



DOCUMENT TITLE PAGE

Identification Numbers (if applicable)	Cummins Report	REPORT DISTRIBUTION Master
Program Project No. 14-000	# <u>0721-80007</u>	(1) Info Center 50120
Pilot Inst. Center No.		(2) Info Center
Test Project No.	Title Driveability of an XTA-10 Rated 290 HP @ 2200 RPM	(3) Info Center
Other	Author M. Thommen - 50231	(4) Author M. Thommen 50231
Date 4/17/80		(5) K.W. Arnett - 50181
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		(9) M.S. Lantz - 50231
		(10) J.C. Walter - 50114
		(11) Vehicle Test 50231(5)

SUMMARY

PURPOSE:

To establish base driveability data on the 10-liter engine for further engine developments.

DISCUSSION:

Complete driveability tests were run according to Cummins test method (4.10) using test unit 39 (Attachments 1 and 2) and the endurance load trailer unit 150. Data acquisition was done with the new MACSYM-2 system using a resolution of 20 H₂.

RESULTS:

Heavy vibrations on drivetrain between 1300 and 1100 RPM were encountered during torque curve runs at Walesboro test track. Excessive smoke opacity was noted on grade starts (80%). This is very high compared to NH engines which typically peak at 20% smoke opacity during grade starts. Overall, this engine points out excellent driveability characteristics, and was well received by the drivers. For detail results see Attachments 3-31.

ACTION:

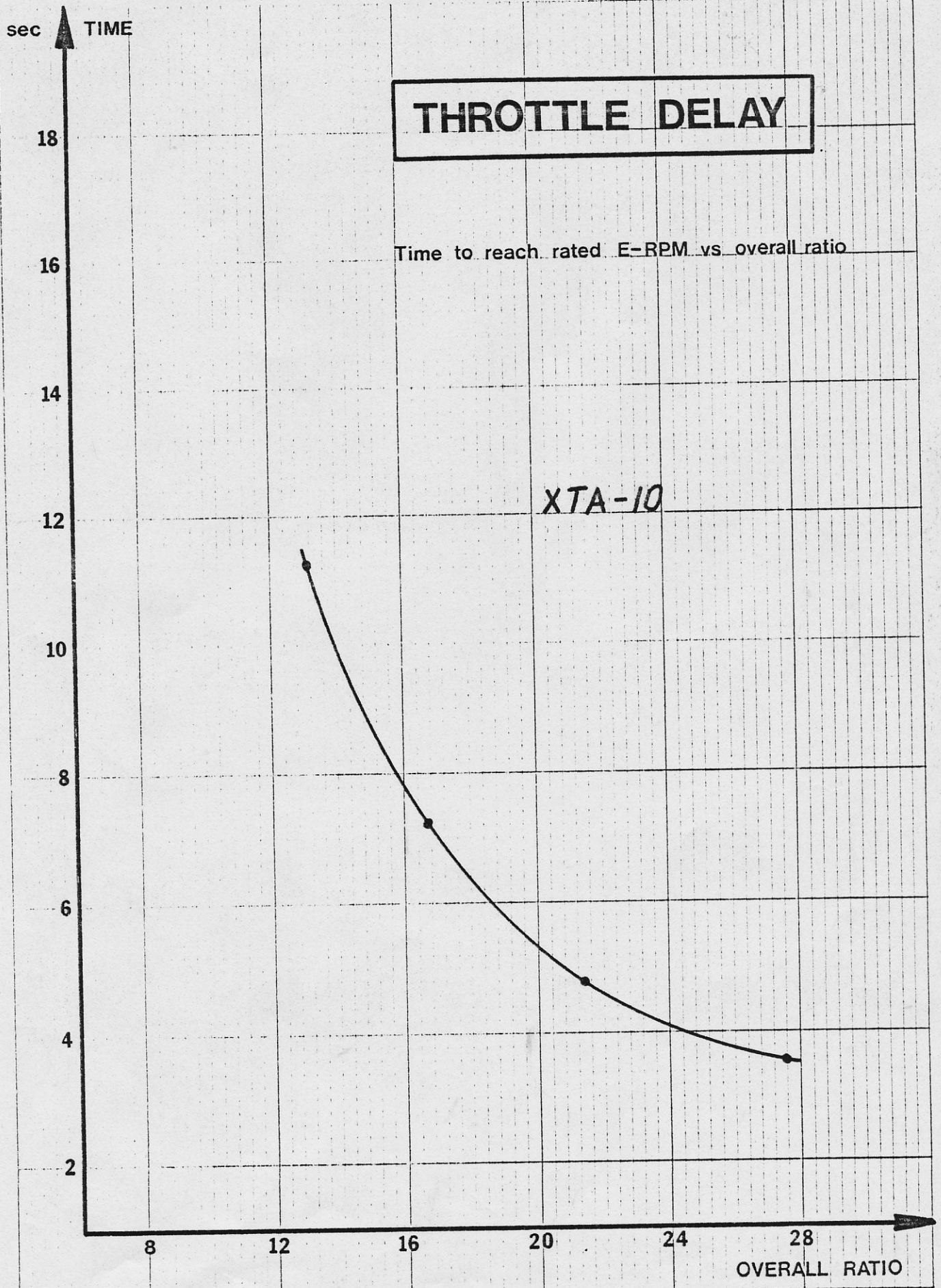
1. Make this data available to 10-liter engine group and retain for future comparisons.
2. Torsional vibrations on this vehicle are being investigated by the PIC.
3. A new fuel pump calibration should be developed to reduce acceleration smoke.

M. Thommen/at

M. Thommen
Engineer - Vehicle Test

DR-031280 DRIVEABILITY DATA FILE

PROGRAM DESCRIPTION: DRIVEABILITY 10-LITER ENGINE
 PROG-PROJ NO / DEPT: 14-000 / 0791
 ENGINEER: MORITZ THOMMEN
 TECHNICIAN: JOHN BEEKER
 INSTRUMENTATION: DON WADE
 DRIVER: LOREN SCHNEIDER / LEON ENOCHS
 ENGINE MAKE / MODEL: CUMMINS / XTA-10
 H.P. @ RPM: 290 @ 2200
 FT.LB @ RPM: 840 @ 1400
 SERIAL NO: 10768041
 CPL / FUEL PUMP CODE: PROTOTYPE / RE-110
 TRUCK # / TRAILER #: 39 / 150
 TRUCK MAKE / MODEL: WHITE / RX2-42T - XPEDITOR 2
 TRANSMISSION MAKE: FULLER
 TRANSMISSION MODEL: RT-1110
 CLUTCH MAKE / MODEL: SPICER / 2-PLATE 14" CERAMIC DAMPENED
 REAR AXLE RATIO: 3.70
 TIRES MAKE / SIZE F: GOODYEAR / 10.00R20
 TIRES MAKE / SIZE R: GOODYEAR / 10.00R20
 INCHES PER 5 REV: 635.833
 FLYWHEEL TEETH: 103
 TRANSMISSION TEETH: 31.5
 LOW IDLE: 665 RPM .37 PSI RAIL .49 "HG BOOST
 HIGH IDLE: 2506 RPM 12.4 PSI RAIL 8.17 "HG BOOST
 GOVERNOR BREAK: 2271 RPM 176.2 PSI RAIL 36.79 "HG BOOST

