

HALLIBURTON SERVICES

TICKET NO. 40179300

02-MAR-87

0BERLIN

FORMATION TESTING SERVICE REPORT

SCHEETZ		1		1		4275.8 - 4292.0		MC NEISH OIL OPERATIONS	
LEASE NAME		WELL NO.		TEST NO.		TESTED INTERVAL		LEASE OWNER/COMPANY NAME	
LEGAL LOCATION SEC. - TWP. - RNG.		22 - 11 SOUTH - 33 WEST		FIELD AREA		H. OBKLEY		COUNTY	
						LOGAN		STATE	
								KANSAS	
								PA	

GAUGE NO: 8645 DEPTH: 4259.7 BLANKED OFF: NO HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC		2101.7			
B	INITIAL FIRST FLOW		7.3			
C	FINAL FIRST FLOW		7.3	30.0	30.0	F
C	INITIAL FIRST CLOSED-IN		7.3			
D	FINAL FIRST CLOSED-IN		20.1	30.0	30.0	C
E	INITIAL SECOND FLOW		9.2			
F	FINAL SECOND FLOW		9.2	30.0	30.0	F
F	INITIAL SECOND CLOSED-IN		9.2			
G	FINAL SECOND CLOSED-IN		14.7	30.0	30.0	C
H	FINAL HYDROSTATIC		2096.8			

GAUGE NO: 8614 DEPTH: 4289.5 BLANKED OFF: YES HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC	2130	2119.3			
B	INITIAL FIRST FLOW	25	23.2	30.0	30.0	F
C	FINAL FIRST FLOW	25	23.2			
C	INITIAL FIRST CLOSED-IN	25	23.2	30.0	30.0	C
D	FINAL FIRST CLOSED-IN	42	35.3			
E	INITIAL SECOND FLOW	25	31.4	30.0	30.0	F
F	FINAL SECOND FLOW	25	26.5			
F	INITIAL SECOND CLOSED-IN	25	26.5	30.0	30.0	C
G	FINAL SECOND CLOSED-IN	25	30.7			
H	FINAL HYDROSTATIC	2105	2113.7			

EQUIPMENT & HOLE DATA

FORMATION TESTED: LOWER KANSAS CITY

NET PAY (ft): _____

GROSS TESTED FOOTAGE: 16.2

ALL DEPTHS MEASURED FROM: KB

CASING PERFS. (ft): _____

HOLE OR CASING SIZE (in): 7.875

ELEVATION (ft): 3140.0 GROUND LEVEL

TOTAL DEPTH (ft): 4292.0

PACKER DEPTH(S) (ft): 4270. 4276

FINAL SURFACE CHOKE (in): _____

BOTTOM HOLE CHOKE (in): 0.750

MUD WEIGHT (lb/gal): 9.40

MUD VISCOSITY (sec): 47

ESTIMATED HOLE TEMP. (°F): _____

ACTUAL HOLE TEMP. (°F): 103 @ 4286.4 ft

TICKET NUMBER: 40179300

DATE: 2-21-87 TEST NO: 1

TYPE DST: OPEN HOLE

HALLIBURTON CAMP:
OBERLIN

TESTER: S. DOLAN

WITNESS: MARTY DUBOIS

DRILLING CONTRACTOR:

ABERCROMBIE DRILLING #5

FLUID PROPERTIES FOR RECOVERED MUD & WATER

SOURCE

RESISTIVITY

CHLORIDES

<u>MUD PIT</u>	<u>0</u> °F	<u>8000</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

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

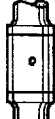
RECOVERED:

3 FEET OF DRILLING MUD

MEASURED FROM
TESTER VALVE

REMARKS:

[illegible]

		O.D.	I.D.	LENGTH	DEPTH	
1		DRILL PIPE.....	4.500	3.826	3738.8	
4		FLEX WEIGHT.....	4.500	2.764	412.1	
50		IMPACT REVERSING SUB.....	6.000	3.000	1.4	4150.8
4		FLEX WEIGHT.....	4.500	2.764	94.7	
5		CROSSOVER.....	6.000	3.000	1.0	
12		DUAL CIP VALVE.....	5.000	0.870	6.0	
60		HYDROSPRING TESTER.....	5.000	0.750	5.0	4257.1
80		AP RUNNING CASE.....	5.000	2.250	4.1	4259.7
16		VR SAFETY JOINT.....	5.000	1.000	2.8	
70		OPEN HOLE PACKER.....	6.750	1.530	5.8	4269.9
70		OPEN HOLE PACKER.....	6.750	1.530	5.8	4275.7
20		FLUSH JOINT ANCHOR.....	5.000	2.370	9.0	
83		HT-500 TEMPERATURE CASE.....	5.000		1.5	4286.4
81		BLANKED-OFF RUNNING CASE.....	5.000		4.1	4289.5
TOTAL DEPTH						4292.0

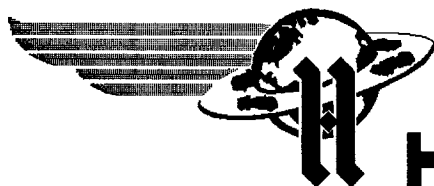
EQUIPMENT DATA

TEMPERATURE RECORDER CHART

10° each circle

EQUATIONS FOR DST GAS WELL ANALYSIS

Indicated Flow Capacity	$kh = \frac{.001637 Q_g T}{m}$	md-ft
Average Effective Permeability	$k = \frac{kh}{h}$	md
Skin Factor	$S = 1.151 \left[\frac{m(P^*) - m(P_i)}{m} - \text{LOG} \left(\frac{k (t/60)}{\phi \mu c_i r_w^2} \right) + 3.23 \right]$	
Damage Ratio	$DR = \frac{m(P^*) - m(P_i)}{m(P^*) - m(P_i) - 0.87 mS}$	
Indicated Flow Rate (Maximum)	$AOF_1 = \frac{Q_g m(P^*)}{m(P^*) - m(P_i)}$	MCFD
Indicated Flow Rate (Minimum)	$AOF_2 = Q_g \sqrt{\frac{m(P^*)}{m(P^*) - m(P_i)}}$	MCFD
Approx. Radius of Investigation	$r_i = 0.032 \sqrt{\frac{k (t/60)}{\phi \mu c_i}}$	ft



