CHENEY TESTING CO.

DRILL STEM TEST REPORT

COMPANY RITCHIE EXPLORATION INC. LEASE AND WELL NO. GRIFFEY 18D #1 SEC. 18 TWP. 6S RGE. 22W TEST NO. 1 DATE 4-20-86

NOMENCLATURE

b	=	Approximate Radius of Investigation	Feet
b^1	=	Approximate Radius of Investigation (Net Pay Zone h^1)	Feet
D.R.	=	Damage Ratio	——
El	=	Elevation	Feet
GD	=	B.T. Gauge Depth (From Surface Reference)	Feet
h	=	Interval Tested	Feet
h^1	=	Net Pay Thickness	Feet
K	=	Permeability	md
K^1	=	Permeability (From Net Pay Zone h^1)	md
m	=	Slope Extrapolated Pressure Plot (Psi^2/cycle Gas)	psi/cycle
OF^1	=	Maximum Indicated Flow Rate	MCF/D
OF^2	=	Minimum Indicated Flow Rate	MCF/D
OF^3	=	Theoretical Open Flow Potential with/Damage Removed Max.	MCF/D
OF^4	=	Theoretical Open Flow Potential with/Damage Removed Min.	MCF/D
P^S	=	Extrapolated Static Pressure	Psig.
P^F	=	Final Flow Pressure	Psig.
$P^{\circ T}$	=	Potentiometric Surface (Fresh Water*)	Feet
Q	=	Average Adjusted Production Rate During Test	bbls/day
Q^1	=	Theoretical Production w/Damage Removed	bbls/day
Q^g	=	Measured Gas Production Rate	MCF/D
R	=	Corrected Recovery	bbls
r^w	=	Radius of Well Bore	Feet
t	=	Flow Time	Minutes
t°	=	Total Flow Time	Minutes
T	=	Temperature Rankine	°R
Z	=	Compressibility Factor	——
μ	=	Viscosity Gas or Liquid	CP
Log	=	Common Log	

* Potentiometric Surface Reference to Rotary Table When Elevation Not Given, Fresh Water Corrected to 100° F.

CHENEY TESTING COMPANY, INC.

P. O. Box 367 HILL CITY, KANSAS 67642

DRILL-STEM TEST DATA

Company	Ritchie Exploration Inc.	Test No.	1
Well Name & Number	Griffey 18D #1	Zone Tested	Topeka
Company Address	125 N. Market, #1000, Wichita, Kansas	Date	4-20-86
Company Rep.	Leah Ann Kasten	Tester	Gary Pevoteaux
Contractor	Murfin Drilling Company	Elevation	2394 K.B.
Location: Sec. 18 Twp. 6s Rge. 22w Co. Graham State Kansas		Est. Feet of Pay	

Recorder No. 13638 Type AK-1 Range 4675 PSI
Recorder Depth 3577 Clock # 25829

(A) Initial Hydrostatic Mud 1864 PSI
(B) First Initial Flow Pressure 216 PSI
(C) First Final Flow Pressure 926 PSI
(D) Initial Shut-in Pressure 1271 PSI
(E) Second Initial Flow Pressure 961 PSI
(F) Second Final Flow Pressure 1156 PSI
(G) Final Shut-in Pressure 1271 PSI
(H) Final Hydrostatic Mud 1847 PSI

Temperature 119
Mud Weight 9.6 Viscosity 43
Fluid Loss 10.2
Interval Tested 3540-3580
Anchor Length 40
Top Packer Depth 3535
Bottom Packer Depth 3540
Total Depth 3580
Drill Pipe Size 4½ F.H.
Wt. Pipe I. D. 2.7 Ft. Run 850
Recovery-Total Feet 2430

Recorder No. 13635 Type AK-1 Range 4675 PSI
Recorder Depth 3572 Clock # 19127

Tool Open Before I.S.I. 30 Mins.
Initial Shut-in 30 Mins.
Flow Period 30 Mins.
Final Shut-in 30 Mins.
Top Choke Size 1" Hole Size 7 7/8"
Bottom Choke Size 3/4" Rubber Size 6 3/4"
Tool Open @ 10:25 A.M.

Blow Remarks

1st Open- Strong Blow, Bottom Of Bucket Immediately.

2nd Open- Strong Blow, Bottom of Bucket In 1 Minute.

Reversed As Much Water Out Of Pipe As Possible.

