



DOCUMENT TITLE PAGE

Identification Numbers (if applicable)	Cummins Report	REPORT DISTRIBUTION
Program Project No. 55-082	# <u>0721-80009</u>	Master PIC - 50231 (1) Info Center 50120 (2) Info Center (3) Info Center (4) Author
Pilot Inst. Center No.	Title Driveability NTC-270 Fleet Engine Rated 270 HP @ 1600 RPM	(5) C.W.Hoefflin - 50194 (6) R.E.Hoffmeister 50196 (7) R.W.Jones - 50194 (8) M.S.Lantz - 50231 (9) A.C.Rosselli - 50191 (10) J.C.Walter - 50114 (11) Vehicle Test 50231(5)
Test Project No.	Author M. Thommen - 50231	
Other		
Date 4/22/80		
Dept. No. 0721	Dept. Name Vehicle Test	

SUMMARY

PURPOSE:

To establish base driveability data on a low RPM governed engine combined with a 7-speed gathered ratio transmission for further engine development and comparison.

DISCUSSION:

Complete driveability tests were run according to Cummins' Test Method (4.20) using Test Unit 38 (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 4 H₂.

RESULTS:

Engine torque response after a 3 sec. throttle interrupt is excellent on this engine (Attachment 4). Seventh gear direct with this 7-speed Spicer transmission and the 3.700 rear axle ratio it is required to drive in the governor range to maintain 55 mph. Detail results are shown in Attachments 3-27.

ACTION:

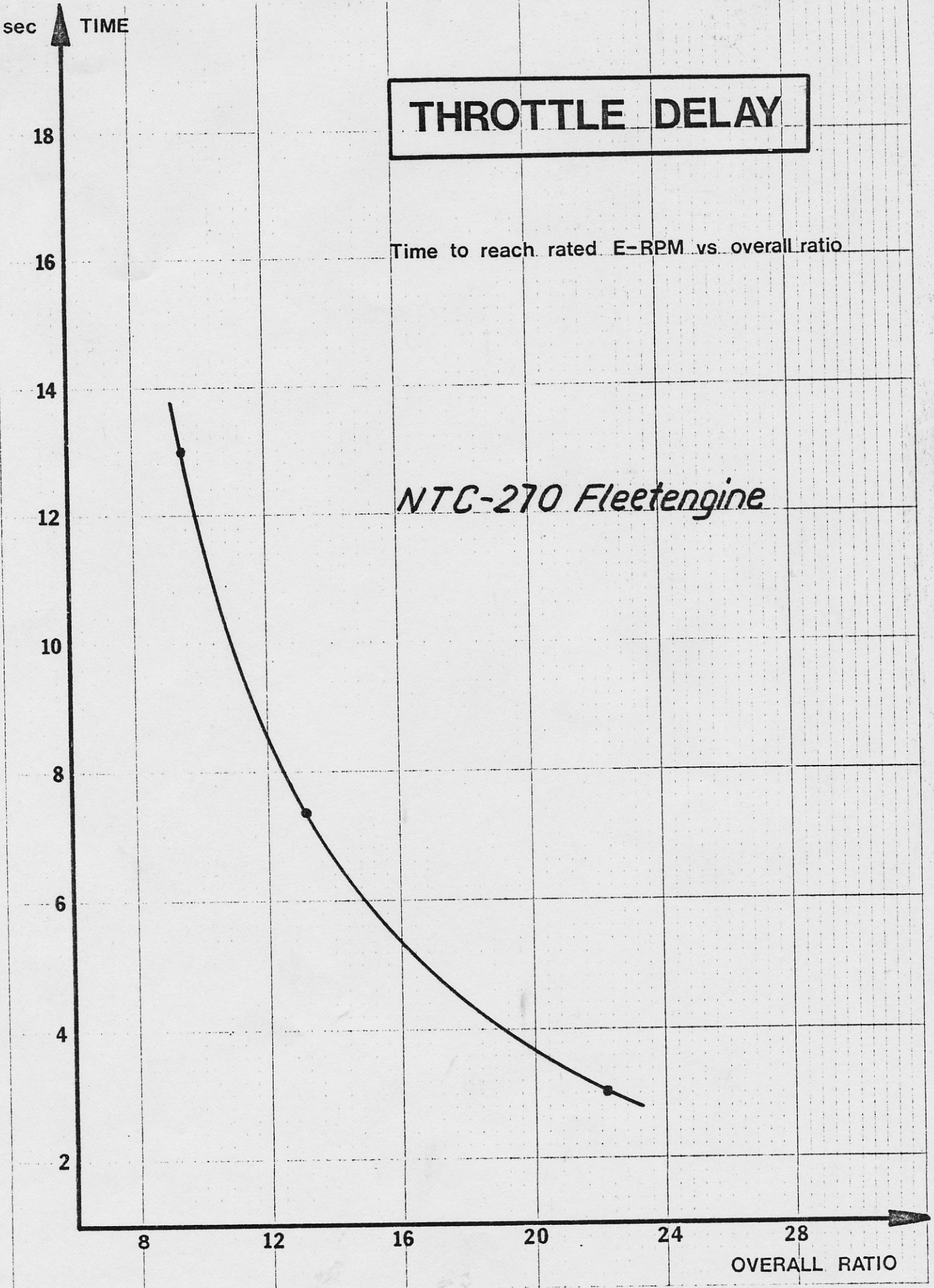
1. Marketing/Sales should pay attention to customer needs concerning geared vehicle cruising speed to provide the best transmission/rear axle/tire specifications.
2. Make this data available to BC-II/III Engine Group and retain for further comparisons.

M. Thommen/at

Monte Thommen
 Engineer - Vehicle Test

DR-113079 DRIVEABILITY DATA FILE

PROGRAM DESCRIPTION: DRIVEABILITY NTC-270 FLEETENGINE
 PROG-PROJ NO / DEPT: 55-082 / 0721
 ENGINEER: MORITZ THOMMEN
 TECHNICIAN: JOHN BEEKER
 INSTRUMENTATION: MIKE NAGEL
 DRIVER: LOREN SCHNEIDER
 TRUCK # / TRAILER #: 38 / 150
 TRUCK MAKE / MODEL: FREIGHTLINER / WFT10464T
 CONV / COE: COE - 4DOOR
 ENGINE MAKE / MODEL: CUMMINS / FLEET
 HP @ RPM 270 @ 1600
 FT.LB @ RPM: 1000 @ 1100
 SERIAL NO: 10814275
 CPL / FUEL PUMP CODE: CPL 0471 / RE-175
 TRANSMISSION MAKE: SPICER
 MODEL: 1107-2A
 CLUTCH MAKE / MODEL: SPICER / CERAMIC-DAMPENED-2PLATE
 REAR AXLE RATIO: 3.70
 TIRES MAKE / SIZE F: GOODYEAR / 11R22.5
 TIRES MAKE / SIZE R: GOODYEAR / 11R22.5
 REV / MILE: 498
 LOW IDLE: 609 RPM 1.0 PSI RAIL 0.08 "HG BOOST
 HIGH IDLE: 1810 RPM 8.0 PSI RAIL 3.61 "HG BOOST



