

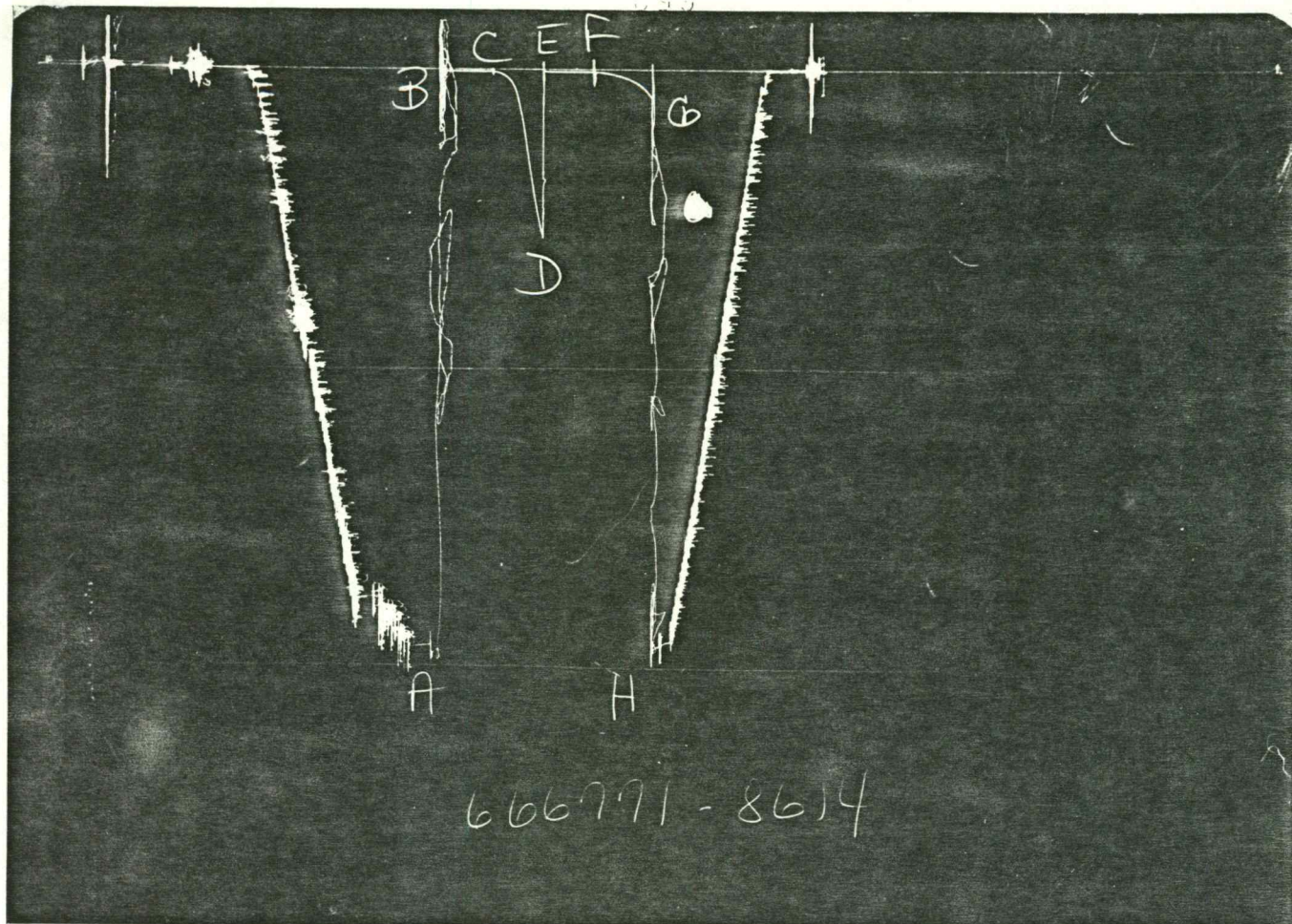
LEGAL LOCATION SEC. - TWP. - RANG.	LEASE NAME	WELL NO.	TEST NO.	TESTED INTERVAL	COUNTY	THOMAS	STATE	KANSAS	PW
21 - 10 SOUTH - 31 WEST	OTTLEY	1	1	4049.' - 4069.'	N.W. CAMPUS				

SW - SE - NE



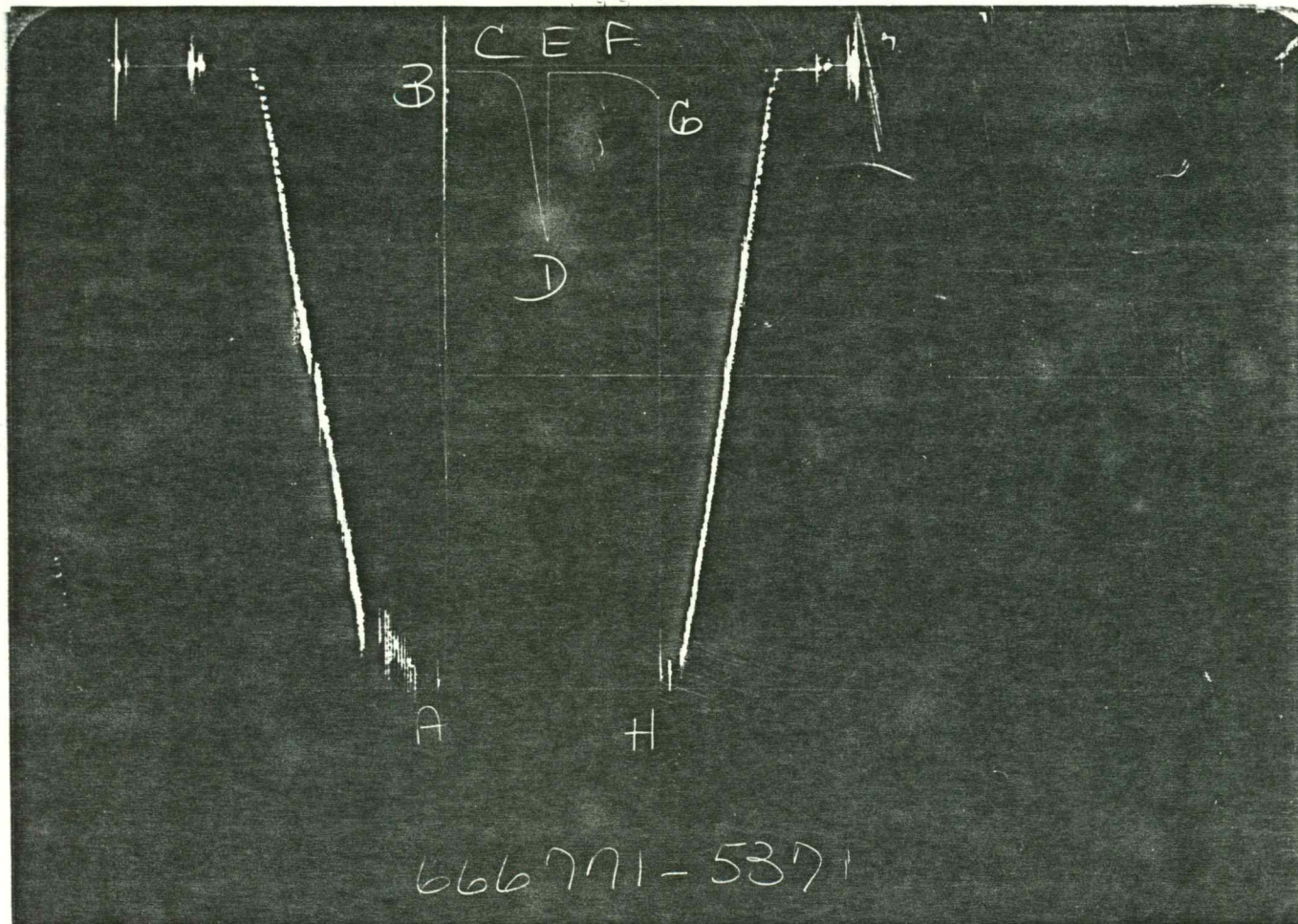
TICKET NO. 66677100
29-DEC-83
OBERLIN

FORMATION TESTING SERVICE REPORT



GAUGE NO: 8614 DEPTH: 4039.0 BLANKED OFF: NO HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC		1931.7			
B	INITIAL FIRST FLOW		6.7			
C	FINAL FIRST FLOW		6.7	30.0	30.0	F
C	INITIAL FIRST CLOSED-IN		6.7			
D	FINAL FIRST CLOSED-IN		548.8	30.0	30.0	C
E	INITIAL SECOND FLOW		7.3			
F	FINAL SECOND FLOW		8.3	30.0	30.0	F
F	INITIAL SECOND CLOSED-IN		8.3			
G	FINAL SECOND CLOSED-IN		88.7	35.0	35.0	C
H	FINAL HYDROSTATIC		1931.7			



GAUGE NO: 537 DEPTH: 4066.0 BLANKED OFF: YES HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC	1947	1947.0			
B	INITIAL FIRST FLOW	16	22.3	30.0	30.0	F
C	FINAL FIRST FLOW	16	22.3			
C	INITIAL FIRST CLOSED-IN	16	22.3	30.0	30.0	C
D	FINAL FIRST CLOSED-IN	564	568.2			
E	INITIAL SECOND FLOW	16	31.0	30.0	30.0	F
F	FINAL SECOND FLOW	16	25.5			
F	INITIAL SECOND CLOSED-IN	16	25.5	35.0	35.0	C
G	FINAL SECOND CLOSED-IN	97	106.2			
H	FINAL HYDROSTATIC	1947	1947.0			

EQUIPMENT & HOLE DATA

FORMATION TESTED: L.K.C. (70' ZONE)
 NET PAY (ft): 3.0
 GROSS TESTED FOOTAGE: 20.0
 ALL DEPTHS MEASURED FROM: KELLY BUSHING
 CASING PERFS. (ft): _____
 HOLE OR CASING SIZE (in): 7.875
 ELEVATION (ft): 2949
 TOTAL DEPTH (ft): 4069.0
 PACKER DEPTH(S) (ft): 4049
 FINAL SURFACE CHOKE (in): _____
 BOTTOM HOLE CHOKE (in): 0.750
 MUD WEIGHT (lb/gal): 9.20
 MUD VISCOSITY (sec): 39
 ESTIMATED HOLE TEMP. (°F): _____
 ACTUAL HOLE TEMP. (°F): 106 @ 4064.0 ft

TICKET NUMBER: 66677100

DATE: 12-19-83 TEST NO: 1

TYPE DST: OPEN HOLE

HALLIBURTON CAMP: OBERLIN

TESTER: RICK DEIBERT

WITNESS: RICH ROBBA

DRILLING CONTRACTOR: SLAWSON RIG #3

FLUID PROPERTIES FOR RECOVERED MUD & WATER

SOURCE	RESISTIVITY	CHLORIDES
MUD REPORT	_____ @ _____ °F	<u>3500</u> ppm
_____	_____ @ _____ °F	_____ ppm
_____	_____ @ _____ °F	_____ ppm
_____	_____ @ _____ °F	_____ ppm
_____	_____ @ _____ °F	_____ ppm
_____	_____ @ _____ °F	_____ ppm

SAMPLER DATA

Psig AT SURFACE: _____
 cu.ft. OF GAS: _____
 cc OF OIL: _____
 cc OF WATER: _____
 cc OF MUD: _____
 TOTAL LIQUID cc: _____

HYDROCARBON PROPERTIES

OIL GRAVITY (°API): _____ @ _____ °F
 GAS/OIL RATIO (cu.ft. per bbl): _____
 GAS GRAVITY: _____

CUSHION DATA

TYPE	AMOUNT	WEIGHT
_____	_____	_____
_____	_____	_____

RECOVERED:

2 FEET OF HEAVY OIL CUT MUD

MEASURED FROM
TESTER VALVE

REMARKS:

TICKET NO: 66677100

[illegible]

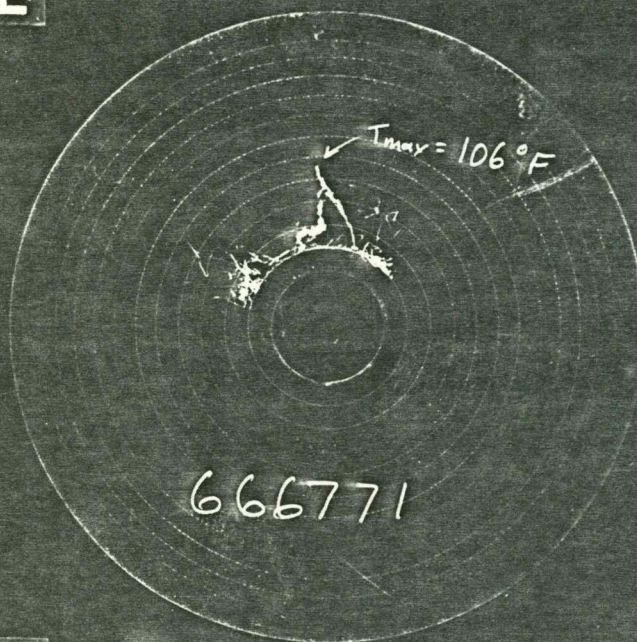
		O.D.	I.D.	LENGTH	DEPTH
1		4.500	3.826	3901.0	
50		6.000	3.000	1.0	3902.0
1		4.500	2.830	125.6	
12		5.030	0.870	6.0	
60		5.000	0.750	5.0	4037.0
80		5.000	2.250	4.1	4039.0
16		5.000	1.000	2.8	
70		6.750	1.530	5.8	4049.0
20		5.000	2.370	13.0	
83		5.000		1.5	4064.0
81		5.000		4.1	4066.0
TOTAL DEPTH					4069.0

EQUIPMENT DATA

TEMPERATURE

RECORDER

CHART



10° each circle

Indicated Flow
Capacity

$$kh = \frac{1637 Q_g T}{m}$$

md-ft

Average Effective
Permeability

$$k = \frac{kh}{h}$$

md

Skin Factor

$$S = 1.151 \left[\frac{m(P^*) - m(P_f)}{m} - \text{LOG} \frac{kt}{\phi \mu c_1 r_w^2} + 3.23 \right] \text{ ---}$$

