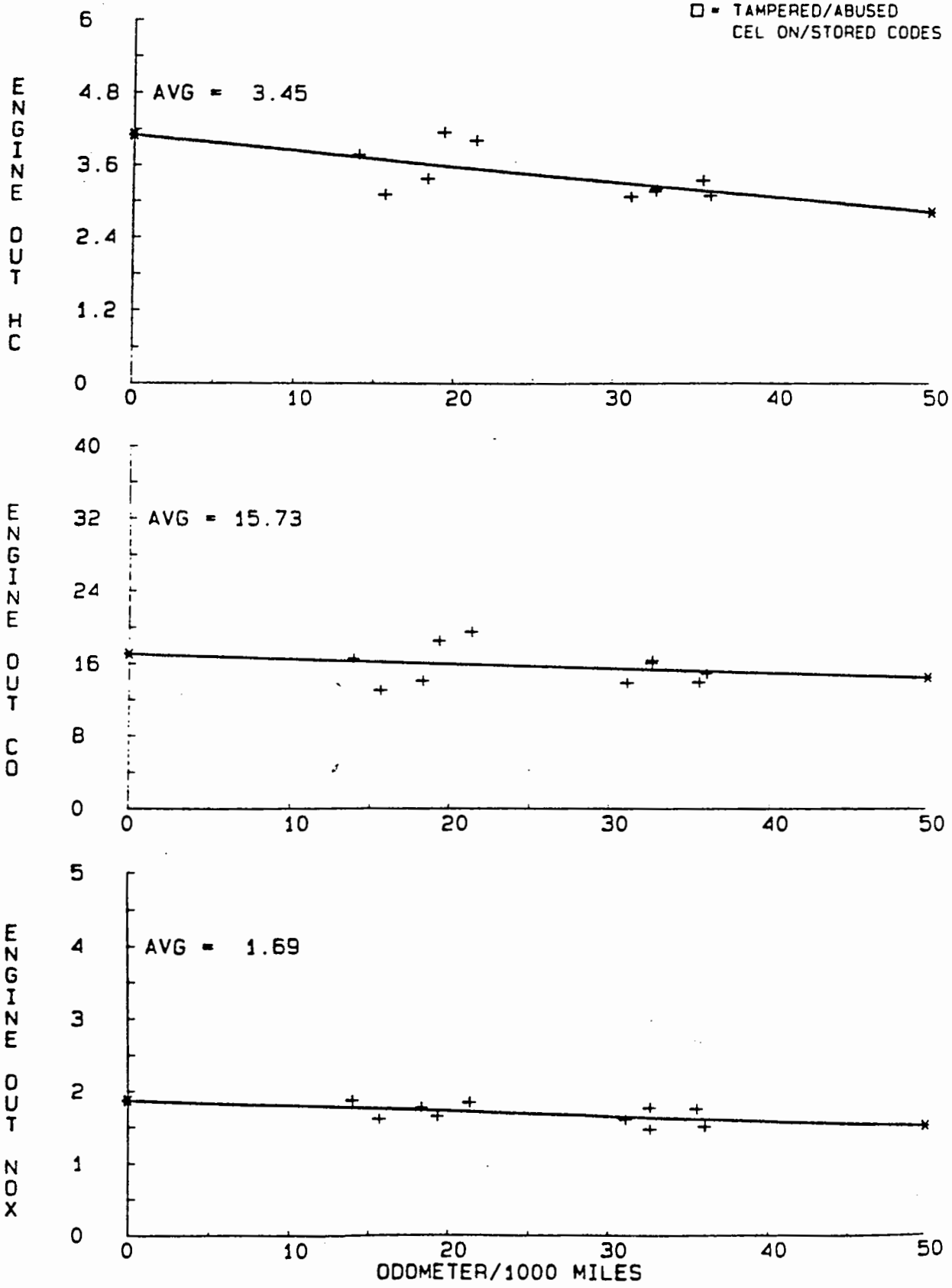
TESTED AT VAN NUYS

2ND/3RD YEARS OF SERVICE

10 OBSERV.

GM CONFIDENTIAL

□ = TAMPERED/ABUSED
CEL ON/STORED CODES



A00

Cal/EPA
California Environmental Protection Agency

Air Resources Board
HAAGEN-SMIT LABORATORY
P.O. Box 8001
9528 Telstar Avenue
El Monte, CA
91734-8001

Pete Wilson
Governor

James M. Strock
Secretary for Environmental Protection

Reference No. C-96-072

OCT 17 1996

Mr. R. C. Harvey
Project Manager
Powertrain Control Center
GM Proving Ground
General Motors Corporation
Milford, MI 48380-3726

Subject: Reality Check Engine-Out Emission Testing

Dear Mr. Harvey:

This is in response to your letter ML-GM489 to the Air Resources Board (ARB) requesting approval of General Motors' (GM's) plan to discontinue engine-out emission testing for the in-use reality check of GM's Alternative Durability Process.

Based on our review of your submitted engine-out emission data from 1992-94 model-year California-certified engine families, the ARB considers that overall the engine-out emissions are stable over the useful life of the vehicles. Thus, GM's request is hereby approved.

If you have any questions, please contact Mr. Duc Nguyen, Manager, or Mr. Shewen Chen, Certification Staff, Certification Section at (818) 575-6661.

Sincerely,

R. B. Summerfield, Chief
Mobile Source Operations Division

Post-it™ brand fax transmittal memo 7671	# of pages ▸
To Steve Fogle	From S. Chen
Co GM	Co. CARB
Dept.	Phone #
Fax # 997-5551	Fax #

Ron To

GM POWERTRAIN

October 22, 1996

ML-GM494

Mr. R. B. Summerfield, Chief
Mobile Source Operations Division
Haagen-Smit Laboratory
P.O. Box 8001
9528 Telstar Avenue
El Monte, CA 91734-8001

Post-it® Fax Note 7671	Date 10-22-96	# of pages ▶ 4
To Shewen Chen	From Jim Kourt	
Co./Dept. CARB	Co. GM	
Phone #	Phone #	
Fax #	Fax #	

Dear Mr. Summerfield:

Subject: Alternate Durability Process (ADP) Vehicle Engine-Out Emission Testing

One of the original assumptions of the GM ADP is that engine-out emissions are stable over the useful life of the vehicle. In the original ADP agreement reached between GM and CARB, GM agreed to conduct engine-out emission testing on the ADP durability data vehicle (DDV).

Recently, GM requested and received CARB approval to eliminate engine-out emission testing of reality check vehicles (reference attached GM letter ML-GM489 and CARB letter C-90-072).

On October 21, 1996, in a telephone conversation with Mr. Shewen Chen of your staff, I requested permission to eliminate engine-out emission testing on any current and future GM ADP DDV's. There should be no reason to continue this requirement since the reality check engine-out testing has been eliminated. Mr. Chen gave verbal approval to discontinue the engine-out emission testing on a 1998 model year 5.7L MDV ADP DDV that is currently at the low mileage test point. Mr. Chen further instructed me to send the CARB a letter formally requesting the elimination of ADP engine-out testing.

GM requests that the CARB approve this change to the GM ADP by approving the elimination of ADP DDV engine-out emission testing.

Please call if you have any questions regarding this request.

Sincerely,

J. M. Kourt
Project Manager
Powertrain Control Center

JMK/ks
Attachments

APPROVED
Air Resources Board
Mobile Source Division
CERTIFICATION SECTION
By Shewen Chen
Title AR Engineering Assc. Date 10/22/96

Dan T p 14

GM POWERTRAIN

October 22, 1996 ML-GM494

Mr. R. B. Summerfield, Chief
Mobile Source Operations Division
Haagen-Smit Laboratory
P.O. Box 8001
9528 Telstar Avenue
El Monte, CA 91734-8001

Post-it® Fax Note 7671	Date 10-22-96	# of pages ▶ 4
To Shewen Chen	From Jim Kourt	
Co./Dept. CARB	Co. GM	
Phone #	Phone #	
Fax #	Fax #	

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Sincerely,

J. M. Kourt

J. M. Kourt
Project Manager
Powertrain Control Center

JMK/ks
Attachments

ADP Tab 15

ATTACHMENTS TO GM LETTER ML-GM494

GM LETTER ML-GM489

CARB LETTER C-96-072

Appt.

GM POWERTRAIN

September 30, 1996 ML-GM489

Mr. D. Nguyen
Mobile Source Division
Air Resources Board
9480 Telstar Avenue
Suite #4
El Monte, CA 91731

Dear Mr. Nguyen:

Subject: Reality Check Engine-Out Emission Testing

One of the original assumptions of the ADP program is engine-out emissions are stable over the useful life of the vehicle. General Motors agreed to conduct engine-out testing on ADP program customer vehicles to prove this assumption.

As part of our ADP reality check process agreement, GM has been conducting engine-out testing on our 1992-94 California certified engine families. Based on 1992-94 model year reality check data (attached), GM believes it is now appropriate to discontinue this engine-out testing requirement.

The elimination of engine-out testing would save us test time and allow for quicker turnaround of the customer vehicle.

We request CARB to please respond with your approval for allowing us to discontinue the engine-out testing of reality check vehicles.

If you have any questions, please feel free to call me at your convenience on 810/685-6976.

Sincerely,

R. C. Harvey

R. C. Harvey
Project Manager
Powertrain Control Center

RCH/SAF/ks
Attachments

Appl

Cal/EPA
California Environmental Protection Agency

Air Resources Board
HAAGEN-SMIT LABORATORY
P.O. Box 8001
528 Telstar Avenue
El Monte, CA 91734-8001

Pete Wilson
Governor

James M. Strock
Secretary for Environmental Protection

Reference No. C-96-072

OCT 17 1996

Mr. R. C. Harvey
Project Manager
Powertrain Control Center
GM Proving Ground
General Motors Corporation
Milford, MI 48380-3726

Subject: Reality Check Engine-Out Emission Testing

Dear Mr. Harvey:

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Sincerely,

R. B. Summerfield, Chief
Mobile Source Operations Division

Post-it™ brand fax transmittal memo 7671	# of pages ▸
To Steve Fogle	From S. Chen
Co. GM	Co. CARB
Dept.	Phone #
Fax # 997-5551	Fax #

App I p 18

CHRYSLER CORPORATION

Chrysler Corporation CIMS 482-00-81
Chrysler Technology Center

January 30, 1998

Ms. Jane Armstrong, Director
Certification Division
U.S. Environmental Protection Agency
2565 Plymouth Road
Ann Arbor, Michigan 48105

Dear Ms. Armstrong

Re: Change Chrysler's Alternative Durability Process to Eliminate Engine-Out Emissions Testing on Reality Check Vehicles

Chrysler Corporation's currently approved Alternative Durability Process (ADP) includes a requirement to measure engine out emissions during reality check testing. This emissions measurement was added at the request of the agency staff, and was consistent with the requirements for other manufacturers at the time that Chrysler's process was approved. Subsequently, it has been learned that both EPA and CARB have modified their position on the requirement for engine out emissions measurements on ADP reality check vehicles.

On August 28, 1997, Chrysler petitioned CARB to eliminate engine out emissions requirements from its reality check programs and received approval from CARB on September 23, 1997. At this time, Chrysler is petitioning EPA, with supporting data, for approval to eliminate engine out emissions for Chrysler's federal ADP reality check vehicles.

Chrysler's and most other ADP aging processes are based on the hypothesis that engine-out emissions remain stable throughout a vehicle's useful life. For this reason, the process concentrates on bench aging catalytic convertors and using these with aged O_2 sensors on stable vehicles to develop our deterioration factors. Other main stream engineering durability processes demonstrate the mechanical durability of components. The table below is a synopsis of some supporting data that supports our ADP hypothesis. These data are based on the attached summary of 34 in-use fleet vehicles (Tier 0 level through prototype LEV).

Average % Emissions		HC	CO	NOx
Increase	(4K - 50K) =	-4.3%	4.7%	-11.9%
	(4K - 100K) =	-2.6%	0.8%	-8.6%

These data show that engine out HC and NOx, on average, are less at 100K than at 4K, and CO shows a very small increase (less than 1% at 100K). We believe that these data confirm that engine out emissions data is not needed on ADP reality check vehicles. There are also other reasons why Chrysler believes that engine out emissions should not be measured on customer owned ADP reality check vehicles. These follow:

App I p 19

- Vehicle modifications are very difficult to make on many production vehicle configurations. This is especially true on packages that use close coupled catalytic converters.
- More extensive vehicle modification adds time to the process, and it is desirable to minimize the time that customer owned vehicles are involved in the reality check program.
- Modifications which involve installation of probes into the system increase the possibility of exhaust leaks.
- Collecting additional emissions data introduces complexity and increases the chances for testing error and subsequent retests.
- Test facility and engineering resources requirements are reduced.

Chrysler would appreciate prompt consideration of this request.

If you have any questions concerning this request please feel free to call me at (248) 576-7363.

Sincerely,

CHRYSLER CORPORATION

E J Kanigowski

Edward J. Kanigowski
Certification Planning Specialist
Vehicle Certification Programs

REVIEWED AND ACCEPTED
DATE 2-3-98 EPA REP

PPS/EJK:sr
Attachment

EJK/adp

A00I020

Tier 0 thru LEV Prototype Engine-Out (E.O.) Deterioration Comparison

MY	Market	Engine	Fuel Sys.	Class	Trans.	# of vvls.	Emission Level	E.O. - 4/5K miles (gpm) HC	CO	NOx	E.O. - 45-50K miles (gpm HC	CO	NOx	E.O. % Increase 4-50K HC	CO	NOx	E.O. - 100K miles (gpm) HC	CO	NOx	E.O. % Increase 4-100K HC	CO	NOx
'85	Fed	2.2L	HTBI	PC	A	2	Tier 0	2.4	10.6	2.1	2.0	10.6	2.1	-14.0	0.0	0.0						
					M	7		3.3	10.2	2.2	3.6	12.3	2.5	10.1	20.6	13.4						
'85	50-S	2.2L Turbo	MPI	PC	M	8		3.0	14.8	2.3	2.8	14.8	2.4	-4.4	0.0	0.4						
'86	Fed	2.2L	TBI	PC	M	2		3.4	17.4	1.6	4.0	15.8	1.1	18.9	-9.2	-27.4						
'86	Cal	2.2L	TBI	PC	A	3		2.4	8.3	2.0	2.2	12.2	1.5	-5.9	47.0	-23.7						
'86	Fed	2.5L	TBI	PC	A	3		2.1	10.6	1.5	2.4	11.1	1.3	14.6	4.7	-15.1						
					M	3		3.0	14.6	1.8	2.9	16.3	1.7	-5.3	11.6	-3.9						
'86	50-S	2.2L Turbo	MPI	PC	A	5		1.5	13.0	2.9	1.4	15.2	1.7	-10.0	16.9	-40.1						
'87	Fed	2.5L	TBI	PC	A	4		1.9	11.8	1.3	1.8	9.7	1.1	-6.3	-17.8	-17.6						
					M	3		2.7	14.7	1.4	2.6	13.8	1.5	-4.4	-6.1	7.2						
'87	50-S	2.2L Turbo	MPI	PC	A	3		1.4	11.6	2.7	1.3	11.8	2.5	-6.4	1.7	-7.1						
					M	2		2.1	14.5	2.5	2.3	14.0	1.5	11.0	-3.4	-40.7						
'87	Fed	3.0L MMC	MPI	LDT	A	5		2.7	9.2	2.8	2.3	12.2	2.1	-12.4	32.6	-23.8						
'88	Fed	2.2L	TBI	PC	A	2		2.3	9.3	1.9	1.9	11.4	2.2	-19.2	22.6	16.3						
					M	2		3.1	12.7	1.6	2.3	13.9	1.6	-26.0	9.4	-1.8						
'88	50-S	2.2L Turbo	MPI	PC	A	3		1.6	14.7	3.7	1.4	16.6	3.1	-14.8	12.9	-15.8						
'88	Fed	2.5L	TBI	PC	A	4		1.8	9.9	2.3	1.6	6.6	2.6	-11.0	-33.3	13.8						
'88	Fed	3.0L MMC	MPI	PC	A	5		2.4	9.1	2.5	2.1	11.2	1.3	-14.5	23.1	-47.0						
'88	50-S	3.0L PRV	MPI	PC	A	3		3.1	11.9	2.8	2.8	11.0	1.1	-9.2	-7.6	-60.4						
'88	Fed	2.5L	TBI	LDT	A	4		2.0	10.4	2.4	1.7	12.8	1.5	-18.3	23.1	-38.9						
'89	Cal	3.0L MMC	MPI	PC	A	3		2.3	10.7	2.5	2.0	12.8	2.2	-12.1	19.6	-13.8						
'89	50-S	2.5L Turbo	MPI	LDT	A	4		1.4	15.2	5.2	1.5	16.1	5.0	8.7	5.9	-4.8						
Non-production		3.0L MMC	MPI	PC	A	2		2.2	11.0	5.9	1.9	8.2	4.3	-15.8	-25.5	-27.4						
Non-production		3.0L MMC	MPI	PC	A	2		2.1	10.0	2.3	2.2	10.0	2.2	4.8	0.0	-4.3						
Non-production		3.0L MMC	MPI	PC	A	2		2.0	9.0	2.0	2.1	10.0	1.8	5.0	11.1	-10.0						
'92	Cal	2.5L	TBI	PC	A	5		1.8	9.2	2.7	1.9	8.4	2.4	5.6	-8.7	-11.1						
'92	Cal	3.3L	MPI	PC	A	4		3.1	10.0	2.2	2.8	10.0	1.8	-9.7	0.0	-18.2						
Non-production		3.0L MMC	MPI	LDT	A	4	Tier 1	2.6	11.1	3.6	2.4	12.1	2.9	-7.6	9.7	-18.8	2.6	11.2	2.6	-2.7	1.5	-27.6
'90	Cal	3.3L	MPI	PC	A	5		2.5	11.0	2.1	2.6	11.0	2.0	4.0	0.0	-4.8	*2.4*	*11.6*	*1.9*	-4.0	0.0	-9.5
'95	Fed	3.5L	MPI	PC	A	4		2.5	12.5	2.5	2.4	13.2	2.2	-4.9	5.6	-9.3	2.2	12.2	2.3	-11.7	-2.4	-7.3
Non-production		3.3L FFV	MPI	PC	A	7		2.5	9.7	2.0	2.7	9.6	2.2	8.0	-1.0	10.0	2.7	10.1	2.2	8.0	4.1	10.0
Non-production		3.3L	MPI	LDT	A	5	LEV	1.4	11.1	1.6	1.4	11.5	1.6	-0.7	3.6	3.2						
Non-production		2.4L DOHC	MPI	PC	A	5		1.2	11.5	2.4	1.1	10.8	2.7	-10.6	-6.1	12.0						
Non-production		2.0L SOHC	MPI	PC	A	5		1.1	9.4	2.3	1.2	9.1	2.4	7.1	-3.2	3.4						

	HC	CO	NOx
Avg. % emissions increase (4-50K) =	-4.3	4.7	-11.9
Avg. % emissions increase (4-100K) =	-2.6	0.8	-8.6

(*) = 75K miles only

NEWEODB2.XLS

SRM 04/10/97

Appendix II

Why is a New Durability Cycle Necessary?

- AMA was probably appropriate on precatalyst vehicles (1968 - 1975+) where changes in engine operation were the sole source of emission deterioration
- AMA cycle was not designed to provide representative catalyst thermal deterioration (insufficient higher catalyst temperatures)
- Surveillance data shows that actual dfs are larger than the AMA certification df
- The manufacturer determined df program for trucks also has higher in-use df's
- Most approved ASAP cycles stress higher catalyst deterioration.

Certification Division **Slide No. 1**

Goals of the SMA

- Represent driving conditions which are reasonably expected to be encountered by vehicle customers,
- Generate emission DFs representative of in-use.
- Assure 100K durability of emission control components.
- Consider the balance between schedule concerns and the time to complete testing.
- Cycle & mileage accum fuel specs are compatible with future technologies and fuels.
- Consider the needs of smaller manufacturers.

Certification Division **Slide No. 2**

Attach 1

Applicability of the SMA Cycle

- Applies to Cars and Trucks (the manufacturer determined df program for trucks will be discontinued).
- Manufacturers which are not prepared to implement an ASAP.
- Manufacturers which have failed an ASAP and choose to revert to the SMAP.
- Available for EDV mileage accumulation.

Certification Division Slide No. 3

Development of the SMA Cycle

- We collected road data from vehicles run using several possible cycles which were more severe than the AMA.
- We analyzed the catalyst temperatures experienced in different modes of operation.
- We considered information provided for ASAP approvals.
- We considered information collected from the revised FTP in-use driving studies. It is not our intention, however, to match the survey results since this is an accelerated cycle.

Certification Division Slide No. 4

Results of Our On-Road Testing

•Parameter	Effect on Catalyst Temperature
• Engine RPM	Major effect; high RPM promoted high catalyst temps
• Downshifts	Major effect; (same as engine RPM)
• Vehicle speed	Major effect; high speeds promoted high catalyst temps
• Acceleration rate	Major effect; high accels promoted high catalyst temps
• Idles	Major effect; usually promoted the lowest catalyst temps
• Closed throttle decels	Variable; promoted higher catalyst temps on 2 vehicles
• Vehicle test load	Moderate effect; high loads promoted high temps
• Cold starts	Moderate effect; higher catalyst temps on warm-ups
• Throttle fluctuations	Moderate effect
• Hot starts	Very little effect
• Ambient Conditions	Very little effect
• Fuel	Very little effect

•• No operational or overheating problems were encountered with any of the vehicles.

Certification Division Slide No. 5

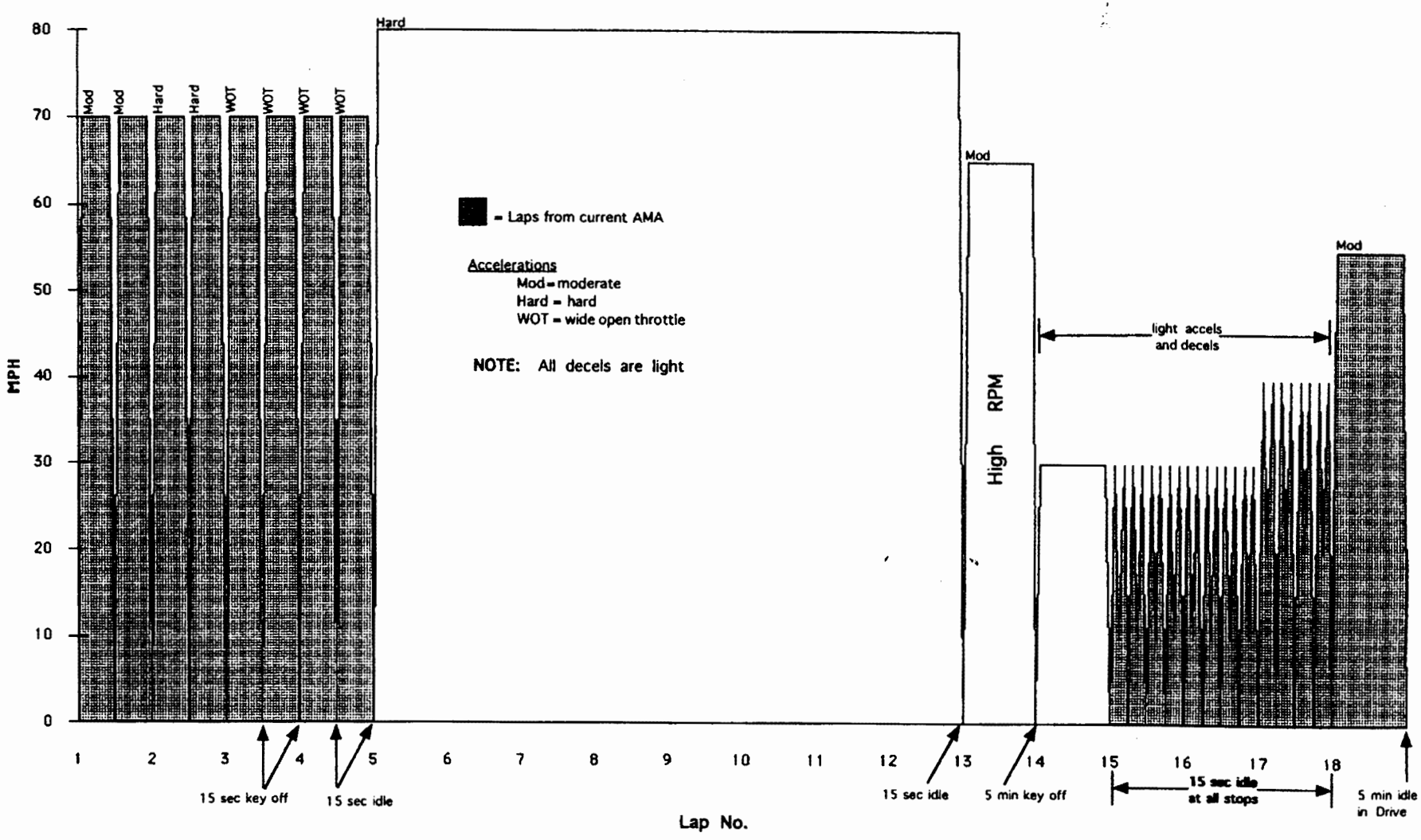
The Proposed Cycle

Lap	Base Speed	No. of Stops	Time/ Stop	Accel Rate	Ave. Speed*	Comments
1	70	2	0 sec	Mod	55 mph	
2	70	2	0 sec	Hard	56 mph	
3	70	2	15 sec	WOT	48 mph	Key off for stops
4	70	2	15 sec	WOT	48 mph	
5	80	0	NA	Hard	74 mph	
6	80	0	NA	NA	80 mph	
7	80	0	NA	NA	80 mph	
8	80	0	NA	NA	80 mph	
9	80	0	NA	NA	80 mph	
10	80	0	NA	NA	80 mph	
11	80	0	NA	NA	80 mph	
12	80	1	15 sec	NA	66 mph	
13	65	1	5 min	Mod	58 mph	Key off 5 minutes
14	30	1	15 sec	Light	28 mph	
15	30	4	15 sec	Light	21 mph	5 Decels to 10 mph
16	30	4	15 sec	Light	21 mph	5 Decels to 10 mph
17	40	4	15 sec	Light	25 mph	5 Decels to 20 mph
18	55	1	5 min	Mod	51 mph	Idle for 5 minutes

*Includes 15 sec stops but not 5 min. idle or 5 min. key off.