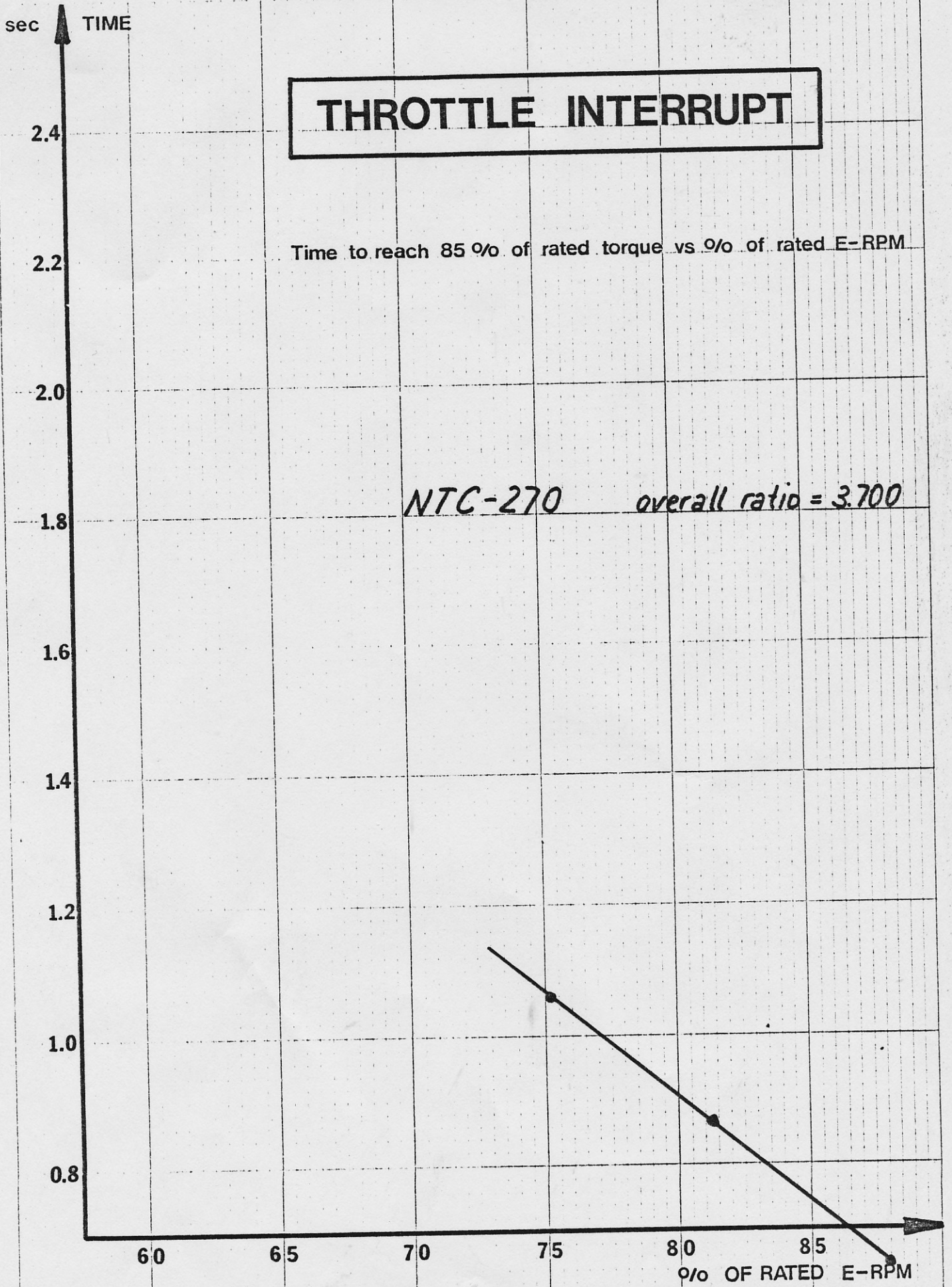
THROTTLE DELAY

Time to reach rated E-RPM vs. overall ratio

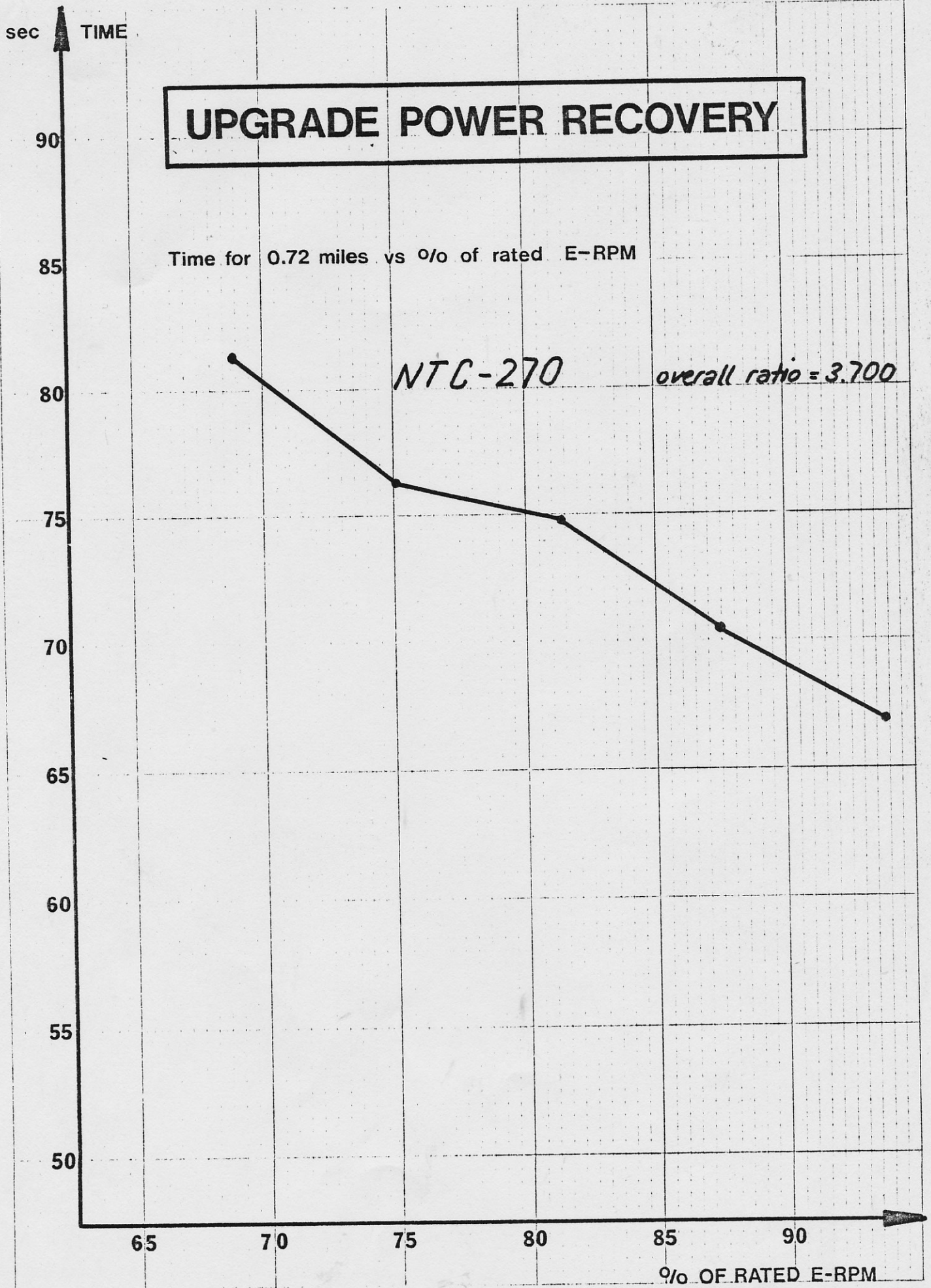
NTC-270 Fleetengine

THROTTLE INTERRUPT

Time to reach 85 % of rated torque vs % of rated E-RPM



NTC-270 overall ratio = 3.700



UPGRADE POWER RECOVERY

Time for 0.72 miles vs % of rated E-RPM

NTC-270

overall ratio = 3.700

Morris Hollman April-17/80

DRIVEABILITY TESTS

UNIT: 38
AXLES: 3-70

MAKE: FTLR
MODEL: 4000R

TIRES: 11R22.5

ID: 113007 SCHNEIDER FLEET-ENGINE
THROTTLE DELAY / BRD GEAR / 7.38 SEC

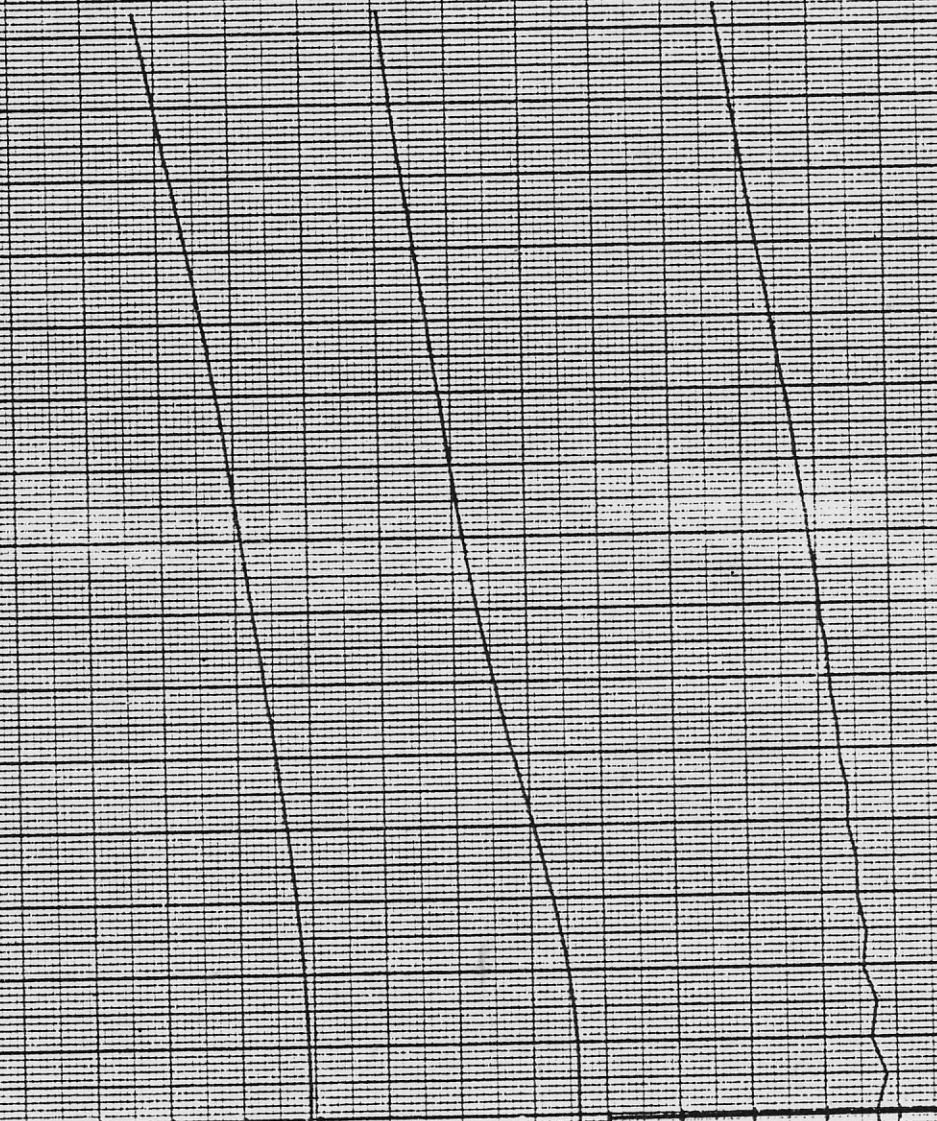
TRANSMISSION: 1107-2A
CVT: 72:000

ENGINE HP
400
200
0

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

ENGINE TORQUE
(X100 LB.FT.)
10
5
0

TIME (SECONDS)
10
9
8
7
6
5
4
3
2
1
0



DRIVEABILITY TEST

TRANSMISSION: 1107-2A
CYM: 72.000

MAKE: FTR
MODEL: 4DOOR
TIRES: 11R22.5

UNITY 38
AXLE: 3.70

11/30/79 TD-113007 SCHNEIDER FLEET-ENGINE
THROTTLE DELAY / 3RD GEAR / 7.38 SEC

% SMOKE OPACITY

100
50
0

INT WELD PRESS (IN HG)

50
25
0

RHIL PRESSURE (PSI)

200
100
0

TIME (SECONDS)