Well Chlorides- 3000 PPM

Recovery Chlorides- 98,000 PPM

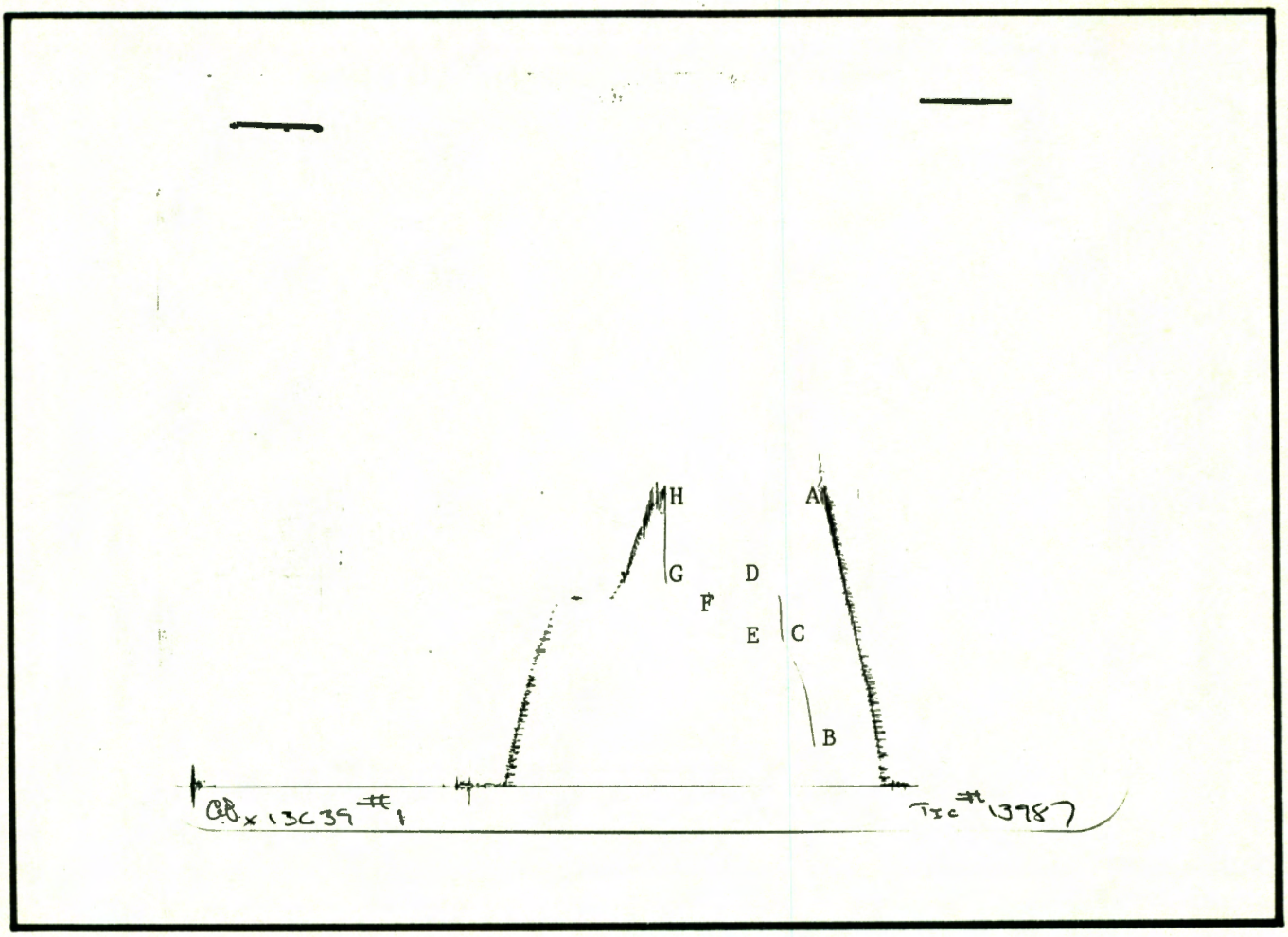
2280' Recovery: Resisitivity- 0.07 ohms @ 76°F.

Drill Collars I.D.- 2.25 Ft. Run- 300'

Recovered 150 Feet Of Watery Mud- 20% Water, 80% Mud.
Recovered 2280 Feet Of Muddy Saltwater- 5-10% Mud
Recovered Feet Of Oil Scum At Top Of Pipe Recovery and At Top Of Tool.
Recovered Feet Of
Recovered Feet Of
Recovered Feet Of

Extra Equipment Circulating Sub Price of Job $380.00

MILLER PRINTERS, INC.
Great Bend, Kansas



This is an actual photograph of recorder chart.

