

Technical Report

Collection of Lead Poisoned
Catalysts in Houston

By

Craig A. Harvey

September 1986

NOTICE

Technical Reports do not necessarily represent final EPA decisions or positions. They are intended to present technical analysis of issues using data which are currently available. The purpose in the release of such reports is to facilitate the exchange of technical information and to inform the public of technical developments which may form the basis for a final EPA decision, position or regulatory action.

Technical Support Staff
Emission Control Technology Division
Office of Mobile Sources
Office of Air and Radiation
U. S. Environmental Protection Agency

SOUTHWEST RESEARCH INSTITUTE

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September 29, 1986

TO: Mr. Craig A. Harvey, Project Officer
Emission Control Technology Division
Environmental Protection Agency
2565 Plymouth Road
Ann Arbor, MI 48105

FROM: Daniel A. Montalvo and Charles T. Hare
Department of Emissions Research
Southwest Research Institute
6220 Culebra Road
San Antonio, TX 78284

SUBJECT: Monthly Progress Report No. 8 for the period August 31 through
September 29, 1986; Work Assignment No. 2-16, Contract 68-03-
3192, "Collection of Lead Poisoned Catalysts in Houston," SwRI
Project 03-7774-016.

I. INTRODUCTION

This project was conducted to complete the passenger car and light truck lead-poisoned catalyst collection begun in the Houston, Texas area under Work Assignment No. 11 of this contract. Five lead-poisoned catalysts were collected under Work Assignment No. 11; five additional catalysts were to be collected under Work Assignment No. 2-16. Various methods to evaluate the conditions of the degraded catalysts include weight and backpressure measurements, and x-ray diffraction to define substrate structure.

This report is the last monthly progress and expenditure report to be submitted to EPA under Work Assignment No. 2-16, Contract 68-03-3192, and also constitutes the final report for the same assignment. Procurement of five or less additional lead-poisoned catalysts under this assignment was not achieved based on inspection stations reporting a very low number of failures due to positive Plumbtesmo tests and/or tampered fuel inlets. This type of failures were much less than one percent of an average 5000 I/M inspections conducted per month as indicated on reports from inspection stations found in Appendix A to this report. Major reasons suggested by inspection stations for the small rejection numbers are as follows:

1. Vehicle owners are more aware of stringent I/M inspection program which requires costly replacement of poisoned catalysts and/or tampered fuel inlets.
2. Some inspection stations are located in affluent areas where need or reason for misfueling is less apparent.
3. Recent comparable prices for leaded and unleaded gasoline.



SAN ANTONIO, TEXAS
WITH OFFICES IN HOUSTON, TEXAS, AND WASHINGTON, D.C.

Of those few gasoline vehicles rejected for positive Plumbtesmo tests and/or tampered fuel inlet, inspection stations report some owners likely do their own replacement work or seek other stations to approve their vehicles without need for catalyst and/or fuel inlet replacement. During the course of Work Assignments No. 11 and 2-16, Intercol reported it received only five calls from vehicle owners with poisoned catalysts; all five vehicles were accepted.

II. WORK ACCOMPLISHED DURING THE CURRENT REPORTING PERIOD

Since no further calls were received at Intercol from owners of vehicles with poisoned catalysts and/or tampered fuel inlets during Work Assignment No. 2-16, this report serves to summarize inspection and testing results obtained with the five catalysts and corresponding fuel samples procured during Work Assignment No. 11.

Table 1 lists the five vehicles converted at Intercol. For identification purposes in this report and for subsequent shipping to EPA, the vehicle numbers are also used to identify corresponding poisoned catalysts. A brief description of the poisoned catalysts along with results of the visual inspections and x-ray analyses, and atomic absorption analyses with corresponding fuel samples is provided in Table 2. More descriptive individual reports for Catalysts No. 1 through No. 5 are presented in Appendices B through F, respectively. Included in Appendices B through F are copies of the new OEM catalyst purchase receipts with source and individual price noted therein.

Table 2 shows that four catalysts were in good overall physical condition as evidenced by visual and x-ray inspections. Catalyst No. 2 was the exception by showing a large meltdown area in the outlet monolith region. With the exception of Catalyst No. 5, all catalysts tested positive with the Plumbtesmo test. It is unclear why Catalyst No. 5 indicated negative at its inlet (testing was repeated several times to confirm). Catalyst HC and CO efficiencies were highest with Catalyst No. 2, 3, and 5. Catalyst No. 2 presented the highest HC (82.7%), CO (96.4%), and NO_x (42.6%) efficiencies of the five catalysts in spite of the meltdown zone and relatively high mileage (62,371) noted for this catalyst. Lead content of the fuel tank samples analyzed by atomic absorption indicated values (0.002 g/gal or less) normally found in unleaded gasoline.

III. QUALITY ASSURANCE

Catalyst backpressures and conversion efficiencies were determined at SwRI using laboratory procedures evaluated for repeatability as specified in the Final Report of Work Assignment No. 20, EPA Contract 68-03-3192. As specified by the Project Officer, atomic absorption lead values determined at SwRI for the fuel tank gasoline samples will be evaluated for accuracy by EPA, using the lead content values also determined for EPA reference samples by SwRI as reported in the individual catalyst test reports in Appendices B through F of this report.

IV. CATALYST SHIPMENT TO EPA

At the termination of Work Assignment No. 2-16 the five catalysts discussed in this report will be shipped by Motor Freight to the attention of the

TABLE 1. VEHICLES CONVERTED AT INTERCOL

Vehicle No.	Mfr/Engine Family	Model	Engine		Vehicle Type	Carb.	Engine Cylinders	Control System
			CID	Liters				
5a	1980 Ford/2000 ^b	Courier	120	2.0	LDT	2BBL	L4	EGR/PLS/OC
3a	1981 Datsun/CNS15V2AAF6 ^c	210	91	1.5	LDV	2BBL	L4	EGR/PLS/OC
2a	1982 Ford/CFM1.6V2GKC2 ^d	Escort	98	1.6	LDV	2BBL	L-4	EGR/AIR/OC/3W
1a	1982 Ford/CFM50T2AAF4 ^e	F150	302	5.0	LDT	2BBL	V-8	EGR/AIR/OC
4a	1982 Ford/CFM50T2AAF4 ^e	F150	302	5.0	LDT	2BBL	V-8	EGR/AIR/OC

^aFailed Plumbtesmo Test

^bVehicle is not included in 1980 Vehicle Eligibility List, but was approved by EPA Project Officer for candidacy

^cVehicle corresponds to Item No. 12 of 1981 Vehicle Eligibility List

^dVehicle corresponds to Item No. 15 of 1982 Vehicle Eligibility List

^eVehicle corresponds to Item No. 21 of 1982 Vehicle Eligibility List, but is considered eligible only as a 1980 Model (i.e., 5 maximum in overall catalyst collection)

TABLE 2. SUMMARY OF INSPECTION AND TESTING PERFORMED ON POISONED CATALYSTS AND FUEL SAMPLES

Vehicle			Catalyst					
No.	Model	Odometer Mileage	Type	Visual Inspection Rating	X-Ray Analysis	Plumbtesmo Test ^a		Backpressure, in. H ₂ O ^(b)
						Inlet	Outlet	
5	1980 Ford Courier	81176	Single-bed pelleted	Good	No abnormality	N	P	5.0
3	1981 Datsun 210	46312	Single-bed monolith	Good	No abnormality	P	P	4.0
2	1982 Ford Escort	62371	Dual-bed monolith with air inlet port	Good	Large meltdown area at outlet monolith	P	P	4.3
1	1982 Ford F150	47830	Dual-bed monolith	Good	No abnormality	P	P	11.8
4	1982 Ford F150	86610	Dual-bed monolith	Good	No abnormality	P	P	8.7

