

MILLER TESTING COMPANY

Box 547

GREAT BEND, KANSAS

Company CITIES SERVICE OIL CO.

Lease and Well No. NIELSON A-1

County COMMANCHE State KANSAS Date OCTOBER 7, 1967

Formation Test No. 1 Total Depth 4890 Elev. _____
 Interval Tested 4831 To 4890 Anchor Length 59'
 Size Hole 7 7/8 Size Drill Pipe 4 1/2 FH Size Packer 6 3/4
 Mud Weight 10 Viscosity 48 Water Loss 10 c.c. Bottom Hole Temp. 110 ° F
 Chokes: Top 1/2 Bottom 1/2 Ticket No. 8647

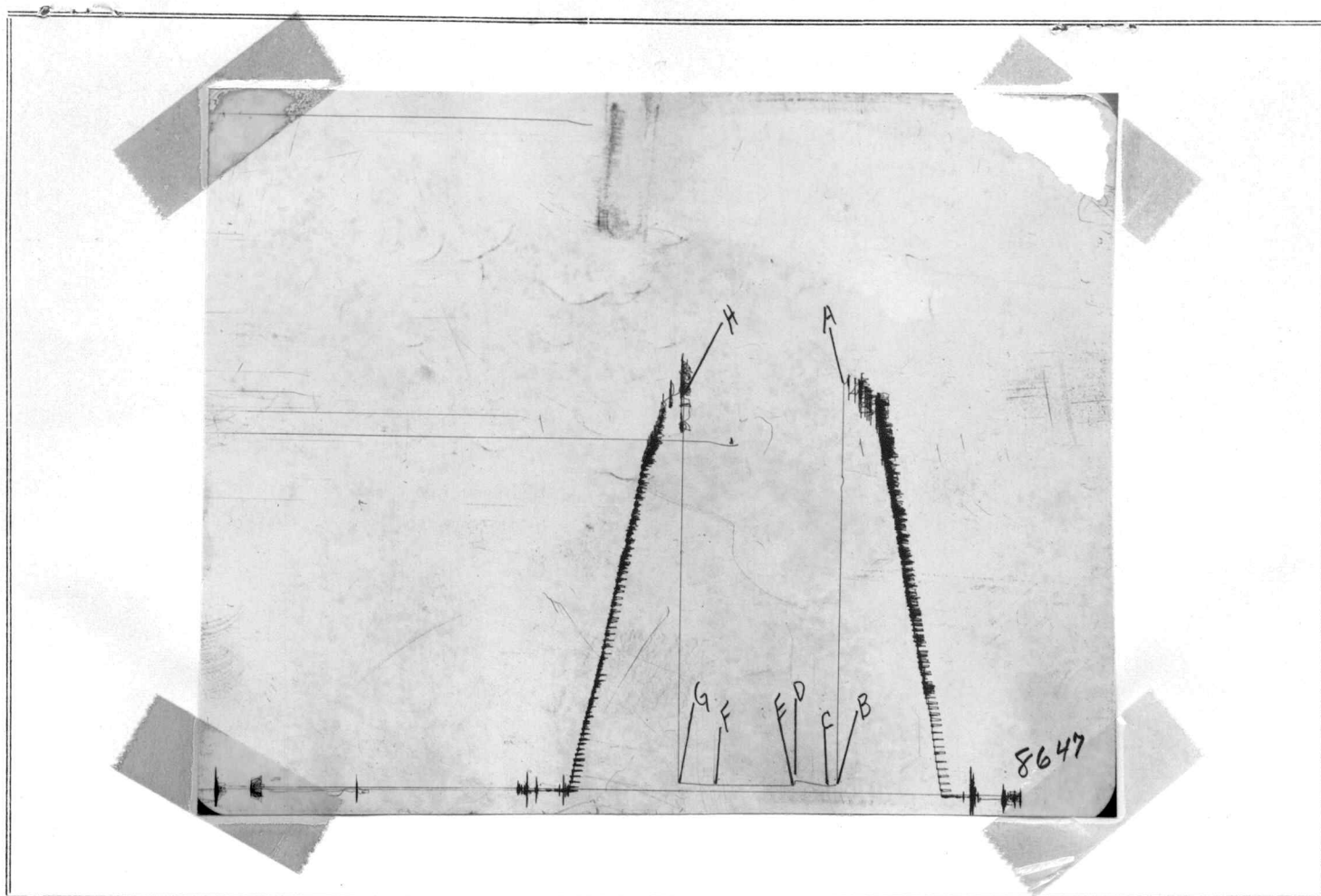
RECOVERY

WEAK THROUGHOUT TEST.

30 FEET OF MUD.

Lease and Well No. NIELSON A-1 18 31S 17W 1980 FWT. 1980 FSI Formation Test No. 1

18-31S-17W



Tool Open: 1st Flow 5 hrs: Shut-in Initial 30 min: 2nd Flow 60 min: Shut-in Final 30 min.

	Field Reading	Corrected Reading
(A) Initial Hydrostatic Pressure	<u>2552</u>	<u>2616</u>
(B) Initial 1st Flow Pressure	<u>56</u>	<u>45</u>
(C) Final 1st Flow Pressure	<u>45</u>	<u>45</u>
(D) Initial Shut-in Pressure	<u>78</u>	<u>74</u>
(E) Initial 2nd Flow Pressure	<u>45</u>	<u>45</u>
(F) Final 2nd Flow Pressure	<u>45</u>	<u>45</u>
(G) Final Shut-in Pressure	<u>56</u>	<u>54</u>
(H) Final Hydrostatic Pressure	<u>2552</u>	<u>2598</u>

8647

MILLER TESTING COMPANY

Box 547

GREAT BEND, KANSAS

Company _____ CITIES SERVICE OIL CO. _____

Lease and Well No. _____ NIELSON A-1 _____

County _____ COMMANCHE _____ State _____ KANSAS _____ Date _____ OCTOBER 8, 1967 _____

Formation Test No. _____ 2 _____ Total Depth _____ 5020 _____ Elev. _____

Interval Tested _____ 4986 _____ To _____ 5020 _____ Anchor Length _____ 34' _____