Certification Division Slide No. 6

Description of Proposed
Standard Mileage Accumulation Cycle



Appx P4

Overview of the Proposed SMA Cycle

Types of Operation	**COMMENTS**
Vehicle Speed - 35% increase in average speed	Reduces time duration to complete 100K miles
	Higher power requirements and engine exhaust temperatures.
	Reduced AF control would contribute to richer mixtures and more catalyst activity.
Accelerations - number of higher rate accelerations increases significantly	Fuel enrichment as a function of A/F control
	Raise power requirements
	Engine wear
Decelerations - Closed throttle from higher speeds	Fuel shut off/lean operation - higher catalyst temperature.
	All deceleratons are light to prolong acceleration mode and reduce tire wear.
Engine RPM - downshift operation	Potential for increased oil consumption/contaminate catalyst (reduces catalyst efficiency)
	Lean operation
	Engine wear
Idles (Key on) and Stops (Key off)	Hot starts/vapor problems/fuel metering. Canister purging
	Exercise computer memory/time delays
City Driving concept retained from current (AMA approx. 50% of driving time)	Provides operation for many engine emission components at an increased rate of frequency and low stress (low power requirements). An attempt to not put all our emphasis on just catalyst thermal deterioration.
Specific load requirements - ALVW	Increases power requirements (F = mass X accel.) at all rates of acceleration and speed.
	Increases engine exhaust temperatures.
Cold Soaks	Not included in current AMA. Proposed on the basis that higher emission levels during cold start operation will contribute to emission system deterioration.
Specify a quantitative measure for acceleration rates	Should contribute to improved test program repeatability.

App II.

Other SMA Provisions

- Mileage accumulation will be at ALVW ((Curb + GWR)/2).
- A full 100K mileage accumulation will be required; we will eliminate 75K data projections.
- 100 Cold Starts will be required during 100k accumulation.
- We do not intend to allow modifications to the SMA cycle that would reduce the top speed. This means that SMA cannot be run on public roads. It must be run on a closed track or dynos.
- The current Truck DF procedures will be discontinued.

Certification Division Slide No. 9

Cycle Statistics - Mileage Accum.

	SMA	AMA
Average Speed (mph)	41.4	30.7
No. of 3.7 mile laps	18	11
Miles per cycle	66.6	40.7
Hours per cycle	1.61	1.33
No. of Cycles	1501 (100K)	1229 (50K)
Hours Required	2415 (100K)	1628 (50K)
Hours of Idle & Hot Soak	356 (100K)	184 (50K)
15 sec idle	106	184
5 min idle	125	0
5 min hot soak	125	0

Certification Division Slide No. 10

Appll p1

Cycle Statistics - Accelerations

Acceleration	Mod. AMA (100K)	AMA(50K)
Light:		
from stop	19,513	45,454
from 10 mph	15,010	0
from 20 mph	7,505	55,282
Moderate:	6,004	0
Hard	4,503	0
WOT:	6,004	2,457
Total	54,036	103,193

Certification Division Slide No. 11

Cycle Statistics - Idles & Stops

Event		Mod. AMA (100K)	AMA(50K)
Idles (Drive)	(15 sec)	25,517	44,244
(5 min)		1501	0
Total		27,018	44,244

Event		Mod. AMA (100K)	AMA(50K)
Key-Off:	(15 sec)	3002	0
	(5 min)	1501	0
Total		4503	0

Certification Division Slide No. 12

App II-9

Cycle Statistics - Time for 100K

The average speed, number of cold starts, and time required to complete durability testing are shown below for the AMA schedule and the SMA schedule. Assumptions include a 24 hour-per-day work schedule, 6 days-per-week, 2 days per test (evaporative test not required), as follows:

			Time Required for 100K (months)		
	Average	Cold	6 Day	6 Day	Cold
Schedule	Speed	Starts	Dyno	Road	Start
AMA	30.7	NA	7.2	8.6	NA
SMA	41.4	100	5.6	6.9	0.3*

* Note: On a 6-day week, 1 test / 10K work effort, about 50 cold starts occur naturally

Certification Division **Slide No. 13**

Reality Checks for SMA

- The type of data collected and the testing procedures will be the same as for ASAPs.
- We will require less data than for the ASAP cycles, but some minimum number of vehicles and some minimum distribution of configurations over the test years will be required. *For example, 3 vehicles tested years 2 to 5.*
- The pass/fail criteria are expected to be the same as (or at least similar to) those specified for ASAPs. *There is still some development required to adapt the ASAP criteria to SMA use.*

Certification Division **Slide No. 14**

Small Mfr Considerations

- We will continue to have assigned df available for a total of 10,000 sales.
- We will allow manufacturers to use the SMA without a reality check for a limited number of sales. The limit will be 10,000 sales reduced by the number sales which use an assigned df. The total sales exempted from reality checks plus the sales which use assigned dfs are limited to a combined total of 10,000 sales.

Consequences of an Individual Family Failing a Reality Check

$$\text{Correction factor} = \frac{\text{Reality Check DF Statistic*}}{\text{SMA DF}}$$

* EPA is considering two options:
- 70% lower confidence value
- XX% of the difference

The factor would be applied to the df generated by the SMA cycle which failed. A failing individual SMA durability df could be carried-over by applying this factor.

Consequences of a Trend Data Reality Check Failure

- If a manufacturer fails the reality check based on the trend data of all his families run on the SMA, the correction factor will be the average of all the manufacturer's individual family values.
- This factor would apply to current and future SMA durability showings.
- Manufacuturer could apply to EPA for a new trend study if they can explain a significant change in their process. If the study showed that there was no trend failure the factor would be rescinded.

Certification Division Slide No. 17

Industry-Wide Correction Factor

- EPA may calculate an Industry-Wide Correction Factor
  - •• It will be based on circumstances explained in the regulations.
  - •• Adequate advance notice would be given before the correction factor is applied.

Certification Division Slide No. 18

Appt p 10

Carryover of SMA DF and Reality Checks

- EPA will consider the carryover of the DF and the reality check data separately.
- The DF carryover will be considered using current policy (or updates to the policy).
- If significant changes are made or new products are added to the sales mix of the configurations which were outside the original breadth considered when the reality check fleet was chosen, EPA may require that a full or partial reality check be conducted on carryover families.

App II p

Appendix III

Released per ED Call to D. Good

GM POWERTRAIN

May 12, 1998

ML-TG147A

cc:
LH
EAB
PK (Andy B)

FYI
Dave Good
5/28/98

Ms. Jane Armstrong, Director
Vehicle Programs & Compliance Division
Office of Mobile Sources
U.S. Environmental Protection Agency
2565 Plymouth Rd.
Ann Arbor, MI 48105

Dear Ms. Armstrong:

Subject: 1996 Model Year Reality Check Emission Test Data

General Motors Corporation submits the attached completed in-use verification (reality check) emission test data for engine family TGM2.4VJGKEK.

This last test of engine family TGM2.4VJGKEK now completes all of the 1996 model year second year of service testing requirements (data previously reported in our letter ML-TG147).

Please call Steve Fogle of my staff on (248) 685-5145 if you have any questions regarding this information.

Sincerely,

Stephen A. Fogle for

R. C. Harvey
Manager
Compliance & Certification

RCH/SAF/ks
Attachment
c: D. J. Good

App III p 1

Compliance & Certification • M/C 483-331-500 • GM Proving Ground • Milford, Michigan 48380-3726

FEDERAL REALITY CHECK SUMMARY

1996 SECOND YEAR OF SERVICE

GM CONFIDENTIAL

ENG FAMILY	TEST DATE	MILES	TAILPIPE NMHC	CO	NOx
TGM2.4VJGKEK		IU STD	0.25	3.4	0.4
1G2NE12T9TM505184	11/25/1997	13,906	0.07	1.0	0.18
1G2NE12T6TM557548	11/26/1997	14,319	0.11	2.5	0.18
1G1JF52TXT7103342	12/4/1997	19,605	0.12	2.0	0.10
1G2NE52T1TM552295	12/4/1997	20,436	0.12	2.4	0.33
1G2NE52T4TM523051#	4/28/1998	22,844			
RETEST	4/29/1998	22,859	0.10	2.0	0.40

- TEST ABORTED - FUEL CAP LEFT OFF DURING COLD SOAK

SAF/GMPT 5/12/1998

App III p 2

Release for 8/12 Call to W.H.

cc: Andy B (Pete K)

Hand out at 12/11/97 GM/EPA Preview Mtg.

FEDERAL REALITY CHECK SUMMARY
1994 MODEL YEAR
FOURTH YEAR OF SERVICE

GM CONFIDENTIAL

FYI

Dave

ENG FAMILY	TEST DATE	MILES	TAILPIPE NMHC	CO	NOx
12/19/97 **R1G2.2V7GFEA**					
R1G2.2V7GEEA - MAN TRANS ($)					
VIN		IU STD	0.32	3.4	0.4
1G1JC144XR7165954$	5/14/1997	58,636	1.11	9.9	0.17
RETEST@	5/20/1997	58,662			
RETEST#	5/20/1997	58,670			
RETEST%	5/29/1997	58,696	0.82	7.4	0.15
RETEST&	6/5/1997	58,733	0.09	1.4	0.37
1G1JC1448R7194272*	5/15/1997	32,398	0.09	1.3	0.66
RETEST(1)	5/16/1997	32,425	0.64	9.7	0.16
RETEST(2)	5/22/1997	32,452	0.64	8.2	0.16
RETEST(3)	5/29/1997	32,484	0.69	11.8	0.16
RETEST(4)	6/4/1997	32,516	0.11	1.6	0.14
1G1LV1548RY303177	5/15/1997	36,725	0.11	2.1	0.25
1G1JC1443R7151149	5/15/1997	47,961	0.13	2.0	0.43
1G1JC5449R7198046	5/16/1997	39,637	0.07	1.6	0.36

3/5

@ - TEST INVALID - HEAT BUILD TO TEST SITE EXCEEDED TIME - SITE ANALYZER PROBLEM
# - TEST INVALID - BENCH OPERATOR ENTERED EPAII INSTEAD OF EPAIII
% - AFTER PERFORMING DIAGNOSTICS FOR MIS-FIRE AND INSTALLING NEW SPARK PLUGS
& - AFTER REPLACING THE EGR VALVE
* - AS RECEIVED - CODE 32 STORED (SIGNAL HOSE DISCONNECTED AT VALVE) AND OIL CRANKCASE 2-2.5 QUARTS OVERFULL
(1) - RECONNECTED EGR HOSE
(2) - AFTER OIL AND FILTER CHANGE
(3) - AFTER PERFORMING DIAGNOSTICS FOR MIS-FIRE AND INSTALLING NEW SPARK PLUGS FOUND NO. 4 PLUG WET WITH OIL
(4) - AFTER REPLACING THE EGR VALVE

App III p 3

FEDERAL REALITY CHECK SUMMARY
1994 MODEL YEAR
FOURTH YEAR OF SERVICE

GM CONFIDENTIAL

ENG FAMILY	TEST DATE	MILES	TAILPIPE NMHC	CO	NOx
R1G3.1V8GFEA					
VIN		IU STD	0.32	3.4	0.4
1G3WH55M9RD420504	9/9/1997	30,645	0.18	2.7	0.27
1G3WH55M0RD404546	9/9/1997	31,035	0.26	4.2	0.30
RETEST(5)	9/18/1997	31,063	0.20	3.0	0.25
1G1LD55MXRY283976	9/10/1997	31,257	0.22	1.7	0.32
1G2WJ52M9RF257662	9/11/1997	32,296	0.17	2.6	0.32
1G1LD55M9RY120803(6)	9/12/1997	38,731	0.17	2.0	0.28
RETEST	9/16/1997	38,759	0.17	1.7	0.25
1G2NE55MXRC779004	9/25/1997	53,276	0.19	2.2	0.50
1G2WJ12M6RF344220	10/15/1997	37,616	0.19	2.4	0.36

6/7

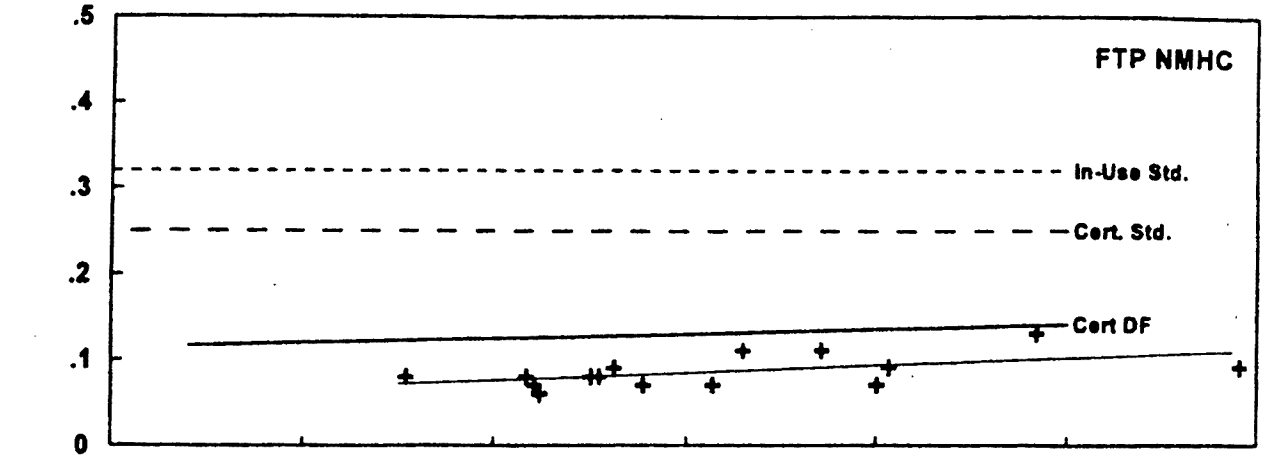
(5) - WITH NEW SPARK PLUGS AND PCV VALVE
(6) - TEST INVALID - DIURNAL FUEL RISE OUT OF SPECIFICATION

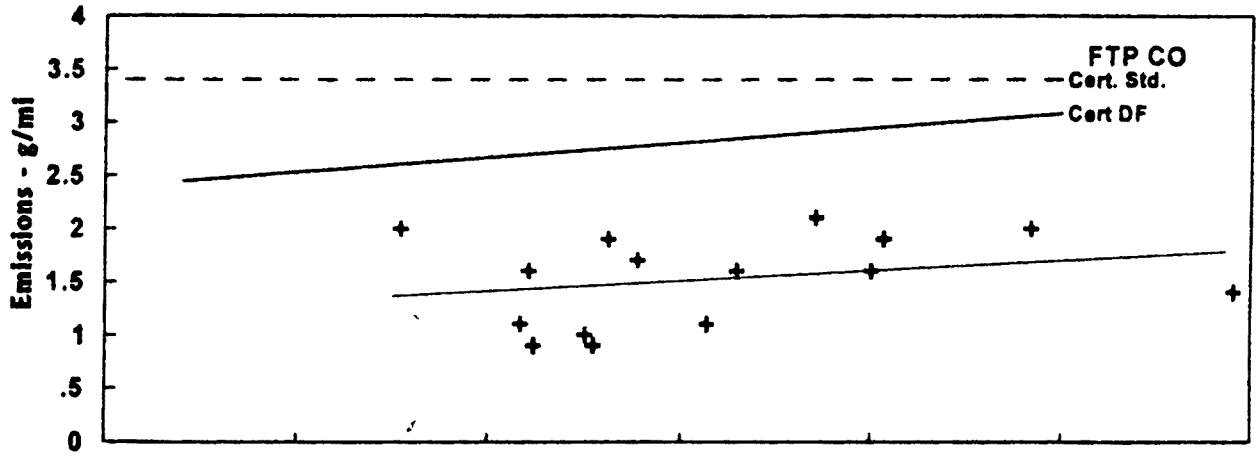
			THC		
R1G4.6VJGAEA					
VIN		IU STD	0.41	3.4	1.0
1G6KS52YXRU828181#	5/15/1997	41,271			
RETEST	5/16/1997	41,285	0.34	1.8	0.40
1G6KS52YXRU803409#	5/15/1997	42,127			
RETEST	5/16/1997	42,143	0.30	2.3	0.29
1G6KF52YXRU313704#	5/16/1997	41,791			
RETEST	5/21/1997	41,806	0.24	1.8	0.28
1G6ET1298RU613717	5/16/1997	50,251	0.21	1.6	0.25
1G6KF52Y5RU288615	5/22/1997	47,144	0.27	1.6	0.43

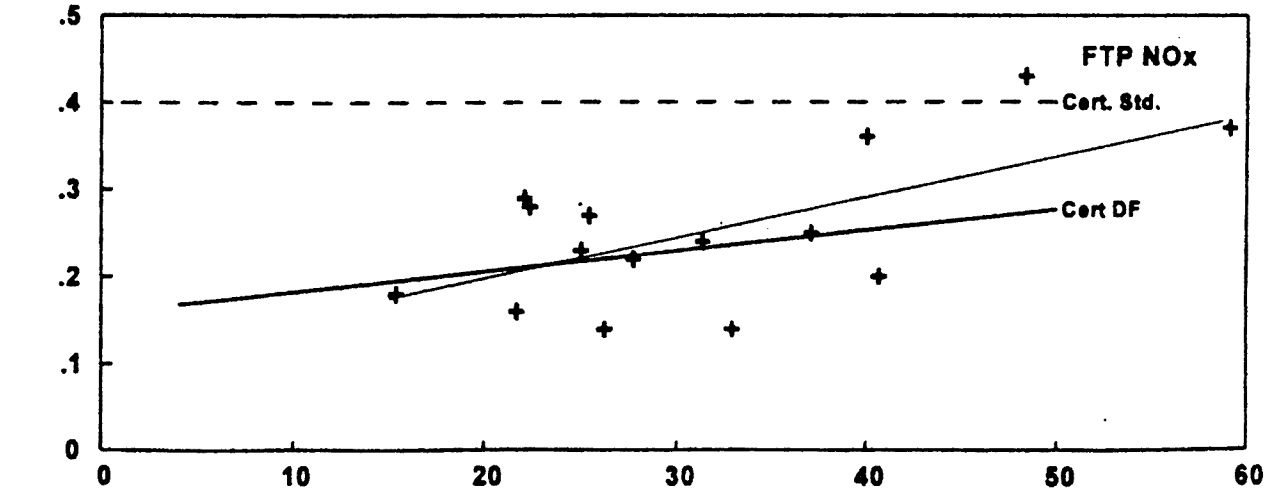
5/5

- TEST ABORTED - TRACTION CONTROL BECAME ACTIVE

Federal Reality Check
Engine Family R1G2.2V7GFEA(Auto) & R1G2.2V7GEEA(Man)
GM CONFIDENTIAL
TAILPIPE EMISSIONS