Vehicle			Catalyst Efficiency, % ^b			Fuel Tank Sample Lead (Pb), g/gal
No.	Model	Odometer Mileage	HC	CO	NO _x	
5	1980 Ford Courier	81176	54.8	66.7	5.3	0.002
3	1981 Datsun 210	46312	72.7	85.4	11.3	0.001
2	1982 Ford Escort	62371	82.7	96.4	42.6	0.001
1	1982 Ford F150	47830	10.7	1.7	2.6	0.002
4	1982 Ford F150	86610	28.6	29.1	2.5	0.002

^aPlumbtesmo Test: P = positive, N = Negative

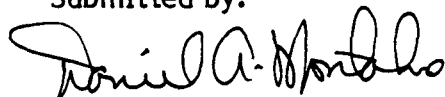
^bEngine conditions: 1800 rpm, load adjusted to give catalyst inlet temperature of 730 ± 30°F, 14.6 air/fuel ratio

Branch Technical Representative at the EPA in Ann Arbor, Michigan. Each catalyst will be identified with the corresponding vehicle number, Work Assignment Number, and Contract Number.

VI. EXPENDITURES

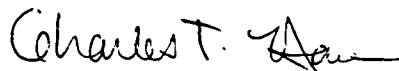
Projected and actual expenditures for Assignment No. 2-16 are shown in Figure 1. As of September 12, 1986, expenditures were \$7,205.26 or 67.88 percent of the projected total.

Submitted by:



Daniel A. Montalvo
Research Physicist
Department of Emissions Research

Approved by:



Charles T. Hare
Director
Department of Emissions Research

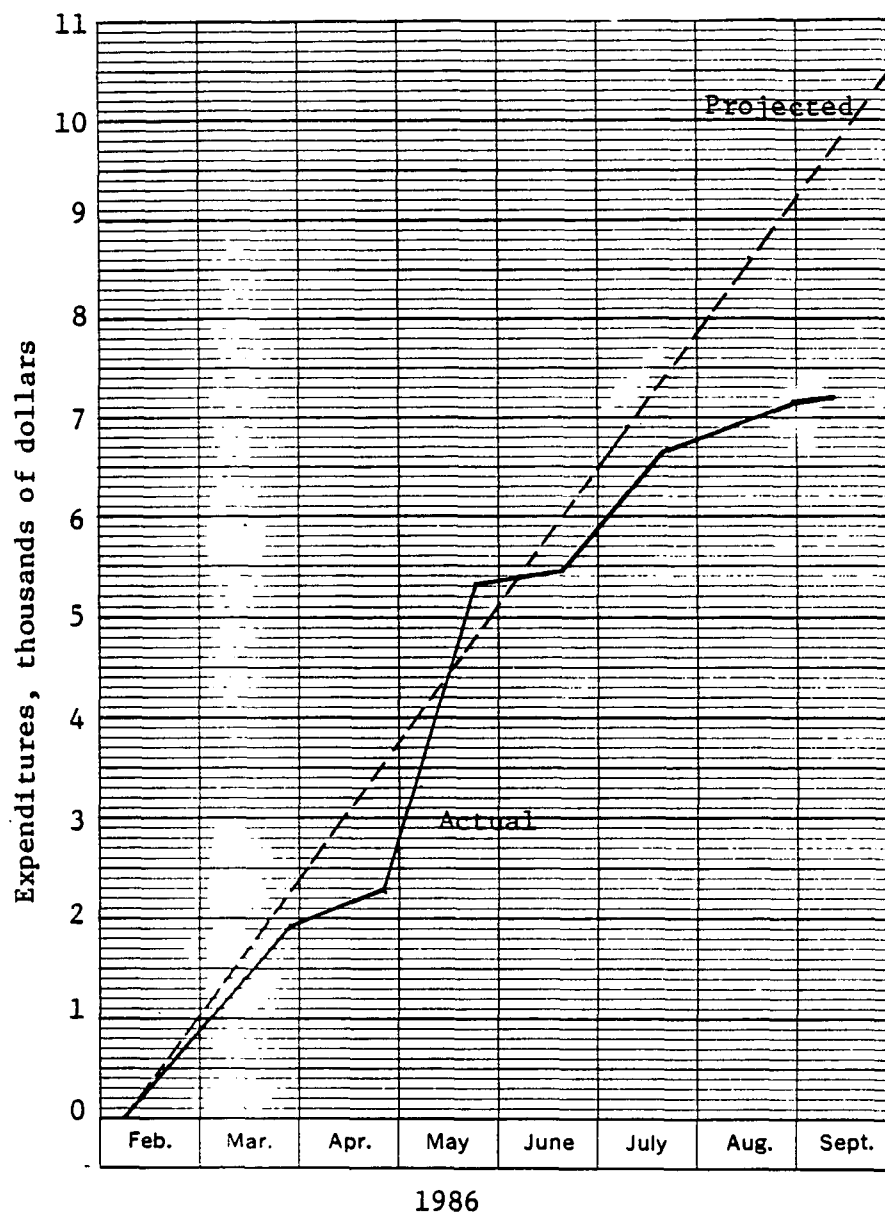


Figure 1. Projected and Actual Expenditures for Work Assignment No. 2-16
Contract 68-03-3192, Project 03-7774-016

APPENDIX A
LIST OF INSPECTION STATIONS

**TABLE 1. AVERAGE NUMBER OF STATE INSPECTIONS AND FAILURES REPORTED
BY HARRIS COUNTY INSPECTION STATIONS**

<u>Inspection Station</u>	<u>Average Number of Inspections per Month</u>	<u>Number of Failures</u>
E.T. Auto Service	200	2a
Exxon Company USA 2920	500	0
Mort Hall Ford, Inc.	4	0
Lindale Electric	600	0
Marks N. Main Gulf	700	2a 2b
Perry State Inspection Service	400	0
Preston Auto Repair	200	0
Frontier Ford	4	15a
Whites (F.E. Doe, Inc.)	450	0
Tony's Service Station	400	0
Mike Hall Dodge/Mazda	4	0
Johnny Moran Texaco	300	0
Painter's Mobil	600	0
Ferranti & Sons	200	1a,c
P & M Automotive	150	0
T's, Inc.	150	0
1960 Gulf	150	2a

^aFailed because of positive Plumbtesmo test and/or modified fuel inlet

^bVehicles had no catalyst

^cDid not provide solicitation letter

APPENDIX B
INDIVIDUAL TEST REPORT
FOR CATALYST NO. 1

REPORT OF INTERCOL'S CONFIRMATORY INSPECTION FOR
MISFUELED 1980-83 LIGHT-DUTY GASOLINE PASSENGER
CARS AND TRUCKS IN HOUSTON, TEXAS