Damage Ratio

$$DR = \frac{m(P^*) - m(P_f)}{m(P^*) - m(P_f) - 0.87 \text{ mS}} \text{ ---}$$

Indicated Flow
Rate (Maximum)

$$AOF_1 = \frac{Q_g m(P^*)}{m(P^*) - m(P_f)} \text{ MCFD}$$

Indicated Flow
Rate (Minimum)

$$AOF_2 = Q_g \sqrt{\frac{m(P^*)}{m(P^*) - m(P_f)}} \text{ MCFD}$$

Approx. Radius of
Investigation

$$r_i = 0.032 \sqrt{\frac{kt}{\phi \mu c_1}} \text{ ft}$$

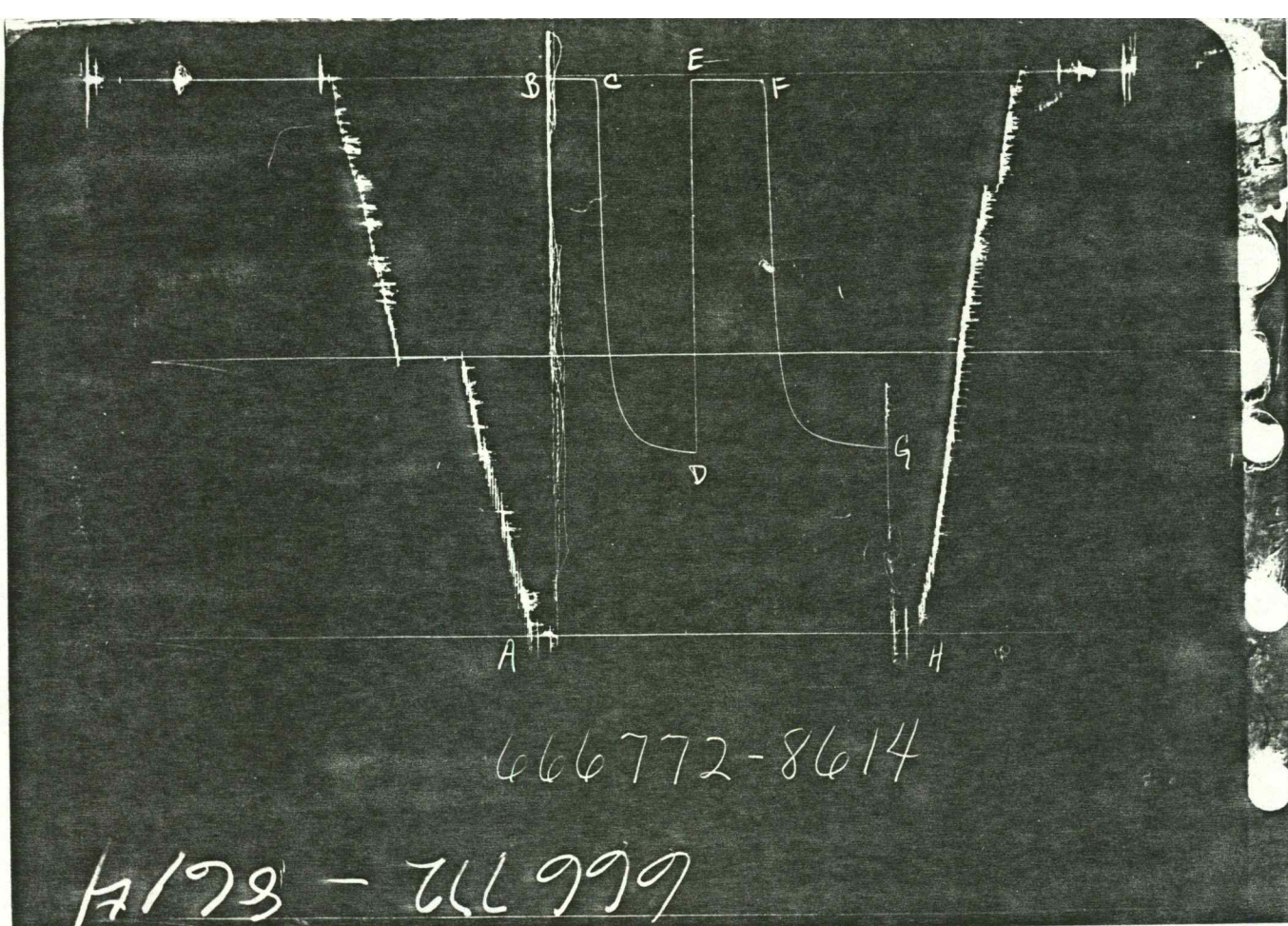
LEGAL LOCATION SEC. - TWP. - RNG.	WELL NO.	TEST NO.	TESTED INTERVAL	COUNTY	THOMAS	STATE	KANSAS	BC
21-10S-31W	1	2	4103. - 4156.					

SW-SE-NE



TICKET NO. 66677200
30-DEC-83
OBERLIN

FORMATION TESTING SERVICE REPORT



GAUGE NO: 8614 DEPTH: 4093.0 BLANKED OFF: NO HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC	2028	1984.2			
B	INITIAL FIRST FLOW	17	7.7	30.0	30.5	F
C	FINAL FIRST FLOW	17	14.5			
C	INITIAL FIRST CLOSED-IN	17	14.5	60.0	60.4	C
D	FINAL FIRST CLOSED-IN	1346	1347.7			
E	INITIAL SECOND FLOW	17	16.7	45.0	45.6	F
F	FINAL SECOND FLOW	33	21.6			
F	INITIAL SECOND CLOSED-IN	33	21.6	75.0	74.6	C
G	FINAL SECOND CLOSED-IN	1330	1335.9			
H	FINAL HYDROSTATIC	1978	1981.7			

666772-537

GAUGE NO: 537 DEPTH: 4153.0 BLANKED OFF: YES HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC					
B	INITIAL FIRST FLOW			30.0		F
C	FINAL FIRST FLOW					
C	INITIAL FIRST CLOSED-IN			60.0		C
D	FINAL FIRST CLOSED-IN					
E	INITIAL SECOND FLOW			45.0		F
F	FINAL SECOND FLOW					
F	INITIAL SECOND CLOSED-IN			75.0		C
G	FINAL SECOND CLOSED-IN					
H	FINAL HYDROSTATIC					

EQUIPMENT & HOLE DATA

FORMATION TESTED: LOWER K.C. 140' ZONE
NET PAY (ft): 5.0
GROSS TESTED FOOTAGE: 53.0
ALL DEPTHS MEASURED FROM: KB
CASING PERFS. (ft): _____
HOLE OR CASING SIZE (in): 7.875
ELEVATION (ft): 2949
TOTAL DEPTH (ft): 4156.0
PACKER DEPTH(S) (ft): 4103
FINAL SURFACE CHOKE (in): _____
BOTTOM HOLE CHOKE (in): 0.750
MUD WEIGHT (lb/gal): 9.30
MUD VISCOSITY (sec): 45
ESTIMATED HOLE TEMP. (°F): _____
ACTUAL HOLE TEMP. (°F): 112 @ 4151.9 ft

TICKET NUMBER: 66677200

DATE: 12-21-83 TEST NO: 2

TYPE DST: OPEN HOLE

HALLIBURTON CAMP: OBERLIN

TESTER: DEIBERT

WITNESS: ROBBA

DRILLING CONTRACTOR: SLAWSON DRILLING COMPANY RIG #3

FLUID PROPERTIES FOR RECOVERED MUD & WATER

SOURCE	RESISTIVITY	CHLORIDES
_____	_____ @ _____ °F	_____ ppm
_____	_____ @ _____ °F	_____ ppm
_____	_____ @ _____ °F	_____ ppm
_____	_____ @ _____ °F	_____ ppm
_____	_____ @ _____ °F	_____ ppm
_____	_____ @ _____ °F	_____ ppm

SAMPLER DATA

Psig AT SURFACE: _____
cu.ft. OF GAS: _____
cc OF OIL: _____
cc OF WATER: _____
cc OF MUD: _____
TOTAL LIQUID cc: _____

HYDROCARBON PROPERTIES

OIL GRAVITY (°API): _____ @ _____ °F
GAS/OIL RATIO (cu.ft. per bbl): _____
GAS GRAVITY: _____

CUSHION DATA

TYPE	AMOUNT	WEIGHT
_____	_____	_____
_____	_____	_____

RECOVERED:

33' OF MUD WITH A FEW OIL SPOTS

MEASURED FROM
TESTER VALVE

REMARKS:

NO READINGS AVAILABLE FOR GAUGE #537. STYLUS WAS NOT ENGAGED DURING THE TEST.

TYPE & SIZE MEASURING DEVICE:

TICKET NO: 66677200

[illegible]

TICKET NO: 66677200

CLOCK NO: 20684 HOUR: 12



GAUGE NO: 8614

DEPTH: 4093.0

REF	MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta t}{t + \Delta t}$	$\log \frac{t + \Delta t}{\Delta t}$
FIRST FLOW					
B 1	0.0	7.7			
2	5.0	8.5	0.8		
3	10.0	9.3	0.8		
4	15.0	10.0	0.7		
5	20.0	10.7	0.7		
6	25.0	11.4	0.7		
C 7	30.5	14.5	3.1		
FIRST CLOSED-IN					
C 1	0.0	14.5			
2	1.0	75.9	61.4	1.0	1.504
3	2.0	302.4	287.9	1.9	1.216
4	3.0	582.6	568.1	2.7	1.053
5	4.0	739.6	725.1	3.5	0.937
6	5.0	872.7	858.2	4.3	0.855
7	6.0	959.3	944.8	5.0	0.787
8	7.0	1018.7	1004.2	5.7	0.731
9	8.0	1068.2	1053.7	6.3	0.683
10	9.0	1104.1	1089.6	6.9	0.644
11	10.0	1133.9	1119.4	7.5	0.607
12	12.0	1173.7	1159.2	8.6	0.550
13	14.0	1204.4	1189.9	9.6	0.503
14	16.0	1228.4	1213.9	10.5	0.464
15	18.0	1248.8	1234.3	11.3	0.431
16	20.0	1265.2	1250.7	12.1	0.403
17	22.0	1279.5	1265.0	12.8	0.378
18	24.0	1289.7	1275.2	13.4	0.357
19	26.0	1299.0	1284.5	14.0	0.337
20	28.0	1305.9	1291.4	14.6	0.320
21	30.0	1311.5	1297.0	15.1	0.305
22	35.0	1323.1	1308.6	16.3	0.272
23	40.0	1329.6	1315.1	17.3	0.246
24	45.0	1336.5	1322.0	18.2	0.225
25	50.0	1340.9	1326.4	19.0	0.207
26	55.0	1344.4	1329.9	19.6	0.192
D 27	60.4	1347.7	1333.2	20.3	0.178
SECOND FLOW					
E 1	0.0	16.7			
2	6.0	17.4	0.7		
3	12.0	17.4	0.0		
4	18.0	18.1	0.7		
5	24.0	18.7	0.7		
6	30.0	18.7	0.0		
7	36.0	20.6	1.8		
8	42.0	21.5	0.9		
F 9	45.6	21.6	0.1		

REF	MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta t}{t + \Delta t}$	$\log \frac{t + \Delta t}{\Delta t}$
SECOND CLOSED-IN					
F 1	0.0	21.6			
2	1.0	46.0	24.4	1.0	1.893
3	2.0	109.8	88.2	2.0	1.591
4	3.0	274.2	252.6	2.9	1.424
5	4.0	480.8	459.2	3.8	1.305
6	5.0	663.7	642.1	4.7	1.213
7	6.0	819.0	797.4	5.6	1.133
8	7.0	913.7	892.1	6.4	1.073
9	8.0	987.0	965.4	7.3	1.021
10	9.0	1034.8	1013.2	8.0	0.977
11	10.0	1078.1	1056.5	8.8	0.935
12	12.0	1134.5	1112.9	10.4	0.865
13	14.0	1174.6	1153.0	11.9	0.807
14	16.0	1204.4	1182.8	13.2	0.760
15	18.0	1223.8	1202.3	14.6	0.718
16	20.0	1241.9	1220.4	15.9	0.681
17	22.0	1255.1	1233.5	17.1	0.649
18	24.0	1266.8	1245.2	18.3	0.620
19	26.0	1275.2	1253.7	19.4	0.594
20	28.0	1282.3	1260.7	20.5	0.570
21	30.0	1288.5	1266.9	21.5	0.549
22	35.0	1299.8	1278.3	24.0	0.502
23	40.0	1308.7	1287.1	26.2	0.463
24	45.0	1315.4	1293.8	28.3	0.430
25	50.0	1320.3	1298.7	30.2	0.402
26	55.0	1324.3	1302.8	31.9	0.377
27	60.0	1328.2	1306.6	33.6	0.356
28	70.0	1334.4	1312.8	36.5	0.320
G 29	74.6	1335.9	1314.3	37.7	0.306

REMARKS:

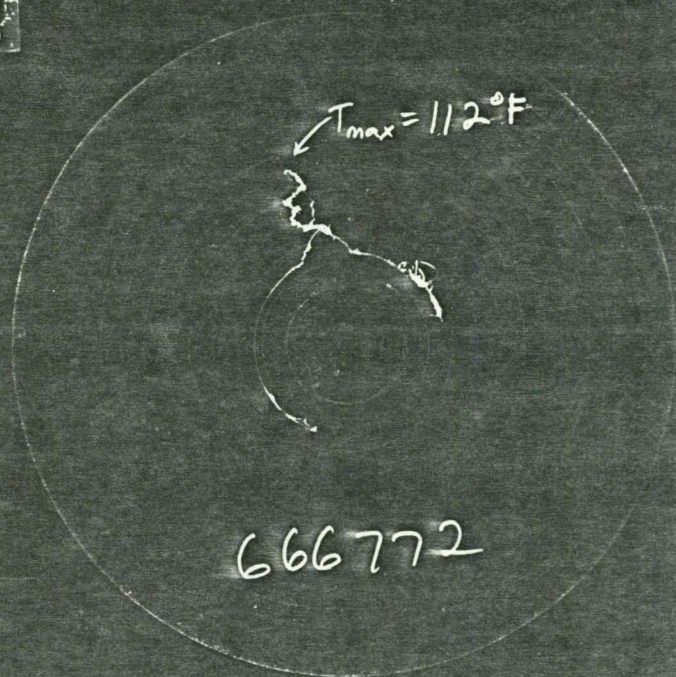
		O.D.	I.D.	LENGTH	DEPTH	
1		DRILL PIPE.....	4.500	3.826	3953.8	
50		IMPACT REVERSING SUB.....	6.000	3.000	1.0	3954.8
1		DRILL PIPE.....	4.500	2.870	125.6	
12		DUAL CIP VALVE.....	5.030	0.870	6.0	
60		HYDROSPRING TESTER.....	5.000	0.750	5.0	4090.6
80		AP RUNNING CASE.....	5.000	2.250	4.1	4093.0
16		VR SAFETY JOINT.....	5.000	1.000	2.8	
70		OPEN HOLE PACKER.....	6.750	1.530	5.8	4103.0
5		CROSSOVER.....	6.000	3.000	1.0	
1		DRILL PIPE.....	4.500	3.826	31.0	
5		CROSSOVER.....	6.000	3.000	1.0	
20		FLUSH JOINT ANCHOR.....	5.000	2.370	13.0	
83		HT-500 TEMPERATURE CASE.....	5.000		1.5	4151.0
81		BLANKED-OFF RUNNING CASE.....	5.000		4.1	4153.0
TOTAL DEPTH					4156.0	

EQUIPMENT DATA

TEMPERATURE

RECORDER

CHART



10° each circle

Indicated Flow
Capacity

$$kh = \frac{1637 Q_g T}{m}$$

md-ft

Average Effective
Permeability

$$k = \frac{kh}{h}$$

md

Skin Factor

$$S = 1.151 \left[\frac{m(P^*) - m(P_f)}{m} - \text{LOG} \frac{kt}{\phi \mu c_f r_w^2} + 3.23 \right] \text{ ---}$$

