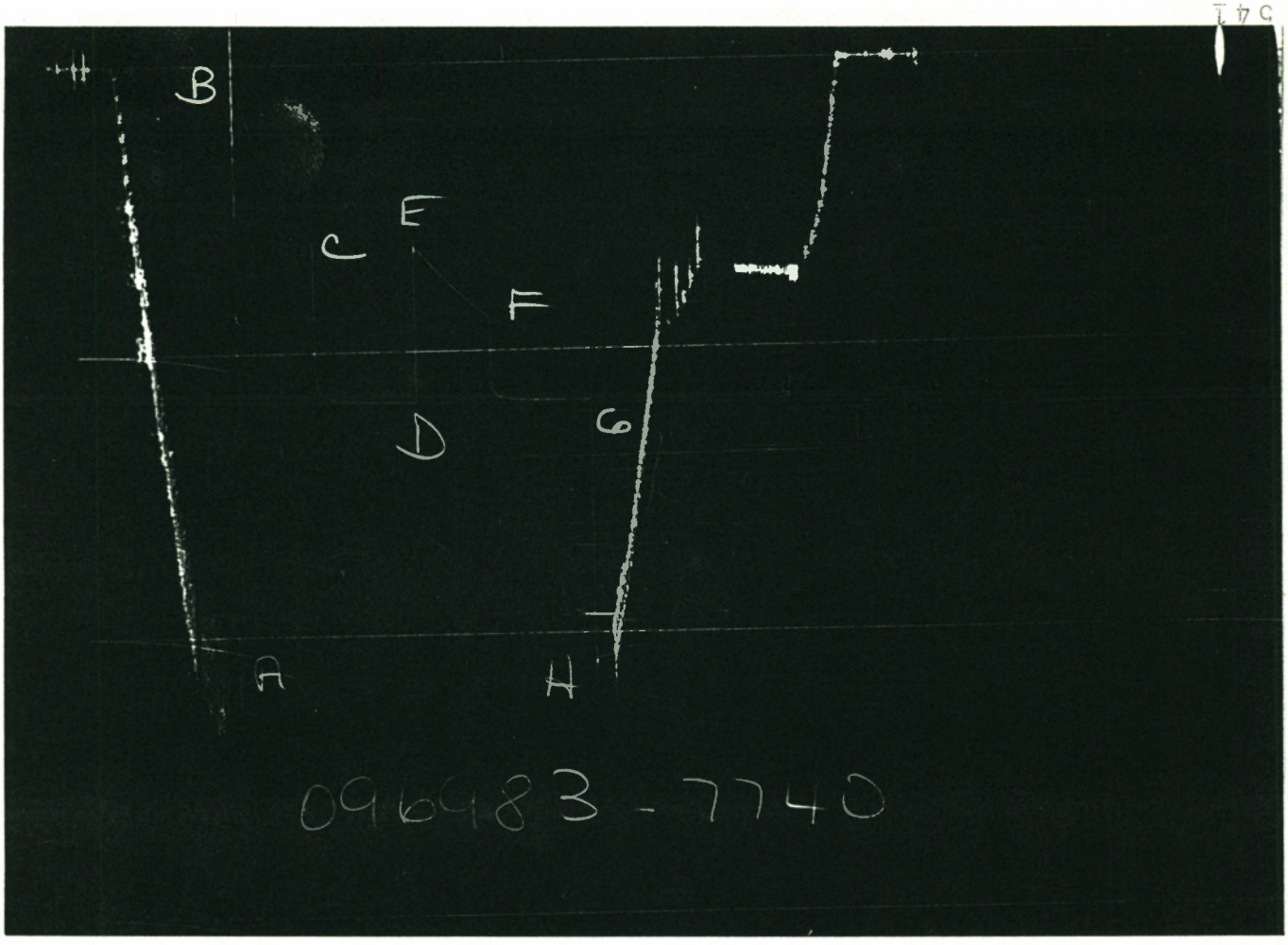
TICKET NO. 09698300
23-JUL-85
NESS CITY

FORMATION TESTING SERVICE REPORT

A. GOERING	1	1	4238.0 - 4256.0	GRUSS PETROLEUM MANAGEMENT, INCORPORATED
LEASE NAME	WELL NO.	TEST NO.	TESTED INTERVAL	LEASE OWNER/COMPANY NAME

LEGAL LOCATION SEC. - TWP. - RNG. 30 - 19 SOUTH - 30 WEST	FIELD AREA	COUNTY LANE	STATE KANSAS PM



GAUGE NO: 7740 DEPTH: 4253.0 BLANKED OFF: YES HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC		2081.3			
B	INITIAL FIRST FLOW		45.6	45.0	46.1	F
C	FINAL FIRST FLOW		623.7			
C	INITIAL FIRST CLOSED-IN		623.7	60.0	59.5	C
D	FINAL FIRST CLOSED-IN		1176.8			
E	INITIAL SECOND FLOW		640.0	45.0	44.6	F
F	FINAL SECOND FLOW		886.2			
F	INITIAL SECOND CLOSED-IN		886.2	60.0	59.8	C
G	FINAL SECOND CLOSED-IN		1176.5			
H	FINAL HYDROSTATIC		2080.0			