INSPECTION STATION: NAME D + M AUTOMOTIVE
ADDRESS 23503 HARBO RD
PHONE NO. 353-7034
FAILED INSPECTION: DATE 9/84 ORIGINAL PREVIOUS ODOMETER 47830
FAILURE: MODIFIED FUEL INLET YES AND/OR POSITIVE PLUMBESMO TEST POS
VEHICLE OWNER: NAME HAUS UTILITY SERVICE
ADDRESS 2200 SCILADA
PHONE NO. 353-9819
VEHICLE NO.: SWRI # 1 LICENSE: STATE TX YEAR 85 NO. VA 4372
MAKE FORD YEAR '82 MODEL F150 GVWR 2650
MFR/ENGINE FAMILY LDV LDT X
VIN 1FTDF15F00PA92595 BODY TYPE PICK-UP
ENGINE SERIAL NO.: N/A ENGINE SIZE: CID 302 LITERS
ENGINE: TYPE EM51T2AA CYLINDERS 8
FUEL SYSTEM: CARBURETOR X BARRELS 2 INJECTION
POLLUTION CONTROL SYSTEM ELR-DIP-DC
VEHICLE CLASSIFICATION/TABLE 1: YEAR 82 NO. N/A
INITIAL INSPECTION AT INTERCOL: DATE 8/20 INSPECTOR R. J. BRY
OEM CATALYST: YES X NO NO MODIFIED FUEL INLET: YES NO NO X
PLUMBESMO: POSITIVE X NEGATIVE NO FUEL SAMPLE OBTAINED YES
ELIGIBILITY STATUS: ACCEPT X REJECT NO ODOMETER
OEM CATALYST/EXHAUST AND/OR FUEL SYSTEM CONDITION: CAT + MUFFLER
TO BE REPLACED
EXHAUST AND/OR FUEL SYSTEM PARTS REQUIRED:
DATE EXHAUST AND/OR FUEL SYSTEM PARTS ORDERED 9/26/85
DATE EXHAUST AND/OR FUEL SYSTEM PARTS RECEIVED 9/26 DATE OWNER CONTACTED 9/26
DATE EXHAUST AND/OR FUEL SYSTEM PARTS INSTALLED 9/27/85
DATE FUEL TANK TOPPED WITH UNLEADED FUEL N/A

CODING OF INDIVIDUAL PARTS FOR INSPECTION AND ANALYSIS AT SWRI: TAG OR
PAINT SWRI VEHICLE NO. AND ENGINE SERIAL NO. ON EACH PART:

CATALYST #1 (IDENTIFY INLET, OUTLET, AND TOP SIDES:
SEAL INLET/OUTLET ENDS/TAPE)
OXYGEN SENSOR NONE
FUEL SAMPLE #1 (SEAL CAP WITH TEFLON TAPE)
DATE SWRI NOTIFIED PARTS ARE READY FOR PICKUP 9/27/85
DATE PARTS PICKED UP 9/30/85

DATE 3/31/86

WORK ASSIGNMENT NO. 2-16
"CONTINUATION OF HOUSTON CATALYST COLLECTION"
(SwRI PROJECT 03-7774-016)

CATALYST NO. 1



Vehicle SwRI Code 1 Odometer Miles 47830 Vehicle Year and Make 1982

Ford Model F150 Pickup Vehicle VIN 1FTDF15FOCPA92595

Engine Family CFM50T2AAF4 Engine: CID 302 Liters 5.0

Engine Cyls. V8 Emission Control System EGR/AIR/OC

Fuel System: Carburetor 2BBL Fuel Injection _____

Date Vehicle Failed Inspection: Original _____ Previous 9/84

Failure Type: Modified Fuel Inlet _____ and/or Positive Plumbtesmo Test Yes

Date Exhaust and/or Fuel System Parts Installed 9/27/85

CATALYST NO. 1 (CONT'D)

Visual Inspection Summary In-line dual bed monolith catalyst with rusty case but
in good condition showing no evidence of overheating. No internal looseness.
Monolith is dark gray at inlet and light gray on outlet. No fractures, melts,
or plugging.

Testing

Catalyst Weight, lb * 12.27 Approximate Dimensions 17x8x3 in.

Plumbtesmo Test: Catalyst Inlet Positive Outlet Positive

Oxygen Sensor N/A

Catalyst X-Ray shows no abnormality

See positive photo of x-ray negative on next page.

Catalyst Backpressure, in. H₂O: 11.8 at Catalyst Inlet Temperature °F 730,

Engine RPM 1800, Engine Torque, ft/lb 43.6,

and Equivalent Engine CID of 305 (5.0 liter)

Catalyst Efficiency (%) HC 10.7 CO 1.7 NO_x 2.6

Atomic Absorption Lead Content Analysis for:

<u>Sample</u>	<u>Pb, g/gal</u>
Gasoline Sample # 1	0.002
EPA Reference 0001028	0.08
EPA Reference 0001975	0.017

*Catalyst weight includes weight of inlet and outlet pipes when integral to catalyst

CATALYST NO. 1 (CONT'D)

INLET



OUTLET

Positive Photo of X-Ray Negative - Catalyst No. 1

Vehicle No. 1



ORIGINAL INVOICE

PARTS INVOICE

"The Best Way to Ford Country"

6445 SOUTHWEST FREEWAY • 713 / 776-7600

MAILING ADDRESS: P. O. BOX 36344, HOUSTON, TEXAS 77036

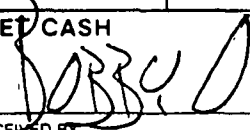
Any warranties on the products sold hereby are those made by the manufacturer. The Seller, WESTWAY FORD, INC., hereby expressly disclaims all warranties, either express or implied, including any implied warranty of merchantability or fitness for a particular purpose, and WESTWAY FORD, INC. neither assumes nor authorizes any other person to assume for it any liability in connection with the sale of said products.

CUST. I.D.	SALESMAN	SHIP VIA	WAYBILL NO.	P.O. # OR R.O. #	TERMS	INVOICE DATE	INVOICE NUMBER
65F	HHA400					SEP/25/1985	91901
PAGE 01 OF 01							

SOLD
CASH SALES
INTERCOLE CORP
15402 VANTAGE PARKWAY EAST
TO

SHIP
TO

***** THANK YOU FOR YOUR BUSINESS *****

ITEM NO.	ORDERED	SHIPPED	B/O	PART NUMBER	BIN	SR	DESCRIPTION	SUGGESTED LIST	NET	TOTAL NET
1										
2										
3	10	10		E37Z,8620,A E59Z,9F472,A	HALL 141	A C	BEET DRIVE-RIBBED (K) SENSOR ASSY EXHAUST G CASH SALES	42.20 63.80	33.93 45.41	33.83 454.10 1047.93
<p>NO RETURNS WITHOUT THIS INVOICE — TERMS NET CASH NO REFUNDS AFTER 30 DAYS NO REFUNDS OR EXCHANGES ON ELECTRICAL PARTS NO REFUND ON ANY ELECTRICAL, SPECIAL ORDERED AND/OR FUEL PARTS 15% HANDLING CHARGE ON ALL RETURNED PARTS</p>										
							X RECEIVED BY 			

K3487 (8-82)

APPENDIX C
INDIVIDUAL TEST REPORT
FOR CATALYST NO. 2

REPORT OF INTERCOL'S CONFIRMATORY INSPECTION FOR
MISFUELED 1980-83 LIGHT-DUTY GASOLINE PASSENGER
CARS AND TRUCKS IN HOUSTON, TEXAS

INSPECTION STATION: NAME MILDRED PAINTS
ADDRESS _____

PHONE NO. _____

FAILED INSPECTION: DATE 5/14/85 ORIGINAL ☒ PREVIOUS _____ ODOMETER 62371

FAILURE: MODIFIED FUEL INLET NEG AND/OR POSITIVE PLUMBTESMO TEST POS.

VEHICLE OWNER: NAME RAUMON G. MATLOCK

ADDRESS 2507 SHADY RAYON

PHONE NO. 350-9845

VEHICLE NO.: SWRI #2 LICENSE: STATE TX YEAR 85 NO. 4XB654

MAKE FORD YEAR 82 MODEL ESCORT GVWR 3130

MFR/ENGINE FAMILY _____ LDV ☒ LDT _____

VIN 1FABP1623CW164556 BODY TYPE 4 DR.