HALLIBURTON SERVICES

TICKET NO. 40179400
02-MAR-87
OBERLIN

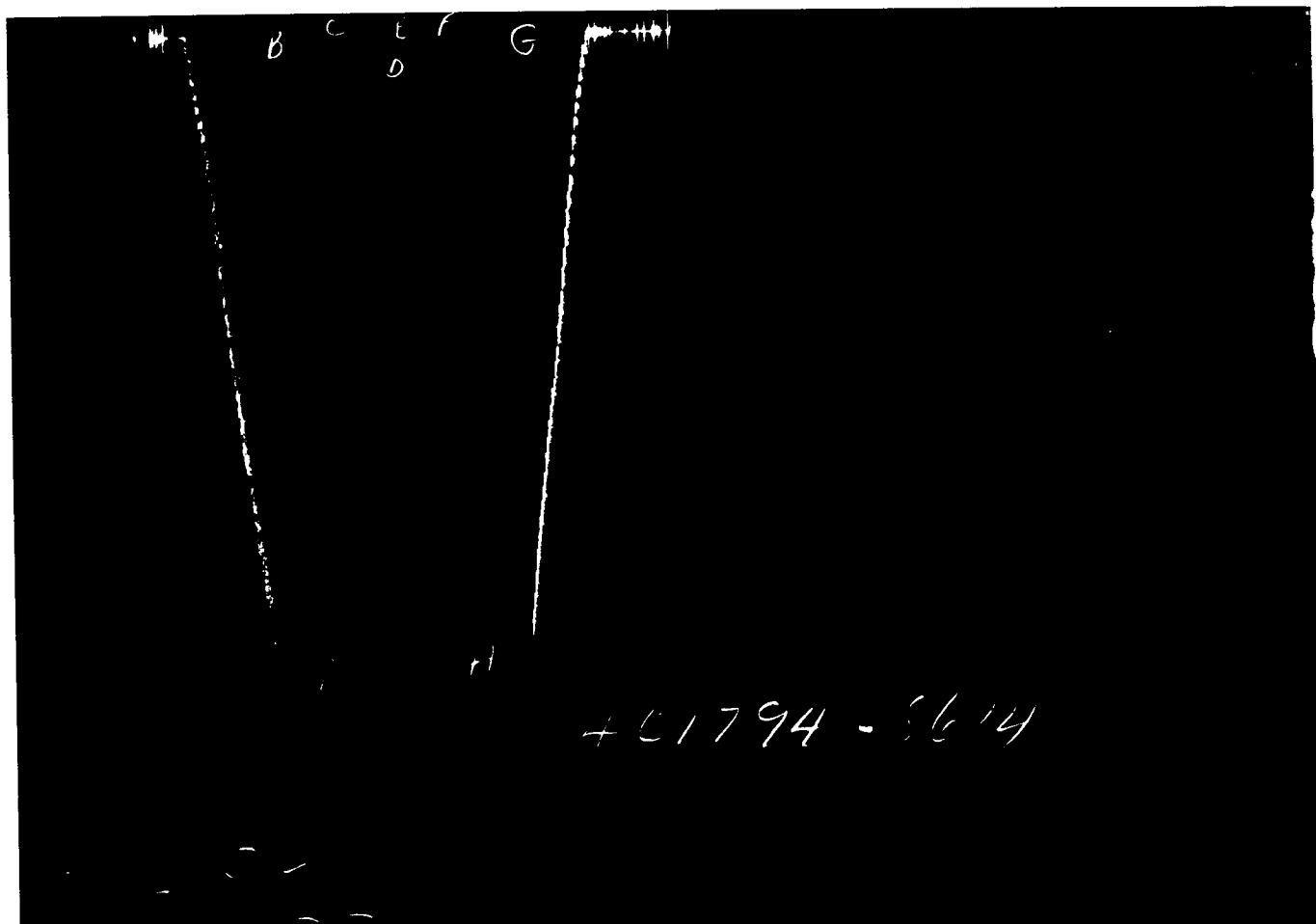
FORMATION TESTING SERVICE REPORT

SHEETZ	1	2	4282.8 - 4303.0	MC NEISH OIL OPERATIONS
LEASE NAME	WELL NO.	TEST NO.	TESTED INTERVAL	LEASE OWNER/COMPANY NAME
LEGAL LOCATION SEC. - TWP. - RNG.	22-11S-33W	FIELD AREA	W. ORKLEY	COUNTY
				LOGAN
				STATE
				KANSAS
				DR

42794-8645

GAUGE NO: 8645 DEPTH: 4266.7 BLANKED OFF: NO HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC		2161.2			
B	INITIAL FIRST FLOW		12.1			
C	FINAL FIRST FLOW		12.1	30.0	30.0	F
C	INITIAL FIRST CLOSED-IN		12.1			
D	FINAL FIRST CLOSED-IN		26.0	30.0	30.0	C
E	INITIAL SECOND FLOW		22.2			
F	FINAL SECOND FLOW		19.8	30.0	30.0	F
F	INITIAL SECOND CLOSED-IN		19.8			
G	FINAL SECOND CLOSED-IN		26.7	30.0	30.0	C
H	FINAL HYDROSTATIC		2111.5			