Size Hole _____ 7 7/8 _____ Size Drill Pipe _____ 4 1/2 FH _____ Size Packer _____ 6 3/4 _____

Mud Weight _____ 9.8 _____ Viscosity _____ 48 _____ Water Loss _____ 12 _____ c.c. Bottom Hole Temp. _____ 110 _____ ° F

Chokes: Top _____ 1/2 _____ Bottom _____ 1/2 _____ Ticket No. _____ 8648 _____

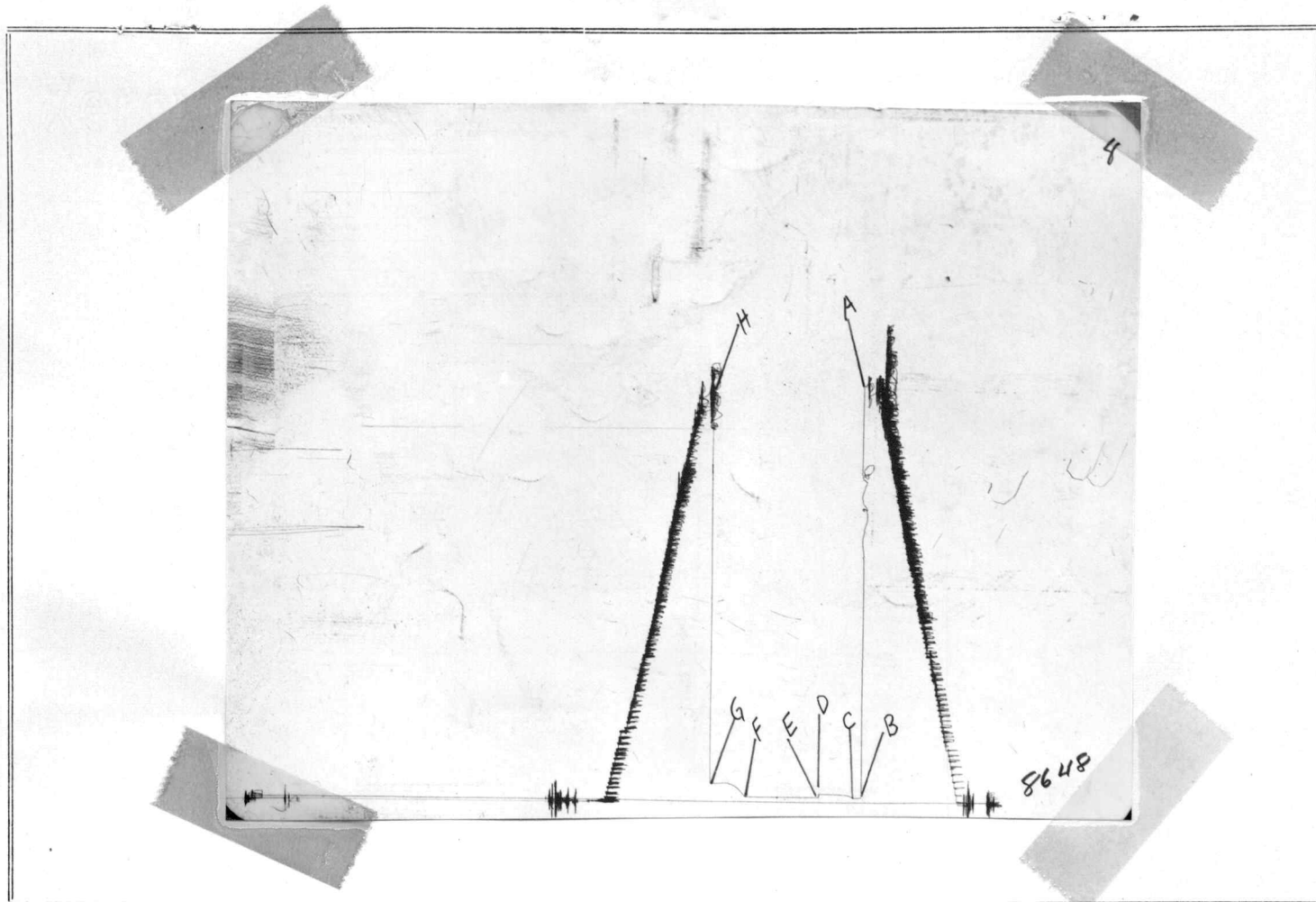
RECOVERY

GOOD THROUGHOUT TEST.

30 FEET OF MUD

Lease and Well No. _____ NIELSON A-1 18 31S 17W 1980 FWL 1980 FSL Formation Test No. _____ 2 _____

18-31S-17W

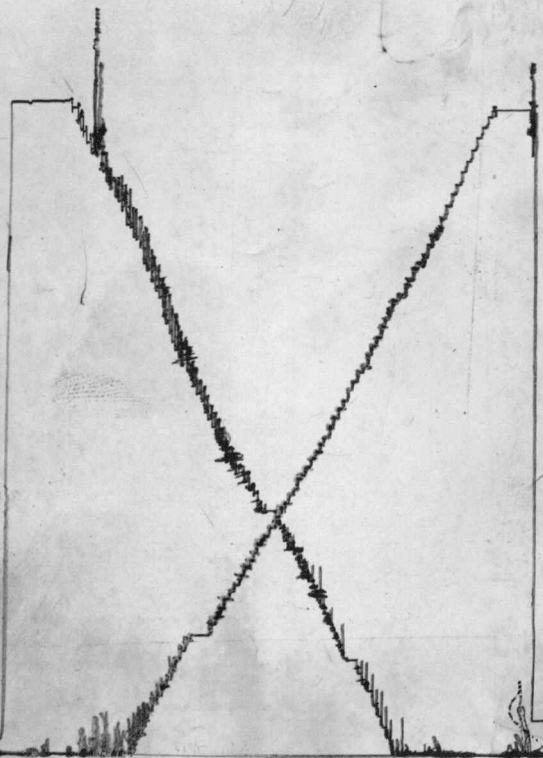


Tool Open: 1st Flow 5 hr. 5 mins: Shut-in Initial 30 min: 2nd Flow 60 min: Shut-in Final 30 min.