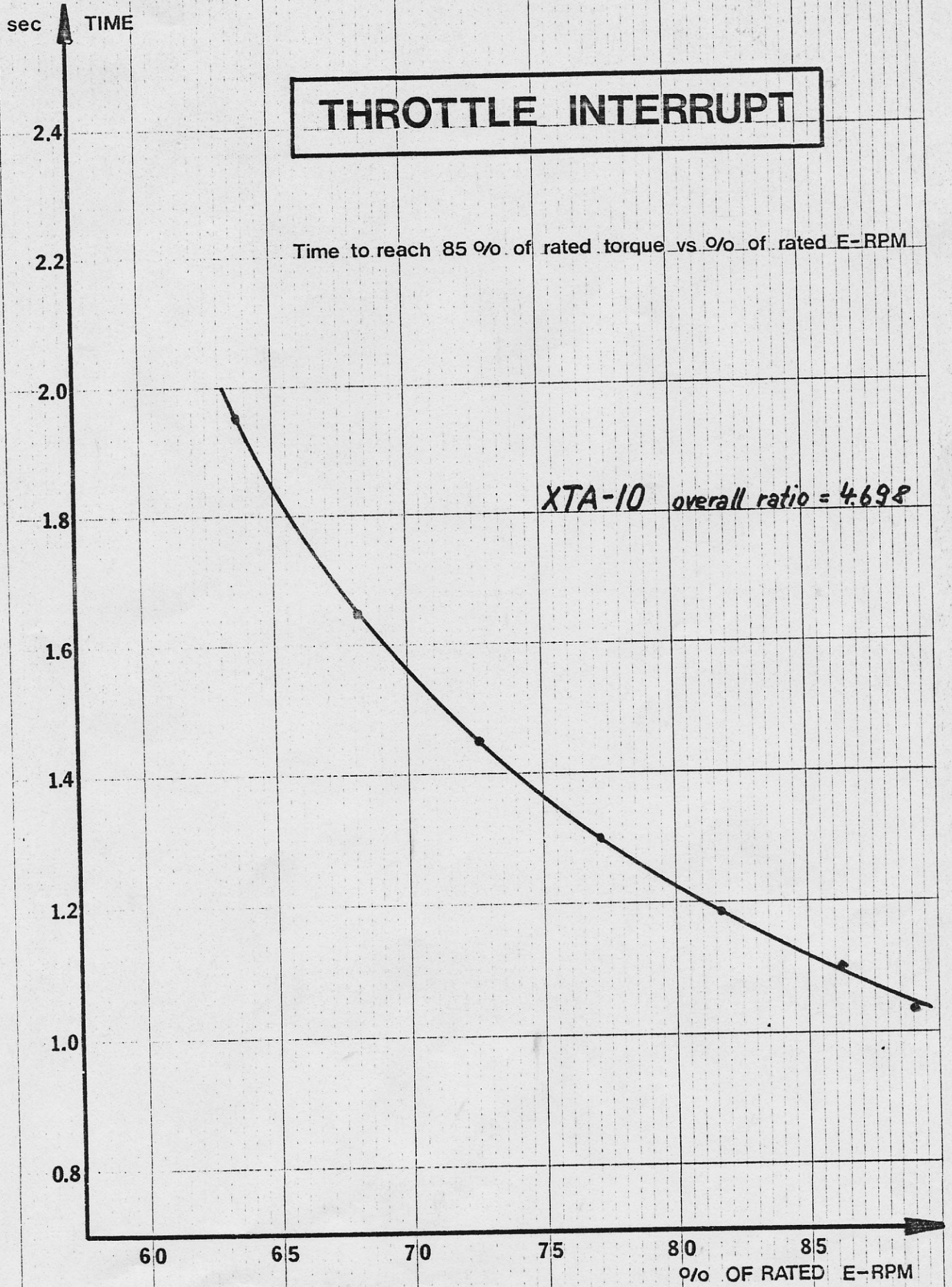


THROTTLE DELAY

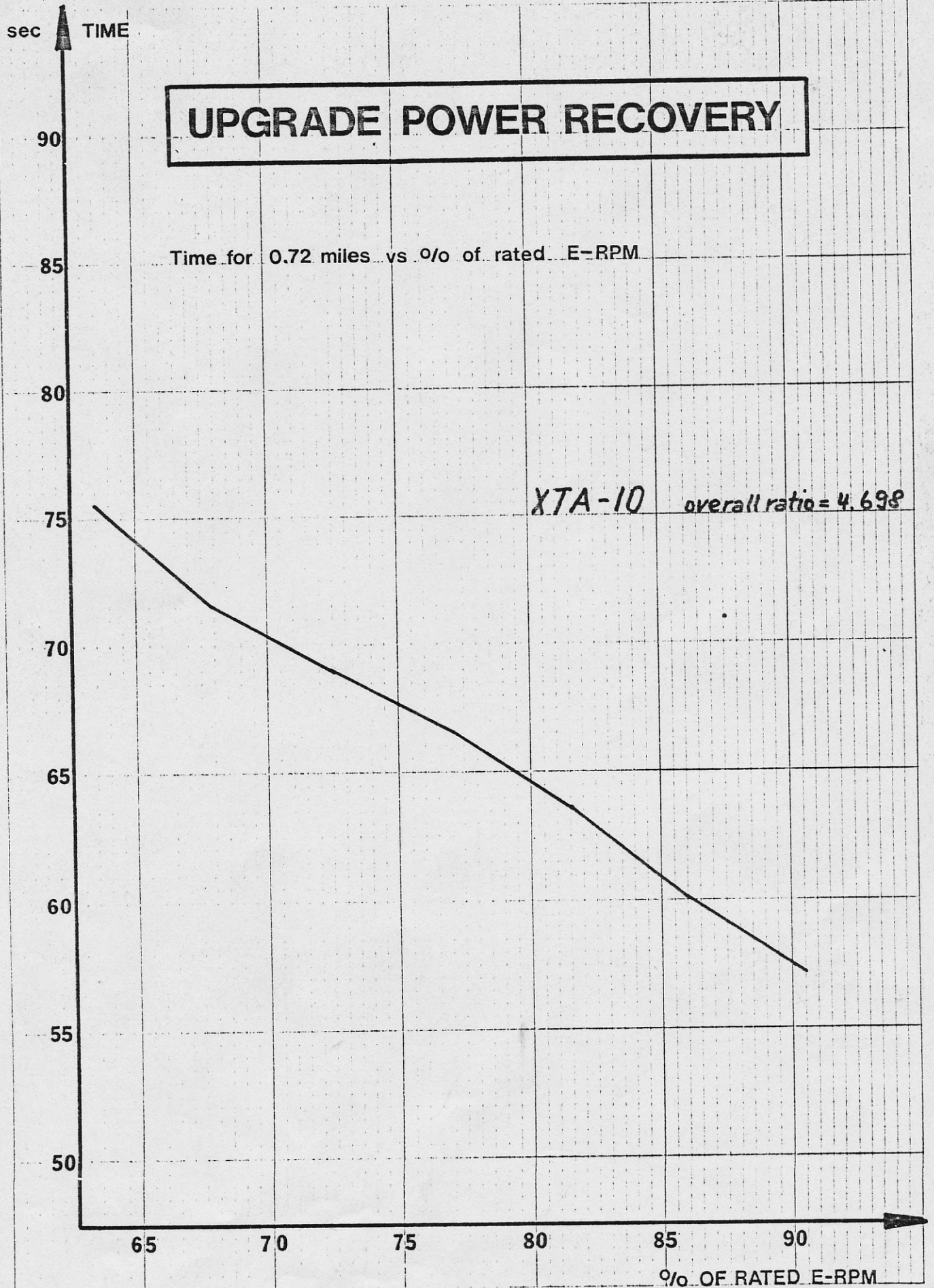
Time to reach rated E-RPM vs overall ratio

XTA-10

moniz thomson April-17/80



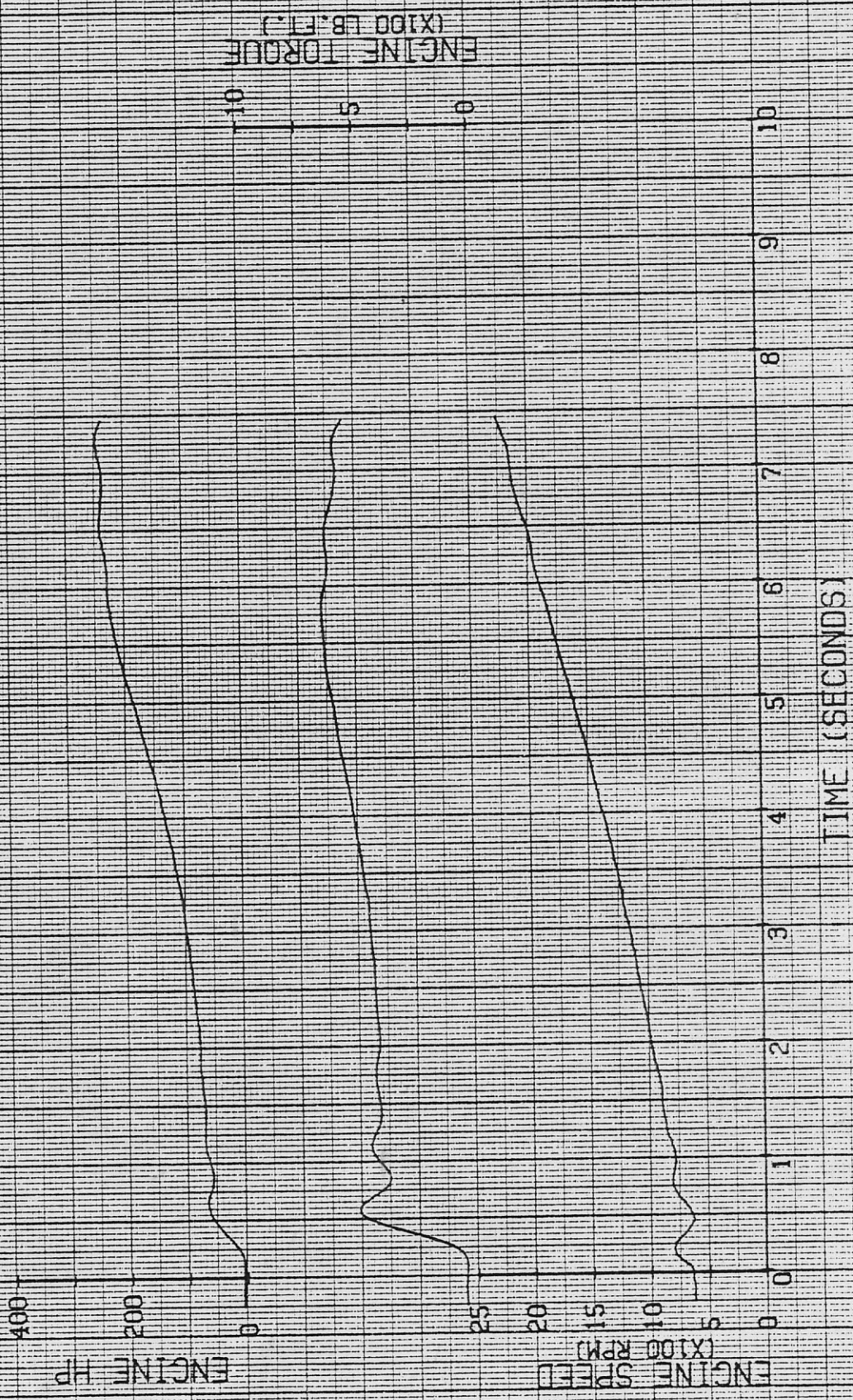
monik thommes April-17/80



man's thommen April-17/80

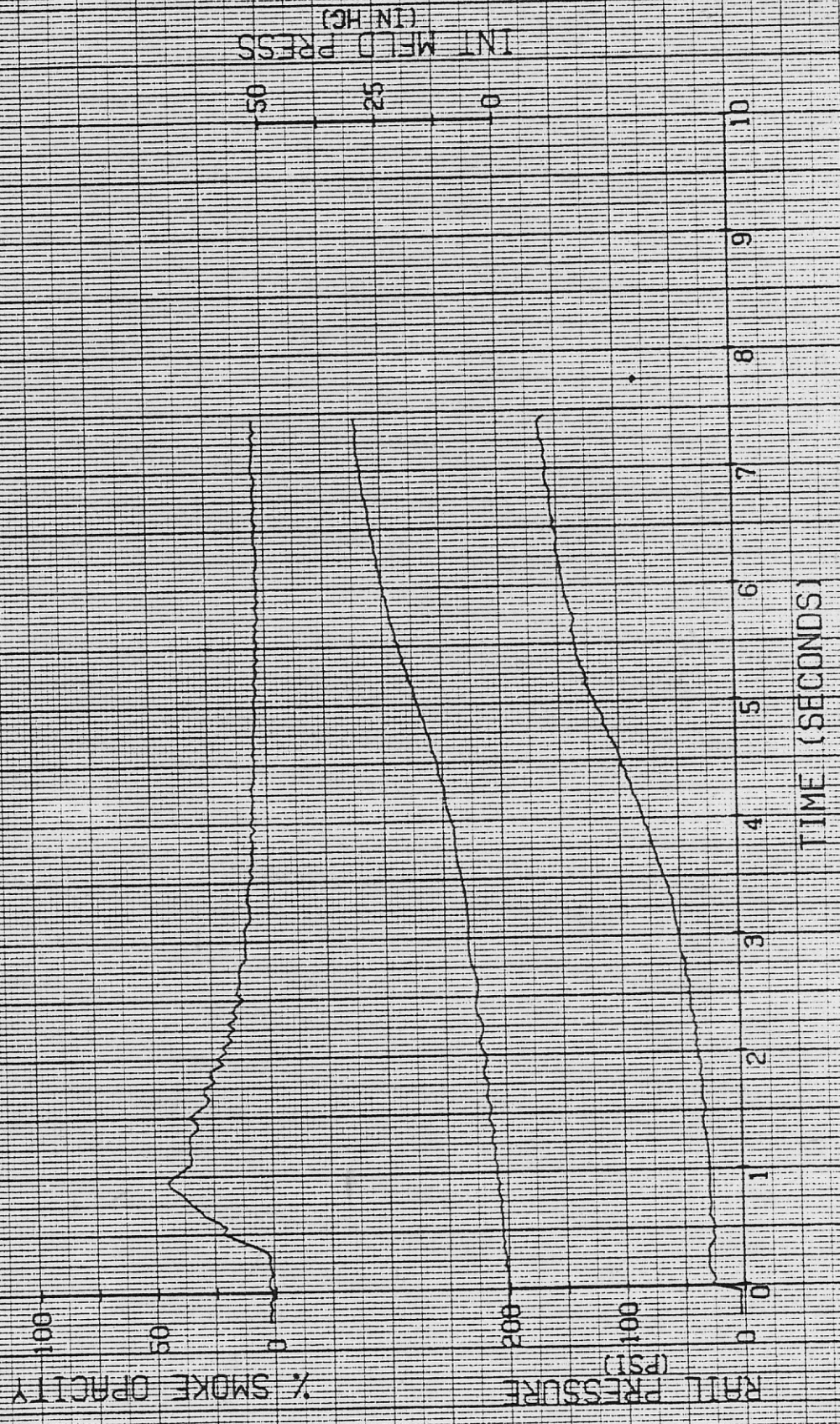
DRIVEABILITY TEST

UNIT, 39
 AXLE, 3.70
 03/14/80 ID-031416 SCHNEIDER XIA-10 290 HP @ 2200
 THROTTLE DELAY / 4TH GEAR / 7.25 SEC
 MAKE, WHIT
 MODEL, XPEDI
 TIRES, 10.00R20
 TRANSMISSION, RT-1110
 GWR, 60,000



DRIVEABILITY TESTS

UNIT, 39
 AXLE, 3.70
 03/14/80 ID#031416 SCHNEIDER XTA-10 290 HP @ 2200
 THROTTLE DELAY / 4TH GEAR / 7.25 SEC
 MAKE, WHIT
 MODEL, XPED1
 TIRES, 10.00R20.
 TRANSMISSION, RT-1110
 CVR, 60.000