GAUGE NO: 8614 DEPTH: 4300.5 BLANKED OFF: YES HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC	2180	2181.7			
B	INITIAL FIRST FLOW	25	26.9	30.0	30.0	F
C	FINAL FIRST FLOW	25	29.9			
C	INITIAL FIRST CLOSED-IN	25	29.9	30.0	30.0	C
D	FINAL FIRST CLOSED-IN	50	43.5			
E	INITIAL SECOND FLOW	25	43.5	30.0	30.0	F
F	FINAL SECOND FLOW	25	37.0			
F	INITIAL SECOND CLOSED-IN	25	37.0	30.0	30.0	C
G	FINAL SECOND CLOSED-IN	50	45.3			
H	FINAL HYDROSTATIC	2163	2131.2			

EQUIPMENT & HOLE DATA

FORMATION TESTED: LOWER KANSAS CITY

NET PAY (ft): _____

GROSS TESTED FOOTAGE: 20.2

ALL DEPTHS MEASURED FROM: KELLY BUSHING

CASING PERFS. (ft): _____

HOLE OR CASING SIZE (in): 7.875

ELEVATION (ft): 3140.0 GROUND LEVEL

TOTAL DEPTH (ft): 4303.0

PACKER DEPTH(S) (ft): 4277, 4283

FINAL SURFACE CHOKE (in): _____

BOTTOM HOLE CHOKE (in): 0.750

MUD WEIGHT (lb/gal): 9.40

MUD VISCOSITY (sec): 45

ESTIMATED HOLE TEMP. (°F): _____

ACTUAL HOLE TEMP. (°F): 102 @ 4297.4 ft

TICKET NUMBER: 40179400

DATE: 2-22-87 TEST NO: 2

TYPE DST: OPEN HOLE

HALLIBURTON CAMP:
OBERLIN

TESTER: S. DOLAN

WITNESS: MARTY DUBOIS

DRILLING CONTRACTOR:

ABERCROMBIE DRILLING #5

FLUID PROPERTIES FOR RECOVERED MUD & WATER

SOURCE

RESISTIVITY

CHLORIDES

<u>MUD PIT</u>	<u> </u> @ <u> </u> °F	<u>8000</u> ppm
_____	<u> </u> @ <u> </u> °F	<u> </u> ppm
_____	<u> </u> @ <u> </u> °F	<u> </u> ppm
_____	<u> </u> @ <u> </u> °F	<u> </u> ppm
_____	<u> </u> @ <u> </u> °F	<u> </u> ppm
_____	<u> </u> @ <u> </u> °F	<u> </u> 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
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RECOVERED :

20' OF DRILLING MUD

MEASURED FROM
TESTER VALVE

REMARKS :

[illegible]

		O.D.	I.D.	LENGTH	DEPTH	
1		DRILL PIPE.....	4.500	3.825	3745.8	
4		FLEX WEIGHT.....	4.500	2.764	412.1	
50		IMPACT REVERSING SUB.....	6.000	3.000	1.4	4157.8
4		FLEX WEIGHT.....	4.500	2.764	94.7	
5		CROSSOVER.....	6.000	3.000	1.0	
12		DUAL CIP VALVE.....	5.000	0.870	6.0	
60		HYDROSPRING TESTER.....	5.000	0.750	5.0	4264.1
80		AP RUNNING CASE.....	5.000	2.250	4.1	4266.7
16		VR SAFETY JOINT.....	5.000	1.000	2.8	
70		OPEN HOLE PACKER.....	6.750	1.530	5.8	4276.9
70		OPEN HOLE PACKER.....	6.750	1.530	5.8	4282.7
20		FLUSH JOINT ANCHOR.....	5.000	2.370	13.0	
83		HT-500 TEMPERATURE CASE.....	5.000		1.5	4297.4
81		BLANKED-OFF RUNNING CASE.....	5.000		4.1	4300.5
TOTAL DEPTH						4303.0

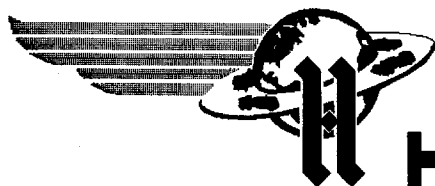
EQUIPMENT DATA

TEMPERATURE RECORDER CHART

10° each circle

EQUATIONS FOR DST GAS WELL ANALYSIS

Indicated Flow Capacity	$kh = \frac{.001637 Q_g T}{m}$	md-ft
Average Effective Permeability	$k = \frac{kh}{h}$	md
Skin Factor	$S = 1.151 \left[\frac{m(P^*) - m(P_i)}{m} - \text{LOG} \left(\frac{k (t/60)}{\phi \mu c_i r_w^2} \right) + 3.23 \right]$	
Damage Ratio	$DR = \frac{m(P^*) - m(P_i)}{m(P^*) - m(P_i) - 0.87 mS}$	
Indicated Flow Rate (Maximum)	$AOF_1 = \frac{Q_g m(P^*)}{m(P^*) - m(P_i)}$	MCFD
Indicated Flow Rate (Minimum)	$AOF_2 = Q_g \sqrt{\frac{m(P^*)}{m(P^*) - m(P_i)}}$	MCFD
Approx. Radius of Investigation	$r_i = 0.032 \sqrt{\frac{k (t/60)}{\phi \mu c_i}}$	ft