Damage Ratio

$$DR = \frac{m(P^*) - m(P_f)}{m(P^*) - m(P_f) - 0.87 mS} \text{ ---}$$

Indicated Flow
Rate (Maximum)

$$AOF_1 = \frac{Q_g m(P^*)}{m(P^*) - m(P_f)}$$

MCFD

Indicated Flow
Rate (Minimum)

$$AOF_2 = Q_g \sqrt{\frac{m(P^*)}{m(P^*) - m(P_f)}}$$

MCFD

Approx. Radius of
Investigation

$$r_i = 0.032 \sqrt{\frac{kt}{\phi \mu c_f}}$$

ft

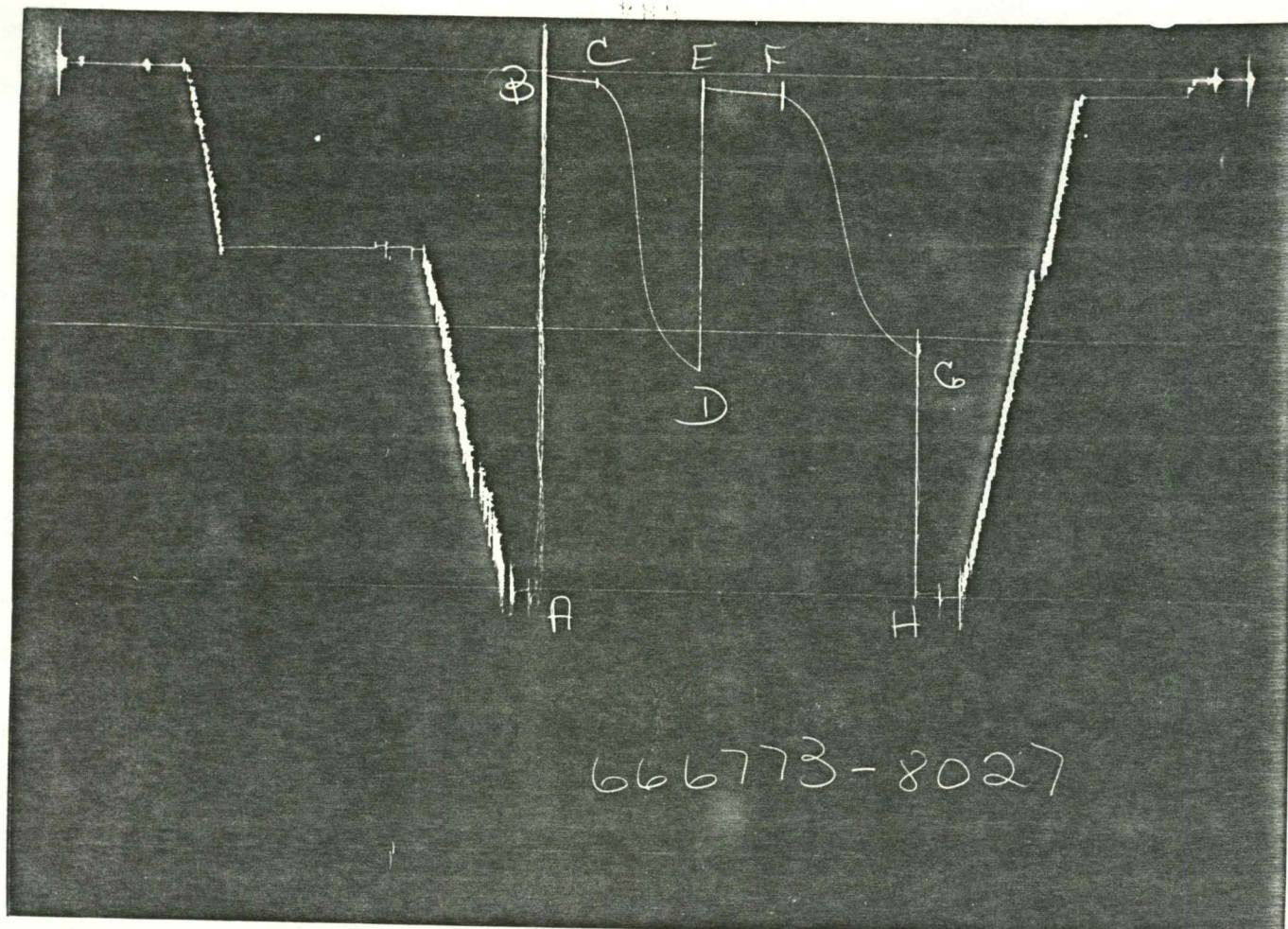


TICKET NO. 66677300
04-JAN-84
OBERLIN

FORMATION TESTING SERVICE REPORT

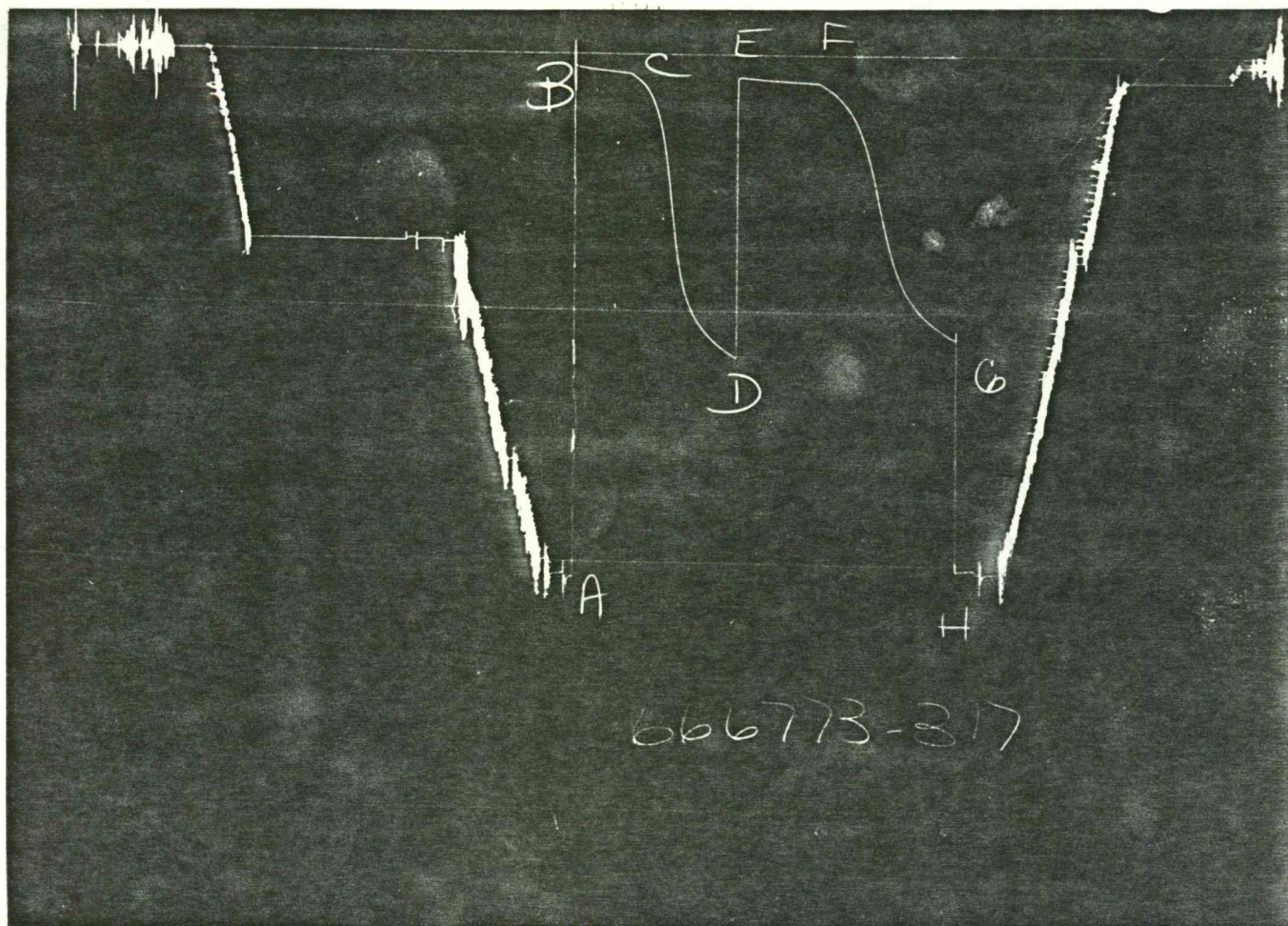
OTILEY	1	1	3	4145.1 - 4206.1	DONALD C. SLAWSON & PEIKULEUM, INC.
LEASE NAME	WELL NO.	TEST NO.	TESTED INTERVAL	LEASE OWNER/COMPANY NAME	
LEGAL LOCATION SEC. - TWP. - RNC.	21 - 10 S - 31 W	FIELD AREA	NORTHWEST OF CAMPUS	COUNTY	THOMAS
				STATE	KANSAS
					PW

NW-SF-NC



GAUGE NO: 8027 DEPTH: 4134.9 BLANKED OFF: NO HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC		2003.3			
B	INITIAL FIRST FLOW		17.2			
C	FINAL FIRST FLOW		43.7	30.0	30.7	F
C	INITIAL FIRST CLOSED-IN		43.7			
D	FINAL FIRST CLOSED-IN		1150.5	60.0	59.9	C
E	INITIAL SECOND FLOW		56.8			
F	FINAL SECOND FLOW		77.9	45.0	44.6	F
F	INITIAL SECOND CLOSED-IN		77.9			
G	FINAL SECOND CLOSED-IN		1076.8	78.0	77.8	C
H	FINAL HYDROSTATIC		1999.8			



GAUGE NO: 317 DEPTH: 4203.0 BLANKED OFF: YES HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC	2050	2042.5			
B	INITIAL FIRST FLOW	42	46.8	30.0	30.7	F
C	FINAL FIRST FLOW	62	74.5			
C	INITIAL FIRST CLOSED-IN	62	74.5	60.0	59.9	C
D	FINAL FIRST CLOSED-IN	1182	1182.4			
E	INITIAL SECOND FLOW	83	93.8	45.0	44.6	F
F	FINAL SECOND FLOW	104	108.8			
F	INITIAL SECOND CLOSED-IN	104	108.8	78.0	77.8	C
G	FINAL SECOND CLOSED-IN	1109	1110.2			
H	FINAL HYDROSTATIC	2024	2037.3			

EQUIPMENT & HOLE DATA

FORMATION TESTED: LKC 160'-180'
 NET PAY (ft): _____
 GROSS TESTED FOOTAGE: 61.4
 ALL DEPTHS MEASURED FROM: KELLY BUSHING
 CASING PERFS. (ft): _____
 HOLE OR CASING SIZE (in): 7.875
 ELEVATION (ft): 2949
 TOTAL DEPTH (ft): 4206.0
 PACKER DEPTH(S) (ft): 4145
 FINAL SURFACE CHOKE (in): 0.250
 BOTTOM HOLE CHOKE (in): 0.750
 MUD WEIGHT (lb/gal): 9.30
 MUD VISCOSITY (sec): 40
 ESTIMATED HOLE TEMP. (°F): _____
 ACTUAL HOLE TEMP. (°F): 110 @ 4200.4 ft

TICKET NUMBER: 66677300DATE: 12-22-83 TEST NO: 3TYPE DST: OPEN HOLEHALLIBURTON CAMP:
OBERLINTESTER: RICK DEIBERTWITNESS: RICH ROBBADRILLING CONTRACTOR:
SLAWSON RIG #3FLUID PROPERTIES FOR
RECOVERED MUD & WATER

SOURCE	RESISTIVITY	CHLORIDES
_____	_____ @ _____ °F	_____ ppm
_____	_____ @ _____ °F	_____ ppm
_____	_____ @ _____ °F	_____ ppm
_____	_____ @ _____ °F	_____ ppm
_____	_____ @ _____ °F	_____ ppm
_____	_____ @ _____ °F	_____ ppm

SAMPLER DATA

Pstg AT SURFACE: _____
 cu.ft. OF GAS: _____
 cc OF OIL: _____
 cc OF WATER: _____
 cc OF MUD: _____
 TOTAL LIQUID cc: _____

HYDROCARBON PROPERTIES

OIL GRAVITY (°API): 39.7 @ 60°F
 GAS/OIL RATIO (cu.ft. per bbl): _____
 GAS GRAVITY: _____

CUSHION DATA

TYPE	AMOUNT	WEIGHT
_____	_____	_____
_____	_____	_____

RECOVERED:

100 FEET OF GAS IN PIPE
 5 FEET OF FREE OIL
 20 FEET OF HEAVY OIL CUT MUD (25% OIL - 75% MUD)
 120 FEET OF SLIGHTLY OIL CUT MUD (8% OIL - 92% MUD)

MEASURED FROM
TESTER VALVE

REMARKS:

[illegible]

TICKET NO: 66677300

CLOCK NO: 20684 HOUR: 12



GAUGE NO: 8027

DEPTH: 4134.9

REF	MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta t}{t + \Delta t}$	$\log \frac{t + \Delta t}{\Delta t}$
FIRST FLOW					
B 1	0.0	17.2			
2	5.0	22.4	5.2		
3	10.0	28.2	5.8		
4	15.0	32.0	3.8		
5	20.0	35.7	3.7		
6	25.0	39.0	3.2		
C 7	30.7	43.7	4.7		
FIRST CLOSED-IN					
C 1	0.0	43.7			
2	4.0	61.6	18.0	3.5	0.942
3	8.0	86.9	43.3	6.3	0.685
4	12.0	125.5	81.8	8.6	0.552
5	16.0	191.1	147.4	10.5	0.465
6	20.0	322.1	278.4	12.1	0.403
7	24.0	565.0	521.3	13.5	0.357
8	28.0	794.7	751.1	14.6	0.321
9	32.0	912.3	868.7	15.6	0.292
10	36.0	981.6	937.9	16.6	0.267
11	40.0	1026.8	983.1	17.4	0.247
12	44.0	1059.6	1015.9	18.1	0.230
13	48.0	1090.9	1047.3	18.7	0.215
14	52.0	1114.0	1070.4	19.3	0.201
15	56.0	1134.0	1090.3	19.8	0.190
D 16	59.9	1150.5	1106.8	20.3	0.179
SECOND FLOW					
E 1	0.0	56.8			
2	5.0	59.6	2.8		
3	10.0	62.6	2.9		
4	15.0	65.7	3.1		
5	20.0	68.1	2.4		
6	25.0	70.2	2.1		
7	30.0	71.4	1.2		
8	35.0	73.5	2.1		
9	40.0	75.3	1.8		
F 10	44.6	77.9	2.6		
SECOND CLOSED-IN					
F 1	0.0	77.9			
2	5.0	97.3	19.4	4.7	1.208
3	10.0	121.9	44.0	8.8	0.932
4	15.0	156.7	78.8	12.5	0.778
5	20.0	208.8	130.9	15.8	0.677
6	25.0	289.1	211.1	18.8	0.602
7	30.0	404.7	326.8	21.4	0.545

REF	MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta t}{t + \Delta t}$	$\log \frac{t + \Delta t}{\Delta t}$
SECOND CLOSED-IN - CONTINUED					
8	35.0	563.4	485.5	23.9	0.498
9	40.0	713.7	635.8	26.1	0.460
10	45.0	828.3	750.4	28.1	0.427
11	50.0	901.1	823.2	30.0	0.399
12	55.0	949.6	871.7	31.8	0.374
13	60.0	990.2	912.2	33.4	0.353
14	65.0	1021.3	943.4	34.9	0.334
15	70.0	1046.0	968.1	36.2	0.317
16	75.0	1067.7	989.8	37.6	0.302
G 17	77.8	1076.8	998.9	38.3	0.294

REMARKS:

TICKET NO: 66677300

CLOCK NO: 20521 HOUR: 12



GAUGE NO: 317

DEPTH: 4203.0

REF	MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta t}{t + \Delta t}$	$\log \frac{t + \Delta t}{\Delta t}$
FIRST FLOW					
B 1	0.0	46.8			
2	5.0	53.8	7.1		
3	10.0	60.0	6.1		
4	15.0	63.9	4.0		
5	19.9	66.8	2.9		
6	25.0	70.8	4.0		
C 7	30.7	74.5	3.7		
FIRST CLOSED-IN					
C 1	0.0	74.5			
2	4.0	93.0	18.5	3.5	0.939
3	8.0	118.1	43.6	6.3	0.686
4	12.0	157.1	82.5	8.6	0.552
5	16.0	227.2	152.7	10.5	0.464
6	20.0	363.3	288.8	12.1	0.404
7	24.0	608.6	534.0	13.5	0.357
8	28.0	833.2	758.6	14.6	0.321
9	32.0	949.0	874.4	15.6	0.292
10	36.0	1016.3	941.8	16.6	0.267
11	40.0	1061.9	987.4	17.4	0.247
12	44.0	1096.5	1021.9	18.1	0.229
13	48.0	1123.4	1048.9	18.7	0.214
14	52.0	1146.4	1071.8	19.3	0.201
15	56.0	1166.5	1092.0	19.8	0.189
D 16	59.9	1182.4	1107.8	20.3	0.179
SECOND FLOW					
E 1	0.0	93.8			
2	5.0	91.3	-2.5		
3	10.0	93.9	2.6		
4	15.0	97.1	3.2		
5	20.0	99.3	2.2		
6	25.0	101.6	2.3		
7	30.0	103.6	2.1		
8	35.0	105.1	1.5		
9	40.0	107.4	2.3		
F 10	44.6	108.8	1.5		
SECOND CLOSED-IN					
F 1	0.0	108.8			
2	5.0	129.0	20.2	4.7	1.203
3	10.0	153.5	44.7	8.9	0.929
4	15.0	187.9	79.1	12.5	0.780
5	20.0	238.7	129.8	15.8	0.678
6	25.0	318.1	209.3	18.8	0.603
7	30.0	441.5	332.6	21.5	0.544

REF	MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta t}{t + \Delta t}$	$\log \frac{t + \Delta t}{\Delta t}$
SECOND CLOSED-IN - CONTINUED					
8	35.0	599.0	490.1	23.9	0.498
9	40.0	750.7	641.9	26.1	0.459
10	45.0	860.5	751.7	28.2	0.427
11	50.0	933.0	824.1	30.0	0.399
12	55.0	983.6	874.7	31.8	0.374
13	60.0	1022.4	913.6	33.4	0.353
14	65.0	1052.6	943.8	34.9	0.334
15	70.0	1077.8	969.0	36.3	0.317
16	75.0	1099.5	990.6	37.5	0.302
G 17	77.8	1110.2	1001.3	38.3	0.294