DRIVEABILITY TEST

UNIT: 39
AXLE: 9.70

MAKE: WHIT

MODEL: XPEDI

TRANSMISSION: RT-1110

TIRES: 10.00R20

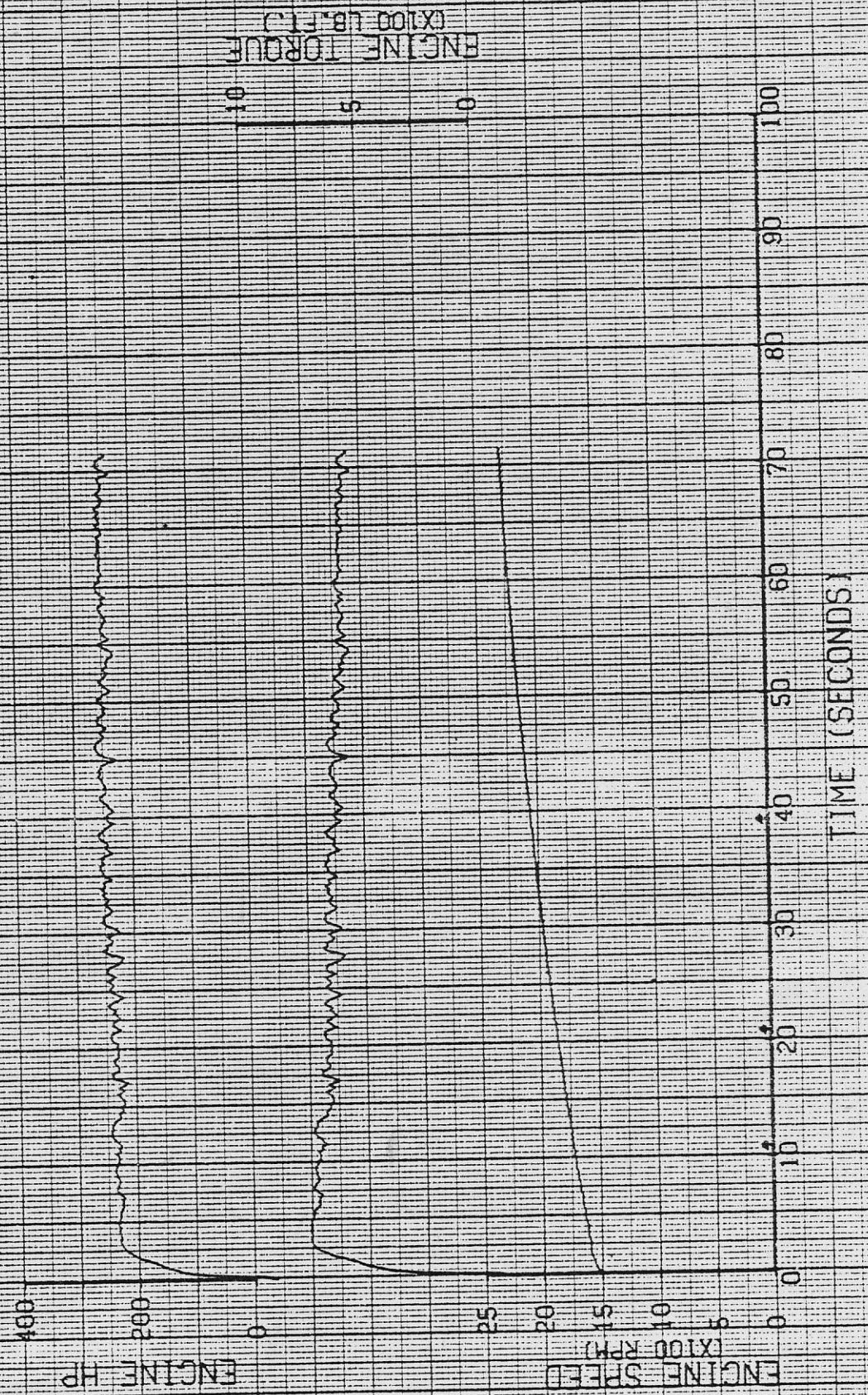
CWT: 60.000

03/19/80

PA-031949 ENOCHS

XTA-10 290 HP @ 2200

PASSING TEST ACCELERATION / 9TH GEAR



ENGINE TORQUE (X100 LB.FT.)

10
5
0

ENGINE SPEED (X100 RPM)
25
20
15
10
5
0

TIME (SECONDS)

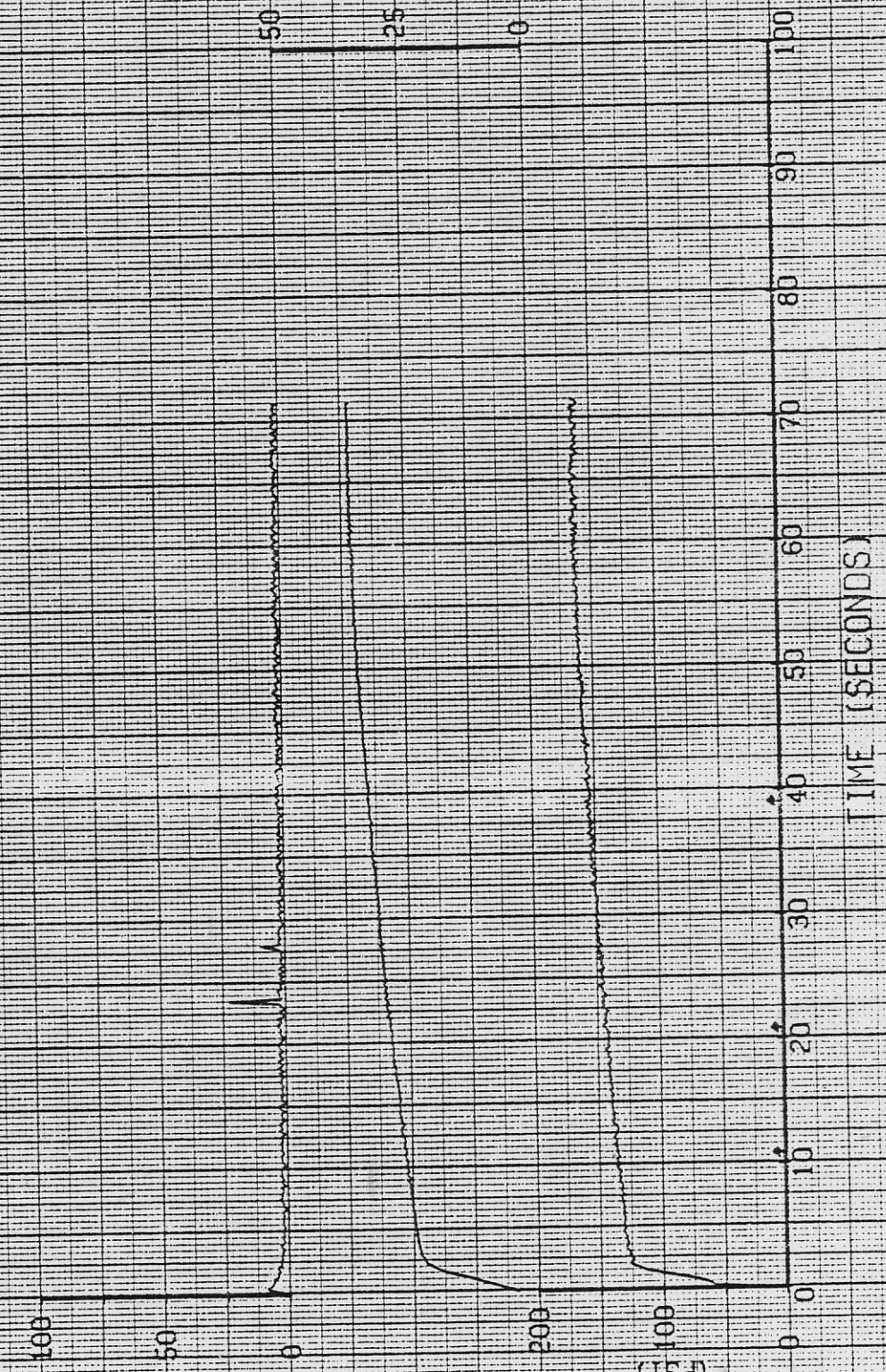
DRIVEABILITY TEST

UNIT: 39
 AXLE: 3-70
 03/19/80 PA-031949 ENOCHS XTA-10 290 HP @ 2200
 PASSING TEST ACCELERATION / 8TH GEAR
 MAKE: WHIT
 MODEL: XPEDI
 TIRES: 10-00R20
 TRANSMISSION: RT-1110
 CVM: 80.000

% SMOKE OPACITY

RAIL PRESSURE (PSI)

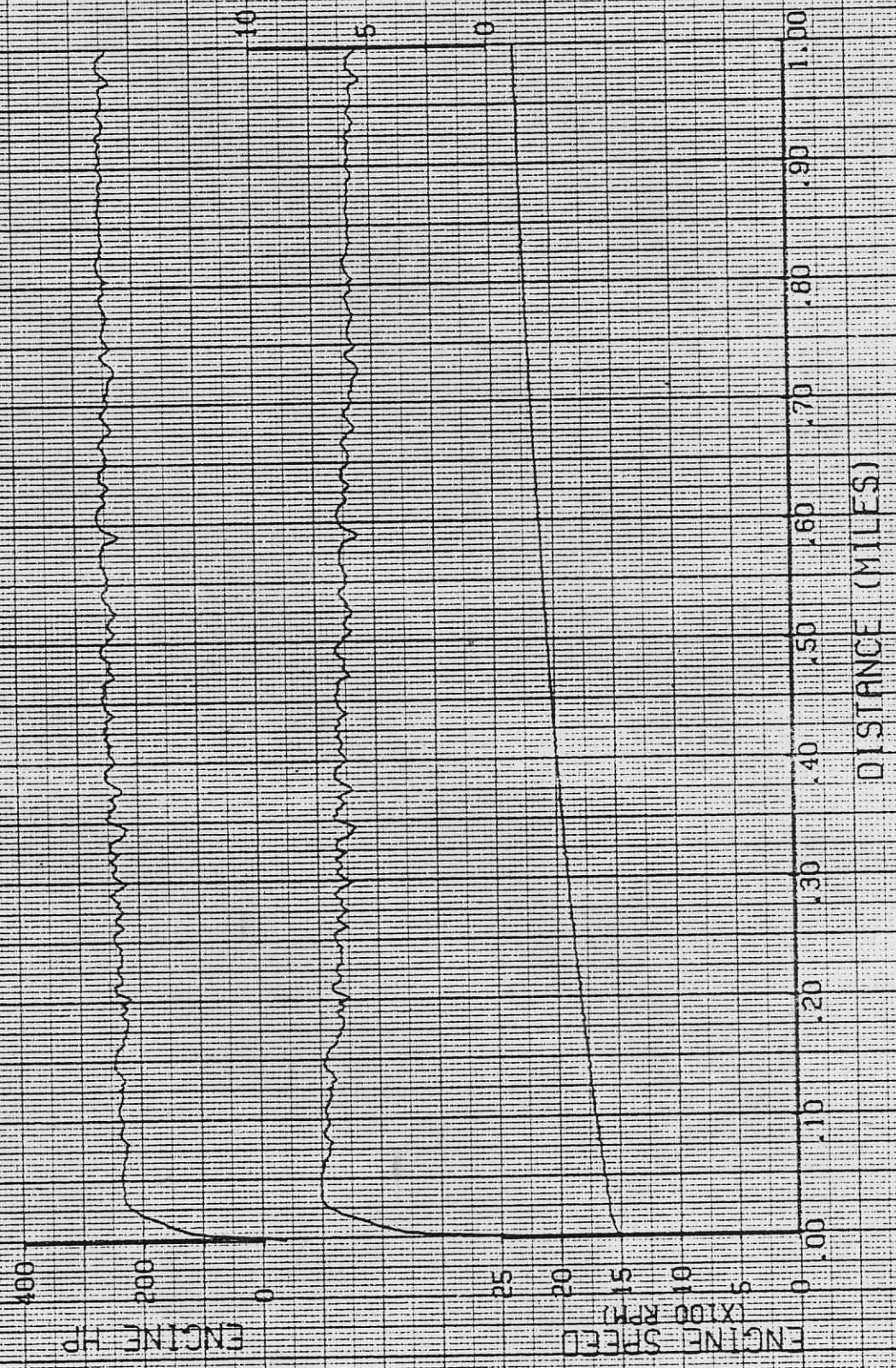
INT. MFLD PRESS (IN HG)



TIME (SECONDS)

DRIVEABILITY TEST

UNIT: 38
 AXLE: 3.70
 03/19/80 PA-031949 ENCCHS XTA-10 290 HP @ 2200
 PASSING TEST ACCELERATION / 8TH GEAR
 MAKE: WHIT
 MODEL: XPED1
 TIRES: 10-00R20
 TRANSMISSION: RT-1110
 CWT: 60.000