POINT		PRESSURE Field Reading	Office Reading	
(A)	Initial Hydrostatic Mud	1864		PSI
(B)	First Initial Flow Pressure	216		PSI
(C)	First Final Flow Pressure	926		PSI
(D)	Initial Closed-in Pressure	1271		PSI
(E)	Second Initial Flow Pressure	961		PSI
(F)	Second Final Flow Pressure	1156		PSI
(G)	Final Closed-in Pressure	1271		PSI
(H)	Final Hydrostatic Mud	1847		PSI

CHENEY TESTING COMPANY, INC.

P. O. Box 367 HILL CITY, KANSAS 67642

DRILL-STEM TEST DATA

Company	Ritchie Exploration Inc.	Test No.	2
Well Name & Number	Griffey 18D #1	Zone Tested	Toronto, Lansing
Company Address	125 N. Market, #1000, Wichita, Kansas	Date	4-21-86
Company Rep.	Leah Ann Kasten	Tester	Gary Pvoteaux
Contractor	Murfin Drilling Company	Elevation	2394 K.B.
Location: Sec. 18 Twp. 6s Rge. 22w Co. Graham State Ks.		Est. Feet of Pay	

Recorder No. 13638 Type AK-1 Range 4675 PSI
Recorder Depth 3640 Clock # 25829

(A) Initial Hydrostatic Mud 1882 PSI
(B) First Initial Flow Pressure 251 PSI
(C) First Final Flow Pressure 972 PSI
(D) Initial Shut-in Pressure 1290 PSI
(E) Second Initial Flow Pressure 1006 PSI
(F) Second Final Flow Pressure 1179 PSI
(G) Final Shut-in Pressure 1290 PSI
(H) Final Hydrostatic Mud 1790 PSI

Temperature 124
Mud Weight 9.6 Viscosity 43
Fluid Loss 10.2
Interval Tested 3584-3643
Anchor Length 59'
Top Packer Depth 3579
Bottom Packer Depth 3584
Total Depth 3643
Drill Pipe Size 4½ F.H.
Wt. Pipe I. D. 2.7 Ft. Run 850
Recovery-Total Feet 2520

Recorder No. 13639 Type AK-1 Range 19127 PSI
Recorder Depth 3635 Clock # 19127

Tool Open Before I.S.I. 30 Mins.
Initial Shut-in 30 Mins.
Flow Period 30 Mins.
Final Shut-in 30 Mins.
Top Choke Size 1" Hole Size 7 7/8"
Bottom Choke Size 3/4" Rubber Size 6 3/4"
Tool Open @ 12:35 A.M.

Blow Remarks

1st Open- Strong Blow, Bottom Of Bucket In 30 Seconds.

2nd Open- Strong Blow, Bottom of Bucket In 1 Minute.

Reversed Saltwater Out Of Pipe For 45 Minutes.

Well Chlorides- 3000 PPM

Recovery Chlorides- 89000 PPM

2380' Recovery:
Resistivity- 0.08 ohms @ 74°F.