10

9

8

7

6

5

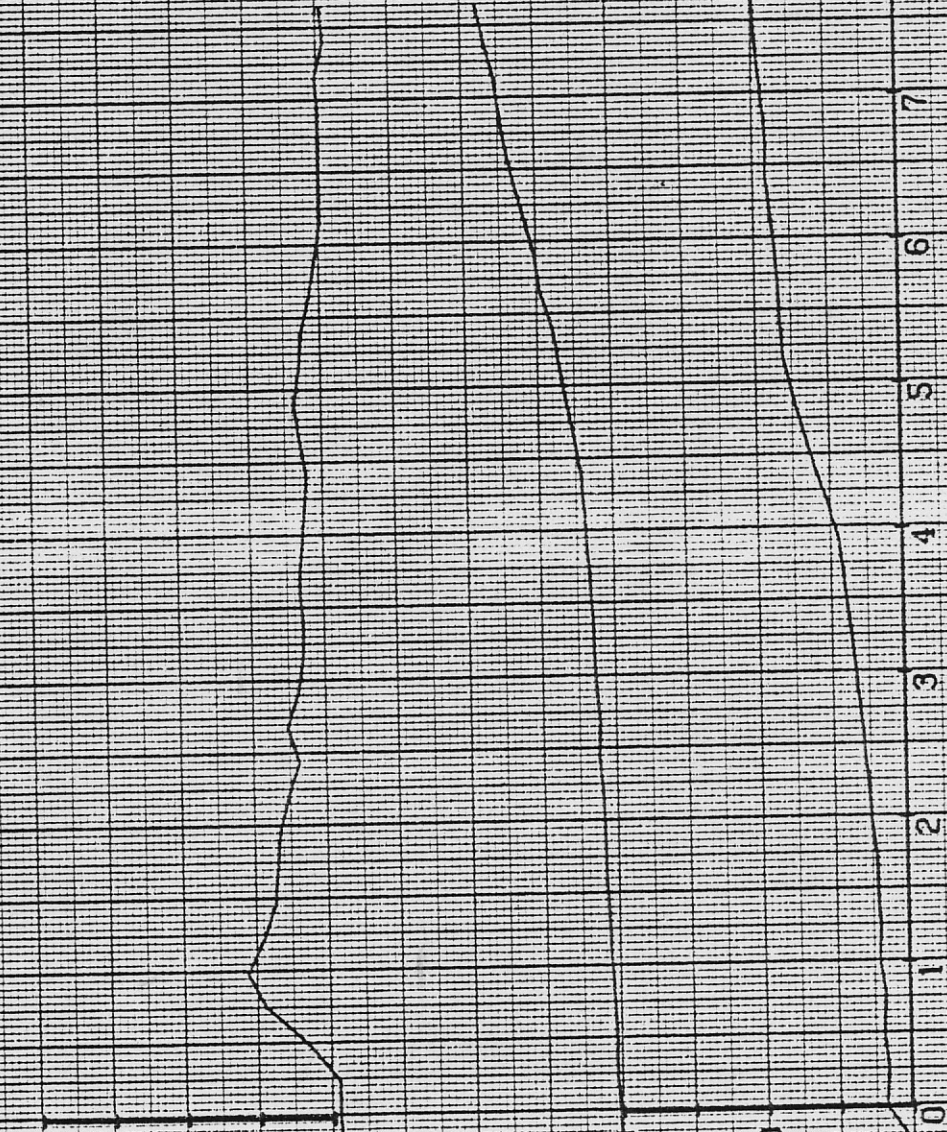
4

3

2

1

0



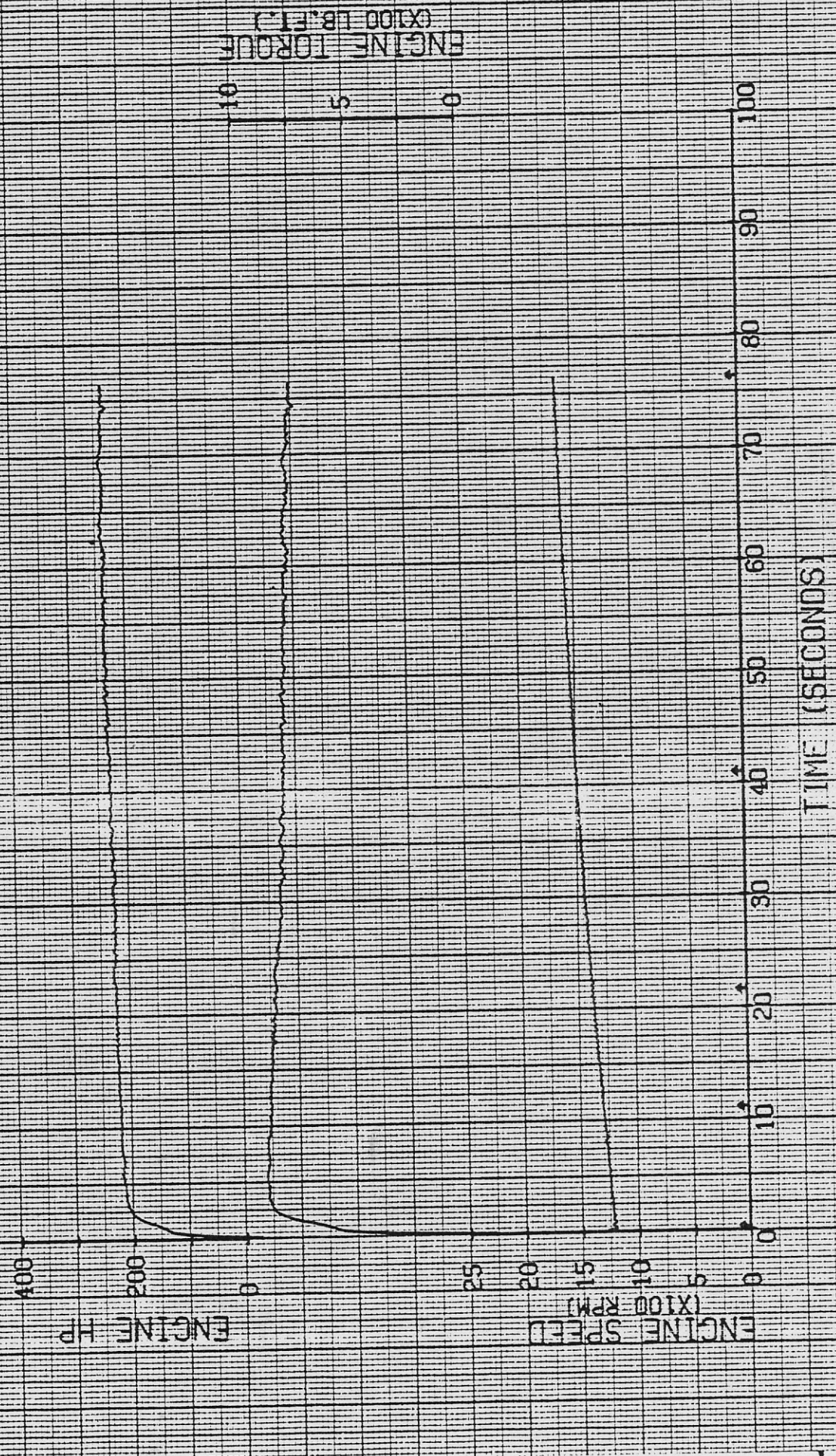
DRIVEABILITY TEST

TRANSMISSION: 1107-2R
CYM: 72.000

MODEL: 4DOOR
TIRES: 11R22.5

UNIT: 38
AXLE: 3.70

PA-120440 SCHNEIDER FLEET-ENGINE
PASSING TEST ACCELERATION / 7TH GEAR



TIME (SECONDS)

ENGINE SPEED (X100 RPM)

ENGINE TORQUE (X100 LB.FT.)

