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REPORT NUMBER 301L-GTL-03-009

SAFETY COMPLIANCE TESTING FOR FMVSS NO. 301L FUEL SYSTEM INTEGRITY

FORD MOTOR CO. IN U.S.A.
2003 FORD EXPEDITION MPV
NHTSA NO. C30200

GENERAL TESTING LABORATORIES, INC.
1623 LEEDSTOWN ROAD
COLONIAL BEACH, VIRGINIA 22443

SEPTEMBER 04, 2003

FINAL REPORT

PREPARED FOR

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
400 SEVENTH STREET, SW
ROOM 6111 (NVS-220)
WASHINGTON, D.C. 20590

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Approved By:

Approval Date: 09/04/03

FINAL REPORT ACCEPTANCE BY OVSC:

Accepted By:

Acceptance Date: 9/9/03

Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
301L-GTL-03-009	N/A	N/A

4. Title and Subtitle	5. Report Date
Final Report of FMVSS 301L Compliance Testing of 2003 FORD EXPEDITION MPV NHTSA No. C30200	September 04, 2003
	6. Performing Organ. Code GTL
7. Author(s) Grant Farrand, Project Engineer Debbie Messick, Project Manager	8. Performing Organ. Rep# GTL-DOT-03-301L-009
9. Performing Organization Name and Address General Testing Laboratories, Inc. 1623 Leedstown Road Colonial Beach, Va 22443	10. Work Unit No. (TRAIS) N/A
	11. Contract or Grant No. DTNH22-01-C-11025
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Admin. Enforcement Office of Vehicle Safety Compliance (NVS-220) 400 7th Street, S.W., Room 6111 Washington, DC 20590	13. Type of Report and Period Covered Final Test Report August 25, 2003
	14. Sponsoring Agency Code NVS-221

15. Supplementary Notes

16. Abstract

Compliance tests were conducted on the subject, 2003 Ford Expedition MPV in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-301-02 for the determination of FMVSS 301 compliance.
Test failures identified were as follows:
NONE

17. Key Words	18. Distribution Statement
Compliance Testing Safety Engineering FMVSS 301	Copies of this report are available from NHTSA Technical Reference Div., Rm. 5108 (NPO-230) 400 7th St., S.W. Washington, DC 20590 Telephone No. (202) 366-4946

19. Security Classif. (of this report)	21. No. of Pages	22. Price
UNCLASSIFIED	65	

20. Security Classif. (of this page)
UNCLASSIFIED

Form DOT F 1700.7 (8-72)

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SECTION 1

PURPOSE OF COMPLIANCE TEST

1.0 PURPOSE OF COMPLIANCE TEST

A 2003 Ford Expedition MPV was subjected to Federal Motor Vehicle Safety Standard (FMVSS) No. 301 testing to determine if the vehicle was in compliance with the requirements of the standard. The purpose of this standard is to reduce deaths and injuries occurring from fires that result from fuel spillage during and after motor vehicle crashes, and resulting from ingestion of fuels during siphoning.

1.1 The test vehicle was a 2003 Ford Expedition MPV. Nomenclature applicable to the test vehicle are:

A. Vehicle Identification Number: 1FMRU15W73LA80166

B. NHTSA No.: C30200

C. Manufacturer: FORD MOTOR CO. IN U.S.A.

D. Manufacture Date: 09/02

1.2 TEST DATE

The test vehicle was subjected to FMVSS No. 301 testing on August 25, 2003.

SECTION 2

COMPLIANCE TEST RESULTS SUMMARY

2.0 TEST RESULTS

All tests were conducted in accordance with NHTSA, Office of Vehicle Safety Compliance (OVSC) Laboratory Procedure, TP-301-02 dated 8 November 1994 and General Testing Laboratories, Inc. (GTL) Test Procedure, TP-301-02, "Fuel System Integrity".

Based on the test performed, the 2003 Ford Expedition MPV appears to meet the lateral impact requirements of FMVSS 301 testing.

SECTION 3

COMPLIANCE TEST DATA

3.0 TEST RESULTS

The following data sheets document the results of testing on the 2003 Ford Expedition MPV.

SUMMARY OF RESULTS

Vehicle's NHTSA No.: C30200 Test Model: EXPEDITION

Test Date.: 08/25/03 Time: 12:45 Temperature 90 ° F

Vehicle Model Year, Make, Model and Body Style:
2003 FORD EXPEDITION MPV

Vehicle Test Weight: 5937 lbs.; Impact Velocity: 19.35 mph

Type of Front Occupant Restraint System Installed in Test Vehicle:

Driver's DSP: TYPE 2 BELT WITH FRONTAL AIR BAG IN STEERING WHEEL

Right Passenger's DSP: TYPE 2 BELT WITH FRONTAL AIR BAG IN DASH

Stoddard solvent spillage from Vehicle's Fuel System: None

REMARKS:

RECORDED BY: DATE: 08/25/03
APPROVED BY:

DATA SHEET 1
TEST VEHICLE SPECIFICATIONS

TEST VEHICLE INFORMATION:

NHTSA No.: C30200
Year/Make/Model/Body Style: 2003 FORD EXPEDITION MPV
Engine Data: 4.6 LITER V8
Transmission Data: 4 SPEED AUTOMATIC
Final Drive Data: REAR WHEEL DRIVE
Major Options: PREMIUM STEREO, CLOTH CAPTAINS CHAIRS, CONSOLE
Date Received: 07/10/03 ; Odometer Reading: 1435.7 miles

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured By: FORD MOTOR CO. IN U.S.A.
Date of Manufacture: 09/02
VIN: 1FMRU15W73LA80166

GVWR: 3129 kg (6900 lbs.);GAWR Front: 1338 kg(2950 lbs.)GAWR Rear: 1814 kg (4000 lbs.)

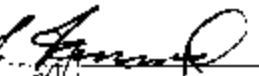
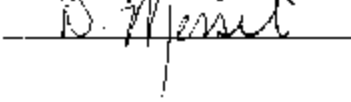
DATA FROM VEHICLE'S TIRE PLACARD:

Location of Placard on Vehicle: DRIVER'S "B" PILLAR
Tire Pressure With Maximum Capacity Vehicle Load —
Front: 35 psi; Rear: 35 psi
Recommended Tire Size: P265/70R17
Recommended Cold Tire Pressure: Front = 241 kPa(35 psi) Rear = 241 kPa (35 psi)
Size of Tires on Test Vehicle: P265/70R17
Type of Spare Tire: FULL SIZE
*NOTE: Data from supplement sheet in glove box

Vehicle Capacity Data —

Type of Front Seat(s): BUCKET
Number of Occupants: Front = 2 ; Mid = 3 Rear = 3 ; Total = 8

A. VEHICLE CAPACITY WEIGHT (VCW) =	1578	lbs.
B. Number of Occupants x 150 lbs. =	1200	lbs.
RATED CARGO AND LUGGAGE WEIGHT (RCLW) = A - B =	378	lbs.

RECORDED BY:  DATE: 08/25/03
APPROVED BY: 

DATA SHEET 2
PRE-TEST DATA

WEIGHT OF TEST VEHICLE:

A. As Received At Laboratory (Maximum Fluids) —

Right Front = 586 kg (1292 lbs.) Right Rear = 625 kg (1377 lbs.)

Left Front = 570 kg (1256 lbs.) Left Rear = 634 kg (1397 lbs.)

TOTAL FRONT = 1156 kg (2548 lbs.) TOTAL REAR = 1258 kg (2774 lbs.)

% of TOTAL = 48 % % of TOTAL = 52 %

TOTAL DELIVERED WEIGHT = 2414 kg (5322 lbs.)

B. Calculation of Target Test Weight —

1. Total Delivered Weight = 2414 kg (5322 lbs.)

2. Rated Cargo & Lugg. Weight (RCLW) = 136 kg (300 lbs.)

3. Weight of 2 Dummies (164 lbs. each) = 149 kg (328 lbs.)

TARGET TEST WEIGHT = 1 + 2 + 3 = 2699 kg (5950 lbs.)

C. Vehicle, Dummies and 136 kg (300 lbs.) of Cargo Weight —

Right Front = 629 kg (1387 lbs) Right Rear = 723 kg (1593 lbs)

Left Front = 604 kg (1331 lbs) Left Rear = 738 kg (1626 lbs)

TOTAL FRONT = 1233 kg (2718 lbs) TOTAL REAR = 1460 kg (3219 lbs)

% of TOTAL = 46 % % of TOTAL = 54 %

TOTAL TEST WEIGHT = 2693 kg (5937 lbs)

Weight of Ballast secured in cargo area = 172 kg (380 lbs)
Type of Ballast: SALT BAGS
Method of Securing Ballast: PASSENGER SEAT BELTS
Vehicle Components Removed for Weight Reduction:
NONE

DATA SHEET 2
PRE-TEST DATA CONTINUED

TEST VEHICLE ATTITUDE:

As Delivered —
Right Front: 909 mm (35.8 inches)
Left Front: 915 mm (36.0 inches)
Right Rear: 920 mm (36.2 inches)
Left Rear: 911 mm (35.8 inches)

As Tested —
Right Front: 900 mm (35.4 inches)
Left Front: 906 mm (35.6 inches)
Right Rear: 900 mm (35.4 inches)
Left Rear: 894 mm (35.2 inches)

Vehicle's Wheelbase = 3022 mm (119 inches)

FUEL SYSTEM DATA:

Fuel System Capacity Listed in Owner's Manual = 106 liters (28 gallons)
Usable Capacity Figure Furnished By COTR = 106 liters (28 gallons)

Test Volume Range (91 to 94% of Usable Capacity) —

96.5 liters (25.48 gallons) TO 99.6 liters (26.32 gallons)

ACTUAL TEST VOLUME = 109 liters (25.9 gallons) (with entire fuel system filled)

Test Fluid Type: Stoddard solvent
Test Fluid Specific Gravity: .7583
Test Fluid Kinematic Viscosity: 1.7 centistokes at 77° F
Test Fluid Color: BLUE ("red" is preferred)
Type of Vehicle Fuel Pump: IN TANK ELECTRIC
Electric Fuel Pump Operation with Ignition Switch ON and Engine OFF —
YES, FOR 2 SECONDS

Details of Fuel System: SEQUENTIAL FUEL INJECTION

REMARKS:

RECORDED BY: _____ DATE: 08/25/03
APPROVED BY: _____

DATA SHEET 3
POST IMPACT DATA

TYPE OF TEST: 301L
TEST DATE: 08/25/03 ; TIME: 12:45 ; TEMP.: 90 °F
VEH. NHTSA NO.: C30200 ; VIN: 1FMRU15W73LA80166

REQUIRED IMPACT VELOCITY RANGE: 18.9 to 19.9 mph

ACTUAL IMPACT VELOCITY: (speed traps located within 5 feet of impact plane)

Trap No. 1 = 19.3 mph Trap No. 2 = 19.3 mph
Average Impact Speed = 19.3 mph

REMARKS:

RECORDED BY: _____ DATE: 08/25/03
APPROVED BY: _____

DATA SHEET 4
SUMMARY OF FMVSS 301 DATA

TEST VEHICLE NHTSA NO.: C30200 ; TEST DATE: 08/25/03

VEHICLE YEAR/MAKE/MODEL/BODY STYLE:
2003 FORD EXPEDITION

TYPE OF IMPACT: 301L

STODDARD SOLVENT SPILLAGE MEASUREMENT:

A. From impact until vehicle motion ceases —

Actual = 0 oz. Maximum Allowable = 1 ounce

B. For 5 minute period after vehicle motion ceases —

Actual = 0 oz. Maximum Allowable = 5 ounces

C. For next 25 minutes —

Actual = 0 oz. Maximum Allowable = 1 oz./minute

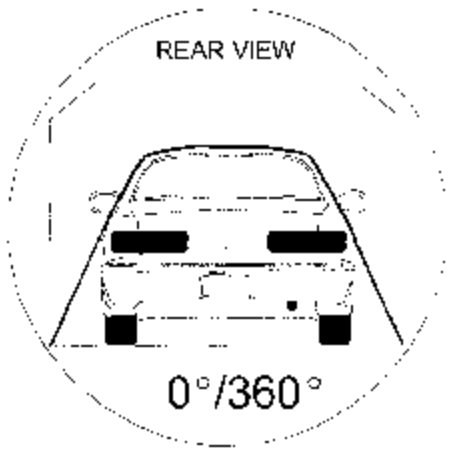
D. Provide Spillage Details: NONE

REMARKS:

RECORDED BY: _____ DATE: 08/25/03
APPROVED BY: _____

DATA SHEET 5
STATIC ROLLOVER TEST DATA:

A. Test Phase = 0° to 90°



Determination of Stoddard Solvent Collection Time Period:

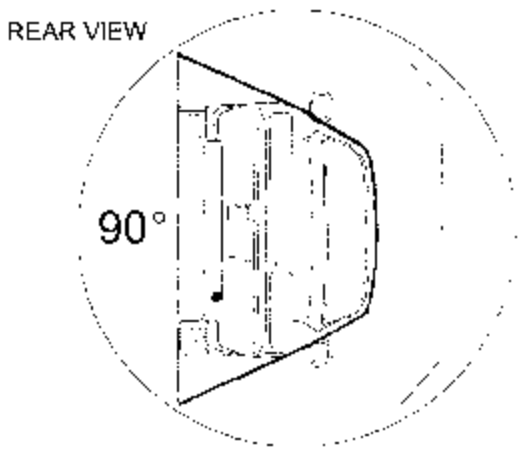
1. Rollover Fixture 90° Rotation Time = 1 minutes, 36 seconds

(Specified Range is 1 to 3 minutes)

2. FMVSS 301 Position Hold Time = 5 minutes, 0 seconds

3. TOTAL = 6 minutes, 36 seconds

4. NEXT WHOLE MINUTE INTERVAL = 7 minutes



Actual Test Vehicle Stoddard Solvent Spillage:

1. First 5 minutes from onset of rotation = 0 oz.
(5 oz. allowed)

2. 6th minute = 0 oz.
(1 oz. allowed)

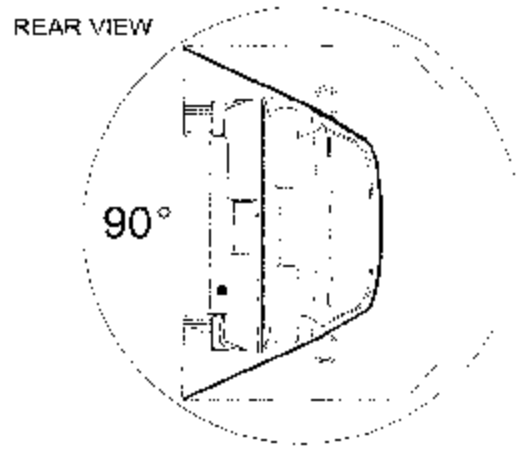
3. 7th minute = 0 oz.
(1 oz. allowed)

4. 8th minute (if required) = N/A oz. (1 oz. allowed)

Provide Details of Stoddard Solvent Spillage Locations — NONE

DATA SHEET 5 CONTINUED

B. Test Phase = 90° to 180°



Determination of Stoddard Solvent Collection Time Period:

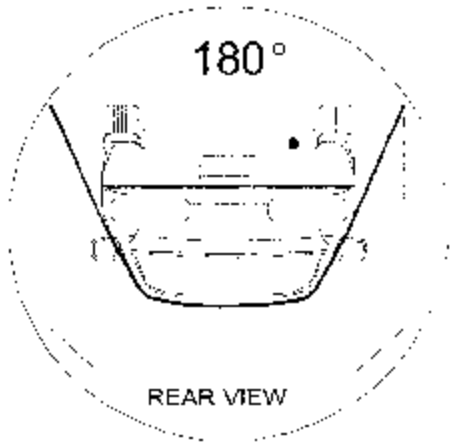
1. Rollover Fixture 90°
Rotation Time = 1 minutes, 34 seconds