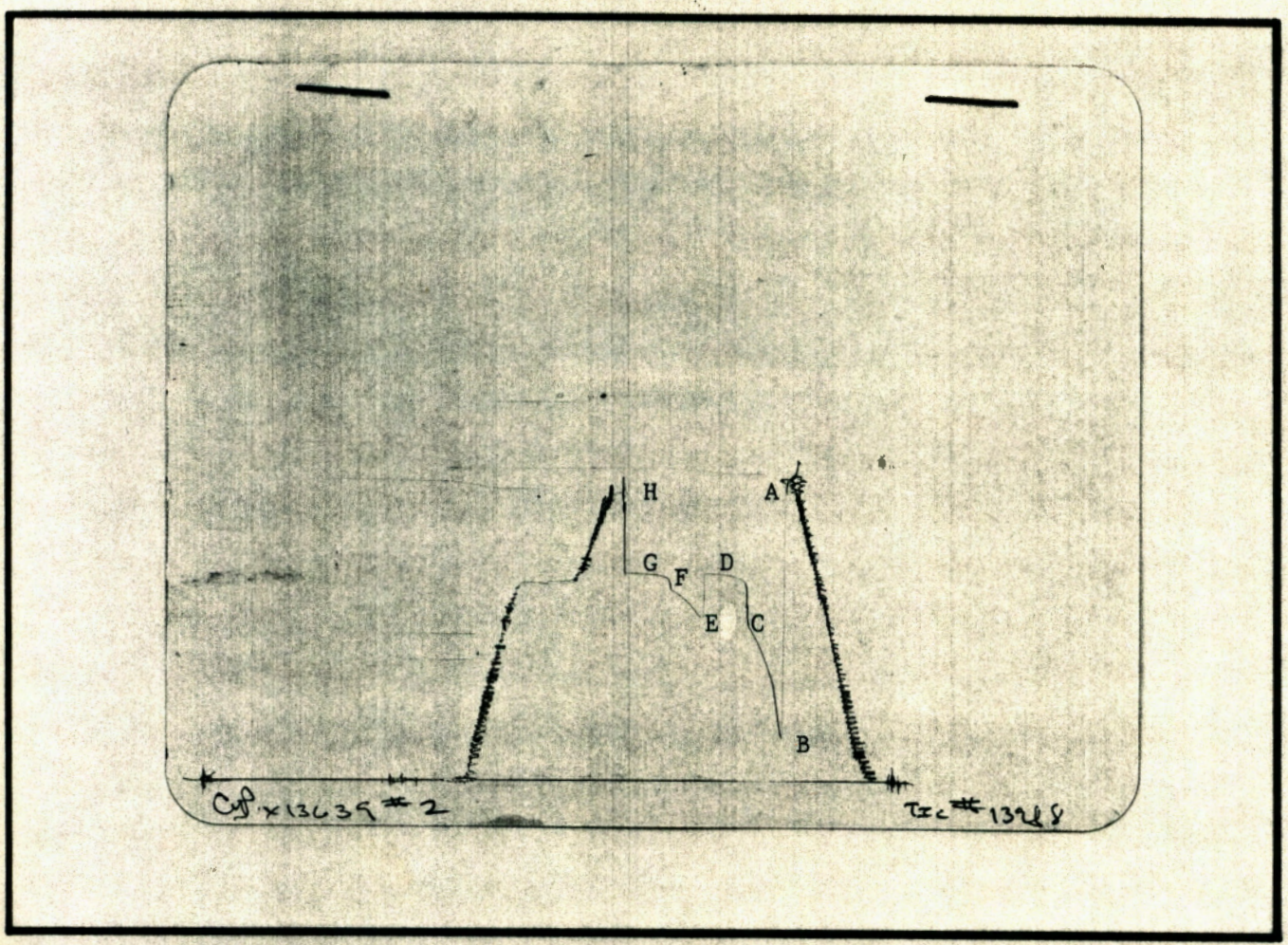
Drill Collars I.D.- 2.25 Ft. Run- 300'

Recovered 140 Feet Of Watery Mud- 15% Water, 85% Mud.
Recovered 2380 Feet Of Saltwater- 5% Mud- 95% Water
Recovered Feet Of
Recovered Feet Of
Recovered Feet Of
Recovered Feet Of

Extra Equipment Circulating Sub Price of Job $380.00

MILLER PRINTERS, INC.
Great Bend, Kansas

COMPANY RITCHIE EXPLORATION INC. LEASE AND WELL NO. GRIFFEY 18D #1 SEC. 18 TWP. 6s RGE. 22w TEST NO. 2 DATE 4-21-86



This is an actual photograph of recorder chart.

POINT		PRESSURE Field Reading	Office Reading	
(A)	Initial Hydrostatic Mud	1882		PSI
(B)	First Initial Flow Pressure	251		PSI
(C)	First Final Flow Pressure	972		PSI
(D)	Initial Closed-in Pressure	1290		PSI
(E)	Second Initial Flow Pressure	1006		PSI
(F)	Second Final Flow Pressure	1179		PSI
(G)	Final Closed-in Pressure	1290		PSI
(H)	Final Hydrostatic Mud	1790		PSI

CHENEY TESTING COMPANY, INC.

P. O. Box 367 HILL CITY, KANSAS 67642

DRILL-STEM TEST DATA

Company	Ritchie Exploration Inc.	Test No.	3
Well Name & Number	Griffey 18D #1	Zone Tested	Lansing H I J
Company Address	125 N. Market, #1000, Wichita, Kansas	Date	4-21-86
Company Rep.	Leah Ann Kasten	Tester	Gary Pevoteaux
Contractor	Murfin Drilling Company	Elevation	2394 K.B.
Location: Sec. 18 Twp. 6s Rge. 22w Co. Graham State Kansas		Est. Feet of Pay	

Recorder No. 13638 Type AK-1 Range 4675 PSI
Recorder Depth 3792 Clock # 25829

(A) Initial Hydrostatic Mud 1995 PSI
(B) First Initial Flow Pressure 45 PSI
(C) First Final Flow Pressure 93 PSI
(D) Initial Shut-in Pressure 1149 PSI
(E) Second Initial Flow Pressure 114 PSI
(F) Second Final Flow Pressure 139 PSI
(G) Final Shut-in Pressure 1145 PSI
(H) Final Hydrostatic Mud 1905 PSI

Temperature 122
Mud Weight 9.5 Viscosity 44
Fluid Loss 10.8
Interval Tested 3731-3795
Anchor Length 64
Top Packer Depth 3726
Bottom Packer Depth 3731
Total Depth 3795
Drill Pipe Size 4½ F.H.
Wt. Pipe I. D. 2.7 Ft. Run 850
Recovery-Total Feet 280

Recorder No. 13639 Type AK-1 Range 4675 PSI
Recorder Depth 3787 Clock # 19127

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 @ 11:00 P.M.
Blow Remarks

1st Open- Fair To Strong Blow. Bottom Of Bucket In 29 Minutes.

