

# FORMATION TESTING SERVICES

P.O.Box 518,  
Hays, Kansas 67601

Hays  
(913) 628-1115

Great Bend  
(316) 792-6187

Company: NATIONAL PET. RESERVES, INC.

Company Address: 260 N. ROCK RD. STE. 215  
Wichita, Ks. 67206

Company Representative: Dan DeBoer

Contractor: Red TIGER Rig #8

Mud 2.5K P.P.M. Cl<sup>-</sup> Hydrostatic \_\_\_\_\_ P.S.I./ft.

Mud Weight 9.1 Viscosity 64 Water Loss 15.6

Total Depth: 4410

Anchor Length: 77'

Top Packer Depth: 4328

Bottom Packer Depth: 4333

Surface Choke: 1" Bottom Choke: 3/4"

Drill Pipe Size: 5" X 0 Wt. Pipe Run: 510' I.D. \_\_\_\_\_

Collars Run: — I.D. —

Main Hole Size: 7 7/8

Internal Rec# 13753 Depth: 4339

Test# #1

Lease Name: Gill A #1

Location: Sec. 35 Twp. 16S Rng. 29W

County LANE St. KANSAS

Date: 10/17/87

Elevation: 2810 KB

Tester: R. Link

Blow: IFP) Weak Blow

SLIGHT BUILD in 15 min

1/2" in bucket

(FFP) Weak Blow

1/4" in bucket

Tool Open: 5:43 AM. Remarks: \_\_\_\_\_

NW/NW/NW

External Rec# 13752 Depth: 4406

## TEST RESULTS & RECOVERY

Interval Tested: 4333 - 4410

Zone Tested: Marathon - Altamont

Initial Hydrostatic Mud: 2179 P.S.I.

Initial Flow Pressure 78 To 87 P.S.I.

Initial Shut-In Pressure 349 P.S.I.

Final Flow Pressure 87 To 87 P.S.I.

Final Shut-In Pressure 319 P.S.I.

Final Hydrostatic Mud 2169 P.S.I.

Initial Flow Period 15 Min.

Initial Shut-In 15 Min.

Final Flow Period 15 Min.

Final Shut-In 15 Min.

20' Feet Total Fluid Recovery — Feet Gas In Pipe

Recovered 20' Feet Mud — %Gas — %Oil — %H<sub>2</sub>O 100% %Mud

Recovered \_\_\_\_\_ Feet \_\_\_\_\_ — %Gas \_\_\_\_\_ %Oil \_\_\_\_\_ %H<sub>2</sub>O \_\_\_\_\_ %Mud

Recovered \_\_\_\_\_ Feet \_\_\_\_\_ — %Gas \_\_\_\_\_ %Oil \_\_\_\_\_ %H<sub>2</sub>O \_\_\_\_\_ %Mud

Recovered \_\_\_\_\_ Feet \_\_\_\_\_ — %Gas \_\_\_\_\_ %Oil \_\_\_\_\_ %H<sub>2</sub>O \_\_\_\_\_ %Mud

Recovered \_\_\_\_\_ Feet \_\_\_\_\_ — %Gas \_\_\_\_\_ %Oil \_\_\_\_\_ %H<sub>2</sub>O \_\_\_\_\_ %Mud

Recovered Fluid Properties: \_\_\_\_\_ P.P.M. Cl<sup>-</sup> Gravity: \_\_\_\_\_ °A.P.I. Resistivity: \_\_\_\_\_ Ω/m<sup>2</sup> BHT \_\_\_\_\_ °F

Extra Equipment: Taps, Safety Joint

Price of Job: \$450.00

Approved By

Our Representative

Ticket No. 1458

Formation Testing Services Inc. shall not be liable for damages of any kind to the property or personnel of the one for whom a test is made or for any loss suffered or sustained directly or indirectly through the use of its equipment, of its statements or opinion concerning the results of any test. Tools lost or damaged in the hole shall be paid at cost by the party for whom the test is made.

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Company Address: 260 N. ROCK RD, STE. 215  
WICHITA, KS. 67206

Company Representative: DAN DEBOER

Contractor: RED TIGER Rig #8

Mud 2.5 K P.P.M. Cl<sup>-</sup> Hydrostatic \_\_\_\_\_ P.S.I./ft.

Mud Weight 8.8 Viscosity \_\_\_\_\_ Water Loss 10.0

Total Depth: 4560

Anchor Length: 100'

Top Packer Depth: 4455

Bottom Packer Depth: 4460

Surface Choke: 1 Bottom Choke: 3/4

Drill Pipe Size: 5" X 0 Wt. Pipe Run: 510' I.D. \_\_\_\_\_

Collars Run: \_\_\_\_\_ I.D. \_\_\_\_\_

Main Hole Size: 7 7/8

Internal Rec# 13753 Depth: 4556

Test# #2

Lease Name: Gill A #1

Location: Sec. 35 Twp. 16S Rng. 29W

County: LANE St. KS.

Date: 10/18/87

Elevation: 2810 KB

Tester: R. LINK

Blow: (IFP) WEAK BLOW 3"

IN BUCKET IN 30 min &

BUILDING

(FFP) FAIR BLOW 6 1/2"

IN 60 min - BUILDING

Tool Open: 9:40 P.M. Remarks: \_\_\_\_\_

NW/NW/NW

External Rec# 13752 Depth: 4465

## TEST RESULTS & RECOVERY

Interval Tested: 4460 - 4560

Zone Tested: FT. SCOTT

Initial Hydrostatic Mud: 2119 P.S.I.

Initial Flow Pressure 39 To 39 P.S.I.

Initial Shut-In Pressure 1069 P.S.I.

Final Flow Pressure 58 To 68 P.S.I.