(Specified Range is 1 to 3 minutes)

2. FMVSS 301 Position Hold Time = 5 minutes, 0 seconds

3. TOTAL = 6 minutes, 34 seconds

4. NEXT WHOLE MINUTE INTERVAL = 7 minutes



Actual Test Vehicle Stoddard Solvent Spillage:

1. First 5 minutes from onset of rotation = 0 oz.
(5 oz. allowed)

2. 6th minute = 0 oz.
(1 oz. allowed)

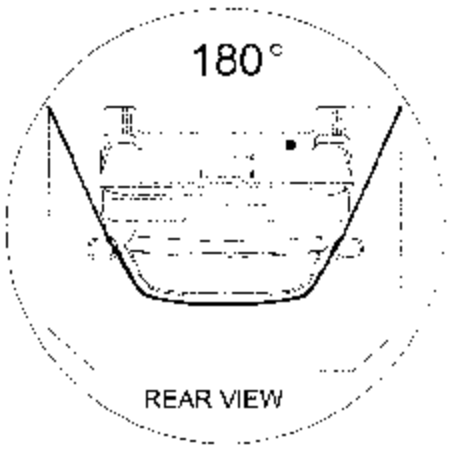
3. 7th minute = 0 oz.
(1 oz. allowed)

4. 8th minute (if required) = N/A oz. (1 oz. allowed)

Provide Details of Stoddard Solvent Spillage Locations — NONE

DATA SHEET 5 CONTINUED

C. Test Phase = 180° to 270°



Determination of Stoddard Solvent Collection Time Period:

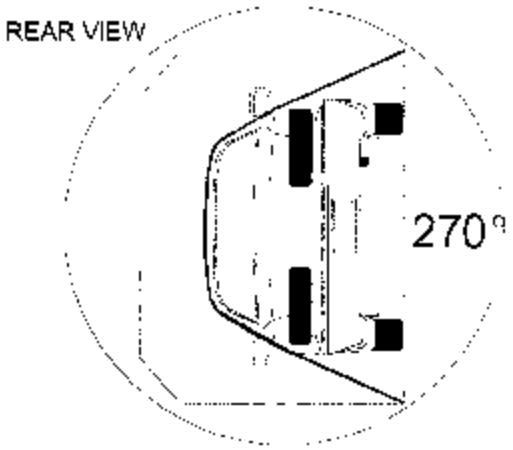
1. Rollover Fixture 90° Rotation Time = 1 minutes, 25 seconds

(Specified Range is 1 to 3 minutes)

2. FMVSS 301 Position Hold Time = 5 minutes, 0 seconds

3. TOTAL = 6 minutes, 25 seconds

4. NEXT WHOLE MINUTE INTERVAL = 7 minutes



Actual Test Vehicle Stoddard Solvent Spillage:

1. First 5 minutes from onset of rotation = 0 oz. (5 oz. allowed)

2. 6th minute = 0 oz. (1 oz. allowed)

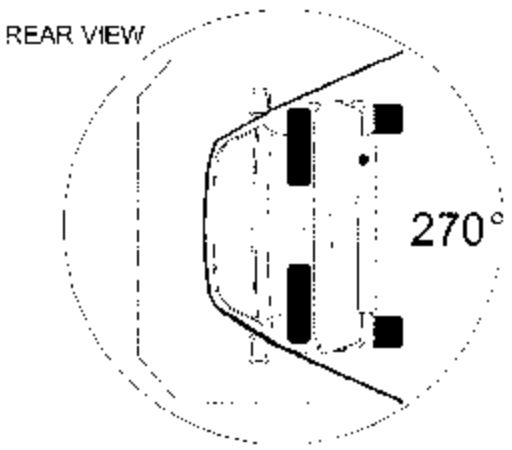
3. 7th minute = 0 oz. (1 oz. allowed)

4. 8th minute (if required) = N/A oz. (1 oz. allowed)

Provide Details of Stoddard Solvent Spillage Locations — NONE

DATA SHEET 5 CONTINUED

D. Test Phase = 270° to 360°



Determination of Stoddard Solvent Collection Time Period:

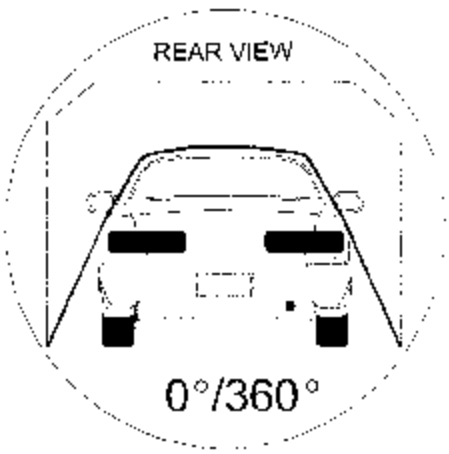
1. Rollover Fixture 90° Rotation Time = 1 minutes, 44 seconds

(Specified Range is 1 to 3 minutes)

2. FMVSS 301 Position Hold Time = 5 minutes, 0 seconds

3. TOTAL = 6 minutes, 44 seconds

4. NEXT WHOLE MINUTE INTERVAL = 7 minutes



Actual Test Vehicle Stoddard Solvent Spillage:

1. First 5 minutes from onset of rotation = 0 oz. (5 oz. allowed)

2. 6th minute = 0 oz. (1 oz. allowed)

3. 7th minute = 0 oz. (1 oz. allowed)

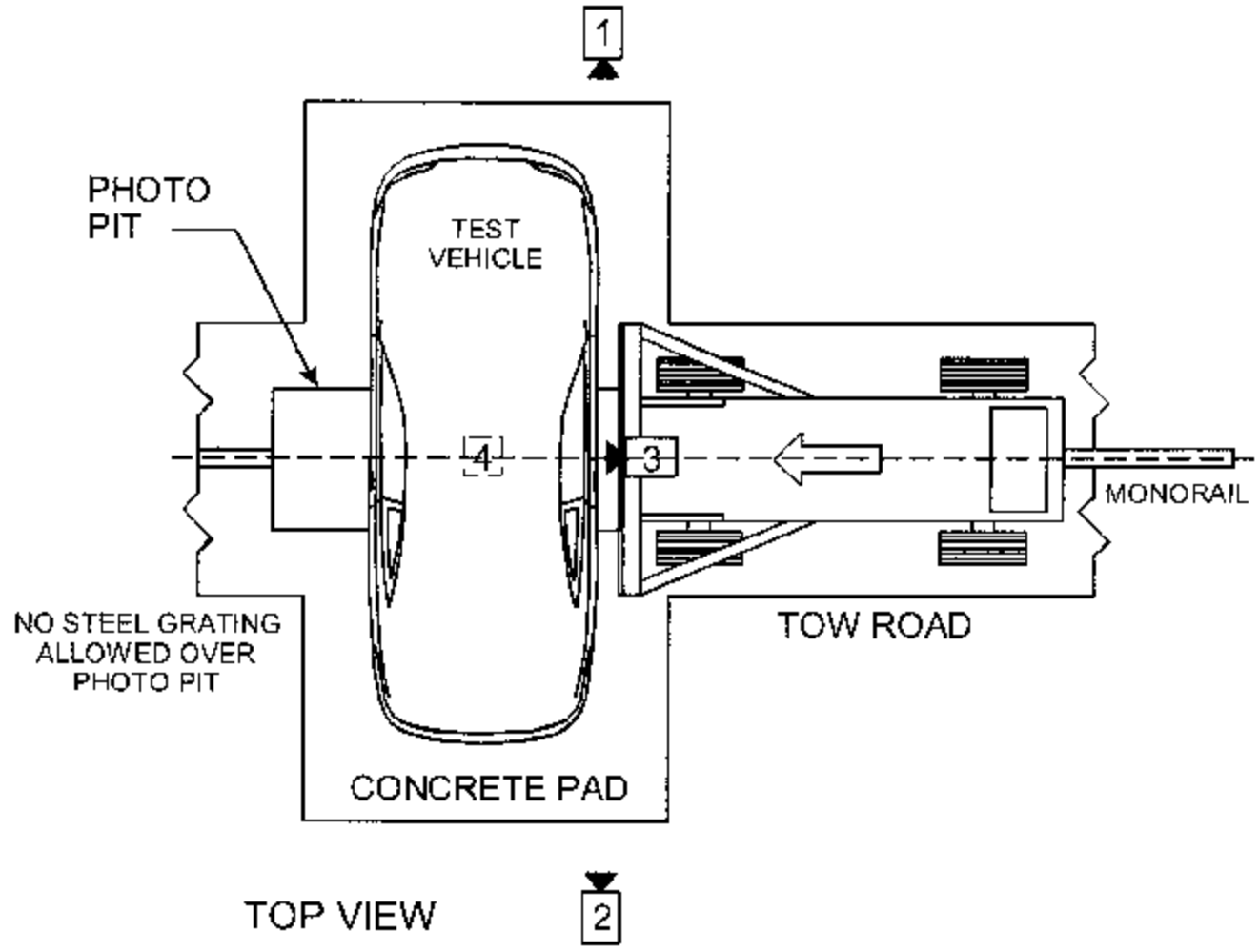
4. 8th minute (if required) = N/A oz. (1 oz. allowed)

Provide Details of Stoddard Solvent Spillage Locations — NONE

_____

DATA SHEET 6
CAMERA LOCATION

VEHICLE NHTSA NO.: C30200 TEST DATE: 08/25/03



CAMERA 1 – REAR SIDE VIEW OF VEHICLE DURING CRASH
CAMERA 2 – FRONT SIDE VIEW OF VEHICLE DURING CRASH
CAMERA 3 – OVERHEAD VIEW OF ENTIRE IMPACT
CAMERA 4 – UNDERBODY VIEW OF FUEL TANK LOCATED IN PIT

SECTION 4
INSTRUMENTATION AND EQUIPMENT LIST

TABLE 1 - INSTRUMENTATION & EQUIPMENT LIST

EQUIPMENT	DESCRIPTION	MODEL/ SERIAL NO.	CAL. DATE	NEXT CAL. DATE
COUNTER/TIMER	SYSTRON DONNER	19 353-10	04/03	04/04
COUNTER/TIMER	SYSTRON DONNER	19 353- 11	03/03	03/04
SPEED TRAP 2	GTL ST1	N/A	08/02	08/03
SPEED TRAP 3	GTL ST2	N/A	08/02	08/03
STOP WATCH	ACCUSPLIT	ACT 1 A&B	05/03	05/04
STOP WATCH	ACCUSPLIT	ACT 2 A&B	05/03	05/04
SCALES	INTERCOMP	199744	05/03	05/04
TIRE PRESSURE GAUGE	WEKSLER	0-100	05/03	05/04
STEEL SCALES	STARRETT	C416R	05/03	05/04
STEEL TAPE	STANLEY	GF2	05/03	05/04
LEVEL	STANLEY	42-449	05/03	05/04
TEMP. INDICATOR	OMEGA	B/5562/14/1	05/03	05/04
TEMP. RECORDER	OMEGA	B/5562/14/1	05/03	05/04

SECTION 5

PHOTOGRAPHS

2003 FORD EXPEDITION
NHTSA NO. C30200
FMVSS NO. 301L

FIGURE 8.1
FRONT VIEW OF VEHICLE PRE-TEST

2003 FORD EXPEDITION
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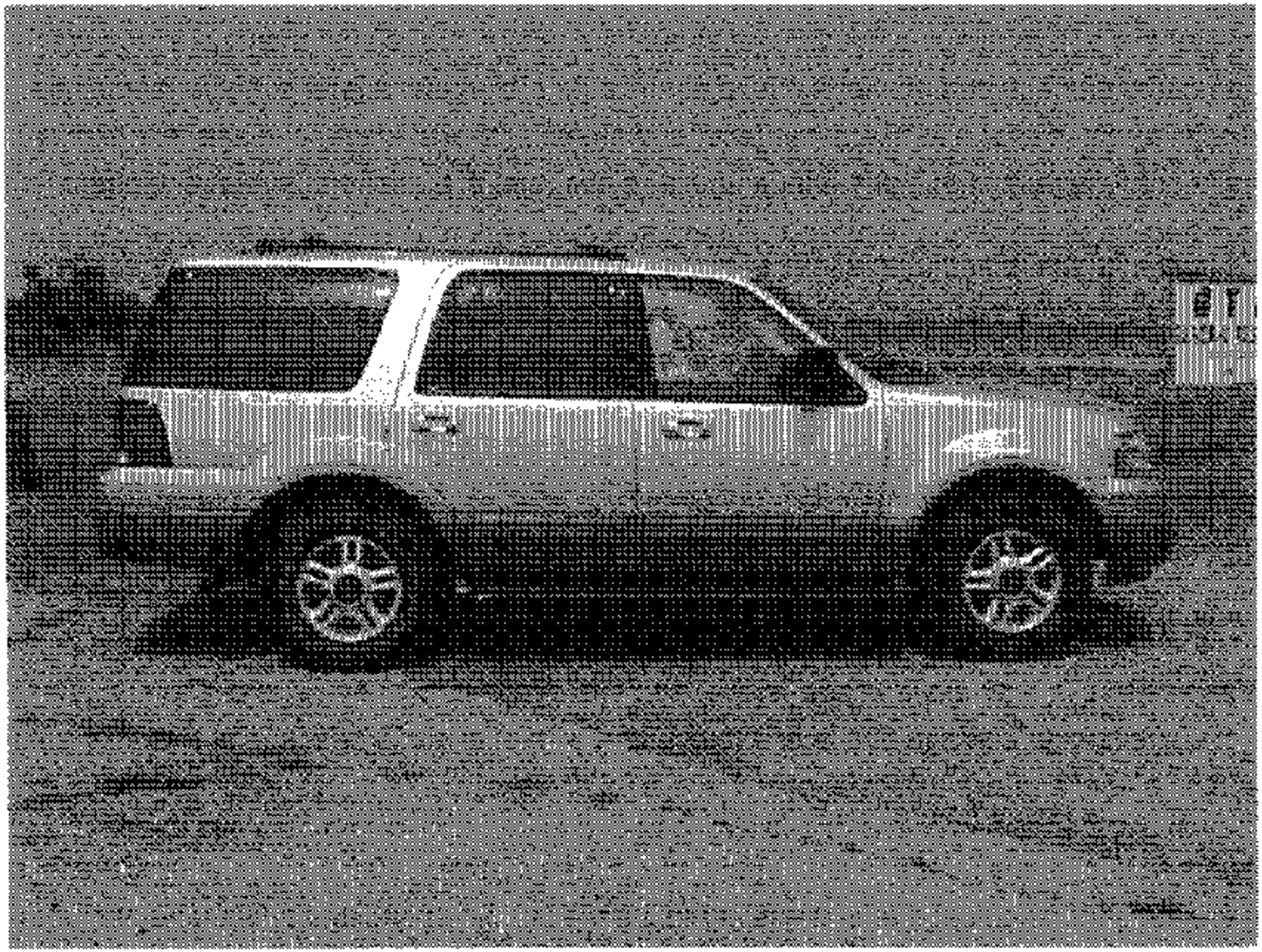
FIGURE 5.2
LEFT SIDE VIEW OF VEHICLE PRE-TEST