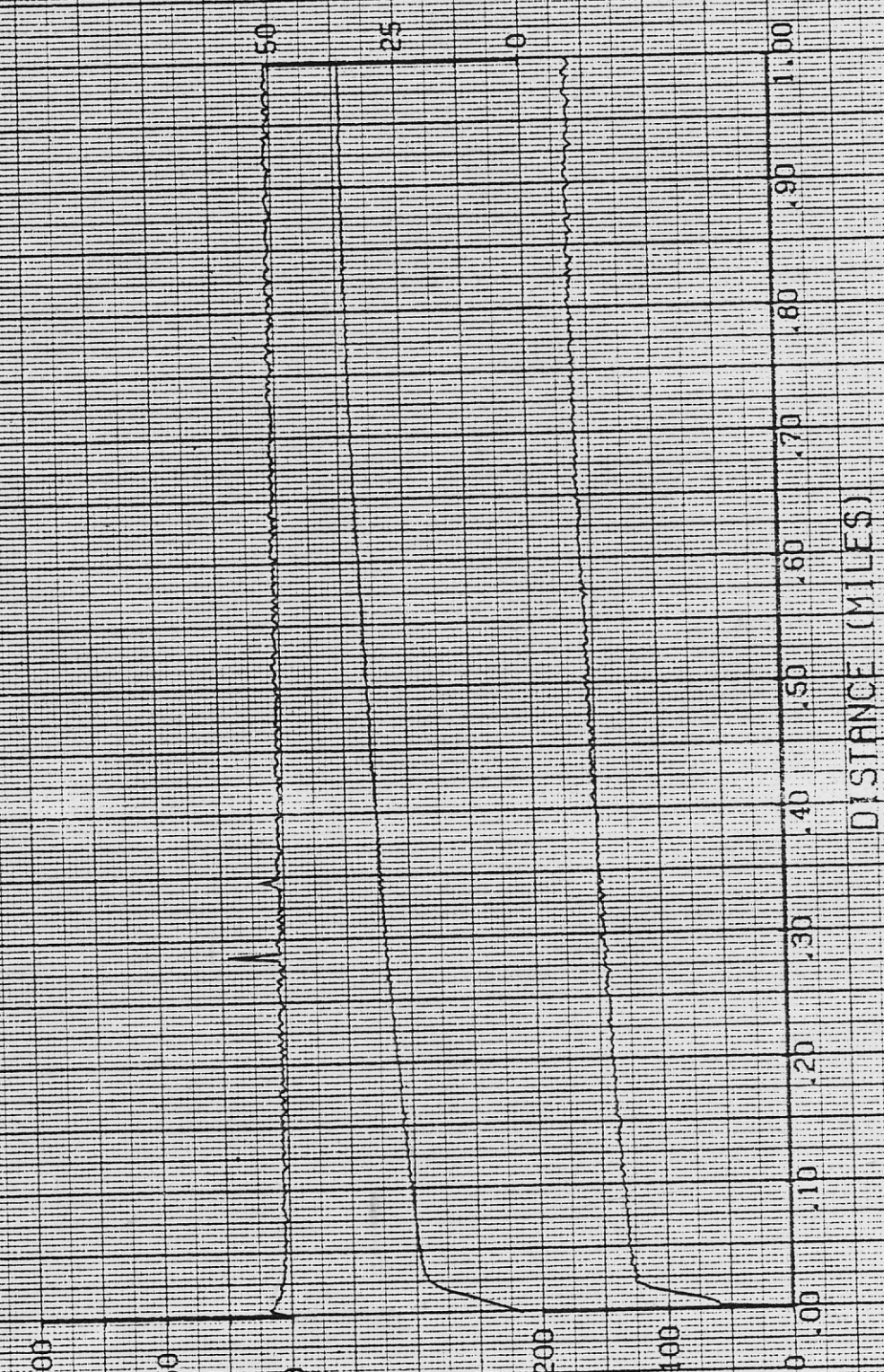
DRIVEABILITY TEST

UNITY 39
 AXLE 3.70
 03/19/80 PA-031949 ENOCHS
 PASSING TEST ACCELERATION / 8TH GEAR
 MAKE, WHIT
 MODEL, XPED1
 FIRE6, 10.00R20
 XTA-10 290 HP @ 2200
 TRANSMISSION, RT-111D
 CYM, 60.000

% SMOKE OPACITY

RAIL PRESSURE (PSI)

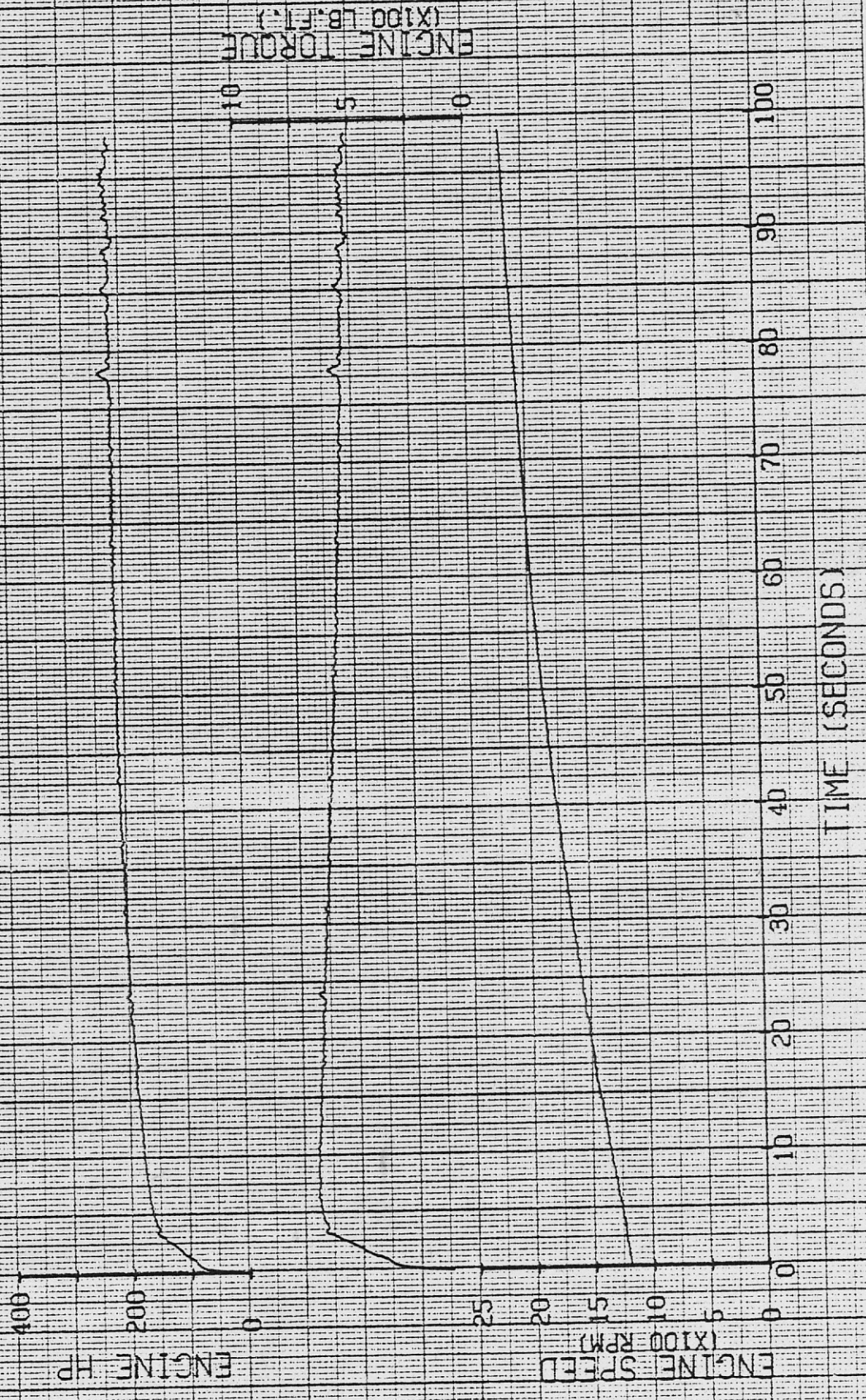
INT. MFD. PRESS (IN.HG)



DISTANCE (MILES)

DRIVEABILITY TESTS

UNIT: 39
 AXLE: 3.70
 03/19/80
 MAKE: WHIT
 MODEL: XPED1
 TIRES: 10.00R20
 TRANSMISSION: RT-1110
 CVW: 60.000
 PL-031950 ENOCHS
 XTA-10 290 HP @ 2200
 PART THROTTLE ACCELERATION V 1200 RPM

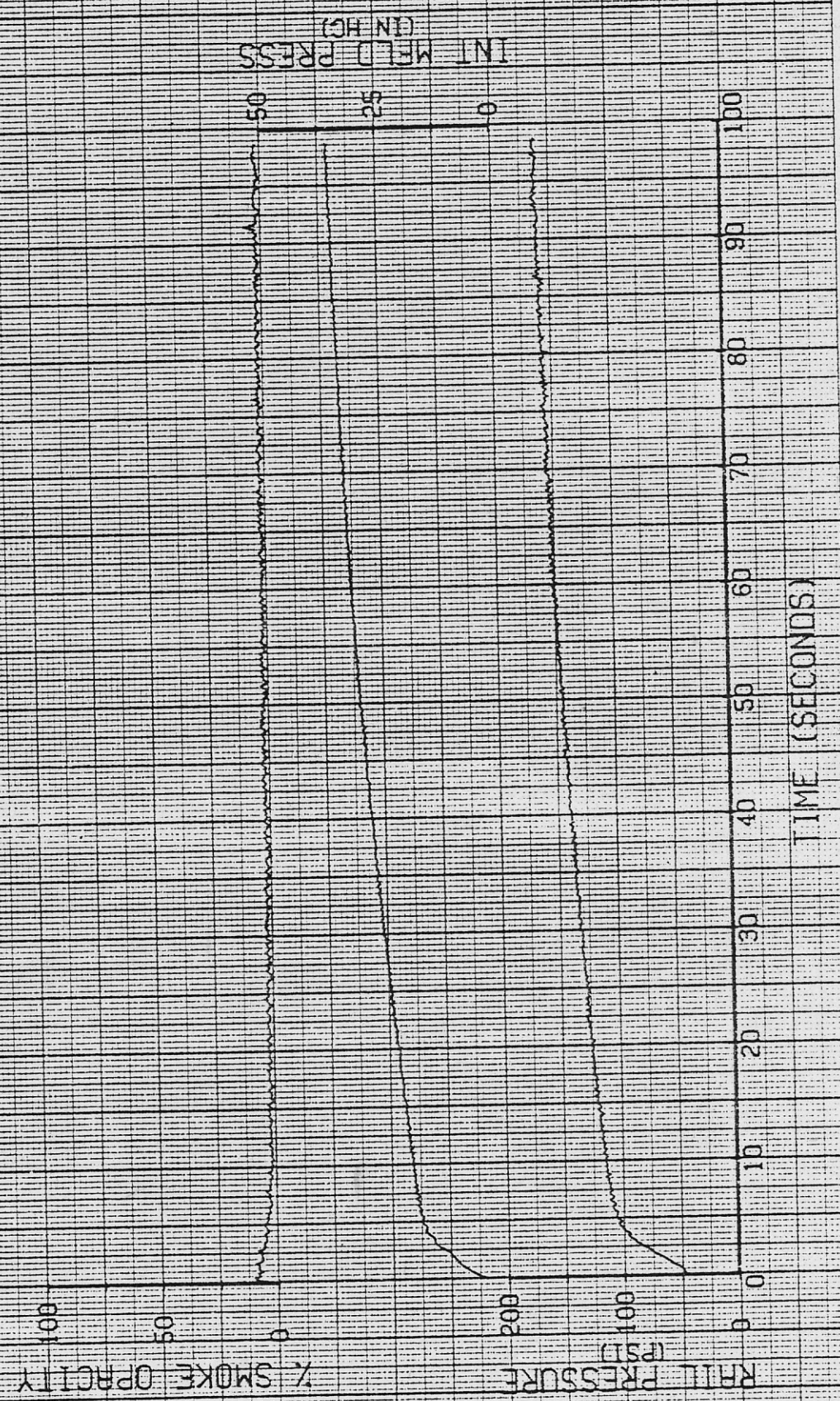


ENGINE TORQUE (X100 LB.FT.)