	Field Reading	Corrected Reading
(A) Initial Hydrostatic Pressure	<u>2621</u>	<u>2690</u>
(B) Initial 1st Flow Pressure	<u>34</u>	<u>29</u>
(C) Final 1st Flow Pressure	<u>34</u>	<u>29</u>
(D) Initial Shut-in Pressure	<u>67</u>	<u>56</u>
(E) Initial 2nd Flow Pressure	<u>34</u>	<u>34</u>
(F) Final 2nd Flow Pressure	<u>34</u>	<u>34</u>
(G) Final Shut-in Pressure	<u>112</u>	<u>123</u>
(H) Final Hydrostatic Pressure	<u>2621</u>	<u>2655</u>

8648

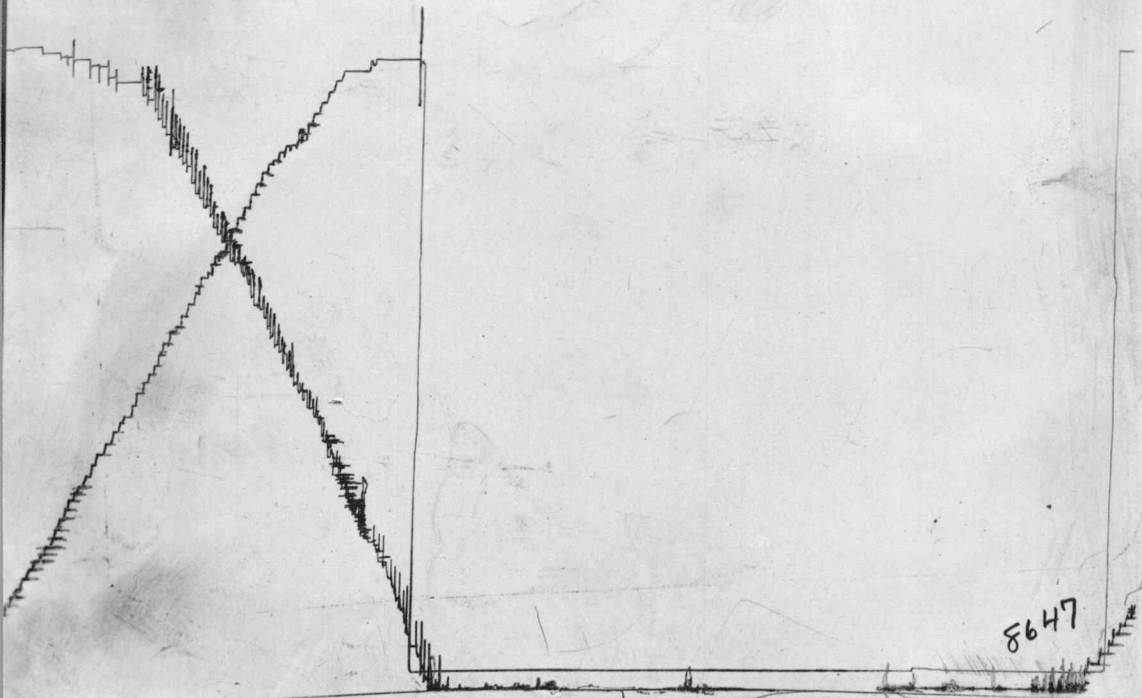
outside
Recorder



8648

outside Recorder

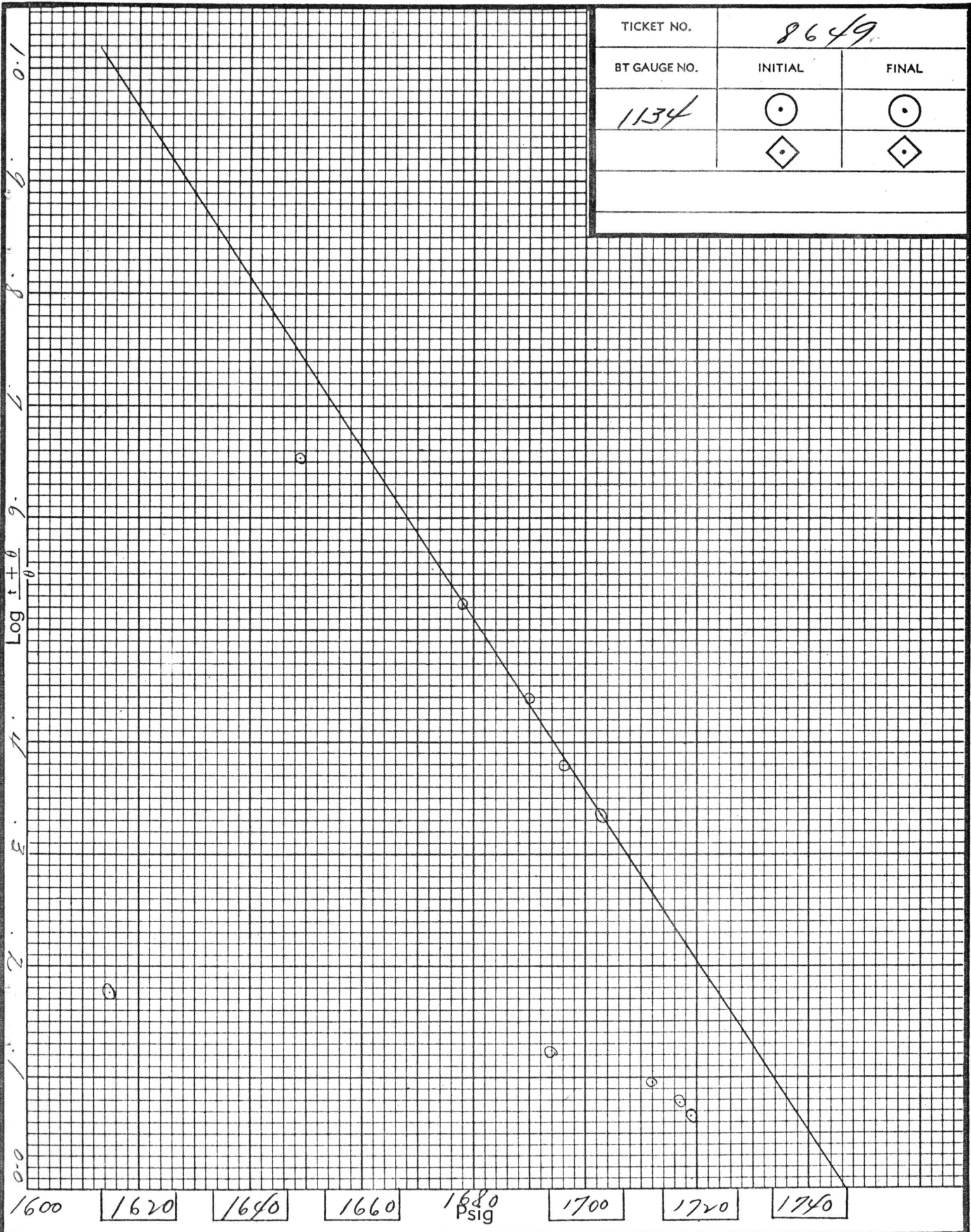
8



Legal Location
E4 Sec. - Twp. - Rng.

CITIES SERVICE OIL COMPANY
Lease Owner/Company Name

18-315-176



TICKET NO.	8649	
BT GAUGE NO.	INITIAL	FINAL
1134		

EXTRAPOLATED PRESSURE GRAPH

Gas Production

B.T. Gauge Numbers			1134		Ticket Number	8649
Initial Hydrostatic			2701	PRESSURE	Elevation	0 ft.
Final Hydrostatic			2655		1st Flow	- MCF
1st Flow	Initial	Time	18		Production Rate	2nd Flow
	Final	5	18			120 MCF
	Closed In Pressure	30	1719		3rd Flow	- MCF
2nd Flow	Initial	Time	9		Hole Size	7.875 in.
	Final	60	16		Footage Tested	Net 11* ft.
	Closed In Pressure	30	1703		Mud Weight	9.8 lbs./gal.
3rd Flow	Initial	Time			Gas Viscosity	0.017 cp
	Final				Gas Gravity	EST. 0.60
	Closed In Pressure				Gas Compressibility	0.82
Extrapolated		1st	-		Temperature	110 °F
Static Pressure		2nd	1746			
		3rd	-			
		1st	-			
Slope P/10		2nd	1615			
		3rd	-			

Remarks: * Reported when calculation request was submitted.

All calculations based on reported data and pressures as shown Miller Testing Company Data Sheets. Extrapolation of F.C.I.P. based on best possible plot considering the limited number of plot points.

SUMMARY		B.T. Gauge No. 1134 Depth 5030'			B.T. Gauge No. Depth			
PRODUCT	EQUATION	FIRST	SECOND	THIRD	FIRST	SECOND	THIRD	UNITS
Transmissability	$\frac{Kh}{\mu} = \frac{1637 Q_e ZT}{m}$		208.53					md. ft. cp