TYPE & SIZE MEASURING DEVICE: _____ TICKET NO: 09698300

TIME	CHOKE SIZE	SURFACE PRESSURE PSI	GAS RATE MCF	LIQUID RATE BPD	REMARKS
7-14-85					
0330					CALLED OUT
0530					ON LOCATION - RIG PULLED PIPE
0640					PICKED-UP AND MADE-UP TOOL
0655					SET TOOL IN TABLE
					STARTED DRILL PIPE
0813					TOOL ON BOTTOM
0815					OPENED TOOL - WEAK BLOW
					INCREASING TO BOTTOM OF BUCKET
					IN 5 MINUTES.
0900					CLOSED TOOL
1000					REOPENED TOOL - WEAK BLOW
					INCREASING TO BOTTOM OF BUCKET
					IN 8 MINUTES.
1045					CLOSED TOOL
1145					TOOL OFF BOTTOM
1430					TOOL IN TABLE
1455					TOOL BROKE AND LAID DOWN
1515					JOB COMPLETED

TICKET NO: 09698300

CLOCK NO: 26738 HOUR: 12

HALLIBURTON SERVICES

GAUGE NO: 7740

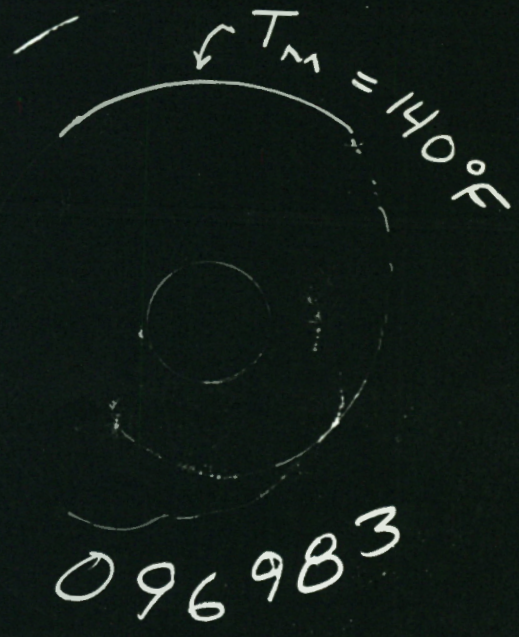
DEPTH: 4253.0

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	45.6			
	2	5.0	126.8	81.2		
	3	10.0	223.1	96.3		
	4	15.0	311.2	88.1		
	5	20.0	391.3	80.2		
	6	25.0	460.0	68.6		
	7	30.0	499.2	39.2		
	8	35.0	539.9	40.8		
	9	40.0	579.7	39.8		
C	10	46.1	623.7	44.0		
			FIRST CLOSED-IN			
C	1	0.0	623.7			
	2	4.0	1143.2	519.5	3.7	1.100
	3	8.0	1158.3	534.5	6.8	0.832
	4	12.0	1164.7	541.0	9.5	0.686
	5	16.0	1168.1	544.3	11.9	0.590
	6	20.0	1170.4	546.6	13.9	0.519
	7	24.0	1172.1	548.4	15.8	0.465
	8	28.0	1172.6	548.8	17.4	0.423
	9	32.0	1173.7	550.0	18.9	0.387
	10	36.0	1174.5	550.8	20.2	0.358
	11	40.0	1175.3	551.6	21.4	0.333
	12	44.0	1175.8	552.1	22.5	0.311
	13	48.0	1176.1	552.4	23.5	0.292
	14	52.0	1176.6	552.8	24.4	0.276
	15	56.0	1176.7	553.0	25.3	0.261
D	16	59.5	1176.8	553.1	26.0	0.249
			SECOND FLOW			
E	1	0.0	640.0			
	2	5.0	664.7	24.8		
	3	10.0	697.7	33.0		
	4	15.0	730.4	32.6		
	5	20.0	760.2	29.8		
	6	25.0	788.8	28.7		
	7	30.0	815.5	26.6		
	8	34.9	840.1	24.6		
	9	40.0	863.5	23.5		
F	10	44.6	886.2	22.7		
			SECOND CLOSED-IN			
F	1	0.0	886.2			
	2	4.0	1156.1	269.9	3.8	1.375
	3	8.0	1164.9	278.7	7.4	1.089
	4	12.0	1168.4	282.2	10.6	0.932