REMARKS:

		O.D.	I.D.	LENGTH	DEPTH	
1		DRILL PIPE.....	4.500	2.870	4005.0	
50		IMPACT REVERSING SUB.....	6.000	3.000	1.0	3995.8
1		DRILL PIPE.....	4.500	2.870	126.0	
12		DUAL CIP VALVE.....	5.000	0.870	6.0	
60		HYDROSPRING TESTER.....	5.000	0.750	5.0	4132.7
80		AP RUNNING CASE.....	5.000	2.250	4.1	4134.9
16		VR SAFETY JOINT.....	5.000	1.000	2.8	
70		OPEN HOLE PACKER.....	6.750	1.530	5.8	4144.7
5		CROSSOVER.....	6.000	3.000	1.0	
1		DRILL PIPE.....	4.500	2.870	31.0	
5		CROSSOVER.....	6.000	3.000	1.0	
20		FLUSH JOINT ANCHOR.....	5.000	2.380	21.0	
83		HT-500 TEMPERATURE CASE.....	5.000		1.5	4200.4
81		BLANKED-OFF RUNNING CASE.....	5.000		4.1	4203.0
TOTAL DEPTH					4206.0	

EQUIPMENT DATA



TICKET NO. 66677400

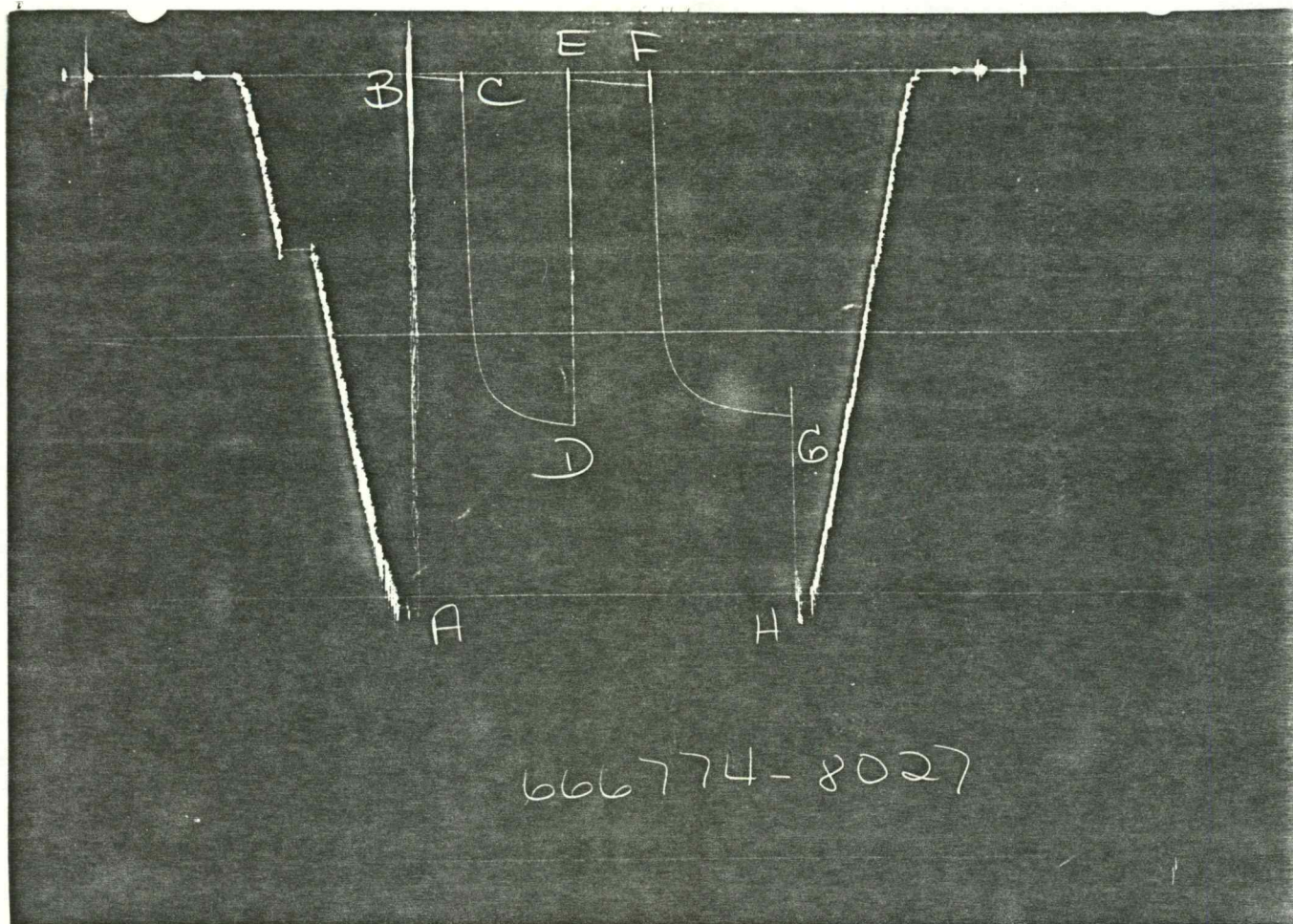
04-JAN-84

OBERLIN

FORMATION TESTING SERVICE REPORT

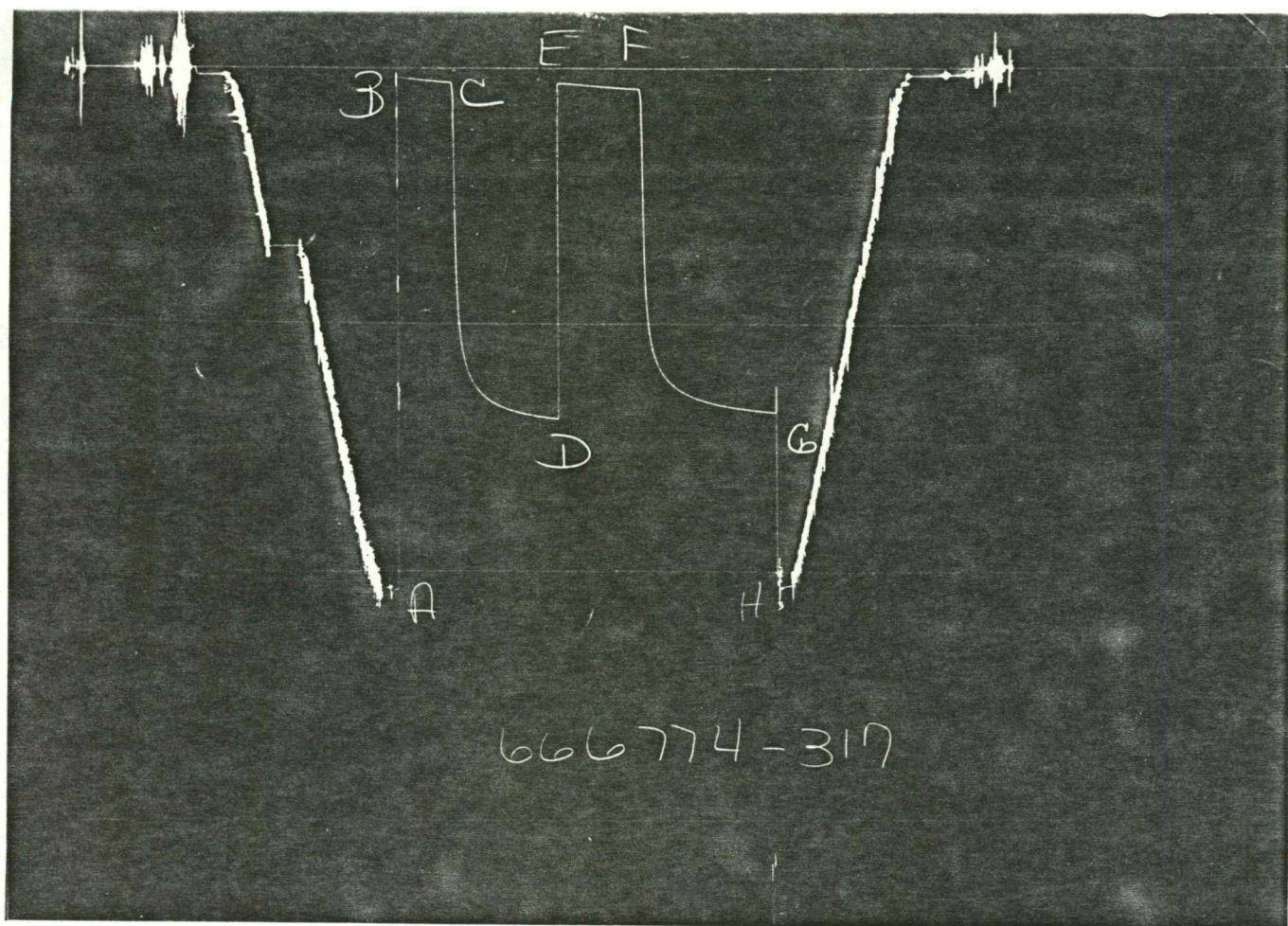
NW - SE - NE

OTILEY	1	4	4196.1 - 4246.1	DONALD C. SLAYSON & PETROLEUM, INC.
LEASE NAME	WELL NO.	TEST NO.	TESTED INTERVAL	LEASE OWNER/COMPANY NAME
LEASAL LOCATION SEC. - TWP. - RNG.	21 - 10 S - 31 W	FIELD AREA	NORTHWEST OF CAMPUS	COUNTY
				THOMAS
				STATE KANSAS
				PV



GAUGE NO: 8027 DEPTH: 4185.5 BLANKED OFF: NO HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC		2031.7			
B	INITIAL FIRST FLOW		8.1			
C	FINAL FIRST FLOW		26.9	30.0	29.5	F
C	INITIAL FIRST CLOSED-IN		26.9			
D	FINAL FIRST CLOSED-IN		1349.7	60.0	59.8	C
E	INITIAL SECOND FLOW		30.0			
F	FINAL SECOND FLOW		52.5	45.0	45.7	F
F	INITIAL SECOND CLOSED-IN		52.5			
G	FINAL SECOND CLOSED-IN		1326.4	75.0	76.9	C
H	FINAL HYDROSTATIC		2027.5			



GAUGE NO: 317 DEPTH: 4243.5 BLANKED OFF: YES HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC	2076	2064.5			
B	INITIAL FIRST FLOW	42	34.4	30.0	29.5	F
C	FINAL FIRST FLOW	52	54.4			
C	INITIAL FIRST CLOSED-IN	52	54.4	60.0	59.8	C
D	FINAL FIRST CLOSED-IN	1368	1379.9			
E	INITIAL SECOND FLOW	62	62.1	45.0	45.7	F
F	FINAL SECOND FLOW	83	79.8			
F	INITIAL SECOND CLOSED-IN	83	79.8	75.0	76.9	C
G	FINAL SECOND CLOSED-IN	1347	1354.9			
H	FINAL HYDROSTATIC	2055	2060.8			

EQUIPMENT & HOLE DATA

FORMATION TESTED: LKC 200' ZONE

NET PAY (ft): _____

GROSS TESTED FOOTAGE: 50.2

ALL DEPTHS MEASURED FROM: KELLY BUSHING

CASING PERFS. (ft): _____

HOLE OR CASING SIZE (in): 7.875

ELEVATION (ft): 2949

TOTAL DEPTH (ft): 4246.0

PACKER DEPTH(S) (ft): 4196

FINAL SURFACE CHOKE (in): 0.250

BOTTOM HOLE CHOKE (in): 0.750

MUD WEIGHT (lb/gal): 9.40

MUD VISCOSITY (sec): 39

ESTIMATED HOLE TEMP. (°F): _____

ACTUAL HOLE TEMP. (°F): 112 @ 4242.0 ft

TICKET NUMBER: 66677400

DATE: 12-26-83 TEST NO: 4

TYPE DST: OPEN HOLE

HALLIBURTON CAMP: OBERLIN

TESTER: RICK DEIBERT

WITNESS: RICH ROBBA

DRILLING CONTRACTOR: SLAWSON #3

FLUID PROPERTIES FOR RECOVERED MUD & WATER

SOURCE	RESISTIVITY	CHLORIDES
MUD REPORT	_____ @ _____ °F	<u>1000</u> ppm
RECOVERY	_____ @ _____ °F	<u>4500</u> ppm
_____	_____ @ _____ °F	_____ ppm
_____	_____ @ _____ °F	_____ ppm
_____	_____ @ _____ °F	_____ ppm
_____	_____ @ _____ °F	_____ ppm

SAMPLER DATA

Pstg AT SURFACE: _____

cu.ft. OF GAS: _____

cc OF OIL: _____

cc OF WATER: _____

cc OF MUD: _____

TOTAL LIQUID cc: _____

HYDROCARBON PROPERTIES

OIL GRAVITY (°API): _____ @ _____ °F

GAS/OIL RATIO (cu.ft. per bbl): _____

GAS GRAVITY: _____

CUSHION DATA

TYPE	AMOUNT	WEIGHT
_____	_____	_____
_____	_____	_____

RECOVERED:

90 FEET OF MUD

MEASURED FROM
TESTER VALVE

REMARKS:

[illegible]

TICKET NO: 66677400

CLOCK NO: 20684 HOUR: 12



HALLIBURTON

SERVICES

GAUGE NO: 8027

DEPTH: 4185.5

REF	MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta t}{t + \Delta t}$	$\log \frac{t + \Delta t}{\Delta t}$
FIRST FLOW					
B 1	0.0	8.1			
2	5.0	12.7	4.5		
3	10.0	15.6	2.9		
4	15.0	18.9	3.3		
5	20.0	21.8	2.9		
6	25.0	24.9	3.1		
C 7	29.5	26.9	2.0		
FIRST CLOSED-IN					
C 1	0.0	26.9			
2	4.0	974.5	947.5	3.5	0.923
3	8.0	1145.7	1118.8	6.3	0.670
4	12.0	1211.2	1184.2	8.5	0.539
5	16.0	1245.7	1218.8	10.4	0.454
6	20.0	1268.4	1241.5	11.9	0.393
7	24.0	1286.1	1259.1	13.2	0.348
8	28.0	1302.1	1275.2	14.4	0.313
9	32.0	1314.6	1287.7	15.4	0.284
10	36.0	1322.8	1295.9	16.2	0.260
11	40.0	1329.9	1303.0	17.0	0.240
12	44.0	1335.0	1308.1	17.7	0.223
13	48.0	1339.9	1313.0	18.3	0.208
14	52.0	1344.1	1317.2	18.8	0.195
15	56.0	1347.6	1320.7	19.3	0.184
D 16	59.8	1349.7	1322.8	19.8	0.174
SECOND FLOW					
E 1	0.0	30.0			
2	5.0	30.7	0.7		
3	10.0	32.2	1.5		
4	15.0	35.8	3.6		
5	20.0	40.8	4.9		
6	25.0	43.9	3.1		
7	30.0	45.8	1.9		
8	35.0	48.5	2.7		
9	40.0	49.7	1.2		
F 10	45.7	52.5	2.8		
SECOND CLOSED-IN					
F 1	0.0	52.5			
2	5.0	986.8	934.3	4.7	1.207
3	10.0	1130.8	1078.3	8.8	0.930
4	15.0	1189.2	1136.7	12.5	0.779
5	20.0	1223.0	1170.5	15.8	0.677
6	25.0	1248.9	1196.4	18.7	0.603
7	30.0	1265.1	1212.6	21.4	0.545

REF	MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta t}{t + \Delta t}$	$\log \frac{t + \Delta t}{\Delta t}$
SECOND CLOSED-IN - CONTINUED					
8	35.0	1278.6	1226.1	23.9	0.498
9	40.0	1287.5	1234.9	26.1	0.460
10	45.0	1296.0	1243.5	28.2	0.427
11	50.0	1303.2	1250.7	30.0	0.399
12	55.0	1308.5	1256.0	31.8	0.374
13	60.0	1312.7	1260.2	33.4	0.353
14	65.0	1315.9	1263.4	34.9	0.334
15	70.0	1320.1	1267.6	36.3	0.317
16	75.0	1325.0	1272.5	37.6	0.302
G 17	76.9	1326.4	1273.9	38.0	0.296