Theoretical Flow Capacity	$Kh = \frac{Kh}{\mu} \mu$		3.545					md. ft.
Average Effective	$K = \frac{Kh}{h}$		---					md.
Permeability	$K_1 = \frac{Kh}{h_1}$		0.322					md.
Indicated Flow Capacity	$(Kh)_s = \frac{3200 Q_e \mu ZT \log(0.472 b/r_w)}{P_s^2 - P_r^2}$		0.867					md. ft.
Damage Ratio	$DR = \frac{\text{Theo. Flow Cap}}{\text{Indicated Flow Cap}} \frac{Kh}{(Kh)_s}$		4.08					---
Indicated	$OF_1 = \frac{Q_e P_s^2}{P_s^2 - P_r^2} \text{ Max.}$		120.01					MCFD
Flow Rate	$OF_2 = \frac{Q_e P_s}{\sqrt{P_s^2 - P_r^2}} \text{ Min.}$		120.00					MCFD
Theoretical	$OF_3 = OF_1 DR \text{ Max.}$		490.57					MCFD
Potential Rate	$OF_4 = OF_2 DR \text{ Min.}$		490.55					MCFD
Approx. Radius of Investigation	$b \approx \sqrt{Kt} \text{ or } \sqrt{Kt_0}$		---					ft.
	$b_1 \approx \sqrt{K_1 t} \text{ or } \sqrt{K_1 t_0}$		4.9					ft.
Potentiometric Surface *	$Pot. = (EI - GD) + (2.319 Ps)$		-981					ft.

NOTICE: These calculations are based upon information furnished by you and taken from Drill Stem Test pressure charts, and are furnished you for your information. In furnishing such calculations and evaluations based thereon, Halliburton is merely expressing its opinion. You agree that Halliburton makes no warranty express or implied as to the accuracy of such calculations or opinions, and that Halliburton shall not be liable for any loss or damage, whether due to negligence or otherwise, in connection with such calculations and opinions.

MILLER TESTING COMPANY

Box 547

GREAT BEND, KANSAS

Company _____ CITIES SERVICE OIL CO. _____

Lease and Well No. _____ NIELSON A-1 _____

County _____ COMMANCHE _____ State _____ KANSAS _____ Date _____ OCTOBER 10, 1967 _____

Formation Test No. 4 Total Depth 5043 Elev. 2077
Interval Tested 5035 To 5043 Anchor Length 8'
Size Hole 7 7/8 Size Drill Pipe 4 1/2 FH Size Packer 6 3/4
Mud Weight 9.7 Viscosity 50 Water Loss 10 c.c. Bottom Hole Temp. 112 ° F
Chokes: Top 1/2 Bottom 1/2 Ticket No. 8650