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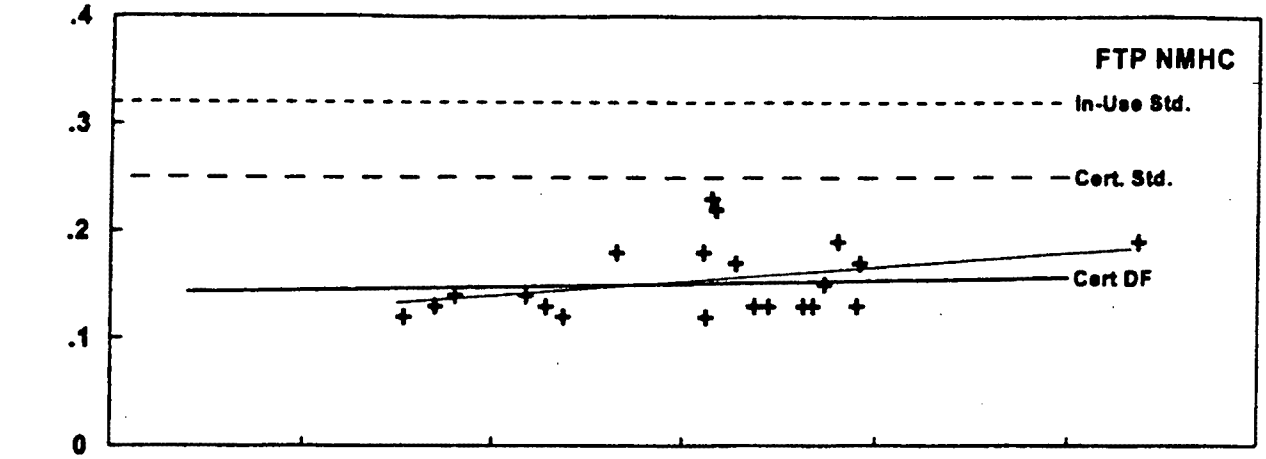
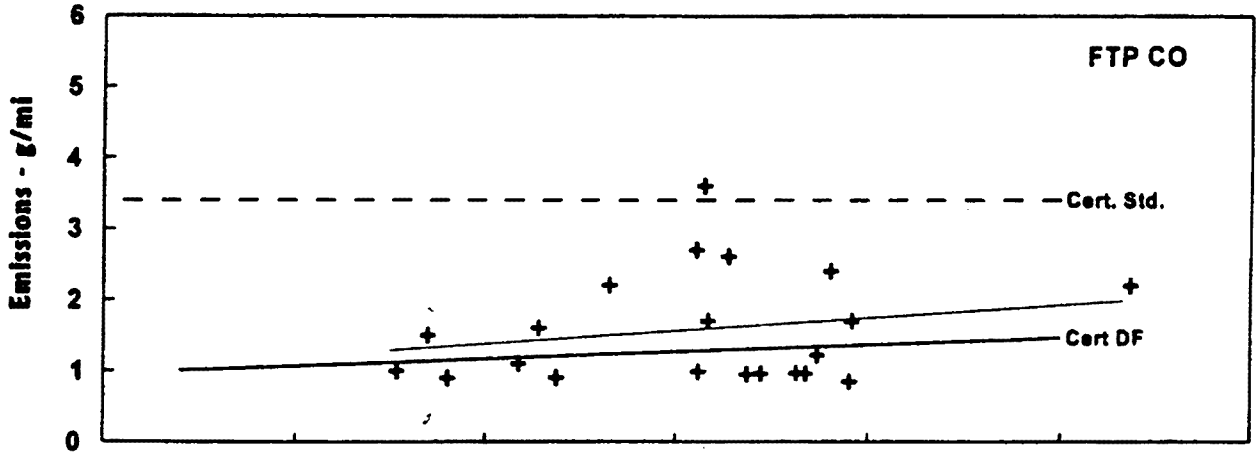
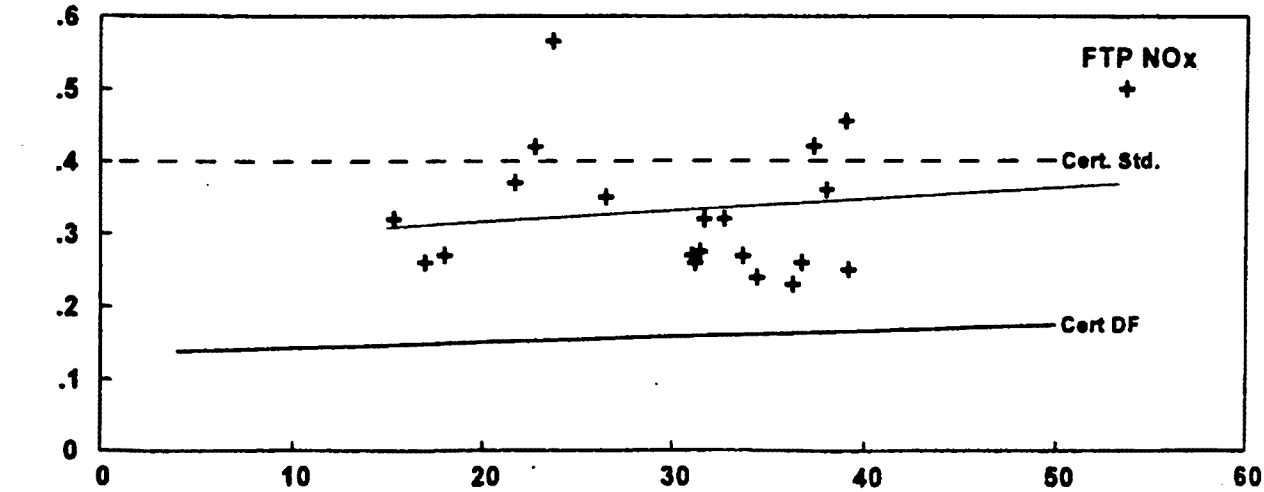
GMPTG/saf 11-21-1997

Doc III 05

California Reality Check
Engine Family R1G3.1V8GFEA
GM CONFIDENTIAL
TAILPIPE EMISSIONS







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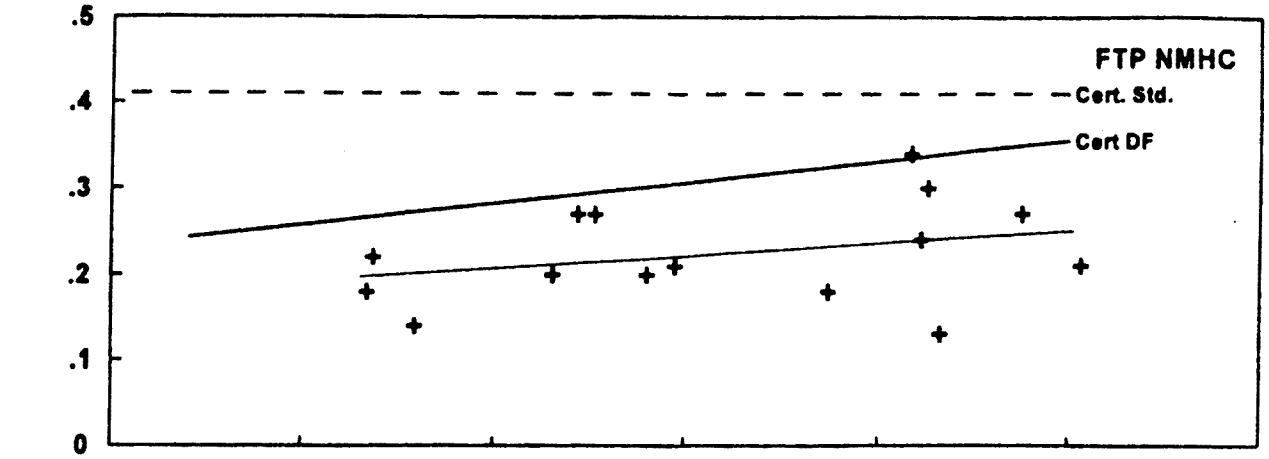
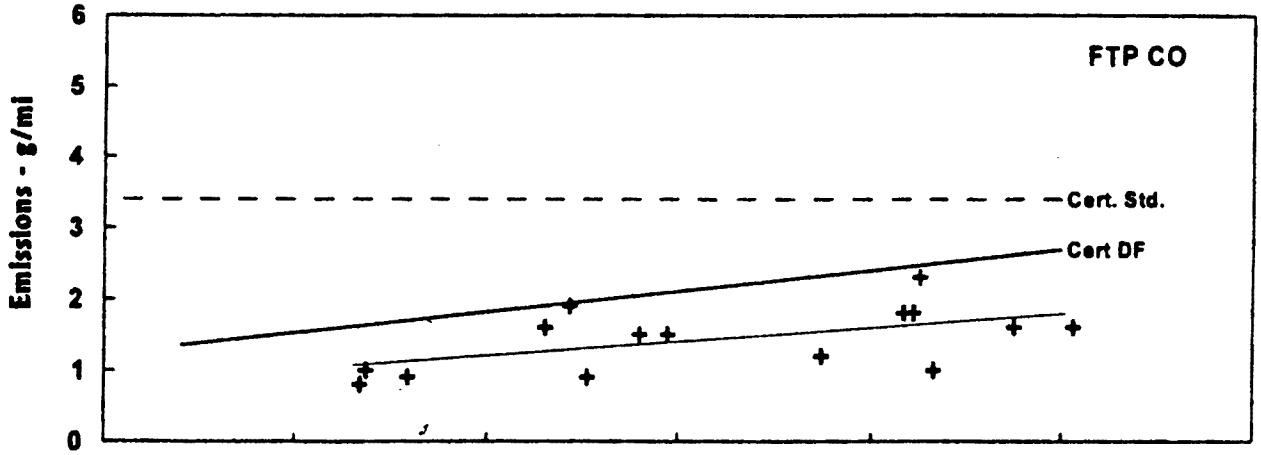
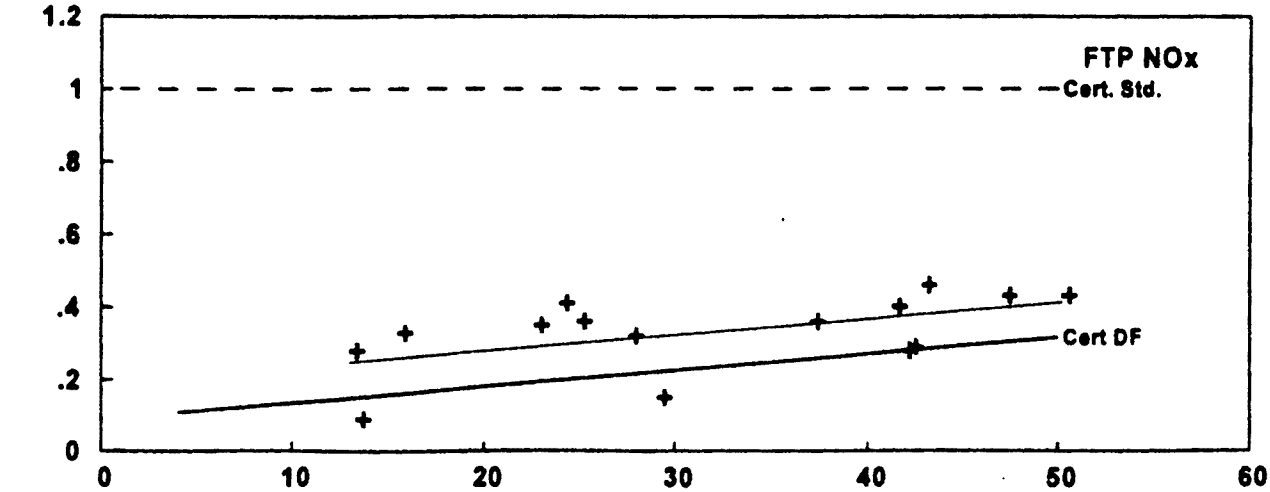
GMPTG/saf 11-21-1997 P

App H

Federal Reality Check
Engine Family R1G4.6VJGAEA
GM CONFIDENTIAL
TAILPIPE EMISSIONS







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GMPTG/saf 12-01-1997

Another

FEDERAL REALITY CHECK SUMMARY

1995 MODEL YEAR

THIRD YEAR OF SERVICE

GM CONFIDENTIAL

ENG FAMILY		MILES	TAILPIPE NMHC	CO	NOx
S1G2.2V7GFEA		IU STD	0.32	3.4	0.4
1G1JC1246S7146679	7/17/1997	41,730	0.07	1.2	0.37
1G1JC1243SM110465	7/22/1997	27,710	0.07	1.1	0.23
1G1LV154XSY300917	7/22/1997	37,432	0.09	1.9	0.32
S1G3.1V8GFEA			0.32	3.4	0.4
1G4AG55M0S6476298	7/22/1997	28,150	0.22	2.3	0.42
S1G4.6V7GFEA					
VIN	TEST DATE		0.32	3.4	0.4
1G6KS52Y0SU835596@	7/29/1997	27,153			
RETEST	7/31/1997	27,176	0.15	2.0	0.41
1G3GR62C4S4135511*	7/21/1997	29,001	0.18	3.1	0.42
RETEST$	7/23/1997	29,037	0.13	1.6	0.35
1G3GR62C7S4135597*	7/18/1997	30,219	0.13	1.6	0.32
RETEST$	7/22/1997	30,246	0.19	2.2	0.32

@ - TEST ABORTED - DIURNAL FUEL TEMPERATURE OUT OF SPEC
* = NORMAL TRANS MODE
$ = PERFORMANCE TRANS MODE

SAF/PCC
REV 10-02-97

App II p 8

FEDERAL REALITY CHECK SUMMARY

1995 MODEL YEAR

SECOND YEAR OF SERVICE

GM CONFIDENTIAL

	TEST DATE	MILES	TAILPIPE NMHC	TAILPIPE CO	TAILPIPE NOx	ENGINE OUT HC	ENGINE OUT CO	ENGINE OUT NOx
ENG FAMILY **S1G4.6V7GFEA**								
VIN		IU STD	0.32	3.4	0.4			
1G6KS52Y6SU835117	6/6/1996	12,934	0.15	0.9	0.34	3.32	13.00	2.18
1G3GR62C6S4146509$	6/10/1996	13,763	0.11	1.0	0.20	3.14	13.12	1.47
1G3GR62C6S4146509*	6/11/1996	13,789	0.13	1.2	0.22	3.16	13.47	1.59
1G3GR52C7S4100696$	6/11/1996	10,885	0.22	2.6	0.11	3.74	18.41	1.52
1G3GR52C7S4100696*	6/12/1996	10,912	0.19	2.3	0.11	3.64	17.79	1.59
S1G2.2V7GFEA								
VIN		IU STD	0.32	3.4	0.4			
1G1JC124XS7120263#								
RETEST	6/7/1996	17,241	0.08	1.7	0.19	1.68	8.81	2.46
1G1JC12R0S7148072&	6/10/1996	11,872	0.12	2.0	0.20	0.72	3.15	0.46
RETEST	6/11/1996	11,898	0.08	1.3	0.14	1.80	8.16	2.07
1G1LV1549SY222601@	6/11/1996	10,765	0.06	1.1	0.18	1.47	8.98	2.39
RETEST	6/14/1996	10,797	0.08	1.6	0.10	1.34	9.39	2.32
S1G3.1V8GFEA								
VIN		IU STD	0.32	3.4	0.4			
1G4AH55M356471979	6/11/1996	14,795	0.26	3.9	0.35	3.05	17.29	2.85
RETEST	6/14/1996	14,840	0.24	2.7	0.33	2.74	14.02	2.74

- INVALID PREP - NO TEST DATA
$ = PERFORMANCE TRANS MODE
* = NORMAL TRANS MODE
& = INVALID - DILUTION AIR LINE DISCONNECTED
@ = CANISTER LINE WAS UNPLUGGED AT SOLENOID

SAF/PCC
REV 03-06-97

App III p 9

CALIFORNIA REALITY CHECK SUMMARY

1994 J CARS

GM CONFIDENTIAL

		TAILPIPE				BAG	ENGINE OUT			SHED		
ENG FAMILY	MILES	NMOG	CO	NOx	HCHO	NMHC	HC	CO	NOx	DIU	SOAK	TC
R1G2.2V7G2EA	IU STD	0.188	3.4	0.4	0.023							2
SECOND YEAR OF SERVICE												
42RCC401*	12,554	0.056	0.9	0.34	0.002	0.055	1.19	10.83	2.44	0.06	0.11	0
RETEST	12,581		1.0	0.39	NA	0.057	1.22	11.04	2.50	NA	NA	
42RCC402*	20,420	0.059	1.2	0.21	0.001	0.059	1.08	10.55	2.19	0.11	0.13	0
42RCC403*&	16,915	0.065	1.1	0.18	0.002	0.065	1.20	10.12	2.21	2.17	1.08	3
RETEST	16,941	0.063	1.3	0.17	0.001	0.063	1.21	10.33	2.13	0.62	0.30	0
42RCC404*	23,338	0.056	0.7	0.21	0.002	0.055	1.22	9.83	2.21	0.08	0.10	0
42RCC405*	25,332	0.054	0.9	0.19	0.001	0.053	1.14	10.32	1.82	0.05	0.09	0.

& - FOUND CANISTER PURGE HOSE OFF AT PURGE SOLENOID

THIRD YEAR OF SERVICE												
43CRCC401*	22,369	0.065	0.9	0.17	0.002	0.063	1.21	10.06	2.13	0.03	0.08	0.
43CRCC402*	38,672	0.068	0.8	0.29	0.002	0.066	1.12	8.94	2.04	0.07	0.08	0.
43CRCC403*	24,474	0.061	0.8	0.19	0.002	0.059	1.21	10.09	2.40	0.05	0.08	0.
43CRCC404*	28,524	0.064	1.2	0.53	0.003	0.063	1.10	10.26	2.36	0.03	0.07	0.
RETEST	28,558	0.063	1.1	0.50	0.002	0.062	1.10	10.11	2.41	NA	NA	
43CRCC405*	28,878	0.063	0.9	0.23	0.002	0.065	1.16	10.04	1.89	0.04	0.08	0.

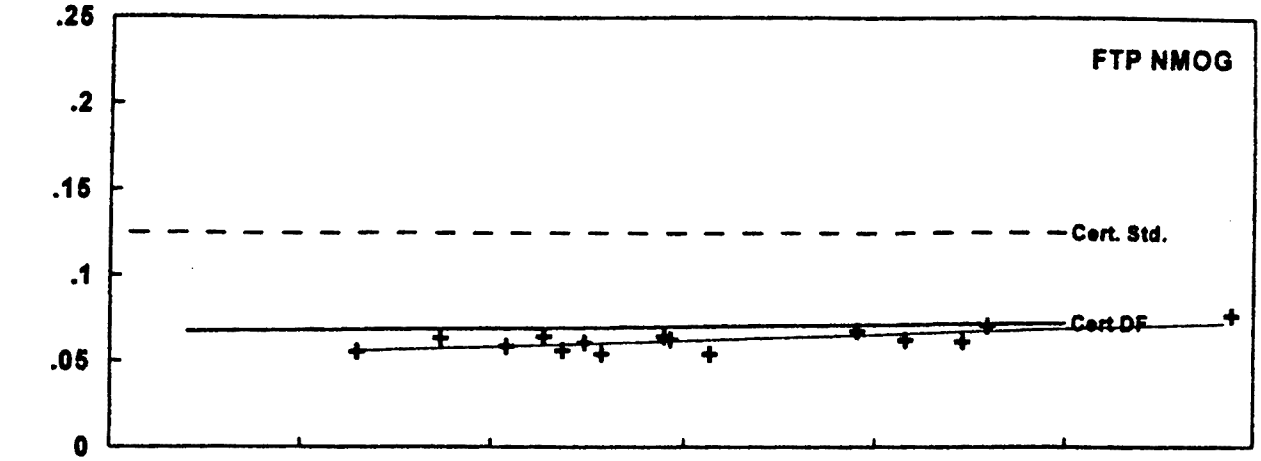
FOURTH YEAR OF SERVICE						
44CRCC401*	41,186	0.062	1.0	0.22	0.002	0.060
44CRCC402*	45,488	0.070	0.9	0.43	0.002	0.069
44CRCC403*	44,171	0.061	0.9	0.29	0.002	0.059
44CRCC404*	58,482	0.076	1.0	0.41	0.003	0.072
44CRCC405*	30,929	0.054	0.7	0.19	0.002	0.052

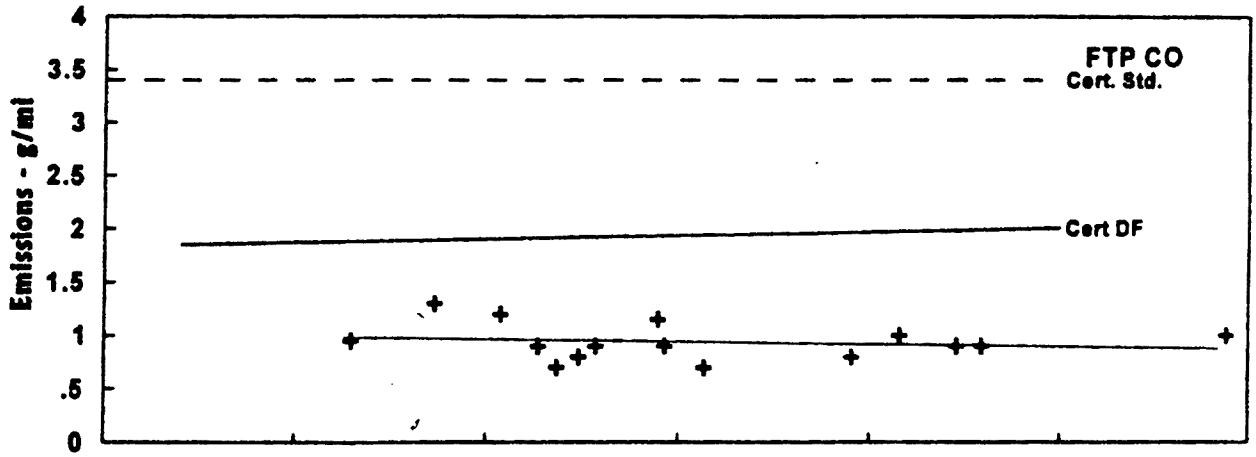
PHASE 2 FUEL USED AND A RAF OF 0.98
* = SIMILAR TO ADP VEHICLE

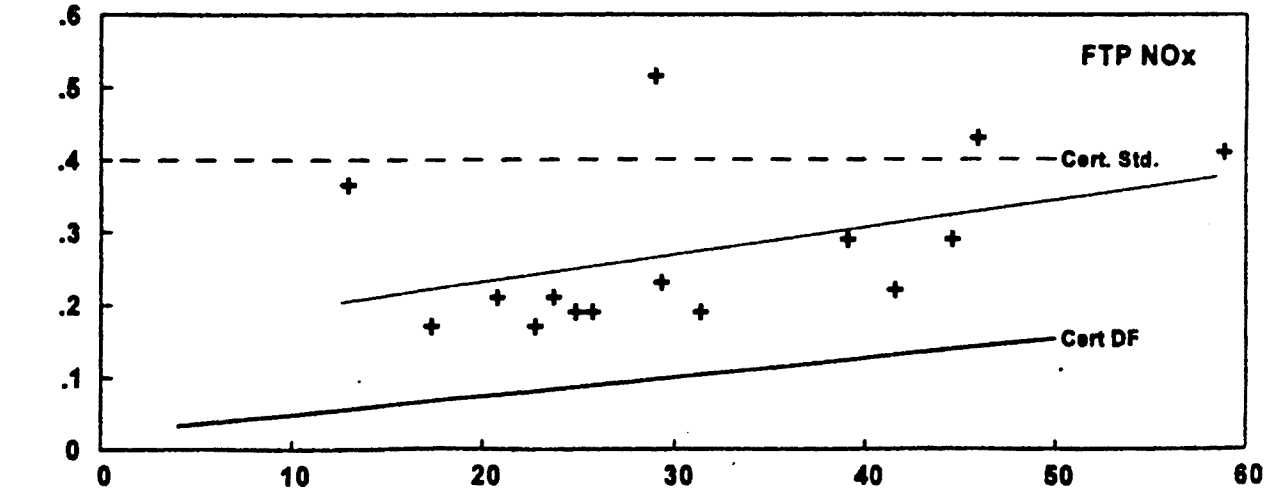
SAF/PCC REV 05-27-97

App III p 10

California Reality Check
Engine Family R1G2.2V7G2EA
GM CONFIDENTIAL
TAILPIPE EMISSIONS







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GMPTG/saf 12-01-1997

1994 MODEL YEAR

CALIFORNIA ENHANCED QUALITY AUDIT

ENGINE FAMILY R1G3.1V8GFEA

					IN-USE STD		0.32	5.2	0.4
								TAILPIPE	
VIN	BLD DATE	TEST DATE	ODO	TRANS	ETW	DHP	NMHC	CO	NOx
1G3WH55M7RD384828	9404	961205	40378	A4	3625	5.9	0.210	1.31	0.23
1G3AG55M5R6302726	9308	970108	41173	A4	3375	6.8	0.208	2.01	0.57
1G3WH55M1RD309591	9309	961206	36565	A4	3625	5.9	0.145	0.89	0.16
1G2WJ52M4RF258637	9402	961206	45866	A4	3750	5.9	0.130	0.99	0.16
1G2NE55M5RM591615	9405	961210	30023	A4	3375	6.4	0.142	0.98	0.24
			38801	AVG			0.167	1.24	0.27
				STD DEV			0.039	0.461	0.171
				% OF STD LIMIT			81.88	73.76	62.55
				% OF STD			51.38	23.54	60.44
				COV LIMIT			0.992	3.406	0.686
				COV OF SAMPLE			0.232	0.373	0.628

65,929 VEHICLES IN FAMILY
4,225 VEHICLES IN LA FOUR COUNTY AREA

SAF/PCC
1/8/1997

Att III-p 1-

*** GM CONFIDENTIAL ***

SUMMARY REPORT

01-22-1997

Model Year : 1994
Body Type : A,L,N,W
Eng. Disp. : 3.1
Converter : TWC (MC)
Trans Type : AUTO
A.I.R. Type : NONE

EPA Class:	B166
Class Type:	SURVEILLANCE
Engine Family:	R1G3.1V8GFEA
Compliance Engr.:	R.J.DELMOTTE