ENGINE SERIAL NO.: N/A ENGINE SIZE: CID _____ LITERS 1.6

ENGINE: TYPE 1.6L 4 CYL CYLINDERS 4

FUEL SYSTEM: CARBURETOR ☒ BARRELS 2 INJECTION _____

POLLUTION CONTROL SYSTEM FLR-AIP-TWC

VEHICLE CLASSIFICATION/TABLE 1: YEAR 82 NO. 15

INITIAL INSPECTION AT INTERCOL: DATE 8/23 INSPECTOR JBR

OEM CATALYST: YES ☒ NO _____ MODIFIED FUEL INLET: YES _____ NO ☒

PLUMBTESMO: POSITIVE ☒ NEGATIVE _____ FUEL SAMPLE OBTAINED YES

ELIGIBILITY STATUS: ACCEPT ☒ REJECT _____ ODOMETER _____

OEM CATALYST/EXHAUST AND/OR FUEL SYSTEM CONDITION: OK CAT + TP

EXHAUST AND/OR FUEL SYSTEM PARTS REQUIRED: 8/26/85

DATE EXHAUST AND/OR FUEL SYSTEM PARTS ORDERED 8/26/85

DATE EXHAUST AND/OR FUEL SYSTEM PARTS RECEIVED 9/5 DATE OWNER CONTACTED 9/5

DATE EXHAUST AND/OR FUEL SYSTEM PARTS INSTALLED 9/7/85

DATE FUEL TANK TOPPED WITH UNLEADED FUEL YES

CODING OF INDIVIDUAL PARTS FOR INSPECTION AND ANALYSIS AT SWRI: TAG OR
PAINT SWRI VEHICLE NO. AND ENGINE SERIAL NO. ON EACH PART:

CATALYST #2 (IDENTIFY INLET, OUTLET, AND TOP SIDES:
SEAL INLET/OUTLET ENDS/TAPE)

OXYGEN SENSOR NONE

FUEL SAMPLE #2 (SEAL CAP WITH TEFLON TAPE)

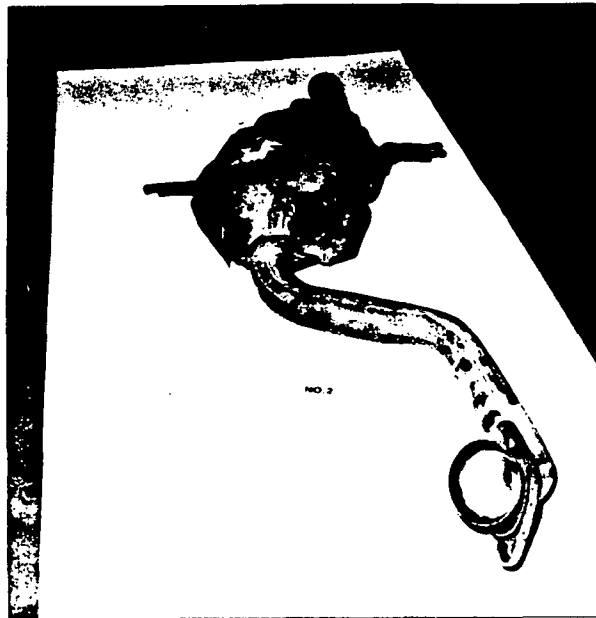
DATE SWRI NOTIFIED PARTS ARE READY FOR PICKUP 9/27/85

DATE PARTS PICKED UP 9/30/85

DATE 3/31/86

WORK ASSIGNMENT NO. 2-16
"CONTINUATION OF HOUSTON CATALYST COLLECTION"
(SwRI PROJECT 03-7774-016)

CATALYST NO. 2



Vehicle SwRI Code 2 Odometer Miles 62371 Vehicle Year and Make 1982

Ford Model Escort 4Dr Sedan Vehicle VIN 1FABP0623CW164556

Engine Family CFM1.6V2GKC2 Engine: CID 98 Liters 1.6

Engine Cyls. L4 Emission Control System EGR/AIR/OC/3W

Fuel System: Carburetor 2BBL Fuel Injection

Date Vehicle Failed Inspection: Original 5/14/85 Previous

Failure Type: Modified Fuel Inlet No and/or Positive Plumbtesmo Test Yes

Date Exhaust and/or Fuel System Parts Installed 9/7/85

CATALYST NO. 2 (CONT'D)

Visual Inspection Summary In-line dual-bed catalyst with air inlet port between
beds. No evidence of overheating. Case appears in good condition in spite of
small hole melted into top outer shield during removal from vehicle. No internal
looseness. Cannot view face on inlet monolith because of curved inlet pipe.
Outlet monolith, however, shows some evidence of meltdown below face surface
(see x-ray results below). Outlet monolith also indicates partial plugging
with dark gray appearance.

Testing

Catalyst Weight, lb* 13.40 Approximate Dimensions 12x8 1/2x4 in.

Plumbtesmo Test: Catalyst Inlet Positive Outlet Positive

Oxygen Sensor N/A

Catalyst X-Ray shows large area of apparent meltdown at outlet monolith

See positive photo of x-ray negative on next page.

Catalyst Backpressure, in. H₂O: 4.3 at Catalyst Inlet Temperature °F 730,

Engine RPM 1800, Engine Torque, ft/lb 75.6,

and Equivalent Engine CID of 128 (2.1 liter)

Catalyst Efficiency (%)	HC	CO	NO _x
	<u>82.7</u>	<u>96.4</u>	<u>42.6</u>

Atomic Absorption Lead Content Analysis for:

<u>Sample</u>	<u>Pb, g/gal</u>
Gasoline Sample # 2	0.001
EPA Reference 0001028	0.08
EPA Reference 0001975	0.017

*Catalyst weight includes weight of inlet and outlet pipes when integral to catalyst

CATALYST NO. 2 (CONT'D)

INLET



OUTLET

Positive Photo of X-Ray Negative - Catalyst No. 2

Vehicle No. 2

DON McMILLIAN FORD, Inc.

Houston's Friendly Ford Dealer



10333 Katy Freeway P.O. Box 19505
HOUSTON, TEXAS 77224-9505



DIRECT PARTS LINE 932-5050

TEXAS WATS LINE
800-392-1962

Motorcraft

OUT OF STATE
800-231-6092

We Stock Parts for
LINCOLN-MERCURY, ZEPHYR, COUGAR & ISUZU

CUST. I.D.	SALESMAN	SHIP VIA	WAYBILL NO.	P.O. # OR R.O. #	TERMS	INVOICE DATE	INVOICE NUMBER

PAGE 01 OF 01

S
O
L
D
INTERIOR
1540
FAST

S
H
I
P

T
O
BY GROUP OF MONTHLY SPECIALS - WE APPROVE YOUR BUSINESS

ITEM NO.	ORDERED	SHIPPED	B/O	PART NUMBER	BIN	SR	DESCRIPTION	SUGGESTED LIST	NET	TOTAL NET
1	10	10		1540	1000		GEN. ASSY EXHAUST STATE TAX TOTAL TAX & FEE TOTAL GRAND TOTAL			
<p>Handwritten signatures and dates: 2/22/75, 2/5/75</p>										

NO REFUND ON PARTS NOT IN ORIGINAL CARTON
NO MERCHANDISE NEW OR USED ACCEPTED FOR REFUND
AFTER 10 DAYS FROM DATE OF INVOICE.
NO CLAIMS CONSIDERED WITHOUT THIS INVOICE.
NO REFUND ON ALL ELECTRICAL PARTS.