DRIVEABILITY TESTS

UNIT: 38

AXLE: 3.70

12/04/79

MAKE: FTLR

MODEL: 400R

FIRES: 11R22.5

PA-120440 SCHNEIDER FLEET-ENGINE
PASSING TEST ACCELERATION / 7TH GEAR

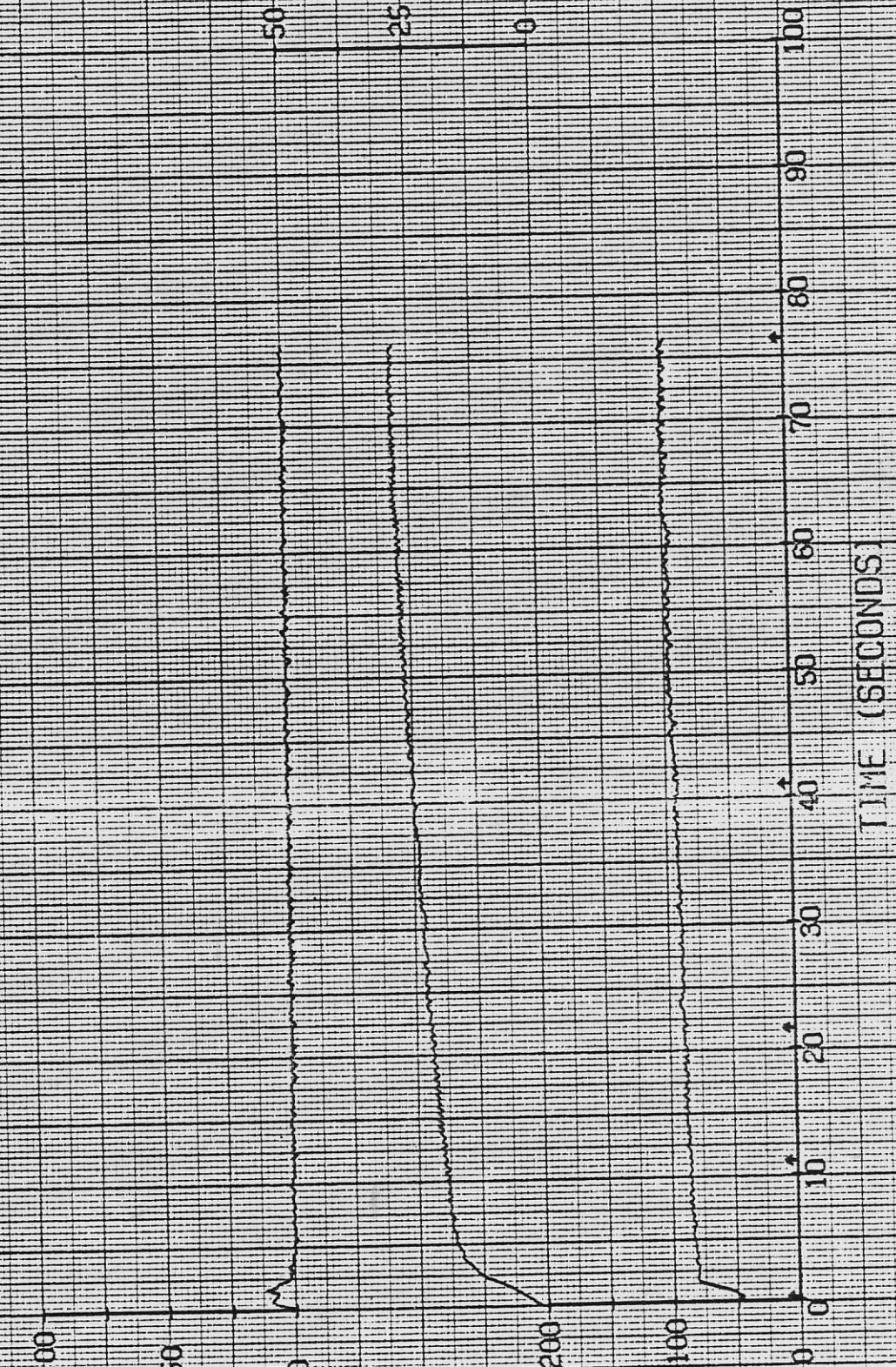
TRANSMISSION: 1107-2A

GVW: 72,000

% SMOKE OPACITY

RAIL PRESSURE (PSI)

INT WELD PRESS (IN HG)



TIME (SECONDS)

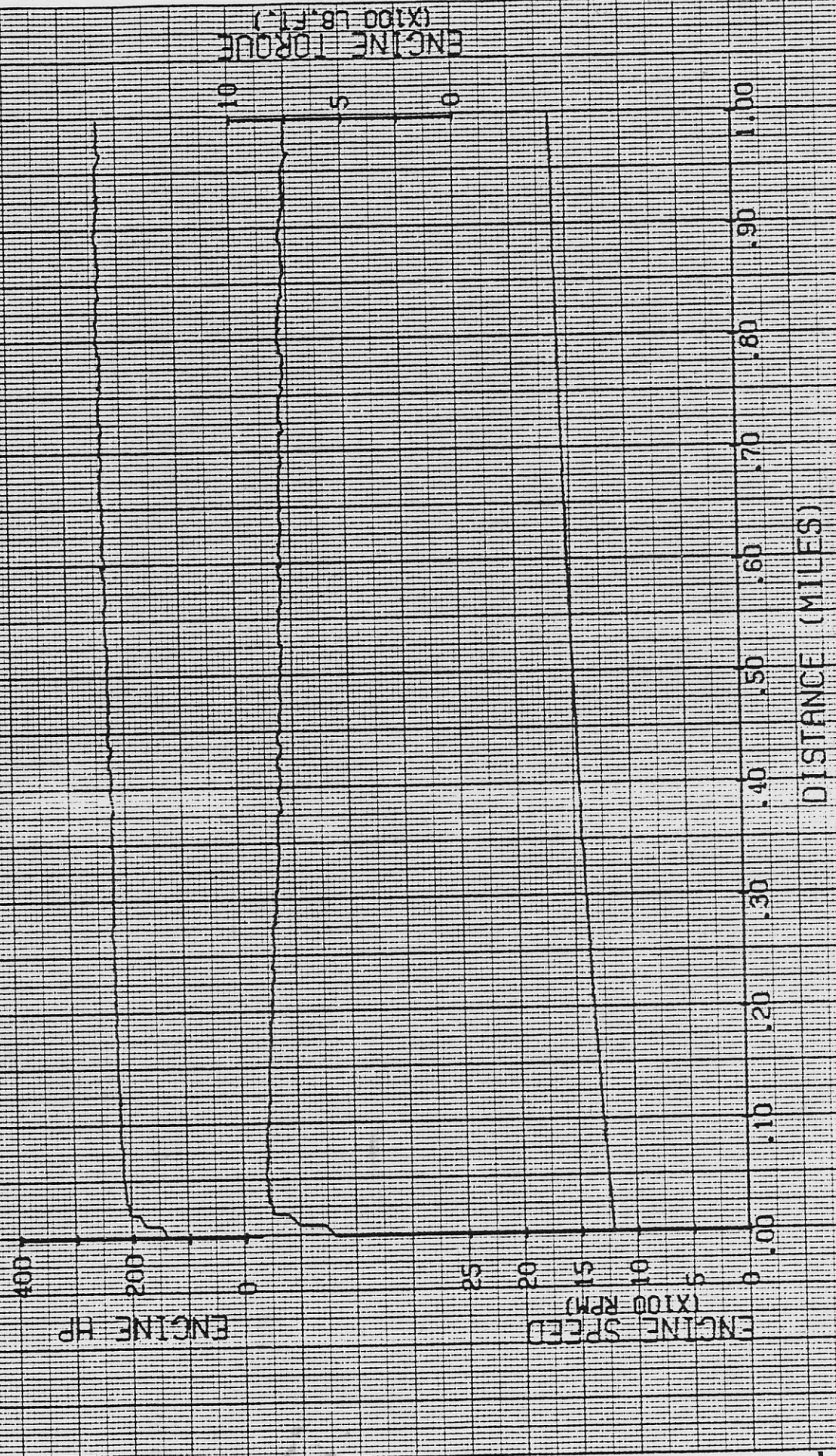
DRIVEABILITY TESTS

UNIT: 38
AXLE: 3.70
12/04/79

MAKE: FTLR
MODEL: 4DOOR
TIRES: 11R22.5

PA-120440 SCHNEIDER FLEET-ENGINE
PASSING TEST ACCELERATION / 7TH GEAR

TRANSMISSION: 1107-2A
CVT: 72.000



DRIVEABILITY TESTS

UNIT 38
AXLE 3-70
12/04/79

MAKE/FYR MODEL: 4000R
TIRES: 11R22.5

PAH120440 SCHNEIDER FLEET-ENGINE
PASSING TEST ACCELERATION V 7TH GEAR

TRANSMISSION: 1107-2A
CVH: 72.000

% SMOKE OPACITY

100
50
0

RHIL PRESSURE
(PSI)

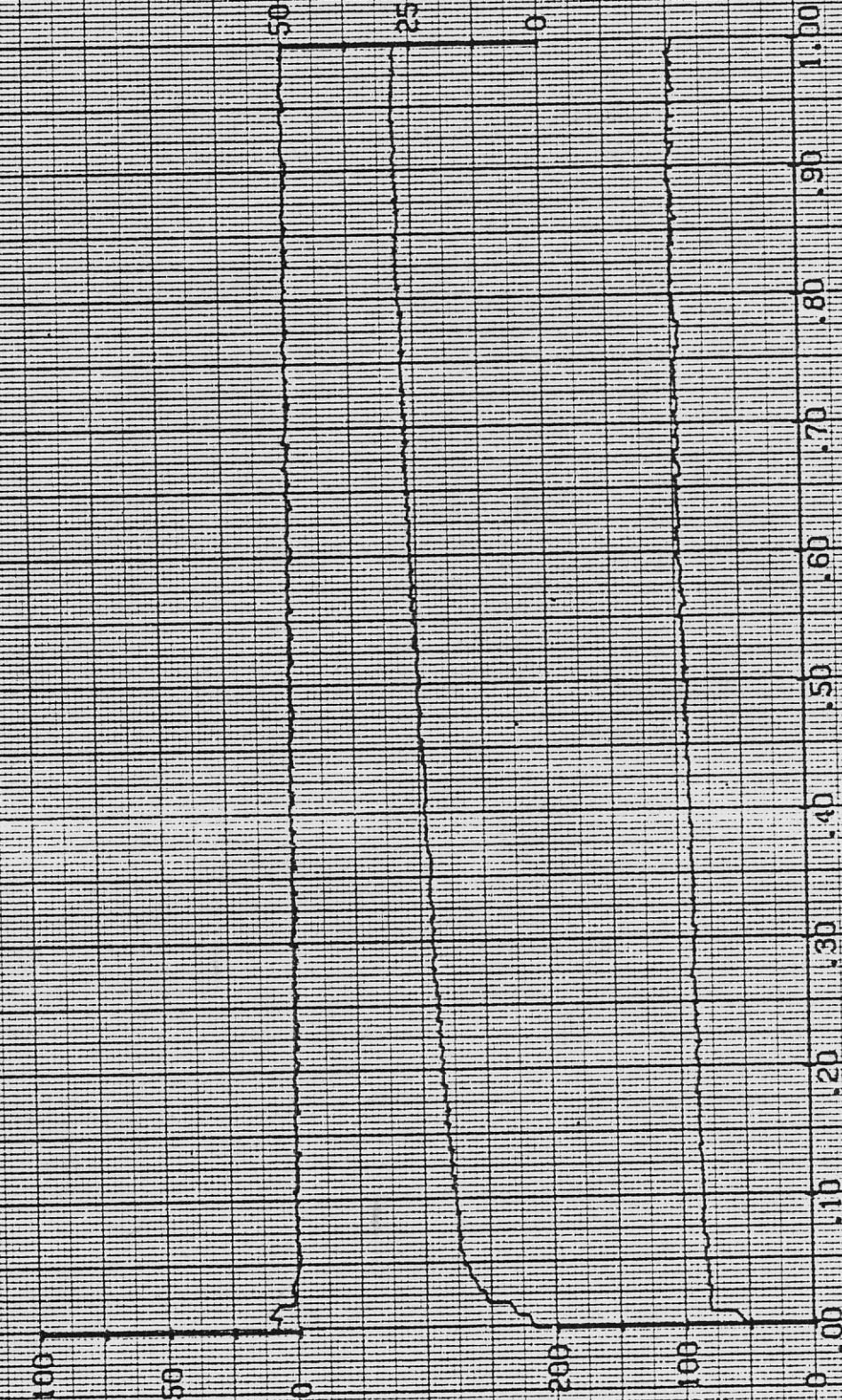
200
100
0

INT. WELD PRESS
(IN HG)