APPLICABLE STANDARDS				
NMHC	HC	CO	NOX	EVAP
0.32		3.40	0.40	2.00

TEST DATA

Veh #	Body	Mileage	Trans	Eng Code	TEST WT. / H.P.	Grams/Mile NMHC	HC	CO	NOX	Grams EVAP	Avg?
0040	W	38,671	AUTO	1A	3625 /5.40	0.175		1.306	0.267	0.160	Yes
0129	N	29,534	AUTO	4A	3375 /4.60	0.138		1.078	0.329	0.310	Yes
0189	L	28,657	AUTO	4D	3250 /6.30	0.128		1.207	0.293	0.170	Yes
0407	W	19,833	AUTO	1A	3625 /5.90	0.125		1.315	0.238	0.180	Yes
VEHICLE NO. 0407 TESTED AT THE WRONG DYNO H.P.						0.123		1.148	0.254	0.160	No
0434	L	16,062	AUTO	4	3250 /6.30	0.102		0.828	0.246	0.910	Yes
335	W	39,686	AUTO	1	3625 /5.90	0.154		1.174	0.312	0.180	Yes

DATA SUMMARY

	NMHC	HC	CO	NOX	EVAP
Average	0.137		1.151	0.281	0.318
Standard	0.320		3.400	0.400	2.000
# Passing	6		6	6	6
# Tested	6		6	6	6
% Passing	100.0%		100.0%	100.0%	100.0%
Average as % of Standard	42.8%		33.9%	70.2%	15.9%

Add Ltr 1

*** GM CONFIDENTIAL ***

SUMMARY REPORT

01-22-1997

Model Year : 1994
Body Type : A,L,N,W
Eng. Disp. : 3.1
Converter : TWC (MC)
Trans Type : AUTO
A.I.R. Type : NONE

EPA Class:	B167
Class Type:	SURVEILLANCE
Engine Family:	R1G3.1V8GFEA
Compliance Engr.:	R.J.DELMOTTE

APPLICABLE STANDARDS				
NMHC	HC	CO	NOX	EVAP
0.32		3.40	0.40	2.00

TEST DATA

Veh #	Body	Mileage	Trans	Eng Code	TEST WT. / H.P.	Grams/Mile NMHC	HC	CO	NOX	Grams EVAP	Avg?
0147	N	64,937	AUTO	4	3250 /6.20	0.152		1.212	0.431	0.270	Yes
0147	WITH A NEW THERMOSTAT					0.143		1.252	0.433	0.440	No
0168	N	50,252	AUTO	4A	3250 /5.30	0.126		1.055	0.349	0.250	Yes
0312	W	54,474	AUTO	1	3625 /5.40	0.166		2.146	0.340	0.530	Yes

DATA SUMMARY

	NMHC	HC	CO	NOX	EVAP
Average	0.148		1.471	0.373	0.350
Standard	0.320		3.400	0.400	2.000
# Passing	3		3	2	3
# Tested	3		3	3	3
% Passing	100.0%		100.0%	66.7%	100.0%
Average as % of Standard	46.3%		43.3%	93.3%	17.5%

FEDERAL REALITY CHECK SUMMARY
1994 - THIRD YEAR OF SERVICE

GM CONFIDENTIAL

ENG FAMILY VIN	TEST DATE	MILES	TAILPIPE NMHC	 CO	 NOx	ENGINE OUT HC	 CO	 NOx
R1G2.2V7GFEA		IU STD	0.32	3.4	0.4			
R1G2.2V7GEEA - MAN TRANS($)								
1G1JC1447R7337020	8/21/1996	22,020	0.06	0.9	0.28	1.02	9.91	2.02
1G1JC5448R7110278	8/21/1996	30,953	0.07	1.1	0.24	1.10	10.17	2.23
1G1JC1442R7366781	8/22/1996	25,082	0.08	0.9	0.27	1.05	9.52	2.62
1G1LV1545RY218779	8/22/1996	25,834	0.09	1.9	0.14	1.57	11.32	2.04
1G1JC144XR7231449$	8/29/1996	40,262	0.09	1.9	0.20	1.67	10.17	1.84
R1G3.1V8GFEA		IU STD	0.32	3.4	0.4			
1G2NE55M8RC761486	8/7/1996	35818	0.13	1.0	0.23	2.57	10.46	1.39
1G2WJ52M0RF205949	8/8/1996	36298	0.13	1.0	0.26	2.35	11.12	1.74
1G1LD55M5RY289118	8/9/1996	30796	0.12	1.0	0.26	2.52	10.92	1.38
1G3WH55M2RD375003	8/14/1996	33976	0.13	1.0	0.24	2.40	10.79	1.58
1G1LD55MXRY164616	8/15/1996	36909	0.15	1.2	0.42	2.49	10.86	1.69
1G3WH55M5RD357840	8/16/1996	38596	0.13	0.9	0.46	2.74	11.64	1.46
RETEST	8/20/1996	38623	0.13	0.8	0.45	2.72	11.42	1.45
1G3WH55M9RD393823	8/16/1996	33270	0.13	1.0	0.27	2.47	10.25	1.71
R1G4.6VJGAEA		IU STD	THC 0.41	3.4	1.0			
1G6KS52Y4RU830718	8/23/1996	29,073	0.21	1.5	0.15	3.14	14.59	1.99
1G6ET1294RU611446#	12/11/1996	42,817						
RETEST@	12/12/1996	42,832	0.18	1.8	0.45	NA	NA	NA
RETEST	12/16/1996	42,859	0.13	1.0	0.46	NA	NA	NA
1G6KS52Y9RU845280	8/23/1996	27,585	0.20	1.5	0.32	2.73	13.97	2.24
1G6KF52Y4RU307266#	8/28/1996	22,610						
RETEST#	8/29/1996	22,633						
RETEST	8/30/1996	22,648	0.20	1.6	0.35	2.86	14.98	2.24
1G6KF52Y3RU285647	8/28/1996	37,045	0.18	1.2	0.36	2.80	14.01	2.31

= TEST ABORTED - TRACTION CONTROL LIGHT CAME ON
@ = CANISTER PURGE HOSE WAS DISCONNECTED AT THE SOLENOID

SAF/PCC 2/26/1997

Attach 12

CALIFORNIA REALITY CHECK SUMMARY

1993 J CARS

GM CONFIDENTIAL

VIN	TEST DATE	MILES	TAILPIPE NMHC	TAILPIPE CO	TAILPIPE NOx	ENGINE OUT HC	ENGINE OUT CO	ENGINE OUT NOx
ENG FAMILY P1G2.0W8JF15		IU STD	0.32	5.2	0.55			
FOURTH YEAR OF SERVICE								
1G2JC54H6P7580482	3/22/1996	34,707	0.11	1.3	0.27	1.15	12.85	1.93
1G2JC54H3P7589513	3/26/1996	40,278	0.11	2.0	0.31	0.98	13.14	1.84
1G2JC14H9P7596846	3/29/1996	38,584	0.09	1.4	0.20	0.88	11.50	1.40
1G2JC14H6P7501627	5/22/1996	33,201	0.13	2.0	0.13	1.42	14.68	2.03
1G2JC54H8P7590270	6/20/1996	58,367	0.15	1.9	0.20	1.13	11.73	1.34

SAF/PCC
3/3/1997

Ann TTLP 15a

Release Ltr. 8/07 Call to D. Good

GM POWERTRAIN

cc:
EAB
LH
SB
LS

March 13, 1997

ML-SG180

FYI
Dave Good
5/13/97

Ms. Jane Armstrong, Director
Vehicle Programs & Compliance Division
Office of Mobile Sources
U.S. Environmental Protection Agency
cc
Jane
Andy Brooks
Cliff Dean
2565 Plymouth Rd.
Ann Arbor, MI 48105

Dear Ms. Armstrong:

Subject: Reality Check Emission Test Data

cc
Ann Chin
12/12/97

General Motors Corporation submits the attached in-use verification (reality check) emission test data for three Federal 1995 model year engine families certified using the GM alternate durability process (ADP). The three 1995 Federal engine families are: (1) S1G2.2V7GFEA, (2) S1G3.1V8GFEA and (3) S1G4.6V7GFEA.

Reality check testing for the subject families for the second year of service was completed at our Milford Proving Ground vehicle emission laboratory.

No vehicles were rejected after initial procurement and no OBD or stored codes were observed. The test procedure used was the normal FTP with a double prep. For each engine family, both exhaust tail pipe and engine out emission data, if available, are provided as part of this submission.

Please call Steve Fogle of my staff on (810) 685-5145 if you have any questions regarding this information.

Sincerely,

R. C. Harvey

R. C. Harvey
Project Manager
Powertrain Control Center

RCH/SAF/ks
c: D. J. Good

Powertrain Control Center • M/C 483-331-500 • GM Proving Ground • Milford, Michigan 48380-3726

Ann Illolt

FEDERAL REALITY CHECK SUMMARY

1995 MODEL YEAR

SECOND YEAR OF SERVICE

GM CONFIDENTIAL

ENG FAMILY	TEST DATE	MILES	TAILPIPE NMHC	TAILPIPE CO	TAILPIPE NOx	ENGINE OUT HC	ENGINE OUT CO	ENGINE OUT NOx
S1G4.6V7GFEA								
VIN		IU STD	0.32	3.4	0.4			
1G6KS52Y6SU835117	6/6/1996	12,934	0.15	0.9	0.34	3.32	13.00	2.18
1G3GR62C6S4146509$	6/10/1996	13,763	0.11	1.0	0.20	3.14	13.12	1.47
1G3GR62C6S4146509*	6/11/1996	13,789	0.13	1.2	0.22	3.16	13.47	1.59
1G3GR52C7S4100696$	6/11/1996	10,885	0.22	2.6	0.11	3.74	18.41	1.52
1G3GR52C7S4100696*	6/12/1996	10,912	0.19	2.3	0.11	3.64	17.79	1.59
S1G2.2V7GFEA								
VIN		IU STD	0.32	3.4	0.4			
1G1JC124XS7120263#								
RETEST	6/7/1996	17,241	0.08	1.7	0.19	1.68	8.81	2.46
1G1JC12R0S7148072&	6/10/1996	11,872	0.12	2.0	0.20	0.72	3.15	0.46
RETEST	6/11/1996	11,898	0.08	1.3	0.14	1.80	8.16	2.07
1G1LV1549SY222601@	6/11/1996	10,765	0.06	1.1	0.18	1.47	8.98	2.39
RETEST	6/14/1996	10,797	0.08	1.6	0.10	1.34	9.39	2.32
S1G3.1V8GFEA								
VIN		IU STD	0.32	3.4	0.4			
1G4AH55M356471979	6/11/1996	14,795	0.26	3.9	0.35	3.05	17.29	2.85
RETEST	6/14/1996	14,840	0.24	2.7	0.33	2.74	14.02	2.74

01

- INVALID PREP - NO TEST DATA
$ = PERFORMANCE TRANS MODE
* = NORMAL TRANS MODE
& = INVALID - DILUTION AIR LINE DISCONNECTED
@ = CANISTER LINE WAS UNPLUGGED AT SOLENOID

SAF/PCC
REV 03-06-97

App III p 17

Released Rev 8/17 (All 3 Obvi)

GM **POWERTRAIN**

cc: Jane TB EAB SB LT LH LS BJ FYI

Dave 2/5/96

cc: Pete K 3/21/96

February 6, 1996 ML-RG227

Ms. Jane Armstrong, Director
Certification Division
Mobile Source Air Pollution Control
U.S. Environmental Protection Agency
2565 Plymouth Rd.
Ann Arbor, MI 48105

Dear Ms. Armstrong:

Subject: Reality Check Emission Test Data

General Motors Corporation submits the attached in-use verification (reality check) emission test data for three Federal 1994 model year engine families and one California 1993 model year carryover engine family certified using the GM alternate durability process (ADP). The three 1994 Federal engine families are: (1) R1G2.2V7GFEA/R1G2.2V7GEEA, (2) R1G3.1V8GFEA and (3) R1G4.6VJGAEA. The 1993 California family is P1G2.0W8JF15 (this 1993 reality check data is being carried over to support 1994 engine family R1G2.0V7GFEA).

Reality check testing for the subject families for the second year of service was completed at our Milford Proving Ground vehicle emission laboratory. The California family (third year of service) was tested at our Los Angeles vehicle emission laboratory. The test procedure used was the normal FTP with a double prep. For each engine family, both exhaust tail pipe and engine out emission data are provided as part of this submission.

No vehicles were rejected after initial procurement and no OBD or stored codes were observed. A tally of reasons that prospective vehicles were rejected from recruitment due to questionnaire topics has not yet been received from our contract vendor. Upon receipt, a copy will be forwarded to you.

In addition, per your request, we have also attached a copy of reality check emission data for other California families previously presented to CARB. The 1992 engine families have completed testing for the second, third and fourth years of service. The 1993 engine families have completed testing for the second and third year of testing. Finally, the 1994 engine families have completed their second year of service testing.

General Motors is willing to meet with you and your staff to review the operation of the reality check programs to facilitate further discussion of future certification streamlining. Please call me on (810) 685-6976 if you have any questions regarding this information.

Sincerely,

R. C. Harvey

R. C. Harvey
Project Manager
Powertrain Control Center

RCH/SAF/ks
c: D. J Good

FEDERAL REALITY CHECK SUMMARY
1994 - SECOND YEAR OF SERVICE

GM CONFIDENTIAL

ENG FAMILY / VIN	TEST DATE	MILES	TAILPIPE NMHC	TAILPIPE CO	TAILPIPE NOx	ENGINE OUT HC	ENGINE OUT CO	ENGINE OUT NOx
R1G2.2V7GFEA		IU STD	0.32	3.4	0.4			
R1G2.2V7GEEA - MAN TRANS($)		Cert Std	.25	3.4	0.4			
1G1JC144XR7165954-$	4/26/95	27,344	0.07	1.7	0.2	1.77	9.71	1.56
1G1JC1443R7225864	4/26/95	24,657	0.08	1.0	0.2	1.17	10.52	2.60
1G1LD5544RY279311	4/26/95	15,031	0.08	2.0	0.2	1.52	10.30	2.35
1G1JC5446R7225350	4/27/95	21,748	0.07	1.6	0.3	1.05	10.22	2.32
1G1JC1444R7252058	5/5/95	21,326	0.08	1.1	0.2	1.28	9.57	1.89
R1G3.1V8GFEA		IU STD	0.32	3.4	0.4			
1G2WJ12M6RF216057	5/2/95	26,185	0.18	2.2	0.4	2.40	10.98	2.02
1G2WJ12M8RF337754@	4/28/95	16,512	0.14	1.3	0.2	2.47	11.34	1.72
RETEST&	5/4/95	16,538						
RETEST	5/5/95	16,546	0.13	1.5	0.3	2.46	10.99	1.73
1G1LV15M3RY157139	5/2/95	22,436	0.13	1.6	0.4	2.52	10.30	1.62
1G2WJ52M1RF282720	5/3/95	17,596	0.14	0.9	0.3	2.58	11.93	1.77
1G1LD55M8RY125846	5/9/95	14,878	0.12	1.0	0.3	2.41	10.08	1.82
1G2NE55M6RC702064	5/4/95	23,335	0.13	1.0	0.6	2.37	11.30	2.47
RETEST@	5/10/95	23,364	0.11	0.8	0.5	2.32	10.08	1.85
RETEST@	5/11/95	23,384	0.11	0.7	0.5	2.26	10.04	1.91
RETEST	5/12/95	23,411	0.11	0.8	0.5	2.31	10.03	1.85
1G2WJ12M7RF203124	5/10/95	21,378	0.14	1.1	0.4	2.37	10.65	1.93
R1G4.6VJGAEA		Tier 0 IU STD	THC 0.41	3.4	1.0			
1G6KS52Y4RU842254	5/9/95	13,318	0.22	1.0	0.1	3.56	15.66	1.91
1G6KS52YXRU821621	5/10/95	13,001	0.18	0.8	0.3	3.26	15.21	1.79
1G6KF52YXRU295527	5/10/95	24,865	0.27	0.9	0.4	3.06	12.96	2.42
1G6KF52Y7RU235334#	5/11/95	23,919	0.25	1.2	0.4	3.25	15.36	1.84
RETEST	5/12/95	23,945	0.29	2.4	0.5	3.50	16.83	2.17
RETEST	5/16/95	23,972	0.25	1.4	0.4	3.19	14.86	1.88
1G6ET1295RU619488	5/16/95	15,480	0.14	0.9	0.3	3.29	16.62	1.82

@ = INVALID - TEST CREW DID NOT TIGHTEN GAS CAP
& - INVALID - TEST CREW DID NOT TIGHTEN GAS CAP - TEST ABORTED
# - INVALID - DIURNAL EQUIPMENT PROBLEM

SAF/PCC 10/4/95

App II p 19

SAF/PCC

CALIFORNIA REALITY CHECK SUMMARY

11/8/95

1993 J CARS

GM CONFIDENTIAL

ENG FAMILY	TEST DATE	MILES	TAILPIPE NMHC	TAILPIPE CO	TAILPIPE NOx	ENGINE OUT HC	ENGINE OUT CO	ENGINE OUT NOx
P1G2.0W8JF15		IU STD	0.32	5.2	0.55			
THIRD YEAR OF SERVICE								
1G2JC54H3P7589513	10/17/95	34,595	0.10	1.6	0.26	0.96	12.17	1.75
1G2JC54H6P7580482	10/18/95	29,224	0.11	1.5	0.23	1.19	12.39	2.07
1G2JC14H9P7596846	10/18/95	34,674	0.10	1.5	0.21	0.95	11.95	1.44
1G2JC54H8P7590270	10/20/95	40,893	0.13	2.3	0.15	1.11	12.73	1.36
1G2JC14H8P7580668	10/31/95	47,055	0.11	1.5	0.34	1.08	12.41	1.73

S/S

Cert Stds .25 3.4 0.4

App III p 21

CALIFORNIA REALITY CHECK SUMMARY

1992 J/L

GM CONFIDENTIAL

		TAILPIPE			ENGINE OUT		
ENG FAMILY	MILES	NMHC	CO	NOx	HC	CO	NOx
N1G2.2W8JF58	IU STD	0.32	5.2	0.55			
SECOND YEAR OF SERVICE							
2.2L - J	17,875	0.17	2.1	0.22	1.51	9.64	2.73
2.2L - J	15,070	0.22	3.4	0.19	1.49	10.89	2.44
2.2L - L*	10,298	0.17	2.7	0.15	1.37	10.62	1.85
2.2L - J	19,823	0.20	2.6	0.17	1.61	10.71	2.62
2.2L - J	16,929	0.13	2.5	0.19	1.32	10.78	2.40
THIRD YEAR OF SERVICE							
2.2L - J	23,627	0.15	2.0	0.17	1.43	10.90	2.05
2.2L - L*	30,330	0.16	2.9	0.16	1.52	11.89	2.33
2.2L - J	28,763	0.21	4.1	0.17	1.51	11.50	2.31
2.2L - J	35,443	0.25	5.1	0.17	1.49	11.69	2.34
2.2L - J#	25,494	0.17	3.3	0.52	1.40	11.29	4.39
RETEST$	25,513	0.24	4.9	0.11	1.47	11.75	1.91
RETEST	27,076	0.23	3.3	0.16	1.35	10.49	2.24
2.2L - L*	20,136	0.20	2.3	0.16	1.38	11.23	1.92
FOURTH YEAR OF SERVICE							
2.2L - J@	35,074	0.32	4.0	0.24	1.58	10.63	2.19
RETEST	35,100	0.29	3.4	0.24	1.58	9.84	2.23
2.2L - J	31,195	0.21	3.2	0.16	1.50	11.67	1.96
2.2L - L*	44,319	0.16	2.4	0.22	1.44	10.48	2.08
2.2L - L*	41,699	0.18	2.6	0.20	1.44	10.13	2.00
2.2L - L*	30,448	0.16	2.5	0.17	1.31	10.82	1.75

= VACUUM LINE TO EGR WAS OFF
$ = IMPROPER PRECONDITIONING

@= INVALID DIURNAL

* = SIMILAR TO ADP VEHICLE

SAF/PCC
REV 08-09-95

Apr III

CALIFORNIA REALITY CHECK SUMMARY

1992 APV's

GM CONFIDENTIAL

		TAILPIPE			ENGINE OUT		
ENG FAMILY	MILES	NMHC	CO	NOx	HC	CO	NOx
N3G3.1X5XA48	IU STD	0.41	6.7	1.00			
SECOND YEAR OF SERVICE							
3.1L - UVAN*	19,582	0.13	3.6	0.42	1.82	13.07	2.04
3.1L - UVAN*	23,581	0.18	5.5	0.50	1.73	12.68	2.31
3.1L - UVAN*	18,924	0.18	5.7	0.21	2.14	13.48	1.73
3.1L - UVAN*	12,569	0.15	4.1	0.27	2.02	13.38	1.91
3.1L - UVAN*	20,667	0.21	6.0	0.26	2.11	14.57	2.19
THIRD YEAR OF SERVICE							
3.1L - UVAN*	32,257	0.22	6.5	0.24	2.20	15.38	2.26
3.1L - UVAN*	30,318	0.21	5.1	0.11	2.25	14.14	1.97
3.1L - UVAN*	29,198	0.16	4.6	0.28	1.84	13.65	2.34
3.1L - UVAN*	31,289	0.19	5.6	0.27	1.98	15.31	2.54
3.1L - UVAN*	37,235	0.24	5.5	0.31	2.08	15.20	2.78
FOURTH YEAR OF SERVICE							
3.1L - UVAN*	41,139	0.15	4.0	0.56	1.87	13.42	2.56
3.1L - UVAN*	53,312	0.18	5.3	0.46	1.92	14.17	2.59
3.1L - UVAN*	49,998	0.15	4.1	0.37	1.76	13.07	2.35
3.1L - UVAN*	40,561	0.18	4.6	0.22	2.16	13.62	1.98
3.1L - UVAN*	53,348	0.27	7.1	0.20	2.23	15.71	2.23

* = SIMILAR TO ADP VEHICLE

SAF/PCC
REV 10-25-95

Amdt 22.