2nd Open- Fair Blow. 2 To 6".

Well Chlorides- 5,000 PPM
Recovery Chlorides- 6,200 PPM

Drill Collars I.D.-2.25 Ft. Run- 300'

Recovered 240 Feet Of Gas In Pipe
Recovered 40 Feet Of Slightly Mud Cut Oil- 12% Mud, 88% Oil.
Recovered 120 Feet Of Mud Cut Oil- 30% Mud, 70% Oil.
Recovered 60 Feet Of Gassy Oil Cut Mud- 8% Gas, 12% Oil, 80% Mud.
Recovered 60 Feet Of Oil Cut Mud- 12% Oil, 13% Water, 75% Mud.
Recovered Feet Of

Extra Equipment Price of Job $350.00

MILLER PRINTERS, INC.
Great Bend, Kansas

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

****

FOR: RITCHIE EXPLORATION INC.
GRIFFEY 18D #1 DST # 3
SEC 18-6S-22W FORMATION: LANSING H-I-J
GRAHAM COUNTY, KANSAS ELEVATION: 2394 KB

****

TEST PARAMETERS

TEST INTERVAL: 3731 - 3795 EST PAY: 15
TIME INTERVAL: 30 - 45 - 30 - 45 VISCOSITY OF FLUID: 2.5
INITIAL FLOW PRESS: 70.0- 111.3 HOLE SIZE: 7.875
FINAL FLOW PRESS: 137.7- 158.4 D.C. CAPACITY:0.00492
SHUT-IN PRESS(I-F):1169.3-1156.6 W.P. CAPACITY:0.00708
BOTTOM HOLE TEMPERATURE: 122 D.P. CAPACITY:0.01402
TOTAL FEET OF RECOVERY: 280 TOTAL BARRELS RECOVERY: 1.3763

****

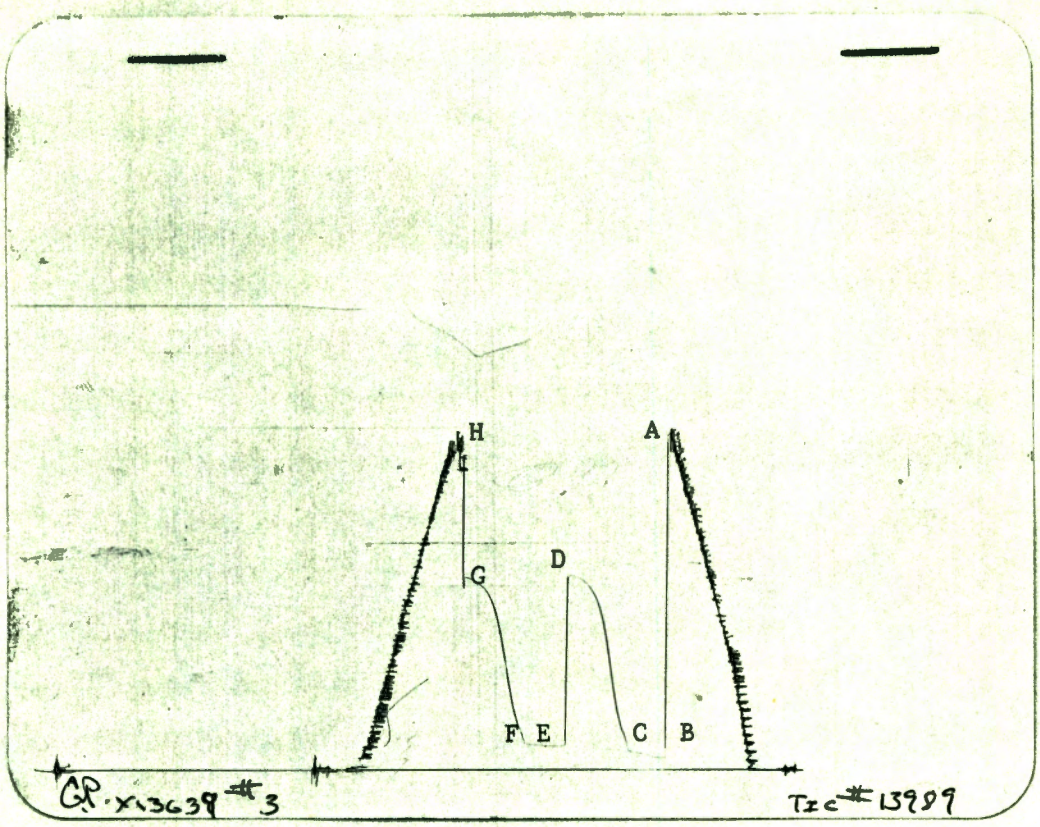
EXTRAPOLATED INITIAL SHUT-IN PRESSURE (PSI): 1319
SLOPE (PSI-CYCLE): 672 POINTS USED: 3