2003 FORD EXPEDITION
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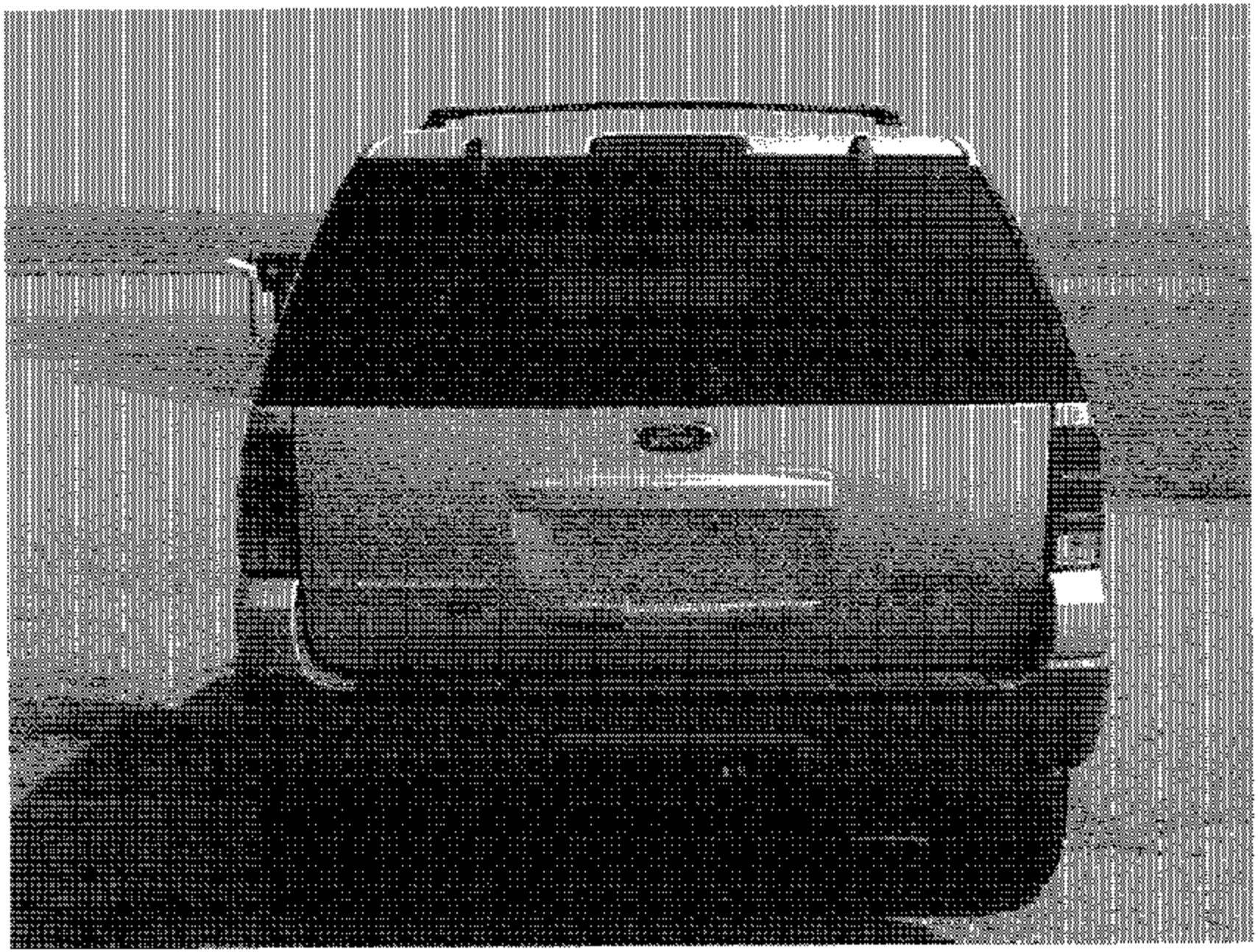
FIGURE 5.3
RIGHT SIDE VIEW OF VEHICLE PRE-TEST



2003 FORD EXPEDITION
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FIGURE 5.4
REAR VIEW OF VEHICLE PRE-TEST

2003 FORD EXPEDITION
NHTSA NO. C30200
FMVSS NO. 301L

FIGURE 5.5
¾ FRONTAL VIEW FROM LEFT SIDE OF VEHICLE
PRE-TEST

2003 FORD EXPEDITION
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FIGURE 5.6
¾ REAR VIEW FROM RIGHT SIDE OF VEHICLE
PRE-TEST

2003 FORD EXPEDITION
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FIGURE 5.7
LEFT VIEW OF VEHICLE/BARRIER PRE-TEST

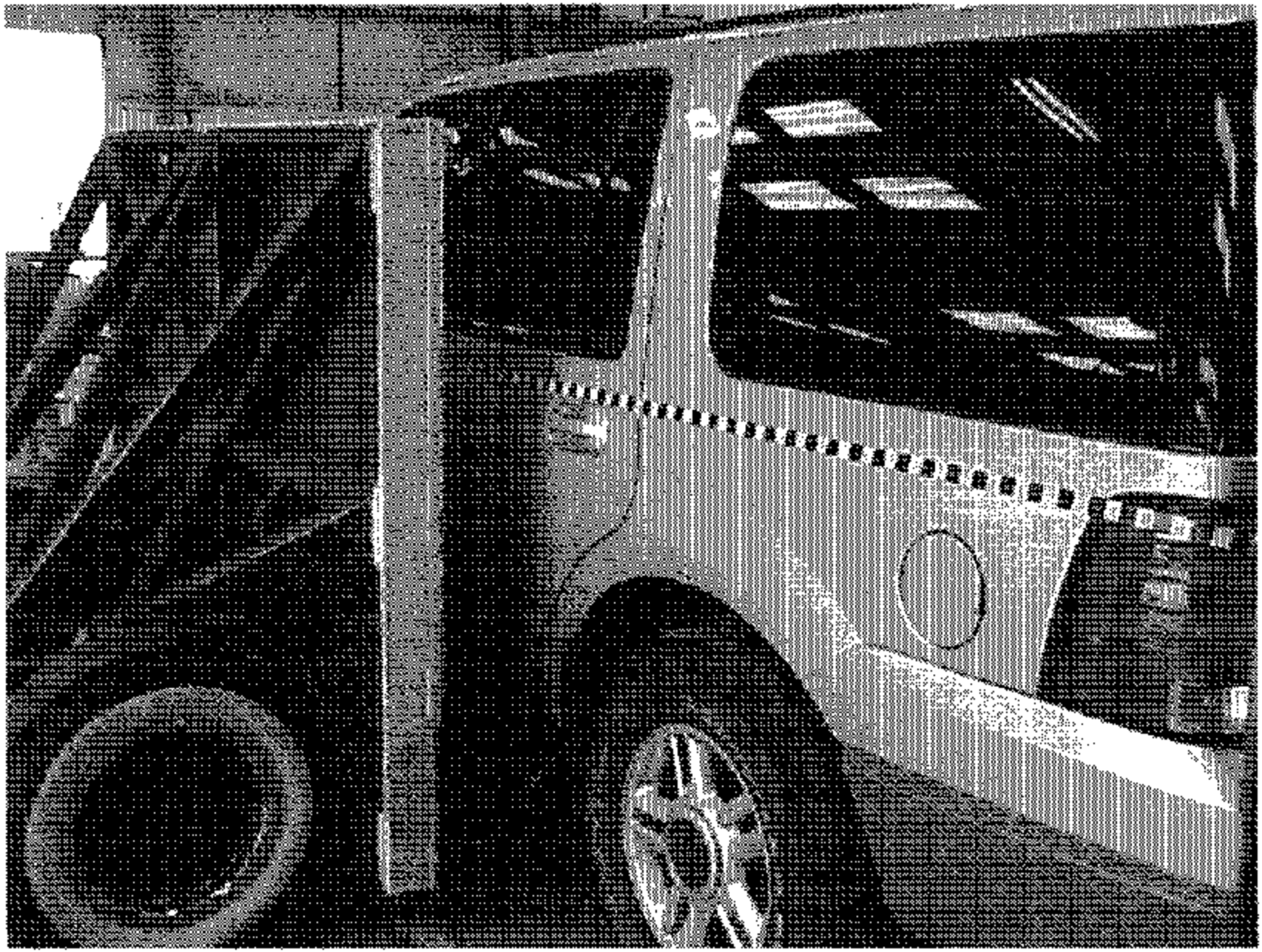

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FIGURE 5.8
RIGHT VIEW OF VEHICLE/BARRIER PRE-TEST

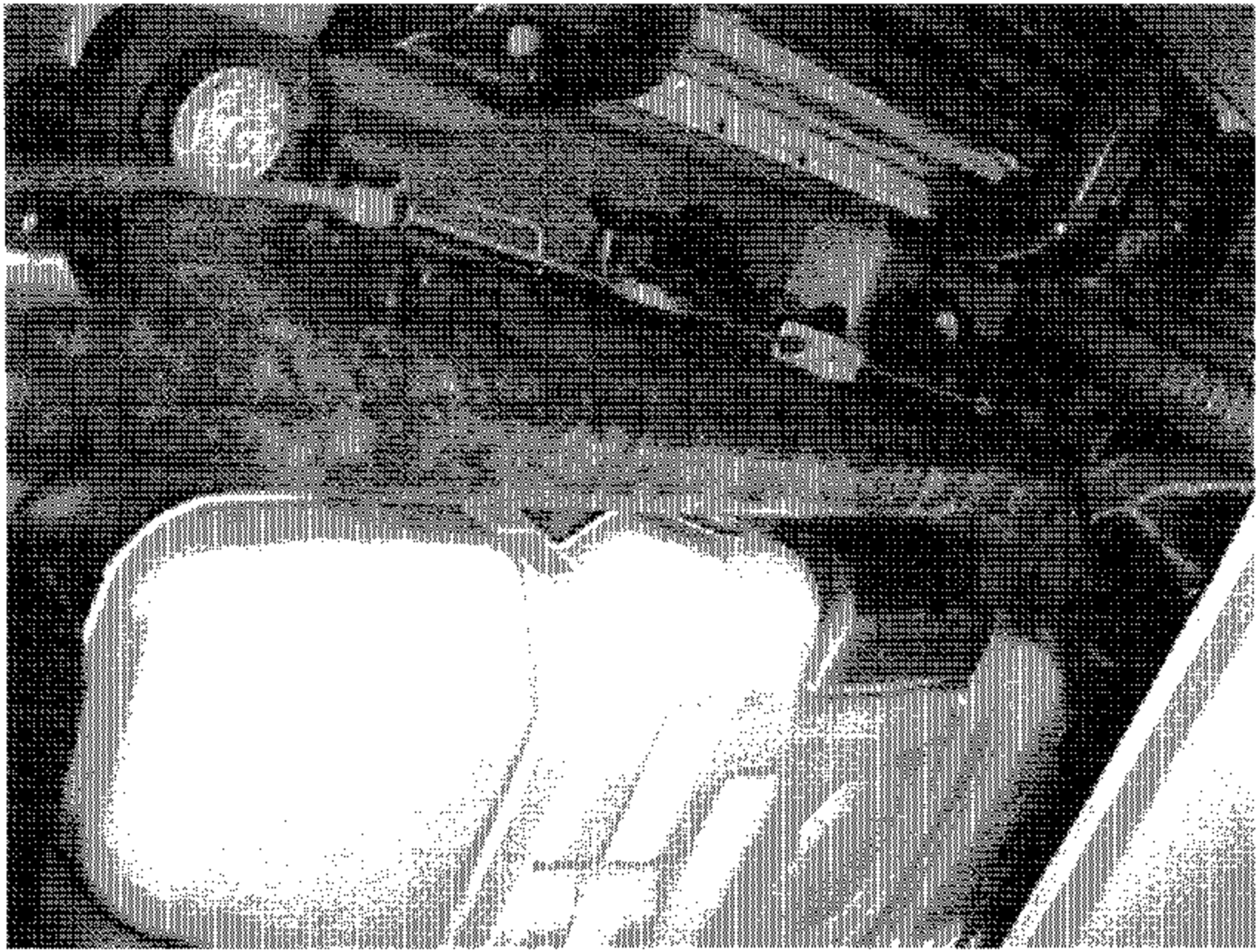

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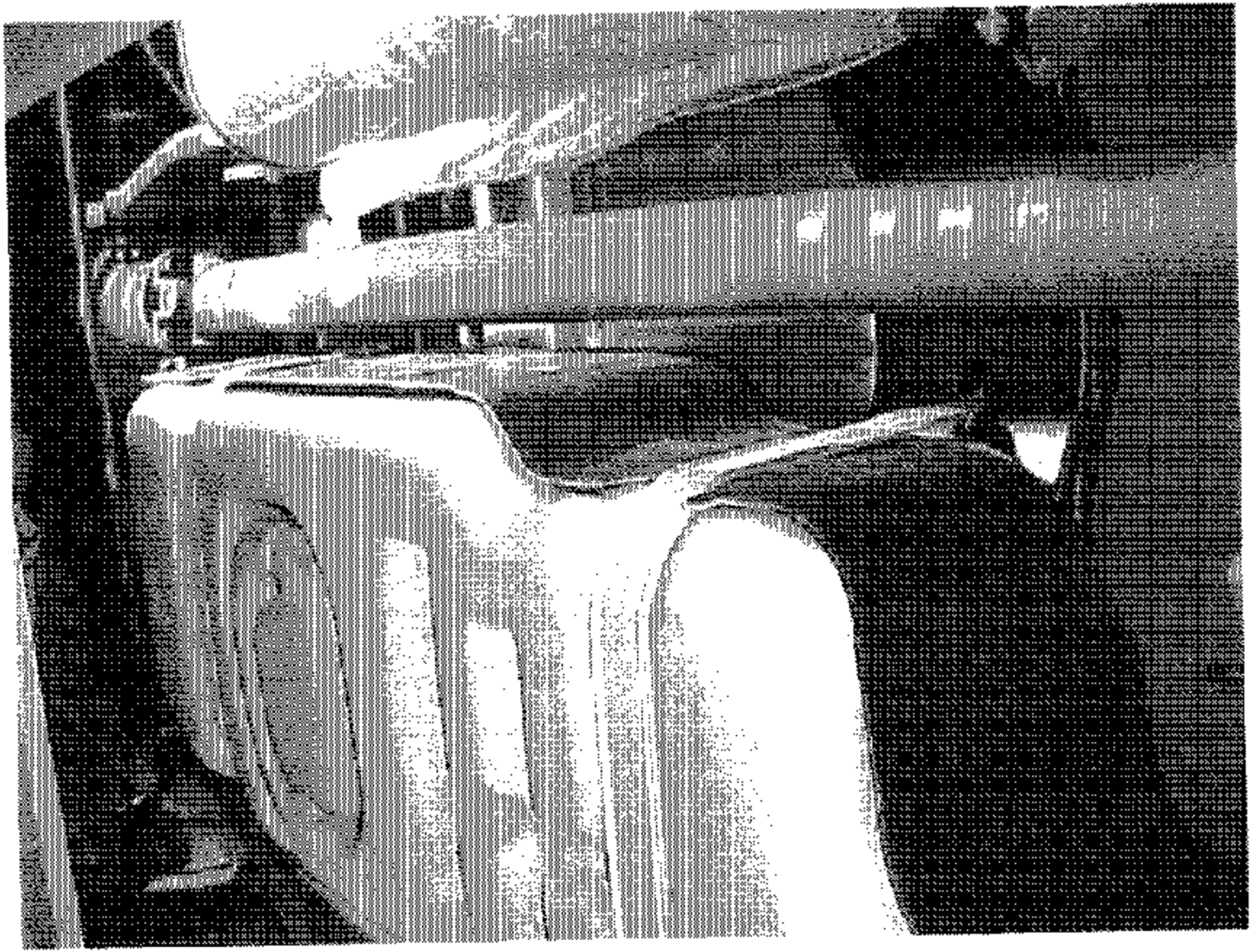
FIGURE 5.9
UNDERBODY VIEW OF FUEL TANK RIGHT VIEW
PRE-TEST



2003 FORD EXPEDITION
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FIGURE 5.10
UNDERBODY VIEW OF FUEL TANK LEFT VIEW
PRE-TEST