REMARKS:

TICKET NO: 66677400

CLOCK NO: 20521 HOUR: 12



GAUGE NO: 317

DEPTH: 4243.5

REF	MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta t}{t + \Delta t}$	$\log \frac{t + \Delta t}{\Delta t}$
FIRST FLOW					
B 1	0.0	34.4			
2	5.0	40.1	5.7		
3	10.0	43.3	3.2		
4	15.0	46.5	3.1		
5	20.0	49.0	2.5		
6	25.0	52.6	3.6		
C 7	29.5	54.4	1.8		
FIRST CLOSED-IN					
C 1	0.0	54.4			
2	4.0	1001.7	947.3	3.5	0.924
3	8.0	1172.8	1118.5	6.3	0.670
4	12.0	1237.9	1183.5	8.5	0.539
5	16.0	1275.0	1220.6	10.4	0.454
6	20.0	1300.0	1245.6	11.9	0.393
7	24.0	1317.5	1263.2	13.2	0.348
8	28.0	1330.9	1276.5	14.4	0.313
9	32.0	1341.8	1287.4	15.3	0.284
10	36.0	1350.7	1296.4	16.2	0.260
11	40.0	1358.0	1303.6	17.0	0.240
12	44.0	1363.5	1309.1	17.7	0.223
13	48.0	1368.9	1314.5	18.3	0.208
14	52.0	1373.1	1318.8	18.8	0.195
15	56.0	1376.7	1322.3	19.3	0.184
D 16	59.8	1379.9	1325.5	19.8	0.174
SECOND FLOW					
E 1	0.0	62.1			
2	5.0	60.0	-2.1		
3	10.0	62.0	2.0		
4	15.0	65.2	3.2		
5	20.0	68.3	3.1		
6	25.0	70.8	2.5		
7	30.0	72.9	2.1		
8	35.0	75.5	2.6		
9	40.0	77.8	2.3		
F 10	45.7	79.8	2.1		
SECOND CLOSED-IN					
F 1	0.0	79.8			
2	5.0	997.5	917.7	4.7	1.205
3	10.0	1158.2	1078.4	8.8	0.931
4	15.0	1216.5	1136.7	12.5	0.778
5	20.0	1251.3	1171.5	15.8	0.678
6	25.0	1275.2	1195.4	18.8	0.603
7	30.0	1292.1	1212.3	21.5	0.545

REF	MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta t}{t + \Delta t}$	$\log \frac{t + \Delta t}{\Delta t}$
SECOND CLOSED-IN - CONTINUED					
8	35.0	1305.2	1225.4	23.9	0.498
9	40.0	1316.0	1236.1	26.1	0.459
10	45.0	1324.1	1244.2	28.2	0.427
11	50.0	1331.5	1251.7	30.0	0.399
12	55.0	1337.2	1257.4	31.8	0.374
13	60.0	1342.2	1262.4	33.4	0.353
14	65.0	1347.0	1267.2	34.9	0.334
15	70.0	1350.3	1270.5	36.3	0.317
16	75.0	1354.0	1274.2	37.6	0.302
G 17	76.9	1354.9	1275.0	38.0	0.296

REMARKS:

		O.D.	I.D.	LENGTH	DEPTH	
1		DRILL PIPE.....	4.500	3.826	4053.7	
50		IMPACT REVERSING SUB.....	6.000	3.000	1.0	4054.7
1		DRILL PIPE.....	4.500	3.826	125.6	
62		MULTIPLE CIP SAMPLER.....	5.030	0.870	6.0	
60		HYDROSPRING TESTER.....	5.000	0.750	5.0	4183.0
80		AP RUNNING CASE.....	5.000	2.250	4.1	4185.5
16		VR SAFETY JOINT.....	5.000	1.000	2.8	
70		OPEN HOLE PACKER.....	6.750	1.530	5.8	4195.8
5		CROSSOVER.....	6.000	3.000	1.0	
1		DRILL PIPE.....	4.500	3.826	31.0	
5		CROSSOVER.....	6.000	3.000	1.0	
20		FLUSH JOINT ANCHOR.....	5.000	2.370	10.0	
83		HT-500 TEMPERATURE CASE.....	5.000		1.5	4242.0
81		BLANKED-OFF RUNNING CASE.....	5.000		4.1	4243.5
TOTAL DEPTH						4246.0

EQUIPMENT DATA

TEMPERATURE

RECORDER

CHART



10° each circle

Indicated Flow
Capacity

$$kh = \frac{1637 Q_g T}{m}$$

md-ft

Average Effective
Permeability

$$k = \frac{kh}{h}$$

md

Skin Factor

$$S = 1.151 \left[\frac{m(P^*) - m(P_f)}{m} - \text{LOG} \frac{kt}{\phi \mu c_t r_w^2} + 3.23 \right] \text{ ---}$$

Damage Ratio

$$DR = \frac{m(P^*) - m(P_f)}{m(P^*) - m(P_f) - 0.87 mS} \text{ ---}$$

Indicated Flow
Rate (Maximum)

$$AOF_1 = \frac{Q_g m(P^*)}{m(P^*) - m(P_f)}$$

MCFD

Indicated Flow
Rate (Minimum)

$$AOF_2 = Q_g \sqrt{\frac{m(P^*)}{m(P^*) - m(P_f)}}$$

MCFD

Approx. Radius of
Investigation

$$r_i = 0.032 \sqrt{\frac{kt}{\phi \mu c_t}}$$

ft

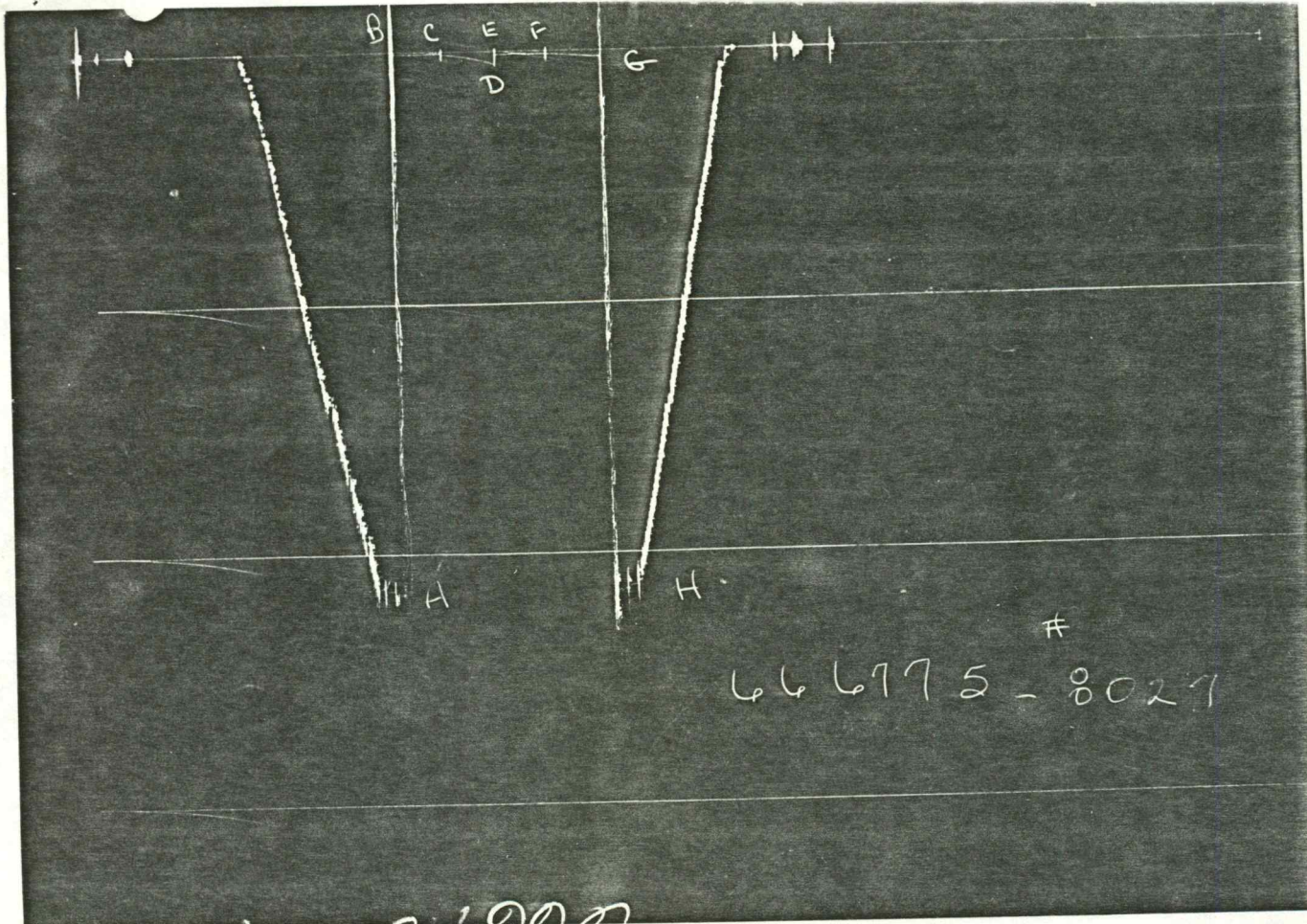
LEASE NAME	OTILEY	WELL NO.	1	TEST NO.	5	TESTED INTERVAL	4366.1 - 4422.1	LEASE OWNER/COMPANY NAME	DONALD C. SLAWSON & PETROLEUM, INC.
LEGAL LOCATION SEC. - TWP. - RNG.	21 - 10S - 31W	FIELD AREA	N.W. CAMPUS	COUNTY	THOMAS	STATE	KANSAS		NM

NW-SE-NE



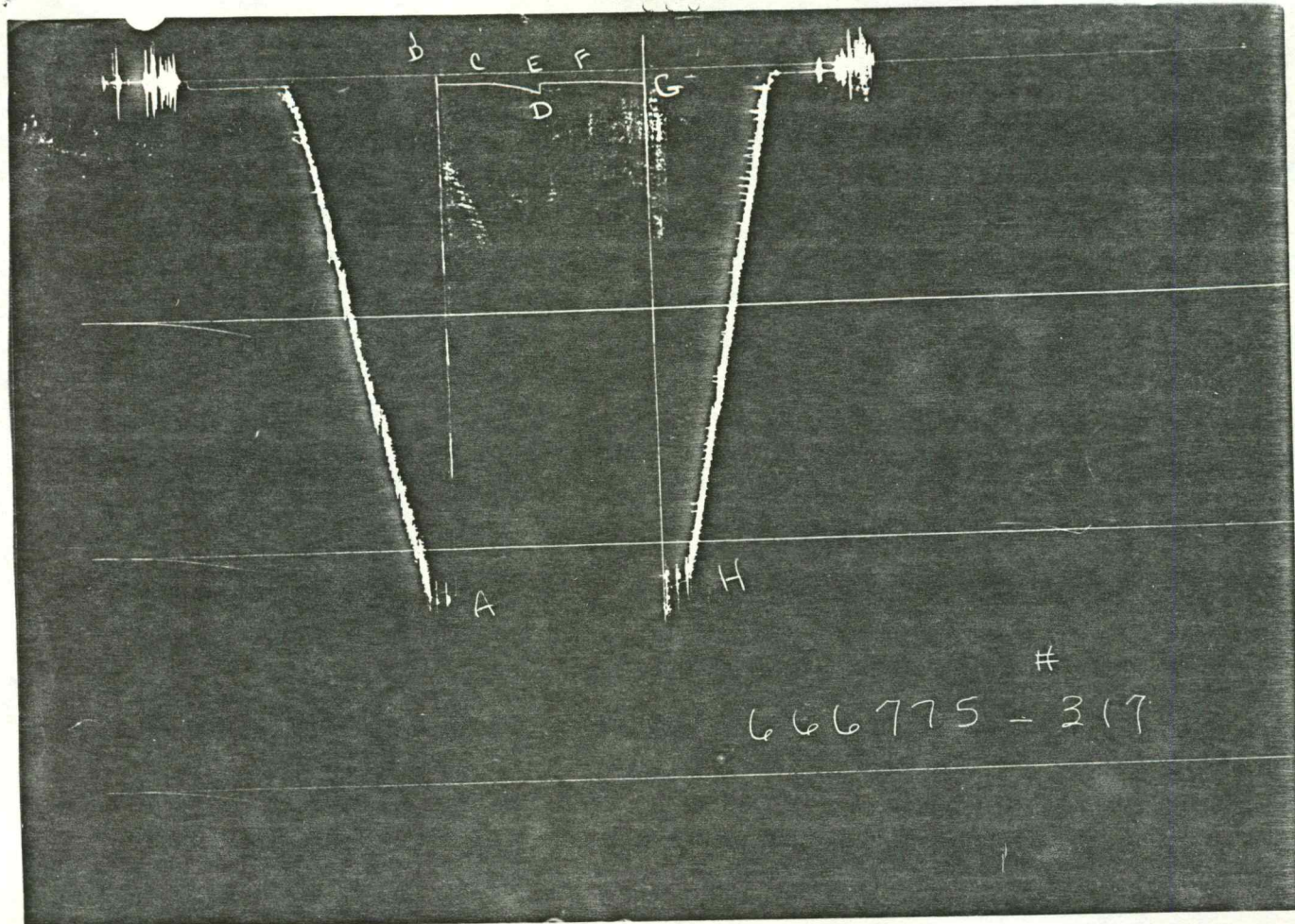
TICKET NO. 66677500
04-JAN-84
OBERLIN

FORMATION TESTING SERVICE REPORT



GAUGE NO: 8027 DEPTH: 4355.5 BLANKED OFF: NO HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC		2157.4			
B	INITIAL FIRST FLOW		7.5			
C	FINAL FIRST FLOW		8.5	30.0	30.0	F
C	INITIAL FIRST CLOSED-IN		8.5			
D	FINAL FIRST CLOSED-IN		50.5	30.0	30.0	C
E	INITIAL SECOND FLOW		11.3			
F	FINAL SECOND FLOW		13.1	30.0	30.0	F
F	INITIAL SECOND CLOSED-IN		13.1			
G	FINAL SECOND CLOSED-IN		24.4	30.0	30.0	C
H	FINAL HYDROSTATIC		2143.9			



GAUGE NO: 317 DEPTH: 4419.5 BLANKED OFF: YES HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC	2181	2193.4			
B	INITIAL FIRST FLOW	42	41.7	30.0	30.0	F
C	FINAL FIRST FLOW	42	43.2			
C	INITIAL FIRST CLOSED-IN	42	43.2	30.0	30.0	C
D	FINAL FIRST CLOSED-IN	83	85.0			
E	INITIAL SECOND FLOW	42	52.9	30.0	30.0	F
F	FINAL SECOND FLOW	42	47.1			
F	INITIAL SECOND CLOSED-IN	42	47.1	30.0	30.0	C
G	FINAL SECOND CLOSED-IN	62	60.6			
H	FINAL HYDROSTATIC	2160	2180.0			

EQUIPMENT & HOLE DATA

FORMATION TESTED: PAWNEE

NET PAY (ft): _____

GROSS TESTED FOOTAGE: 56.2

ALL DEPTHS MEASURED FROM: KELLY BUSHING

CASING PERFS. (ft): _____

HOLE OR CASING SIZE (in): 7.875

ELEVATION (ft): 2949

TOTAL DEPTH (ft): 4422.0

PACKER DEPTH(S) (ft): 4366

FINAL SURFACE CHOKE (in): 0.250

BOTTOM HOLE CHOKE (in): 0.750

MUD WEIGHT (lb/gal): 9.40

MUD VISCOSITY (sec): 40

ESTIMATED HOLE TEMP. (°F): _____

ACTUAL HOLE TEMP. (°F): 115 @ 4418.0 ft

TICKET NUMBER: 66677500

DATE: 12-28-83 TEST NO: 5

TYPE DST: OPEN HOLE

HALLIBURTON CAMP: OBERLIN

TESTER: RICK DEIBERT

WITNESS: RICH ROBBA

DRILLING CONTRACTOR: SLAWSON RIG # 3

FLUID PROPERTIES FOR RECOVERED MUD & WATER

SOURCE	RESISTIVITY	CHLORIDES
<u>MUD</u>	<u>0</u> °F	<u>4000</u> ppm
_____	<u>0</u> °F	_____ ppm
_____	<u>0</u> °F	_____ ppm
_____	<u>0</u> °F	_____ ppm
_____	<u>0</u> °F	_____ ppm
_____	<u>0</u> °F	_____ ppm