HALLIBURTON SERVICES

TICKET NO. 40179500

02-MAR-87

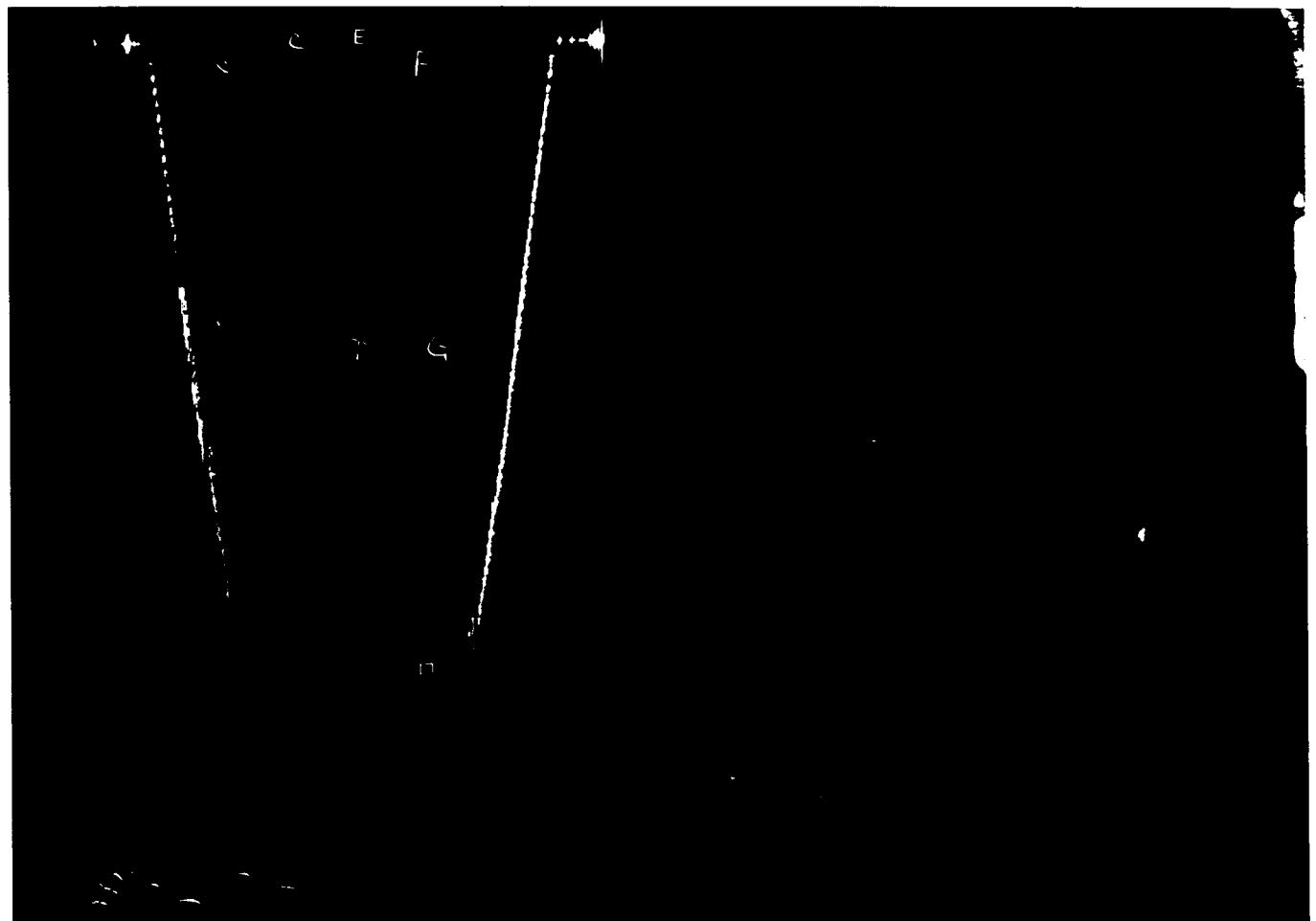
DBERLIN

FORMATION TESTING SERVICE REPORT

SHEETZ	1	3	4301.8 - 4335.0	MC NEISH OIL OPERATIONS
LEASE NAME	WELL NO.	TEST NO.	TESTED INTERVAL	LEASE OWNER/COMPANY NAME
LEGAL LOCATION SEC. - TWP. - RNG.	22 - 11 SOUTH - 33 WEST	FIELD AREA	WEST OAKLEY, KS	COUNTY
			LOGAN	STATE
			KANSAS	PM

GAUGE NO: 8645 DEPTH: 4285.7 BLANKED OFF: NO HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC		2160.7			
B	INITIAL FIRST FLOW		9.6			
C	FINAL FIRST FLOW		35.4	30.0	31.3	F
C	INITIAL FIRST CLOSED-IN		35.4			
D	FINAL FIRST CLOSED-IN		937.3	30.0	29.8	C
E	INITIAL SECOND FLOW		47.6			
F	FINAL SECOND FLOW		64.2	30.0	28.4	F
F	INITIAL SECOND CLOSED-IN		64.2			
G	FINAL SECOND CLOSED-IN		921.2	30.0	30.5	C
H	FINAL HYDROSTATIC		2115.9			



GAUGE NO: 8614 DEPTH: 4332.5 BLANKED OFF: YES HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC	2180	2184.5			
B	INITIAL FIRST FLOW	33	37.1			
C	FINAL FIRST FLOW	50	61.2	30.0	31.3	F
C	INITIAL FIRST CLOSED-IN	50	61.2			
D	FINAL FIRST CLOSED-IN	965	964.3	30.0	29.8	C
E	INITIAL SECOND FLOW	67	75.9			
F	FINAL SECOND FLOW	83	89.5	30.0	28.4	F
F	INITIAL SECOND CLOSED-IN	83	89.5			
G	FINAL SECOND CLOSED-IN	949	948.5	30.0	30.5	C
H	FINAL HYDROSTATIC	2130	2143.3			

EQUIPMENT & HOLE DATA

FORMATION TESTED: LOWER KANSAS CITY

NET PAY (ft): _____

GROSS TESTED FOOTAGE: 33.2

ALL DEPTHS MEASURED FROM: KB

CASING PERFS. (ft): _____

HOLE OR CASING SIZE (in): 7.875

ELEVATION (ft): 3140.0 G.L.