50
25
0

1.00
.90
.80
.70
.60
.50
.40
.30
.20
.10
0.00

DISTANCE (MILES)



DRIVEABILITY TEST

UNIT, 38
AXLE, 3.70
12/04/79

MAKE, FTLR
MODEL, 4DOOR
TIRES, 11R22.5

PL-120444 SCHNEIDER FLEET-ENGINE
PART THROTTLE ACCELERATION / 1000 RPM /

TRANSMISSION, 1107-2A
CYM, 72.000



DRIVEABILITY TESTS

UNIT: 38
AXLE: 3.70

MAKE: FTLR

MODEL: 4DOOR

TRANSMISSION: 1107-2A
GVW: 72,000

TIRE: HR22.5

P-120444 SCHNEIDER FLEET-ENGINE
PART THROTTLE ACCELERATION / 1000 RPM /

% SMOKE OPACITY

100
50
0

RAIL PRESSURE (PSI)

200
100
0

INT. WELD PRESS (IN HG)

50
25
0

100
90
80
70
60
50
40
30
20
10
0

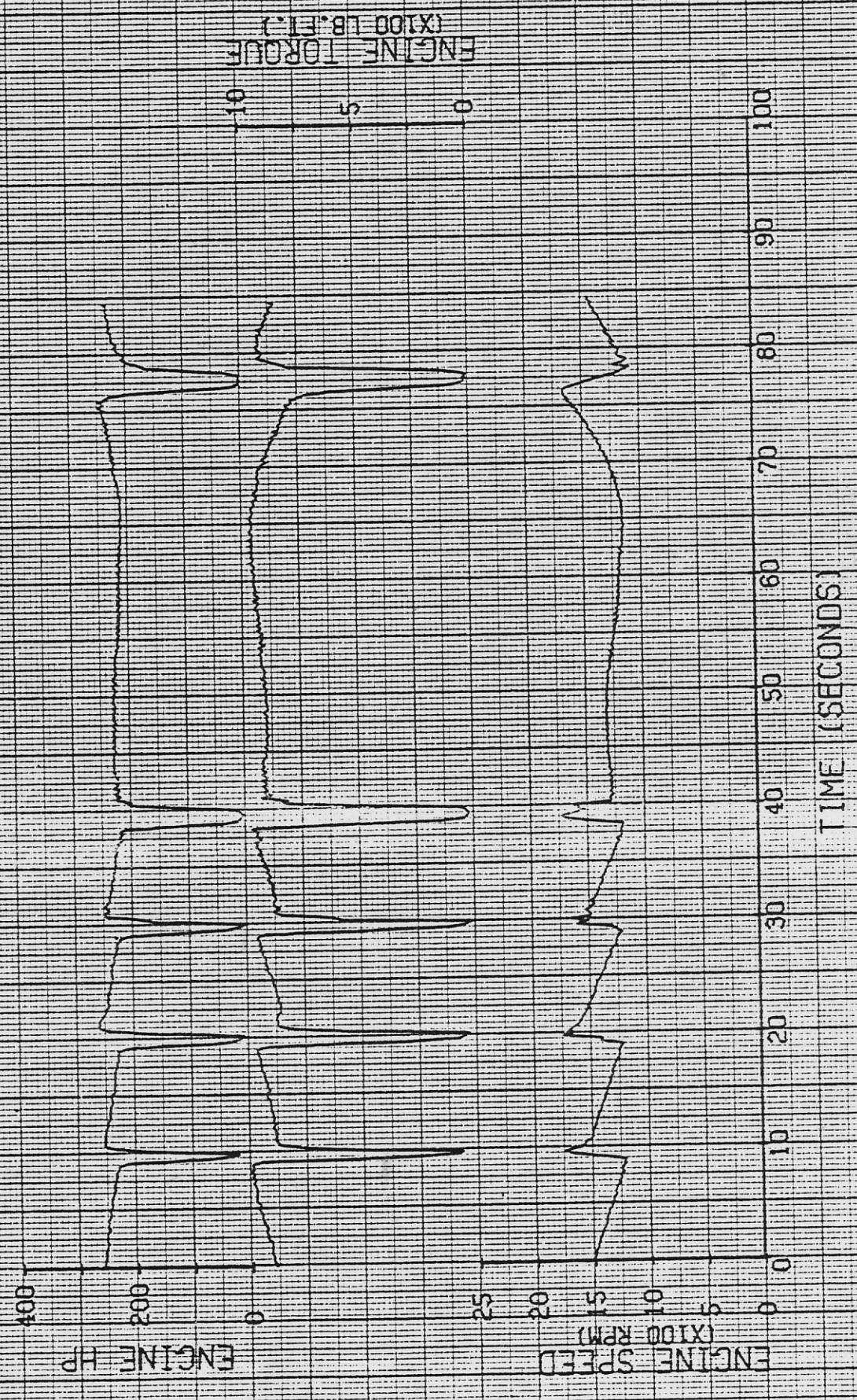
TIME (SECONDS)

DRIVEABILITY TEST

UNIT, 98
AXLE, 3.70
12/03/79 SC-120311 SCHNEIDER
STEVENS CREEK HILL

MAKE, FTLR
MODEL, 4000R
FIRE, 11R22.5
FLEET-ENGINE

TRANSMISSION, 1107-2R
GVW, 72,000



TIME (SECONDS)

DRIVEABILITY TEST

UNIT: 38
AXLE: 3.70
12/03/79

TRANSMISSION: 1107-2A
CYW: 72.000

MAKE: FTLR

MODEL: 4DOOR
TRER: 11R22.5

SC-120311 SCHNEIDER FLEET-ENGINE
STEVENS CREEK HILL

% SMOKE OPACITY

100
50
0

RAIL PRESSURE
PSI

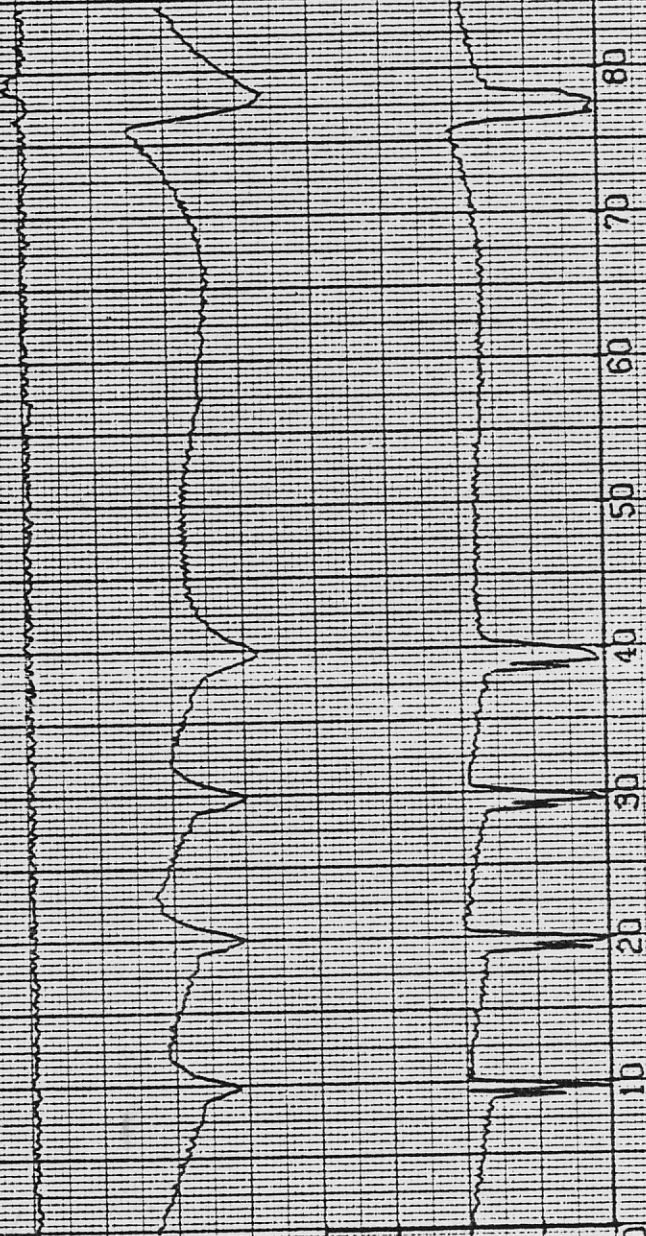
200
100
0

INT WELD PRESS
(IN HG)

50
25
0

100
90
80
70
60
50
40
30
20
10
0

TIME (SECONDS)



DRIVEABILITY TEST

UNIT, 38

AXLE, 3.70

12/04/79

CS-120434 SCHNEIDER

GRADE START / 1ST GEAR / WITH SHIFT

MAKE, FTLR

MODEL, 400R

TIRES, 11R22.5

FLEET-ENGINE

TRANSMISSION, 1107-2A

G/W, 72,000

400

200

0

ENGINE HP

25

20

15

10

5

0

ENGINE SPEED
(X100 RPM)

10

5

0

ENGINE TORQUE
(X100 LB.FT.)