I HAVE READ, UNDERSTAND AND ACCEPT ALL
PROVISIONS OF THE WARRANTY STATEMENT
COVERING GENUINE FORD PARTS.

X
RECEIVED BY

THIS IS YOUR ORIGINAL INVOICE

APPENDIX D
INDIVIDUAL TEST REPORT
FOR CATALYST NO. 3

REPORT OF INTERCOL'S CONFIRMATORY INSPECTION FOR
MISFUELED 1980-83 LIGHT-DUTY GASOLINE PASSENGER
CARS AND TRUCKS IN HOUSTON, TEXAS

INSPECTION STATION: NAME

MILKRED PAINTS

ADDRESS

PHONE NO.

FAILED INSPECTION:

DATE

8/27/85

ORIGINAL

X PREVIOUS

ODOMETER

46312

FAILURE: MODIFIED FUEL INLET

HEL

AND/OR POSITIVE PLUMBTESMO TEST PAS

VEHICLE OWNER:

NAME

RAYMOND G. MATLOCK

ADDRESS

2507 SHADY BAYON

PHONE NO.

350-9845

VEHICLE NO.:

SWRI #3

LICENSE:

STATE TX

YEAR

86

NO.

2VJ208

MAKE

DATSUN

YEAR

81

MODEL

210SL SW

GVWR

2865

MFR/ENGINE FAMILY

LDV

X

LDT

VIN

1J1PR5510205068

BODY TYPE

STATION WAGON

ENGINE SERIAL NO.:

1111

ENGINE SIZE:

CID

91.8

LITERS

ENGINE:

TYPE

1.6 V2 ME/CYLINDERS

4

FUEL SYSTEM:

CARBURETOR

X

BARRELS

2

INJECTION

POLLUTION CONTROL SYSTEM

ELR-AIP-DC

VEHICLE CLASSIFICATION/TABLE 1:

YEAR

87

NO.

12

INITIAL INSPECTION AT INTERCOL:

DATE

8/27

INSPECTOR

BOBBY

OEM CATALYST:

YES

X

NO

MODIFIED FUEL INLET:

YES

NO

X

PLUMBTESMO:

POSITIVE

X

NEGATIVE

FUEL SAMPLE OBTAINED

ELIGIBILITY STATUS:

ACCEPT

X

REJECT

ODOMETER

OEM CATALYST/EXHAUST AND/OR FUEL SYSTEM CONDITION:

OK CAT+T/P 11/4

EXHAUST AND/OR FUEL SYSTEM PARTS REQUIRED:

DATE EXHAUST AND/OR FUEL SYSTEM PARTS ORDERED

9/10/86

DATE EXHAUST AND/OR FUEL SYSTEM PARTS RECEIVED

9/12

DATE OWNER CONTACTED

9/11

DATE EXHAUST AND/OR FUEL SYSTEM PARTS INSTALLED

9/18/85

DATE FUEL TANK TOPPED WITH UNLEADED FUEL

YES

CODING OF INDIVIDUAL PARTS FOR INSPECTION AND ANALYSIS AT SWRI: TAG OR
PAINT SWRI VEHICLE NO. AND ENGINE SERIAL NO. ON EACH PART:

CATALYST

#3

(IDENTIFY INLET, OUTLET, AND TOP SIDES:
SEAL INLET/OUTLET ENDS/TAPE)

OXYGEN SENSOR

NONE

FUEL SAMPLE

#3

(SEAL CAP WITH TEFLON TAPE)

DATE SWRI NOTIFIED PARTS ARE READY FOR PICKUP

9/27/85

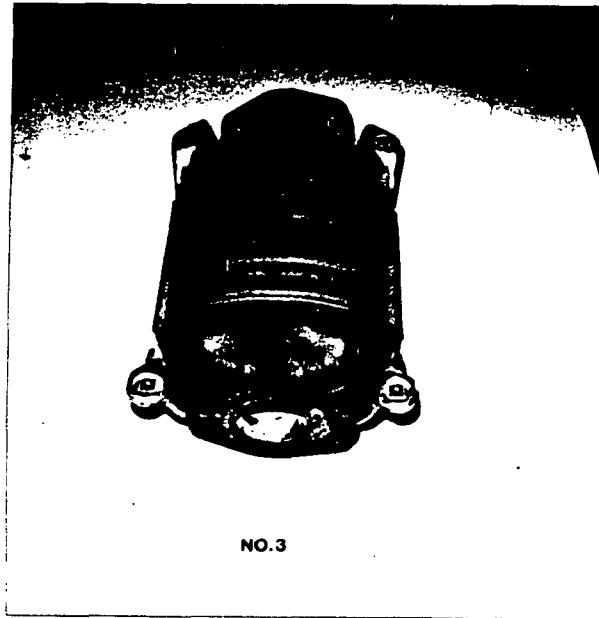
DATE PARTS PICKED UP

9/30/85

DATE 3/31/86

WORK ASSIGNMENT NO. 2-16
"CONTINUATION OF HOUSTON CATALYST COLLECTION"
(SwRI PROJECT 03-7774-016)

CATALYST NO. 3



Vehicle SwRI Code 3 Odometer Miles 46312 Vehicle Year and Make 1981

Datsun Model 210SL 4Dr Sedan Vehicle VIN JH1PB05SICU205068

Engine Family CNS15V2AAF6 Engine: CID 91 Liters 1.5

Engine Cyls. L4 Emission Control System EGR/PLS/OC

Fuel System: Carburetor 2BBL Fuel Injection

Date Vehicle Failed Inspection: Original 8/27/85 Previous

Failure Type: Modified Fuel Inlet No and/or Positive Plumbtesmo Test Yes

Date Exhaust and/or Fuel System Parts Installed 9/18/85

CATALYST NO. 3 (CONT'D)

Visual Inspection Summary Single bed monolith in good, clean condition (some
rust on top side). No internal looseness or evidence of overheating. Both
monolith faces (inlet and outlet) show clean light-gray colored appearance.

Testing

Catalyst Weight, lb* 8.31 Approximate Dimensions 13 1/4x7 1/4x3 in.

Plumbtesmo Test: Catalyst Inlet Positive Outlet Positive

Oxygen Sensor N/A

Catalyst X-Ray Shows no abnormality

See positive photo of x-ray negative on next page.

Catalyst Backpressure, in. H₂O: 4.0 at Catalyst Inlet Temperature °F 730,

Engine RPM 1800, Engine Torque, ft/lb 83.1,

and Equivalent Engine CID of 128 (2.1 liter)

Catalyst Efficiency (%)

