

# CHENEY TESTING COMPANY, INC.

P. O. Box 367

HILL CITY, KANSAS 67642

## DRILL-STEM TEST DATA

|                                                        |                               |             |                      |
|--------------------------------------------------------|-------------------------------|-------------|----------------------|
| Company                                                | Abercrombie Drilling Inc.     | Test No.    | 1                    |
| Well Name & Number                                     | Munsell #3                    | Zone Tested | Lansing/Ks. City 70' |
| Company Address                                        | 801 Union Center Wichita, Ks. | Date        | 2/18/85              |
| Company Rep.                                           | Raul F. Brito                 | Tester      | Rod Steinbrink       |
| Contractor                                             | Abercrombie Drilling Company  | Elevation   | 2806                 |
| Location: Sec. 3 Twp. 7s Rge. 29w Co. Lane State Ks. / | Est. Feet of Pay 4            |             |                      |

Recorder No. 13370 Type AK-1 Range 3900 PSI

Recorder Depth 4043 Clock # 25826

(A) Initial Hydrostatic Mud 1988 PSI

(B) First Initial Flow Pressure 29 PSI

(C) First Final Flow Pressure 39 PSI

(D) Initial Shut-in Pressure 1115 PSI

(E) Second Initial Flow Pressure 59 PSI

(F) Second Final Flow Pressure 79 PSI

(G) Final Shut-in Pressure 1086 PSI

(H) Final Hydrostatic Mud 1949 PSI

Temperature 110

Mud Weight 9.2 Viscosity 51

Fluid Loss 11.2

Interval Tested 4038-4060

Anchor Length 22

Top Packer Depth 4033-4038

Bottom Packer Depth 4060

Total Depth 4085

Drill Pipe Size 4 1/2 XH

Wt. Pipe I. D. 2.7 Ft. Run 640

Recovery-Total Feet 150

Recovered 150 Feet Of Water mud: 30% mud & 70% water.

Recovered Feet Of

Recovered Feet Of

Recovered Feet Of

Recovered Feet Of

Recovered Feet Of

Recovered Feet Of

Extra Equipment Straddle, Extra Packer Price of Job \$1100.00

Recorder No. 11020 Type AK-1 Range 3900 PSI

Recorder Depth 4049 Clock # 27807

Tool Open Before I.S.I. 30 Mins.

Initial Shut-in 45 Mins.

Flow Period 60 Mins.

Final Shut-in 45 Mins.

Top Choke Size 1" Hole Size 7 7/8"

Bottom Choke Size 3/4" Rubber Size 6 3/4"

Tool Open @ 12:23 AM

Blow Remarks 1st open: Fair to medium

blow, slowly built ot 5 inches through-

out. ISI: Bled off blow, no return.

2nd open: Surface return after 3 minutes

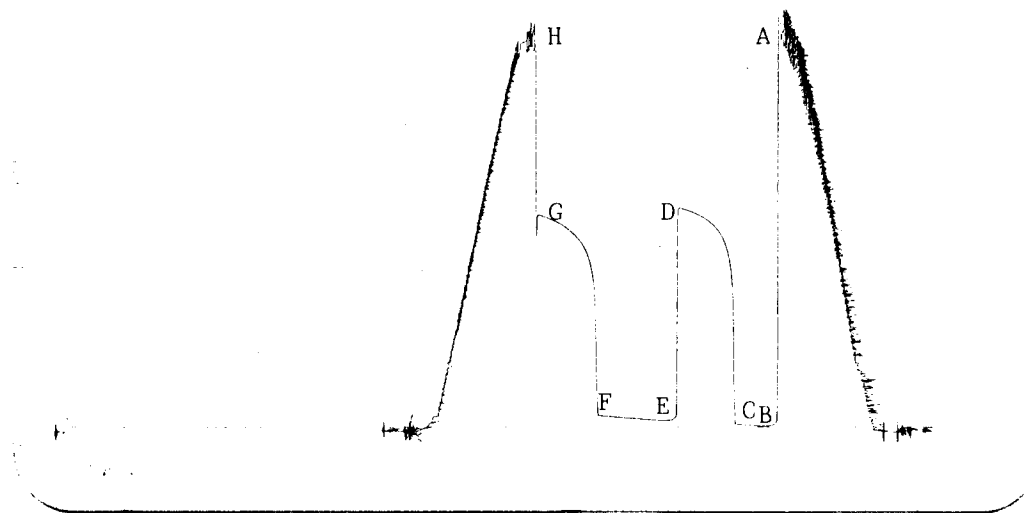
stayed steady throughout.

Well Chlorides; 6,000 ppm.

Recovery Chlorides; 65,000 ppm.

Resistivity .154 ohms @ 65°F.