SAMPLER DATA

Pstg AT SURFACE: _____

cu.ft. OF GAS: _____

cc OF OIL: _____

cc OF WATER: _____

cc OF MUD: _____

TOTAL LIQUID cc: _____

HYDROCARBON PROPERTIES

OIL GRAVITY (°API): _____ @ _____ °F

GAS/OIL RATIO (cu.ft. per bbl): _____

GAS GRAVITY: _____

CUSHION DATA

TYPE	AMOUNT	WEIGHT
_____	_____	_____
_____	_____	_____

RECOVERED:

15 FEET OF DRILLING MUD

MEASURED FROM
TESTER VALVE

REMARKS:

TYPE & SIZE MEASURING DEVICE:

TICKET NO: 66677500[illegible]

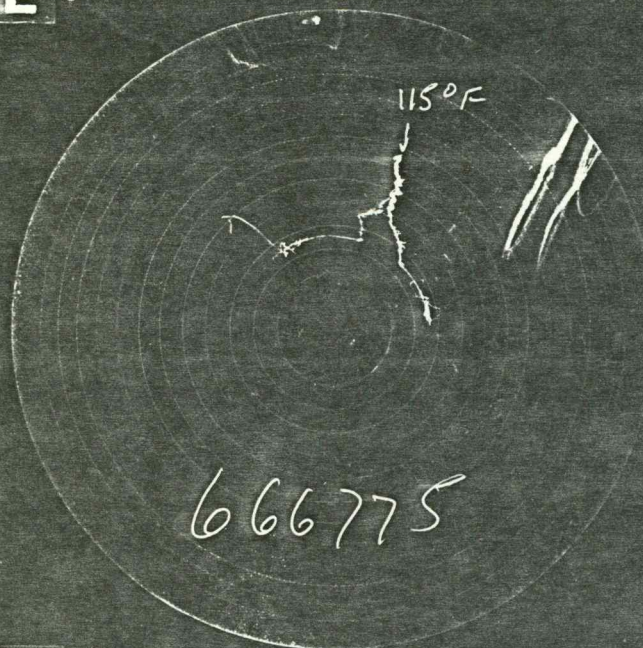
		O.D.	I.D.	LENGTH	DEPTH	
1		DRILL PIPE.....	4.500	3.826	4216.8	
50		IMPACT REVERSING SUB.....	6.000	3.000	1.0	4217.8
1		DRILL PIPE.....	4.500	3.826	126.0	
12		DUAL CIP VALVE.....	5.030	0.870	6.0	
60		HYDROSPRING TESTER.....	5.000	0.750	5.0	4353.0
80		AP RUNNING CASE.....	5.000	2.250	4.1	4355.5
16		VR SAFETY JOINT.....	5.000	1.000	2.8	
70		OPEN HOLE PACKER.....	6.750	1.530	5.8	4365.8
5		CROSSOVER.....	6.000	3.000	1.0	
1		DRILL PIPE.....	4.500	3.826	31.0	
5		CROSSOVER.....	6.000	3.000	1.0	
20		FLUSH JOINT ANCHOR.....	5.000	2.370	16.0	
83		HT-500 TEMPERATURE CASE.....	5.000		2.5	4418.0
81		BLANKED-OFF RUNNING CASE.....	5.000		4.1	4419.5
TOTAL DEPTH						4422.0

EQUIPMENT DATA

TEMPERATURE

RECORDER

CHART



10° each circle

Indicated Flow
Capacity

$$kh = \frac{1637 Q_g T}{m} \quad \text{md-ft}$$

Average Effective
Permeability

$$k = \frac{kh}{h} \quad \text{md}$$

Skin Factor

$$S = 1.151 \left[\frac{m(P^*) - m(P_f)}{m} - \text{LOG} \frac{kt}{\phi \mu c_t r_w^2} + 3.23 \right] \quad \text{---}$$

Damage Ratio

$$DR = \frac{m(P^*) - m(P_f)}{m(P^*) - m(P_f) - 0.87 mS} \quad \text{---}$$

Indicated Flow
Rate (Maximum)

$$AOF_1 = \frac{Q_g m(P^*)}{m(P^*) - m(P_f)} \quad \text{MCFD}$$

Indicated Flow
Rate (Minimum)

$$AOF_2 = Q_g \sqrt{\frac{m(P^*)}{m(P^*) - m(P_f)}} \quad \text{MCFD}$$

Approx. Radius of
Investigation

$$r_i = 0.032 \sqrt{\frac{kt}{\phi \mu c_t}} \quad \text{ft}$$



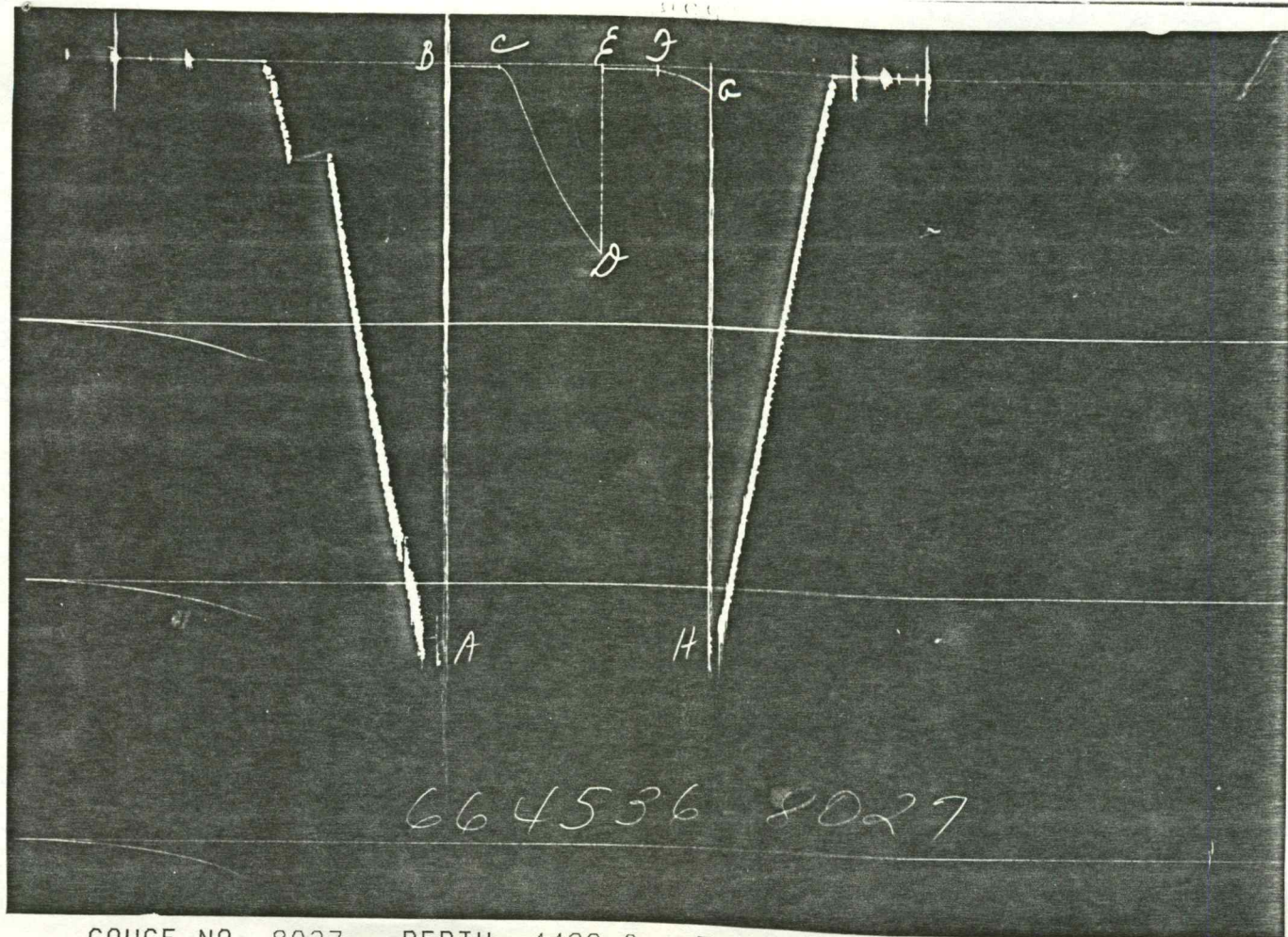
TICKET NO. 66453600

04-JAN-84

OBERLIN

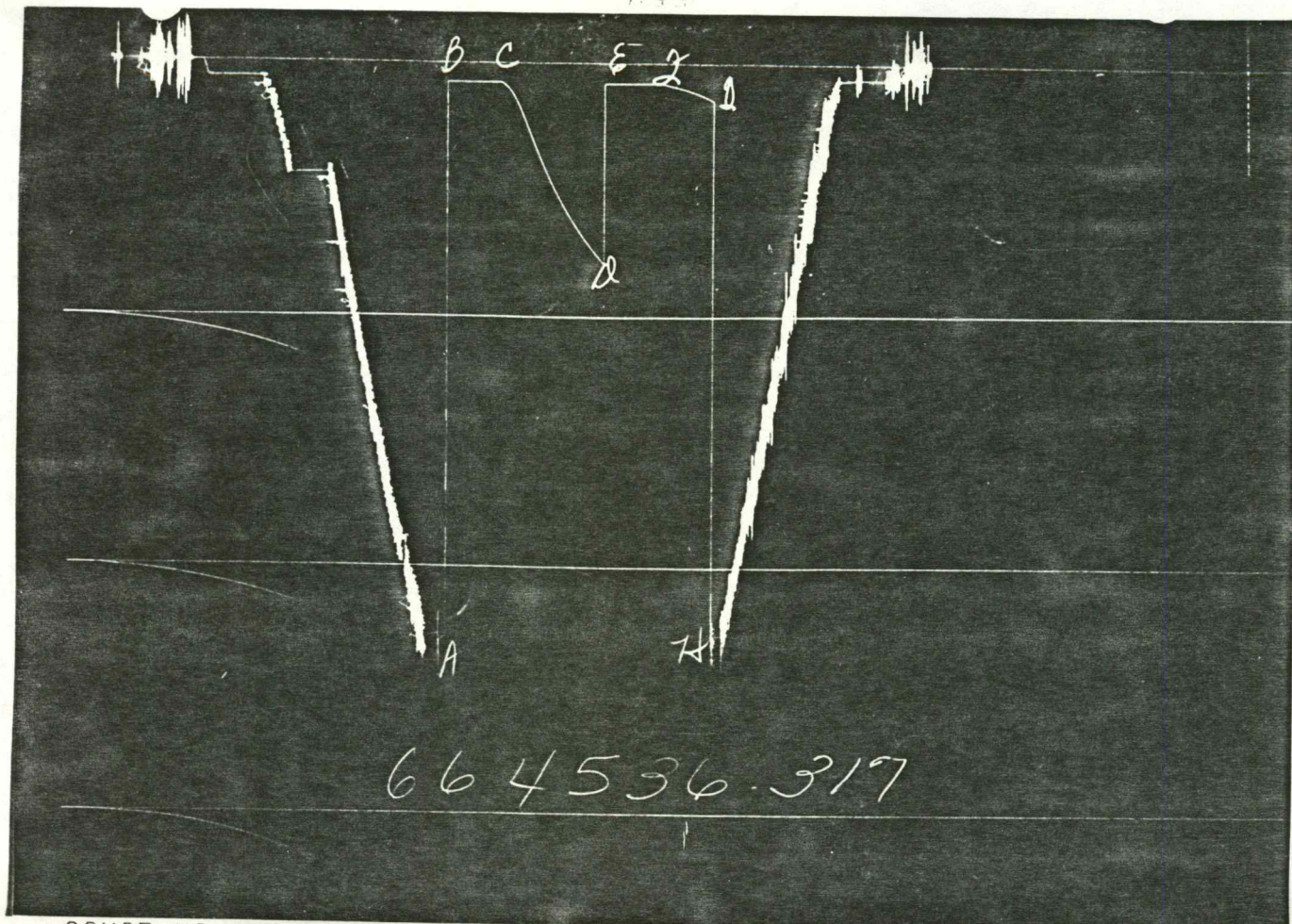
FORMATION TESTING SERVICE REPORT

WELL NAME	WELL NO.	TEST NO.	TESTED INTERVAL	BOUNDED BY	LEASE OWNER/COMPANY NAME
LEGAL LOCATION SEC. - TWP. - RNC.	21-10S-31W			THOMAS	KANSAS SM
NW - SE - NE					
FIELD AREA	NORTH WEST OF CAMPUS		COUNTY	THOMAS	STATE



GAUGE NO: 8027 DEPTH: 4428.0 BLANKED OFF: NO HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC		2228.7			
B	INITIAL FIRST FLOW		10.2			
C	FINAL FIRST FLOW		11.1	30.0	30.2	F
C	INITIAL FIRST CLOSED-IN		11.1			
D	FINAL FIRST CLOSED-IN		731.2	60.0	58.3	C
E	INITIAL SECOND FLOW		13.0			
F	FINAL SECOND FLOW		13.8	30.0	30.8	F
F	INITIAL SECOND CLOSED-IN		13.8			
G	FINAL SECOND CLOSED-IN		87.6	30.0	30.7	C
H	FINAL HYDROSTATIC		2226.2			



GAUGE NO: 317 DEPTH: 4545.0 BLANKED OFF: YES HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC	2285	2276.1			
B	INITIAL FIRST FLOW	62	71.5			
C	FINAL FIRST FLOW	62	71.5	30.0	30.2	F
C	INITIAL FIRST CLOSED-IN	62	71.5			
D	FINAL FIRST CLOSED-IN	788	789.0	60.0	58.3	C
E	INITIAL SECOND FLOW	62	79.5			
F	FINAL SECOND FLOW	62	75.5	30.0	30.8	F
F	INITIAL SECOND CLOSED-IN	62	75.5			
G	FINAL SECOND CLOSED-IN	146	144.6	30.0	30.7	C
H	FINAL HYDROSTATIC	2264	2275.3			

EQUIPMENT & HOLE DATA

FORMATION TESTED: JOHNSON

NET PAY (ft): _____

GROSS TESTED FOOTAGE: 109.0

ALL DEPTHS MEASURED FROM: KELLY BUSHING

CASING PERFS. (ft): _____

HOLE OR CASING SIZE (in): 7.875

ELEVATION (ft): 2949

TOTAL DEPTH (ft): 4548.0

PACKER DEPTH(S) (ft): 4439

FINAL SURFACE CHOKE (in): 0.250

BOTTOM HOLE CHOKE (in): 0.750

MUD WEIGHT (lb/gal): 9.40

MUD VISCOSITY (sec): 43

ESTIMATED HOLE TEMP. (°F): _____

ACTUAL HOLE TEMP. (°F): 120 @ 4543.9 ft

TICKET NUMBER: 66453600

DATE: 12-29-83 TEST NO: 6

TYPE DST: OPEN HOLE

HALLIBURTON CAMP:
OVERLIN

TESTER: RICK DEIBERT

WITNESS: RICH ROBBA

DRILLING CONTRACTOR:
SLAWSON DRILLING COMPANY RIG #3

FLUID PROPERTIES FOR RECOVERED MUD & WATER

SOURCE	RESISTIVITY	CHLORIDES
_____	_____ @ _____ °F	_____ ppm
_____	_____ @ _____ °F	_____ ppm
_____	_____ @ _____ °F	_____ ppm
_____	_____ @ _____ °F	_____ ppm
_____	_____ @ _____ °F	_____ ppm
_____	_____ @ _____ °F	_____ ppm