RECOVERY

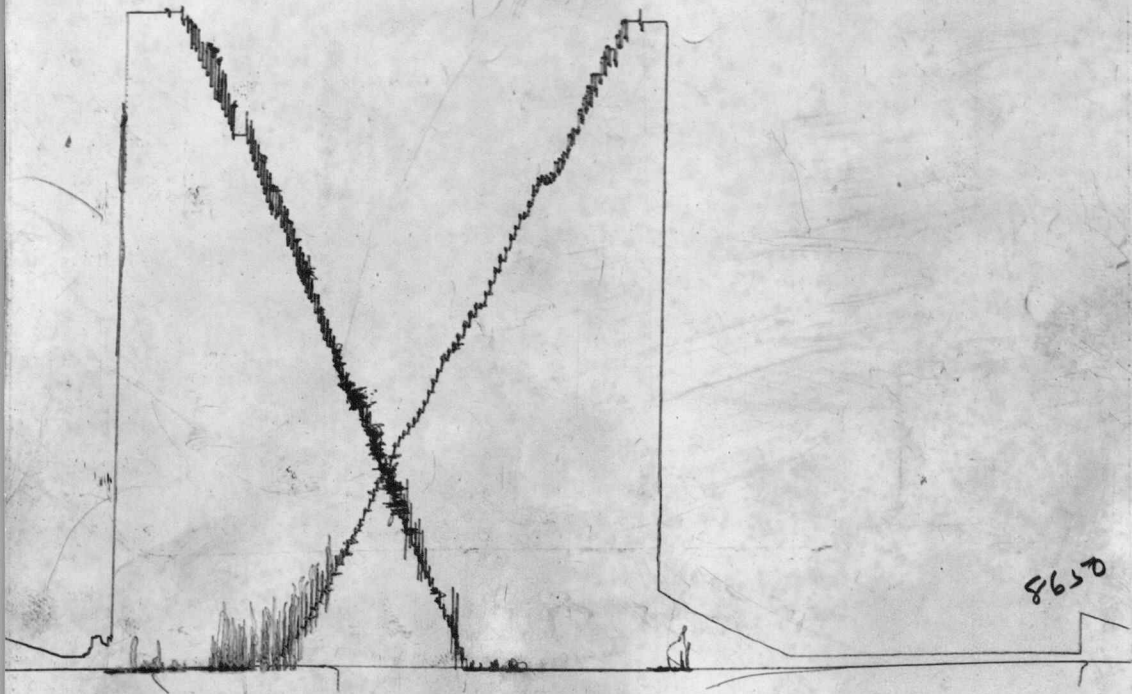
WEAK BLOW THROUGHOUT TEST.

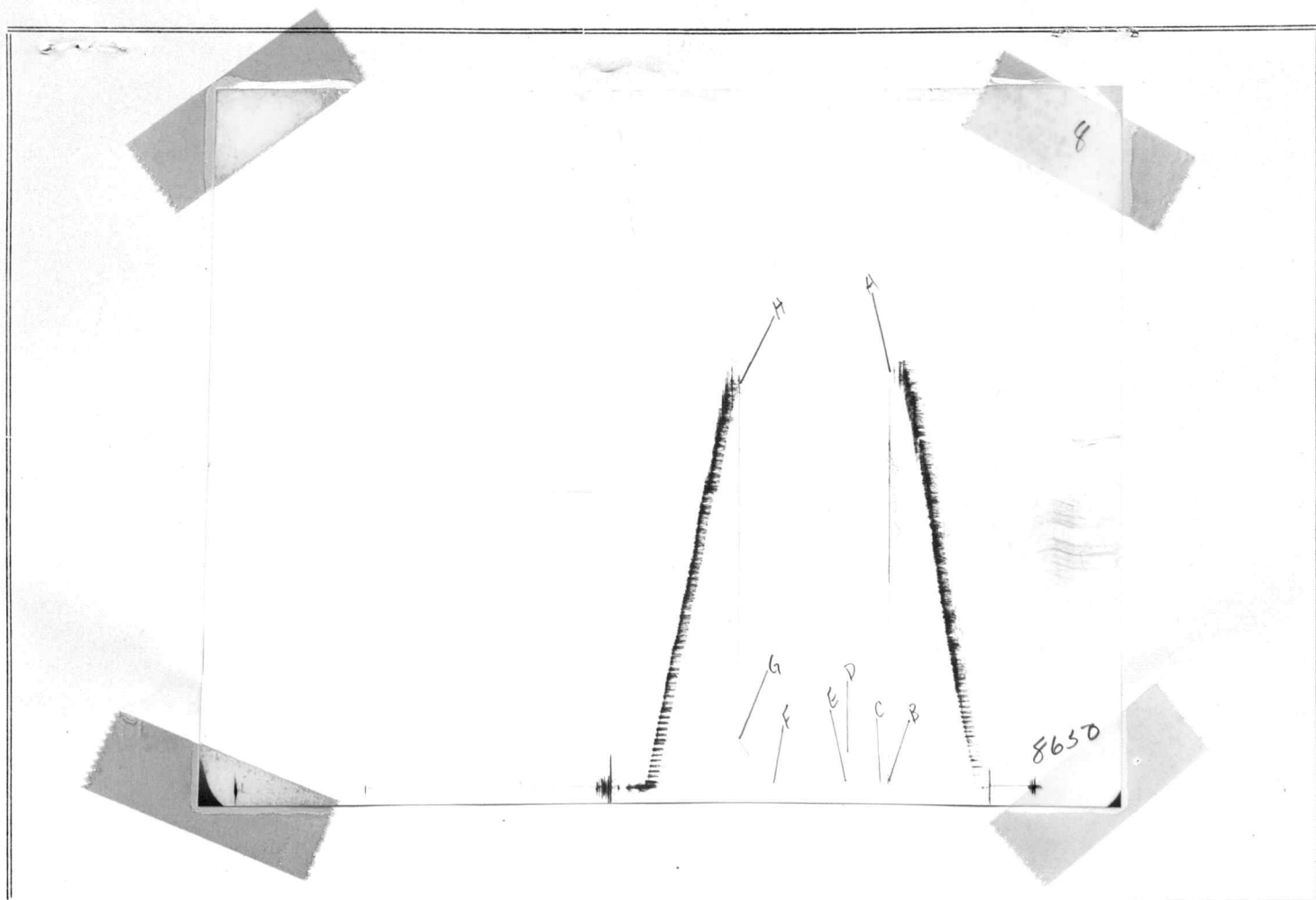
25 FEET OF MUD.