CALIFORNIA REALITY CHECK SUMMARY

1992 S/T UTILITIES

GM CONFIDENTIAL

		TAILPIPE			ENGINE OUT		
ENG FAMILY	MILES	NMHC	CO	NOx	HC	CO	NOx
N3G4.3XBXE31	IU STD	0.41	6.7	1.00			
SECOND YEAR OF SERVICE							
4.3L - S UTIL	25,035	0.24	4.0	0.56	2.39	17.75	1.78
4.3L - S UTIL	10,497	0.22	3.1	0.58	2.56	15.00	1.78
4.3L - S UTIL	24,515	0.19	2.4	0.64	2.46	13.48	1.54
4.3L - T UTIL*	25,248	0.25	2.2	0.54	2.30	13.33	1.62
4.3L - T UTIL*	12,768	0.28	2.9	0.44	2.71	15.51	2.16
4.3L - T UTIL*	28,295	0.34	4.5	0.77	2.56	16.01	2.02
THIRD YEAR OF SERVICE							
4.3L - S UTIL	20,515	0.20	1.8	0.50	2.23	13.05	1.56
4.3L - T UTIL*	26,903	0.21	2.7	0.84	2.80	16.07	1.92
4.3L - S UTIL	37,354	0.24	3.7	0.59	2.34	15.77	1.78
4.3L - T UTIL*	30,741	0.32	5.5	0.64	2.64	21.22	1.92
4.3L - T UTIL*	22,279	0.23	2.9	0.56	2.97	19.36	1.86
4.3L - T UTIL*	46,705	0.23	3.1	0.50	2.63	16.45	1.77
FOURTH YEAR OF SERVICE							
4.3L - T UTIL*	34,025	0.30	3.0	0.40	2.95	20.75	1.57
4.3L - S UTIL	37,151	0.31	5.5	0.44	2.35	18.56	1.41
4.3L - T UTIL*	40,398	0.28	3.2	0.90	2.78	14.71	1.78
4.3L - T UTIL*	30,875	0.27	3.0	0.60	2.91	17.94	1.90
4.3L - T UTIL*#	36,304	0.30	4.5	0.47	2.64	19.18	1.74
RETEST	36,369	0.31	4.6	0.50	2.59	19.20	1.65

- INVALID - DIURNAL FUEL TEMP OUT OF RANGE

* = SIMILAR TO ADP VEHICLE

SAF/PCC
REV 08-24-95

A00TII02

SAF/PCC **CALIFORNIA REALITY CHECK SUMMARY**

11/8/95 **1993 J CARS**

GM CONFIDENTIAL

		TAILPIPE			ENGINE OUT		
ENG FAMILY	MILES	NMHC	CO	NOx	HC	CO	NOx
P1G2.0W8JF15	IU STD	0.32	5.2	0.55			

SECOND YEAR OF SERVICE

2.0L - J*	13,502	0.12	1.9	0.19	1.25	13.22	2.16
2.0L - J*	16,484	0.10	1.5	0.17	1.18	12.36	1.63
2.0L - J*	12,503	0.10	1.2	0.17	1.19	12.75	1.63
2.0L - J*	10,059	0.13	1.6	0.13	1.27	13.06	1.88
2.0L - J*@	17,700	0.08	1.5	0.12	1.00	12.89	1.36
RETEST	18,541	0.08	1.2	0.15	1.00	12.85	1.45

@ - DATA INVALID - VEHICLE TESTED AT WRONG WEIGHT

THIRD YEAR OF SERVICE

2.0L - J*	34,595	0.10	1.6	0.26	0.96	12.17	1.75
2.0L - J*	29,224	0.11	1.5	0.23	1.19	12.39	2.07
2.0L - J*	34,674	0.10	1.5	0.21	0.95	11.95	1.44
2.0L - J*	40,893	0.13	2.3	0.15	1.11	12.73	1.36
2.0L - J*	47,055	0.11	1.5	0.34	1.08	12.41	1.73

FOURTH YEAR OF SERVICE

* = SIMILAR TO ADP VEHICLE

App III p 2

SAF/PCC

CALIFORNIA REALITY CHECK SUMMARY

11/8/95

1993 W CARS

GM CONFIDENTIAL

ENG FAMILY	MILES	TAILPIPE NMHC	TAILPIPE CO	TAILPIPE NOx	ENGINE OUT HC	ENGINE OUT CO	ENGINE OUT NOx
P1G3.1W8MCF5	IU STD	0.32	5.2	0.55			

SECOND YEAR OF SERVICE

3.1L - W*	12,392	0.16	1.9	0.12	2.62	11.44	1.50
3.1L - W*	17,637	0.13	2.1	0.17	2.67	12.52	1.78
3.1L - W*	13,934	0.15	2.1	0.11	2.51	12.37	1.73
3.1L - W*	24,420	0.15	3.0	0.14	2.60	13.34	1.40
3.1L - W*	22,145	0.14	2.5	0.15	2.58	12.31	1.47

THIRD YEAR OF SERVICE

3.1L - W*#	34,386	0.14	1.7	0.50	2.91	43.18	0.99
RETEST @	34,414	0.14	2.4	0.50	2.95	46.29	0.96
RETEST	34,440	0.15	1.3	0.13	2.76	11.17	1.18
3.1L - W*$	35,075	0.14	2.1	0.14	NA	NA	NA
RETEST	35,101	0.13	1.7	0.16	2.38	11.52	1.46
3.1L - W*	24,325	0.14	2.0	0.11	2.66	12.26	1.54
3.1L - W*	26,358	0.13	1.7	0.16	2.52	10.98	1.61
3.1L - W*	22,232	0.20	2.1	0.38	2.71	11.76	2.05

FOURTH YEAR OF SERVICE

- INVALID - NO SIDE COOLING
@ - VACUUM HOSE FROM MANIFOLD TO AIR MANAGEMENT VALVE WAS PINCHED
$ - INVALID - CE SAMPLE PUMP NOT WORKING PROPERLY

* = SIMILAR TO ADP VEHICLE

ADP TTP

SAF/PCC
11/8/95

CALIFORNIA REALITY CHECK SUMMARY

1993 M VANS

GM CONFIDENTIAL

		TAILPIPE			ENGINE OUT		
ENG FAMILY	MILES	NMHC	CO	NOx	HC	CO	NOx
P3G4.3X5XG38	IU STD	0.41	6.7	1.0			

SECOND YEAR OF SERVICE

4.3L - M*	18,498	0.22	3.1	0.68	2.80	14.32	2.91
4.3L - M*	12,304	0.14	1.5	0.60	2.51	11.77	2.75
4.3L - M*	24,462	0.16	2.0	0.61	2.23	12.35	2.64
4.3L - M*	15,427	0.13	1.5	0.85	2.30	12.88	2.90
4.3L - M*	17,972	0.15	1.6	0.66	2.56	11.81	2.74
4.3L - M*	12,411	0.15	1.9	0.94	2.60	12.22	3.29

THIRD YEAR OF SERVICE

4.3L - M*	37,577	0.20	2.7	0.80	2.42	11.84	2.82
4.3L - M*	37,417	0.18	2.6	0.72	2.46	11.83	2.41
4.3L - M*	29,865	0.17	2.4	0.48	2.48	13.51	2.75
4.3L - M*	33,395	0.18	1.9	0.70	2.42	11.93	2.80
4.3L - M*	25,720	0.15	2.0	0.83	2.61	11.69	3.22

FOURTH YEAR OF SERVICE

* = SIMILAR TO ADP VEHICLE

App III p 26

SAF/PCC **CALIFORNIA REALITY CHECK SUMMARY**

11/8/95 **1993 CADILLAC's**

GM CONFIDENTIAL

		TAILPIPE			ENGINE OUT		
ENG FAMILY	MILES	NMHC	CO	NOx	HC	CO	NOx
P1G4.6W8XEB8	IU STD	0.39	7.0	0.7	(TIER 0)		

SECOND YEAR OF SERVICE

4.6L - E$	12,194	0.14	1.5	0.07	2.29	14.90	1.29
RETEST	12,220	0.11	1.4	0.09	2.23	14.57	1.28
4.6L - E	19,135	0.17	1.9	0.08	3.83	22.18	1.55
4.6L - K*	11,654	0.14	1.7	0.16	3.79	19.03	1.65
4.6L - K*	15,266	0.14	1.6	0.18	2.96	16.73	1.22
4.6L - K*	10,970	0.10	1.1	0.14	2.36	13.74	1.40

THIRD YEAR OF SERVICE

4.6L - E	35,404	0.22	2.0	0.30	3.43	17.44	1.79
4.6L - E%	39,168	0.20	2.2	0.17	3.09	18.65	1.35
RETEST	39,194	0.23	2.2	0.13	3.02	18.48	1.29
4.6L - K*	26,412	0.15	1.3	0.26	3.39	17.56	1.31
4.6L - K*	48,475	0.27	3.1	0.33	3.04	16.27	1.82
4.6L - K*	31,102	0.16	1.6	0.18	2.88	15.26	1.30

FOURTH YEAR OF SERVICE

* = SIMILAR TO ADP VEHICLE

$ = NON OEM GAS CAP
% = FUEL LINE TO CANISTER WAS DISCONNECTED

ADP TI 02

SAF/PCC
11/8/95

CALIFORNIA REALITY CHECK SUMMARY

1993 C/K PICKUPS

GM CONFIDENTIAL

		TAILPIPE			ENGINE OUT		
ENG FAMILY	MILES	NMHC	CO	NOx	HC	CO	NOx
P3G5.7X5XG59	IU STD	0.41	6.7	1.0			

SECOND YEAR OF SERVICE

5.7L - C	22,901	0.23	2.5	0.50	2.59	17.58	1.41
5.7L - C*	23,776	0.24	2.2	0.37	3.10	16.30	1.28
5.7L - C*	15,453	0.24	2.4	0.44	2.64	14.84	1.36
5.7L - C*	29,254	0.29	3.6	0.64	3.09	18.63	2.05
5.7L - C	14,192	0.24	2.0	0.31	3.24	18.07	1.37

THIRD YEAR OF SERVICE

5.7L - C*	41,199	0.30	3.1	0.47	3.07	17.16	1.36
5.7L - C*#	41,180	0.43	5.5	0.70	3.24	16.73	1.86
RETEST	41,207	0.33	4.9	0.60	2.97	16.93	1.53
5.7L - C*	31,740	0.31	2.8	0.48	3.50	16.77	2.12
5.7L - C*	45,864	0.32	3.5	0.54	3.33	19.03	1.70
5.7L - C*	33,730	0.29	4.1	0.53	3.03	17.34	1.69

FOURTH YEAR OF SERVICE

= IGNITION TIMING NOT SET TO SPEC - RESET

* = SIMILAR TO ADP VEHICLE

ADPT1028

CALIFORNIA REALITY CHECK SUMMARY

1994 - SECOND YEAR OF SERVICE

GM CONFIDENTIAL

		TAILPIPE				ENGINE OUT		
ENG FAMILY	MILES	NMOG	CO	NOx	HCHO	HC	CO	NOx
R1G2.2V7G2EA	IU STD	0.188	3.4	0.4	0.023			
2.2L - J*	12,554	0.056	0.9	0.34	0.002	1.19	10.83	2.44
2.2L - J*	20,420	0.059	1.2	0.21	0.001	1.08	10.55	2.19
2.2L - J*&	16,915	0.065	1.1	0.18	0.001	1.20	10.12	2.21
RETEST	16,941	0.063	1.4	0.17	0.001	1.21	10.33	2.13
2.2L - J*	23,338	0.056	0.7	0.21	0.002	1.22	9.83	2.21
2.2L - J*	25,332	0.054	0.9	0.19	0.001	1.14	10.32	1.82

& - FOUND CANISTER PURGE HOSE OFF AT PURGE SOLENOID
PHASE 2 FUEL USED AND RAF OF 0.98

		TAILPIPE			ENGINE OUT		
ENG FAMILY	MILES	NMHC	CO	NOx	HC	CO	NOx
R1G4.6VJG1EA	IU STD	0.32	5.2	0.55			
4.6L - K	18,325	0.17	1.4	0.06	3.40	14.15	1.77
4.6L - KSP*	21,368	0.12	1.1	0.13	4.04	19.55	1.84
4.6L - K@	15,639						
RETEST	15,663	0.13	0.8	0.28	3.13	13.11	1.61
4.6L - KSP*	19,357	0.12	1.3	0.25	4.17	18.56	1.65
4.6L - KSP*	14,017	0.14	1.2	0.52	3.79	16.62	1.87

@ - INVALID - TEST ABORTED PHASE 3 - TRACTION CONTROL LIGHT CAME ON

		TAILPIPE			ENGINE OUT		
ENG FAMILY	MILES	NMHC	CO	NOx	HC	CO	NOx
R1G4.9V8G1EA	IU STD	0.32	5.2	0.55			
4.9L - K*	18,565	0.17	2.8	0.11	2.86	15.80	1.38
4.9L - K*	20,840	0.12	2.1	0.38	2.74	15.27	1.87
4.9L - K*	19,868	0.14	2.2	0.16	2.81	16.02	1.29
4.9L - K*	13,730	0.12	1.9	0.18	2.78	15.11	1.45
4.9L - K*	14,431	0.14	2.0	0.14	3.03	15.93	1.49

* = SIMILAR TO ADP VEHICLE

Exhibit 82

1994 - SECOND YEAR OF SERVICE

GM CONFIDENTIAL

		TAILPIPE			ENGINE OUT		
ENG FAMILY	MILES	NMHC	CO	NOx	HC	CO	NOx
R3G3.125GFEA	IU STD	0.41	6.7	1.0			
3.1L - UVAN*	27,128	0.17	3.3	0.37	2.15	13.03	2.92
3.1L - UVAN*	16,743	0.17	3.0	0.23	2.09	12.13	3.08
3.1L - UVAN*&	12,778	0.14	2.3	0.14	2.27	11.40	4.22
RETEST	12,804	0.14	2.5	0.13	2.19	11.77	4.05
3.1L - UVAN*	12,940	0.13	2.3	0.25	2.28	11.15	3.41
3.1L - UVAN*	14,306	0.14	2.8	0.19	2.05	12.17	2.94

& - INVALID - SHED BROKE DURING DIURNAL

* = SIMILAR TO ADP VEHICLE

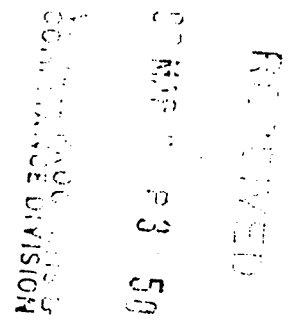
Released Per FOI Case Denial

GM POWERTRAIN

cc:
EAB
LH
SB
LS
FYI
Dave 3/6/97
cc
Jane
Andy Brooks

March 3, 1997 ML-RG234

Ms. Jane Armstrong, Director
Vehicle Programs & Compliance Division
Office of Mobile Sources
U.S. Environmental Protection Agency
2565 Plymouth Rd.
Ann Arbor, MI 48105



Dear Ms. Armstrong:

Subject: Reality Check Emission Test Data

General Motors Corporation submits the attached in-use verification (reality check) emission test data for three Federal 1994 model year engine families and one California 1993 model year carryover engine family certified using the GM alternate durability process (ADP). The three 1994 Federal engine families are: (1) R1G2.2V7GFEA/R1G2.2V7GEEA, (2) R1G3.1V8GFEA and (3) R1G4.6VJGAEA. The 1993 California family is P1G2.0W8JF15 (this 1993 reality check data is being carried over to support 1994 engine family R1G2.0V7GFEA).

Reality check testing for the subject families for the third year of service was completed at our Milford Proving Ground vehicle emission laboratory. The California family (fourth year of service) and family R1G3.1V8GFEA were tested at our Los Angeles vehicle emission laboratory.

No vehicles were rejected after initial procurement and no OBD or stored codes were observed. The test procedure used was the normal FTP with a double prep. For each engine family, both exhaust tail pipe and engine out emission data, if available, are provided as part of this submission. In response to our letter ML-GM495, approval was given to discontinue engine out emission testing on December 10, 1996.

Please call Steve Fogle of my staff on (810) 685-5145 if you have any questions regarding this information.

Sincerely,

R. C. Harvey

R. C. Harvey
Project Manager
Powertrain Control Center

RCH/SAF/ks
c: D. J. Good

Attn 31

Rec'd 4/2

cc:
EAB
LH
PK (Andy Brunts)
orig → FH

FYI - 1% passed

Dave
4/27/98

SA

HONDA

AMERICAN HONDA MOTOR CO., INC.
1919 Torrance Boulevard • Torrance, CA 90501-2746
(310) 783-2000

April 15, 1998

AHCERT-982500

Director
Certification Division (EPA-335)
Mobile Source Air Pollution Control
U.S. ENVIRONMENTAL PROTECTION AGENCY
2565 Plymouth Road
Ann Arbor, MI 48105

ATTENTION: Mr. Dave Good

Dear Sir:

Enclosed is the report of the results of our first Reality Check test program conducted on 1997 model year Acura 3.0CL vehicles.

The exhaust emission test results are all satisfactory.

Yours truly,

AMERICAN HONDA MOTOR CO., INC.

Brian Gill
Assistant Vice President
Product Regulations Compliance, Certification

BG/llw

Enclosure(s)

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Laura

Annual Report on In-use Verification Program

Model Year : 1997
Program Term : 1st (10k to 30k-mile interval)
Engine Family : VHN3.0VJGKEK (49-State, Tier-1)
Model : Acura 3.0CL (AT)
Test Cell : American Honda Ann Arbor Laboratory (MI) #2 Cell
Test Fuel :Indolene 6.8gal

V.ID.	VIN	Test No.	Test Date	ETW (lbs)	HPa (HP)	Odometer (miles)	NMHC (g/mile)	NMOG (g/mile)	CO (g/mile)	NOx (g/mile)	HCHO (g/mile)	Remarks
R97AZF1	19UYA225XVL011468	1	02/10/98	3625	7.0	11,414	0.088	---	0.49	0.14	---	
R97AZF2	19UYA2253VL010193	1	02/11/98	3625	7.0	13,874	0.082	---	0.55	0.15	---	Slave tires were used due to deformed wheel.
R97AZF3	19UYA2244VL007827	1	02/11/98	3625	7.0	15,461	0.091	---	0.52	0.19	---	
R97AZF4	19UYA2256VL009295	1	02/17/98	3625	7.0	15,202	0.089	---	0.60	0.24	---	
R97AZF5	19UYA2254VL005178	1	02/17/98	3625	7.0	16,489	0.087	---	0.60	0.16	---	

50K Tier 1 Stds: .25 3.4 .4

Other special procedures
Canister loading method : 2g breakthrough, off-vehicle
6-hour(min.) soak : omitted
Continuous analysis : diluted exhaust gas sample and compensation of CVS flow volume

Annual

Annual Report on In-use Verification Program

Model Year : 1997
Program Term : 1st (10k to 30k-mile interval)
Engine Family : VHN3.0VJG2EK (California, TLEV)
Model : Acura 3.0CL (AT)
Test Cell : Honda R&D of America (CA) #1 Cell
Test Fuel :Phase2 6.8gal

V.ID.	VIN	Test No.	Test Date	ETW (lbs)	HPa (HP)	Odometer (miles)	NMHC (g/mile)	NMOG *1 (g/mile)	CO (g/mile)	NOx (g/mile)	HCHO *2 (g/mile)	Remarks
R97AZL1	19UYA224XVL002129	1	03/03/98	3625	7.0	16,603	0.0651	0.0669	0.66	0.14	0.0018	
R97AZL2	19UYA2241VL002147	1	03/04/98	3625	7.0	11,241	---	---	---	---	---	Void *3
		2	03/05/98	3625	7.0	11,250	0.0790	0.0812	0.95	0.13	0.0022	
R97AZL3	19UYA2241VL012662	1	03/04/98	3625	7.0	14,377	0.0803	0.0825	0.82	0.12	0.0022	
R97AZL4	19UYA2241VL012628	1	03/10/98	3625	7.0	11,327	0.0712	0.0731	0.67	0.15	0.0019	
R97AZL5	19UYA224XVL005385	1	03/10/98	3625	7.0	15,630	0.0663	0.0681	0.50	0.15	0.0018	Slave tires were used due to nail-stuck.

50K TLEV Stds: .125 3.4 .4 .015

*1: NMOG = NMHC x $Ratio_{NMOG/NMHC}$[1.0482] x RAF[0.98]
*2: HCHO = NMHC x $Ratio_{HCHO/NMHC}$[0.0273]
*3: The engine failed to start due to the ignition wire disconnected during the canister removal and installation.

Other special procedures
Canister loading method : 2g breakthrough, off-vehicle
6-hour(minimum) soak : omitted
Continuous analysis : direct exhaust gas sample and return to CVS

Annual Report on In-use Verification Program

Procurement Information

V.ID.	VIN	A/C	Trans.	City, State	Answers for questionnaire *1															Remarks	Result
					1	2	3	4-a)	4-b)	4-c)	4-d)	5	6	7	8	9	10	11	12	13		
R97AZF1	19UYA225XVL011468	Y	AT	Ann Arbor, MI	N	N	11,100	N	N	N	N	N	N	N	N	N	N	N	N		Accept
R97AZF2	19UYA2253VL010193	Y	AT	Ann Arbor, MI	N	N	15,000	N	N	N	N	N	N	N	N	N	N	N	N		Accept
R97AZF3	19UYA2244VL007827	Y	AT	Plymouth, MI	N	N	14,000	N	N	N	N	N	N	N	N	N	N	N	N		Accept
R97AZF4	19UYA2256VL009295	Y	AT	Ann Arbor, MI	N	N	15,030	N	N	N	N	N	N	N	N	N	N	N	N		Accept
R97AZF5	19UYA2254VL005178	Y	AT	Plymouth, MI	N	N	16,000	N	N	N	N	N	N	N	N	N	N	N	N		Accept
R97AZL1	19UYA224XVL002129	Y	AT	Long Beach, CA	N	N	16,253	N	N	N	N	N	N	N	N	N	N	N	N		Accept
R97AZL2	19UYA2241VL002147	Y	AT	Whitter, CA	N	N	11,000	N	N	N	N	N	N	N	N	N	N	N	N		Accept
R97AZL3	19UYA2241VL012662	Y	AT	Diamond Bar, CA	N	N	13,500	N	N	N	N	N	N	N	N	N	N	N	N		Accept
R97AZL4	19UYA2241VL012628	Y	AT	LA Palma, CA	N	N	10,771	N	N	N	N	N	N	N	N	N	N	N	N		Accept
R97AZL5	19UYA224XVL005385	Y	AT	Los Angeles, CA	N	N	15,089	N	N	N	N	N	N	N	N	N	N	N	N	AT replaced	Accept

The vehicles were procured by Automotive Testing and Development Services Inc., (ATDS) in Michigan and California.
The vehicles were randomly selected using state registration information from R.L.Polk.
No vehicles were rejected.
No MIL illumination were found.
*1: Refer to attached format of Telephone Questionnaire.

Annual Report on In-use Verification Program

Telephone Questionnaire

Date:_____ Air Conditioning: ☐YES , ☐NO Transmission: ☐AUTO , ☐MANUAL

Vehicle:_____ Phone(Home):_____

Owner:_____ Times:_____

Address:_____ (Work)_____

City/State/Zip_____ Times:_____

VIN:_____ License Plate_____ State_____

No.	Question	Answer	Reject Criteria
1	Has the speedometer/odometer ever failed to work?	☐Yes ☐No	Yes
2	Has the speedometer been replaced?	☐Yes ☐No	Yes
3	What is the odometer reading? 1/ ☑1st interval : 10,000 to 30,000 miles ☐2nd interval : 20,000 to 50,000 miles ☐3rd interval : 40,000 to 70,000 miles (Pre-selected by mfr.)	_____miles	Out of listed range 1/
4	Have you used your vehicle for any of the following activities? a) As a taxi? b) As a commercial delivery vehicle? c) To race in competitive speed events? d) To plow snow?	 ☐Yes ☐No ☐Yes ☐No ☐Yes ☐No ☐Yes ☐No	Yes
5	Do you often pull a trailer? If yes, what is the trailer weight?	☐Yes ☐No _____Lbs	more than 1000 Lbs (Mfr. fills)
6	Have you ever operated your vehicle on leaded gasoline?	☐Yes ☐No	Yes
7	Has your vehicle ever been involved in a significant accident or flood damage?	☐Yes ☐No	Yes
8	Is any performance equipment installed? or, Have you ever installed? (e.g., power-improve device or lowered suspension)	☐Yes ☐No	Yes
9	Is there any history of major engine repair such as piston, crankshaft, cylinder head or engine block replacement?	☐Yes ☐No	Yes
10	Has the catalytic converter of your vehicle ever been replaced or missing?	☐Yes ☐No	Yes
11	Are there any ominous noises or serious leaks of coolant, oil or fuel from engine or transmission?	☐Yes ☐No	Yes
12	Are there any leaks from the exhaust system?	☐Yes ☐No	Yes
13	Does the check engine indicator flash (not turn on) when you drive?	☐Yes ☐No	Yes

HONDA 1997 3.0CL 1st Program

A..TTD 3

Ford Motor Company
Environmental and Safety Engineering
Vehicle Environmental Engineering

The American Road
Room 252 WHQ
Dearborn, MI 48121

October 22, 1997

Mr. Thomas M. Ball, Chief
United States Environmental Protection Agency
2565 Plymouth Road
Ann Arbor, MI 48105

Dear Mr. Ball:

Ford Motor Company (Ford) plans to begin testing Reality Check vehicles for the1996 MY ADP family TFM4.6VJGFFL October 27, 1997. Attached, please find the list of the in-use vehicle configurations Ford plans to test.

Please contact Ms. Peg Gutmann at (313) 594-1035 if you have any questions.

Sincerely,

D. W. Berens, Manager
Surveillance and Compliance Department

Appdx. 3

1996 FINAL REALITY CHECK VEHICLE SELECTION

FORD TFM4.6VJGFFL ENGINE FAMILY

Carline: MARK VIII

Configuration	Calibration	Axle	Transmission	ETW	Sales	% of Sales	# of vehicles required	Actual # of vehicles required
1	6-38L	3.07	AUTO	4000	7357	76%	3.81	4
2	6-38K	3.27	AUTO	4000	2290	24%	1.19	1
				Total:	9647			

EPA Criteria: -5 vehicles selected based on calibration, axle, ETW, transmission and sales weight.