DST #1  
13370 X



This is an actual photograph of recorder chart.

| POINT                                  | PRESSURE      |                |
|----------------------------------------|---------------|----------------|
|                                        | Field Reading | Office Reading |
| (A) Initial Hydrostatic Mud .....      | 1988          | PSI            |
| (B) First Initial Flow Pressure .....  | 29            | PSI            |
| (C) First Final Flow Pressure .....    | 39            | PSI            |
| (D) Initial Closed-in Pressure .....   | 1115          | PSI            |
| (E) Second Initial Flow Pressure ..... | 59            | PSI            |
| (F) Second Final Flow Pressure .....   | 79            | PSI            |
| (G) Final Closed-in Pressure .....     | 1086          | PSI            |
| (H) Final Hydrostatic Mud .....        | 1949          | PSI            |

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## DRILL-STEM TEST DATA

|                                                      |                               |             |                      |
|------------------------------------------------------|-------------------------------|-------------|----------------------|
| Company                                              | Abercrombie Drilling Inc.     | Test No.    | 2                    |
| Well Name & Number                                   | Munsell #3                    | Zone Tested | Lansing Ks City 160' |
| Company Address                                      | 801 Union Center Wichita, Ks. | Date        | 2/18/85              |
| Company Rep.                                         | Raul F. Brito                 | Tester      | Rod Steinbrink       |
| Contractor                                           | Abercrombie Drilling Company  | Elevation   | 2806 KB              |
| Location: Sec. 3 Twp. 7s Rge. 29w Co. Lane State Ks. | Est. Feet of Pay 5            |             |                      |

Recorder No. 13370 Type AK-1 Range 3900 PSI

Recorder Depth 4166 Clock # 25826

(A) Initial Hydrostatic Mud 2092 PSI

(B) First Initial Flow Pressure 29 PSI

(C) First Final Flow Pressure 29 PSI

(D) Initial Shut-in Pressure 79 PSI

(E) Second Initial Flow Pressure 29 PSI

(F) Second Final Flow Pressure 29 PSI

(G) Final Shut-in Pressure 39 PSI

(H) Final Hydrostatic Mud 2062 PSI

Temperature 111

Mud Weight 9.3 Viscosity 60

Fluid Loss 10.4

Interval Tested 4148-4174

Anchor Length 26

Top Packer Depth 4143

Bottom Packer Depth 4148

Total Depth 4174

Drill Pipe Size 4½ XH

Wt. Pipe I. D. 2.7 Ft. Run 640

Recovery-Total Feet 15

Recovered 15 Feet Of Mud with oil spots: 1% oil & 99% mud.

Recovered Feet Of

Recovered Feet Of

Recovered Feet Of

Recovered Feet Of

Recovered Feet Of

Extra Equipment Price of Job \$675.00

Recorder No. 13372 Type AK-1 Range 3975 PSI

Recorder Depth 4169 Clock # 25831

Tool Open Before I.S.I. 30 Mins.

Initial Shut-in 45 Mins.

Flow Period 60 Mins.

Final Shut-in 45 Mins.

Top Choke Size 1" Hole Size 7 7/8"

Bottom Choke Size 3/4" Rubber Size 6 3/4"

Tool Open @ 7:44 PM

Blow Remarks 1st open; Weak blow, increased to 3/4 inch & stayed steady. ISI: 3/4

inch blow, died on its own in 41 minutes.

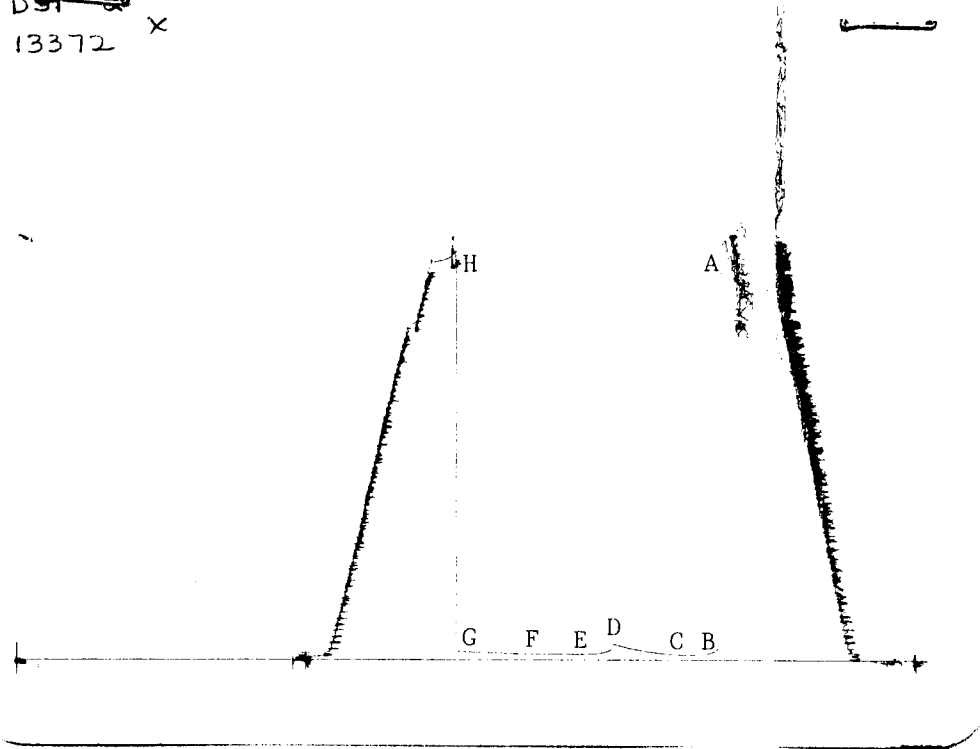
2nd open; Weak surface blow, died in 25 minutes.

Well Chlorides; 7,000 ppm.

Recovery Chlorides; 7,000 ppm.

Resistivity .952 ohms @ 65° F.