EXTRAPOLATED FINAL SHUT-IN PRESSURE (PSI): 1360
SLOPE (PSI-CYCLE): 548 POINTS USED: 3

****

CALCULATIONS

PRODUCTION POTENTIAL (B/D)	: 33.03
TRANSMISSIBILITY (MD-FT/CP)	: 9.80
EFFECTIVE PERMEABILITY (MD)	: 1.63
PRODUCTIVITY INDEX (B/D/PSI)	: 0.0111
DAMAGE RATIO	: 0.401
APPROXIMATE RADIUS OF INVESTIGATION (FT)	: 9.9
DRAWDOWN FACTOR (%)	:-3.108
POTENTIOMETRIC SURFACE (FT)	:1752.84



This is an actual photograph of recorder chart.

POINT		PRESSURE Field Reading	Office Reading	
(A)	Initial Hydrostatic Mud	1995	1990	PSI
(B)	First Initial Flow Pressure	45	70.0	PSI
(C)	First Final Flow Pressure	93	111.3	PSI
(D)	Initial Closed-in Pressure	1149	1169.3	PSI
(E)	Second Initial Flow Pressure	114	137.7	PSI
(F)	Second Final Flow Pressure	139	158.4	PSI
(G)	Final Closed-in Pressure	1145	1156.6	PSI
(H)	Final Hydrostatic Mud	1905	1900	PSI

INITIAL SHUT-IN

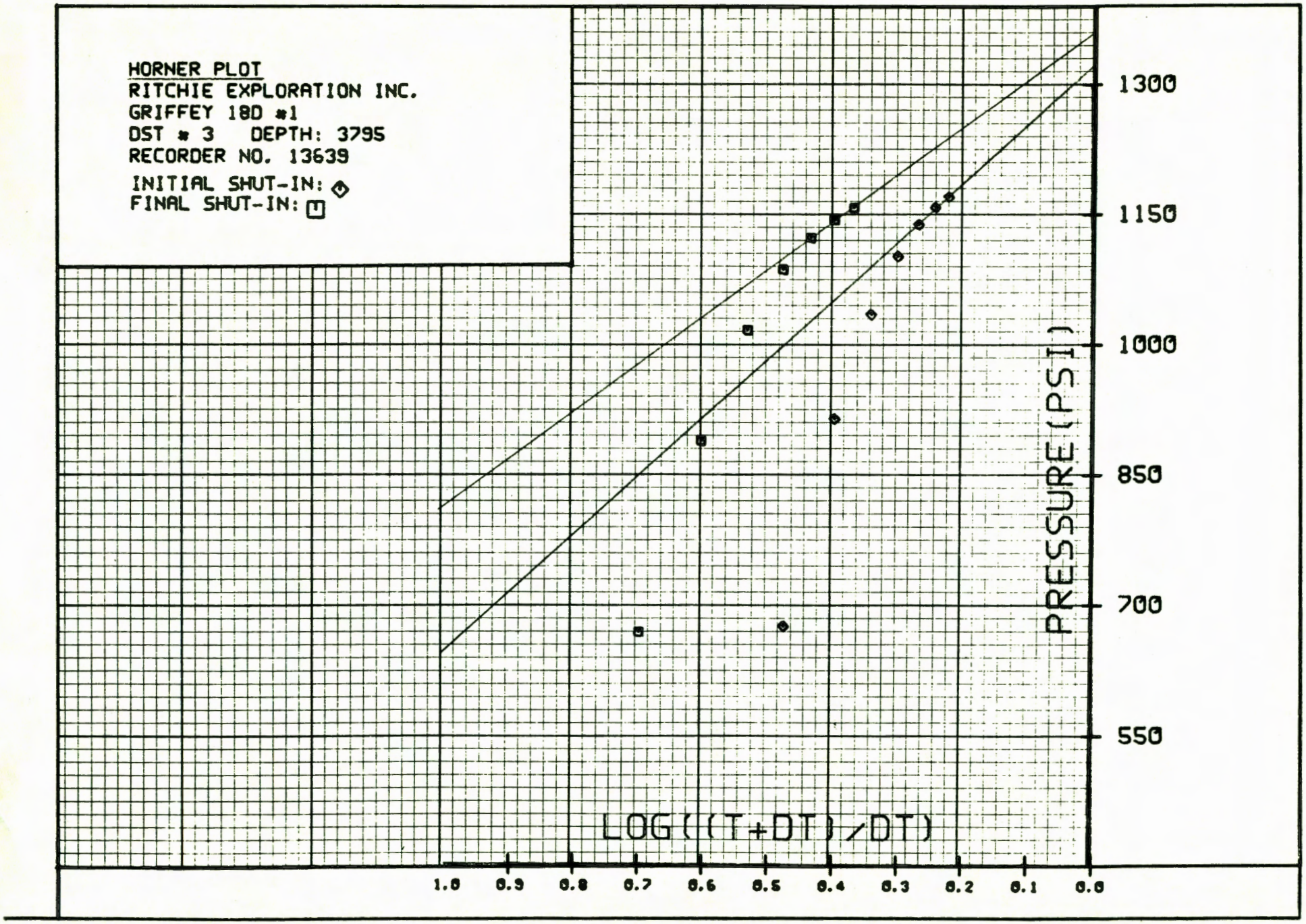
RECORDER NO: 13639 DEPTH: 3795 FT.
INITIAL FLOW TIME (T): 30 MIN.