20

18

16

14

12

10

8

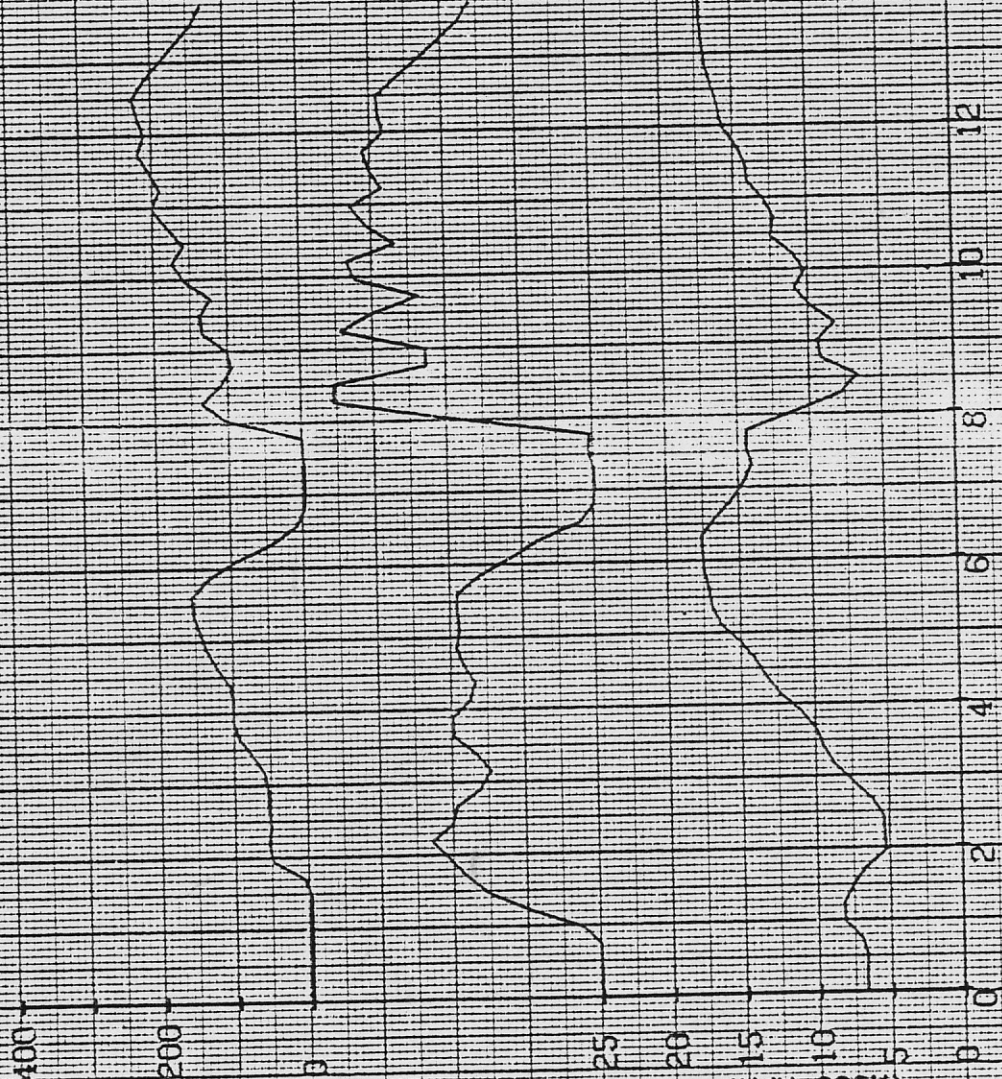
6

4

2

0

TIME (SECONDS)



DRIVEABILITY TESTS

UNIT: 38
AXLE: 3.70
12/04/79 CS-120434 SCHNEIDER
GRADE START / 1ST GEAR / WITH SHIFT

MAKE: FTLR
MODEL: 4000R
TIRES: 11R22.5

TRANSMISSION: 1107-2A
CVW: 72.000

% SMOKE OPACITY

100
50
0

RAIL PRESSURE (PSI)

200
100
0

INT WELD PRESS (IN HG)

50
25
0

TIME (SECONDS)