DST # 20  
13372 X



This is an actual photograph of recorder chart.

| POINT                                  | PRESSURE      |                |
|----------------------------------------|---------------|----------------|
|                                        | Field Reading | Office Reading |
| (A) Initial Hydrostatic Mud .....      | 2092          | PSI            |
| (B) First Initial Flow Pressure .....  | 29            | PSI            |
| (C) First Final Flow Pressure .....    | 29            | PSI            |
| (D) Initial Closed-in Pressure .....   | 79            | PSI            |
| (E) Second Initial Flow Pressure ..... | 29            | PSI            |
| (F) Second Final Flow Pressure .....   | 29            | PSI            |
| (G) Final Closed-in Pressure .....     | 39            | PSI            |
| (H) Final Hydrostatic Mud .....        | 2062          | PSI            |

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## DRILL-STEM TEST DATA

|                                                      |                               |             |                        |
|------------------------------------------------------|-------------------------------|-------------|------------------------|
| Company                                              | Abercrombie Drilling Inc.     | Test No.    | 3                      |
| Well Name & Number                                   | Munsell #3                    | Zone Tested | Lansing/ Ks. City 180' |
| Company Address                                      | 801 Union Center Wichita, Ks. | Date        | 2/19/85                |
| Company Rep.                                         | Raul F. Brito                 | Tester      | Rod Steinbrink         |
| Contractor                                           | Abercrombie Drilling Company  | Elevation   | 2806 KB                |
| Location: Sec. 3 Twp. 7s Rge. 29w Co. Lane State Ks. | Est. Feet of Pay <sup>4</sup> |             |                        |

Recorder No. 13370 Type AK-1 Range 3900 PSI  
 Recorder Depth 4190 Clock # 25826  
 (A) Initial Hydrostatic Mud 2125 PSI  
 (B) First Initial Flow Pressure 39 PSI  
 (C) First Final Flow Pressure 39 PSI  
 (D) Initial Shut-in Pressure 820 PSI  
 (E) Second Initial Flow Pressure 49 PSI  
 (F) Second Final Flow Pressure 59 PSI  
 (G) Final Shut-in Pressure 811 PSI  
 (H) Final Hydrostatic Mud 2047 PSI  
 Temperature 111  
 Mud Weight 9.3 Viscosity 55  
 Fluid Loss 10.8  
 Interval Tested 4172-4198  
 Anchor Length 26  
 Top Packer Depth 4167  
 Bottom Packer Depth 4172  
 Total Depth 4198  
 Drill Pipe Size 4½ XH  
 Wt. Pipe I. D. 2.7 Ft. Run 640  
 Recovery-Total Feet 65

Recovered 65 Feet Of Oil specked mud.

Recovered Feet Of

Recovered Feet Of

Recovered Feet Of

Recovered Feet Of

Recovered Feet Of

Recovered Feet Of

Extra Equipment Price of Job \$675.00

Recorder No. 13372 Type AK-1 Range 3975 PSI  
 Recorder Depth 4193 Clock # 25831  
 Tool Open Before I.S.I. 30 Mins.  
 Initial Shut-in 45 Mins.  
 Flow Period 60 Mins.  
 Final Shut-in 45 Mins.  
 Top Choke Size 1" Hole Size 7 7/8"  
 Bottom Choke Size 3/4" Rubber Size 6 3/4"  
 Tool Open @ 9:22 AM  
 Blow Remarks 1st open; Medium blow,  
 slowly increased to 4 inches throughout.  
 ISI: Bled off blow, no return.  
 2nd open: No blow, flushed tool good  
 surge, surface blow, built to ½ inch  
 slowly stayed steady throughout.

Recovery Chlorides; 5,000 ppm.

Resistivity 1.39 ohms @ 65°F.

# INITIAL SHUT-IN

=====

RECORDER NO: 13370    DEPTH: 4198 FT.  
 INITIAL FLOW TIME (T): 30 MIN.

| DT(MIN) | LOG((T+DT)/DT) | PRESSURE(PSIG) |
|---------|----------------|----------------|
| =====   |                |                |
| 0       | 0.000          | 40.4           |
| 5       | 0.845          | 728.4          |
| 10      | 0.602          | 769.8          |
| 15      | 0.477          | 789.5          |
| 20      | 0.398          | 801.3          |
| 25      | 0.342          | 808.2          |
| 30      | 0.301          | 813.1          |
| 35      | 0.269          | 817.1          |
| 40      | 0.243          | 819.1          |
| 45      | 0.222          | 821.0          |