Result:: - 5 vehicles from 2 configurations were selected.

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1996 MY Reality Check
TFM4.6V8GFEL - 4.6L Crown Vic/Grand Marq/Town Car
Test Vehicle Configurations

Configuration	Model	Calibration	Axle	Trans	ETW	Actual Sales	Percent of Sales	Vehicle Estimate	Number of Test Vehicles Required
1	Crown Victoria Grand Marquis	6-18F	2.73	Auto	4000	110,631	55.3%	2.8	3
2	Town Car	6-18J	3.08	Auto	4250	54,788	27.4%	1.4	1
3	Crown Victoria Police	6-18I	2.73	Auto	4250	52,359	Not Eligible	Not Eligible	Not Eligible
4	Town Car	6-18E	2.73	Auto	4250	19,619	9.8%	0.5	1
5	Crown Vic. Grand Marq.	6-18H	2.73	Auto	4000	15,059	7.5%	0.4	0
					Total Engine Family Sales:	252,456			

Selection Criteria: Five vehicles are selected based on proportional sampling. Total sales for calculations is 200,097
Configuration #3 not eligible, fleet vehicles.

Attach 3

cc:
Andy Broda
(Pete K)

Environmental and
Safety Engineering
Ford Motor Company

Room 252 WHQ
The American Road
Dearborn, Michigan 48121

December 8, 1997

Trina
(EAB, LH)
FYI
Dave Brzezowski
12/8/97

Mr. Thomas M. Ball, Chief
United States Environmental Protection Agency
2565 Plymouth Road
Ann Arbor, MI 48105

Dear Mr. Ball:

Attached are the Alternate Durability Program (ADP) Reality Check reports for the 1996 MY Engine Families TFM3.0V8GKEK and TFM4.6VJGFFL. The customer vehicles tested were in their second year of customer service with mileage between 10,000 and 30,000 miles. The report contains plots of the emission data, the logs of the vehicle emissions data and maintenance, the OBD diagnostic codes report, and the procurement summary. Performance of the statistical outlier analysis indicated no outlier data points for either engine family.

The report for the TFM3.0V8GKEK engine family includes data for seven vehicles in their second year of service. Also included are data for four vehicles which were void due to incorrect dynamometer horsepower. One vehicle was rejected due to the customer having possibly created a surge to the vehicles computer, by jumping the vehicle with the cables connected reversed.

The report for the 1996 MY engine family TFM4.6VJGFFL includes data for five vehicles in their second year of service. One vehicle was rejected due to low oil.

If you have any questions or comments concerning this information please contact me.

Sincerely,

D. W. Berens

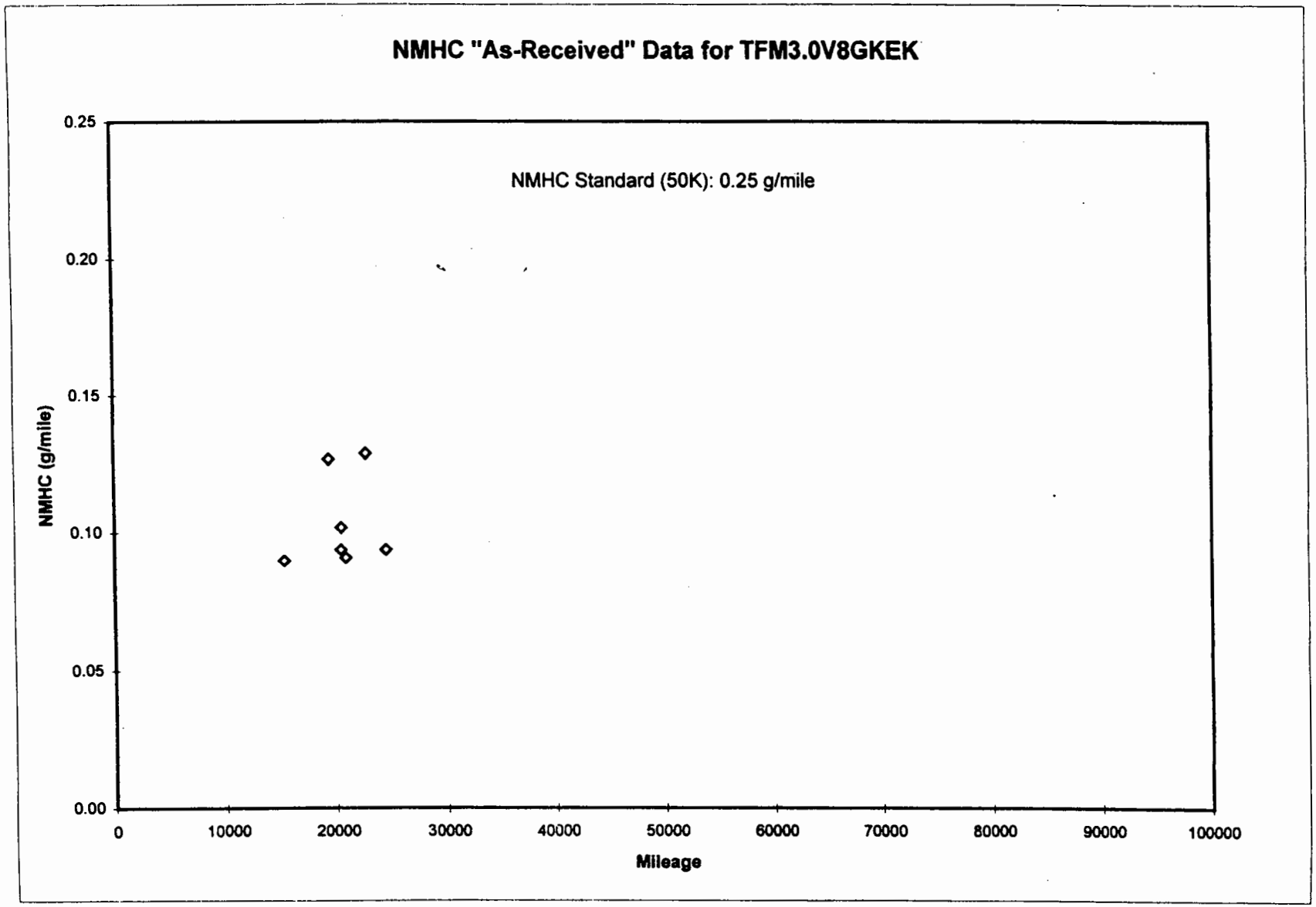
D. W. Berens, Manager
Surveillance & Compliance

Attach 1

TFM3.0V8GKEK

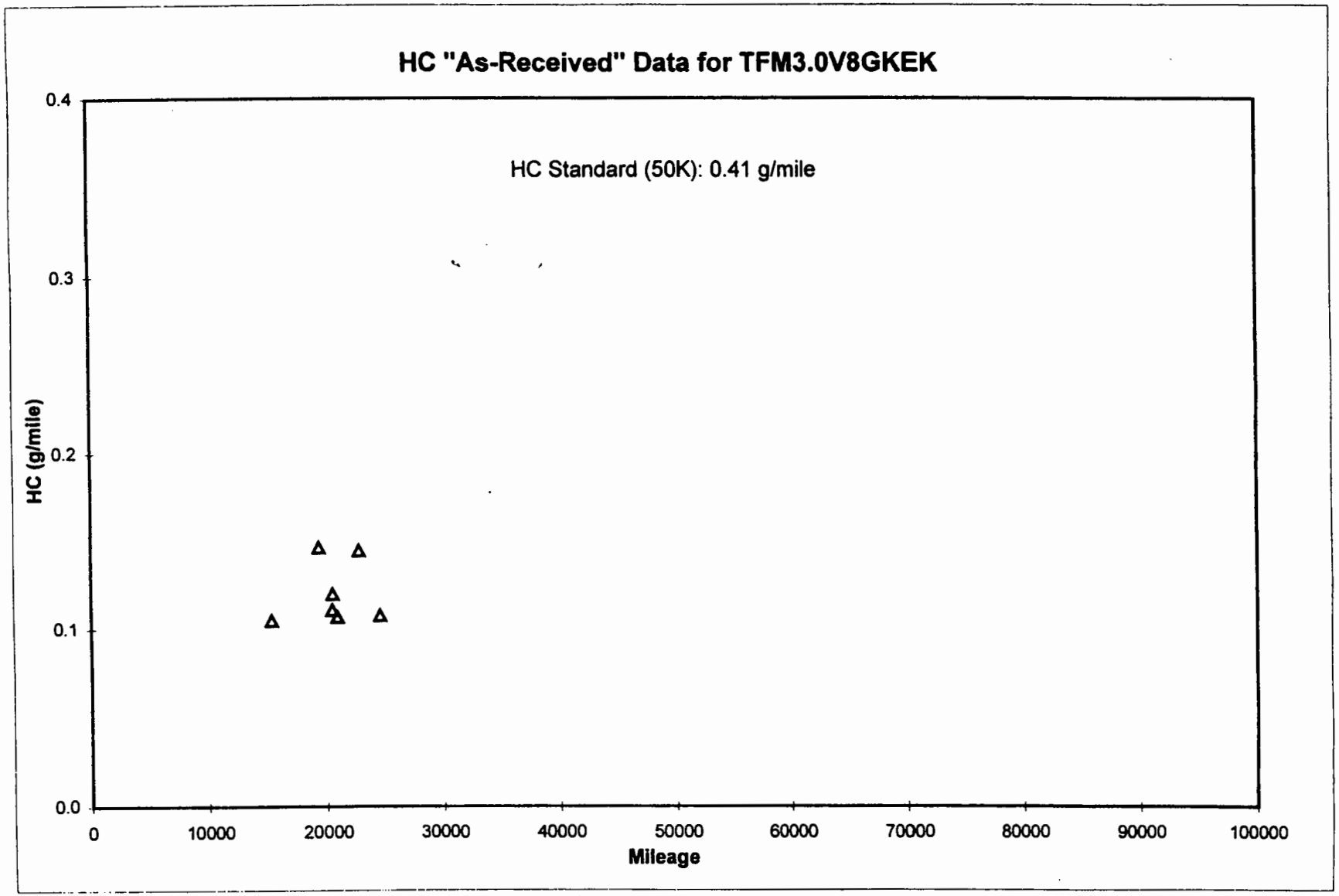
App III 41

ATTACHMENT I

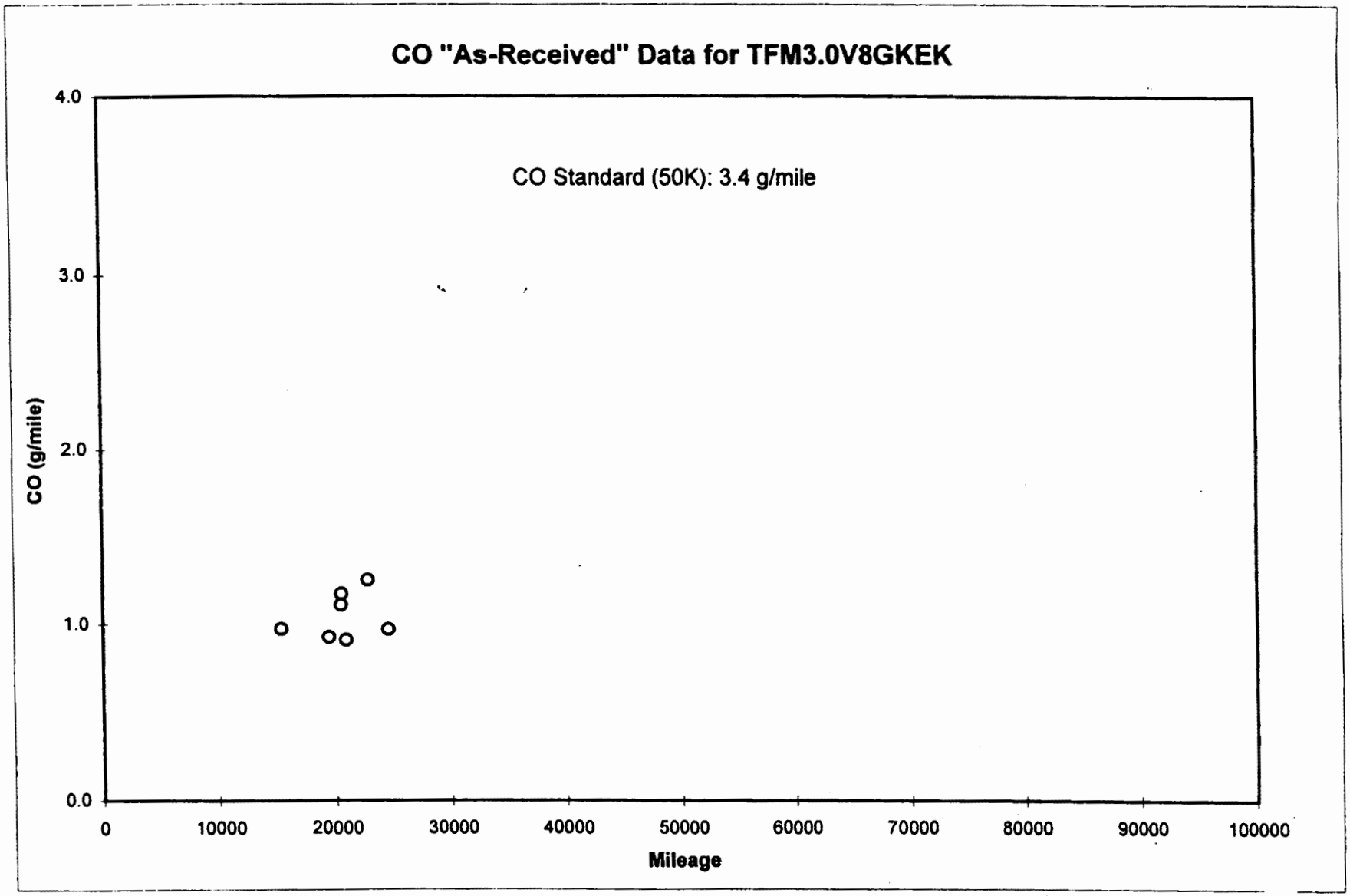


Ann Arbor

ATTACHMENT II

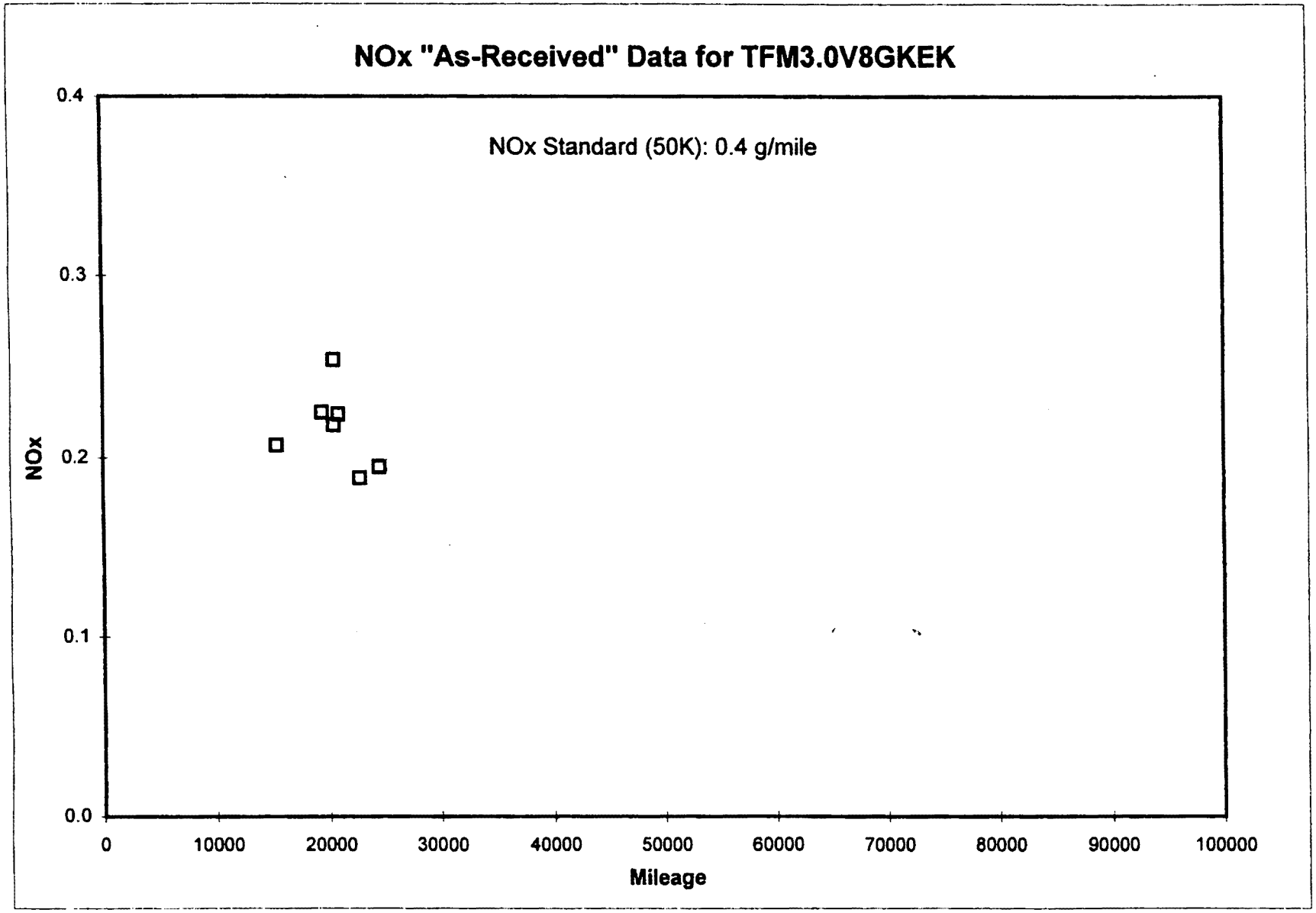


ATTACHMENT III



App III of 3

ATTACHMENT IV



Ford Motor Company

9/16/97

ATTACHMENT V

Vehicle Emission Data and Maintenance
Engine Family TFM3.0V8GKEK
(First Year Report)

Engine Family	In Service	Model Yr.	Test Loc.	Test Condition
TFM3.0V8GKEK	2	1996	CTL	Loaded Canister

Tracking No. / Model / Body Style / ODO	Test No. / VIN / Calibration / Trans	Test Date / Actual HP / ETW / Shift Sched.	Final Emission Levels (g/mile) NMHC Total	THC Total	THC Eng. Out	CO Total	CO Eng. Out	NOx Total	NOx Eng. Out	Test Type	Comments
VF0101 TAURUS GL SEDAN 14753	1 1FALP52U9TG284834 610BR11A A	9-Jul-97 6.4 3625 NA	0.095	0.109		0.99		0.21		As Received	[redacted] Tested at incorrect horsepower.
VF0101 TAURUS GL SEDAN 14772	2 1FALP52U9TG284834 610BR11A	11-Jul-97 6.4 3625 NA	0.093	0.107	2.063	0.78	10.66	0.21	2.26	Feedgas	[redacted] Tested at incorrect horsepower.
VF0102 TAURUS GL SEDAN 13662	1 1FALP52U3TG292007 610BR11A A	10-Jul-97 6.4 3625 NA	0.094	0.109		0.73		0.22		As Received	[redacted]. Tested at incorrect horsepower.
VF0102 TAURUS GL SEDAN 13681	2 1FALP52U3TG292007 610BR11A A	15-Jul-97 6.4 3625 NA	0.087	0.103	1.782	0.69	10.34	0.23	2.29	Feedgas	[redacted]. Tested at incorrect horsepower.
VF0103 TAURUS GL SEDAN 14169	1 1FALP52U3TG281668 610BR11A A	17-Jul-97 6.4 3625 NA	0.110	0.125		0.81		0.24		As Received	[redacted]. Tested at incorrect horsepower.
VF0103 TAURUS GL SEDAN 14188	2 1FALP52U3TG281668 610BR11A A	23-Jul-97 6.4 3625 NA	0.099	0.113	1.962	0.94	10.59	0.22	2.36	Feedgas	[redacted]. Tested at incorrect horsepower.
VF0104 TAURUS GL SEDAN 20628	1 1FALP52U9TG145187 610BR06A A	19-Jul-97 6.4 3625 NA	0.102	0.129		1.42		0.27		As Received	[redacted]. Tested at incorrect horsepower.
VF0105 SABLE GS SEDAN 22795	1 1MELM50U1TG655943 610AR11A A	25-Jul-97 6.4 3625 NA	0.128	0.145		1.25		0.19		As Received	

.25 .41 3.4 .4

ATTACHMENT V

Vehicle Emission Data and Maintenance
Engine Family TFM3.0V8GKEK
(First Year Report)

Tracking No. / Model / Body Style / ODO	Test No. / VIN / Calibration / Trans	Test Date / Actual HP / ETW / Shift Sched.	Final Emission Levels (g/mile) NMHC Total	THC Total	THC Eng. Out	CO Total	CO Eng. Out	NOx Total	NOx Eng. Out	Test Type	Comments
VF0106 SABLE GS SEDAN 20534	1 1MELM50UXTG663006 610AR11A A	29-Jul-97 6.4 3625 NA	0.102	0.120		1.17		0.25		As Received	
VF0107 TAURUS GL SEDAN 20495	1 1FALP52U1TG250497 610BR11A A	31-Jul-97 6.3 3625 NA	0.094	0.110		1.11		0.22		As Received	
VF0107 TAURUS GL SEDAN 20514	2 1FALP52U1TG250497 610BR11A A	5-Aug-97 6.3 3625 NA	0.084	0.098	1.776	0.84	10.57	0.22	2.43	Feedgas	
VF0108 TAURUS GL SEDAN	1 1FALP52U2TG251786 610BR11A									Rejected	Customer jumped vehicle w/ cables reversed.
VF0109 TAURUS GL SEDAN 24558	1 1FALP52U2TG179827 610BR11A A	6-Aug-97 6.3 3625 NA	0.094	0.108		0.97		0.20		As Received	
VF0109 TAURUS GL SEDAN 24576	2 1FALP52U2TG179827 610BR11A A	11-Aug-97 6.3 3625 NA	0.102	0.116	2.119	0.85	9.42	0.21	2.08	Feedgas	
VF0110 TAURUS GL SEDAN 15374	1 1FALP52U0TG274502 610BR11A A	8-Aug-97 6.3 3625 NA	0.090	0.105		0.97		0.21		As Received	
VF0110 TAURUS GL SEDAN 15393	2 1FALP52U0TG274502 610BR11A A	13-Aug-97 6.3 3625 NA	0.087	0.101	1.804	0.81	10.63	0.21	2.26	Feedgas	
VF0111 TAURUS GL SEDAN 20919	1 1FALP52U2TG125427 610BR06A A	12-Aug-97 6.3 3625 NA	0.091	0.107		0.91		0.22		As Received	

.25 .4 3.0 .2

ATTACHMENT V

Vehicle Emission Data and Maintenance
Engine Family TFM3.0V8GKEK
(First Year Report)

Tracking No. Model Body Style ODO	Test No. VIN Calibration Trans	Test Date Actual HP ETW Shift Sched.	Final Emission Levels (g/mile) NMHC Total	THC Total	THC Eng. Out	CO Total	CO Eng. Out	NOx Total	NOx Eng. Out	Test Type	Comments
VF0112 SABLE GS SEDAN 19428	1 1MELM50U6TG602140 610AR07A A	14-Aug-97 6.4 3625 NA	0.127	0.147		0.92		0.23		As Received	
			.125	.41		34		.4			

A600 TLA

ATTACHMENT VI

Summary of DTC Codes
Engine Family TFM3.0V8GKEK

Vehicle Number	Code(s)	Code Description	Action Taken
VF0101	111-111-111	SYSTEM PASS	NONE
VF0102	111-111-111	SYSTEM PASS	NONE
VF0103	111-111-111	SYSTEM PASS	NONE
VF0104	111-111-111	SYSTEM PASS	NONE
VF0105	111-111-111	SYSTEM PASS	NONE
VF0106	111-111-111	SYSTEM PASS	NONE
VF0107	111-111-111	SYSTEM PASS	NONE
[redacted]	111-111-111	SYSTEM PASS	NONE
VF0109	111-111-111	SYSTEM PASS	NONE
VF0110	111-111-111	SYSTEM PASS	NONE
VF0111	111-111-111	SYSTEM PASS	NONE
VF0112	111-111-111	SYSTEM PASS	NONE