20
18
16
14
12
10
8
6
4
2
0



DRIVEABILITY TEST

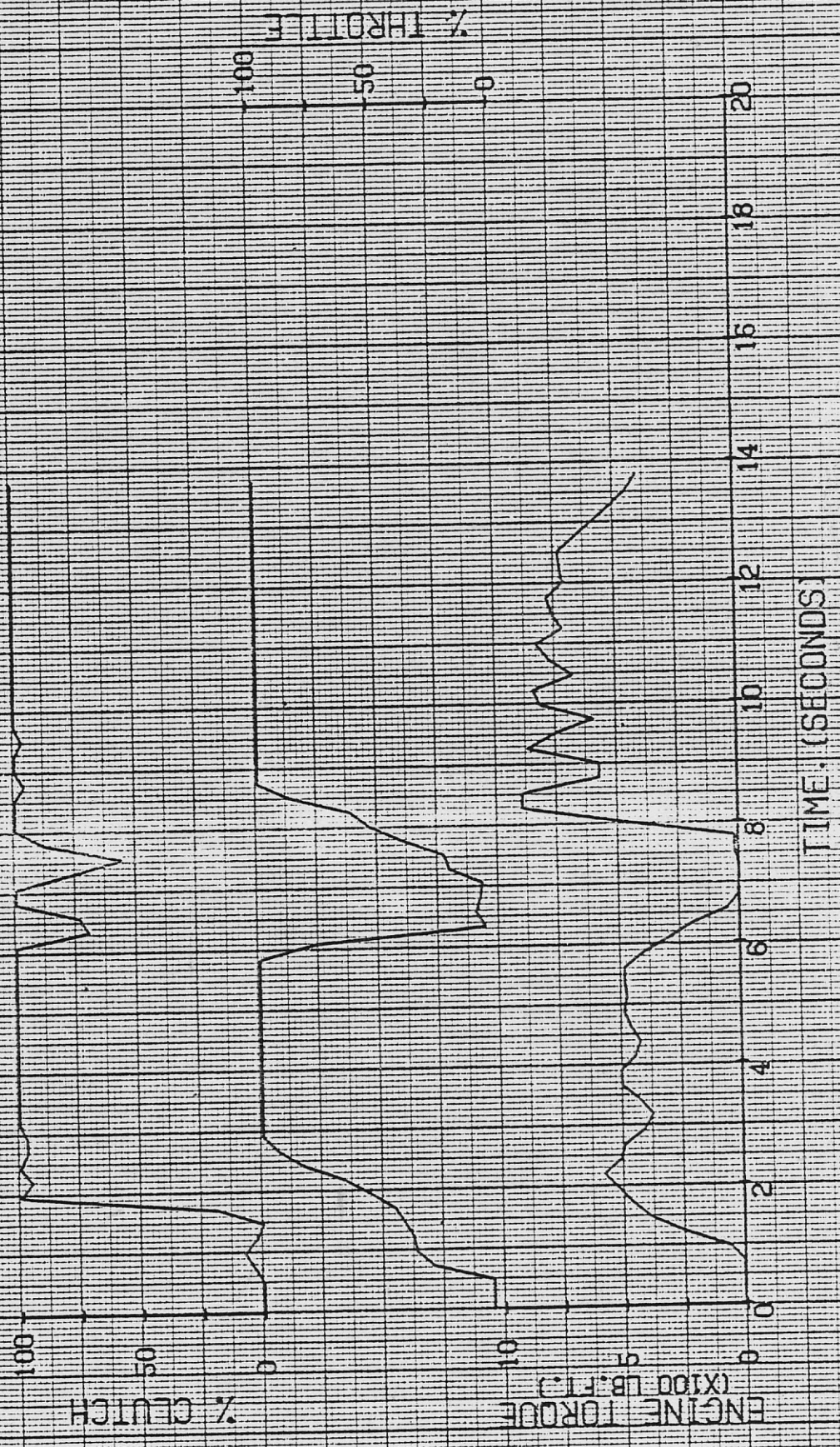
UNIT: 38
AXLE: 3.70
12/04/79

MODEL: 400R

TIRES: 11R22.5

MAKE: FTLR
CS-120434 SCHNEIDER
GRADE START / 1ST GEAR / WITH SHIFT

TRANSMISSION: 1107-2A
GVW: 72,000



DRIVEABILITY TEST

TRANSMISSION, 1107-2A
CVH, 72-000

MODEL, 400R

TIRES, 11R22.5

CS-120438 SCHNEIDER FLEET-ENGINE
GRADE START / 2ND GEAR / WITH SHIFT

UNIT, 38

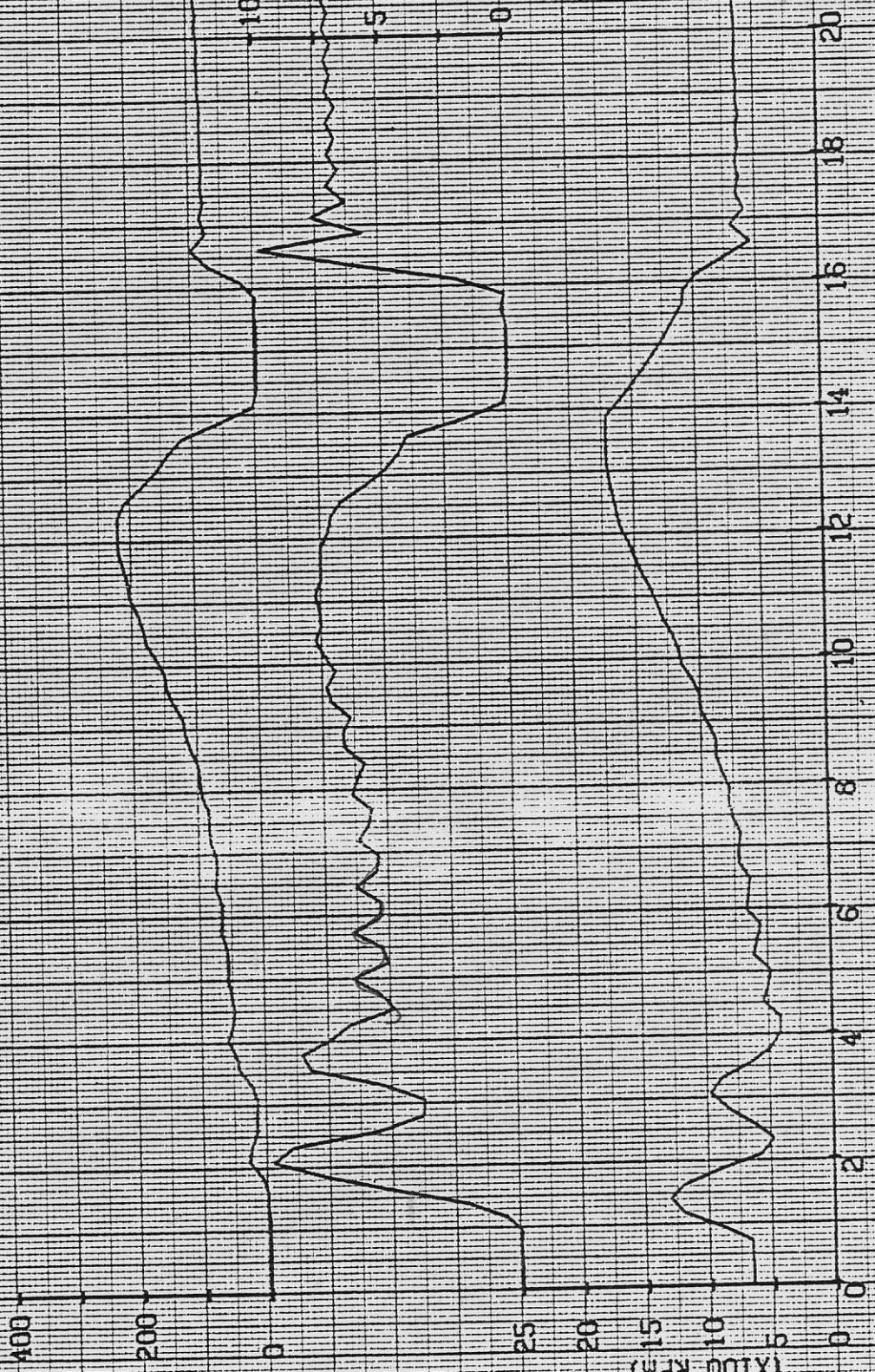
AXLE, 3.70

12/04/79

ENGINE HP

ENGINE SPEED
(X100 RPM)

ENGINE TORQUE
(X100 LB.FT.)



TIME (SECONDS)

DRIVEABILITY TEST

UNIT, 38

AXLE, 3.70

12/04/79

CS-120438 SCHNEIDER FLEET-ENGINE
GRADE START / 2ND GEAR / WITH SHUFF

MAKE, FTLR

MODEL, 4DOOR

TIRES, 11R22.5

TRANSMISSION, 1107-2A

CVM, 72.000

% SMOKE OPACITY

100

05

0

RAIL PRESSURE (PSI)

200

100

0

INT. FUEL PRESS (IN HG)

50

25

0

20

18

16

14

12

10

8

6

4

2

0

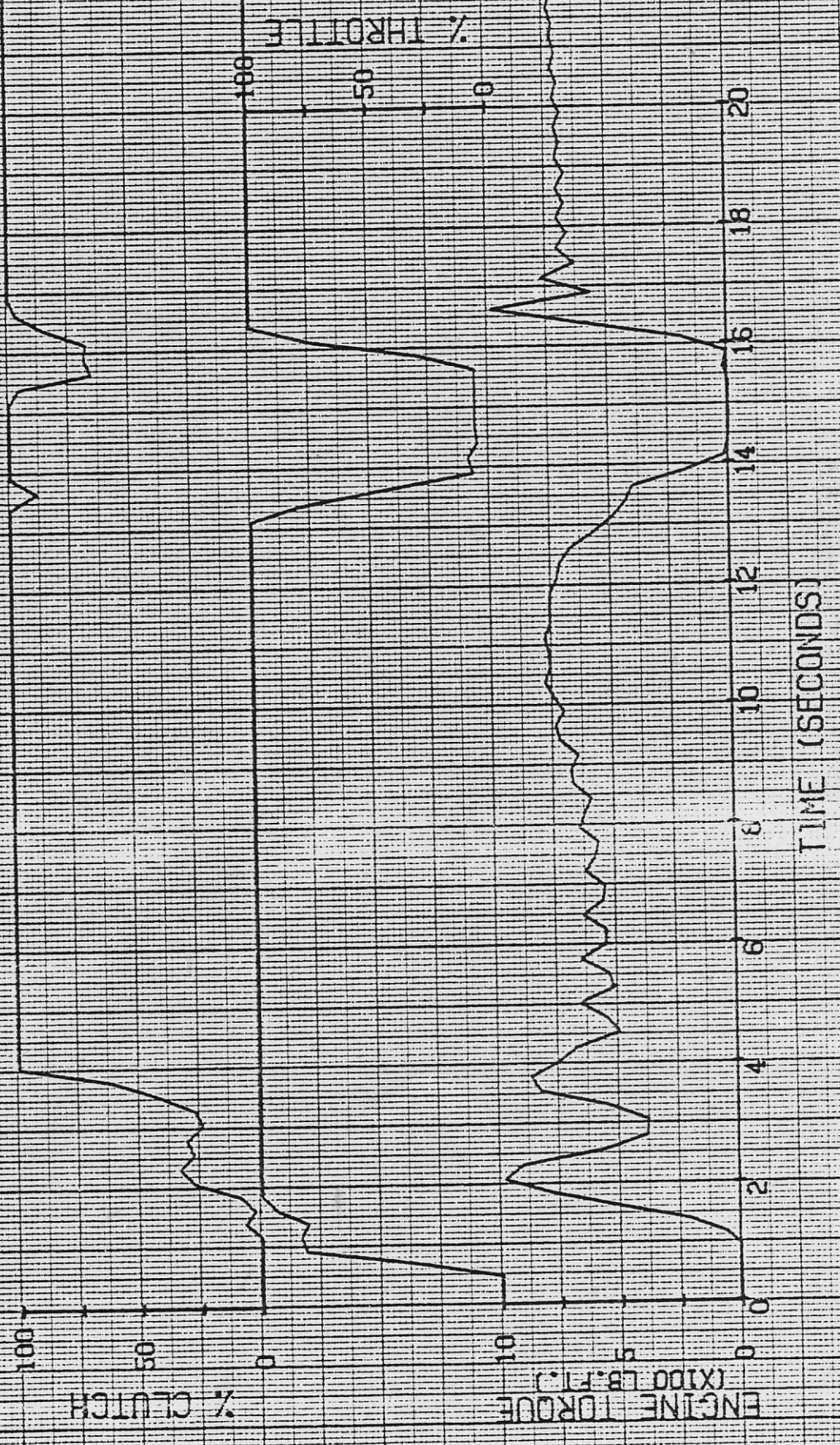
TIME (SECONDS)

DRIVEABILITY TESTS

UNIT, 38
AXLES, 3.70
12/04/79 CS-120438 SCHNEIDER
GRADE START / 2ND GEAR / WITH SHIFT

MAKE, FTLR
MODEL, 4000R
TIRES, 11R22.5

TRANSMISSION, 1107-2A
CW, 72.000



DRIVEABILITY TEST

UNIT, 38

AXLE, 3.70

12/03/79

MAKE, FTLR

MODEL, 400R

TIRES, 11R22.5

T1-120319 SCHNEIDER FLEET-ENGINE

THROTTLE INTERRUPT / 1400 RPM

TRANSMISSION, 1107-2A

CWT, 72,000



DRIVEABILITY TEST

TRANSMISSION: 1107-2A
CVT: 72.000

MODEL: 400R
TIRES: 11R22.5

UNIT: 38
AXLE: 3.70

11-120319 SCHNEIDER FLEET-ENGINE
THROTTLE INTERRUPT / 1400 RPM



INT WELD PRESS (IN HCl)

50

25

0

20

18

16

14

12

10

8

6

4

2

0

TIME (SECONDS)

% SMOKE OPACITY

RAIL PRESSURE (PSI)