Final Shut-In Pressure 886 P.S.I.

Final Hydrostatic Mud 2089 P.S.I.

Initial Flow Period 30 Min.

Initial Shut-In 30 Min.

Final Flow Period 60 Min.

Final Shut-In 45 Min.

120' Feet Total Fluid Recovery \_\_\_\_\_ Feet Gas In Pipe

Recovered 90' Feet HDCM \_\_\_\_\_ %Gas \_\_\_\_\_ %Oil \_\_\_\_\_ %H<sub>2</sub>O \_\_\_\_\_ %Mud

Recovered 30 Feet FREE OIL \_\_\_\_\_ %Gas 100% %Oil \_\_\_\_\_ %H<sub>2</sub>O 100% %Mud

Recovered \_\_\_\_\_ Feet \_\_\_\_\_ %Gas \_\_\_\_\_ %Oil \_\_\_\_\_ %H<sub>2</sub>O \_\_\_\_\_ %Mud

Recovered \_\_\_\_\_ Feet \_\_\_\_\_ %Gas \_\_\_\_\_ %Oil \_\_\_\_\_ %H<sub>2</sub>O \_\_\_\_\_ %Mud

Recovered \_\_\_\_\_ Feet \_\_\_\_\_ %Gas \_\_\_\_\_ %Oil \_\_\_\_\_ %H<sub>2</sub>O \_\_\_\_\_ %Mud

Recovered \_\_\_\_\_ Feet \_\_\_\_\_ %Gas \_\_\_\_\_ %Oil \_\_\_\_\_ %H<sub>2</sub>O \_\_\_\_\_ %Mud

Recovered Fluid Properties: \_\_\_\_\_ P.P.M. Cl<sup>-</sup> Gravity: 37 °A.P.I. Resistivity: \_\_\_\_\_ Ω/m<sup>2</sup> BHT \_\_\_\_\_ °F

Extra Equipment: SAFETY JT; JARS

Price of Job: \$450.00

Approved By: Randy Link

Our Representative

Ticket No 1466

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Company: NATIONAL PET. RESERVES, INC.

Company Address: 260 N. ROCK RD. STE. 215  
WICHITA, KS. 67206

Company Representative: DAN DEBOER

Contractor: RED TIGER Rig #8

Mud: 25K P.P.M. Cl<sup>-</sup> Hydrostatic \_\_\_\_\_ P.S.I./ft.

Mud Weight 8.8 Viscosity 42 Water Loss 9.2

Total Depth: 4622

Anchor Length: 115'

Top Packer Depth: 4455

Bottom Packer Depth: 4460

Surface Choke: 1" Bottom Choke: 3/4"

Drill Pipe Size: 5"X0 Wt. Pipe Run: 510 I.D. \_\_\_\_\_

Collars Run: \_\_\_\_\_ I.D. \_\_\_\_\_

Main Hole Size: 7 7/8"

Internal Rec# 13753 Depth: 4566

#2023      4618

#3

Test# \_\_\_\_\_

Lease Name: GILL A#1

Location: Sec. 35 Twp. 16S Rng. 29W

County LANE St. KS

Date: 10/19/87

Elevation: 2810 KB

Tester: R. LINK

Blow: IFP: WEAK BLOW 2"  
IN BUCKET IN 30 min

FFP: WEAK BLOW 4" IN  
BUCKET IN 60 min.

Tool Open: 11:57 P.M. Remarks: \_\_\_\_\_

NW/NW/NW

External Rec# 13752 Depth: 4464

## TEST RESULTS & RECOVERY

Interval Tested: 4460-4575

Zone Tested: FT. SCOTT

Initial Hydrostatic Mud: 2238 P.S.I.

Initial Flow Pressure 78 To 78 P.S.I.

Initial Shut-In Pressure 1194 P.S.I.

Final Flow Pressure 116 To 116 P.S.I.

Final Shut-In Pressure 1107 P.S.I.

Final Hydrostatic Mud 2089 P.S.I.

Initial Flow Period 30 Min.

Initial Shut-In 60 Min.

Final Flow Period 60 Min.

Final Shut-In 90 Min.

110' Feet Total Fluid Recovery

Feet Gas In Pipe

Recovered 90' Feet HOCM \_\_\_\_\_

Recovered 20' Feet FREE OIL \_\_\_\_\_

Recovered \_\_\_\_\_ Feet \_\_\_\_\_

Recovered \_\_\_\_\_ Feet \_\_\_\_\_

Recovered \_\_\_\_\_ Feet \_\_\_\_\_

Recovered \_\_\_\_\_ Feet \_\_\_\_\_

Recovered Fluid Properties: \_\_\_\_\_ P.P.M. Cl<sup>-</sup> Gravity 37 °A.P.I.

%Gas 15 %Oil \_\_\_\_\_ %H<sub>2</sub>O 85 %Mud

%Gas 100% %Oil \_\_\_\_\_ %H<sub>2</sub>O \_\_\_\_\_ %Mud

%Gas \_\_\_\_\_ %Oil \_\_\_\_\_ %H<sub>2</sub>O \_\_\_\_\_ %Mud

%Gas \_\_\_\_\_ %Oil \_\_\_\_\_ %H<sub>2</sub>O \_\_\_\_\_ %Mud

%Gas \_\_\_\_\_ %Oil \_\_\_\_\_ %H<sub>2</sub>O \_\_\_\_\_ %Mud

Resistivity: \_\_\_\_\_ Ω/m<sup>2</sup> BHT \_\_\_\_\_ °F

Extra Equipment: EXTRA PACKER, JARS, SAFETY JT.