DT(MIN)	LOG((T+DT)/DT)	PRESSURE(PSIG)
0	0.000	111.3
5	0.845	232.9
10	0.602	389.0
15	0.477	674.7
20	0.398	913.4
25	0.342	1033.9
30	0.301	1100.4
35	0.269	1137.1
40	0.243	1156.6
45	0.222	1169.3

FINAL SHUT-IN

RECORDER NO: 13639 DEPTH: 3795 FT.
TOTAL FLOW TIME: 60 MIN.

DT(MIN)	LOG((T+DT)/DT)	PRESSURE(PSIG)
0	0.000	158.4
5	1.114	268.5
10	0.845	431.4
15	0.699	667.8
20	0.602	888.1
25	0.531	1015.5
30	0.477	1085.5
35	0.434	1122.2
40	0.398	1142.9
45	0.368	1156.6


HORNER PLOT
RITCHIE EXPLORATION INC.
GRIFFEY 18D #1
DST # 3 DEPTH: 3795
RECORDER NO. 13639
INITIAL SHUT-IN:
FINAL SHUT-IN:
1300
1150
1000
850
700
550
PRESSURE (PSI)
LOG((T+DT)/DT)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0

CHENEY TESTING COMPANY, INC.

P. O. Box 367 HILL CITY, KANSAS 67642

DRILL-STEM TEST DATA

Company	Ritchie Exploration Inc.	Test No.	4
Well Name & Number	Griffey 18D #1	Zone Tested	Conglomerate Sand
Company Address	125 N. Market, Suite 1000, Wichita, Kansas	Date	4-22-86
Company Rep.	Leah Ann Kasten	Tester	Gary Pevoteaux
Contractor	Murfin Drilling Company	Elevation	2394
Location: Sec. 18 Twp. 6s Rge. 22w Co. Graham State Kansas		Est. Feet of Pay	

Recorder No. 13638 Type AK-1 Range 4675 PSI
Recorder Depth 3901 Clock # 25829
(A) Initial Hydrostatic Mud 2055 PSI
(B) First Initial Flow Pressure 367 PSI
(C) First Final Flow Pressure 848 PSI
(D) Initial Shut-in Pressure 1142 PSI
(E) Second Initial Flow Pressure PSI
(F) Second Final Flow Pressure PSI
(G) Final Shut-in Pressure PSI
(H) Final Hydrostatic Mud 1986 PSI
Temperature 127
Mud Weight 9.9 Viscosity 43
Fluid Loss 11.2
Interval Tested 3869-3904
Anchor Length 35
Top Packer Depth 3864
Bottom Packer Depth 3869
Total Depth 3904
Drill Pipe Size 4½ X.H.
Wt. Pipe I. D. 2.70 Ft. Run 850
Recovery-Total Feet 1600

Recorder No. 13639 Type AK-1 Range 4675 PSI
Recorder Depth 3896 Clock # 19127
Tool Open Before I.S.I. 15 Mins.
Initial Shut-in Mins.
Flow Period Mins.
Final Shut-in Mins.
Top Choke Size 1" Hole Size 7 7/8"
Bottom Choke Size 3/4" Rubber Size 6 3/4"
Tool Open @ 4:35 P.M.
Blow Remarks
1st Open- Very STrong Blow.
No Final Shut-in.