TOTAL DEPTH (ft): 4335.0

PACKER DEPTH(S) (ft): 4296, 4302

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): 107 @ 4329.4 ft

TICKET NUMBER: 40179500

DATE: 2-22-87 TEST NO: 3

TYPE DST: OPEN HOLE

HALLIBURTON CAMP:
OBERLIN

TESTER: S. DOLAN

WITNESS: MARTY DUBOIS

DRILLING CONTRACTOR:

ABERCROMBIE DRILLING #5

FLUID PROPERTIES FOR RECOVERED MUD & WATER

SOURCE

RESISTIVITY

CHLORIDES

<u>MUD PIT</u>	<u> </u> @ <u> </u> °F	<u>8000</u> ppm
<u> </u>	<u> </u> @ <u> </u> °F	<u> </u> ppm
<u> </u>	<u> </u> @ <u> </u> °F	<u> </u> ppm
<u> </u>	<u> </u> @ <u> </u> °F	<u> </u> ppm
<u> </u>	<u> </u> @ <u> </u> °F	<u> </u> ppm
<u> </u>	<u> </u> @ <u> </u> °F	<u> </u> 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:

100 FEET OF DRILLING MUD

MEASURED FROM
TESTER VALVE

REMARKS:

[illegible]

TICKET NO: 40179500

CLOCK NO: 14280 HOUR: 12



GAUGE NO: 8645

DEPTH: 4285.7

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	9.6			
2	5.0	12.2	2.6		
3	10.0	17.4	5.2		
4	15.0	21.5	4.1		
5	20.0	25.5	3.9		
6	25.0	29.8	4.4		
7	30.0	34.3	4.4		
C 8	31.3	35.4	1.1		
FIRST CLOSED-IN					
C 1	0.0	35.4			
2	2.0	606.6	571.2	1.9	1.225
3	4.0	855.6	820.2	3.5	0.949
4	6.0	881.5	846.1	5.0	0.794
5	8.0	894.8	859.5	6.4	0.692
6	10.0	904.5	869.1	7.6	0.615
7	12.0	911.0	875.6	8.7	0.557
8	14.0	916.0	880.6	9.7	0.510
9	16.0	920.3	884.9	10.6	0.471
10	18.0	924.3	888.9	11.4	0.438
11	20.0	927.3	891.9	12.2	0.409
12	22.0	929.9	894.5	12.9	0.385
13	24.0	931.9	896.5	13.6	0.363
14	26.0	934.0	898.6	14.2	0.344
15	28.0	935.9	900.5	14.8	0.326
D 16	29.8	937.3	901.9	15.3	0.312
SECOND FLOW					
E 1	0.0	47.6			
2	5.0	46.0	-1.6		
3	10.0	49.5	3.4		
4	15.0	52.7	3.3		
5	20.0	56.8	4.0		
6	25.0	61.1	4.4		
F 7	28.4	64.2	3.0		
SECOND CLOSED-IN					
F 1	0.0	64.2			
2	2.0	469.3	405.1	1.9	1.490
3	4.0	827.2	763.0	3.8	1.199
4	6.0	861.2	797.0	5.5	1.038
5	8.0	874.6	810.4	7.1	0.926
6	10.0	884.0	819.9	8.5	0.845
7	12.0	891.8	827.7	10.0	0.776
8	14.0	897.5	833.3	11.3	0.722
9	16.0	901.9	837.8	12.6	0.674

REF	MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta t}{t + \Delta t}$	$\log \frac{t + \Delta t}{\Delta t}$
SECOND CLOSED-IN - CONTINUED					
10	18.0	906.0	841.8	13.8	0.635
11	20.0	909.0	844.9	15.0	0.600
12	22.0	911.9	847.7	16.1	0.570
13	24.0	914.6	850.5	17.1	0.542
14	26.0	916.7	852.5	18.1	0.518
15	28.0	918.7	854.5	19.1	0.495
G 16	30.5	921.2	857.0	20.2	0.471

REMARKS:

TICKET NO: 40179500

CLOCK NO: 13852 HOUR: 12



GAUGE NO: 8614

DEPTH: 4332.5

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	37.1			
2	5.0	37.5	0.4		
3	10.0	42.9	5.4		
4	15.0	47.9	5.0		
5	20.0	51.7	3.8		
6	25.0	55.3	3.6		
7	30.0	59.9	4.7		
C 8	31.3	61.2	1.2		
FIRST CLOSED-IN					
C 1	0.0	61.2			
2	2.0	688.4	627.2	1.9	1.224
3	4.0	888.3	827.1	3.5	0.950
4	6.0	912.7	851.5	5.0	0.794
5	8.0	924.6	863.4	6.4	0.691
6	10.0	932.8	871.6	7.6	0.616
7	12.0	939.3	878.1	8.7	0.557
8	14.0	944.1	882.9	9.7	0.510
9	16.0	948.1	886.9	10.6	0.471
10	18.0	951.0	889.8	11.4	0.437
11	20.0	954.5	893.3	12.2	0.409
12	22.0	956.9	895.7	12.9	0.384
13	24.0	959.4	898.2	13.6	0.363
14	26.0	961.7	900.5	14.2	0.343
15	28.0	963.1	902.0	14.8	0.326
D 16	29.8	964.3	903.1	15.3	0.312
SECOND FLOW					
E 1	0.0	75.9			
2	5.0	72.1	-3.7		
3	10.0	75.4	3.2		
4	15.0	79.3	3.9		
5	20.0	82.4	3.2		
6	25.0	86.7	4.2		
F 7	28.4	89.5	2.8		
SECOND CLOSED-IN					
F 1	0.0	89.5			
2	2.0	529.8	440.3	1.9	1.495
3	4.0	860.4	770.9	3.8	1.200
4	6.0	891.6	802.0	5.4	1.040
5	8.0	905.0	815.4	7.1	0.926
6	10.0	914.2	824.7	8.6	0.843
7	12.0	920.6	831.1	10.0	0.776
8	14.0	925.5	836.0	11.4	0.721
9	16.0	929.7	840.2	12.6	0.675