12

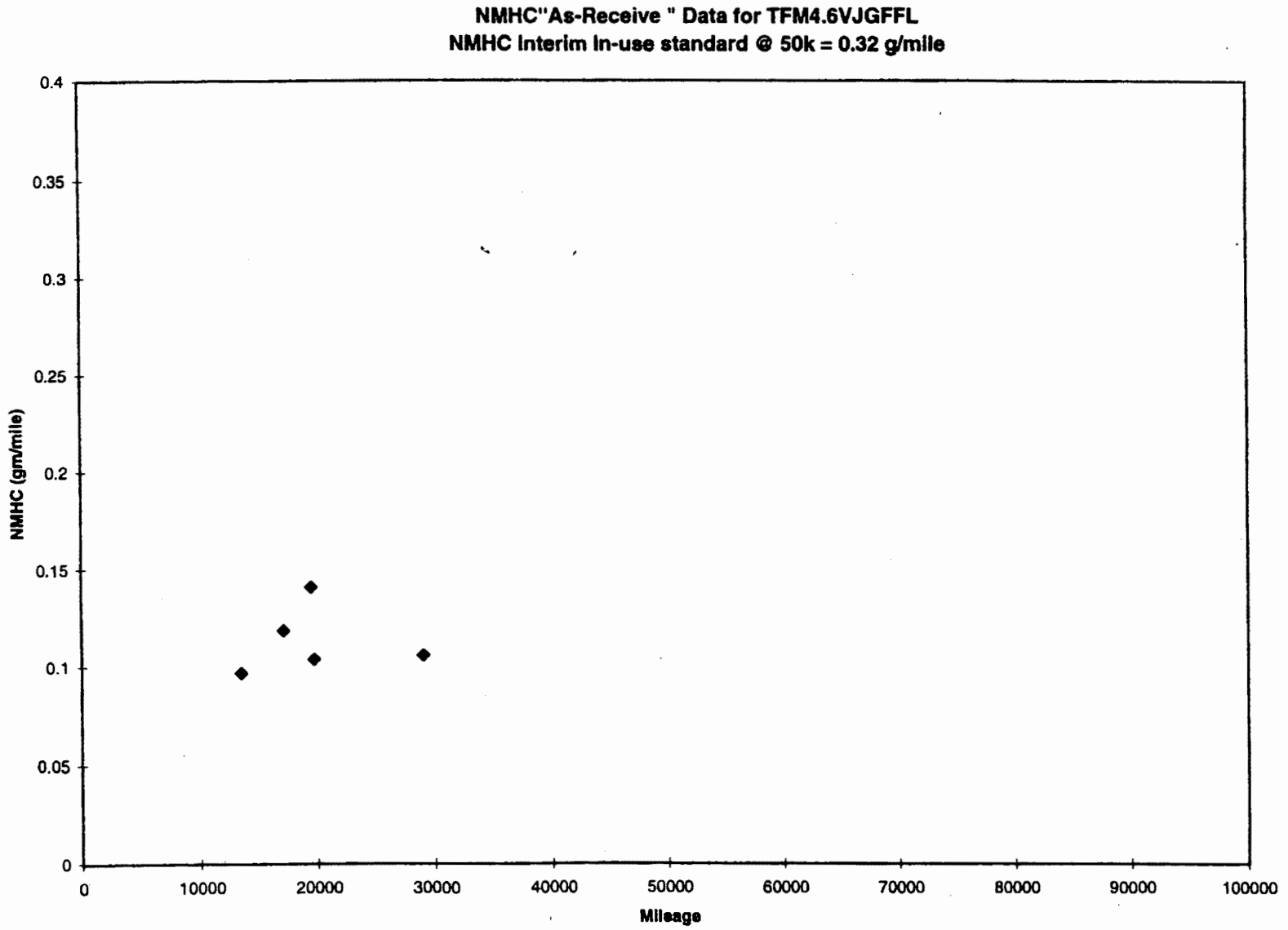
Note: A 111-111-111 code indicates system pass (I.e. no diagnostic trouble present).

Summary of Vehicle Procurement and Vehicle Rejections
Engine Family TFM3.0V8GKEK, Year 2 of Customer Service

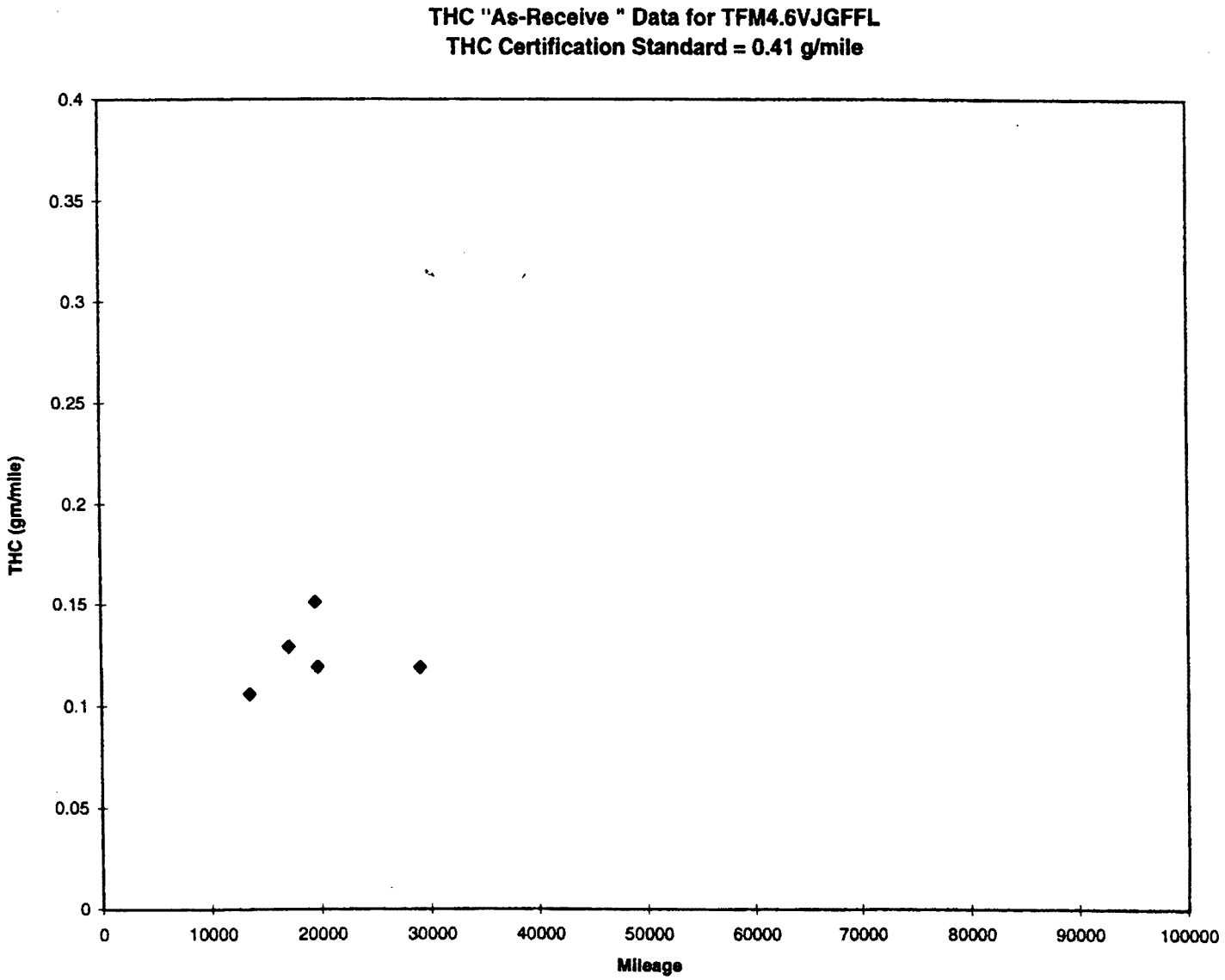
Results of Phone Survey	**Number of Vehicles/Notes**
Owners contacted	16
Vehicles acceptable	13
Vehicles eliminated	
- Ford Motor Employee	3
Result of Procurement	
Accepted	12
Rejected - Aftermarket Alarm	1
Vehicles Rejected at Laboratory	
Rejected at Laboratory	1
- Vehicle [redacted] - Improper battery jump by customer.	Approved by LaVonne Skinner, John Beadmore contacted 7/29/97.
Outlier Vehicles	**(Emission Constituent)**
None	None

TFM4.6VJGFFL

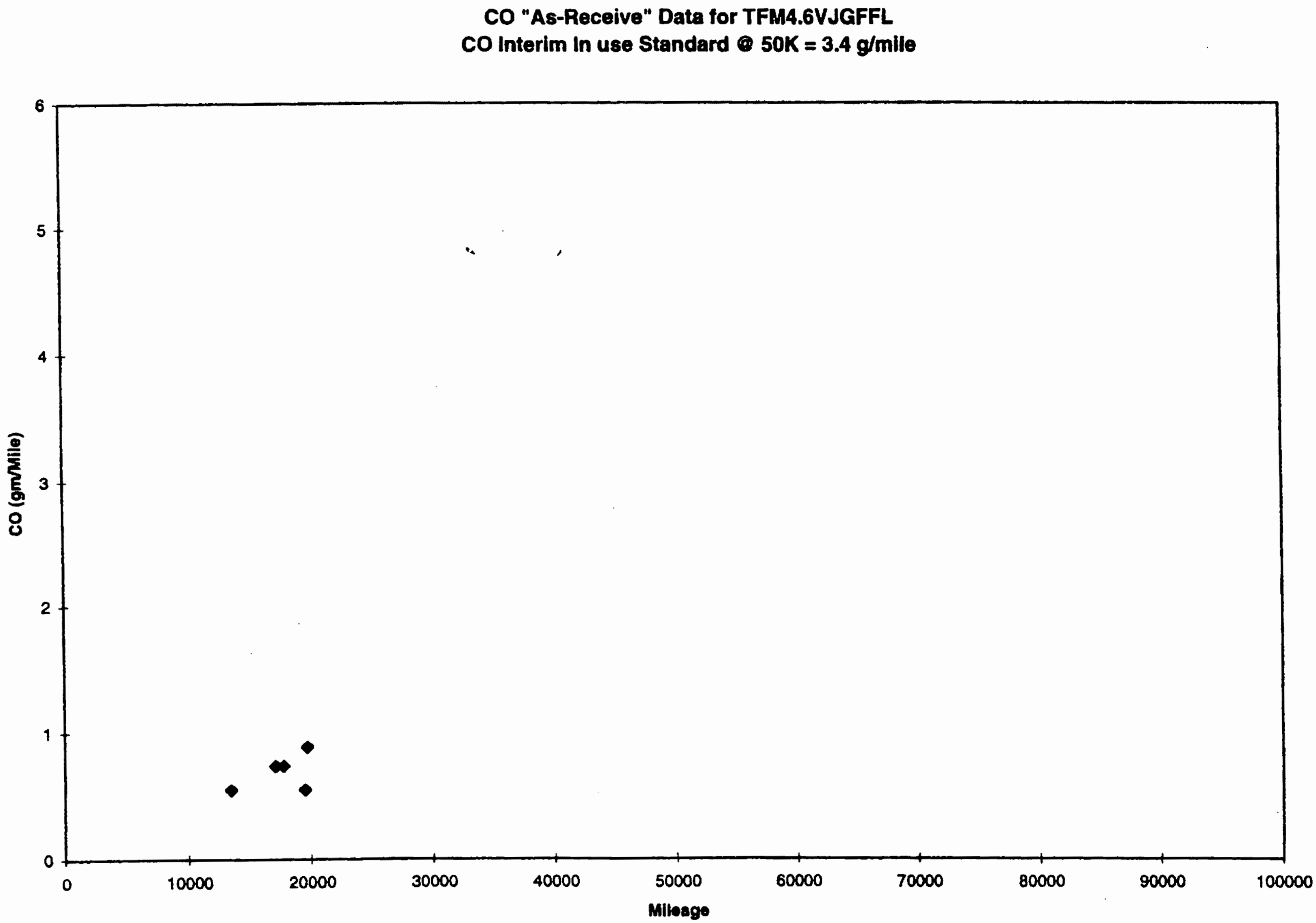
Attachment I



Attachment II

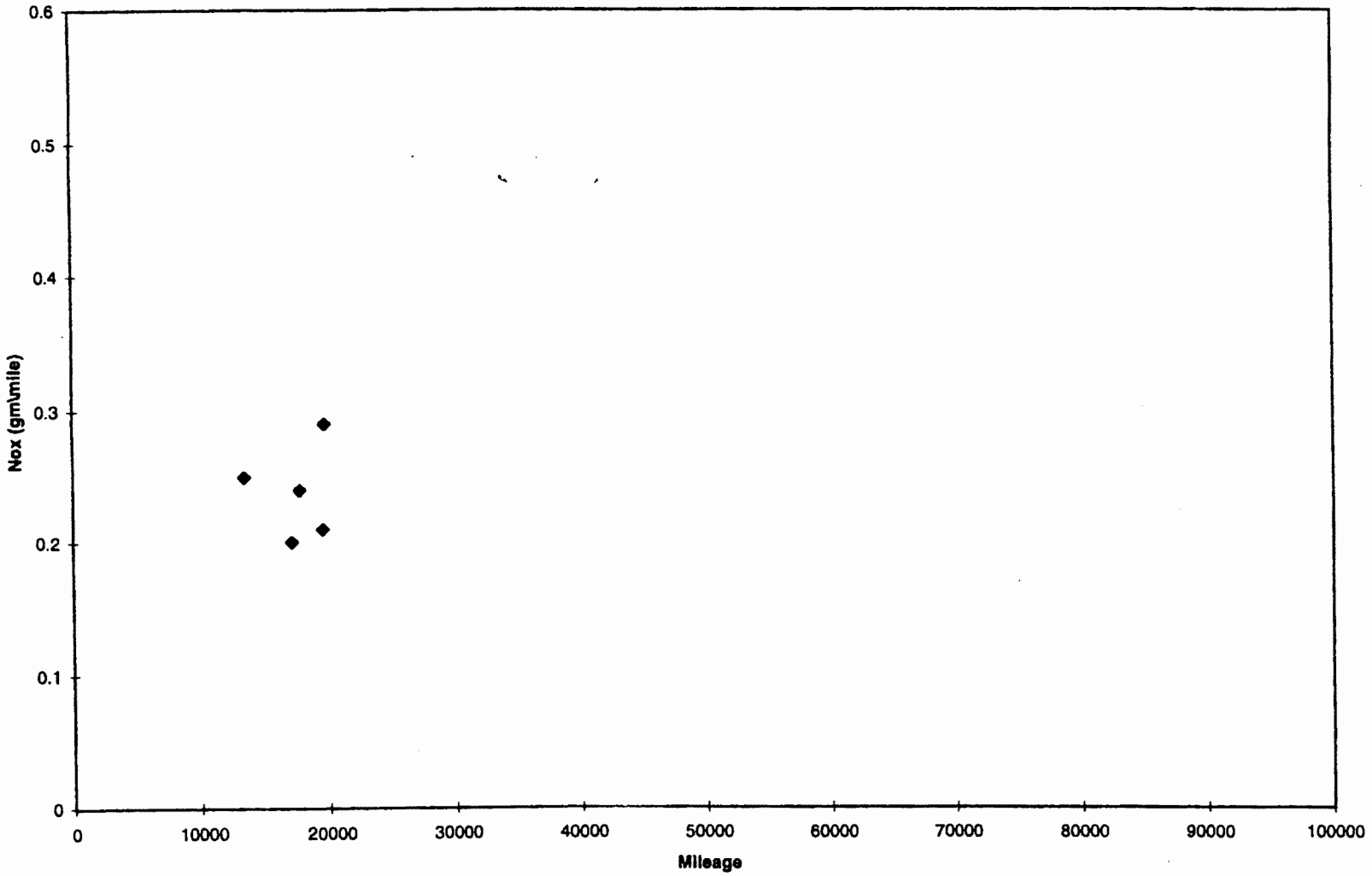


Attachment III



Attachment IV

Nox "As-Received" Data for TFM4.6VJGFFL
Nox Interim In-use Standard @ 50k = 0.4 g/mile



App III p.

Vehicle Emission Data and Maintenance
Engine Family TFM4.6VJGFFL
(Second Year Report)

Attachment V

Engine Family	Year In Service	Model Yr.	Test Location	Test Condition
TFM4.6VJGFFL	2	1996	Veh. Operat.	

Tracking No. / Model / Body Style / ODO	Test No. / VIN / Calibration / Trans	Test Date / Actual HP / ETW / Shift Sched.	Final Emission Levels (gm/mile) NMHC (.25)	THC (.41)	CO (3.4)	NOX (.4)	Test Type	Comments
VF0201 Mark VIII Sedan 19566	1 1LNLM91V3TY698752 638LR10A AUTO	11/1/97 7.6 4000 AUTO	0.141	0.151	0.55	0.21	As Received	
VF0202 Mark VIII Sedan 13522	1 1LNLM91V8TY633895 638LR10A AUTO	10/31/97 7.6 4000 AUTO	0.097	0.106	0.55	0.25	As Received	
VF0203 Mark VIII Sedan 17150	1 1LNLM91V9TY724075 638LR10A AUTO	11/5/97 7.6 4000 AUTO	0.119	0.129	0.74	0.20	As Received	
VF0204 Mark VIII Sedan 19767	1 1LNLM91V6TY653241 638LR10A AUTO	11/5/97 7.6 4000 AUTO	0.104	0.119	0.89	0.29	As Received	
VF0205 Mark VIII Sedan	1LNLM91V1TY702796 638KR10A AUTO						Vehicle Rejected	Oil 1.5 quarts low J. Beardmore contacted
VF0206 Mark VIII Sedan 17803	1 1LNLM91V5TY680091 638KR10A AUTO	11/11/97 7.6 4000 AUTO	0.106	0.119	0.74	0.24	As Received	

Summary of DTC Codes
Engine Family TFM4.6VJGFFL

Attachment VI

Vehicle Number	Code(s)	Code Description	Action Taken
VF0201	111-111-111	SYSTEM PASSED	NONE
VF0202	111-111-111	SYSTEM PASSED	NONE
VF0203	111-111-111	SYSTEM PASSED	NONE
VF0204	111-111-111	SYSTEM PASSED	NONE
VF0206	111-111-111	SYSTEM PASSED	NONE

Note: A 111-111-111 code indicates system pass (i.e. no diagnostic trouble present)

Att VI b 5f

Summary of Vehicle Procurement and Vehicle Rejections
Engine Family TFM4.6VJGFFL, Year 2 of Customer Service

Results of Phone Survey	**Number of Vehicles/Notes**
Owners contacted	6
Vehicles acceptable	6
Vehicles eliminated (list reasons)	None
Result of Procurement	
Accepted	6
Rejected (list reasons)	None
Vehicles Rejected at Laboratory	
Vehicles rejected at laboratory	1
Vehicle #VF0205 - Low Oil On Dipstick	Approved by Hikmet Alie, John Beadmore contacted 11/15/97.
Outlier Vehicles	**(Emission Constituent)**
None	None

1996 MY Reality Check
TFM3.0V8FFEK - 3.0L Taurus FFV (Methanol)
Test Vehicle Configurations

Configuration	Model	Calibration	Axle	Trans	ETW	Actual Sales	Percent of Sales	Vehicle Estimate	Number of Test Vehicles Required
1	Taurus FFV	6-10G	3.77	Auto	3750	501	100.0%	5.0	5
					Total Engine Family Sales:	501			

Selection Criteria: Five vehicles are selected based on proportional sampling.

Part III 52

1996 MY Reality Check
TFM3.0V8NFGK - 3.0L Taurus FFV (Ethanol)
Test Vehicle Configurations

Configuration	Model	Calibration	Axle	Trans	ETW	Actual Sales	Percent of Sales	Vehicle Estimate	Number of Test Vehicles Required
1	Taurus FFV	6-10C	3.77	Auto	3750	3,275	100.0%	5.0	5
					Total Engine Family Sales:	3,275			

Selection Criteria: Five vehicles are selected based on proportional sampling.

Add III 057

1996 MY Reality Check
TFM4.6VJGFEK - 4.6L 4V Mustang Cobra
Test Vehicle Configurations

Configuration	Model	Calibration	Axle	Trans	ETW	Actual Sales	Percent of Sales	Vehicle Estimate	Number of Test Vehicles Required
1	Coupe ZBJ	6-37M	3.27	M5	3750	7,139	74.6%	3.7	4
2	Convertible ZBH	6-37N	3.27	M5	3875	2,431	25.4%	1.3	1
					Total Engine Family Sales:	9,570			

Selection Criteria: Five vehicles are selected based on proportional sampling.

App III of 7

TOYOTA

TOYOTA TECHNICAL CENTER, USA, INC.

cc:
EAB
SB
LH
Pete Kohuke &
Andy Brooks

FYI

Dave
11/18/96

November 14, 1996

David Good
Vehicle Programs and Compliance Division
Mobile Source Pollution Control
U.S. Environmental Protection Agency
2565 Plymouth Road
Ann Arbor, Michigan 48105

Dear Mr. Good:

Subject: Alternate Service Accumulation Durability Program (ASADP) Reality Check Annual Report

Reference: Mr. Eldert A. Bontekoe's letter to E. Brune, General Manager, Powertrain Department AA-1 Toyota Technical Center (TTC), dated April 15, 1994 no subject.

In accordance with the guidelines of "Dear Manufacturer's Letter CD-94-13," and the referenced letter (Attached for your convenience), Toyota Technical Center herewith submits its first ASADP reality check report. This report includes data from vehicles in the 2nd year of service with mileage's in the 10 to 30 thousand mile range. This report covers the following engine families and models:

ENGINE FAMILY	MODEL
1) STY1.8VJGFFA	Corolla, Corolla Wagon
2) STY4.0VJGFFK	1995 Lexus (LS400)

The following attachments are provided in accordance with the guidelines of "CD-94-13":

Attachment I	Vehicle Emission Test Data Summary
Attachment II	Vehicle Procurement And Rejection Summary
Attachment III	On Board Diagnostics (OBD) Summary & Service Codes
Attachment IV	Engineering Reports
Attachment V	Maintenance Summary

If you have any questions or need additional information please contact Shinichi Matsumoto (313) 995-3696 or Tom Beierschmitt (313)-995-3743.