HC	CO	NO _x
<u>72.7</u>	<u>85.4</u>	<u>11.3</u>

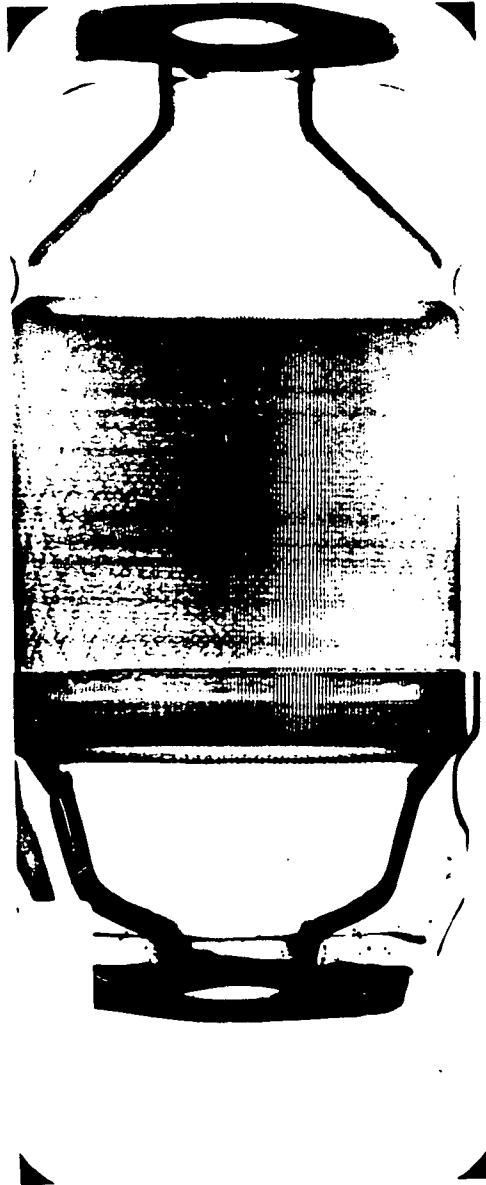
Atomic Absorption Lead Content Analysis for:

<u>Sample</u>	<u>Pb, g/gal</u>
Gasoline Sample # 3	0.001
EPA Reference 0001028	0.08
EPA Reference 001975	0.017

*Catalyst weight includes weight of inlet and outlet pipes when integral to catalyst

CATALYST NO. 3 (CONT'D)

INLET



OUTLET

Positive Photo of X-Ray Negative - Catalyst No. 3

Vehicle No. 3

NAME INTERCO CORP		DATE 9-13 1985		1567	
ADDRESS 15402 VA. 174TH PARKWAY HOUSTON TX					
MOSE. SOLD		MOSE. RETURNED		SALESMAN	
CASH		CHARGE		ORDER NO.	
CASH		CREDIT		CODE	
✓		428			
QUAN.	PART NUMBER	DESCRIPTION		UNIT LIST	TOTAL NET
1	20802-W8P26	CRST Cowl		422 91	338 01
<div style="font-size: 48pt; transform: rotate(-15deg);">Paid</div> <div style="font-size: 48pt; transform: rotate(-15deg);">OK</div> <div style="font-size: 48pt; transform: rotate(-15deg);">8309</div>		AIR FIGHT			20 00
TICKET NO. 1567		CUSTOMER NO.		KEY <input checked="" type="checkbox"/>	TOTAL 358 01
YOKEM NISSAN 15202 Eastex Freeway HUMBLE, TEXAS 77396 Telephone (713) 441-3181 		DESCRIPTION		AMOUNT	
		PARTS-RETAIL			
		PARTS-WHOLESALE		338 01	
		ACCESSORIES-RETAIL			
		ACCESSORIES-WHOLESALE			
		358 01		20 00	
TAX					
REC'D BY X		S		CHARGE SALES	
		S		CASH SALES	
				358 01	

NO REFUNDS AFTER 30 DAYS. ALL CLAIMS AND RETURNS
 GOODS MUST BE ACCOMPANIED BY THIS BILL.

**15% RESTOCKING CHARGE ON ALL
 RETURNED PARTS.**

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 Any warranties on the products sold hereby are those made by the manufacturer. The seller, YOKEM NISSAN, hereby expressly disclaims all warranties, either express or implied, including any implied warranty of merchantability or fitness for a particular purpose, and YOKEM NISSAN neither assumes nor authorizes any other person to assume for it any liability in connection with the sale of said products.

HCP 843 08-2114

APPENDIX E
INDIVIDUAL TEST REPORT
FOR CATALYST NO. 4

100

D+M AUTOMOTIVE
23503 HARRY RD
353-2034

8/85 ORIGINAL ☒ PREVIOUS ODOMETER 86610

NEG AND/OR POSITIVE PLUMBESMO TEST *DS*

INDUS UTILITY SERVICE

ΣΣΣ ΣΕΙΛΑΔΑ

353-9809

#4 **LICENSE:** **STATE** **TX** **YEAR** **85** **NO.** **441979**

YEAR 82 MODEL F150 GVWR 5250

LDV , LDT X

BODY TYPE Pick-Up

ENGINE SIZE: CID LITERS 5.4

1. FMS. JZME CYLINDERS

BARRELS 2 INJECTION

FR-AP-10

YEAR 82 NO. 1A

1/3 INSPECTOR 80834

YES ☒ NO ☐ MODIFIED FUEL INLET: YES ☐ NO ☒

7
SITIVE X NEGATIVE FUEL SAMPLE OBTAINED YES

ACCEPT ☒ REJECT ☐ ODOMETER 86617

PAT + MOFFLER

TO BE REDUCED

EXHAUST AND/OR FUEL SYSTEM PARTS REQUIRED:

DATE EXHAUST AND/OR FUEL SYSTEM PARTS ORDERED . 9/26/86

DATE EXHAUST AND/OR FUEL SYSTEM PARTS RECEIVED 9/26 DATE OWNER CONTACTED 9/26

DATE EXHAUST AND/OR FUEL SYSTEM PARTS INSTALLED, 9/27/85

DATE FUEL TANK TOPPED WITH UNLEADED FUEL

CODING OF INDIVIDUAL PARTS FOR INSPECTION AND ANALYSIS AT SWRI: TAG OR
PAINT SWRI VEHICLE NO. AND ENGINE SERIAL NO. ON EACH PART:

CATALYST _____ (IDENTIFY INLET, OUTLET, AND TOP SIDES:
SEAL INLET/OUTLET ENDS/TAPE)

OXYGEN SENSOR NOLE
FUEL SAMPLE (SEAL CAP WITH TEFLON TAPE)

DATE SWRI NOTIFIED PARTS ARE READY FOR PICKUP 9/27/85

DATE PARTS PICKED UP 9/30/85 A-5

DATE 3/31/86

WORK ASSIGNMENT NO. 2-16
"CONTINUATION OF HOUSTON CATALYST COLLECTION"
(SwRI PROJECT 03-7774-016)

CATALYST NO. 4



Vehicle SwRI Code 4 Odometer Miles 86610 Vehicle Year and Make 1982

Ford Model F150 Pickup Vehicle VIN 1FTDF153CNA05946

Engine Family CFM50T2AAF4 Engine: CID 302 Liters 5.0

Engine Cyls. V8 Emission Control System EGR/AIR/OC

Fuel System: Carburetor 2BBL Fuel Injection

Date Vehicle Failed Inspection: Original 8/85 Previous

Failure Type: Modified Fuel Inlet No and/or Positive Plumbtesmo Test Yes

Date Exhaust and/or Fuel System Parts Installed 9/27/85

CATALYST NO. 4 (CONT'D)

Visual Inspection Summary In-line dual bed monolith catalyst with rusty and
clay-smear case, but in good condition showing no evidence of overheating.
No internal looseness or rattle. Monolith shows small area of partial plugging
at inlet, and gray to black coloring on outlet. No fractures or melts.

Testing

Catalyst Weight, lb* 12.06 Approximate Dimensions 17x8x3 in.

Plumbtesmo Test: Catalyst Inlet Positive Outlet Positive

Oxygen Sensor N/A

Catalyst X-Ray shows no abnormality

See positive photo of x-ray negative on next page.