TIME (SECONDS)

DRIVEABILITY TEST

UNIT: 39
 AXLE: 5.70
 03/19/80 PL-031950 ENOCHS
 PART THROTTLE ACCELERATION / 1200 RPM
 MAKE: WHIT
 MODEL: XPED1
 FIRES: 10.00R20
 TRANSMISSION: RT-1110
 CVW: 60.000
 XIA-10 290 HP @ 2200

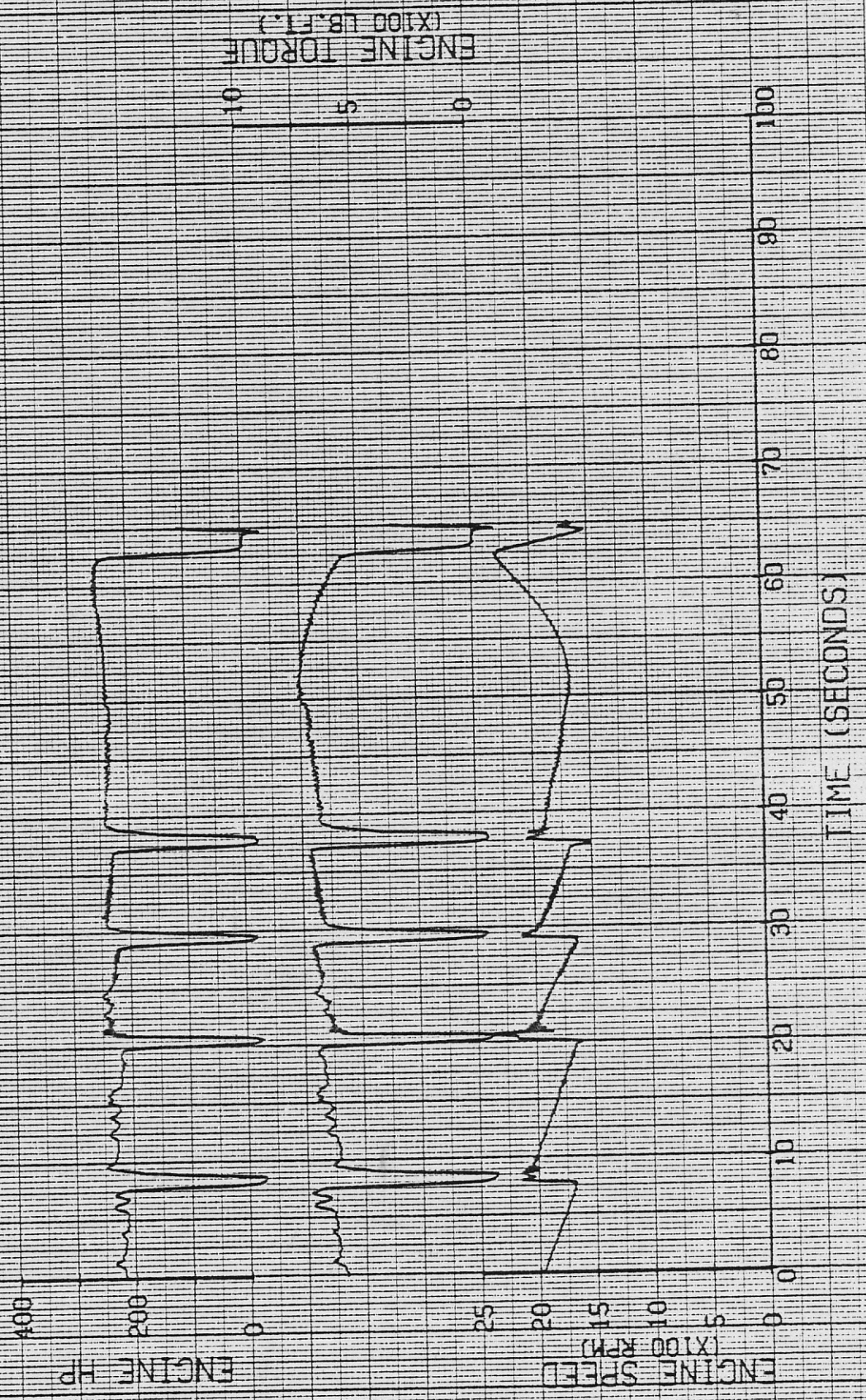


DRIVEABILITY TEST

UNIT, 39
AXLE, 3.70
03/18/80 SC-031827 SCHNEIDER
STEVENS CREEK HILL

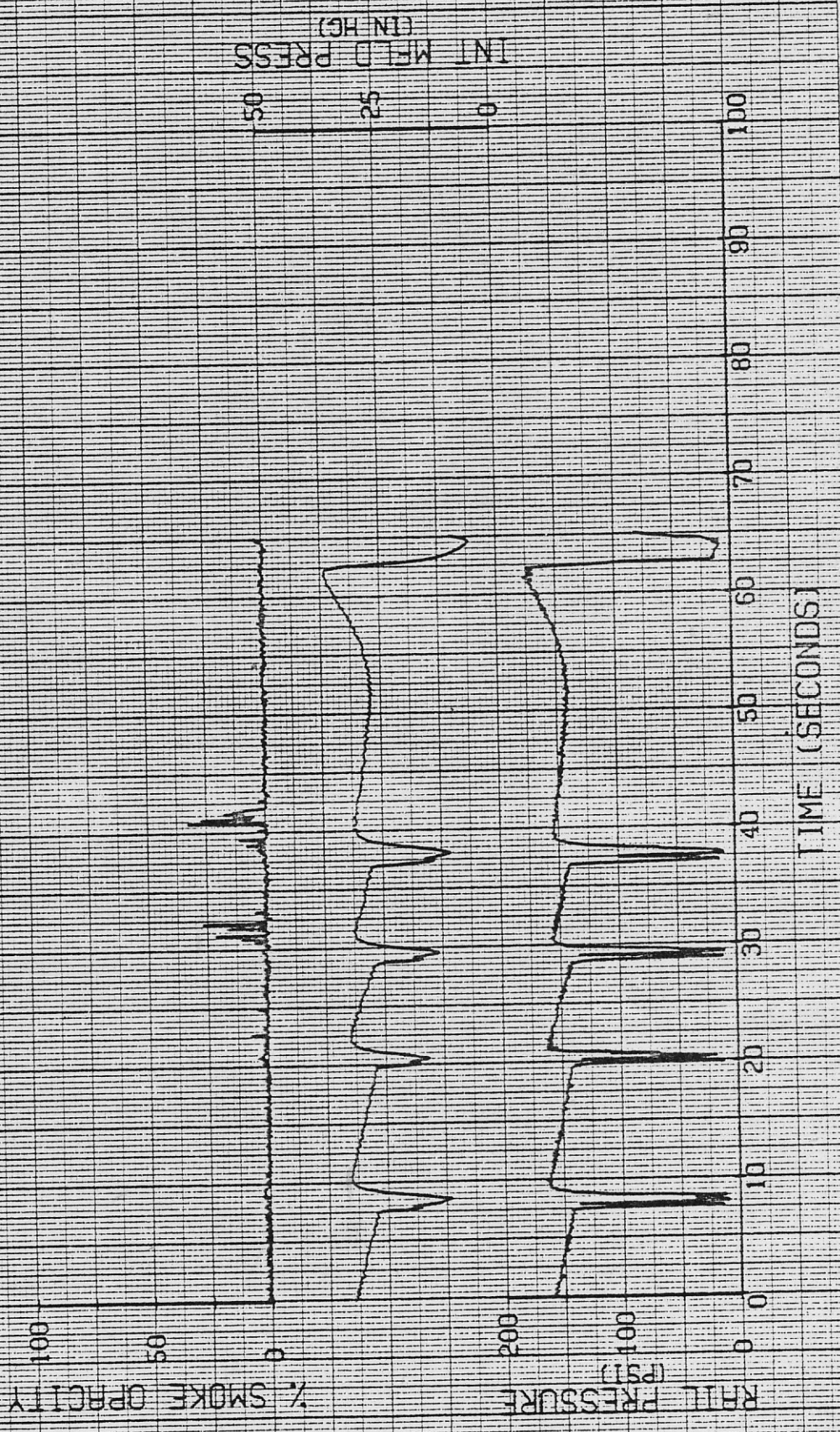
MAKE, WHITE
MODEL, XPEDI
FIRES, 10.00K20
XIA-10 290 HP @ 2200

TRANSMISSION, RT-1110
GVN, 60.000



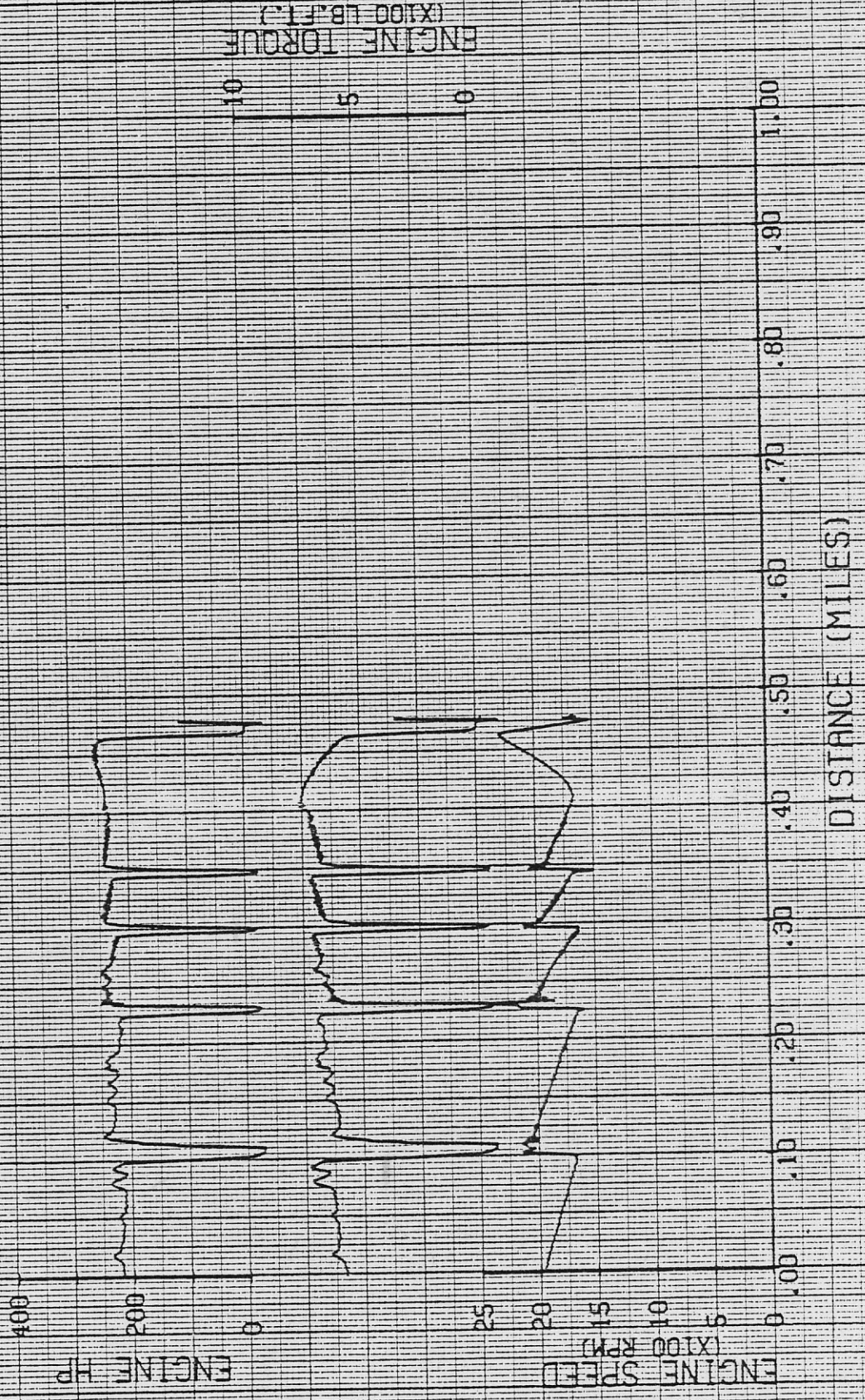
DRIVEABILITY TEST

UNIT, 39
 AXLE, 3.70
 03/18/80 SC-031827 SCHNEIDER
 STEVENS CREEK HILL
 MAKE, WHIT
 MODEL, XFED1
 FIRES, 10.00R20
 XIAF-10 290 HP @ 2200
 TRANSMISSION, RT-1110
 GVW, 60,000



DRIVEABILITY TEST

UNIT: 39
 AXLE: 3.70
 03/18/80 SC-031827 SCHNEIDER
 STEVENS CREEK HILL
 MAKE: WHITE
 MODEL: XPED1
 FIRES: 10.00R20
 XTA-10 290 HP @ 2200
 TRANSMISSION: RT-1110
 CYCLE: 60.000