Sincerely,

Naoki Tsuji

Naoki (Nick) Tsuji
General Manager
Powertrain Department AA-No. 1

1588 Woodridge, RR #7 Ann Arbor, Michigan 48105 Telephone: (313) 995-2600

Ann Dlg 61

VEHICLE EMISSION TEST DATA SUMMARY

ENGINE FAMILY: STY1.8VHGFFA | **MODEL: COROLLA & COROLLA WAGON** | **MODEL YEAR: 1995**

TEST SITE: TTC- ANN ARBOR | **TESTING YEAR: FIRST**

VEH. I.D. / MODEL / ODO (MILES)	TEST NO. / VIN / MODEL CODE	TEST DATE / TEST(HP) / ETW (LBS)	FTP (WITH HEAT BUILD) TEST RESULTS (G/MILE) THC	NMHC	CO	NOX	(MPG) FE	COMMENTS
96-AA-39 COROLLA 17,809	1 2T1AE09B0SC105818 AE102L-DEPNKA	7/10/96 7.8 2875	0.171	0.155	2.45	0.15	30.1	A/C, P/S, A/T TEST WAS AS RECEIVED
96-AA-40 COROLLA 28,622	1 2T1AE09BXSC098179 AE102L-DEPNKA	7/10/96 7.8 2875	0.178	0.162	2.67	0.21	29.9	A/C, P/S, A/T TEST WAS AS RECEIVED
96-AA-41 COROLLA 13,869	1 2T1AE09BXSC098814 AE102L-DEPNKA	7/11/96 7.8 2875	0.165	0.151	2.14	0.15	30.6	A/C, P/S, A/T TEST WAS AS RECEIVED
96-AA-42 COROLLA 22,336	1 1NXAE00B8SZ228410 AE102L-DEPNKA	7/17/96 7.8 2875	0.202	0.185	1.92	0.22	30.1	A/C, P/S, A/T TEST WAS AS RECEIVED
96-AA-43 COROLLA 12,031	1 2T1AE09B0SC126331 AE102L-DEPNKA	7/18/96 7.8 2875	0.135	0.125	2.25	0.09	30.4	A/C, P/S, A/T TEST WAS AS RECEIVED
96-AA-61 COROLLA 20,290	1 1NXAE09BXSZ285632 AE102L-DEMNKA	8/1/96 7.8 2750	**0.195**	**0.176**	**1.89**	**0.12**	**31.3**	**TEST VOID - WRONG DYNO** **SEE ENG. REPORT** TEST WAS AS RECEIVED
96-AA-62 COROLLA 22,171	1 1NXAE09BXSZ315891 AE102L-DEMNKA	8/14/96 7.8 2750	0.179	0.161	2.12	0.19	32.8	A/C, PS, M/T TEST WAS AS RECEIVED

VEHICLE EMISSION TEST DATA SUMMARY

ENGINE FAMILY: STY4.0VJGFFK | MODEL: LEXUS LS 400 | MODEL YEAR: 1995

TEST SITE: TTC- ANN ARBOR | TESTING YEAR: FIRST

VEH. I.D. / MODEL / ODO (MILES)	TEST NO. / VIN / MODEL CODE	TEST DATE / TEST (HP) / ETW (LBS)	FTP (WITH HEAT BUILD) TEST RESULTS (G/MILE) THC	NMHC	CO	NOX	(MPG) FE	COMMENTS
96-AA-44 LS400 22,048	1 JT8UF22E2S0017520 UCF20L-AEPGKA	8/14/96 7.7 4000	0.137	0.129	0.68	0.15	21.3	A/C, P/S, A/T TEST WAS AS RECEIVED
96-AA-45 LS400 24,792	1 JT8UF22E7S0007842 UCF20L-AEPGKA	8/20/96 7.7 4000	0.139	0.129	0.78	0.18	20.7	A/C, P/S, A/T TEST WAS AS RECEIVED
96-AA-46 LS400 20,219	1 JT8UF22E6S0013759 UCF20L-AEPGKA	10/9/96 7.7 4000	0.137	0.126	0.78	0.17	20.6	A/C, P/S, A/T TEST WAS AS RECEIVED
96-AA-47 LS400 10,571	1 JT8UF22E3S0023892 UCF20L-AEPGKA	10/23/96 7.7 4000	0.141	0.131	0.71	0.13	20.4	A/C, P/S, A/T TEST WAS AS RECEIVED
96-AA-48 LS400 19,303	1 JT8UF22E4S0010228 UCF20L-AEPGKA	10/30/96 7.7 4000	0.147	0.137	0.72	0.18	20.6	A/C, P/S, A/T TEST WAS AS RECEIVED

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SUMMARY OF VEHICLE PROCUREMENT AND VEHICLE REJECTIONS

ENGINE FAMILY:	**STY1.8VJGFFA**	**STY4.0JGFFK**
MODELS AFFECTED	**COROLLA**	**LEXUS LS 400**
NUMBER OF MAILINGS	1	2
RESULT OF MAILINGS:		
A. NEW LETTERS MAILED OUT	100	67
B. UNDELIVERABLE LETTERS	7	6
C. CUSTOMER RESPONSES	22	7
D. CUSTOMERS INTERESTED IN PROGRAM	22	7
RESULTS OF PHONE SURVEY:		
A . CUSTOMERS CONTACTED	7	7
B. VEHICLES ACCEPTED	7	5
C. VEHICLES REJECTED	0	2
VEHICLES REJECTED AT TTC:	NONE	NONE
RESULT OF PROCUREMENT:		
A. VEHICLES ACCEPTED	7	5
B. VEHICLES REJECTED (LIST REASONS)	0	2
HIGH MILEAGE		1
LOW MILEAGE		1

App II p.61

SUMMARY OF OBD DIAGNOSTICS AND SERVICE CODES

A. There were no Diagnostic Trouble Codes present for any of the vehicles tested.

B. The Malfunction Indication Light (MIL) was not illuminated on any vehicle as received.

Attach 65

ENGINEERING REPORTS

Subject: Test Void for Vehicle 96-AA-61

Background Information:

A. Subsequent to testing and the return of the vehicle to the customer, it was ascertained that Vehicle 96-AA-61 was tested on Chassis Dynamometer No. 1, "CH1".

B. CH1 is not maintained in accordance with the requirements of 40CFR.

Conclusion:

TTC-AA judges the test on vehicle 96-AA-61 to be void.

MAINTENANCE SUMMARY

A. Toyota used slave tires for "Reality Check" testing on Lexus and Corolla vehicles.

B. Only maintenance performed on vehicles prior to "As Received" testing was that involving addition of necessary fluids such as transmission fluid or engine oil to assure safe testing.

C. No extraordinary maintenance operations were performed on any vehicles.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
ANN ARBOR, MICHIGAN 48105

OFFICE OF
AIR AND RADIATION

April 15, 1994

Ed Brune
General Manager
Powertrain Department AA-1
Toyota Technical Center, U.S.A , Inc.
1588 Woodridge, RR #7
Ann Arbor, MI 48105

Dear Mr. Brune:

This letter serves to document the verbal approval previously granted by EPA allowing Toyota to use an Alternative Service Accumulation Durability Program (ASADP) for 1995 engine families STY1.8VJGFFA, SNT1.8VJGFFA, and STY4.0VHGFFK. This approval is based on information submitted in a number of correspondences and in various meetings and telephone conversations.

The general elements of Toyota's ASADP program, as EPA understands them, are outlined below. If Toyota feels there are discrepancies in our understanding, these should be brought to EPA's attention as soon as possible. Otherwise, if there is agreement, Toyota should proceed with its plans. As required by 40 CFR 86.094-13(e)(8), the detailed elements of your approved ASADP should be consolidated into a written agreement documenting the details of your program for each engine family utilizing it. The agreement should contain the information required by 40 CFR 86.094-13(e)(1) through (8), including a detailed description of the in-use vehicle recruitment procedures, in-use vehicle screening procedures, and in-use vehicle testing procedures. A copy of the agreement must be included in the application for certification, as required by 40 CFR 86.094-13(e)(8).

1. Mileage Accumulation Schedule:

Toyota is using a schedule known as the Toyota 9-Lap for mileage accumulation. This whole-vehicle schedule contains higher speeds and acceleration rates than the AMA schedule, thus decreasing the number of hours for a vehicle to complete 100K durability mileage accumulation. EPA will approve the use of this mileage accumulation schedule for the above-named 1995 engine families. Future plans to utilize this schedule should be coordinated with EPA well in advance of certification. In any case, EPA is authorized to approve this schedule only through the 1996 model year. Further EPA guidance on durability requirements after that

Attach 68

E. Reporting

Any engineering reports, and test results from all testing performed will be submitted to EPA at the end of the test program. EPA will use the engineering reports to determine which test data it will use for determining in-use verification.

3. Carryover of Reality Check and Durability Data:

EPA will consider carryover/carryacross of the df data and the reality check data separately. Carryover of df data will be considered on a case-by-case basis using criteria similar to the policies in Advisory Circular 17F. However, there will likely be cases where EPA would allow a df carryover but still require a supplemental or a full in-use reality check. EPA is treating such carryover requests on a case-by-case basis. Toyota should notify EPA of its plans to utilize carryover/carryacross of any data generated from an ASADP program as soon as possible.

Please contact me or Linda Hormes of my staff if you have any questions.

Sincerely,

Eldert A. Bontekoe
Senior Project Manager
Certification Branch
Certification Division

C:\..\toyotadu.rl

ADATDP 69

time will be issued separately. If Toyota desires to make any changes to the approved 9-lap cycle, EPA must be notified as soon as possible.

Toyota will perform emission tests at the intervals previously submitted to and approved by EPA (letters from Toyota dated May 20, 1993 and July 14, 1993). Deterioration factors will be calculated using the least-squares best-fit method using all data points for the 100K dfs and for the 50K dfs.

2. In-Use Verification procedures:

A. Vehicle configuration selection

For each engine family, Toyota has agreed to test a minimum of 5 vehicles selected in the 2nd, 3rd and 4th years of service. These vehicles are to be selected from the available configurations within the engine family and are chosen to be representative of the actual sales proportions of the configurations. Prior to certification, Toyota must submit a list of configurations comprising a proposed test fleet based on projected sales. As near to the end of the production year as possible, Toyota will submit to EPA a final selection based on actual sales. EPA reserves the right to specify one configuration to be sampled each year. Once the configuration fleet has been finalized, the same configurations will be tested each year.

The vehicles are to be selected with a minimum of screening. Toyota has developed a screening questionnaire which would eliminate vehicles for reasons of safety, obvious tampering and gross mis-use. EPA prefers (but will not require) that an independent contractor be used for vehicle procurement to minimize the risk of over-screening.

B. Testing

All vehicles accepted into the program will be tested in an "as-received" condition. If, after the initial test, maintenance is performed, Toyota will document what was done and why in engineering reports.

C. Rejection of Vehicles

If Toyota wishes to subsequently reject any vehicle which had been accepted into the program, advance EPA approval must be obtained. Vehicles rejected during the questionnaire screening process must be reported to EPA.

D. In-Use Verification Pass/Fail criteria

EPA is not at this time agreeing to a methodology for determining the acceptability of in-use verification data.

Att II p 7

3-23-98

OK NL 4-7-98

TOYOTA

TOYOTA TECHNICAL CENTER, USA, INC.

March 20,1998

cc:
EAB
LH
Pete K
(Andy Binks)

Mr. David Good
Vehicle Programs and Compliance Division
U. S. Environmental Protection Agency
2565 Plymouth Road
Ann Arbor, Michigan

Dear Mr. Good:

Subject: Alternate Service Accumulation Durability Program (ASADP) Reality Check Annual Report

FYI - 25/25 passed

Dave L
4/14/98

In accordance with the guidelines of "Dear Manufacturer's Letter CD94-13" Toyota Technical Center herewith submits its annual "ASADP Reality Check Report" for the 1997 calendar year (CY). This report includes data from vehicles in the 2nd year of service for new families and the 3rd year of service for models tested in previous years as shown in table below:

ENGINE FAMILY	MODEL	YEAR OF SERVICE	MILEAGE RANGE
1) STY1.8VJGFFA	Corolla, Corolla Wagon	Third	20-50K Miles
2) STY4.0VJGFFK	Lexus LS400	Third	20-50K Miles
3) TTY1.8VJGFFK	Corolla, Corolla Wagon Celica	Second	10-30K Miles
4) TTY4.0VJGKHK	Lexus LS400	Second	10-30K Miles

The following attachments are provided in accordance with the guidelines of "CD94-13."

Attachment I	Vehicle Emission Test Data Summary
Attachment II	Vehicle Procurement And Rejection Summary
Attachment III	On Board Diagnostics (OBD) Summary & Service Codes
Attachment IV	Engineering Report
Attachment V	Maintenance Summary

If you have any questions or need additional information please contact Mr. Thomas A. Beierschmitt of my staff at (313)9953743.

Sincerely,

F. Ohya

Fumiaki Ohya
General Manager
Powertrain Department AAI

1588 Woodridge, RR #7, Ann Arbor, Michigan 48105 Telephone: (313) 995-2600

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VEHICLE EMISSION TEST DATA SUMMARY

ENGINE FAMILY: STY1.8VJGFFA | **MODEL: COROLLA & COROLLA WAGON** | **MODEL YEAR: 1995**

TEST SITE: TTC- ANN ARBOR | **TESTING YEAR: SECOND**

VEH. I.D. / MODEL / ODO (MILES)	TEST NO. / VIN / MODEL CODE	TEST DATE / TEST(HP) / ETW (LBS)	FTP (WITH HEAT BUILD) TEST RESULTS (G/MILE) THC	NMHC	CO	NOX	(MPG) FE	COMMENTS
97-AA-37 COROLLA 31,657	1 1NXAE09B8SZ314576 AE102L-DEPNKA	9/10/97 7.8 2875	0.188	0.165	2.33	0.2	30.9	A/C, P/S, A/T TEST WAS AS RECEIVED
97-AA-38 COROLLA 26,213	1 1NXAE09B9SZ280616 AE102L-DEPNKA	9/16/97 7.8 2875	0.176	0.161	2.86	0.23	29.8	A/C, P/S, A/T TEST WAS AS RECEIVED
97-AA-39 COROLLA 25,581	1 1NXAE09B8SZ335461 AE102L-DEPNKA	9/16/97 7.8 2875	0.184	0.167	2.65	0.15	30.3	A/C, P/S, A/T TEST WAS AS RECEIVED
97-AA-40 COROLLA 39,590	1 1NXAE00B9SZ226958 AE102L-DEMNKA	9/9/97 7.8 2750	0.217	0.187	1.98	0.25	31.6	A/C, P/S, M/T TEST WAS AS RECEIVED
97-AA-41 COROLLA 33,309	1 1NXAE09B9SZ271012 AE102L-DEPNKA	2/4/97 7.8 2875	0.205	0.184	2.31	0.17	30.7	A/C, P/S, A/T TEST WAS AS RECEIVED

In Use & Cert 50K Stds = .41 .25 3.4 .4

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VEHICLE EMISSION TEST DATA SUMMARY

ENGINE FAMILY: STY4.0VJGFFK | **MODEL:** LEXUS LS 400 | **MODEL YEAR:** 1995

TEST SITE: TTC- ANN ARBOR | **TESTING YEAR:** SECOND

VEH. I.D. / MODEL / ODO (MILES)	TEST NO. / VIN / MODEL CODE	TEST DATE / TEST (HP) / ETW (LBS)	FTP (WITH HEAT BUILD) TEST RESULTS (G/MILE) THC	NMHC	CO	NOX	(MPG) FE	COMMENTS
97-AA-42	1	8/21/97						
LS400	JT8UF22E1S0014785	7.7						A/C, P/S, A/T
32,140	UCF20L-AEPGKA	4000	0.137	0.122	0.59	0.25	20.9	TEST WAS AS RECEIVED
97-AA-43	1	8/27/97						
LS400	JT8UF22E0S0032274	7.7						A/C, P/S, A/T
23,021	UCF20L-AEPGKA	4000	0.160	0.145	0.91	0.21	20.4	TEST WAS AS RECEIVED
97-AA-44	1	8/28/97						
LS400	JT8UF22E0S0006080	7.7						A/C, P/S, A/T
33,688	UCF20L-AEPGKA	4000	0.168	0.143	1.12	0.25	20.8	TEST WAS AS RECEIVED
97-AA-45	1	8/13/97						
LS400	JT8UF22E4S0008575	7.7						A/C, P/S, A/T
29,307	UCF20L-AEPGKA	4000	0.193	0.169	0.93	0.28	20.3	TEST WAS AS RECEIVED
97-AA-46	1	9/3/97						
LS400	JT8UF22EXS0019564	7.7						A/C, P/S, A/T
24,442	UCF20L-AEPGKA	4000	0.141	0.124	0.84	0.20	20.5	TEST WAS AS RECEIVED

In Use & Cert 1 SOL Stds .41 .25 3.4 .4

Attach II p 73

VEHICLE EMISSION TEST DATA SUMMARY

ENGINE FAMILY: TTY1.8VJGFFK[1] | **MODEL:** COROLLA & COROLLA WAGON, CELICA | **MODEL YEAR:** 1996

TEST SITE: TTC- ANN ARBOR | **TESTING YEAR:** FIRST

VEH. I.D. [2] / MODEL / ODO (MILES)	TEST NO. / VIN / MODEL CODE	TEST DATE / TEST(HP) / ETW (LBS)	FTP (WITH HEAT BUILD) TEST RESULTS (G/MILE) THC	NMHC	CO	NOX	(MPG) FE	COMMENTS
96-AA-39 COROLLA 17,809	1 2T1AE09B0SC105818 AE102L-DEPNKA	7/10/96 7.8 2875	0.171	0.155	2.45	0.15	30.1	A/C, P/S, A/T TEST WAS AS RECEIVED
96-AA-40 COROLLA 28,622	1 2T1AE09BXSC098179 AE102L-DEPNKA	7/10/96 7.8 2875	0.178	0.162	2.67	0.21	29.9	A/C, P/S, A/T TEST WAS AS RECEIVED
96-AA-41 COROLLA 13,869	1 2T1AE09BXSC098814 AE102L-DEPNKA	7/11/96 7.8 2875	0.165	0.151	2.14	0.15	30.6	A/C, P/S, A/T TEST WAS AS RECEIVED
96-AA-42 COROLLA 22,336	1 1NXAE00B8SZ228410 AE102L-DEPNKA	7/17/96 7.8 2875	0.202	0.185	1.92	0.22	30.1	A/C, P/S, A/T TEST WAS AS RECEIVED
96-AA-43 COROLLA 12,031	1 2T1AE09B0SC126331 AE102L-DEPNKA	7/18/96 7.8 2875	0.135	0.125	2.25	0.09	30.4	A/C, P/S, A/T TEST WAS AS RECEIVED
96-AA-62 COROLLA 22,171	1 1NXAE09BXSZ315891 AE102L-DEMNKA	8/14/96 7.8 2750	0.179	0.161	2.12	0.19	32.8	A/C, PS, M/T TEST WAS AS RECEIVED
97-AA-47 COROLLA 12,572	1 1NXBA0230TZ467345 AE101L-DEHDKA	9/9/97 7.8 2750	0.176	0.154	1.60	0.17	28.4	A/C, PS, AT TEST WAS AS RECEIVED
97-AA-48 COROLLA 12,513	1 1NXBA02E0TZU77938 AE101L-DEHDKA	9/23/97 7.8 2750	0.200	0.179	1.61	0.21	27.2	A/C, PS, M/T TEST WAS AS RECEIVED

[1] This family has (2) 96MY 1.6L Corollas and (5) C/O 1.8L Corollas from family STY1.8VJGFFA. Approved 6/19/97.

[2] In 1996 CY Toyota tested (5) A/T Corollas and (1) M/T Corolla. Only (4) A/T were required.

All TLA

Cert & In-use Stds: .41 .25 3.4 .4

DFs:	50k	100k
NMHC	1.246	1.427
CO	1.205	1.512
NO_x	1.297	1.620

VEHICLE EMISSION TEST DATA SUMMARY

ENGINE FAMILY: TTY4.0VJGKHK [1] | **MODEL:** LEXUS LS 400 | **MODEL YEAR:** 1996

TEST SITE: TTC- ANN ARBOR | **TESTING YEAR:** FIRST

VEH. I.D. / MODEL / ODO (MILES)	TEST NO. / VIN / MODEL CODE	TEST DATE / TEST (HP) / ETW (LBS)	FTP (WITH HEAT BUILD [2]) TEST RESULTS (G/MILE) THC	NMHC	CO	NOX	(MPG) FE	COMMENTS
96-AA-44 LS400 22,048	1 JT8UF22E2S0017520 UCF20L-AEPGKA	8/14/96 7.7 4000	0.137	0.129	0.68	0.15	21.3	A/C, P/S, A/T TEST WAS AS RECEIVED
96-AA-45 LS400 24,792	1 JT8UF22E7S0007842 UCF20L-AEPGKA	8/20/96 7.7 4000	0.139	0.129	0.78	0.18	20.7	A/C, P/S, A/T TEST WAS AS RECEIVED
96-AA-46 LS400 20,219	1 JT8UF22E6S0013759 UCF20L-AEPGKA	10/9/96 7.7 4000	0.137	0.126	0.78	0.17	20.6	A/C, P/S, A/T TEST WAS AS RECEIVED
96-AA-47 LS400 10,571	1 JT8UF22E3S0023892 UCF20L-AEPGKA	10/23/96 7.7 4000	0.141	0.131	0.71	0.13	20.4	A/C, P/S, A/T TEST WAS AS RECEIVED
96-AA-48 LS400 19,303	1 JT8UF22E4S0010228 UCF20L-AEPGKA	10/30/96 7.7 4000	0.147	0.137	0.72	0.18	20.6	A/C, P/S, A/T TEST WAS AS RECEIVED
97-AA-56 LS400 10,928	1 JT8BH22F9T0067083 UCF20L-AEPGKA	9/23/97 7.7 4000	0.154	0.136	0.86	0.17	20.3	**VOID: CANISTER NOT LOADED** A/C, P/S, A/T TEST WAS AS RECEIVED
97-AA-57 LS400 10,119	1 JT8BH22F1T0056501 UCF20L-AEPGKA	11/19/97 7.7 4000	0.136	0.122	1.13	0.16	20.5	CAN LOADED TO 2G Breakthrough A/C, P/S, A/T TEST WAS AS RECEIVED

[1] This engine family consists of (1) 96MY LS400 and (5) C/O 1995 LS400 from family STY4.0VJGFFK. Approved by EPA 7/25/97.

[2] Canister loaded to 2 gram breakthrough for 97-AA-57.

Cert Fuel Tier 1 w/ 50K Stds! .41 .25 3.4 .4 DFS

	50K	100K
NMHC	1.104	1.216
CO	1.053	1.110
NO_x	1.159	1.331

ATTACHMENT II

ENGINE FAMILY:	**STY1.8VJGFFA**	**STY4.0VJGFFK**	**TTY1.8VJGFFK**	**TTY4.0VJGKHK**
MODELS AFFECTED:	1.8L Corolla 1.8L Corolla Wagon	Lexus LS400	1.8L Corolla 1.8L Corolla Wagon 1.8L Celica, 1.6L Corolla	Lexus LS400
RESULTS OF MAILINGS:				
NEW LETTERS MAILED OUT	600	98	300	100
UNDELIVERABLE LETTERS	62	3	0	1
CUSTOMER RESPONSES	95	95	17	2
CUSTOMERS INTERESTED IN PROGRAM	95	10	17	2
RESULTS OF PHONE SURVEY:				
CUSTOMERS CONTACTED	5	6	2	2
VEHICLES ACCEPTED	5	5	2	2
VEHICLES REJECTED	90	1	15	0
VEHICLES REJECTED AT TTC	NONE	NONE	NONE	NONE
RESULT OF PROCUREMENT:	0	0	0	0
VEHICLES ACCEPTED	5	5	2	2
VEHICLES REJECTED & REASONS				
HIGH MILEAGE	17	0	2	0
LOW MILEAGE	15	4	3	0
CUSTOMER CHANGED MIND	0	1	0	0
TESTING ALREADY COMPLETED	58	0	10	0

SUMMARY OF OBD DIAGNOSTICS AND SERVICE CODES

A. There were no Diagnostic Trouble Codes present for any of the vehicles tested.

B. The Malfunction Indicator Lamp (MIL) was not illuminated on any vehicle as received.

ENGINEERING REPORTS

Subject: Test Void for Vehicle 97-AA-56

Background Information:

A. Subsequent to testing and the return of the vehicle to the customer, it was ascertained that Vehicle 97-AA-56 was tested by using heat build instead of canister loading as required by certification procedures.

B. Paragraph 5.b. of "CD-94-13" clearly states that "Each tailpipe emission test must be conducted using EPA certification-quality test procedures, e.g. using pre-loaded canister test procedures if the engine family is certified using those test procedures."

Conclusion:

TTC-AA judges test on vehicle 97-AA-56 to be void since canister was not loaded.

MAINTENANCE SUMMARY

A. Toyota uses slave tires for "Reality Check" testing on Lexus and Corolla vehicles.

B. Only maintenance performed on vehicles prior to "As Received" tesing was that involving addition of necessary fluids such as transmission fluid or engine oil to assure safe testing.

C. No extraordinary maintenance operations were performed on any vehicles.

Att-III p7

EPA-420-D-98-100