Lease and Well No. NIELSON A-1 18 315 17W 1980 FWL 1980 FSI
Formation Test No. _____

18-315-17W
L

outside Recorder





Tool Open: 1st Flow 5 hrs: 5 mins: Shut-in Initial 30 min: 2nd Flow 60 min: Shut-in Final 30 min.

	Field Reading	Corrected Reading
(A) Initial Hydrostatic Pressure	<u>2644</u>	<u>2690</u>
(B) Initial 1st Flow Pressure	<u>22</u>	<u>11</u>
(C) Final 1st Flow Pressure	<u>22</u>	<u>11</u>
(D) Initial Shut-in Pressure	<u>79</u>	<u>179</u>
(E) Initial 2nd Flow Pressure	<u>15</u>	<u>16</u>
(F) Final 2nd Flow Pressure	<u>11</u>	<u>13</u>
(G) Final Shut-in Pressure	<u>290</u>	<u>295</u>
(H) Final Hydrostatic Pressure	<u>2632</u>	<u>2644</u>

MILLER TESTING COMPANY

Box-547

GREAT BEND, KANSAS

Company CITIES SERVICE OIL

Lease and Well No. NIELSON A

County COMMANCHE State KANSAS Date OCTOBER 11, 1967

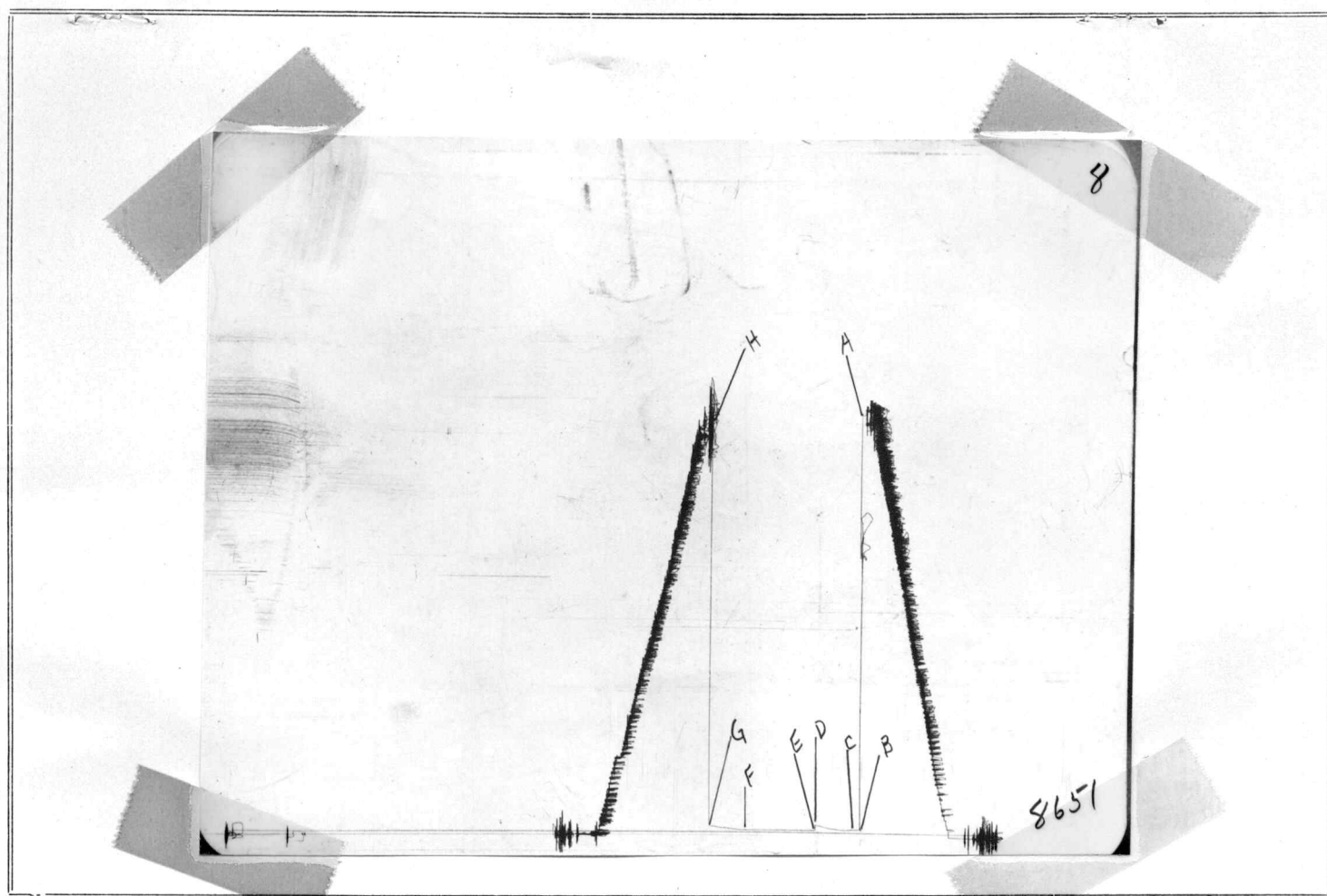
Formation Test No. 5 Total Depth 5070 Elev. 2077
 Interval Tested 5043 To 5070 Anchor Length 27'
 Size Hole 7 7/8 Size Drill Pipe 4 1/2 FH Size Packer 6 3/4
 Mud Weight 9.6 Viscosity 54 Water Loss 11.6 c.c. Bottom Hole Temp. 113 °F
 Chokes: Top 1/2 Bottom 1/2 Ticket No. 8651

RECOVERY

VERY WEAK THROUGHOUT TEST.