REF		MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta t}{t+\Delta t}$	$\log \frac{t+\Delta t}{\Delta t}$
			SECOND CLOSED-IN - CONTINUED			
	5	16.0	1170.6	284.4	13.6	0.825
	6	20.0	1172.3	286.1	16.4	0.743
	7	24.0	1173.3	287.1	19.0	0.679
	8	28.0	1174.0	287.8	21.4	0.628
	9	32.0	1174.4	288.2	23.7	0.584
	10	36.0	1175.0	288.8	25.8	0.547
	11	40.0	1175.3	289.1	27.8	0.514
	12	44.0	1175.8	289.6	29.6	0.486
	13	48.0	1176.0	289.8	31.4	0.461
	14	52.0	1176.5	290.3	33.1	0.439
	15	56.0	1176.5	290.3	34.6	0.419
G	16	59.8	1176.5	290.3	36.0	0.401

REMARKS:

TEMPERATURE RECORDER CHART



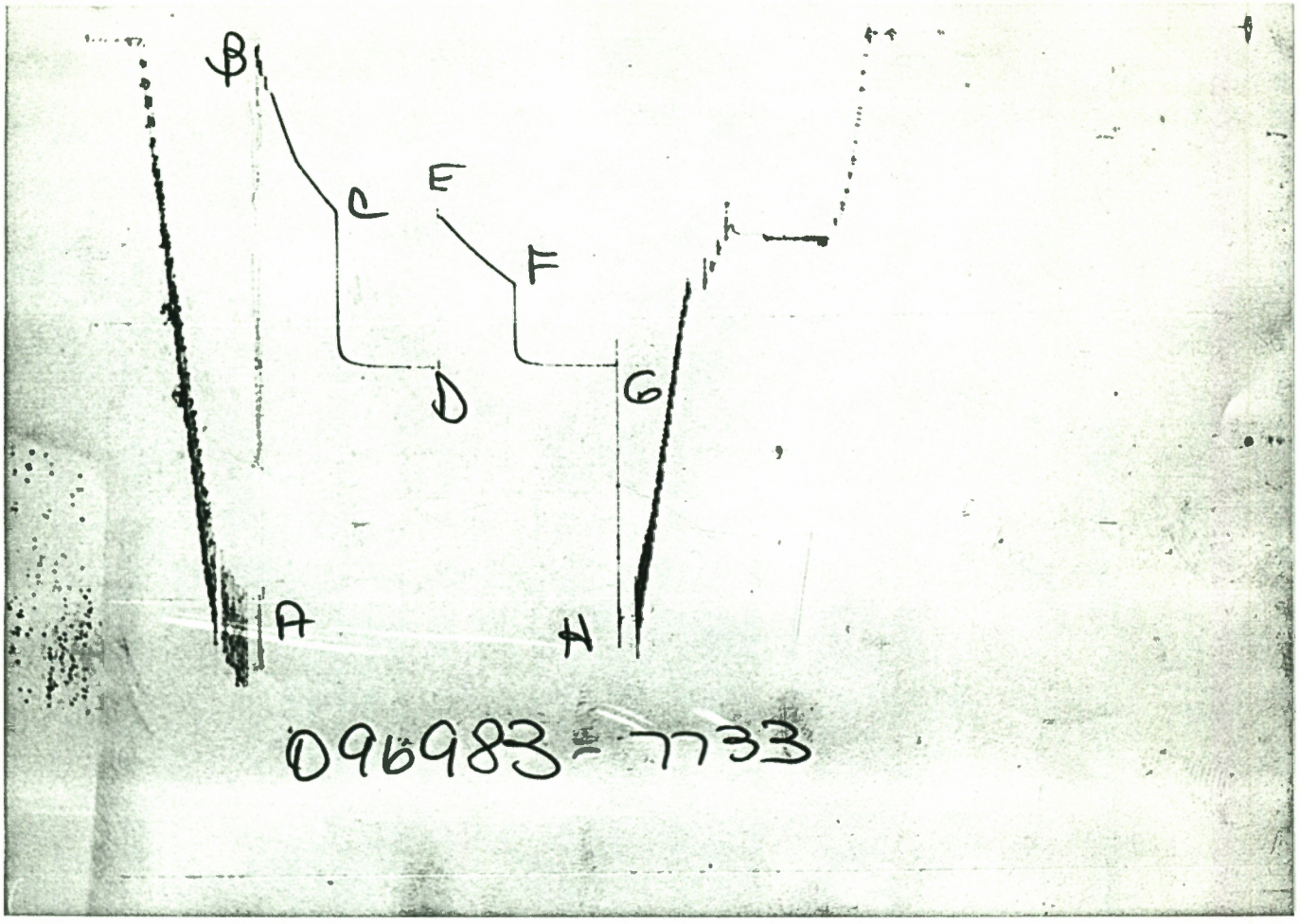
10° each circle

EQUATIONS FOR DST GAS WELL ANALYSIS

Indicated Flow Capacity	$kh = \frac{1637\ Q_g\ T}{m}$	md-ft
Average Effective Permeability	$k = \frac{kh}{h}$	md
Skin Factor	$S = 1.151 \left[\frac{m(P^*) - m(P_f)}{m} - \text{LOG}\left(\frac{k(t/60)}{\phi\ \mu\ c_t r_w^2}\right) + 3.23 \right]$	—
Damage Ratio	$DR = \frac{m(P^*) - m(P_f)}{m(P^*) - m(P_f) - 0.87\ mS}$	—
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	$r_i = 0.032 \sqrt{\frac{k(t/60)}{\phi \mu c_t}}$	ft

NOMENCLATURE

B	=	Formation Volume Factor (Res Vol / Std Vol)	——
c_t	=	System Total Compressibility	(Vol Vol) / psi
DR	=	Damage Ratio	——
h	=	Estimated Net Pay Thickness	Ft
k	=	Permeability	md
m	=	(Liquid) Slope Extrapolated Pressure Plot	psi cycle
		(Gas) Slope Extrapolated m(P) Plot	MM psi^2 cp cycle
$m(P^*)$	=	Real Gas Potential at P^*	MM psi^2 cp
$m(P_f)$	=	Real Gas Potential at P_f	MM psi^2 cp
AOF_1	=	Maximum Indicated Absolute Open Flow at Test Conditions	MCFD
AOF_2	=	Minimum Indicated Absolute Open Flow at Test Conditions	MCFD
P^*	=	Extrapolated Static Pressure	Psig
P_f	=	Final Flow Pressure	Psig
Q	=	Liquid Production Rate During Test	BPD