SAMPLER DATA

Pstg AT SURFACE: _____

cu.ft. OF GAS: _____

cc OF OIL: _____

cc OF WATER: _____

cc OF MUD: _____

TOTAL LIQUID cc: _____

HYDROCARBON PROPERTIES

OIL GRAVITY (°API): _____ @ _____ °F

GAS/OIL RATIO (cu.ft. per bbl): _____

GAS GRAVITY: _____

CUSHION DATA

TYPE	AMOUNT	WEIGHT
_____	_____	_____
_____	_____	_____

RECOVERED:

15 FEET OF MUD WITH FEW OIL SPOTS

MEASURED FROM
TESTER VALVE

REMARKS:

TYPE & SIZE MEASURING DEVICE:

TICKET NO: 66453600

[illegible]

CLOCK NO: 20684 HOUR: 12



DEPTH: 4428.0

REF	MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta t}{t + \Delta t}$	$\log \frac{t + \Delta t}{\Delta t}$
FIRST FLOW					
B	1	0.0	10.2		
C	2	30.2	11.1	0.9	
FIRST CLOSED-IN					
C	1	0.0	11.1		
	2	5.0	43.3	32.1	4.3 0.845
	3	10.0	105.7	94.6	7.5 0.605
	4	15.0	191.4	180.2	10.0 0.478
	5	20.0	275.7	264.6	12.0 0.400
	6	25.0	356.5	345.4	13.7 0.344
	7	30.0	430.3	419.2	15.1 0.302
	8	35.0	499.1	488.0	16.2 0.270
	9	40.0	557.5	546.3	17.2 0.244
	10	45.0	610.5	599.4	18.1 0.223
	11	50.0	659.8	648.7	18.8 0.205
	12	55.0	704.4	693.2	19.5 0.190
D	13	58.3	731.2	720.1	19.9 0.181
SECOND FLOW					
E	1	0.0	13.0		
F	2	30.8	13.8	0.8	
SECOND CLOSED-IN					
F	1	0.0	13.8		
G	2	30.7	87.6	73.8	20.4 0.476

[illegible]

REMARKS:

CLOCK NO: 20521 HOUR: 12



DEPTH: 4545.0

REF	MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta t}{t + \Delta t}$	$\log \frac{t + \Delta t}{\Delta t}$
FIRST FLOW					
B	1	0.0	71.5		
C	2	30.2	71.5	0.0	
FIRST CLOSED-IN					
C	1	0.0	71.5		
	2	5.0	102.3	30.8	4.3 0.846
	3	10.0	166.3	94.8	7.5 0.603
	4	15.0	247.3	175.8	10.0 0.480
	5	20.0	334.7	263.2	12.0 0.400
	6	25.0	417.5	345.9	13.7 0.344
	7	30.0	493.9	422.3	15.1 0.302
	8	35.0	557.6	486.1	16.2 0.271
	9	40.0	618.2	546.7	17.2 0.244
	10	45.0	672.0	600.5	18.1 0.223
	11	50.0	719.9	648.4	18.8 0.205
	12	55.0	762.8	691.3	19.5 0.190
D	13	58.3	789.0	717.5	19.9 0.181
SECOND FLOW					
E	1	0.0	79.5		
F	2	30.8	75.5	-4.1	
SECOND CLOSED-IN					
F	1	0.0	75.5		
G	2	30.7	144.6	69.1	20.4 0.476

[illegible]

REMARKS:

		O.D.	I.D.	LENGTH	DEPTH	
1		DRILL PIPE.....	4.500	3.826	4289.0	
50		IMPACT REVERSING SUB.....	6.000	3.000	1.0	4290.0
1		DRILL PIPE.....	4.500	3.826	126.0	
12		DUAL CIP VALVE.....	5.030	0.870	6.0	
60		HYDROSPRING TESTER.....	5.000	0.750	5.0	4425.0
80		AP RUNNING CASE.....	5.000	2.250	4.1	4428.0
16		VR SAFETY JOINT.....	5.000	1.000	2.8	
70		OPEN HOLE PACKER.....	6.750	1.530	5.8	4439.0
5		CROSSOVER.....	5.000	3.000	1.0	
1		DRILL PIPE.....	4.500	3.826	62.3	
5		CROSSOVER.....	6.000	3.000	1.0	
20		FLUSH JOINT ANCHOR.....	5.000	2.370	38.0	
83		HT-500 TEMPERATURE CASE.....	5.000		1.5	4543.0
81		BLANKED-OFF RUNNING CASE.....	5.000		4.1	4545.0
TOTAL DEPTH					4548.0	

EQUIPMENT DATA

TEMPERATURE

RECORDER

CHART



10° each circle

Indicated Flow
Capacity

$$kh = \frac{1637 Q_g T}{m}$$

md-ft

Average Effective
Permeability

$$k = \frac{kh}{h}$$

md

Skin Factor

$$S = 1.151 \left[\frac{m(P^*) - m(P_f)}{m} - \text{LOG} \frac{kt}{\phi \mu c_f r_w^2} + 3.23 \right] \text{ ---}$$

Damage Ratio

$$DR = \frac{m(P^*) - m(P_f)}{m(P^*) - m(P_f) - 0.87 mS} \text{ ---}$$

Indicated Flow
Rate (Maximum)

$$AOF_1 = \frac{Q_g m(P^*)}{m(P^*) - m(P_f)}$$

MCFD

Indicated Flow
Rate (Minimum)

$$AOF_2 = Q_g \sqrt{\frac{m(P^*)}{m(P^*) - m(P_f)}}$$

MCFD

Approx. Radius of
Investigation

$$r_i = 0.032 \sqrt{\frac{kt}{\phi \mu c_f}}$$

ft



TICKET NO. 66453700

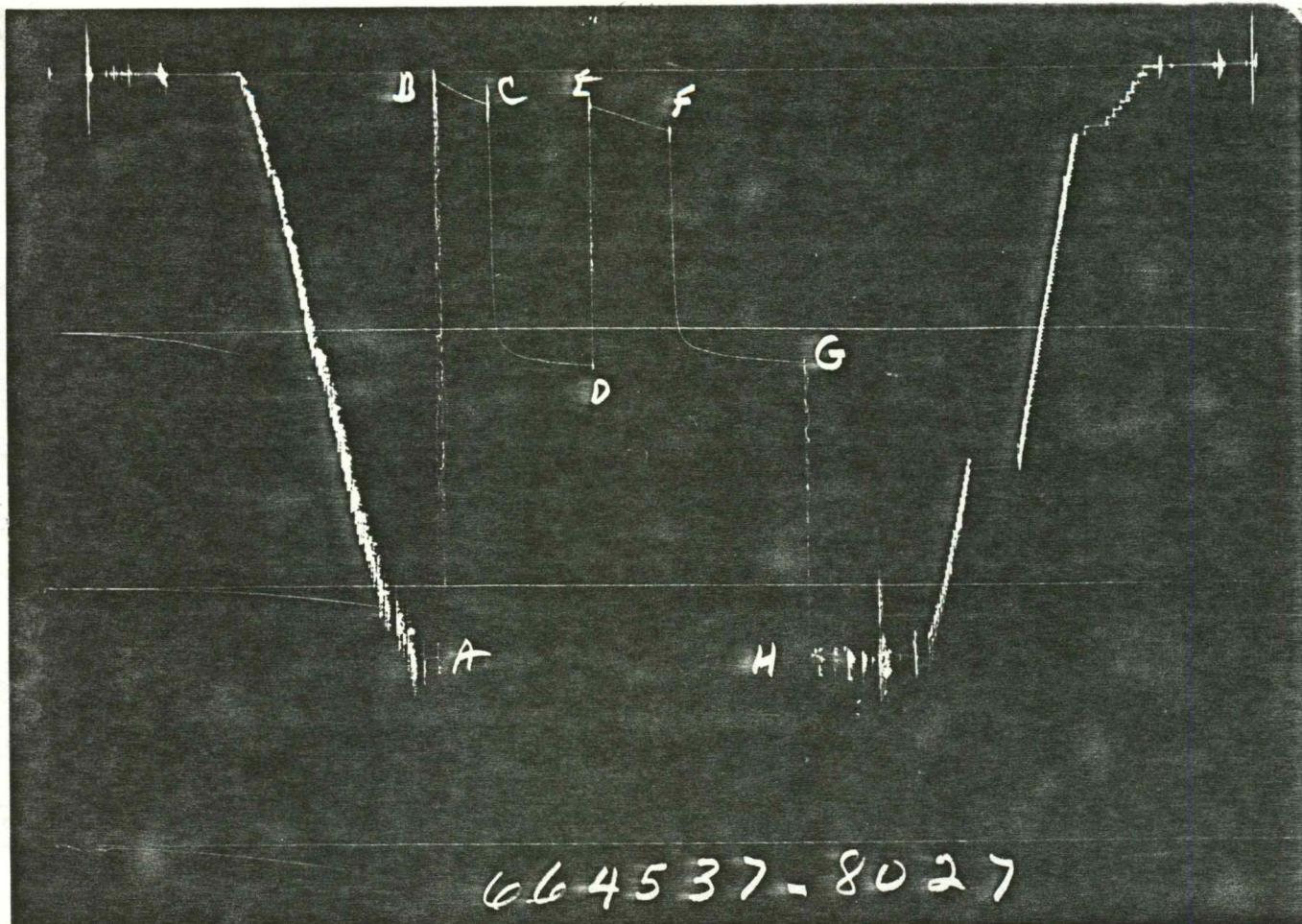
04-JAN-84

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FORMATION TESTING SERVICE REPORT

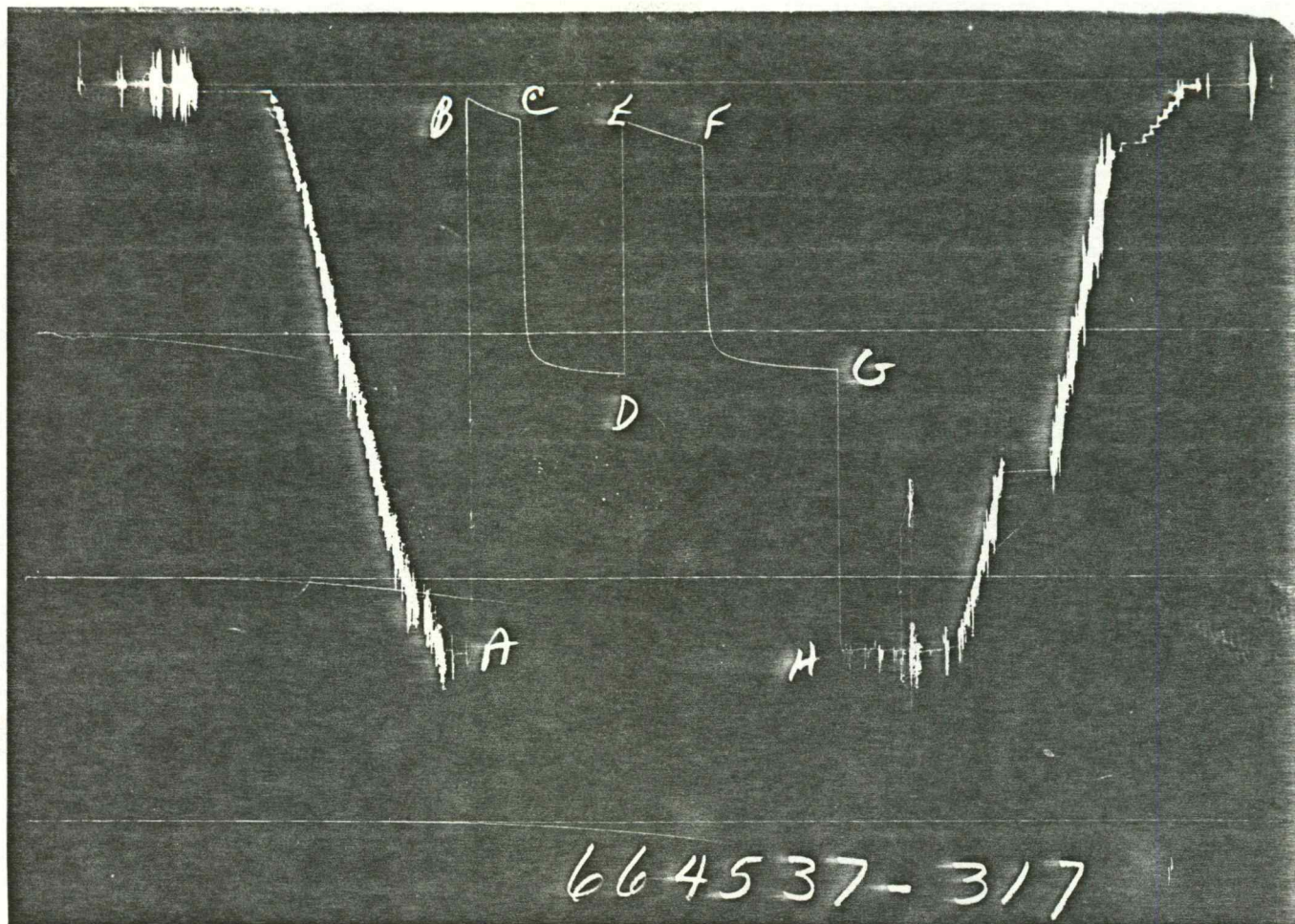
NW-SE-NE

WILLET	WELL NO.	TEST NO.	TESTED INTERVAL	BOUNDED BY	LEASE OWNER/COMPANY NAME
LEASE NAME					
LEGAL LOCATION	21-10S-31W	FIELD AREA	NW CAMPUS	COUNTY	THOMAS
SEC. - TYP. - RNG.				STATE	KANSAS
					DR



GAUGE NO: 8027 DEPTH: 4521.0 BLANKED OFF: NO HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC		2271.8			
B	INITIAL FIRST FLOW		25.0			
C	FINAL FIRST FLOW		119.4	30.0	31.1	F
C	INITIAL FIRST CLOSED-IN		119.4			
D	FINAL FIRST CLOSED-IN		1142.9	60.0	58.8	C
E	INITIAL SECOND FLOW		128.3			
F	FINAL SECOND FLOW		228.5	45.0	46.5	F
F	INITIAL SECOND CLOSED-IN		228.5			
G	FINAL SECOND CLOSED-IN		1128.4	75.0	76.2	C
H	FINAL HYDROSTATIC		2265.0			



GAUGE NO: 317 DEPTH: 4568.0 BLANKED OFF: YES HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC	2306	2309.5			
B	INITIAL FIRST FLOW	42	54.2	30.0	31.1	F
C	FINAL FIRST FLOW	125	141.8			
C	INITIAL FIRST CLOSED-IN	125	141.8	60.0	58.8	C
D	FINAL FIRST CLOSED-IN	1161	1166.9			
E	INITIAL SECOND FLOW	135	155.3	45.0	46.5	F
F	FINAL SECOND FLOW	239	252.2			
F	INITIAL SECOND CLOSED-IN	239	252.2	75.0	76.2	C
G	FINAL SECOND CLOSED-IN	1140	1154.8			
H	FINAL HYDROSTATIC	2285	2291.1			

EQUIPMENT & HOLE DATA

FORMATION TESTED: MISSISSIPPI

NET PAY (ft): _____

GROSS TESTED FOOTAGE: 40.0

ALL DEPTHS MEASURED FROM: KELLY BUSHING

CASING PERFS. (ft): _____

HOLE OR CASING SIZE (in): 7.875

ELEVATION (ft): 2949

TOTAL DEPTH (ft): 4571.0

PACKER DEPTH(S) (ft): 4531

FINAL SURFACE CHOKE (in): 0.250

BOTTOM HOLE CHOKE (in): 0.750

MUD WEIGHT (lb/gal): 9.50

MUD VISCOSITY (sec): 42

ESTIMATED HOLE TEMP. (°F): _____

ACTUAL HOLE TEMP. (°F): 130 @ 4566.0 ft

TICKET NUMBER: 66453700

DATE: 12-30-83 TEST NO: 7

TYPE DST: OPEN HOLE

HALLIBURTON CAMP:
OBERLIN

TESTER: RICK DEIBERT

WITNESS: RICH ROBBA

DRILLING CONTRACTOR:
SLAWSON RIG #3

FLUID PROPERTIES FOR RECOVERED MUD & WATER

SOURCE	RESISTIVITY	CHLORIDES
<u>SYSTEM</u>	<u>0</u> °F	<u>2000</u> ppm
<u>RECOVERY</u>	<u>0</u> °F	<u>29000</u> ppm
_____	<u>0</u> °F	_____ ppm
_____	<u>0</u> °F	_____ ppm
_____	<u>0</u> °F	_____ ppm
_____	<u>0</u> °F	_____ ppm

SAMPLER DATA

Pstg AT SURFACE: _____

cu.ft. OF GAS: _____

cc OF OIL: _____

cc OF WATER: _____

cc OF MUD: _____

TOTAL LIQUID cc: _____

HYDROCARBON PROPERTIES

OIL GRAVITY (°API): _____ @ _____ °F

GAS/OIL RATIO (cu.ft. per bbl): _____

GAS GRAVITY: _____

CUSHION DATA

TYPE	AMOUNT	WEIGHT
_____	_____	_____
_____	_____	_____

RECOVERED:

SEE REMARKS

MEASURED FROM
TESTER VALVE

REMARKS:

RECOVERY: 479' TOTAL FLUID AND 149' OF GAS IN PIPE

45' OF MUD AND WATER CUT OIL (30% MUD, 30% WATER, 40% OIL.)