REF	MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta t}{t + \Delta t}$	$\log \frac{t + \Delta t}{\Delta t}$
SECOND CLOSED-IN - CONTINUED					
10	18.0	933.4	843.9	13.8	0.636
11	20.0	936.3	846.8	15.0	0.600
12	22.0	939.6	850.1	16.1	0.570
13	24.0	942.2	852.6	17.1	0.542
14	26.0	944.6	855.1	18.1	0.517
15	28.0	946.5	857.0	19.1	0.495
G 16	30.5	948.5	859.0	20.2	0.471

REMARKS:

		O.D.	I.D.	LENGTH	DEPTH
1					
	DRILL PIPE.....	4.500	3.826	3764.8	
4					
	FLEX WEIGHT.....	4.500	2.764	412.1	
50					
	IMPACT REVERSING SUB.....	6.000	3.000	1.4	4176.8
4					
	FLEX WEIGHT.....	4.500	2.764	94.7	
5					
	CROSSOVER.....	6.000	3.000	1.0	
12					
	DUAL CIP VALVE.....	5.000	0.870	6.0	
60					
	HYDROSPRING TESTER.....	5.000	0.750	5.0	4283.1
80					
	AP RUNNING CASE.....	5.000	2.250	4.1	4285.7
16					
	VR SAFETY JOINT.....	5.000	1.000	2.8	
70					
	OPEN HOLE PACKER.....	6.750	1.530	5.8	4295.9
70					
	OPEN HOLE PACKER.....	6.750	1.530	5.8	4301.7
20					
	FLUSH JOINT ANCHOR.....	5.000	2.370	26.0	
83					
	HT-500 TEMPERATURE CASE.....	5.000		1.5	4329.4
81					
	BLANKED-OFF RUNNING CASE.....	5.000		4.1	4332.5
TOTAL DEPTH					4335.0

EQUIPMENT DATA

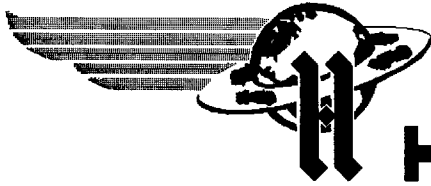
TEMPERATURE RECORDER CHART

Temp 107°F

10° each circle

EQUATIONS FOR DST GAS WELL ANALYSIS

Indicated Flow Capacity	$kh = \frac{.001637 Q_g T}{m}$	md-ft
Average Effective Permeability	$k = \frac{kh}{h}$	md
Skin Factor	$S = 1.151 \left[\frac{m(P^*) - m(P_i)}{m} - \text{LOG} \left(\frac{k (t/60)}{\phi \mu c_i r_w^2} \right) + 3.23 \right]$	
Damage Ratio	$DR = \frac{m(P^*) - m(P_i)}{m(P^*) - m(P_i) - 0.87 mS}$	
Indicated Flow Rate (Maximum)	$AOF_1 = \frac{Q_g m(P^*)}{m(P^*) - m(P_i)}$	MCFD
Indicated Flow Rate (Minimum)	$AOF_2 = Q_g \sqrt{\frac{m(P^*)}{m(P^*) - m(P_i)}}$	MCFD
Approx. Radius of Investigation	$r_i = 0.032 \sqrt{\frac{k (t/60)}{\phi \mu c_i}}$	ft