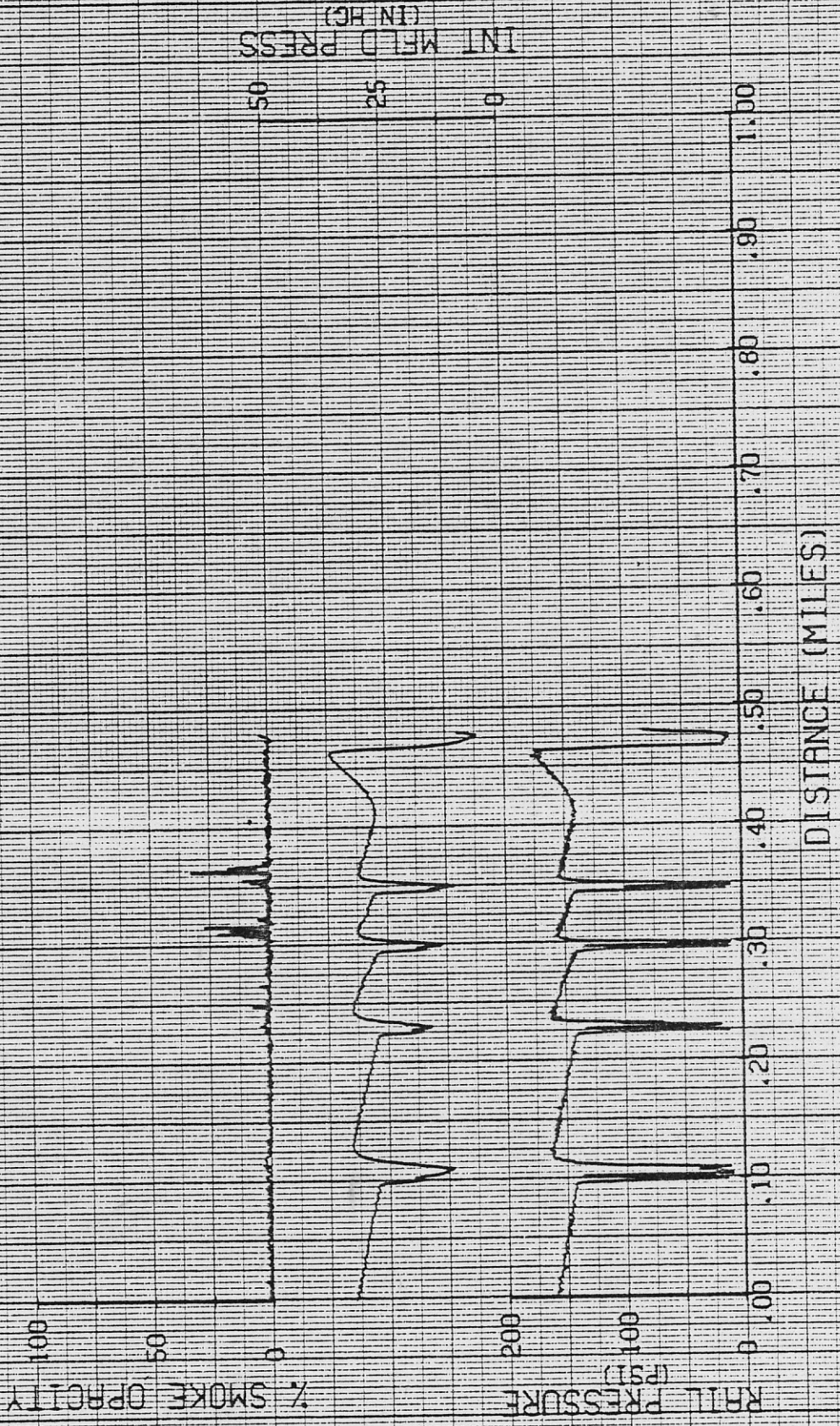


DRIVEABILITY TEST

UNIT, 39
AXLE, 3.70
03/18/80
SC-031827 SCHNEIDER
STEVENS CREEK HILL

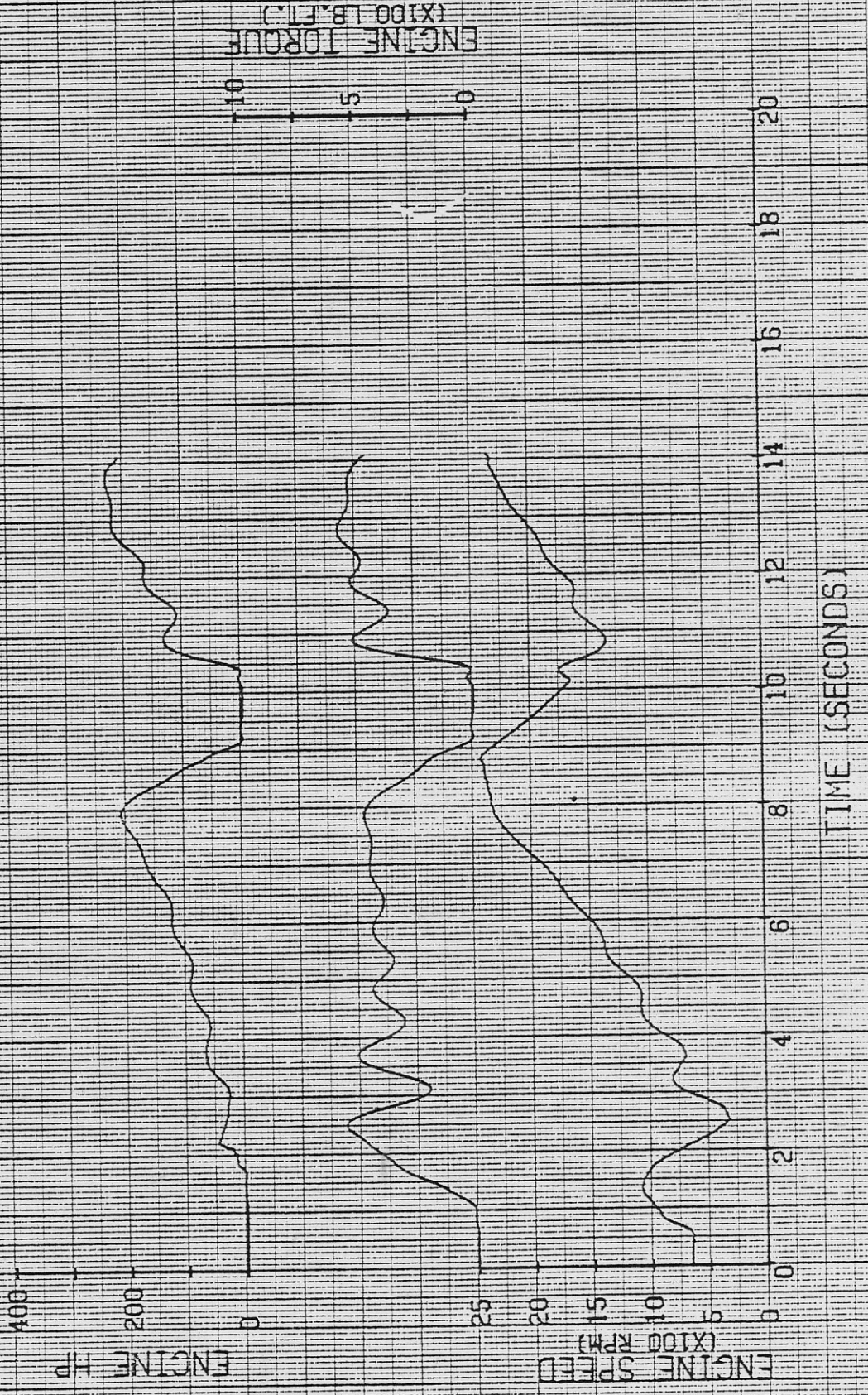
MAKE, WHIT
MODEL, XPEDI
TIRES, 10.00R20
XTR-10 290 HP @ 2200

TRANSMISSION, RT-1110
CYW, 80.000



DRIVEABILITY TEST

UNIT, 39
 AXLE, 3.70
 03/17/80 CS-031722 SCHNEIDER XTA-10 290 HP @ 2200
 GRADE START / 1ST GEAR / WITH SHIFT
 MAKE, WHIT
 MODEL, XPED1
 TIRES, 10.00R20
 TRANSMISSION, RT-1110
 CYM, 60.000



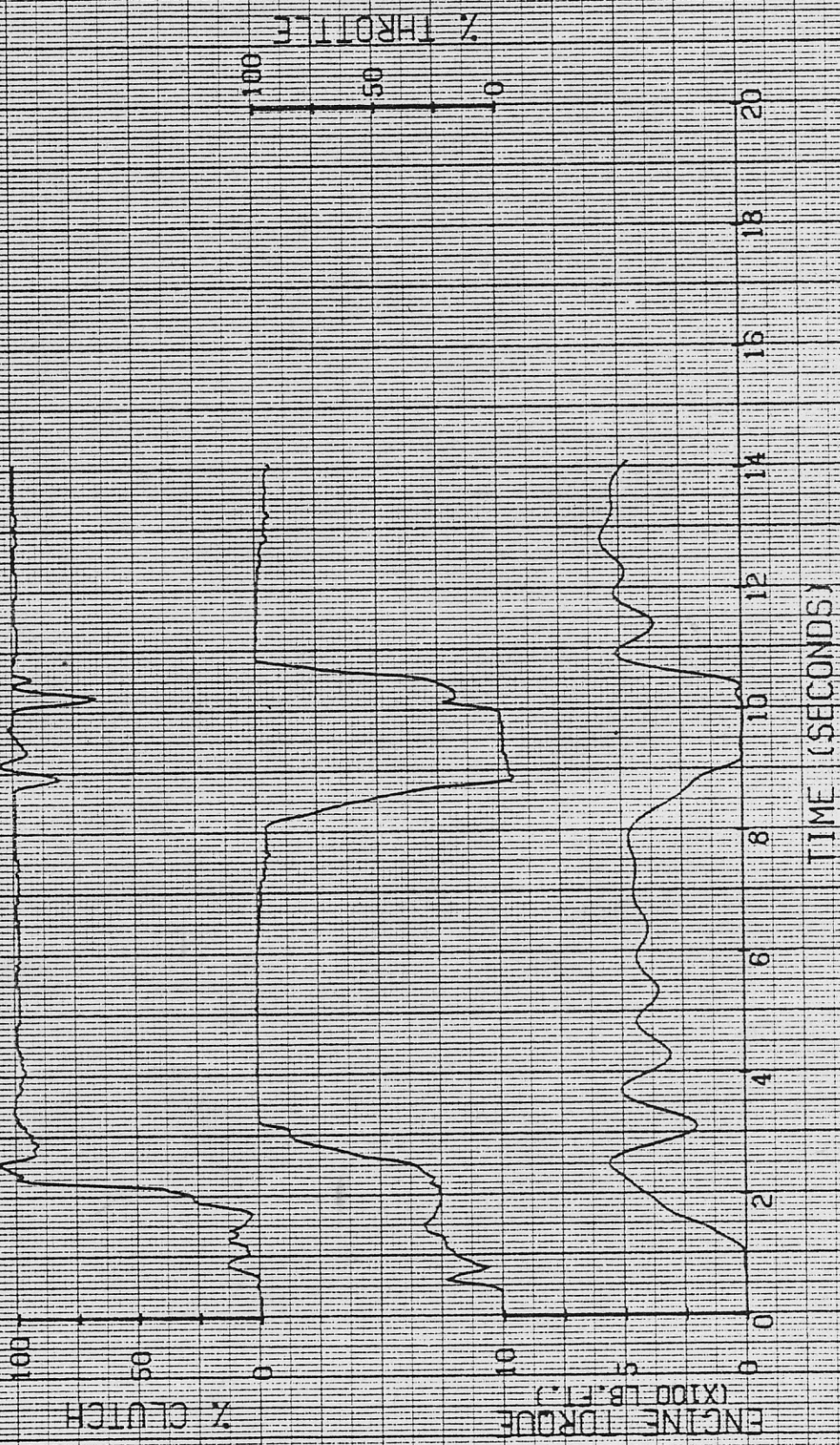
DRIVEABILITY TESTS

UNIT, 39
 AXLE, 3.70
 03/17/80 CS-031722 SCHNEIDER X1A-10 290 HP @ 2200
 GRADE START / 1ST GEAR / WITH SHIFT
 MAKE, WHIT
 MODEL, XPED1
 TIRES, 10.00R20
 TRANSMISSION, RT-1110
 CVM, 60.000