Well Chlorides- 5,000 PPM
Recovery Chlorides- 44,000 PPM

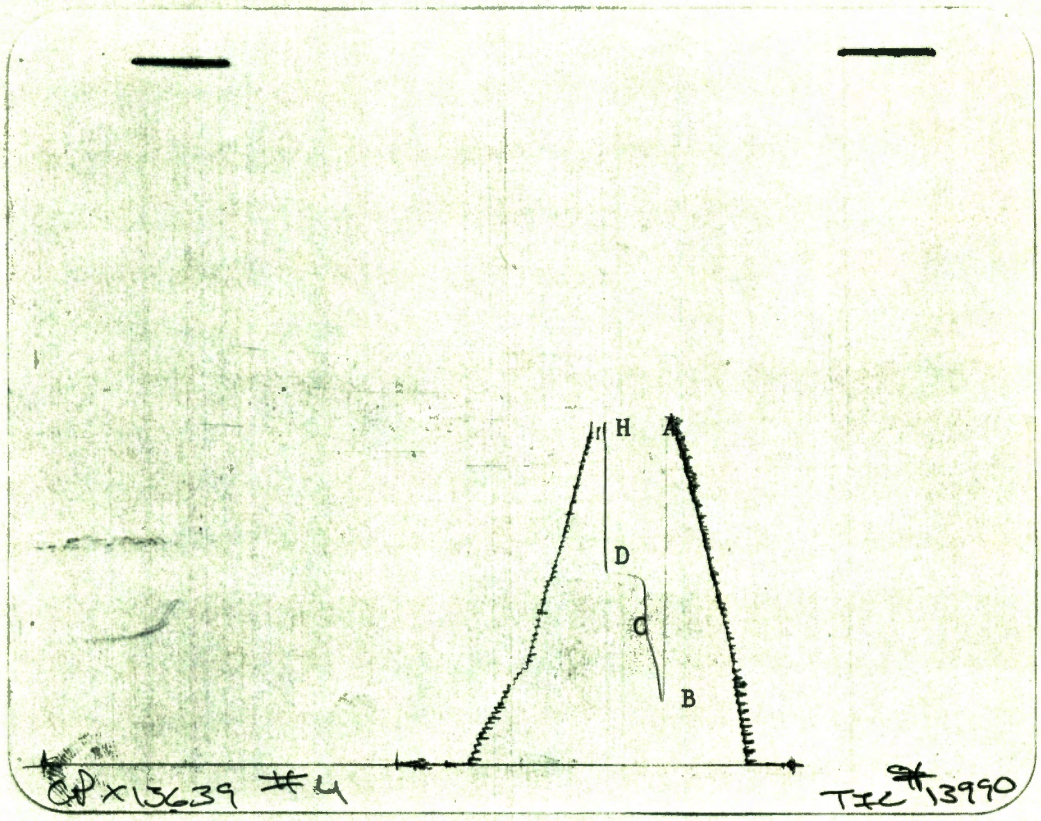
1140' Recovery:
Resistivity- 0.14 ohm meters @ 74°F.

Drillcollars I.D. 2.25 Ft. Run- 260'

Recovered 100 Feet Of Mud With oil spots- 6% Water, 94% Mud.
Recovered 60 Feet Of Water mud with oil spots- 20% Water, 80% Mud.
Recovered 180 Feet Of Muddy water with oil spots- 35% Mud, 65% Water.
Recovered 120 Feet Of Muddy Water with oil spots- 8% Mud, 92% Water.
Recovered 1140 Feet Of Saltwater
Recovered Feet Of

Extra Equipment Price of Job $350.00

MILLER PRINTERS, INC.
Great Bend, Kansas



This is an actual photograph of recorder chart.

POINT		PRESSURE Field Reading	Office Reading	
(A)	Initial Hydrostatic Mud	2055		PSI
(B)	First Initial Flow Pressure	367		PSI
(C)	First Final Flow Pressure	848		PSI
(D)	Initial Closed-in Pressure	1142		PSI
(E)	Second Initial Flow Pressure			PSI
(F)	Second Final Flow Pressure			PSI
(G)	Final Closed-in Pressure			PSI
(H)	Final Hydrostatic Mud	1986		PSI