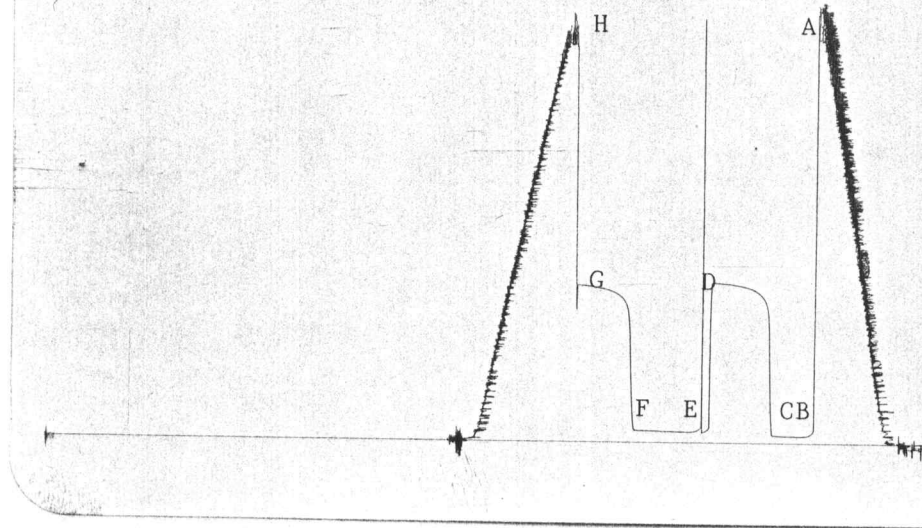
# FINAL SHUT-IN

=====

RECORDER NO: 13370    DEPTH: 4198 FT.  
 TOTAL FLOW TIME: 90 MIN.

| DT(MIN) | LOG((T+DT)/DT) | PRESSURE(PSIG) |
|---------|----------------|----------------|
| =====   |                |                |
| 0       | 0.000          | 60.1           |
| 5       | 1.279          | 494.8          |
| 10      | 1.000          | 732.3          |
| 15      | 0.845          | 759.9          |
| 20      | 0.740          | 776.7          |
| 25      | 0.663          | 786.5          |
| 30      | 0.602          | 792.4          |
| 35      | 0.553          | 800.3          |
| 40      | 0.512          | 803.3          |
| 45      | 0.477          | 805.3          |

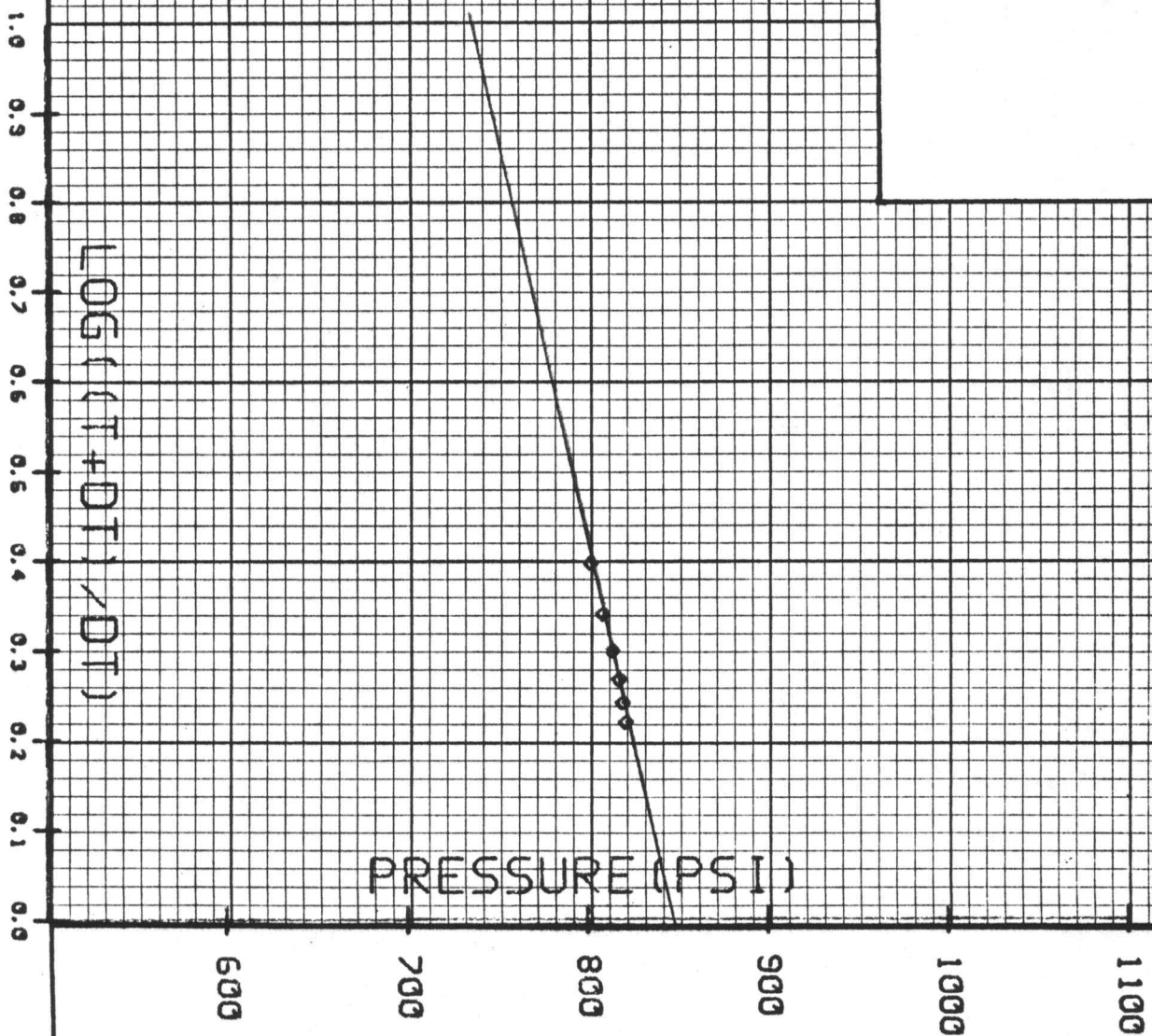
DST # 3  
13370 X



This is an actual photograph of recorder chart.