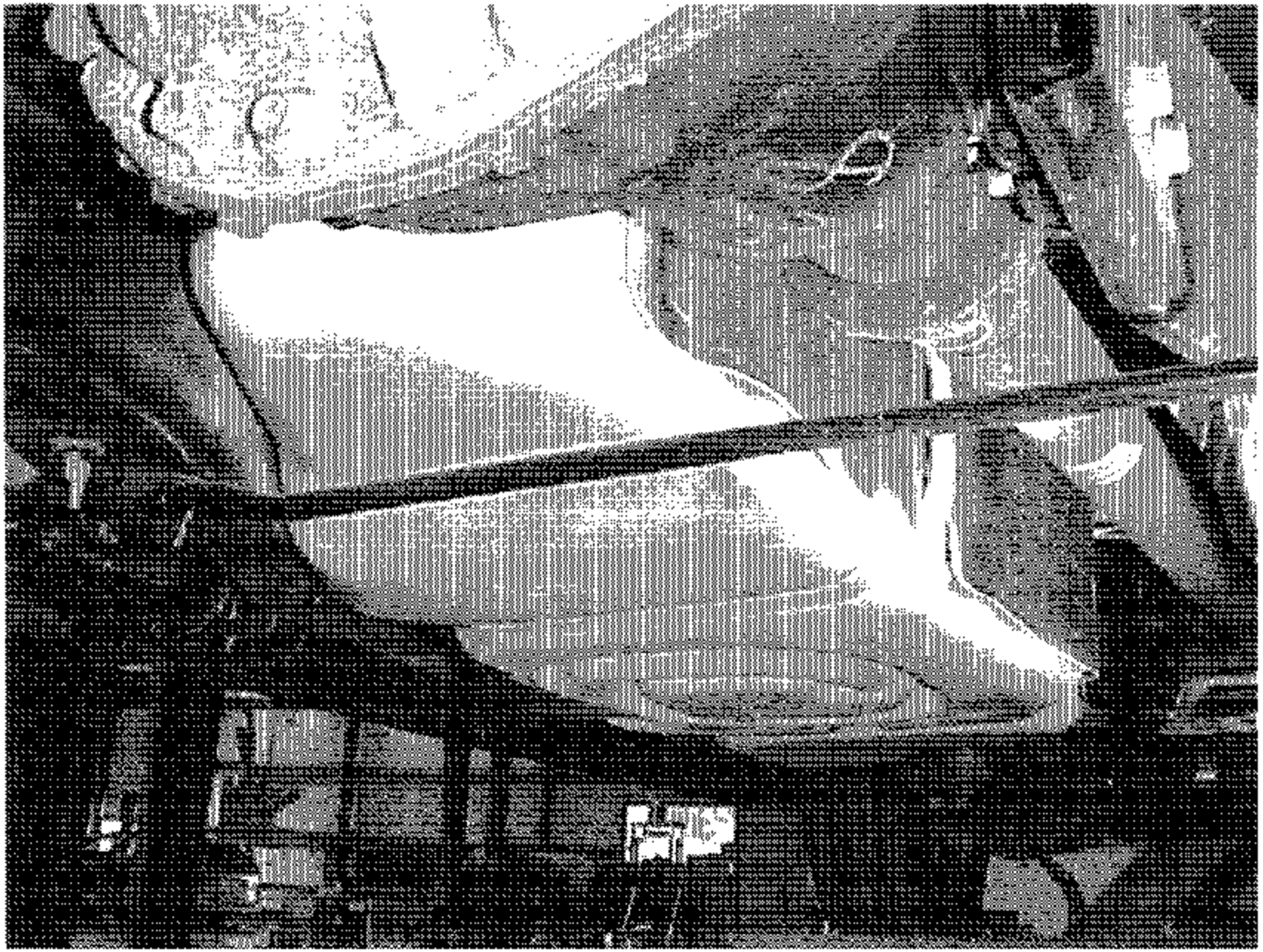

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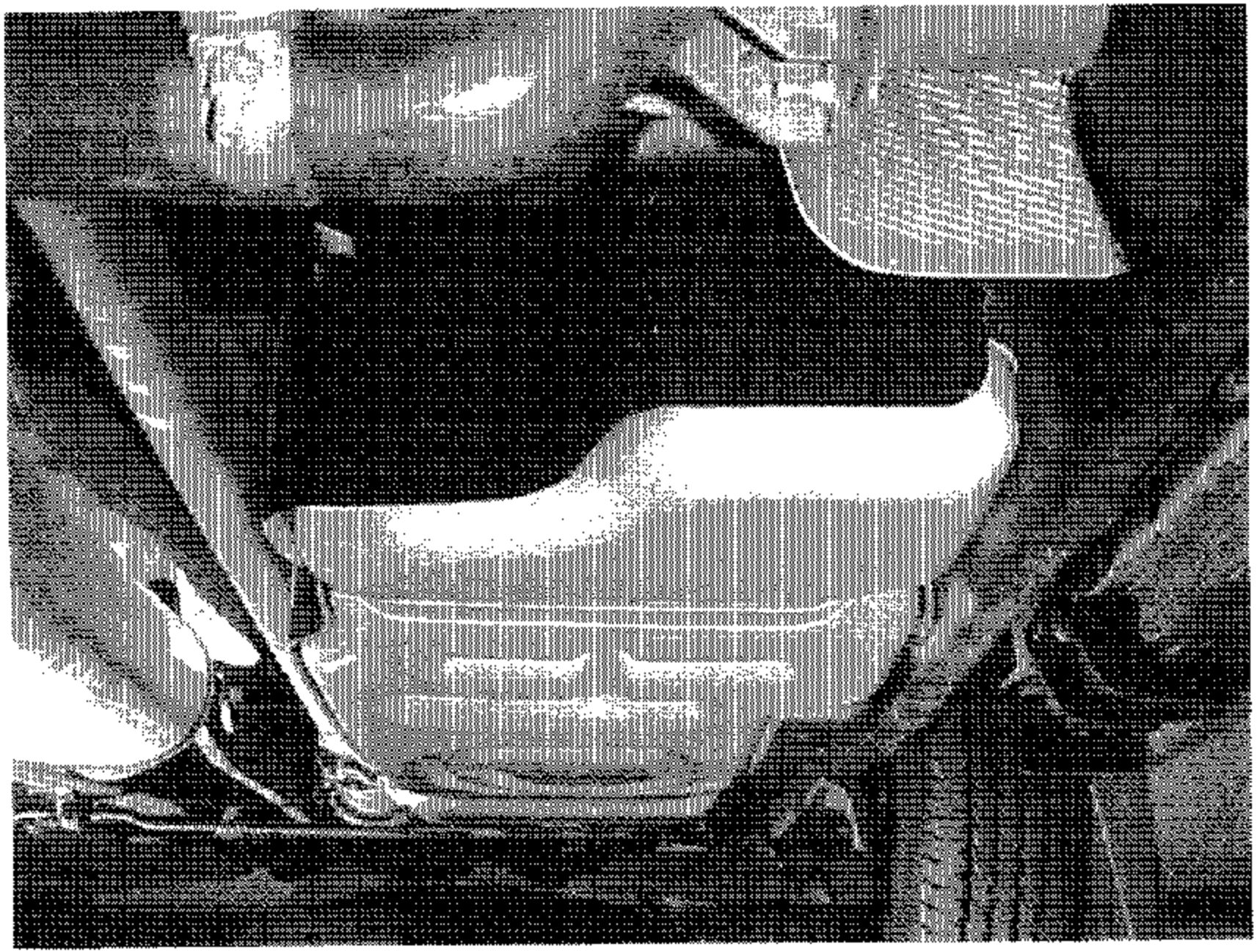
FIGURE 5.11
UNDERBODY VIEW OF FUEL TANK REAR VIEW
PRE-TEST



2003 FORD EXPEDITION
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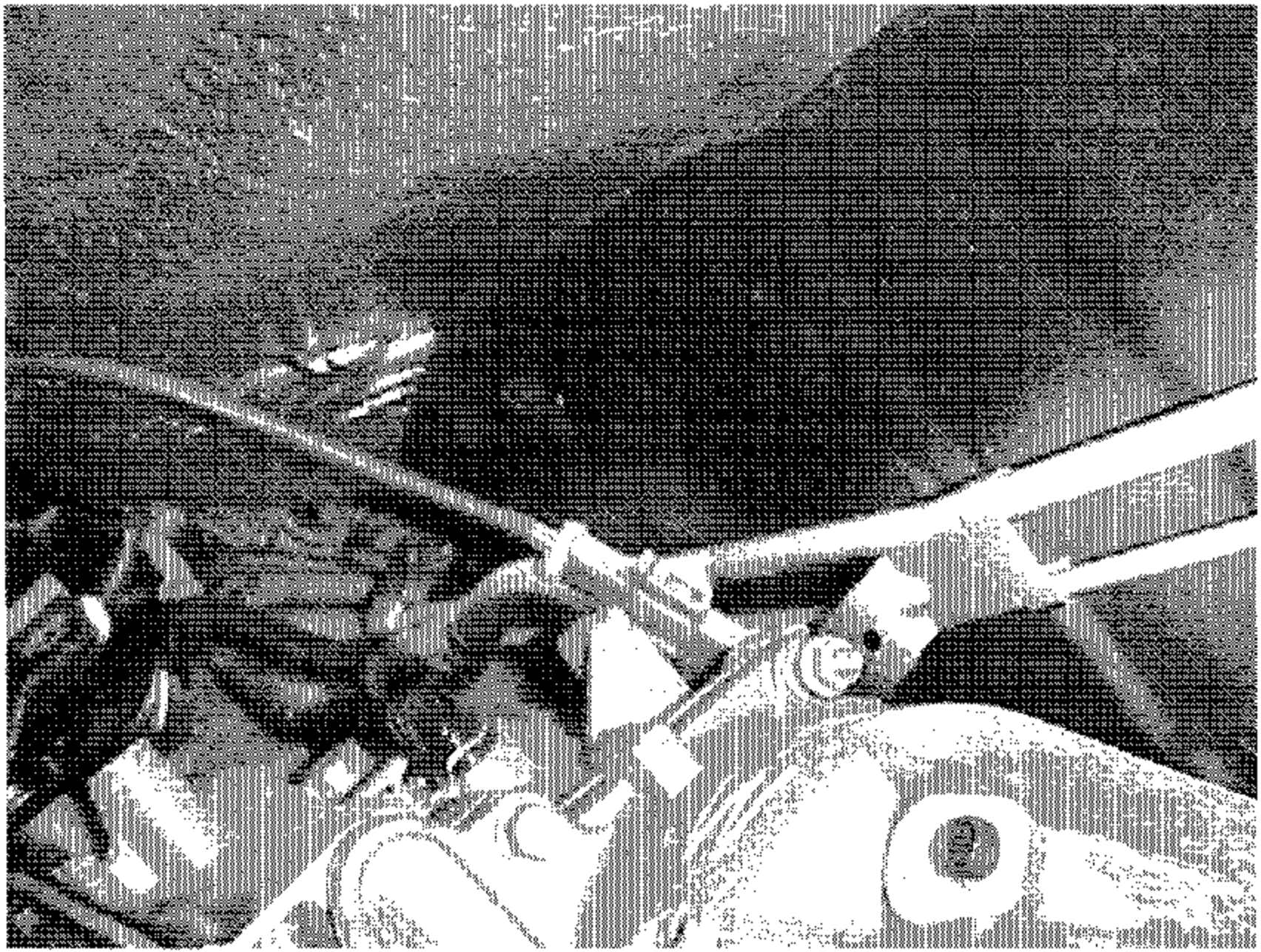
FIGURE 5.12
UNDERBODY VIEW OF FUEL TANK FRONT VIEW
PRE-TEST

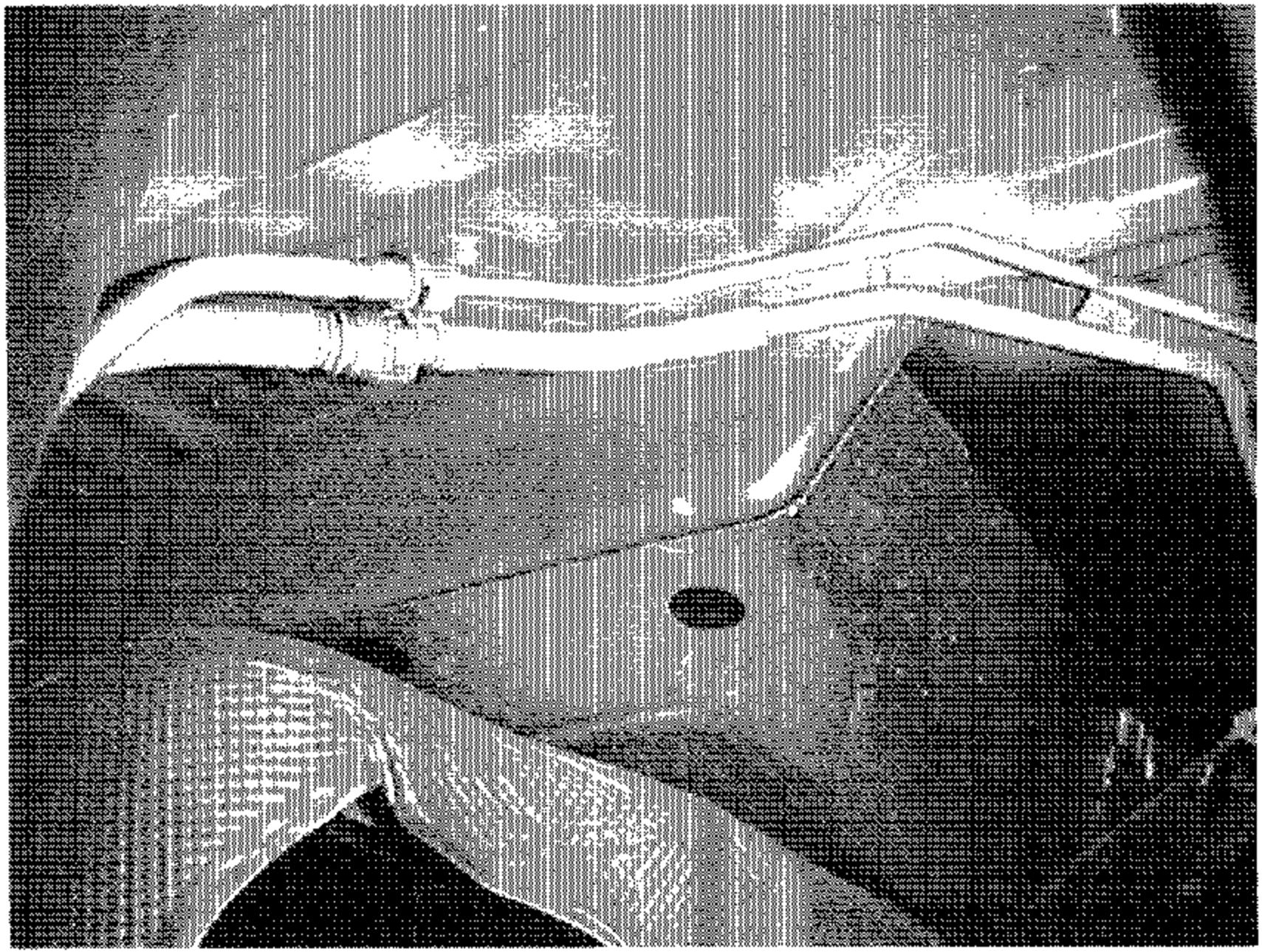
2003 FORD EXPEDITION
NHTSA NO. C30200
FMVSS NO. 301L