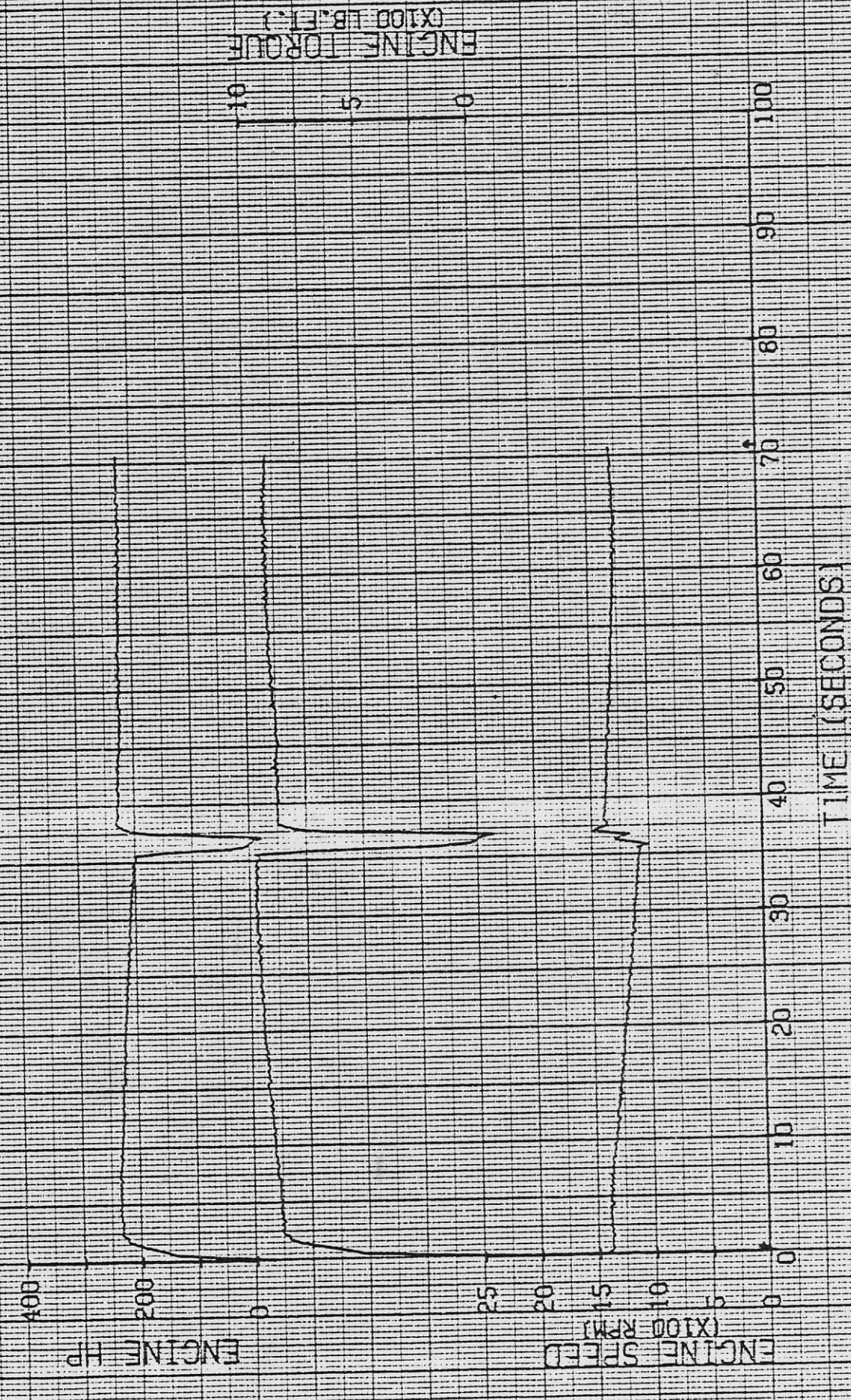
DRIVEABILITY TEST

UNIT: 36
AXLE: 3.70
12/03/79

MAKE: FTLR
MODE: 4DOOR
FIRES: 11R22.5

UR-120322 SCHNEIDER FLEET-ENGINE
UPGRADE POWER RECOVERY / 1400 RPM

TRANSMISSION: 1107-2R
CYM: 72.000



DRIVEABILITY TEST

TRANSMISSION, 1107-2A
CYM, 72.000

MODEL, 4DOOR
TYRES, 11R22.5

MAKE, FTLR

UNIT, 38
AXLE, 3.70

UR-120322 SCHNEIDER FLEET-ENGINE
UPGRADE POWER RECOVERY / 1400 RPM

% SMOKE OPACITY

100
50
0

RAIL PRESSURE (PSI)

200
100
0

INT MFD PRESS (IN HG)

50
25
0

100
90
80
70
60
50
40
30
20
10
0

TIME (SECONDS)

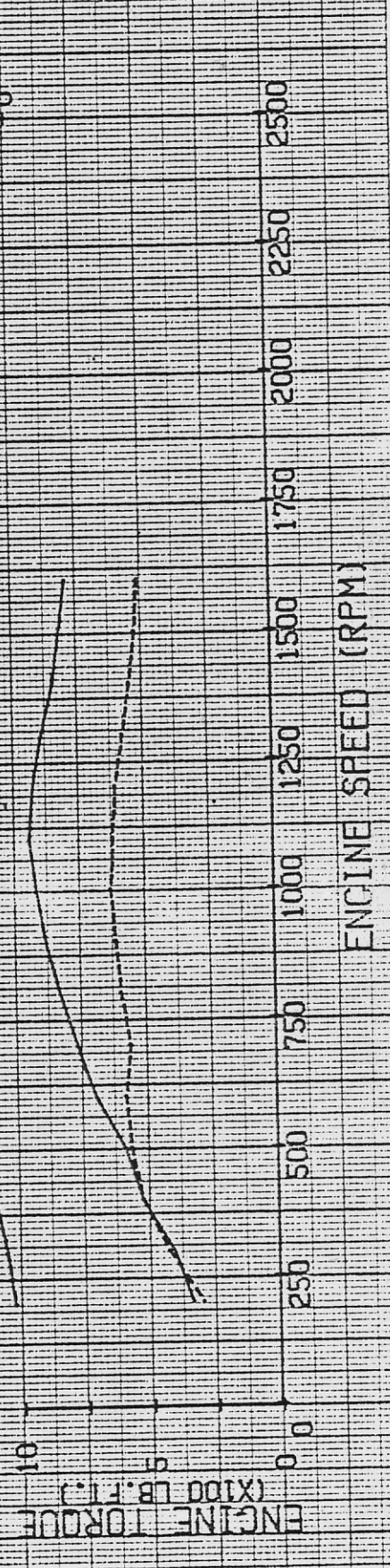


DRIVEABILITY TESTS

UNIT: 38
 AXLE: 3.70
 TRANSMISSION: 1107-2A
 CVT: 72.000

MAKE: FTLR MODEL: 4000R
 TIRES: 11R22.5

11/30/79 TC-113001 SCHNEIDER FLEET-ENGINE
 TORQUE CURVE 1600-200 RPM / WITH AIR
 12/04/79 TC-120430 SCHNEIDER FLEET-ENGINE
 TORQUE CURVE 1600-200 RPM / NO AIR



DRIVEABILITY TESTS

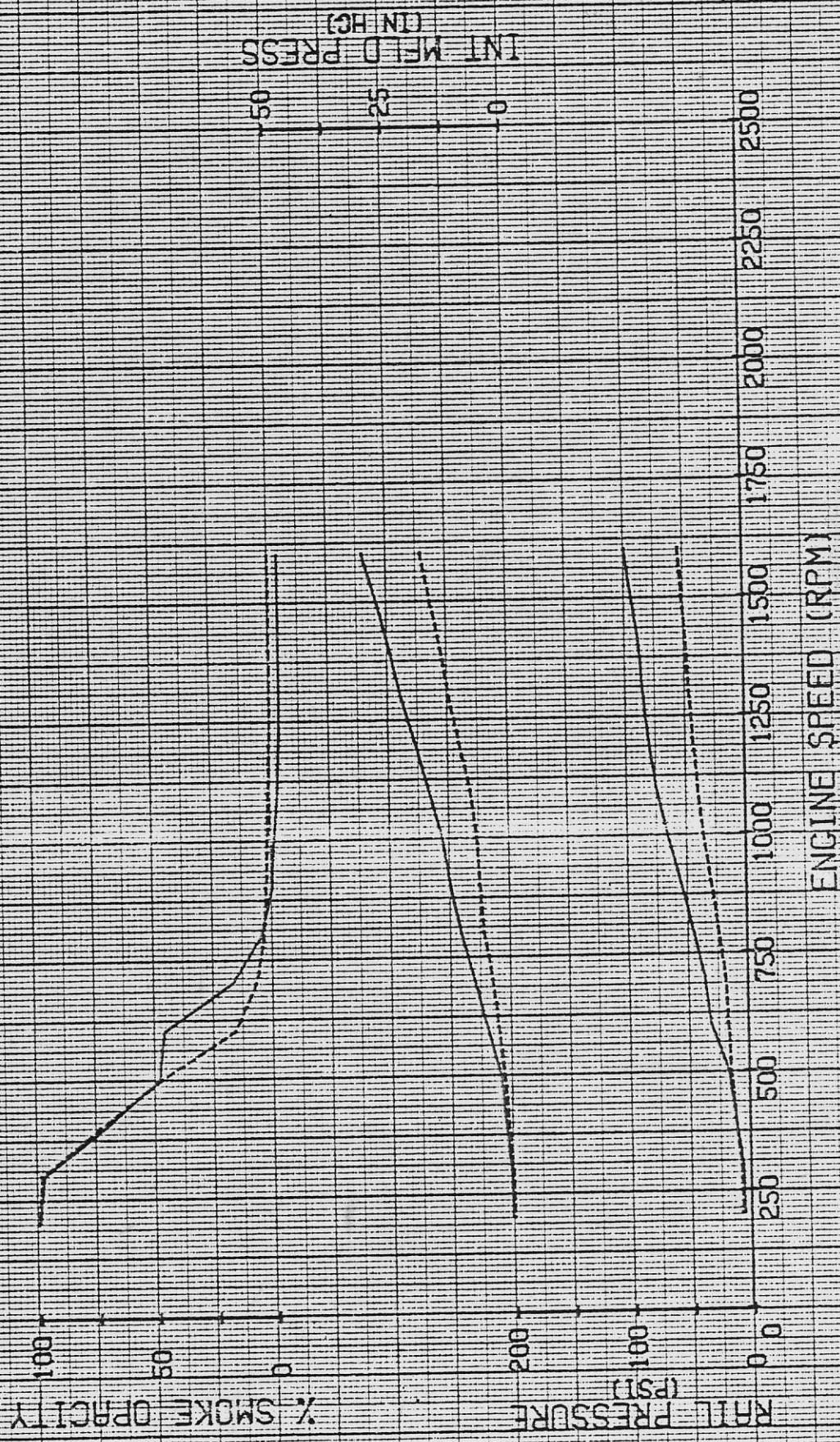
UNIT, 38
 AXLE, 3.70
 TRANSMISSION, 1107-2A
 CVW, 72,000

MAKE, FTLR
 MODEL, 400R

TYRES, 11R22.5

11/30/79 IC-113001 SCHNEIDER FLEET-ENGINE
 TORQUE CURVE 1600-200 RPM / WITH AIR

12/04/79 IC-120430 SCHNEIDER FLEET-ENGINE
 TORQUE CURVE 1600-200 RPM / NO AIR



INT. MFD. PRESS (IN HG)
 50
 25
 0

ENGINE SPEED (RPM)

% SMOKE OPACITY

RAIL PRESSURE (PSI)



Cummins Report - Supplementary Comments

INQUIRY:

TO: C C List DATE 4/22/80
FROM: M.Thommen 50231 CITY Columbus

C C LIST:
INFORMATION CENTER: 50120

RESPONSE:

TO: M. Thommen-50231 DATE 5/6/80
FROM: J.C.Walter CITY

SUBJECT: CUMMINS REPORT # 0721-80009
Driveability NTC-270 Fleet Engine
Rated 270 HP @ 1600 RPM

The attached CR recommends action on your part. Your comments are requested:

Do you concur with the findings of the report? YES/NO

Do you concur with the action recommended? YES/NO

When will action be implemented?

General Comments:

I suggest that arrangements be made to present the information in this report to Technical Sales and Service Engineering. Intention of such a presentation is to make them aware of the work being done to stay out of Driveability problems.

We should discuss.

An excellent report.

Author: Include in C C List above each person responsible for taking action recommended in report.
Send Inquiry copy to C C List omitting Information Centers.
Responder: Send response to C C List including Information Centers.
Hand written response is acceptable.

J.C.Walter

Name