Catalyst Backpressure, in. H₂O: 8.7 at Catalyst Inlet Temperature °F 730,

Engine RPM 1800, Engine Torque, ft/lb 43.8,

and Equivalent Engine CID of 305 (5.0 liters)

Catalyst Efficiency (%)

<u>HC</u>	<u>CO</u>	<u>NO_x</u>
<u>28.6</u>	<u>29.1</u>	<u>2.5</u>

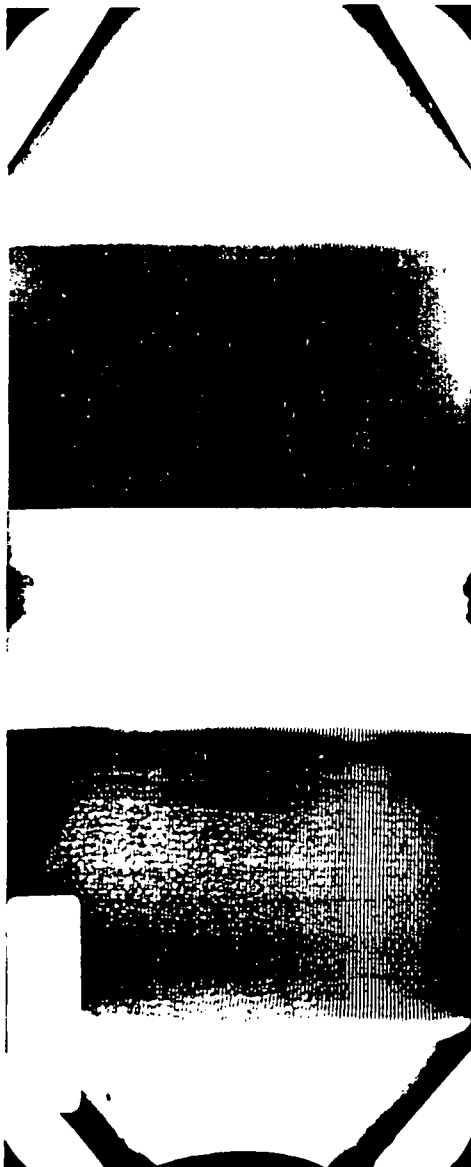
Atomic Absorption Lead Content Analysis for:

<u>Sample</u>	<u>Pb, g/gal</u>
Gasoline Sample # 4	0.002
EPA Reference 0001028	0.08
EPA Reference 0001975	0.017

*Catalyst weight includes weight of inlet and outlet pipes when integral to catalyst

CATALYST NO. 4 (CONT'D)

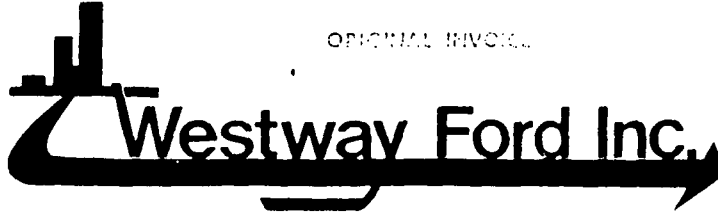
INLET



OUTLET

Positive Photo of X-Ray Negative - Catalyst No. 4

VEHICLE NO. 4



ORIGINAL INVOICE

PARTS INVOICE

"The Best Way to Ford Country"

6445 SOUTHWEST FREEWAY • 713 / 776-7600

MAILING ADDRESS: P. O. BOX 36344, HOUSTON, TEXAS 77036

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CUST ID	SALESMAN	SHIP VIA	WAYBILL NO	PO # OR PO #	TERMS	INVOICE DATE	INVOICE NUMBER

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PAGE OF

9250.00

ITEM NO	ORDERED	SHIPPED	B/O	PART NUMBER	BIN	SR	DESCRIPTION	SUGGESTED LIST	NET	TOTAL NET
1	1	1		EF97.96470.12	WALL	141	4	PELT OFFICE-RIBBER	42.20	42.20
2	1	1		EF97.96470.12	WALL	141	0	SENSOR AGENT EXHAUST	80.90	80.90
3	1	1					CRASH SALES			123.10
										123.10

pd
2407

NO RETURNS WITHOUT THIS INVOICE — TERMS NET CASH

NO REFUNDS AFTER 30 DAYS

NO REFUNDS OR EXCHANGES ON ELECTRICAL PARTS

NO REFUND ON ANY ELECTRICAL SPECIAL

ORDERED AND/OR FUEL PARTS

15 HANDLING CHARGE ON ALL RETURNED PARTS

X

RECEIVED BY

K3487 (R 82)

APPENDIX F
INDIVIDUAL TEST REPORT
FOR CATALYST NO. 5

REPORT OF INTERCOL'S CONFIRMATORY INSPECTION FOR
MISFUELED 1980-83 LIGHT-DUTY GASOLINE PASSENGER
CARS AND TRUCKS IN HOUSTON, TEXAS

INSPECTION STATION: NAME P4M AUTOMOTIVE
ADDRESS 23503 HARDY RD
PHONE NO. 353-7034
FAILED INSPECTION: DATE 3/21/85 ORIGINAL ☒ PREVIOUS ☐ ODOMETER 81176
FAILURE: MODIFIED FUEL INLET NE AND/OR POSITIVE PLUMBTESMO TEST PIS
VEHICLE OWNER: NAME HAGS UTILITY SERVICE
ADDRESS 7700 SCIENCE
PHONE NO. 353-9809

VEHICLE NO.: SWRI #5 LICENSE: STATE TX YEAR 85 NO. RC1871
MAKE FORD YEAR 80 MODEL COURIER GVWR 4100
MFR/ENGINE FAMILY LDV LDT ☒
VIN SLTCKXK-23632 BODY TYPE PICK-UP
ENGINE SERIAL NO.: N/A ENGINE SIZE: CID 121.2 LITERS
ENGINE: TYPE DMAT CYLINDERS 4
FUEL SYSTEM: CARBURETOR ☒ BARRELS 2 INJECTION
POLLUTION CONTROL SYSTEM EGR CAT

VEHICLE CLASSIFICATION/TABLE I: YEAR NA NO. NA

INITIAL INSPECTION AT INTERCOL: DATE 9/3 INSPECTOR RRBY
OEM CATALYST: YES ☒ NO ☐ MODIFIED FUEL INLET: YES ☐ NO ☒
PLUMBTESMO: POSITIVE ☒ NEGATIVE ☐ FUEL SAMPLE OBTAINED ☒
ELIGIBILITY STATUS: ACCEPT ☒ REJECT ☐ ODOMETER
OEM CATALYST/EXHAUST AND/OR FUEL SYSTEM CONDITION: CAT + TAN PIPES

EXHAUST AND/OR FUEL SYSTEM PARTS REQUIRED:
DATE EXHAUST AND/OR FUEL SYSTEM PARTS ORDERED 9/25/85
DATE EXHAUST AND/OR FUEL SYSTEM PARTS RECEIVED 10/2 DATE OWNER CONTACTED 10/2
DATE EXHAUST AND/OR FUEL SYSTEM PARTS INSTALLED 10/2/85
DATE FUEL TANK TOPPED WITH UNLEADED FUEL NO