Price of Job: \$600.00

Approved By

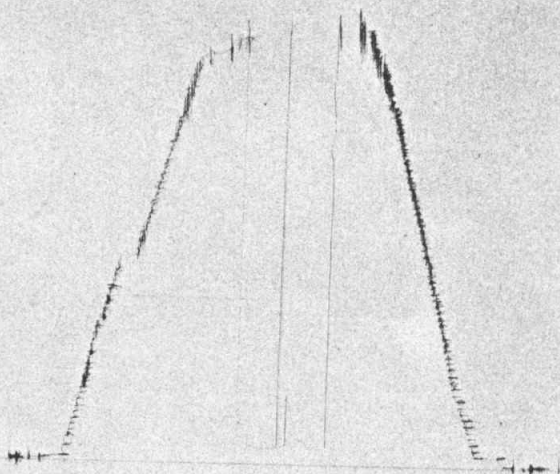
Randy Link

Our Representative

Ticket No 1481 THANK

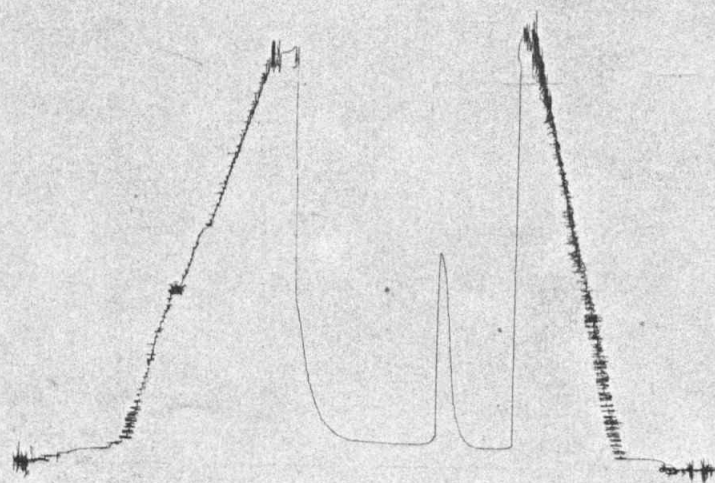
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13753/1458/1



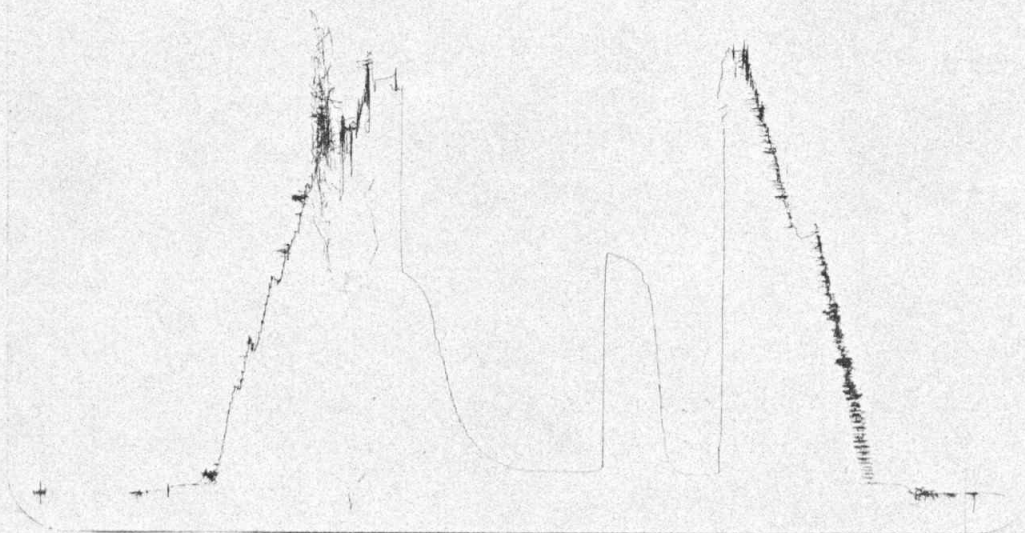
D.S.T. #1

13753/1459/2



D.S.T. #2

13753/1481/3



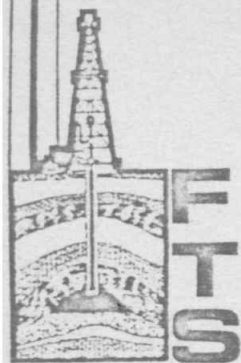
D.S.T. #3

2023/1481/3

BOTTOM RECORDER



Complete Field Service and Chart Evaluation



**FORMATION TESTING  
SERVICES INC.**

**FORMATION TEST REPORT**

**NATIONAL PETROLEUM RESERVES**

**Gill A - 1**

P.O.Box 518  
Hays, Kans. 67601

Hays-Bus. (913) 628-1115

FTS

FORMATION TESTING SERVICES, INC.  
DRILL-STEM TEST REPORT

COMPANY- NATIONAL PET

WELL- GILL A-1

COUNTY- LANE

STATE- KANSAS

COMPANY- NATIONAL PET RES

WELL- GILL A-1

COUNTY- LANE

STATE- KANSAS

LOCATION- NW-NW-NW

SEC:35 TYP:16S RGE:29W

PERMANENT DATUM:GL

ELEVATIONS

ELEV OF PERM DATUM:

KB:2810

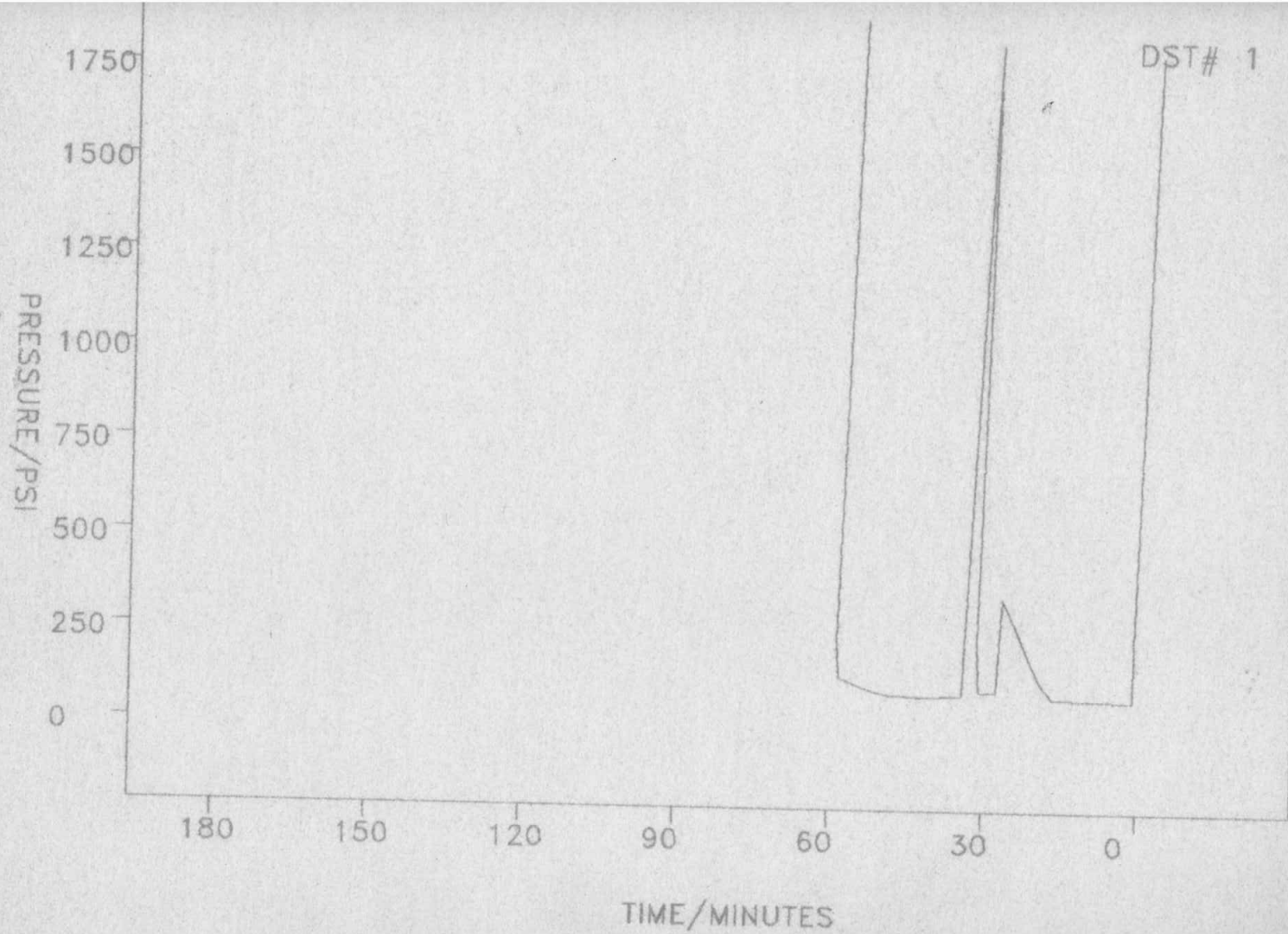
INTERVALS TESTED

DF:

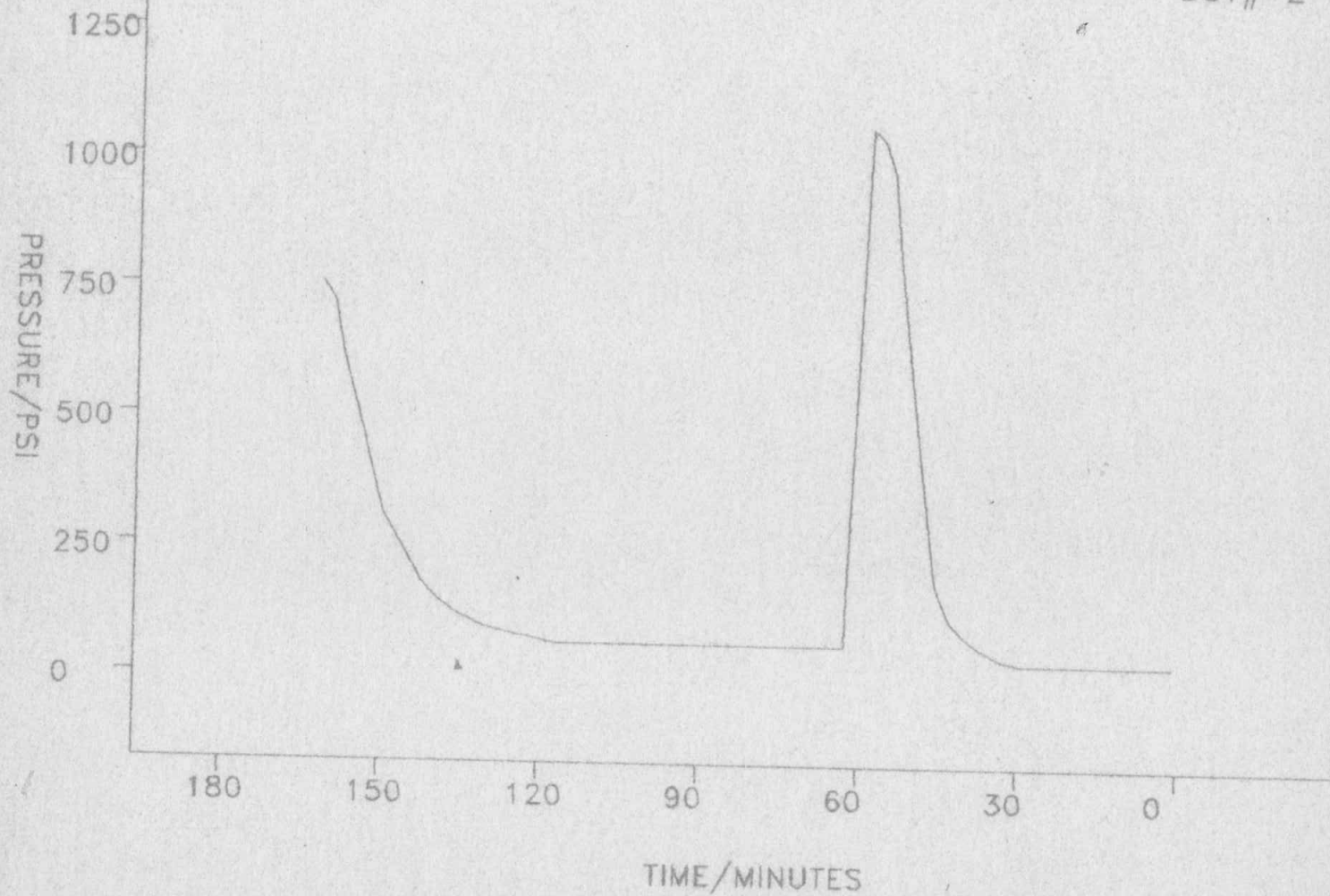
MEASURED FROM:KB

GL:

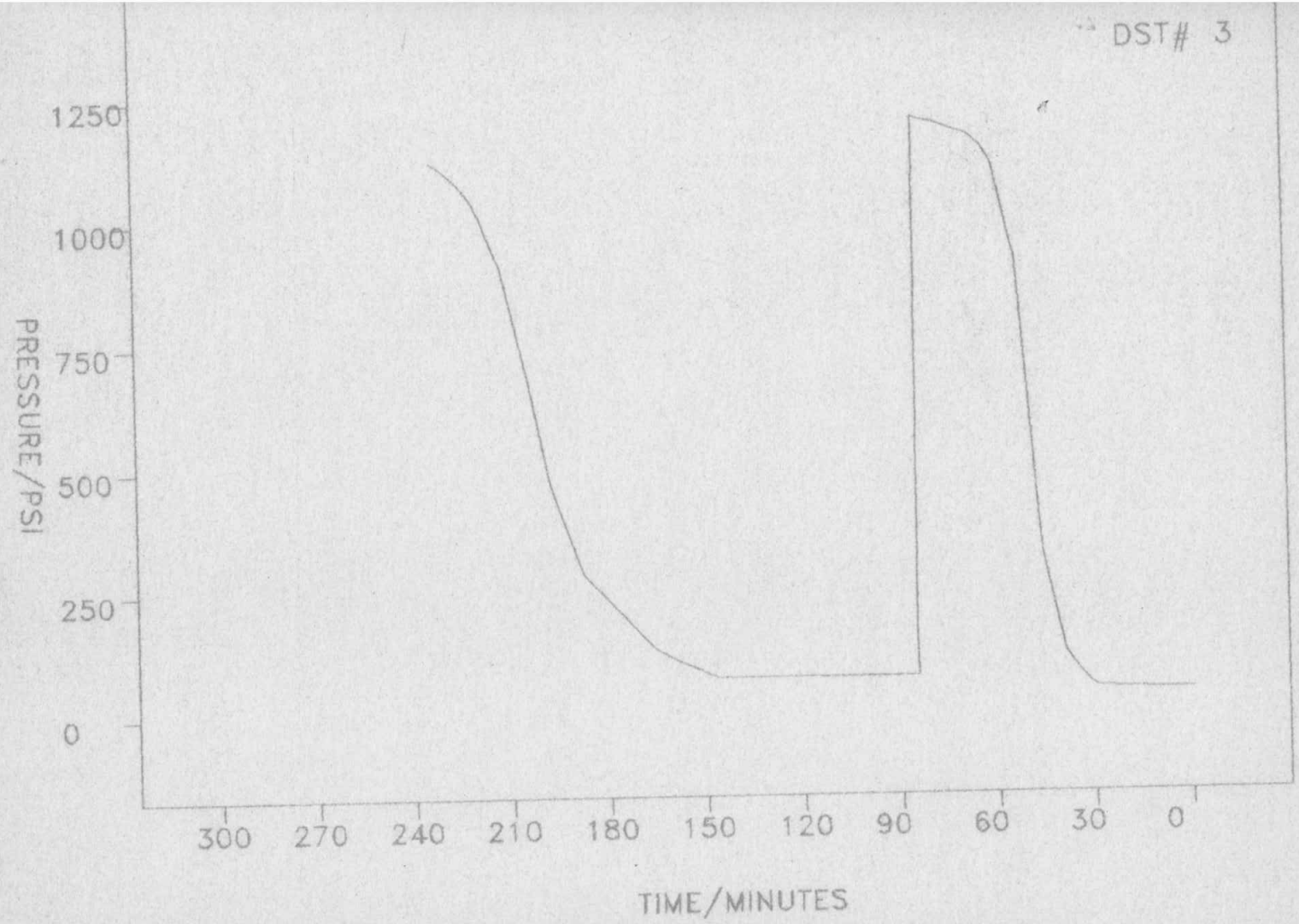
| TOTAL DST'S:3     | D.S.T.#1  |     | D.S.T.#2  |     | D.S.T.#3  |     | D.S.T.# |
|-------------------|-----------|-----|-----------|-----|-----------|-----|---------|
| DATE              | 10/17/87  |     | 10/18/87  |     | 10/19/87  |     |         |
| ZONE TESTED       | MARMATON  |     | FT. SCOT  |     | FT. SCOT  |     |         |
| INTERVAL          | 4333-4410 |     | 4460-4560 |     | 4460-4575 |     |         |
| ANCHOR LENGTH     | 77        | FT  | 100       | FT  | 115       | FT  | FT      |
| INITIAL HYDRO.    | 2179      | PSI | 2119      | PSI | 2238      | PSI | PSI     |
| INIT. FLOW PRESS. | 78-87     | PSI | 39-39     | PSI | 78-78     | PSI | PSI     |
| INIT. SHUT-IN     | 349       | PSI | 1069      | PSI | 1194      | PSI | PSI     |
| FINAL FLOW PRESS. | 87-87     | PSI | 58-68     | PSI | 116-116   | PSI | PSI     |
| FINAL SHUT-IN     | 319       | PSI | 886       | PSI | 1107      | PSI | PSI     |
| FINAL HYDRO.      | 2169      | PSI | 2089      | PSI | 2089      | PSI | PSI     |
| TOTAL FLUID REC.  | 20        | FT  | 120       | FT  | 110       | FT  | FT      |
| GAS               | 0         | BBL | 0         | BBL | 0         | BBL | BBL     |
| OIL               | 0         | BBL | 1.237     | BBL | .588      | BBL | BBL     |
| WATER             | 0         | BBL | 0         | BBL | 0         | BBL | BBL     |
| MUD               | .351      | BBL | .868      | BBL | 1.342     | BBL | BBL     |
| TOTAL FLUID REC.  | .351      | BBL | 2.105     | BBL | 1.93      | BBL | BBL     |