DRIVEABILITY TEST

UNITY 39
 AXLE 3.70
 03/17/80 05-031722 SCHNEIDER XTR-10 290 HP @ 2200
 GRADE START / 1ST GEAR / WITH SHIFT
 MAKE: WHIT MODEL: XPED1
 TIRE: 10.00R20
 TRANSMISSION: RT-1110
 CVT: 60.000



DRIVEABILITY TEST

UNIT: 39
 AXLE: 3-70
 03/17/80 CS1031724 SCHNEIDER XIA-10 290 HP @ 2200
 GRADE START / 2ND GEAR / WITH SHIFT
 MAKE: WHIT
 MODEL: XPE01
 FITRES: 10.00R20
 TRANSMISSION: RT-1110
 GVW: 60,000



DRIVEABILITY TEST

UNIT: 39
 AXLE: 3-70
 03/17/80 CS-031724 SCHNEIDER XTA-10 290 HP @ 2200
 GRADE START / PND GEAR / WITH SHIFT

MAKE: WHIT
 TIRES: 10.00R20
 MODEL: XPEDI
 TRANSMISSION: RT-1110
 CVM: 60.000

% SMOKE OPACITY

RAIL PRESSURE (PSI)

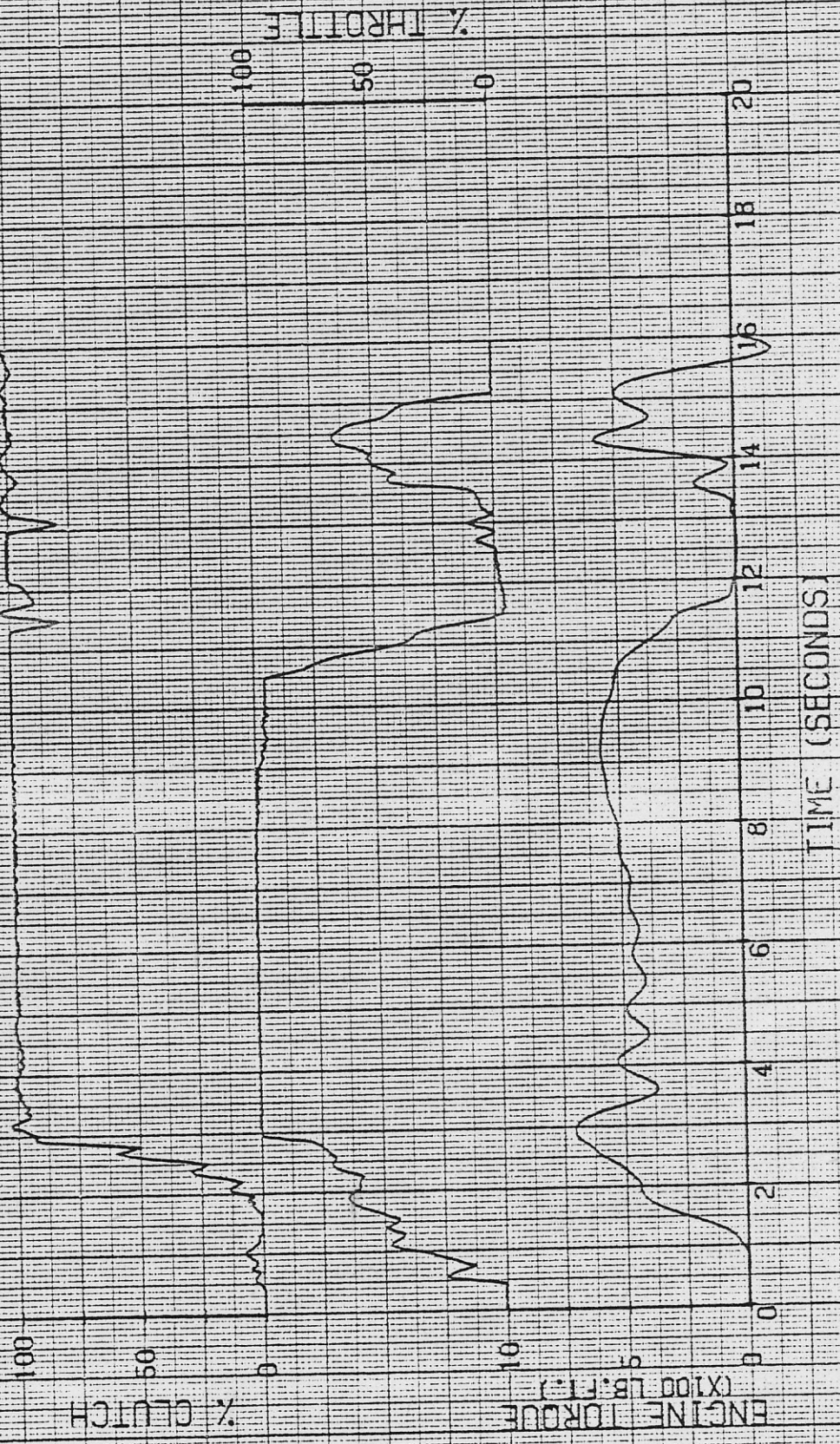
INT. MFLD. PRESS (IN. HG)



TIME (SECONDS)

DRIVEABILITY TEST

UNIT: 39
 AXLE: 3:70
 03/17/80 05-031724 SCHNEIDER XTA-10 290 HP @ 2200
 MAKE: WHIT
 MODEL: XFED1
 TIRES: 10.00R20
 TRANSMISSION: RT-1110
 CVT: 80.000
 GRADE START / 2ND GEAR / WITH SHIFT



DRIVEABILITY TEST

UNIT: 39
AXLE: 3.70

MAKE: WHIT

MODEL: XPED1

FIRE: 10.00R20

TRANSMISSION: RT-1110
CYWT: 80,000

03/17/80 CS-031725 SCHNEIDER XTA-10 290 HP @ 2200
GRADE START / BRO GEAR / NO SHIFT

ENGINE HP

ENGINE TORQUE
(X100 LB.FT.)

ENGINE SPEED
(X100 RPM)

TIME (SECONDS)



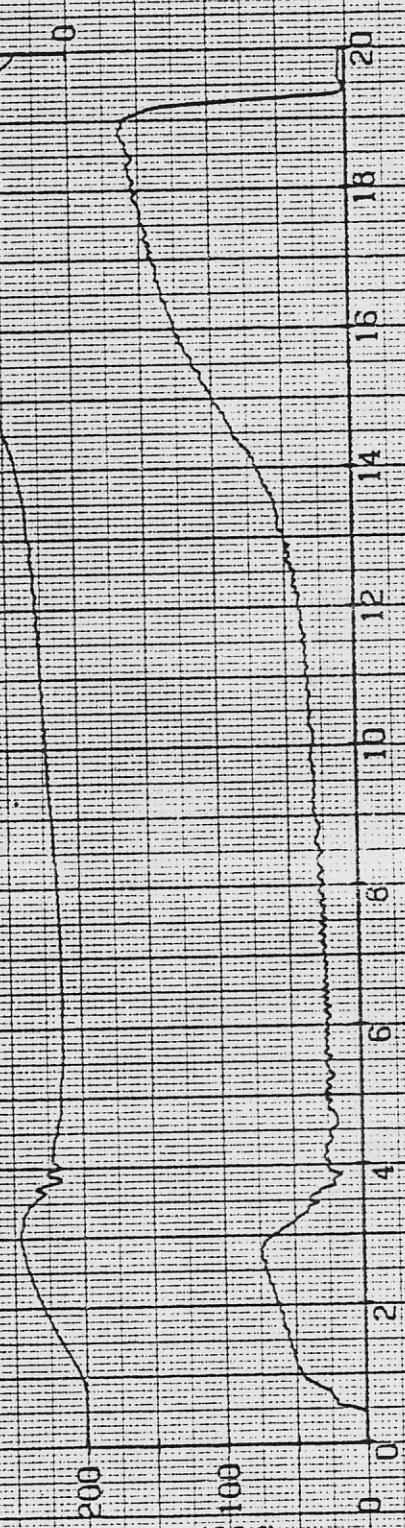
DRIVEABILITY TESTS

UNIT: 39
 AXLE: 3.70
 03/17/80 CS-031725 SCHNEIDER XTA-10 290 HP @ 2200
 GRADE START / BRD GEAR / NO SHIFT
 MAKE: WHIT
 MODEL: XPE01
 FIRES: 10,00R20
 TRANSMISSION: RT-1110
 CVM: 80,000

% SMOKE OPACITY



RAIL PRESSURE (PSI)



INT. MFLD. PRESS (IN HG)



TIME (SECONDS)

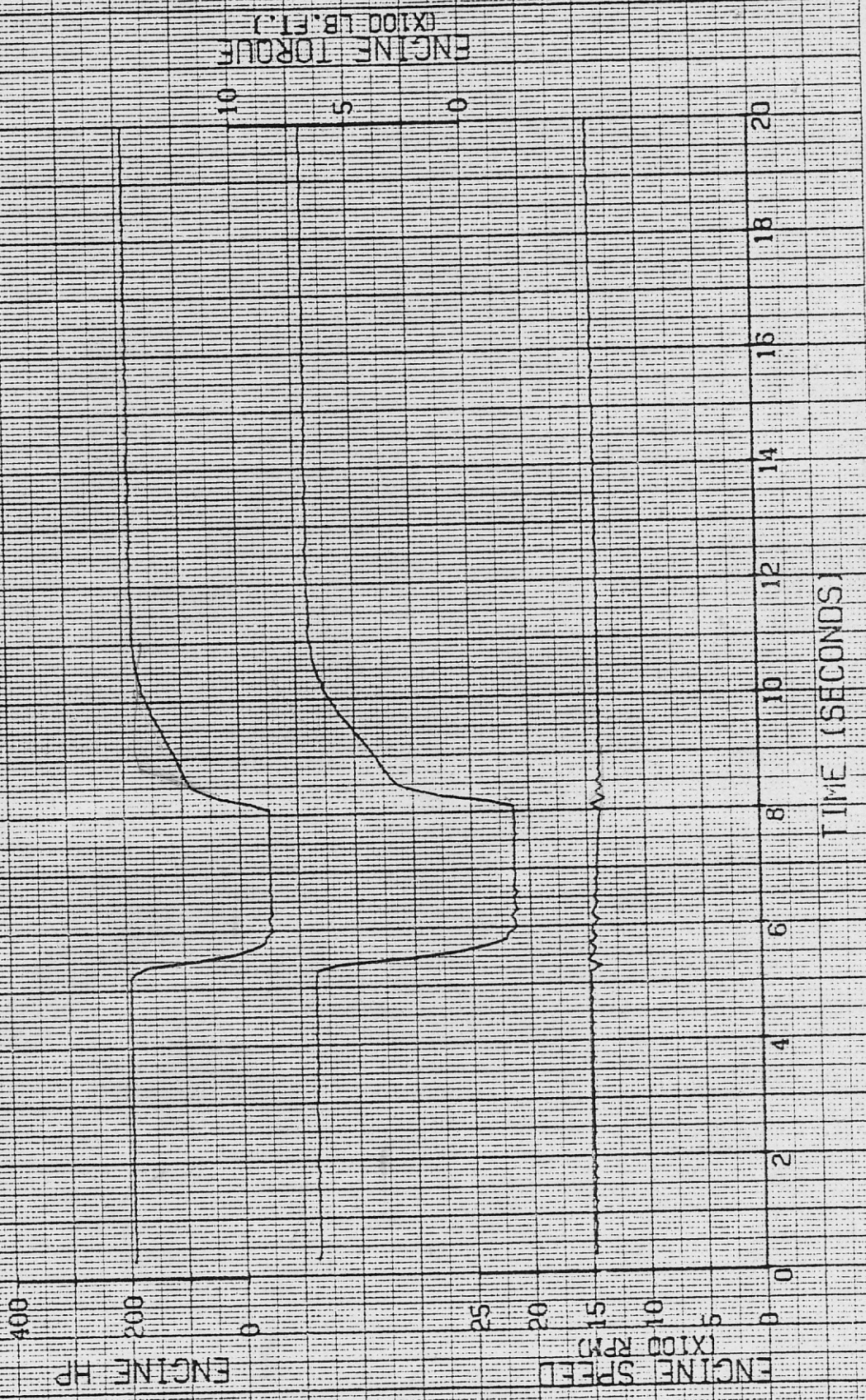
DRIVEABILITY TEST

UNIT: 39
 MAKE: WHIT
 MODEL: XPED1
 AXLE: 3.70
 FIRES: 10.00R20
 TRANSMISSION: RT-1110
 CYW: 60.000
 03/17/80 05-031725 SCHEFFIDER XTA-10 290 HP @ 2200
 GRADE START / BRD GEAR / NO SHIFT