62' OF WATER AND OIL CUT MUD (65% MUD, 10% WATER, 25% OIL.)

62' OF WATER AND OIL CUT MUD (86% MUD, 4% WATER, 10% OIL)

62' OF OIL AND WATER CUT MUD (72% MUD, 20% WATER, 8% OIL)

124' OF SLIGHTLY OIL AND MUD CUT WATER (36% MUD, 63% WATER, 1% OIL)

124' OF SLIGHTLY OIL AND MUD CUT WATER (48% MUD, 51% WATER AND 1% OIL)

TYPE & SIZE MEASURING DEVICE: _____

TICKET NO: 66453700

[illegible]

TICKET NO: 66453700

CLOCK NO: 20684 HOUR: 12



GAUGE NO: 8027

DEPTH: 4521.0

REF	MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta t}{t + \Delta t}$	$\log \frac{t + \Delta t}{\Delta t}$
FIRST FLOW					
B 1	0.0	25.0			
2	2.0	30.2	5.2		
3	4.0	38.6	8.3		
4	6.0	47.2	8.6		
5	8.0	54.8	7.6		
6	10.0	61.8	7.0		
7	12.0	68.3	6.4		
8	14.0	74.3	6.0		
9	16.0	79.8	5.5		
10	18.0	85.2	5.4		
11	20.0	90.7	5.4		
12	22.0	96.3	5.6		
13	24.0	101.4	5.1		
14	26.0	106.6	5.2		
15	28.0	111.1	4.5		
16	30.0	116.1	4.9		
C 17	31.1	119.4	3.3		

FIRST CLOSED-IN

C 1	0.0	119.4			
2	1.0	492.9	373.5	1.0	1.503
3	2.0	916.2	796.8	1.9	1.218
4	3.0	988.6	869.2	2.7	1.060
5	4.0	1022.3	902.9	3.5	0.944
6	5.0	1041.6	922.3	4.3	0.859
7	6.0	1054.0	934.6	5.0	0.793
8	7.0	1064.6	945.3	5.7	0.735
9	8.0	1072.3	952.9	6.4	0.688
10	9.0	1078.7	959.3	7.0	0.649
11	10.0	1083.7	964.3	7.6	0.613
12	12.0	1092.4	973.1	8.6	0.555
13	14.0	1098.1	978.7	9.7	0.507
14	16.0	1103.6	984.2	10.6	0.469
15	18.0	1108.5	989.1	11.4	0.435
16	20.0	1112.5	993.1	12.2	0.407
17	22.0	1115.4	996.1	12.9	0.383
18	24.0	1117.6	998.3	13.5	0.361
19	26.0	1119.4	1000.0	14.2	0.341
20	28.0	1120.3	1000.9	14.7	0.324
21	30.0	1123.1	1003.7	15.3	0.309
22	35.0	1130.0	1010.6	16.4	0.276
23	40.0	1133.5	1014.1	17.5	0.250
24	45.0	1136.7	1017.3	18.4	0.228
25	50.0	1139.1	1019.8	19.2	0.210
26	55.0	1141.1	1021.8	19.9	0.194
D 27	58.8	1142.9	1023.6	20.3	0.184

REF	MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta t}{t + \Delta t}$	$\log \frac{t + \Delta t}{\Delta t}$
SECOND FLOW					
E 1	0.0	128.3			
2	2.0	130.4	2.1		
3	4.0	136.0	5.6		
4	6.0	141.9	5.8		
5	8.0	146.2	4.3		
6	10.0	150.8	4.6		
7	12.0	155.2	4.4		
8	14.0	159.8	4.6		
9	16.0	163.7	3.8		
10	18.0	168.1	4.4		
11	20.0	173.1	5.0		
12	22.0	178.9	5.8		
13	24.0	183.7	4.8		
14	26.0	188.2	4.4		
15	28.0	192.4	4.2		
16	30.0	196.9	4.5		
17	32.0	200.8	3.9		
18	34.0	204.4	3.6		
19	36.0	208.9	4.5		
20	38.0	213.0	4.0		
21	40.0	216.5	3.5		
22	42.0	220.2	3.7		
23	44.0	225.3	5.1		
F 24	46.5	228.5	3.2		

SECOND CLOSED-IN

F 1	0.0	228.5			
2	1.0	715.3	486.8	1.0	1.892
3	2.0	911.2	682.7	1.9	1.603
4	3.0	976.7	748.2	2.9	1.430
5	4.0	1007.6	779.1	3.8	1.311
6	5.0	1025.8	797.3	4.7	1.220
7	6.0	1037.3	808.7	5.6	1.143
8	7.0	1047.1	818.6	6.4	1.082
9	8.0	1053.9	825.4	7.2	1.031
10	9.0	1060.1	831.5	8.1	0.982
11	10.0	1063.8	835.3	8.8	0.943
12	12.0	1072.1	843.6	10.4	0.873
13	14.0	1077.6	849.1	11.9	0.815
14	16.0	1081.9	853.4	13.2	0.766
15	18.0	1085.4	856.8	14.6	0.725
16	20.0	1088.9	860.4	15.9	0.688
17	22.0	1091.8	863.3	17.2	0.655
18	24.0	1094.9	866.4	18.3	0.627
19	26.0	1098.5	870.0	19.5	0.600
20	28.0	1101.7	873.2	20.6	0.576
21	30.0	1104.4	875.9	21.6	0.554
22	35.0	1109.0	880.5	24.1	0.507
23	40.0	1112.9	884.4	26.4	0.468
24	45.0	1115.5	887.0	28.5	0.435

REMARKS:

TICKET NO: 66453700

CLOCK NO: 20684 HOUR: 12



GAUGE NO: 8027

DEPTH: 4521.0

REF	MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta t}{t + \Delta t}$	$\log \frac{t + \Delta t}{\Delta t}$
SECOND CLOSED-IN - CONTINUED					
25	50.0	1118.7	890.2	30.4	0.407
26	55.0	1120.7	892.2	32.2	0.382
27	60.0	1123.1	894.6	33.8	0.360
28	70.0	1126.9	898.4	36.8	0.324
G 29	76.2	1128.4	899.9	38.4	0.305

REF	MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta t}{t + \Delta t}$	$\log \frac{t + \Delta t}{\Delta t}$

REMARKS:

TICKET NO: 66453700

CLOCK NO: 20521 HOUR: 12


 HALLIBURTON
SERVICES

GAUGE NO: 317

DEPTH: 4568.0

REF	MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta t}{t + \Delta t}$	$\log \frac{t + \Delta t}{\Delta t}$
FIRST FLOW					
B 1	0.0	54.2			
2	2.0	54.4	0.2		
3	4.0	62.5	8.1		
4	6.0	70.7	8.2		
5	8.0	77.7	7.0		
6	10.0	84.0	6.3		
7	12.0	90.7	6.8		
8	14.0	97.2	6.4		
9	16.0	102.7	5.5		
10	18.0	108.1	5.4		
11	20.0	113.2	5.1		
12	22.0	118.3	5.1		
13	24.0	123.8	5.5		
14	26.0	128.6	4.8		
15	28.0	133.6	5.0		
16	30.0	139.1	5.5		
C 17	31.1	141.8	2.7		

FIRST CLOSED-IN

C 1	0.0	141.8			
2	1.0	560.6	418.9	0.9	1.517
3	2.0	934.1	792.3	1.9	1.220
4	3.0	1017.2	875.4	2.7	1.056
5	4.0	1043.8	902.0	3.5	0.943
6	5.0	1063.4	921.6	4.3	0.858
7	6.0	1076.5	934.7	5.0	0.790
8	7.0	1087.2	945.5	5.7	0.736
9	8.0	1094.6	952.8	6.4	0.688
10	9.0	1101.1	959.4	7.0	0.650
11	10.0	1105.6	963.8	7.5	0.615
12	12.0	1114.9	973.1	8.6	0.556
13	14.0	1122.2	980.4	9.7	0.507
14	16.0	1127.2	985.4	10.5	0.469
15	18.0	1131.4	989.6	11.4	0.435
16	20.0	1135.2	993.4	12.2	0.407
17	22.0	1138.6	996.8	12.9	0.383
18	24.0	1141.8	1000.0	13.5	0.361
19	26.0	1145.1	1003.3	14.2	0.341
20	28.0	1147.0	1005.2	14.7	0.324
21	30.0	1149.0	1007.2	15.3	0.308
22	35.0	1153.2	1011.4	16.4	0.276
23	40.0	1157.0	1015.2	17.5	0.250
24	45.0	1160.4	1018.6	18.4	0.228
25	50.0	1162.4	1020.7	19.2	0.210
26	55.0	1165.2	1023.5	19.8	0.195
D 27	58.8	1166.9	1025.1	20.3	0.184

REF	MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta t}{t + \Delta t}$	$\log \frac{t + \Delta t}{\Delta t}$
SECOND FLOW					
E 1	0.0	155.3			
2	2.0	152.9	-2.4		
3	4.0	158.2	5.3		
4	6.0	163.3	5.1		
5	8.0	168.4	5.1		
6	10.0	173.2	4.8		
7	12.0	178.1	4.9		
8	14.0	182.3	4.3		
9	16.0	187.3	5.0		
10	18.0	192.4	5.1		
11	20.0	196.7	4.3		
12	22.0	200.9	4.3		
13	24.0	205.5	4.6		
14	26.0	209.5	4.0		
15	28.0	213.5	4.1		
16	30.0	218.5	5.0		
17	32.0	223.2	4.7		
18	34.0	227.3	4.2		
19	36.0	231.3	4.0		
20	38.0	235.1	3.8		
21	40.0	239.3	4.2		
22	42.0	242.7	3.4		
23	44.0	247.6	4.9		
F 24	46.5	252.2	4.6		

SECOND CLOSED-IN

F 1	0.0	252.2			
2	1.0	630.5	378.3	1.0	1.890
3	2.0	889.2	637.0	1.9	1.604
4	3.0	985.4	733.3	2.9	1.433
5	4.0	1022.4	770.2	3.8	1.309
6	5.0	1043.5	791.3	4.7	1.214
7	6.0	1057.7	805.5	5.6	1.142
8	7.0	1067.9	815.8	6.4	1.081
9	8.0	1074.9	822.7	7.2	1.030
10	9.0	1080.7	828.5	8.0	0.984
11	10.0	1086.7	834.5	8.9	0.942
12	12.0	1094.5	842.3	10.4	0.874
13	14.0	1101.9	849.7	11.9	0.814
14	16.0	1107.3	855.1	13.3	0.766
15	18.0	1111.7	859.5	14.6	0.725
16	20.0	1115.4	863.2	15.9	0.688
17	22.0	1118.4	866.2	17.1	0.655
18	24.0	1121.5	869.3	18.3	0.626
19	26.0	1123.9	871.7	19.5	0.600
20	28.0	1126.3	874.2	20.6	0.576
21	30.0	1128.5	876.3	21.6	0.554
22	35.0	1133.3	881.1	24.1	0.507
23	40.0	1138.0	885.8	26.4	0.468
24	45.0	1140.8	888.6	28.5	0.435

REMARKS:

TICKET NO: 66453700

CLOCK NO: 20521 HOUR: 12



GAUGE NO: 317

DEPTH: 4568.0

REF	MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta t}{t + \Delta t}$	$\log \frac{t + \Delta t}{\Delta t}$
SECOND CLOSED-IN - CONTINUED					
25	50.0	1143.8	891.6	30.4	0.407
26	55.0	1146.3	894.1	32.2	0.382
27	60.0	1148.5	896.4	33.8	0.360
28	70.0	1153.2	901.0	36.8	0.324
G 29	76.2	1154.8	902.6	38.4	0.305

REF	MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta t}{t + \Delta t}$	$\log \frac{t + \Delta t}{\Delta t}$

REMARKS:

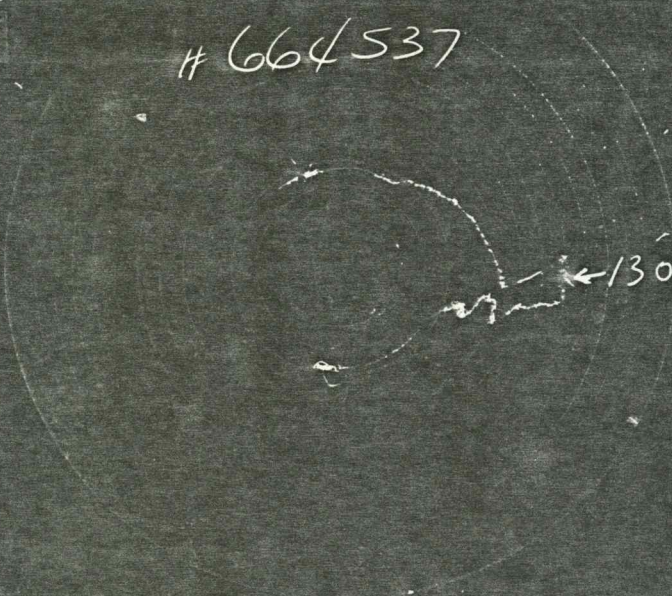
		O.D.	I.D.	LENGTH	DEPTH	
1		DRILL PIPE.....	4.500	3.826	4382.0	
50		IMPACT REVERSING SUB.....	6.000	3.000	1.0	4383.0
1		DRILL PIPE.....	4.500	3.826	126.0	
12		DUAL CIP VALVE.....	5.030	0.870	6.0	
60		HYDROSPRING TESTER.....	5.000	0.750	5.0	4518.0
80		AP RUNNING CASE.....	5.000	2.250	4.1	4521.0
16		VR SAFETY JOINT.....	5.000	1.000	2.8	
70		OPEN HOLE PACKER.....	6.750	1.530	5.8	4531.0
20		FLUSH JOINT ANCHOR.....	5.000	2.370	33.0	
83		HT-500 TEMPERATURE CASE.....	5.000		1.5	4566.0
81		BLANKED-OFF RUNNING CASE.....	5.000		4.1	4568.0
TOTAL DEPTH					4571.0	
EQUIPMENT DATA						

TEMPERATURE

RECORDER

CHART

664537



10° each circle

Indicated Flow
Capacity

$$kh = \frac{1637 Q_g T}{m}$$

md-ft

Average Effective
Permeability

$$k = \frac{kh}{h}$$

md

Skin Factor

$$S = 1.151 \left[\frac{m(P^*) - m(P_f)}{m} - \text{LOG} \frac{kt}{\phi \mu c_f r_w^2} + 3.23 \right] \text{ ---}$$

Damage Ratio

$$DR = \frac{m(P^*) - m(P_f)}{m(P^*) - m(P_f) - 0.87 mS} \text{ ---}$$

Indicated Flow
Rate (Maximum)

$$AOF_1 = \frac{Q_g m(P^*)}{m(P^*) - m(P_f)}$$

MCFD

Indicated Flow
Rate (Minimum)

$$AOF_2 = Q_g \sqrt{\frac{m(P^*)}{m(P^*) - m(P_f)}}$$

MCFD

Approx. Radius of
Investigation

$$r_i = 0.032 \sqrt{\frac{kt}{\phi \mu c_f}}$$

ft