DST# 2



DST# 3



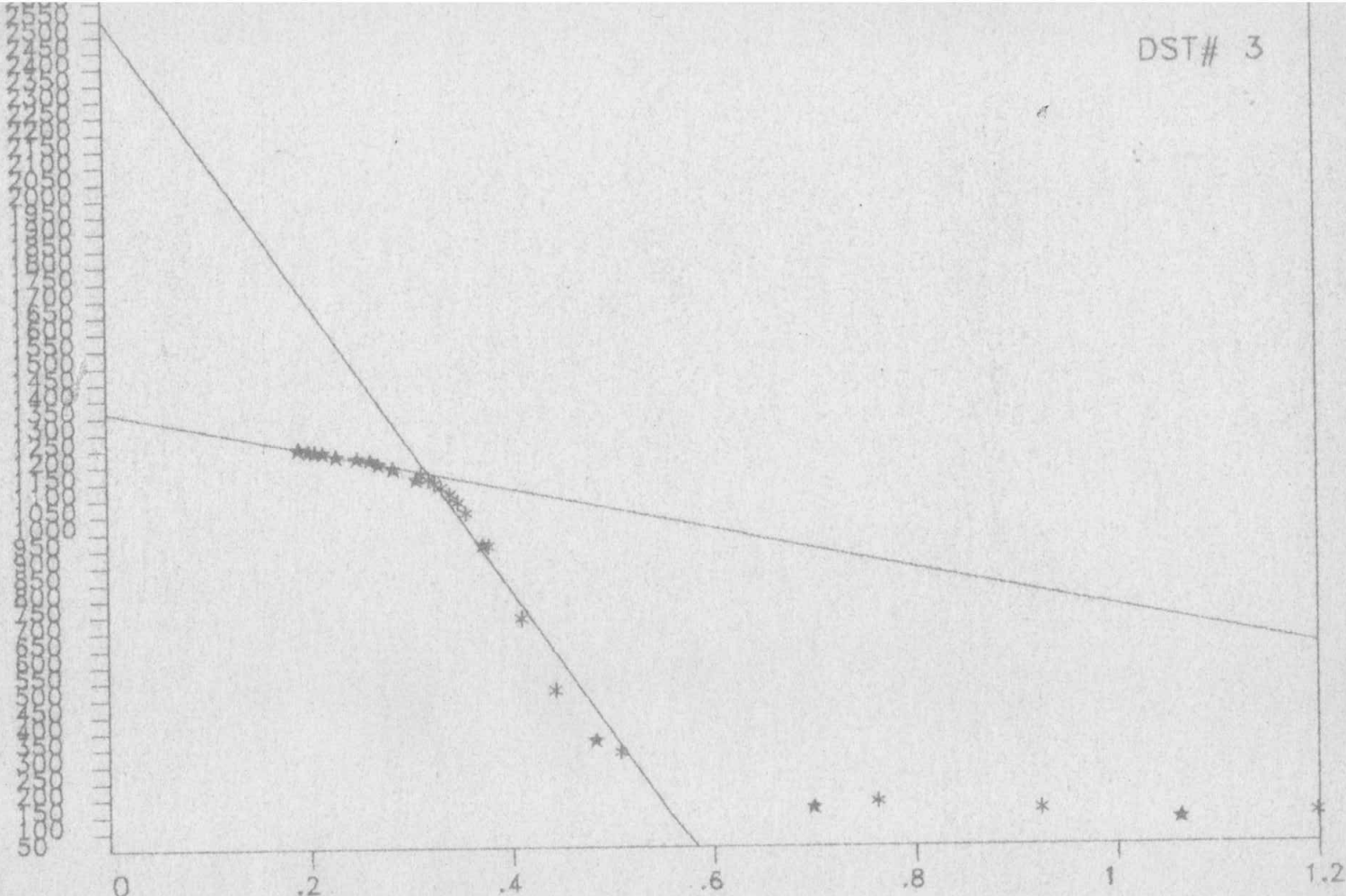
DST# 3

PRESSURE/PSI

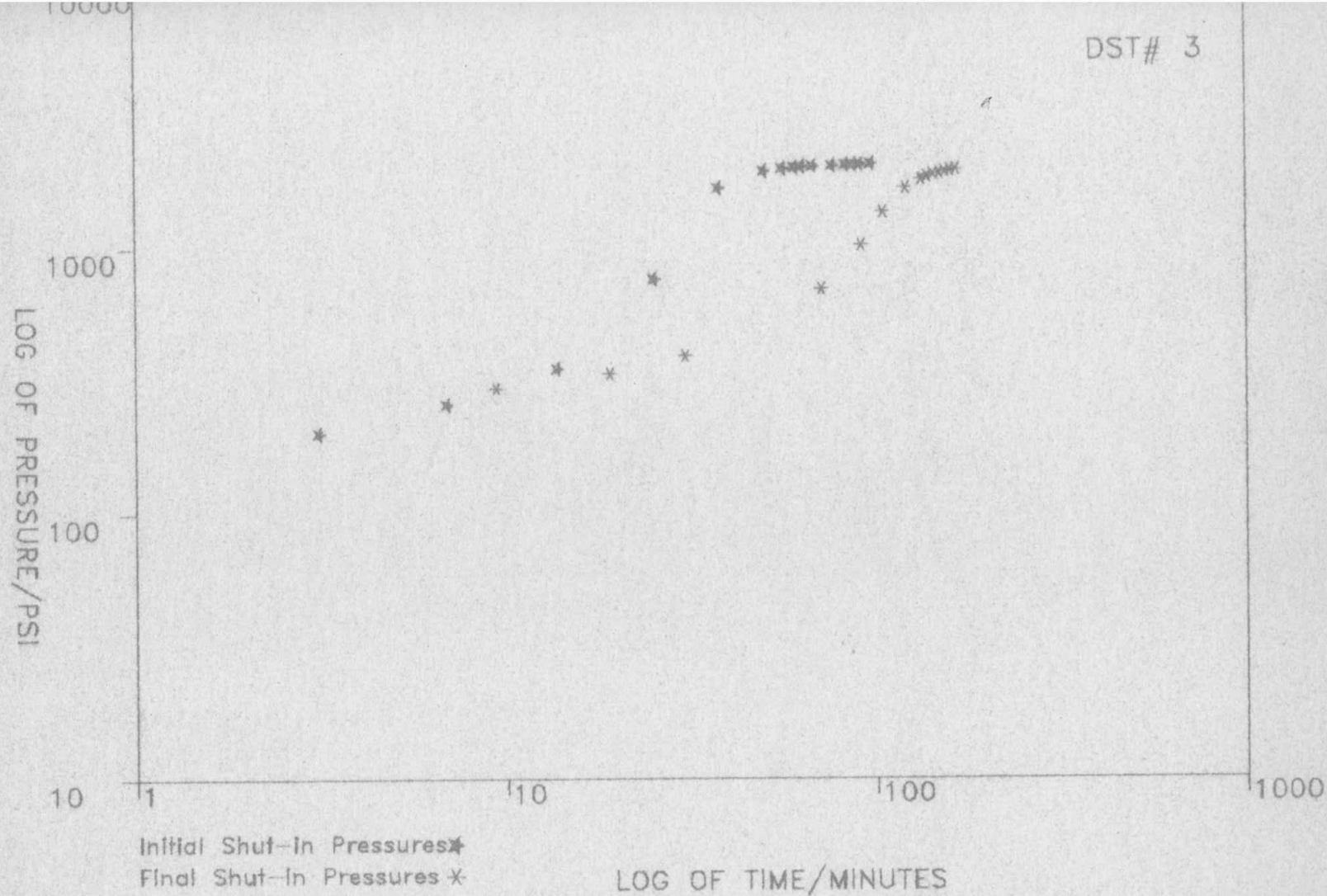
0 .2 .4 .6 .8 1 1.2

Initial Shut-in Pressures \*  
Final Shut-in Pressures \*

LOG (T+DT)/DT



DST# 3



# DRILL STEM TEST INFORMATION

## RECORDED INFORMATION

|                               | DST #1      | DST #2      | DST #3      | DST # |
|-------------------------------|-------------|-------------|-------------|-------|
| DATE TESTED                   | 10/17/87    | 10/18/87    | 10/19/87    |       |
| ZONE TESTED                   | MARMATON    | FT. SCOT    | FT. SCOT    |       |
| INTERVAL (FT)                 | 4333-4410   | 4460-4560   | 4460-4575   |       |
| ANCHOR LENGTH (FT)            | 77          | 100         | 115         |       |
| INITIAL HYDRO (PSI)           | 2179        | 2119        | 2238        |       |
| INIT. FLOW PRES. (PSI)        | 78-87       | 39-39       | 78-78       |       |
| INIT. SHUT-IN (PSI)           | 349         | 1069        | 1194        |       |
| FINAL FLOW PRES. (PSI)        | 87-87       | 58-68       | 116-116     |       |
| FINAL SHUT-IN (PSI)           | 319         | 886         | 1107        |       |
| FINAL HYDRO. (PSI)            | 2169        | 2089        | 2089        |       |