| POINT                                  | PRESSURE      |                |
|----------------------------------------|---------------|----------------|
|                                        | Field Reading | Office Reading |
| (A) Initial Hydrostatic Mud .....      | 2125          | 2120           |
| (B) First Initial Flow Pressure .....  | 39            | 40.4           |
| (C) First Final Flow Pressure .....    | 39            | 40.4           |
| (D) Initial Closed-in Pressure .....   | 820           | 821.0          |
| (E) Second Initial Flow Pressure ..... | 49            | 54.2           |
| (F) Second Final Flow Pressure .....   | 59            | 60.1           |
| (G) Final Closed-in Pressure .....     | 811           | 805.3          |
| (H) Final Hydrostatic Mud .....        | 2047          | 2042           |

HORNER PLOT  
ABERCROMBIE DRILLING INC.  
MUNSELL #3  
DST # 3 DEPTH: 4198  
RECORDER NO. 13370  
INITIAL SHUT-IN:  $\diamond$   
FINAL SHUT-IN:  $\square$



CHENEY TESTING CO, INC.  
CALCULATION OF FORMATION CHARACTERISTICS  
FROM DST DATA

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FOR: ABERCROMBIE DRILLING INC.  
MUNSELL #3  
SEC 3-7S-29W  
LANE COUNTY KANSAS  
DST # 3  
FORMATION: LANSING 180'  
ELEVATION: 2806 KB

\*\*\*\*\*

TEST PARAMETERS

|                                  |                                |
|----------------------------------|--------------------------------|
| TEST INTERVAL: 4172 - 4198       | EST PAY: 4                     |
| TIME INTERVAL: 30 - 45 - 60 - 45 | VISCOSITY OF FLUID: 1.5        |
| INITIAL FLOW PRESS: 40.4- 40.4   | HOLE SIZE: 7.875               |
| FINAL FLOW PRESS: 54.2- 60.1     | D.C. CAPACITY:0.00000          |
| SHUT-IN PRESS(I-F): 821.0- 805.3 | W.P. CAPACITY:0.00708          |
| BOTTOM HOLE TEMPERATURE: 111     | D.P. CAPACITY:0.01402          |
| TOTAL FEET OF RECOVERY: 65       | TOTAL BARRELS RECOVERY: 0.4601 |

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EXTRAPOLATED INITIAL SHUT-IN PRESSURE (PSI): 845  
SLOPE (PSI-CYCLE): 90                      POINTS USED: 6

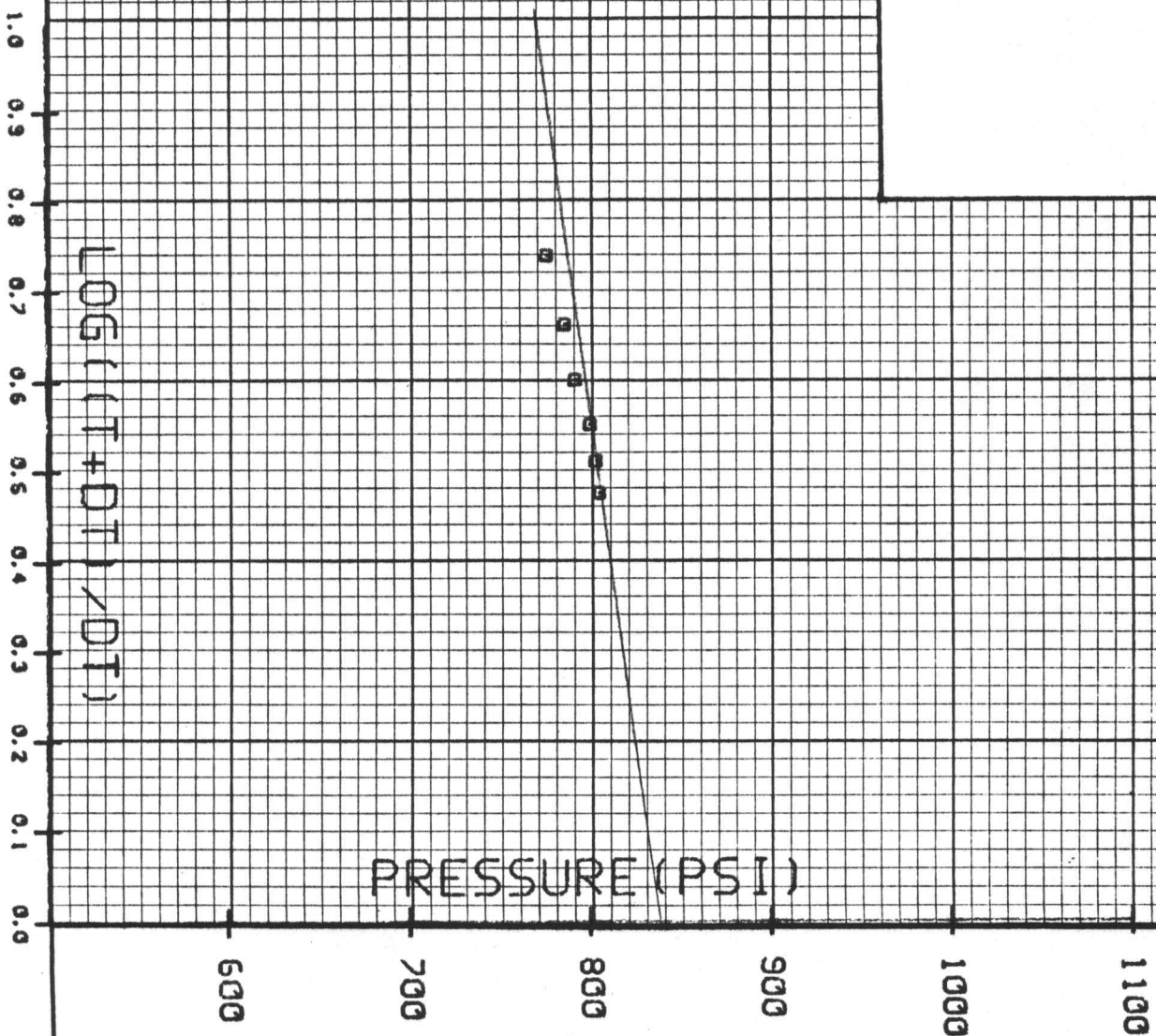
EXTRAPOLATED FINAL SHUT-IN PRESSURE (PSI): 837  
SLOPE (PSI-CYCLE): 67                      POINTS USED: 3