HALLIBURTON SERVICES

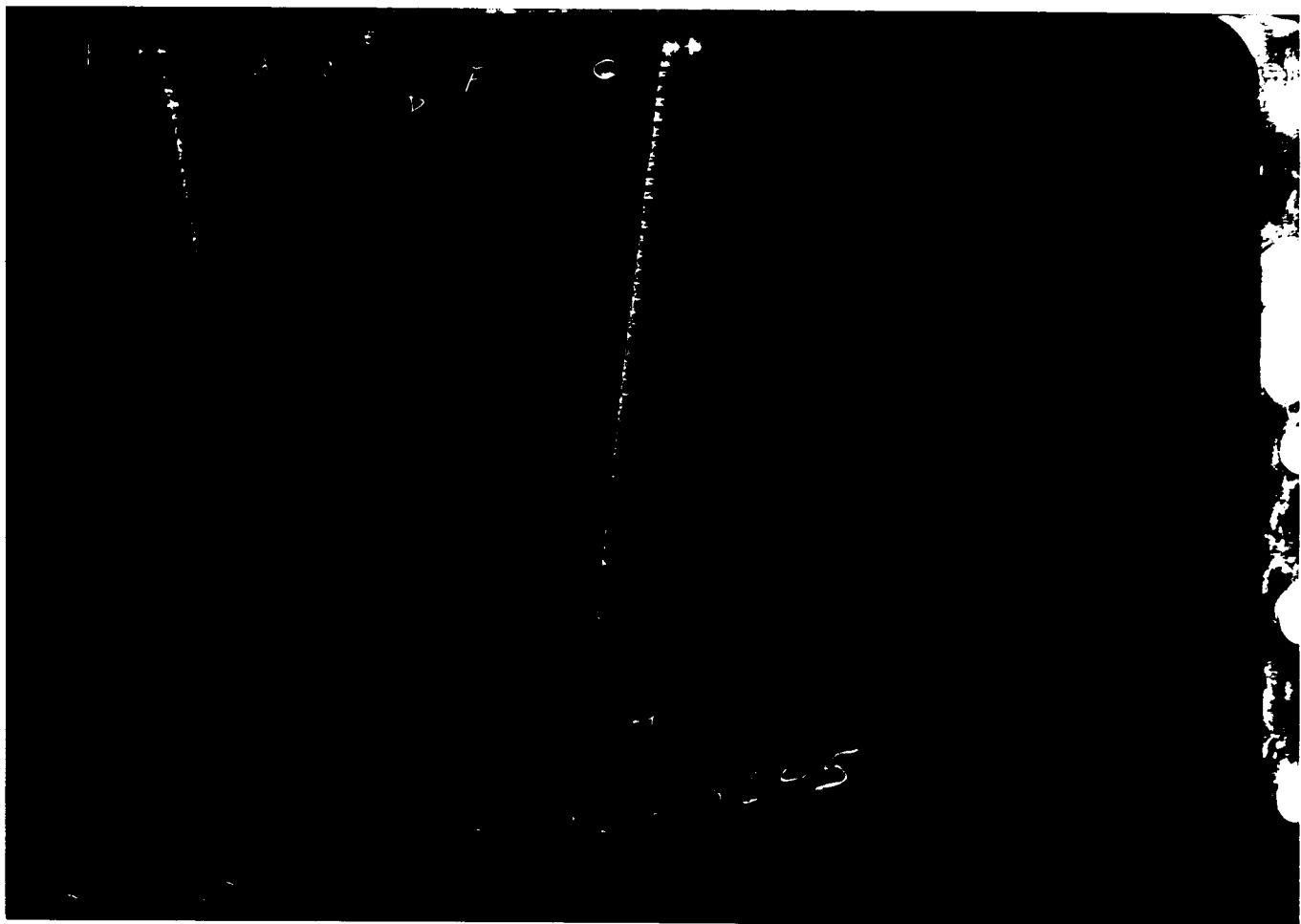
TICKET NO. 40179600

02-MAR-87

0BERLIN

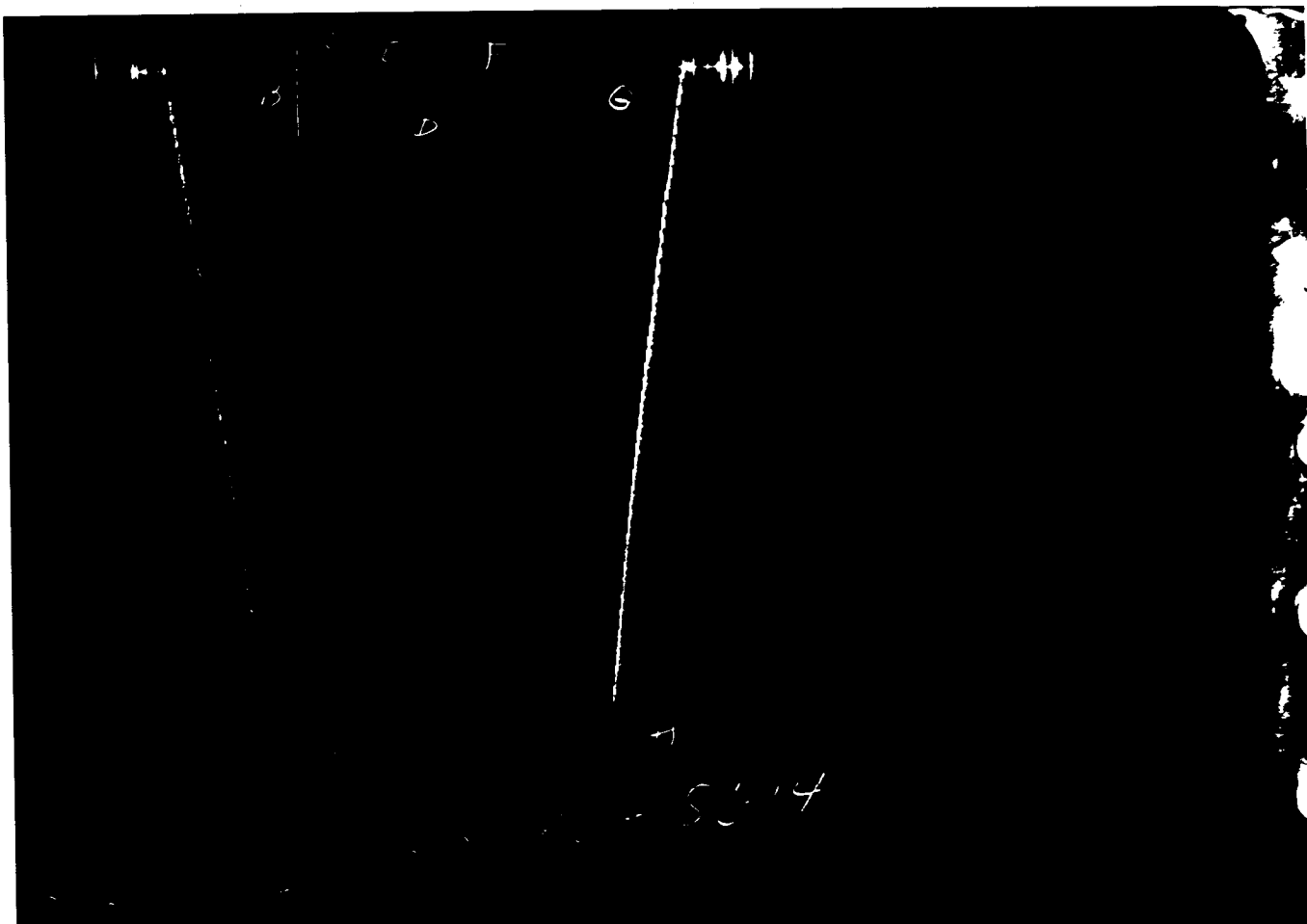
FORMATION TESTING SERVICE REPORT

SHEETZ		1		4		4630.8 - 4653.0		MC NEISH OIL OPERATIONS	
LEASE NAME		WELL NO.		TEST NO.		TESTED INTERVAL		LEASE OWNER/COMPANY NAME	
LEGAL LOCATION SEC. - TWP. - RANG.		22-11S-33W		FIELD AREA		WEST OF OAKLEY, KANSAS		COUNTY LOGAN	
								STATE KANSAS	
								JC	



GAUGE NO: 8645 DEPTH: 4614.7 BLANKED OFF: NQ HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC		2276.9			
B	INITIAL FIRST FLOW		8.4			
C	FINAL FIRST FLOW		8.7	30.0	30.0	F
C	INITIAL FIRST CLOSED-IN		8.7			
D	FINAL FIRST CLOSED-IN		97.0	45.0	45.0	C
E	INITIAL SECOND FLOW		17.7			
F	FINAL SECOND FLOW		15.0	45.0	45.0	F
F	INITIAL SECOND CLOSED-IN		15.0			
G	FINAL SECOND CLOSED-IN		74.7	60.0	60.0	C
H	FINAL HYDROSTATIC		2284.5			



GAUGE NO: 8614 DEPTH: 4650.5 BLANKED OFF: YES HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC	2380	2298.9			
B	INITIAL FIRST FLOW	33	28.0	30.0	30.0	F
C	FINAL FIRST FLOW	33	29.4			
C	INITIAL FIRST CLOSED-IN	33	29.4	45.0	45.0	C
D	FINAL FIRST CLOSED-IN	116	118.2			
E	INITIAL SECOND FLOW	33	38.3	45.0	45.0	F
F	FINAL SECOND FLOW	33	35.4			
F	INITIAL SECOND CLOSED-IN	33	35.4	60.0	60.0	C
G	FINAL SECOND CLOSED-IN	99	96.2			
H	FINAL HYDROSTATIC	2305	2308.9			

EQUIPMENT & HOLE DATA

FORMATION TESTED: JOHNSON

NET PAY (ft): _____

GROSS TESTED FOOTAGE: 22.3

ALL DEPTHS MEASURED FROM: KELLY BUSHING

CASING PERFS. (ft): _____

HOLE OR CASING SIZE (in): 7.875

ELEVATION (ft): 3140.0 GROUND LEVEL

TOTAL DEPTH (ft): 4653.0

PACKER DEPTH(S) (ft): 4625, 4631

FINAL SURFACE CHOKE (in): _____

BOTTOM HOLE CHOKE (in): 0.750