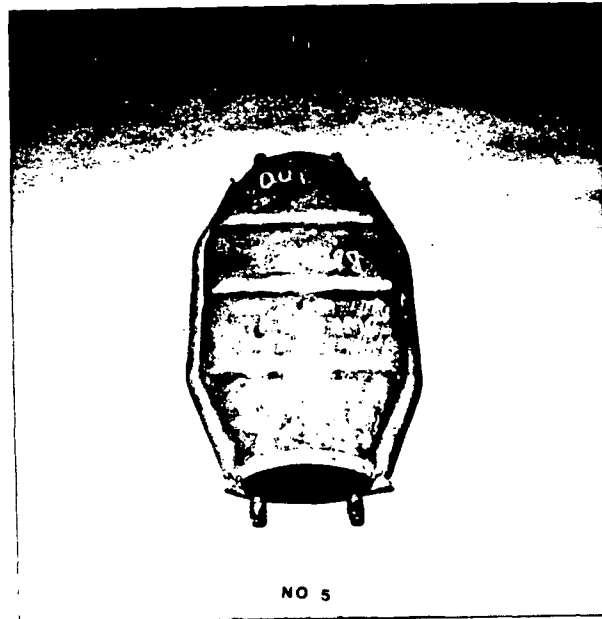
CODING OF INDIVIDUAL PARTS FOR INSPECTION AND ANALYSIS AT SWRI: TAG OR
PAINT SWRI VEHICLE NO. AND ENGINE SERIAL NO. ON EACH PART:

CATALYST #5 (IDENTIFY INLET, OUTLET, AND TOP SIDES:
SEAL INLET/OUTLET ENDS/TAPE)
OXYGEN SENSOR NONE
FUEL SAMPLE #5 (SEAL CAP WITH TEFLON TAPE)
DATE SWRI NOTIFIED PARTS ARE READY FOR PICKUP 9/27/85
DATE PARTS PICKED UP 9/30/85

DATE 8/29/86

WORK ASSIGNMENT NO. 2-16
"CONTINUATION OF HOUSTON CATALYST COLLECTION"
(SwRI PROJECT 03-7774-016)

CATALYST NO. 5



Vehicle SwRI Code 5 Odometer Miles 81176 Vehicle Year and Make 1980

Ford Model Courier Pickup Vehicle VIN SGTCXK-23632

Engine Family 2000 Engine: CID 120 Liters 2.0

Engine Cyls. L4 Emission Control System EGR/PLS/OC

Fuel System: Carburetor 2BBL Fuel Injection

Date Vehicle Failed Inspection: Original 3/21/85 Previous

Failure Type: Modified Fuel Inlet No and/or Positive Plumbtesmo Test Yes

Date Exhaust and/or Fuel System Parts Installed 10/2/85

CATALYST NO. 5 (CONT'D)

Visual Inspection Summary Single bed pelleted catalyst in good and clean condition
(very light rust on outside surface of shield). Moderate looseness of pellets upon
shaking. No burn-through holes or evidence of overheating. Dark brown color at
inlet inside surface and light gray color at outlet inside surface.

Testing

Catalyst Weight, lb* 13.50 Approximate Dimensions 13" x 7 1/2" x 3 1/4"

Plumbtesmo Test: Catalyst Inlet Negative Outlet Positive

Oxygen Sensor N/A

Catalyst X-Ray Shows no abnormality

See positive photo of x-ray negative on next page.

Catalyst Backpressure, in. H₂O: 5.0 at Catalyst Inlet Temperature °F 705,

Engine RPM 1800, Engine Torque, ft/lb 71.6,

and Equivalent Engine CID of 128 (2.1 liters)

Catalyst Efficiency (%)

HC	CO	NO _x
<u>54.8</u>	<u>56.7</u>	<u>5.3</u>

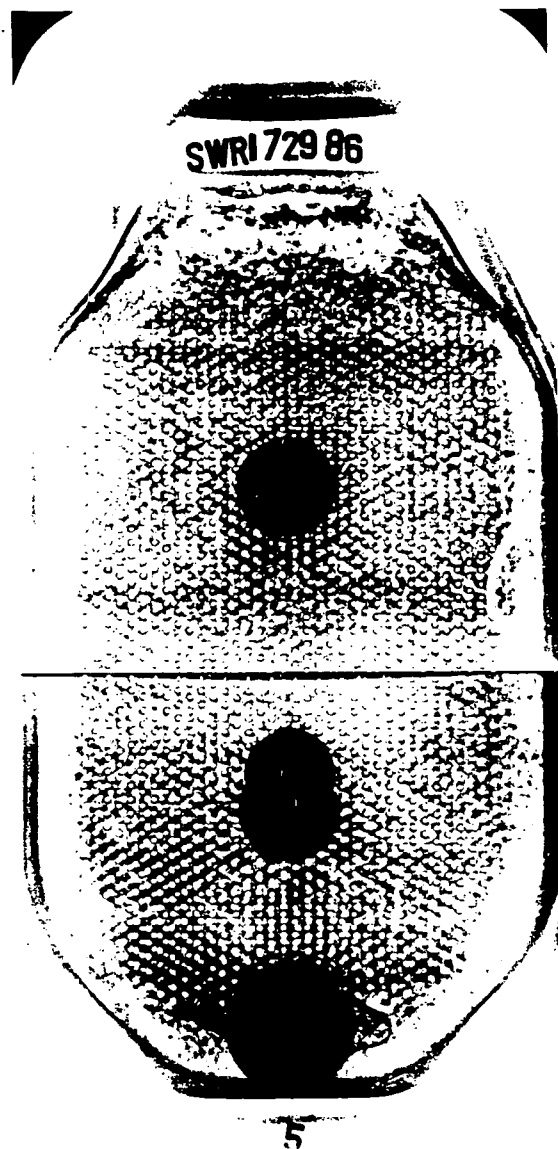
Atomic Absorption Lead Content Analysis for:

<u>Sample</u>	<u>Pb, g/gal</u>
Gasoline Sample # <u>5</u>	0.002
EPA Reference <u>1005</u>	0.016

*Catalyst weight includes weight of inlet and outlet pipes when integral to catalyst

CATALYST NO. 5 (CONT'D)

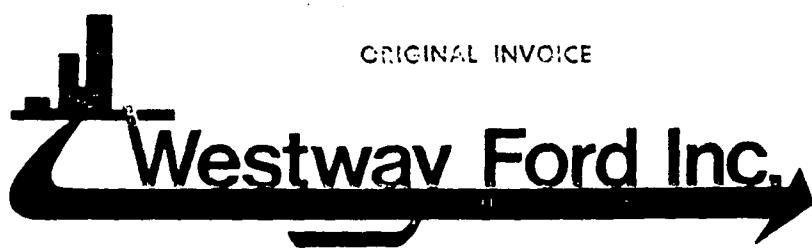
INLET



OUTLET

Positive Photo of X-Ray Negative - Catalyst No. 5

VEHICLE NO. 5



ORIGINAL INVOICE

PARTS INVOICE

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CUST. I.D.	SALESMAN	SHIP VIA	WAYBILL NO.	P.O. # OR R.O. #	TERMS	INVOICE DATE	INVOICE NUMBER
75F	HHA400					OCT/02/1985	92475
SOLD TO CASH WHOLESALE INTERCOLE CORP 15402 VANTAGE PARKWAY EAST						PAGE 01 OF 01	

***** THANK YOU FOR YOUR BUSINESS *****

ITEM NO.	ORDERED	SHIPPED	B/O	PART NUMBER	BIN	SR	DESCRIPTION	SUGGESTED LIST	NET	TOTAL NET
1	1	1		E27Z,5E212,A		11	SALES TAX	304.83	243.90	243.90
2							TOTAL TAXABLE ITEMS.....			14.94
							TOTAL TAX.....			243.90
							CASH SALES			14.94
										<u>258.84</u>

#8499

NO RETURNS WITHOUT THIS INVOICE — TERMS NET CASH
 NO REFUNDS AFTER 30 DAYS
 NO REFUNDS OR EXCHANGES ON ELECTRICAL PARTS
 NO REFUND ON ANY ELECTRICAL, SPECIAL ORDERED AND/OR FUEL PARTS
 15% HANDLING CHARGE ON ALL RETURNED PARTS

X
RECEIVED BY