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CALCULATIONS

|                                          |   |        |
|------------------------------------------|---|--------|
| AVERAGE PRODUCTION RATE (B/D)            | : | 7.36   |
| TRANSMISSIBILITY (MD-FT/CP)              | : | 17.86  |
| PERMEABILITY (MD)                        | : | 6.70   |
| PRODUCTIVITY INDEX (B/D/PSI)             | : | 0.0202 |
| DAMAGE RATIO                             | : | 1.890  |
| APPROXIMATE RADIUS OF INVESTIGATION (FT) | : | 24.6   |
| DRAWDOWN FACTOR (%)                      | : | 0.947  |
| POTENTIOMETRIC SURFACE (FT)              | : | 549.00 |

HORNER PLOT  
ABERCROMBIE DRILLING INC.  
MUNSELL #3  
OST # 3 DEPTH: 4198  
RECORDER NO. 13370  
INITIAL SHUT-IN:  $\diamond$   
FINAL SHUT-IN:  $\square$



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## DRILL-STEM TEST DATA

|                                                      |                               |                  |                |
|------------------------------------------------------|-------------------------------|------------------|----------------|
| Company                                              | Abercrombie Drilling Inc.     | Test No.         | 4              |
| Well Name & Number                                   | Munsell #3                    | Zone Tested      | Johnson        |
| Company Address                                      | 801 Union Center Wichita, Ks. | Date             | 2/21/85        |
| Company Rep.                                         | Raul F. Brito                 | Tester           | Rod Steinbrink |
| Contractor                                           | Abercrombie Drilling Company  | Elevation        | 2806 KB        |
| Location: Sec. 3 Twp. 7s Rge. 29w Co. Lane State KS. |                               | Est. Feet of Pay | 4              |

Recorder No. 13370 Type AK-1 Range 3900 PSI

Recorder Depth 4528 Clock # 25826

(A) Initial Hydrostatic Mud 2380 PSI

(B) First Initial Flow Pressure 29 PSI

(C) First Final Flow Pressure 29 PSI

(D) Initial Shut-in Pressure 1096 PSI

(E) Second Initial Flow Pressure 39 PSI

(F) Second Final Flow Pressure 39 PSI

(G) Final Shut-in Pressure 968 PSI

(H) Final Hydrostatic Mud 2272 PSI

Temperature 115

Mud Weight 9.6 Viscosity 53

Fluid Loss 12.0

Interval Tested 4506-4536

Anchor Length 30

Top Packer Depth 4501

Bottom Packer Depth 4506

Total Depth 4536

Drill Pipe Size 4 1/2 xH

Wt. Pipe I. D. 2.7 Ft. Run 640

Recovery-Total Feet 20

Recovered 20 Feet Of Oil cut mud; 4% oil & 96% mud.

Recovered Feet Of

Recovered Feet Of

Recovered Feet Of

Recovered Feet Of

Recovered Feet Of

Extra Equipment Price of Job \$675.00

Recorder No. 13372 Type AK-1 Range 3975 PSI

Recorder Depth 4531 Clock # 25831

Tool Open Before I.S.I. 30 Mins.

Initial Shut-in 45 Mins.

Flow Period 30 Mins.

Final Shut-in 45 Mins.

Top Choke Size 1" Hole Size 7 7/8"

Bottom Choke Size 3/4" Rubber Size 6 3/4"

Tool Open @ 1:43 PM

Blow Remarks 1st open: Weak blow, slowly increased to 1 1/4 throughout.

ISI: Bled off blow, no return.

2nd open: NO blow, flushed tool, good surge, no blow.

Well Chlorides: 4,000 ppm.