FIGURE 5.13
UNDERBODY VIEW OF FUEL LINES AT TANK
PRE-TEST



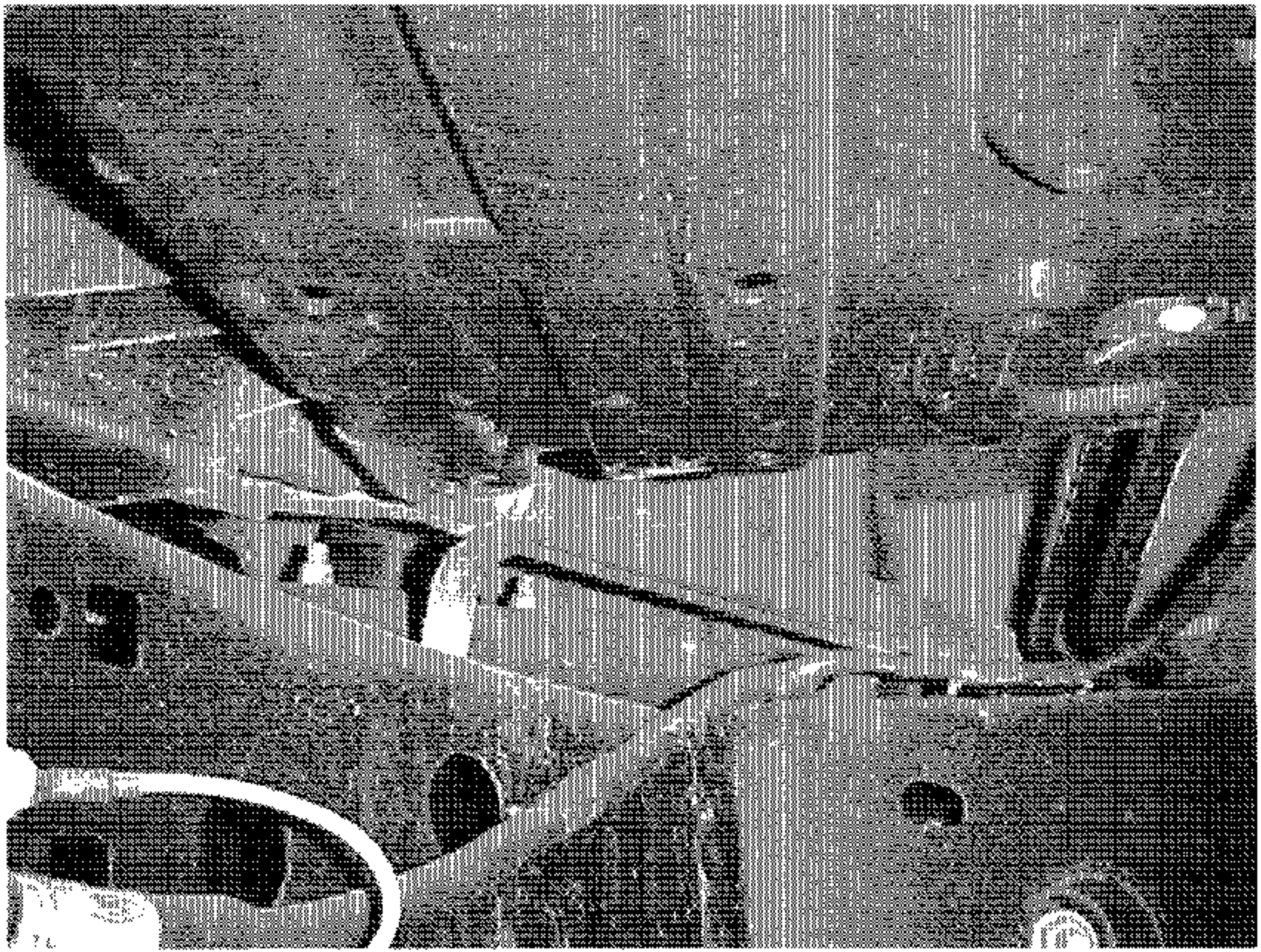
2003 FORD EXPEDITION
NHTSA NO. C30200
FMVSS NO. 301L

FIGURE 5.14
UNDERBODY VIEW OF FUEL LINES TO ENGINE
PRE-TEST



2003 FORD EXPEDITION
NHTSA NO. C30200
FMVSS NO. 301L

FIGURE 5.15
UNDERBODY VIEW OF FUEL LINES IN CENTER
PRE-TEST



2003 FORD EXPEDITION
NHTSA NO. C30200
FMVSS NO. 301L

FIGURE 5.16
UNDERBODY VIEW OF FUEL FILL AND VENT LINES
TO TANK PRE-TEST

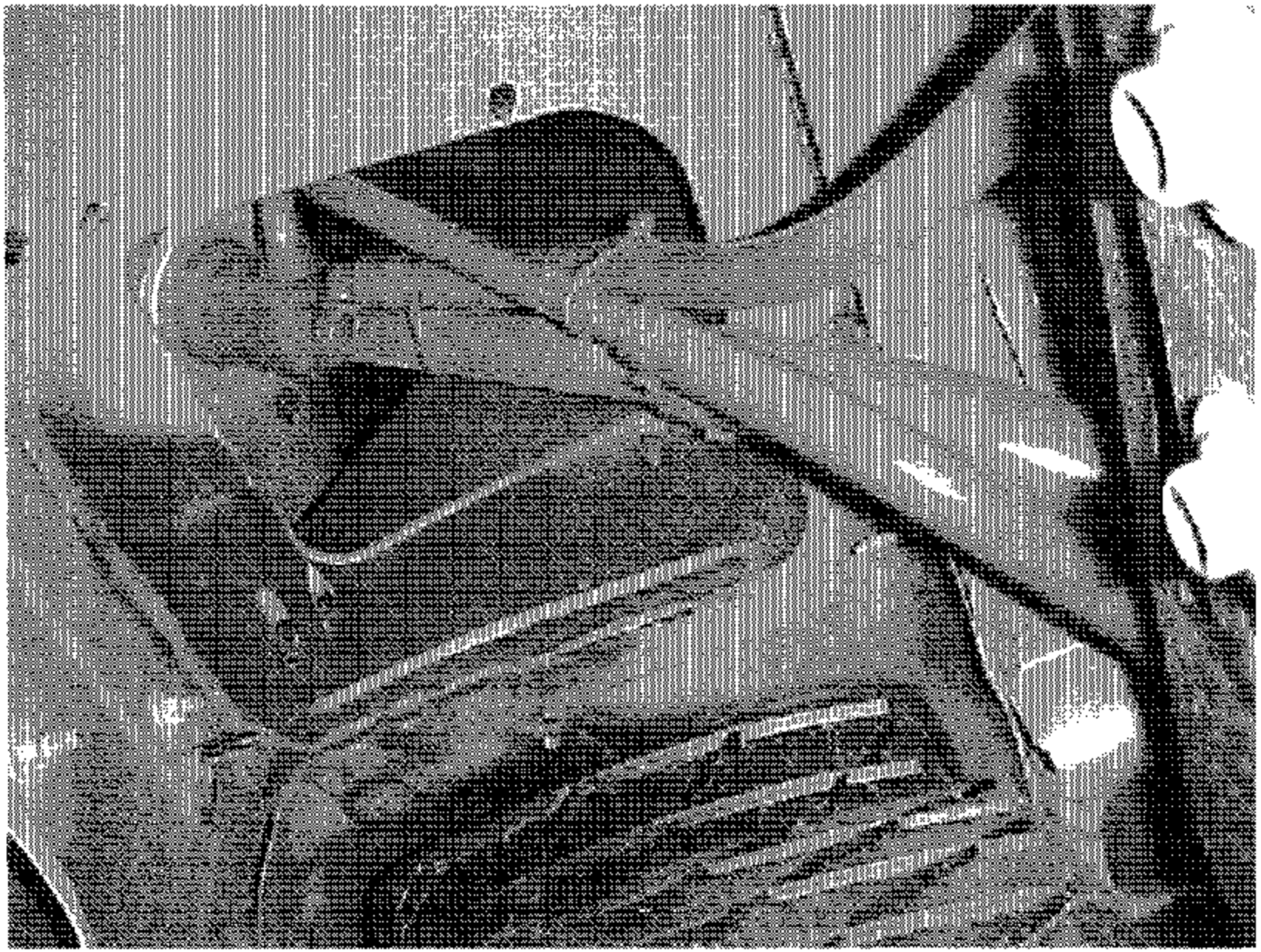


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FIGURE 5.17
UNDERBODY VIEW OF FUEL FILL AND VENT LINES
AT FILL PRE-TEST

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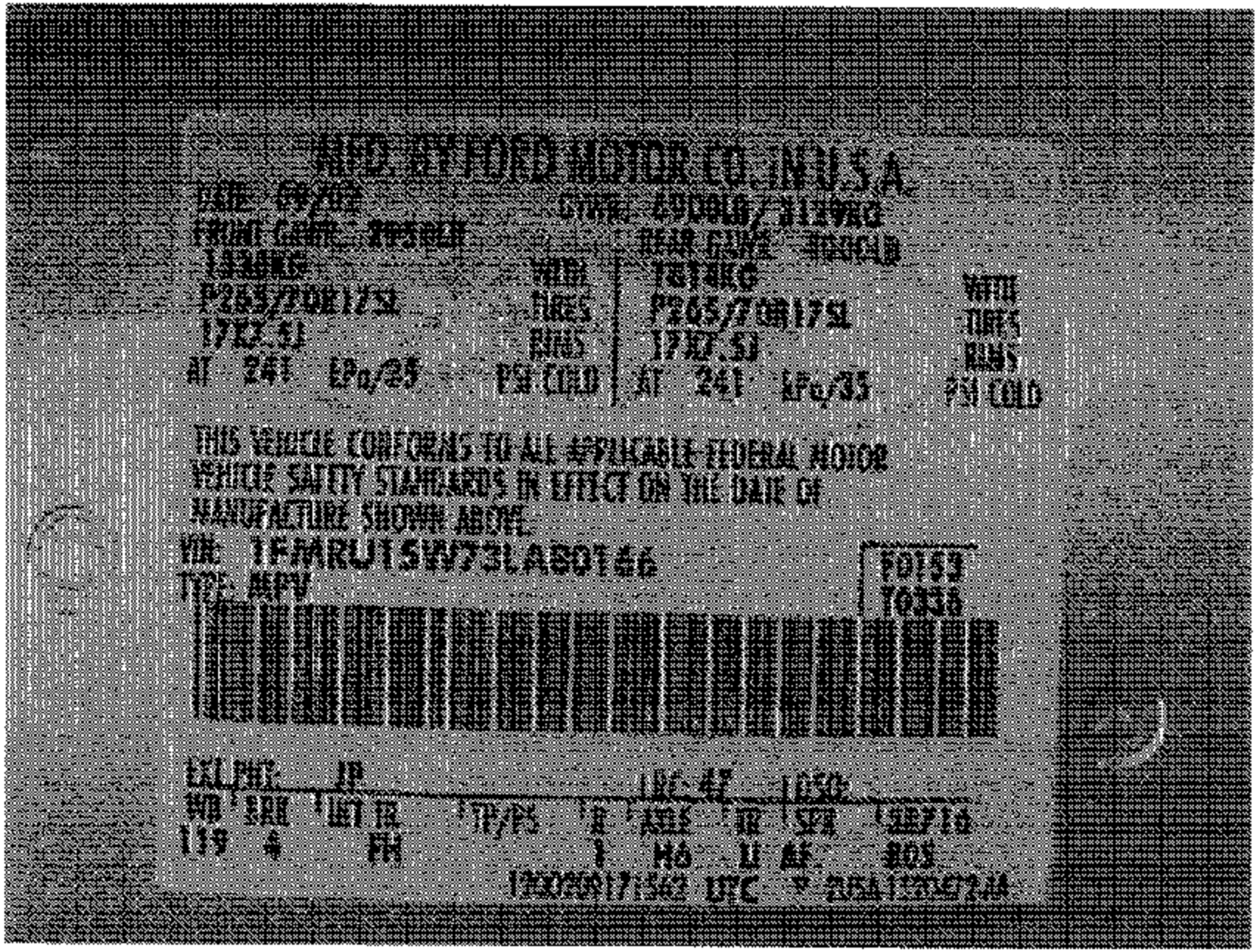
FIGURE 5.18
UNDERBODY VIEW OF FUEL FILL AND VENT LINES IN CENTER PRE-TEST



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NHTSA NO. C30200
FMVSS NO. 301L

FIGURE 5.19
VEHICLE CERTIFICATION AND TIRE INFORMATION LABEL

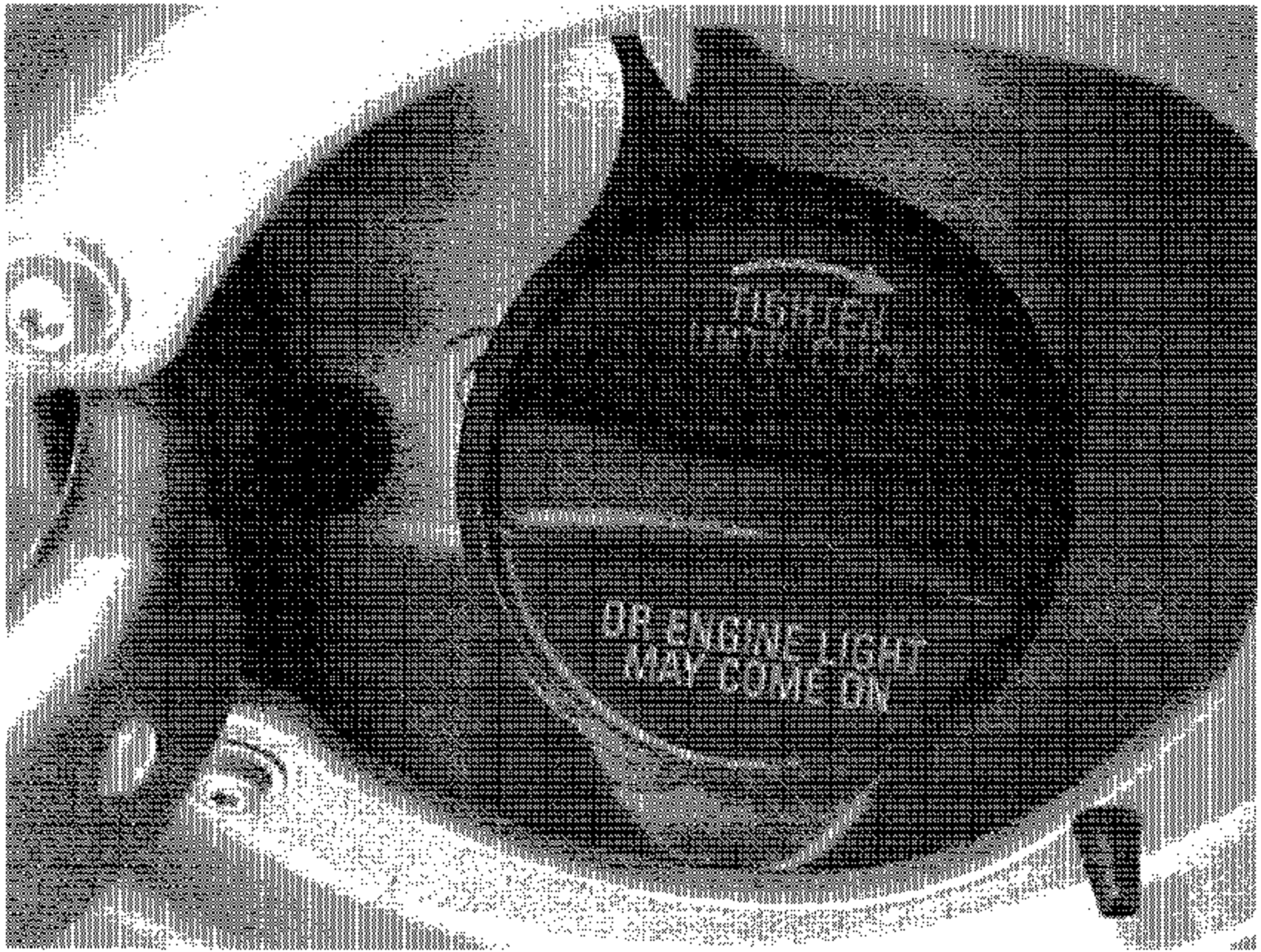

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FIGURE 5.20
VEHICLE FUEL CAP PRE-TEST