DRIVEABILITY TEST

UNIT: 39
 AXLE: 3:70
 03/18/80
 MAKE: IHIT
 MODEL: XPED1
 FIRES: 10,00R20
 II-D31838 SCHNEIDER XTA-10 290 HP @ 2200
 THROTTLE INTERRUPT / 1400 RPM
 TRANSMISSION: RT-1110
 GVM: 60,000



DRIVEABILITY TEST

UNIT: 39
 AXLE: 3.70
 03/18/80 II-031833 SCHNEIDER X18-10 290 HP @ 2200
 THROTTLE INTERRUPT / 1400 RPM
 MAKE: WHITE
 TIRES: 10.00R20
 MODEL: XPE01
 TRANSMISSION: RT-1110
 CYM: 60.000

% SMOKE OPACITY

RAIL PRESSURE (PSI)

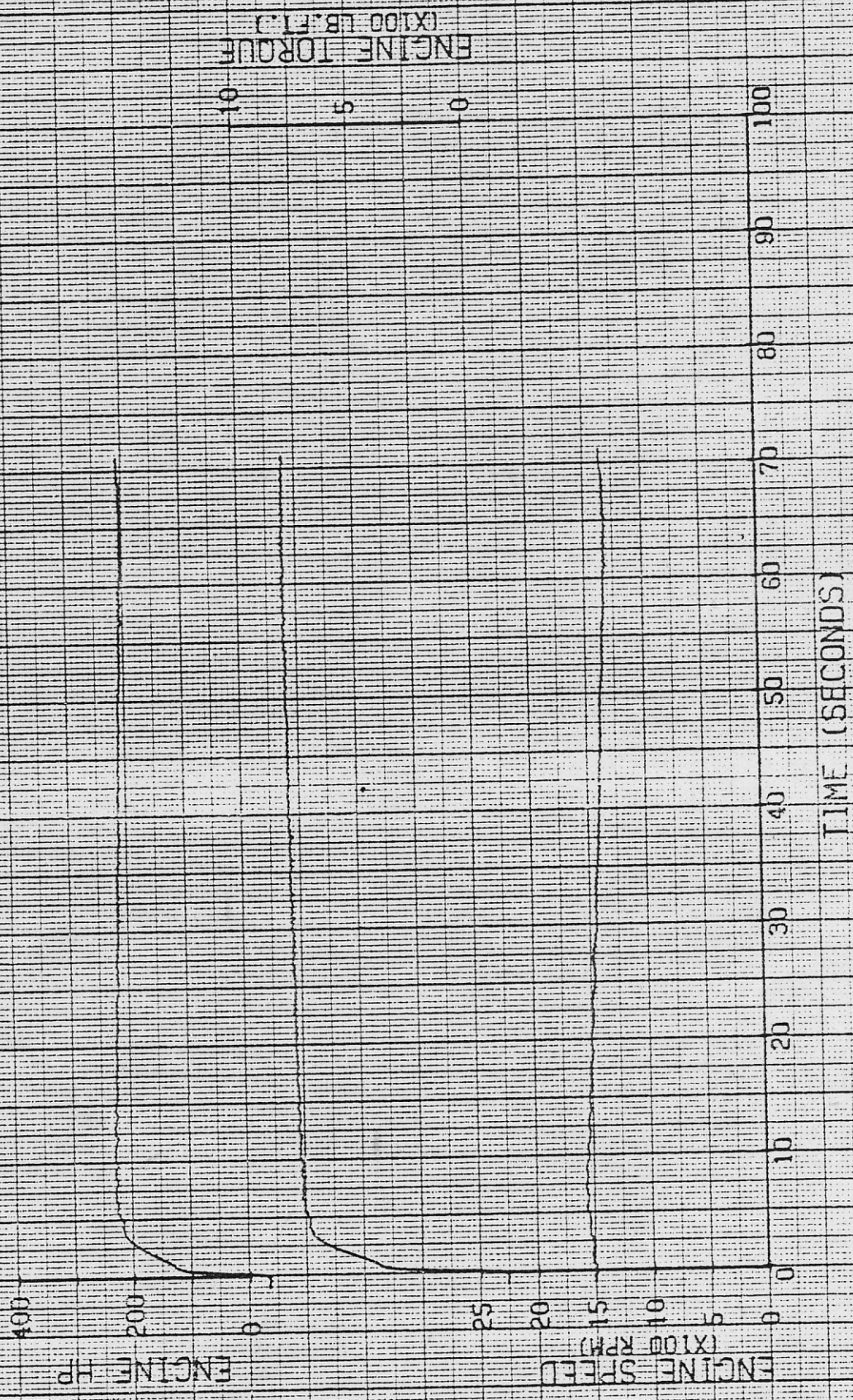
INT MFLD PRESS (IN.HG)

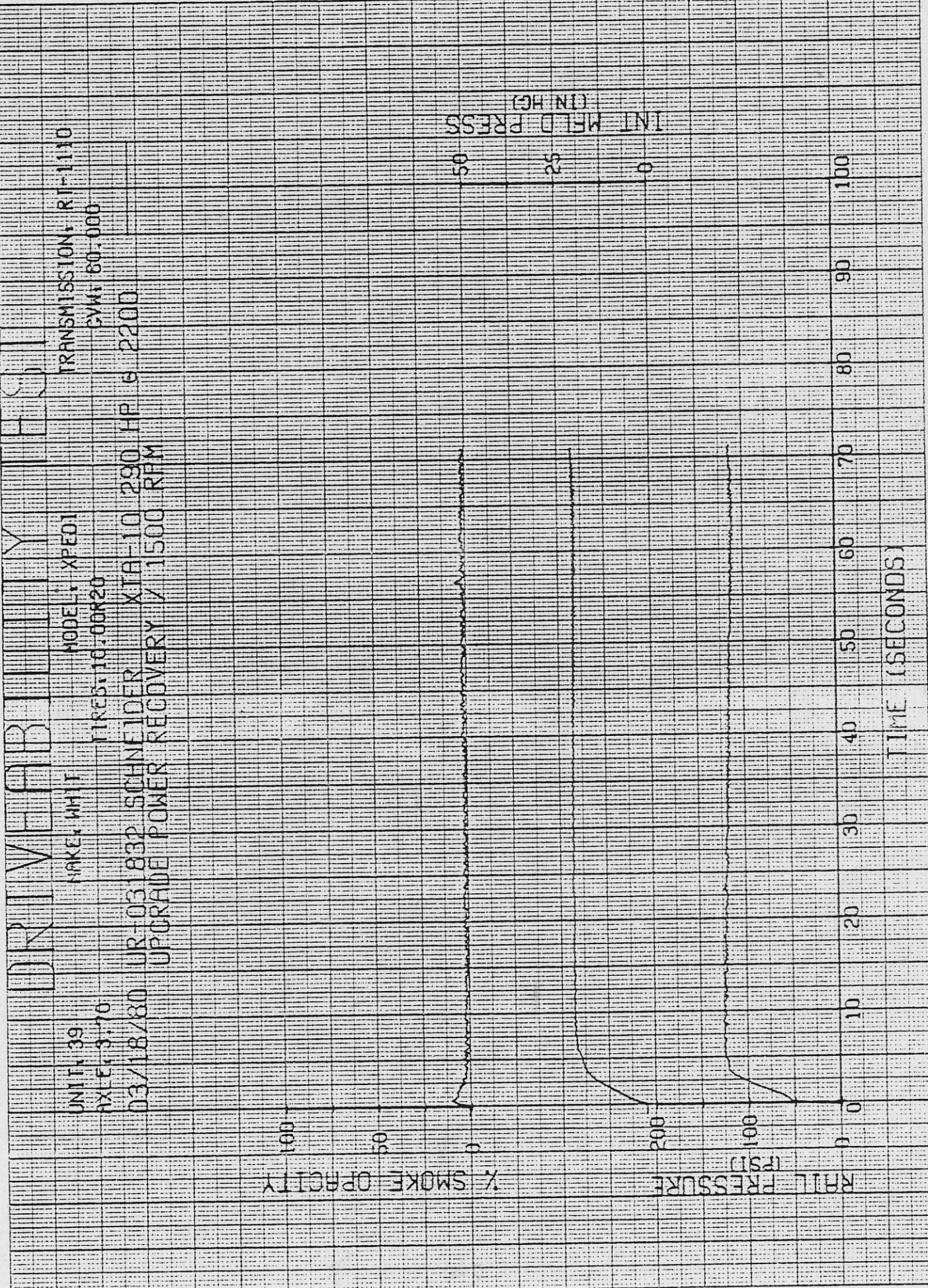


TIME (SECONDS)

DRIVEABILITY TEST

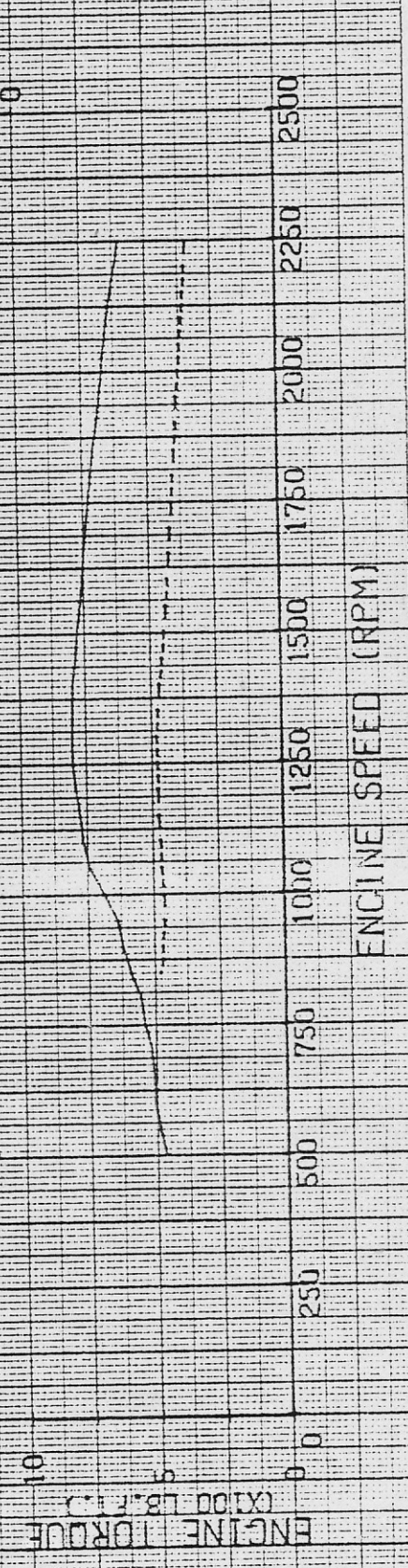
UNIT: 39
 AXLE: S-70
 03/18/80 UR-031832 SCHNEIDER XTA-10 290 HP @ 2200
 UPGRADE POWER RECOVERY / 1500 RPM
 MAKE: WHIT
 MODEL: XPEDI
 TIRES: 10.00R20
 TRANSMISSION: RT-1110
 GVM: 60,000





DRIVEABILITY TESTS

UNIT: 39
 AXLE: 3.70
 03/14/80
 03/14/80
 MAKE: WHITE
 MODEL: X-ED1
 TIRES: 10.00R20
 TRANSMISSION: RT-1110
 GVM: 80,000
 IC-031401 SCHNEIDER XIA-10 290 HP @ 2200
 TORQUE CURVE / 4TH GEAR / WITH AIR
 IC-031403 SCHNEIDER XIA-10 290 HP @ 2200
 TORQUE CURVE / 2ND GEAR / NO AIR



DRIVEABILITY TEST

UNIT: 39
 AXLE: 3.70
 03/14/80 IC-031401 SCHNEIDER XTA-10 290 HP @ 2200
 TORQUE CURVE / 4TH GEAR / WITH AIR
 03/14/80 IC-031403 SCHNEIDER XTA-10 290 HP @ 2200
 TORQUE CURVE / 2ND GEAR / NO AIR
 MAKE: WHIT
 MODEL: XPE01
 TIRES: 10.00R20
 TRANSMISSION: RT-1110
 GVW: 60,000