15 FEET SLIGHTLY OIL SPOTTED MUD.

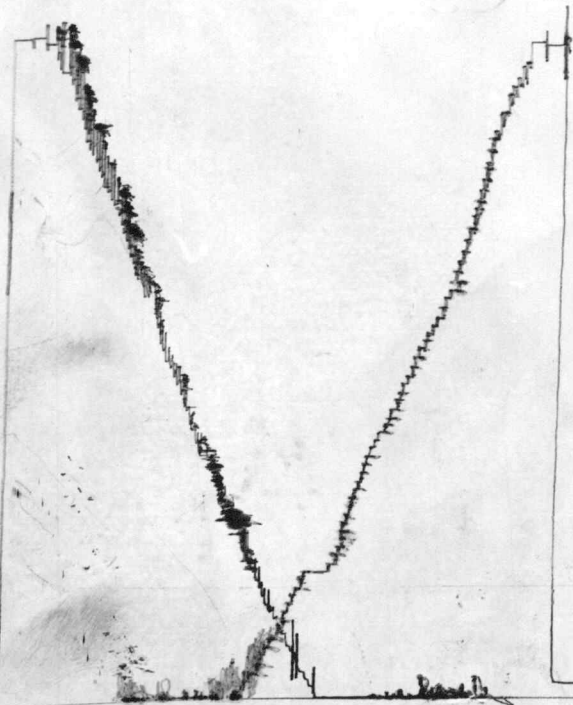
Lease and Well No. NIELSON A-1 18 31S 17W 1980 FWL 1980 FSL
 Formation Test No. 5 19-31S-17W



Tool Open: 1st Flow 5 hr. 5 mins: Shut-in Initial 30 hr. 30 min: 2nd Flow 60 hr. 60 min: Shut-in Final 30 hr. 30 min.

	Field Reading	Corrected Reading
(A) Initial Hydrostatic Pressure	<u>2644</u>	<u>2706</u>
(B) Initial 1st Flow Pressure	<u>22</u>	<u>22</u>
(C) Final 1st Flow Pressure	<u>22</u>	<u>22</u>
(D) Initial Shut-in Pressure	<u>56</u>	<u>52</u>
(E) Initial 2nd Flow Pressure	<u>11</u>	<u>13</u>
(F) Final 2nd Flow Pressure	<u>11</u>	<u>13</u>
(G) Final Shut-in Pressure	<u>45</u>	<u>43</u>
(H) Final Hydrostatic Pressure	<u>2644</u>	<u>2690</u>

Outside Recorder



8657

MILLER TESTING COMPANY

Box 547

GREAT BEND, KANSAS

Company CITIES SERVICE OIL CO.

Lease and Well No. NIELSON A-1

County COMMANCHE State KANSAS Date OCTOBER 16, 1967

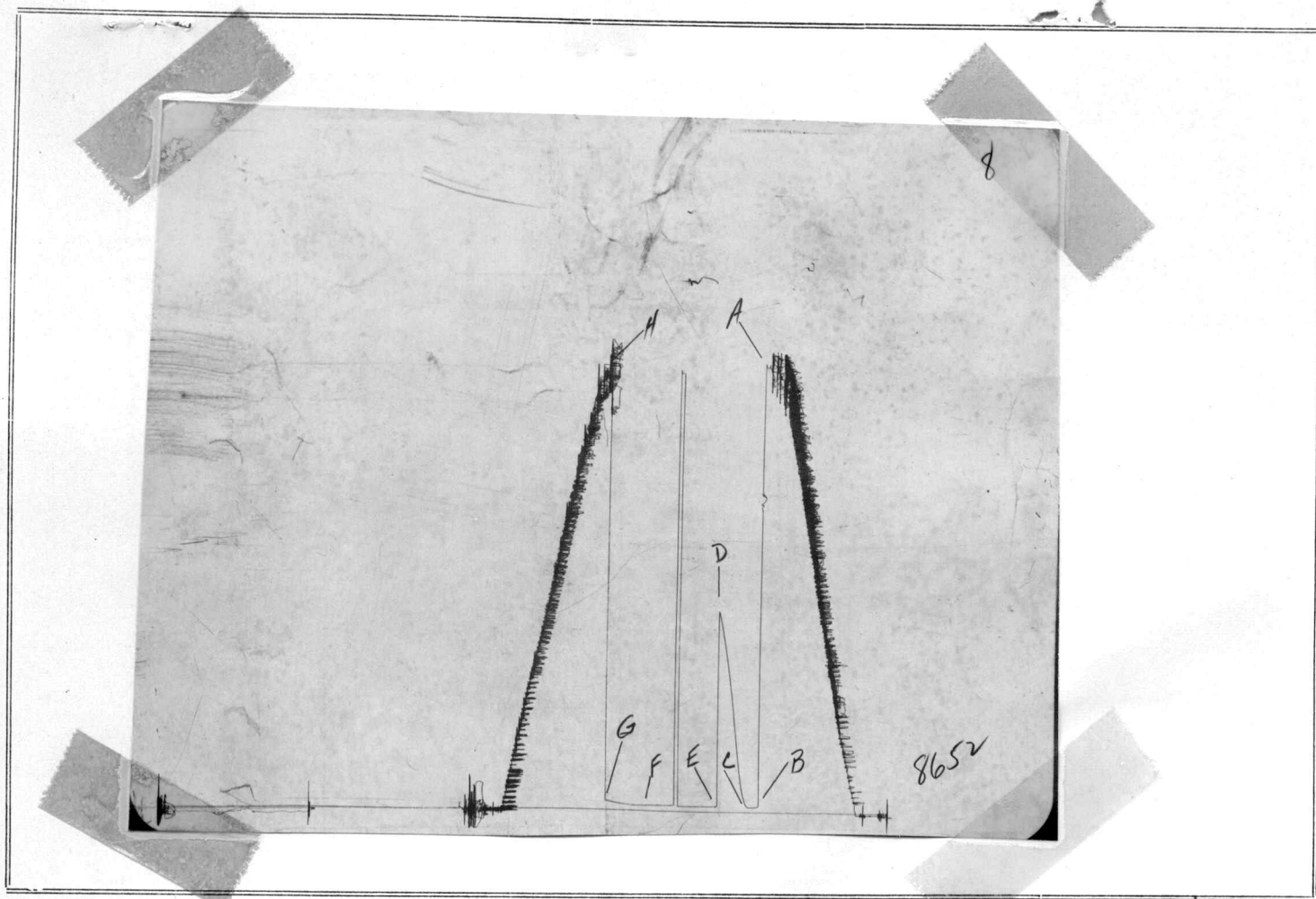
Formation Test No.	<u>6</u>	Total Depth	<u>5435</u>	Elev.	<u>2077 DF</u>
Interval Tested	<u>5400</u>	To	<u>5435</u>	Anchor Length	<u>35'</u>
Size Hole	<u>7 7/8</u>	Size Drill Pipe	<u>4 1/2 FH</u>	Size Packer	<u>6 3/4</u>
Mud Weight	<u>9.7</u>	Viscosity	<u>55</u>	Water Loss	<u>10.8</u> c.c.
				Bottom Hole Temp.	<u>115</u> ° F
Chokes: Top	<u>1/2</u>	Bottom	<u>1/2</u>	Ticket No.	<u>8652</u>

RECOVERY

VERY WEAK BLOW FOR 30 MINUTES. FLUSHED TOOL. NO BLOW.
15 FEET OF MUD.