| TOTAL FLUID FT. (PSI)         | 20          | 120         | 110         |       |
| GAS (BBL)                     | 0           | 0           | 0           |       |
| OIL (BBL)                     | 0           | 1.237       | .588        |       |
| WATER (BBL)                   | 0           | 0           | 0           |       |
| MUD (BBL)                     | .351        | .868        | 1.342       |       |
| TOTAL FLUID (BBL)             | .351        | 2.105       | 1.93        |       |
| PIPE CAPACITY (BBL/FT)        | .0178       | .0178       | .0178       |       |
| WEIGHT PIPE CAPACITY (BBL/FT) | .0175       | .0175       | .0175       |       |
| COLAR CAPACITY (BBL/FT)       | 0           | 0           | 0           |       |
| EXTRA EQUIPMENT               | JRS SFTY JT | JRS SFTY JT | STRD JRS JT |       |
| TESTER                        | R LINK      | R LINK      | R LINK      |       |
| COMPANY REP.                  | D DEBOER    | D DEBOER    | D DEBOER    |       |
| HOLE SIZE (IN.)               | 7.875       | 7.875       | 7.875       |       |
| ZONE POROSITY (%)             | 12(Default) | 12(Default) | 12(Default) |       |
| EFFECTIVE FEET PAY            | 4(Default)  | 4(Default)  | 4(Default)  |       |
| GRAVITY (API)                 | 35(Default) | 37          | 37          |       |