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FIGURE 5.21
FRONT VIEW OF VEHICLE POST TEST

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FIGURE 5.22
LEFT SIDE VIEW OF VEHICLE POST TEST

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FIGURE 5.24
REAR VIEW OF VEHICLE POST TEST

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FIGURE 5.25
¾ FRONTAL VIEW FROM LEFT SIDE OF VEHICLE
POST TEST

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FIGURE 5.26
¾ REAR VIEW FROM RIGHT SIDE OF VEHICLE
POST TEST

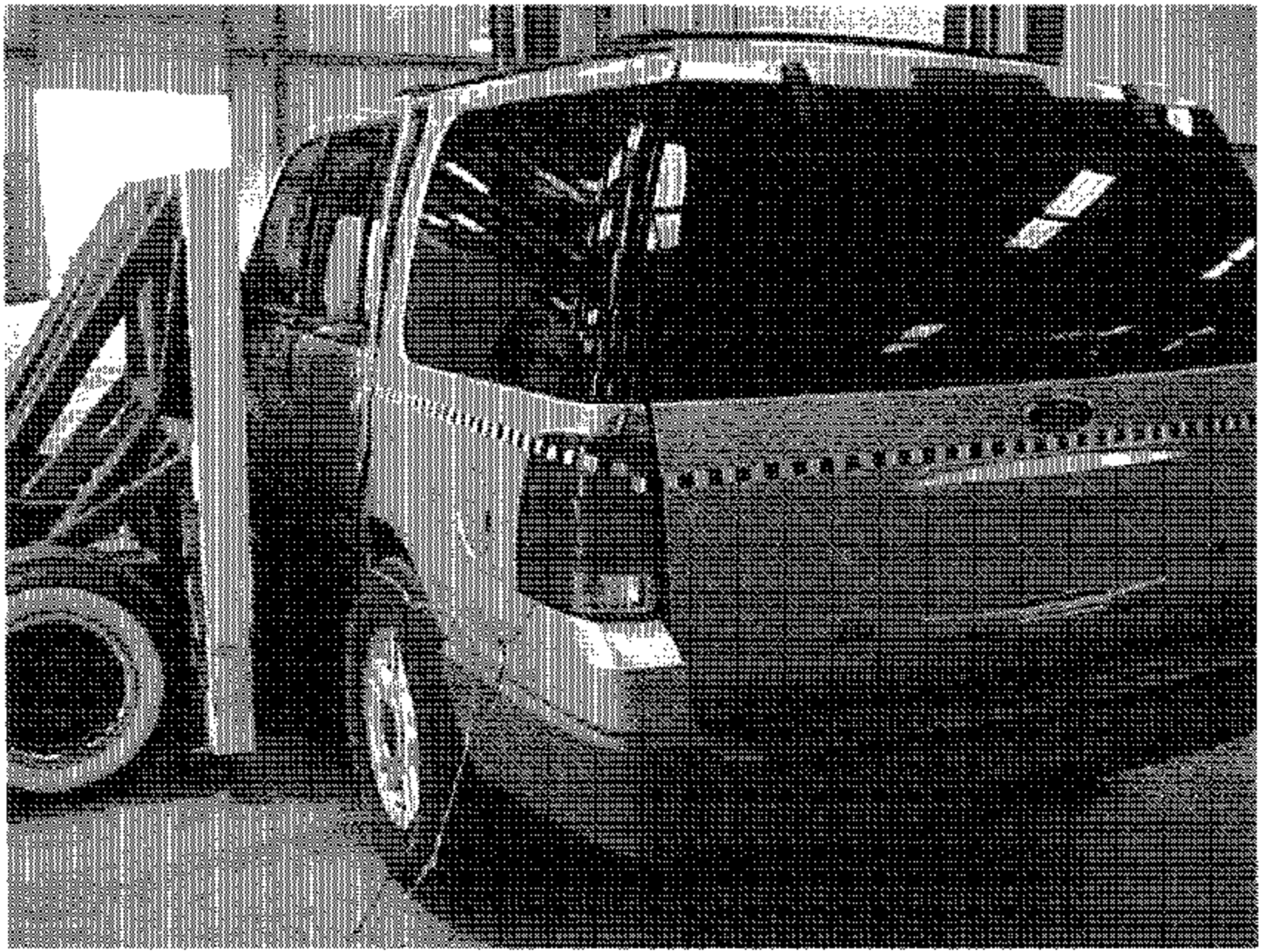

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FIGURE 5.28
RIGHT VIEW OF VEHICLE/BARRIER POST TEST

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FIGURE 5.29
UNDERBODY VIEW OF FUEL TANK RIGHT VIEW
POST TEST

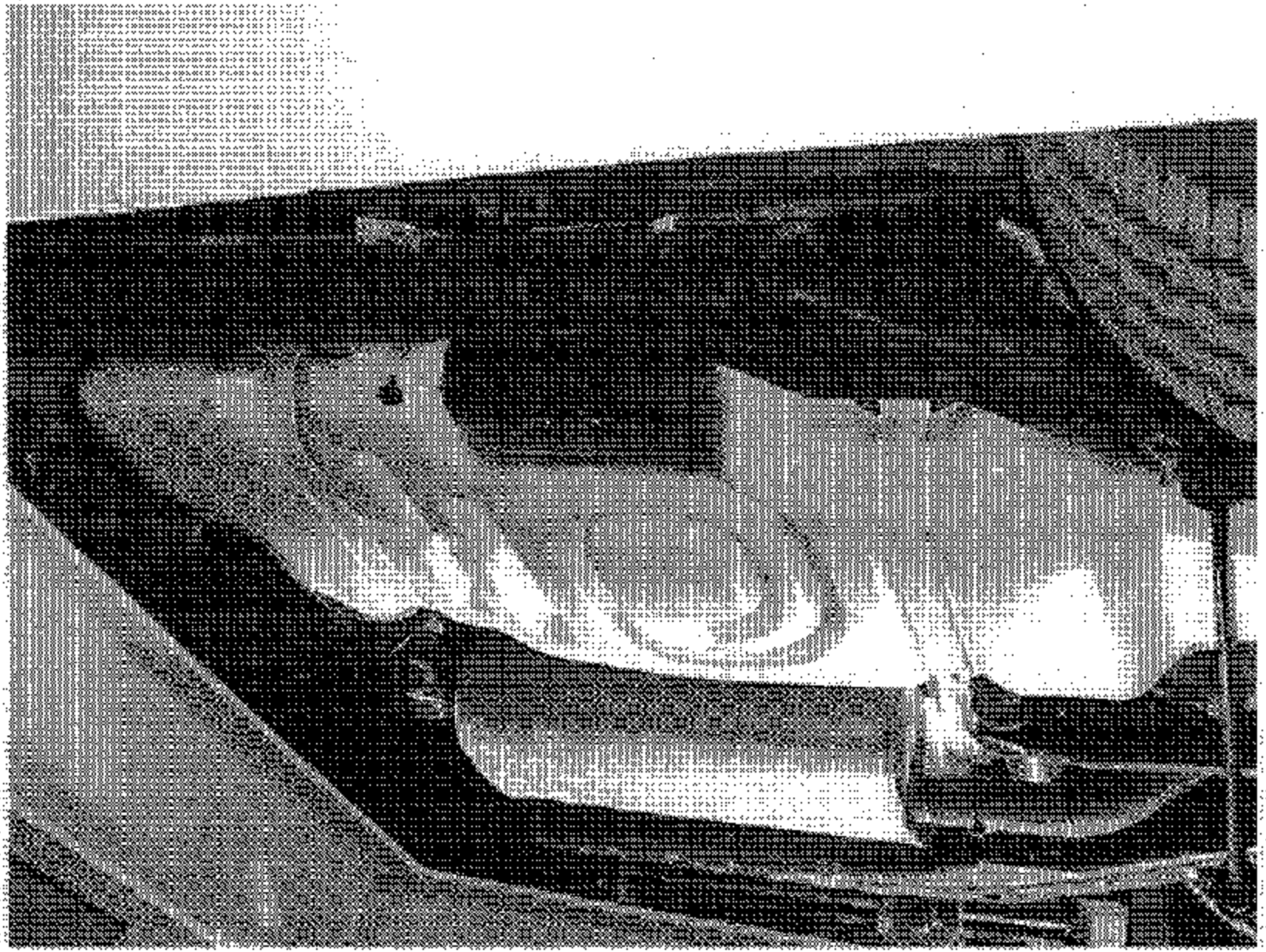

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FIGURE 5.30
UNDERBODY VIEW OF FUEL TANK LEFT VIEW
POST TEST

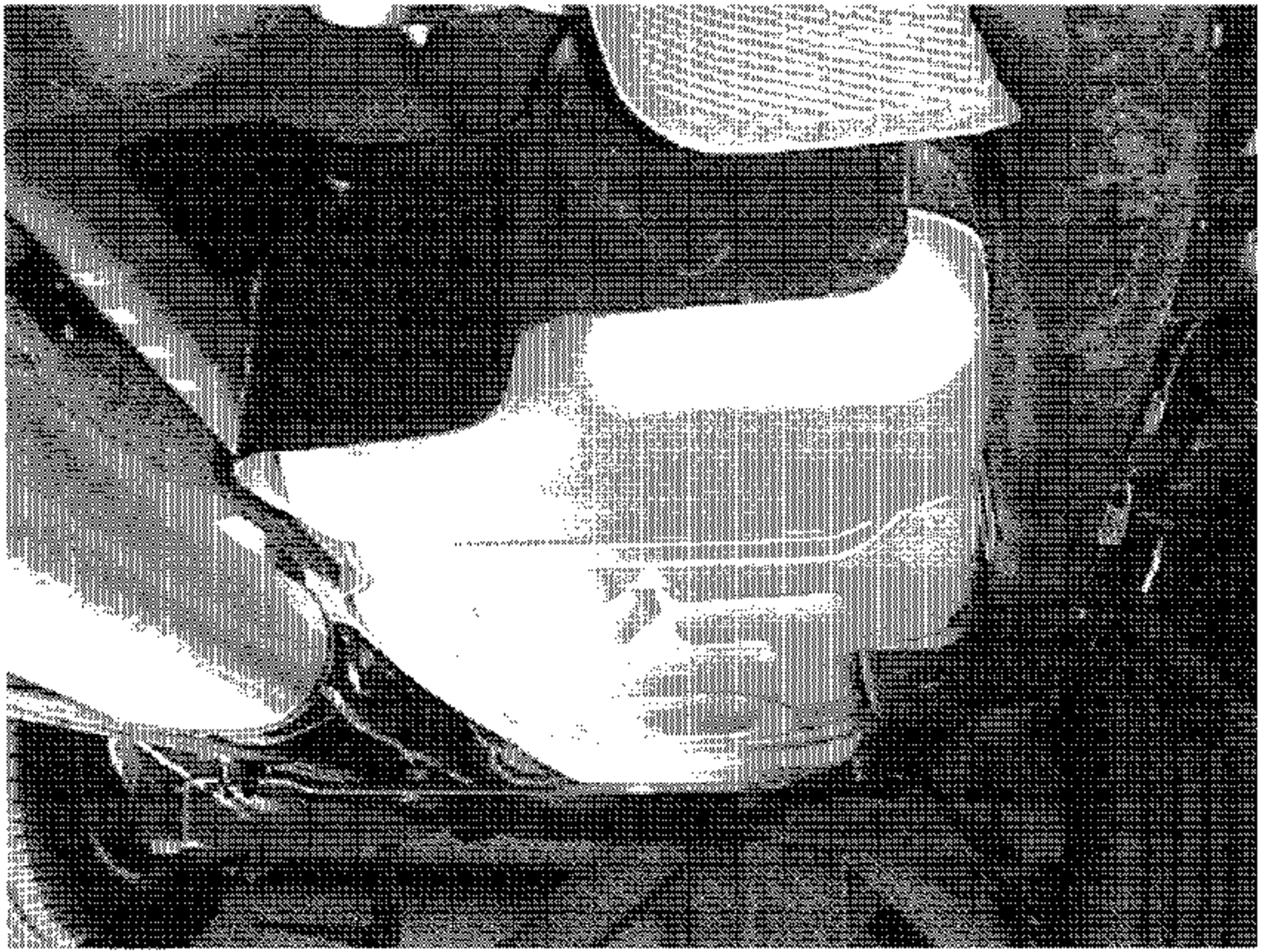

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FIGURE 5.31
UNDERBODY VIEW OF FUEL TANK FRONT VIEW
POST TEST

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FIGURE 5.32
UNDERBODY VIEW OF FUEL LINES