Lease and Well No. NIELSON A-1 18 31S 17W 1980 FWT 1980 FSL Formation Test No. 6

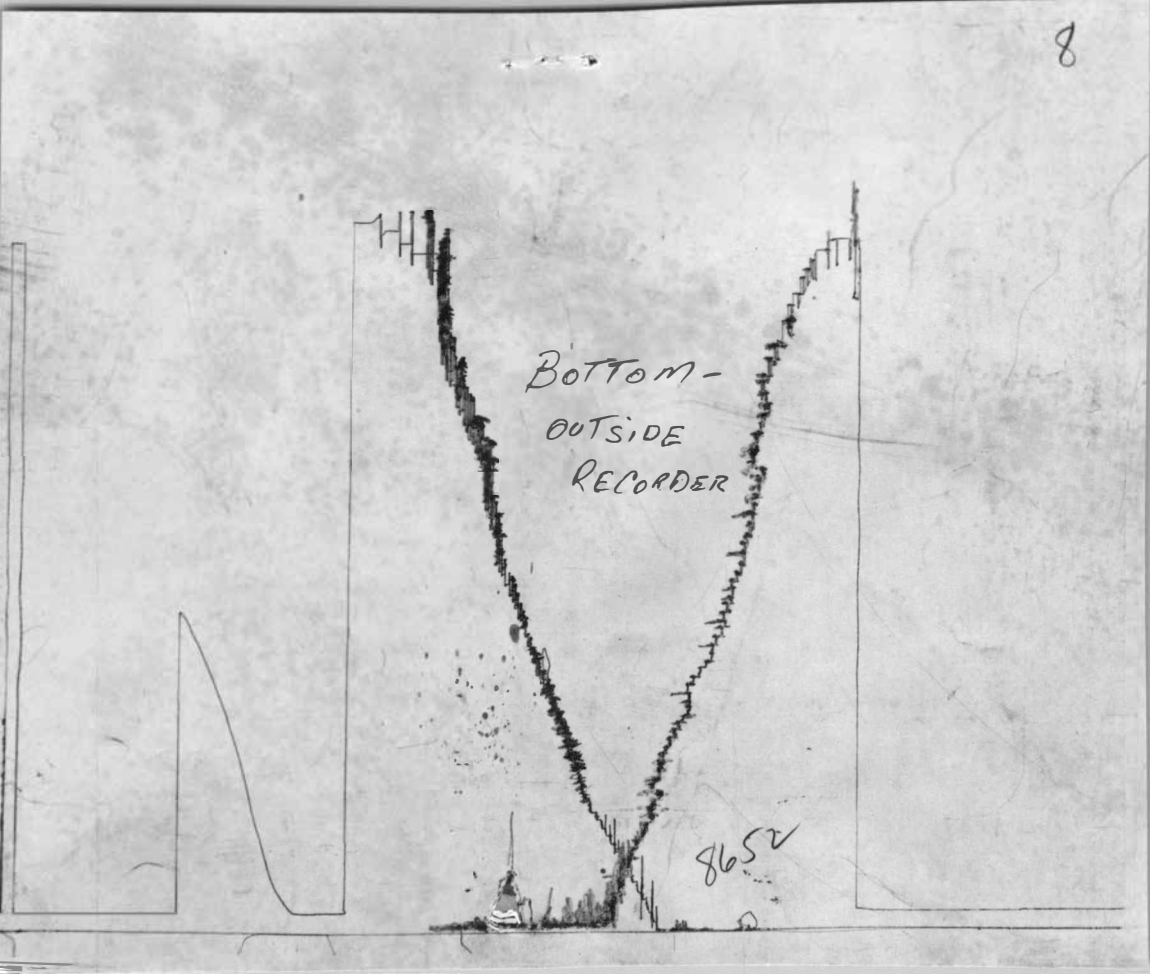
18-31S-17W



Tool Open: 1st Flow hr. 5 mins; Shut-in Initial hr. 30 min: 2nd Flow hr. 60 min: Shut-in Final hr. 30 min.

	Field Reading	Corrected Reading
(A) Initial Hydrostatic Pressure	<u>2874</u>	<u>2908</u>
(B) Initial 1st Flow Pressure	<u>45</u>	<u>34</u>
(C) Final 1st Flow Pressure	<u>45</u>	<u>34</u>
(D) Initial Shut-in Pressure	<u>1280</u>	<u>1282</u>
(E) Initial 2nd Flow Pressure	<u>45</u>	<u>36</u>
(F) Final 2nd Flow Pressure	<u>45</u>	<u>36</u>
(G) Final Shut-in Pressure	<u>56</u>	<u>65</u>
(H) Final Hydrostatic Pressure	<u>2874</u>	<u>2862</u>

8652



A hand-drawn sketch on a piece of paper. The central feature is a large, inverted V-shape. The two arms of the V are drawn with very jagged, irregular lines, suggesting a rough or noisy measurement. The bottom of the V is sharp and points downwards. To the left of the V, there is a smooth, continuous curve that starts at a low level, rises to a peak, and then falls back to the starting level. The entire drawing is enclosed within a simple rectangular frame. The text 'BOTTOM- OUTSIDE RECORDER' is written in the center of the V, and '8652' is written near the bottom right of the V.

BOTTOM-
OUTSIDE
RECORDER

8652