|                                 |             |             |             |
|---------------------------------|-------------|-------------|-------------|
| CHLORIDES-RESERVOIR FLUID (PPM) | 113         | 115         | 115         |
| FORMATION TEMP. (F)             | 15-15-15-15 | 30-30-60-45 | 30-60-60-90 |
| TIME PERIODS (MINUTES)          |             |             |             |
| TYPE OF DRIVE                   |             |             | GAS         |
| AVERAGE WATER SATURATION (%)    |             |             | 35          |
| WATER VISCOSITY (CP)            |             |             | .75         |
| ABANDONMENT PRESSURE (PSI)      |             |             | 50          |
| ECONOMIC LIMIT (BOPM)           |             |             | 90          |

### PRODUCTION CALCULATIONS

|                              |          |
|------------------------------|----------|
| GAS/OIL RATIO                | 135      |
| FORMATION VOL FACTOR         | 1.0783   |
| VIS OF FLUID-RESERVOIR (CP)  | 2.3181   |
| BUBBLE POINT (PSI)           | 646.4175 |
| EXTRAP. PRES. 1ST SI (PSI)   | 1314.152 |
| EXTRAP. PRES. 2ND SI (PSI)   | 2497.893 |
| SLOPE OF 2ND SI (PSI/LC)     | 4284.356 |
| TRANSMISS. LIQUID (md-ft/cp) | 1.2565   |
| FLOW CAP (md-ft)             | 2.9129   |
| PRODUCT. INDEX (BOPD/PSI)    | .0007    |
| POTENTIO. SURFACE (ft ASL)   | 4036.614 |
| PERMEABILITY (md)            | .7282    |
| RADIUS OF INVEST. (FT)       | 15.2776  |
| FLOW RATE GAS (MCF)          | 0        |
| FLOW RATE TOTAL FLUID (BPD)  | 30.7032  |
| FLOW RATE OIL (BPD)          | 30.7032  |
| ESTIMATED DAMAGE RATIO       | .1035    |
| POTENTIAL/DAMAGE REM. (BPD)  | 30.7032  |

### RESERVOIR CALCULATIONS

|                     |         |
|---------------------|---------|
| RECOVERY FACTOR (%) | 13.1359 |
| ANNUAL DECLINE (%)  | 81.5713 |
| WELL LIFE (YEARS)   | 1.3751  |

NO. ACRES NOT AFFECTED  
ECONOMIC RESERVES (BBL)

19.9977  
5896.874

PROJECTED PRODUCTION SCHEDULE FOR DST#3

PROJECTION BEGINS: 12/1/

| YEAR | START<br>RATE<br>BBL/MONTH | FINAL<br>RATE<br>BBL/MONTH | PRODUCTION (BBLS)<br>YEAR | CUM      |
|------|----------------------------|----------------------------|---------------------------|----------|
| 1987 | 921.096                    | 800.006                    | 859.130                   | 859.130  |
| 1988 | 800.006                    | 147.420                    | 4630.093                  | 5489.223 |
| 1989 | 147.420                    | 90.000                     | 407.393                   | 5896.616 |

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REMARKS AND CONCLUSIONS

Pressure chart analyses used in this evaluation have been made using equations applicable to liquid recovery tests. Static bottom-hole extrapolations are based on the Horner method with a Least-Squares line fitting algorithm applied for final pressure extrapolation. Fluid property equations from the California Research Corporation and from Beal's Charts for Fluid Viscosities were used to calculate the formation volume factors.

Reserve calculations are based upon log derived information and drainage area. All calculations are volumetric and depletion and production schedules are based upon exponential decline curve expectations.

#### D.S.T. #1

- 1) Mechanically and mathematically valid test.
- 2) Non-productive extremely tight formation.

#### D.S.T. #2

- 1) Mechanically and mathematically valid test.
- 2) Horner plots have not been made due to the high slopes of the shut-in curves. Sufficient break over has not occurred to allow analysis.

#### D.S.T. #3

- 1) Liquid flow rates are based upon fluid flow during both flow periods for a total flow time of 90 minutes.
- 2) Sufficient break-over has not occurred on the final shut

pressure on the first shut-in indicate a reservoir pressure of 1341 p.s.i.

- 3) Horner plots indicate the well to be in radial flow during the interval of the test. Significant storage domination is indicated, which is reflected in the poor fluid recovery and low permeability.
- 4) Reservoir analysis for potential production have been made assuming 12% porosity and 4 feet of pay with 20 acres of drainage. Volumetric calculations made with these assumptions indicate of reservoir 5900 potential barrels of oil.