# INITIAL SHUT-IN

=====

RECORDER NO: 13370 DEPTH: 4536 FT.  
INITIAL FLOW TIME (T): 30 MIN.

| DT(MIN) | LOG((T+DT)/DT) | PRESSURE(P SIG) |
|---------|----------------|-----------------|
| 0       | 0.000          | 26.6            |
| 5       | 0.845          | 283.9           |
| 10      | 0.602          | 663.3           |
| 15      | 0.477          | 835.8           |
| 20      | 0.398          | 921.6           |
| 25      | 0.342          | 977.7           |
| 30      | 0.301          | 1018.1          |
| 35      | 0.269          | 1049.7          |
| 40      | 0.243          | 1072.4          |
| 45      | 0.222          | 1090.1          |

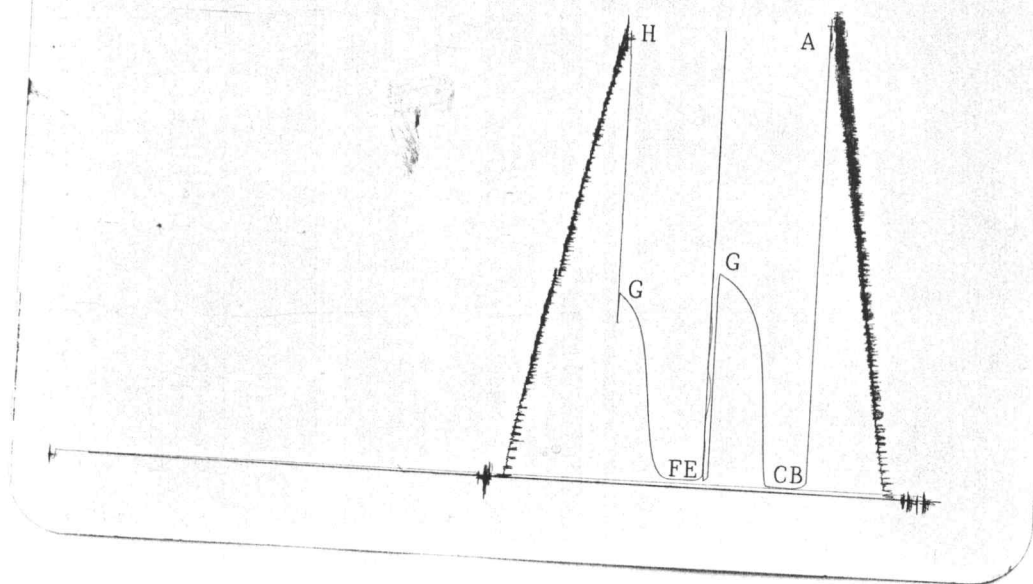
# FINAL SHUT-IN

=====

RECORDER NO: 13370 DEPTH: 4536 FT.  
TOTAL FLOW TIME: 60 MIN.

| DT(MIN) | LOG((T+DT)/DT) | PRESSURE(P SIG) |
|---------|----------------|-----------------|
| 0       | 0.000          | 38.4            |
| 5       | 1.114          | 50.3            |
| 10      | 0.845          | 98.6            |
| 15      | 0.699          | 216.8           |
| 20      | 0.602          | 495.8           |
| 25      | 0.531          | 726.4           |
| 30      | 0.477          | 841.7           |
| 35      | 0.434          | 902.8           |
| 40      | 0.398          | 939.3           |
| 45      | 0.368          | 965.9           |

DST # 4  
13370 X



This is an actual photograph of recorder chart.

| POINT                                  | PRESSURE      |                |
|----------------------------------------|---------------|----------------|
|                                        | Field Reading | Office Reading |
| (A) Initial Hydrostatic Mud .....      | 2380          | 2375 PSI       |
| (B) First Initial Flow Pressure .....  | 29            | 26.6 PSI       |
| (C) First Final Flow Pressure .....    | 29            | 26.6 PSI       |
| (D) Initial Closed-in Pressure .....   | 1096          | 1090.1 PSI     |
| (E) Second Initial Flow Pressure ..... | 39            | 38.4 PSI       |
| (F) Second Final Flow Pressure .....   | 39            | 38.4 PSI       |
| (G) Final Closed-in Pressure .....     | 968           | 965.9 PSI      |
| (H) Final Hydrostatic Mud .....        | 2272          | 2267 PSI       |

CHENEY TESTING CO, INC.  
CALCULATION OF FORMATION CHARACTERISTICS  
FROM DST DATA

\*\*\*\*\*

FOR: ABERCROMBIE DRILLING INC.  
MUNSELL #3  
SEC 3-7S-29W  
LANE COUNTY KANSAS

DST # 4  
FORMATION: JOHNSON  
ELEVATION: 2806 KB

\*\*\*\*\*

TEST PARAMETERS

|                                   |                                |
|-----------------------------------|--------------------------------|
| TEST INTERVAL: 4506 - 4536        | EST PAY: 4                     |
| TIME INTERVAL: 30 - 45 - 30 - 45  | VISCOSITY OF FLUID: 2          |
| INITIAL FLOW PRESS: 26.6- 26.6    | HOLE SIZE: 7.875               |
| FINAL FLOW PRESS: 38.4- 38.4      | D.C. CAPACITY: 0.00000         |
| SHUT-IN PRESS(I-F): 1090.1- 965.9 | W.P. CAPACITY: 0.00708         |
| BOTTOM HOLE TEMPERATURE: 115      | D.P. CAPACITY: 0.01402         |
| TOTAL FEET OF RECOVERY: 20        | TOTAL BARRELS RECOVERY: 0.1416 |

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EXTRAPOLATED INITIAL SHUT-IN PRESSURE (PSI): 1285  
SLOPE (PSI-CYCLE): 865      POINTS USED: 3