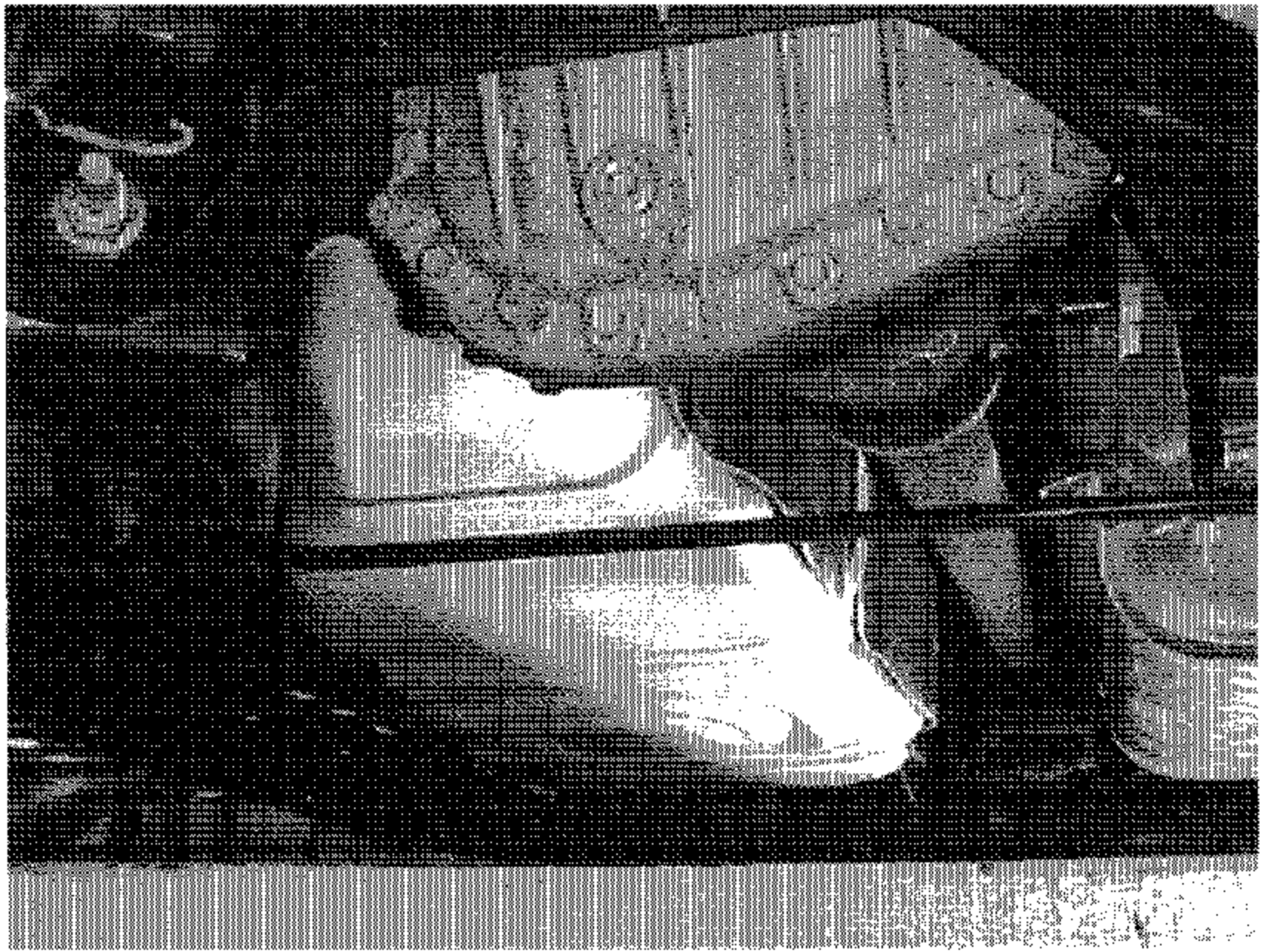

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FIGURE 5.33
UNDERBODY VIEW OF FUEL LINES REAR VIEW
POST TEST

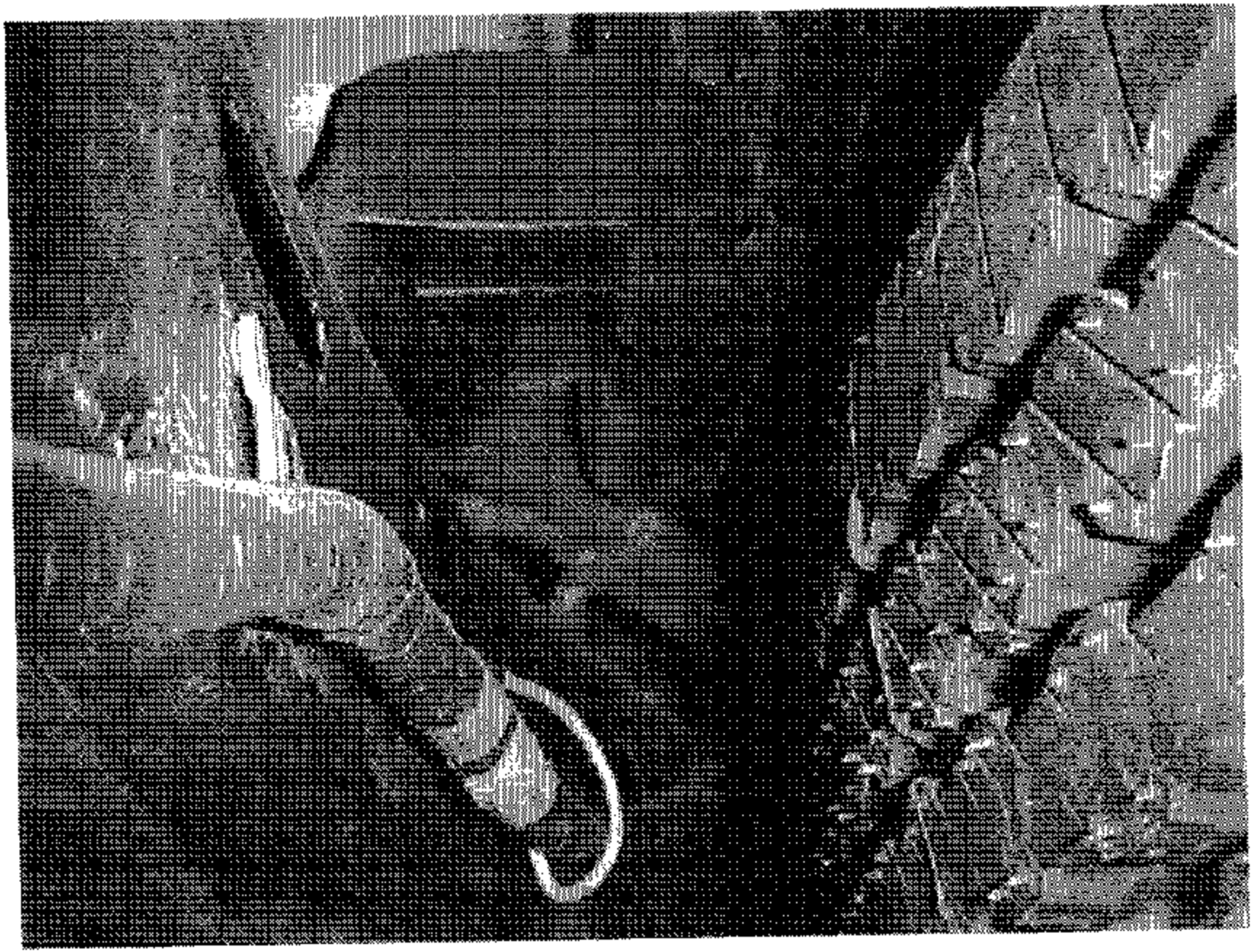

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FIGURE 5.34
UNDERBODY VIEW OF FUEL FILL AND VENT LINES
TO TANK POST TEST

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FIGURE 5.35
UNDERBODY VIEW OF FUEL FILL AND VENT LINES
AT FILL POST TEST

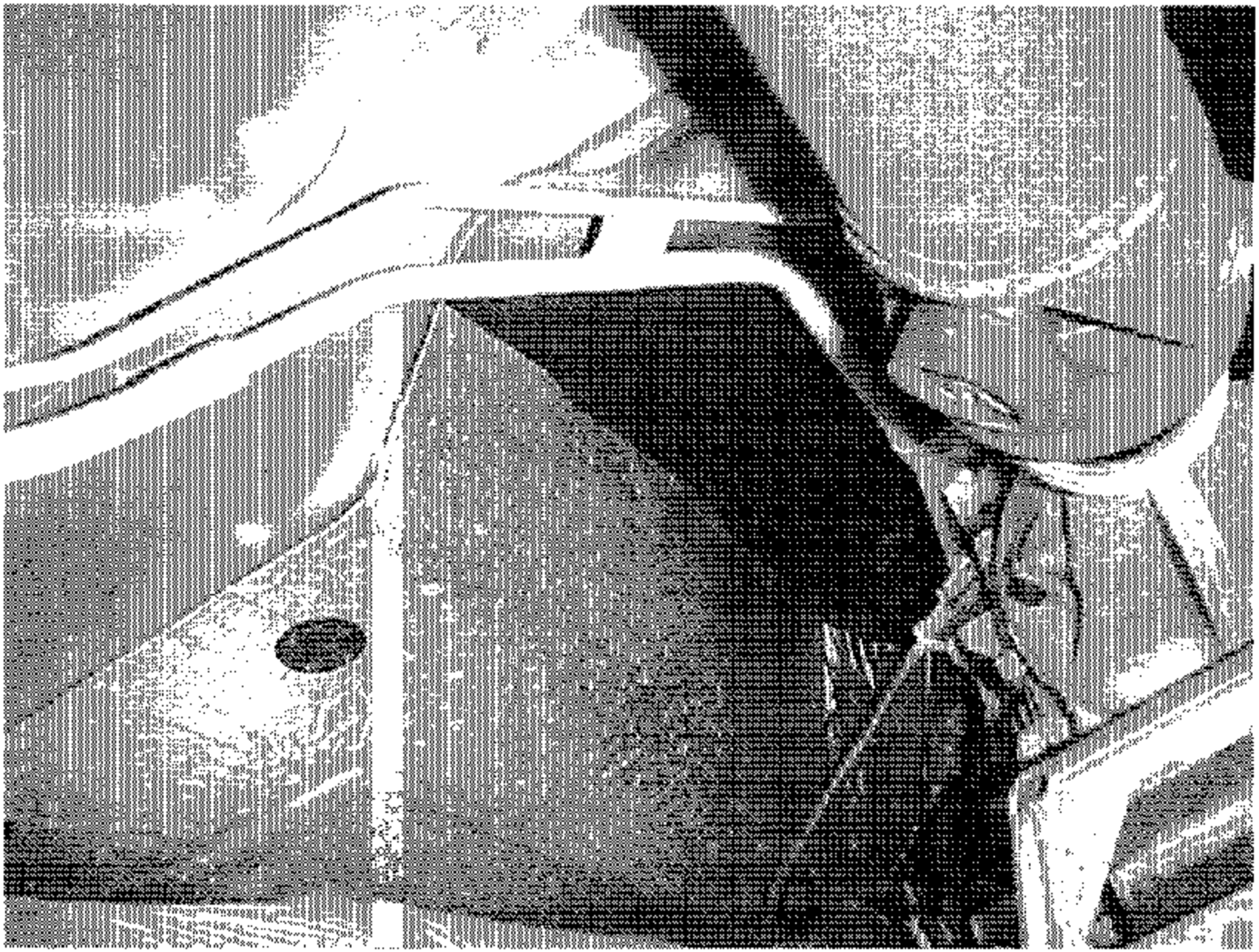

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FIGURE 5.36
UNDERBODY VIEW OF FUEL LINES TO ENGINE
POST TEST

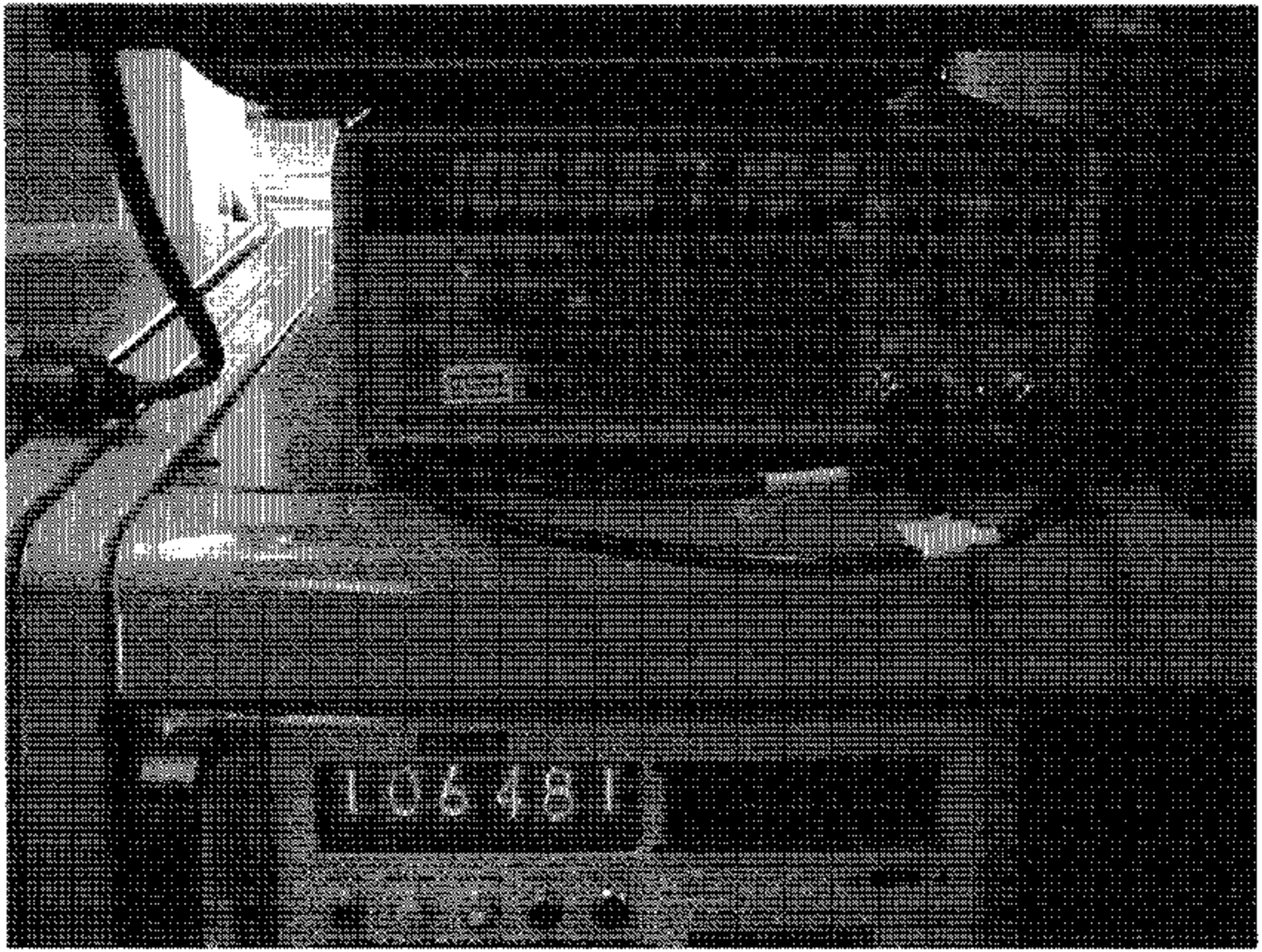

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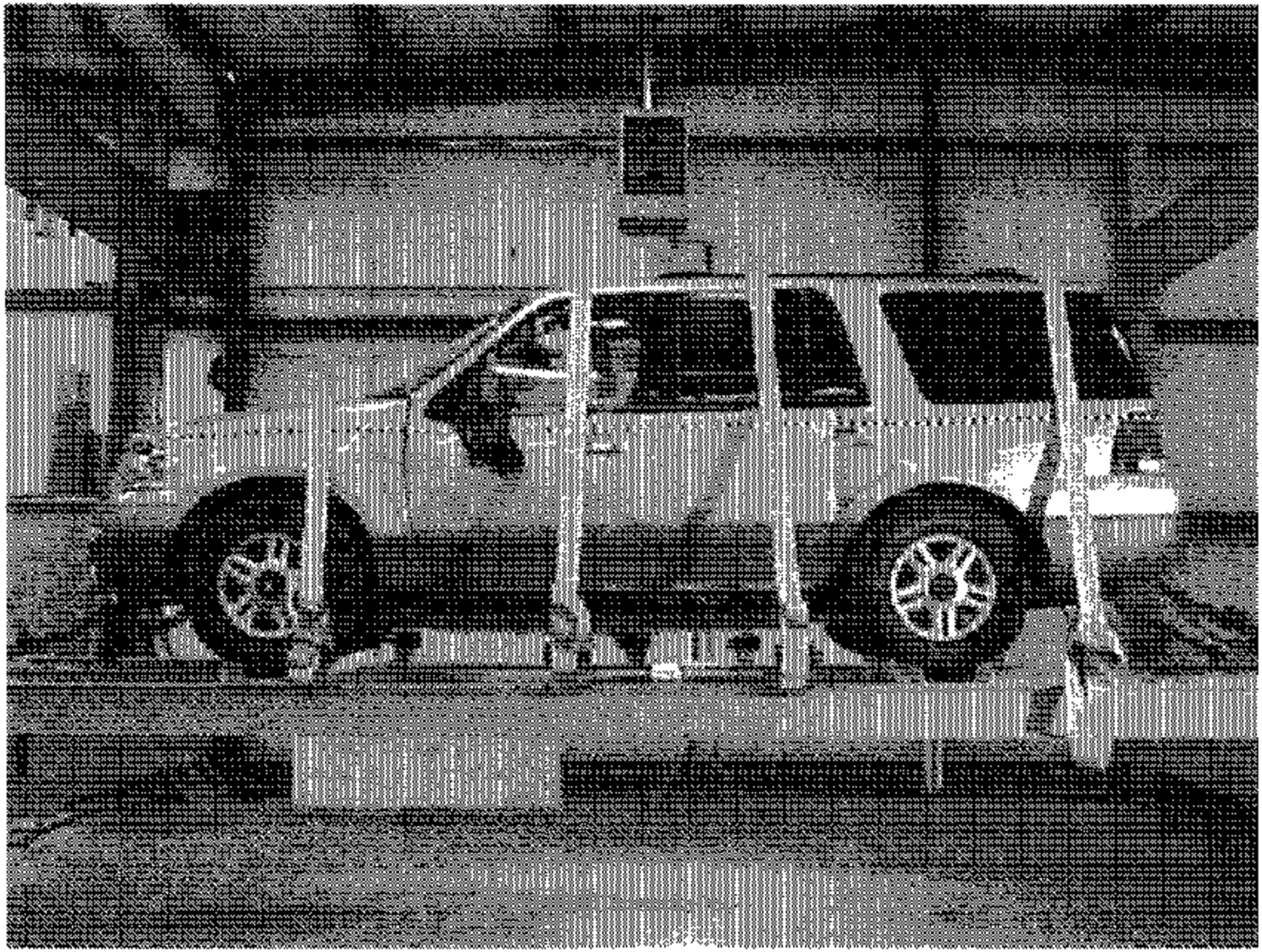
FIGURE 5.37
SPEED COUNTERS POST TEST