MUD WEIGHT (lb/gal): 9.60

MUD VISCOSITY (sec): 46

ESTIMATED HOLE TEMP. (°F): _____

ACTUAL HOLE TEMP. (°F): 110 @ 4647.4 ft

TICKET NUMBER: 40179600

DATE: 2-24-87 TEST NO: 4

TYPE DST: OPEN HOLE

HALLIBURTON CAMP:
OBERLIN

TESTER: S. DOLAN

WITNESS: MARTY DUBOIS

DRILLING CONTRACTOR:

ABERCROMBIE DRILLING RIG #5

FLUID PROPERTIES FOR RECOVERED MUD & WATER

SOURCE

RESISTIVITY

CHLORIDES

<u>MUD PIT</u>	<u> </u> @ <u> </u> °F	<u>8000</u> ppm
_____	<u> </u> @ <u> </u> °F	<u> </u> ppm
_____	<u> </u> @ <u> </u> °F	<u> </u> ppm
_____	<u> </u> @ <u> </u> °F	<u> </u> ppm
_____	<u> </u> @ <u> </u> °F	<u> </u> ppm
_____	<u> </u> @ <u> </u> °F	<u> </u> 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
------	--------	--------

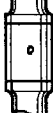
RECOVERED :

30 FEET OF SLIGHTLY OIL SPOTTED MUD

MEASURED FROM
TESTER VALVE

REMARKS :

[illegible]

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4		FLEX WEIGHT.....	4.500	2.764	412.1	
50		IMPACT REVERSING SUB.....	6.000	3.000	1.4	4505.8
4		FLEX WEIGHT.....	4.500	2.764	94.7	
5		CROSSOVER.....	6.000	3.000	1.0	
12		DUAL CIP VALVE.....	5.000	0.870	6.0	
60		HYDROSPRING TESTER.....	5.000	0.750	5.0	4612.1
80		AP RUNNING CASE.....	5.000	2.250	4.1	4614.7
16		VR SAFETY JOINT.....	5.000	1.000	2.8	
70		OPEN HOLE PACKER.....	6.750	1.530	5.8	4624.9
70		OPEN HOLE PACKER.....	6.750	1.530	5.8	4630.7
20		FLUSH JOINT ANCHOR.....	5.000	2.370	15.0	
83		HT-500 TEMPERATURE CASE.....	5.000		1.5	4647.4
81		BLANKED-OFF RUNNING CASE.....	5.000		4.1	4650.5
TOTAL DEPTH						4653.0

EQUIPMENT DATA

TEMPERATURE RECORDER CHART

10° each circle

EQUATIONS FOR DST GAS WELL ANALYSIS

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