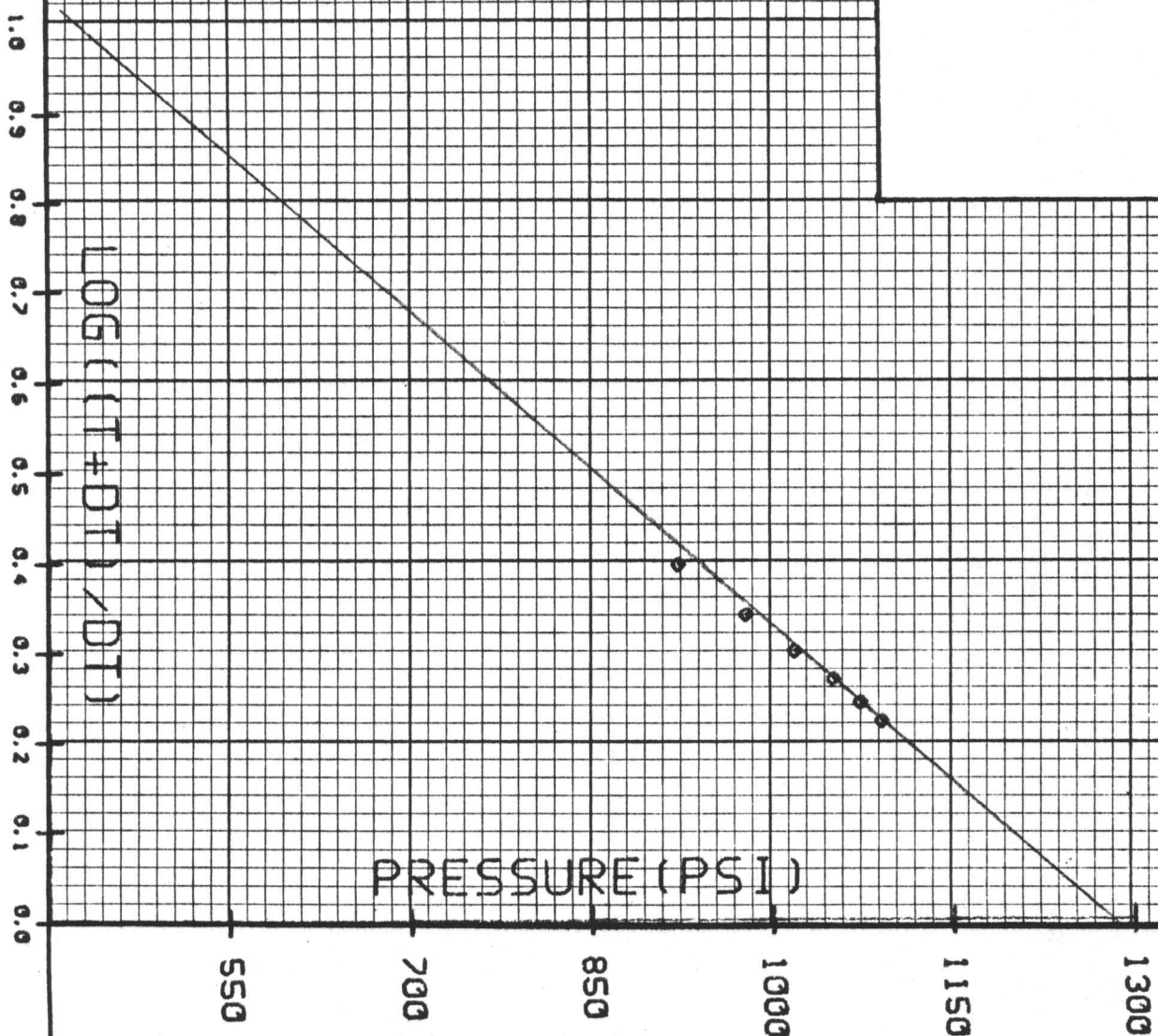
EXTRAPOLATED FINAL SHUT-IN PRESSURE (PSI): 0  
SLOPE (PSI-CYCLE): 1      POINTS USED: 0

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CALCULATIONS

|                                          |   |          |
|------------------------------------------|---|----------|
| AVERAGE PRODUCTION RATE (B/D)            | : | 3.40     |
| TRANSMISSIBILITY (MD-FT/CP)              | : | 1.28     |
| PERMEABILITY (MD)                        | : | 0.64     |
| PRODUCTIVITY INDEX (B/D/PSI)             | : | 0.0014   |
| DAMAGE RATIO                             | : | -0.014   |
| APPROXIMATE RADIUS OF INVESTIGATION (FT) | : | 6.2      |
| DRAWDOWN FACTOR (%)                      | : | 100.000  |
| POTENTIOMETRIC SURFACE (FT)              | : | -1730.00 |

HORNER PLOT  
ABERCROMBIE DRILLING INC.  
MUNSELL #3  
DST # 4 DEPTH: 4536  
RECORDER NO. 13370  
INITIAL SHUT-IN:  $\diamond$   
FINAL SHUT-IN:  $\square$



HORNER PLOT  
ABERCROMBIE DRILLING INC.  
MUNSELL #3  
DST # 4 DEPTH: 4536  
RECORDER NO. 13370  
INITIAL SHUT-IN:  $\diamond$   
FINAL SHUT-IN:  $\square$

1.0 0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1 0.0

$\text{LOG}((T+DT)/DT)$

PRESSURE (PSI)

700 800 900 1000 1100 1200