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FMVSS NO. 301L

FIGURE 5.38
VEHICLE IN ROLLOVER FIXTURE AT 0°

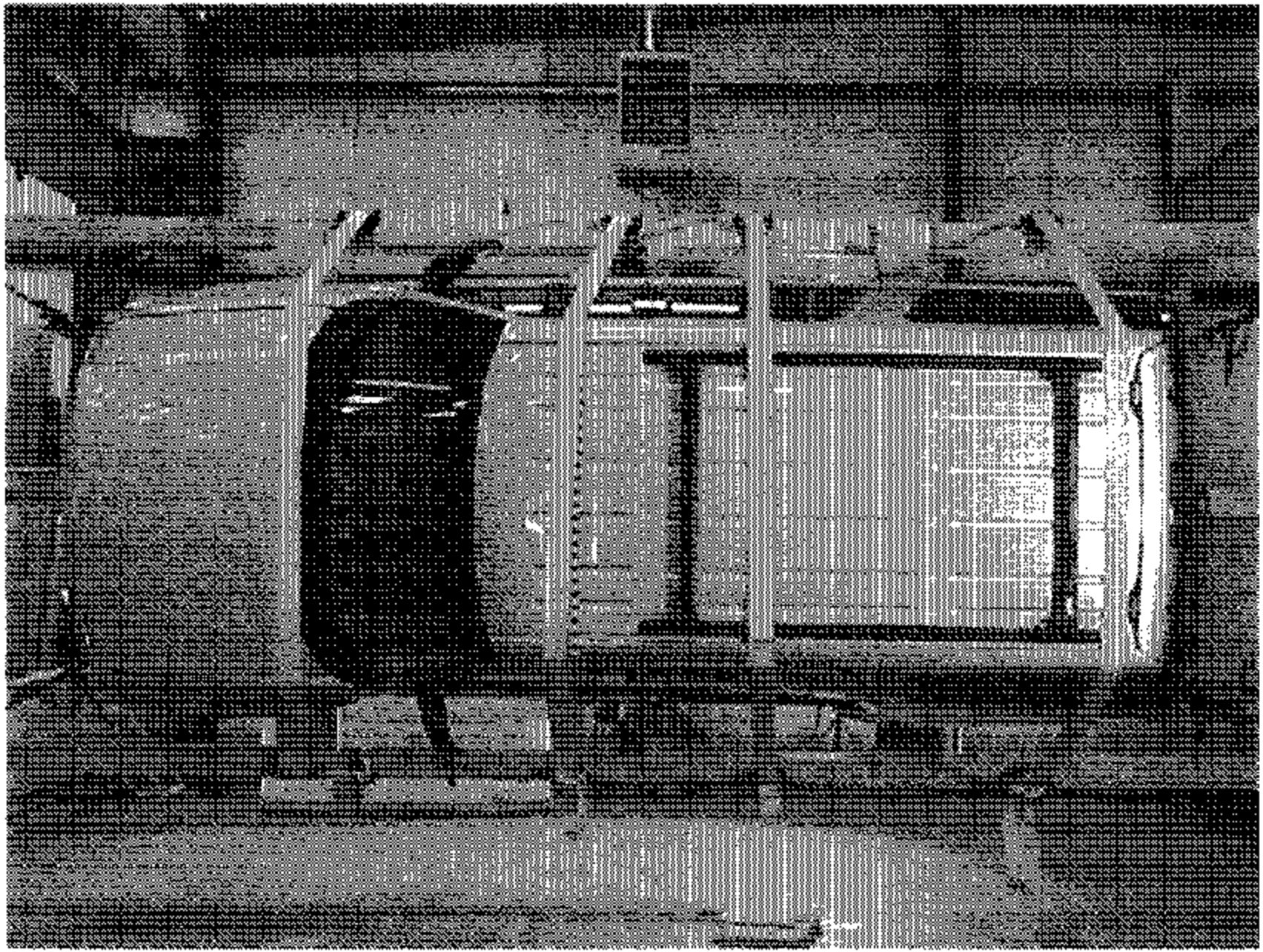

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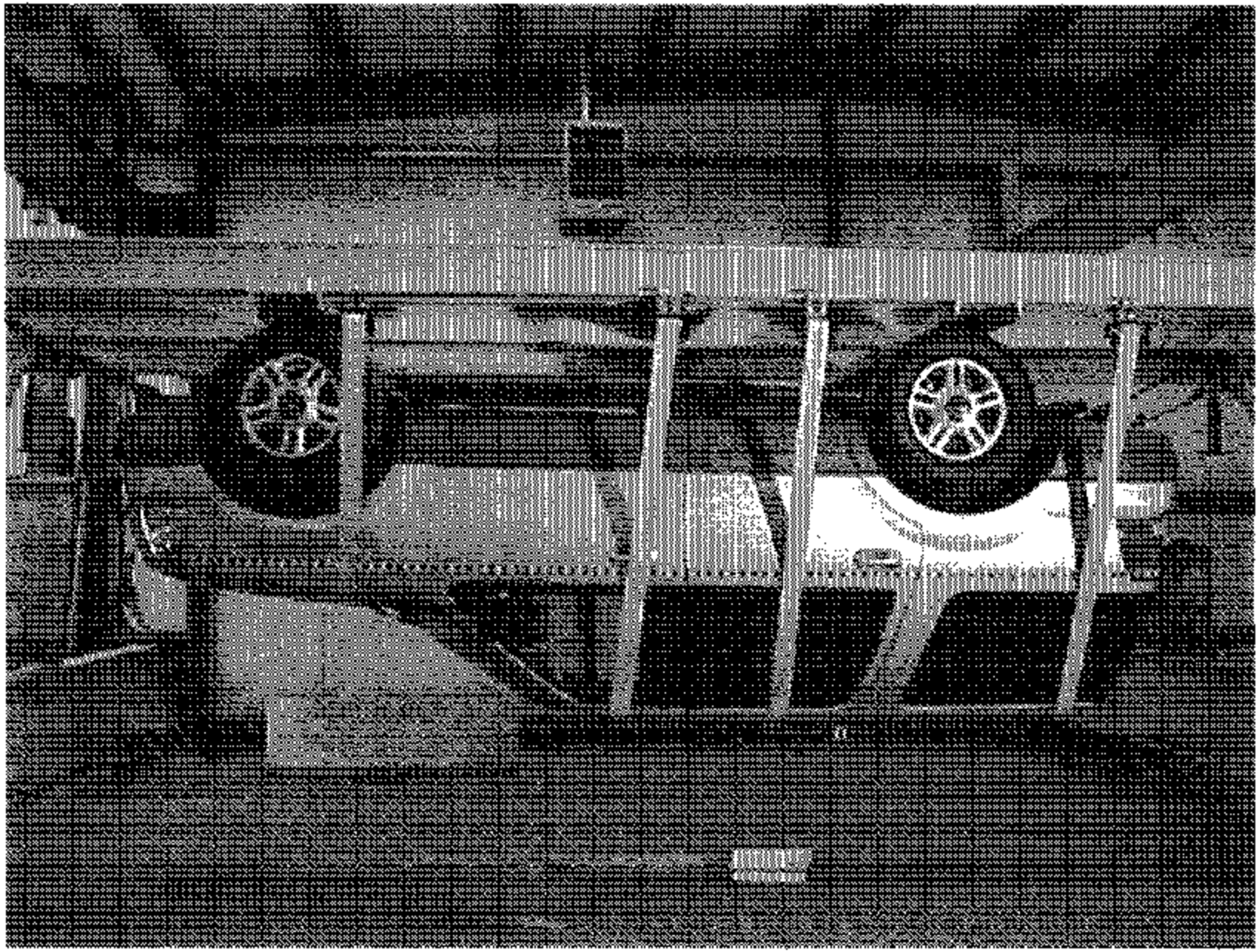
FIGURE 5.39
VEHICLE IN ROLLOVER FIXTURE AT 90°



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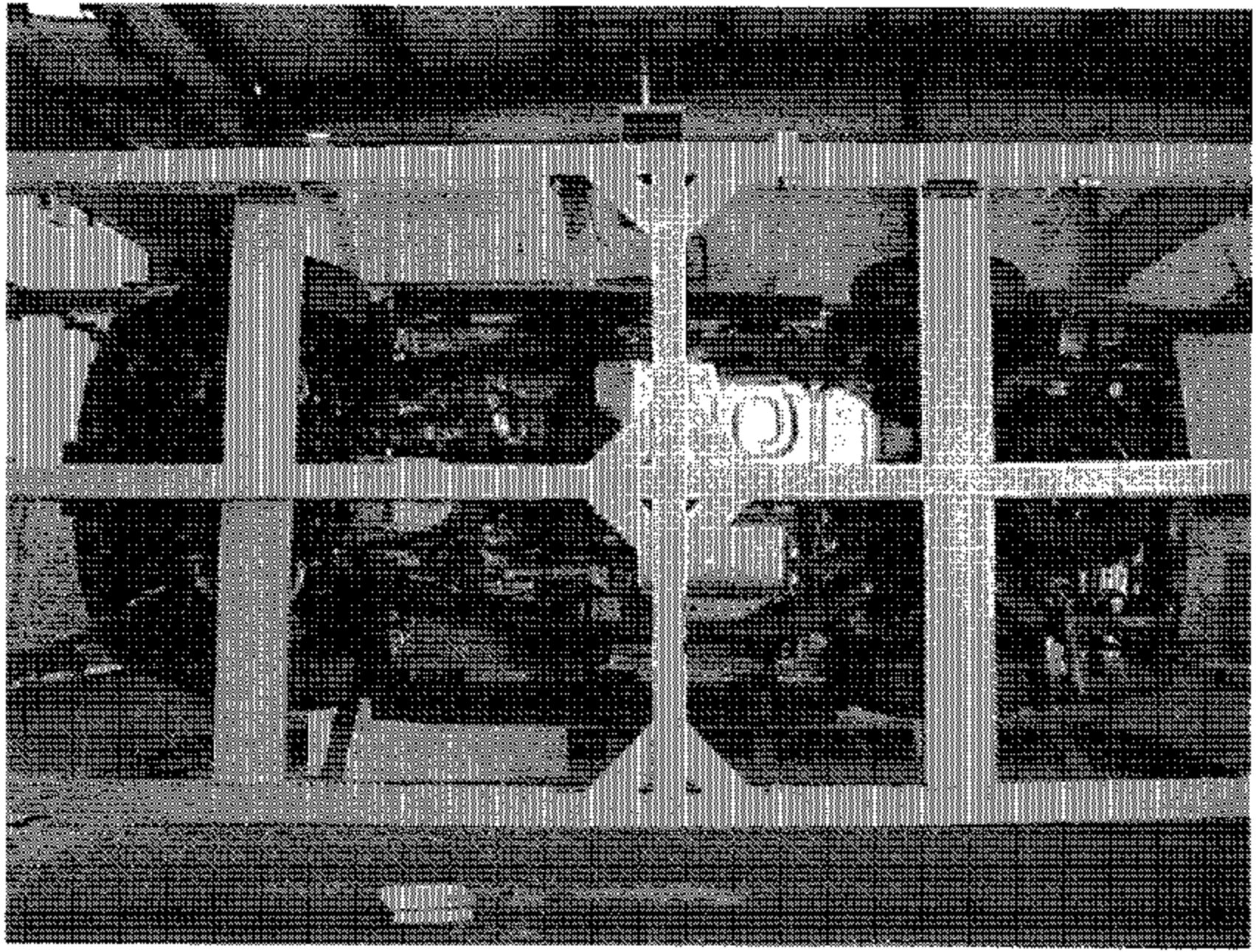
FMVSS NO. 301L

FIGURE 5.40
VEHICLE IN ROLLOVER RIG AT 180°



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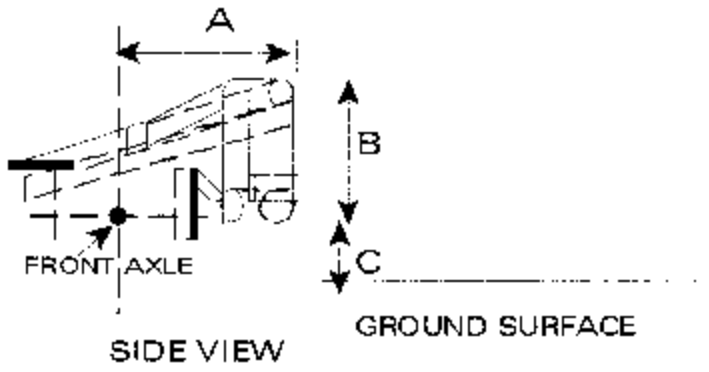
NHTSA NO. C30200
FMVSS NO. 301L

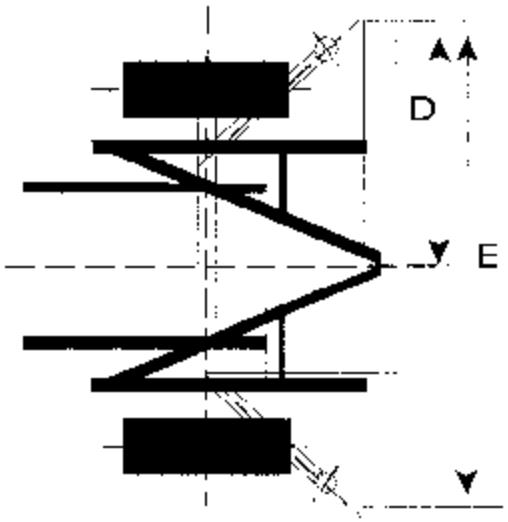
FIGURE 5.41
VEHICLE IN ROLLOVER RIG AT 270°

SECTION 6

BARRIER INFORMATION



SIDE VIEW



TOP VIEW

DIMENSIONS SHOWN IN TABLE ON NEXT PAGE

NOTES:
1.Face Plate 0.50 in. (19mm) thick cold rolled steell
2.All Inner Reinforcements 4.0 x 2.0 x 0.19 in. (102 x 51 x 5mm) Steel Tubing
3.Impact Surface above shown without .75 x 48 x 96 in. Plywood Face attached

LETTER	INCHES	MILLIMETERS
A	20.5*	521*
B	60.0	1524
C	5.0	127
D	39.0	991
E	78.0	198

TEST SET-UP OF COMMON CARRIAGE WITH 60" x 78" FLAT FACE IMPACT SURFACE INSTALLED:

LEFT FRONT WEIGHT	1081
RIGHT FRONT WEIGHT	1079
LEFT REAR WEIGHT	882
RIGHT REAR WEIGHT	873
TOTAL WEIGHT	3915

* EXCLUDING 3/4" PLYWOOD FACE

DIMENSIONS FOR GTL 60" x 78" FLAT FACE IMPACT SURFACE