Q_1	=	Theoretical Liquid Production w Damage Removed	BPD
Q_g	=	Measured Gas Production Rate	MCFD
r_i	=	Approximate Radius of Investigation	Ft
r_w	=	Radius of Well Bore	Ft
S	=	Skin Factor	
t	=	Total Flow Time Previous to Closed-in	Minutes
Δt	=	Closed-in Time at Data Point	Minutes
T	=	Temperature Rankine	°R
ϕ	=	Porosity	——
μ	=	Viscosity of Gas or Liquid	cp
Log	=	Common Log	



GAUGE NO: 7733 DEPTH: 4217.0 BLANKED OFF: NO HOUR OF CLOCK: 1

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC	2051	2064.3			
B	INITIAL FIRST FLOW	26	25.6	45.0	46.1	F
C	FINAL FIRST FLOW	600	606.8			
C	INITIAL FIRST CLOSED-IN	600	606.8	60.0	59.5	C
D	FINAL FIRST CLOSED-IN	1155	1161.8			
E	INITIAL SECOND FLOW	618	620.8	45.0	44.6	F
F	FINAL SECOND FLOW	859	867.6			
F	INITIAL SECOND CLOSED-IN	859	867.6	60.0	59.8	C
G	FINAL SECOND CLOSED-IN	1155	1162.8			
H	FINAL HYDROSTATIC	2051	2062.8			

EQUIPMENT & HOLE DATA

FORMATION TESTED: KANSAS CITY "I"
NET PAY (ft): 10.0
GROSS TESTED FOOTAGE: 18.0
ALL DEPTHS MEASURED FROM: KB
CASING PERFS. (ft):
HOLE OR CASING SIZE (in): 7.875
ELEVATION (ft): 2936.0 KELLY BUSHING
TOTAL DEPTH (ft): 4256.0
PACKER DEPTH(S) (ft): 4232, 4238
FINAL SURFACE CHOKE (in):
BOTTOM HOLE CHOKE (in): 0.750
MUD WEIGHT (lb/gal): 9.40
MUD VISCOSITY (sec): 44
ESTIMATED HOLE TEMP. (°F):
ACTUAL HOLE TEMP. (°F): 140 @ 4251.0 ft

TICKET NUMBER: 09698300

DATE: 7-14-85 TEST NO: 1

TYPE DST: OPEN HOLE

HALLIBURTON CAMP: NESS CITY

TESTER: B. CROSSWHITE

WITNESS: S. MURPHY

DRILLING CONTRACTOR: STRATA #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	WEI(

RECOVERED:

1890 FEET OF SALTWATER WITH NO SHOW OF OIL

REMARKS:

STAIR-STEPPING OCCURRED DURING THE INITIAL FLOW PERIOD ON GAUGE #7733.

TICKET NO: 09698300	GAUGE NO: 7733
CLOCK NO: 26748 HOUR: 12	DEPTH: 4217.0

HALLIBURTON SERVICES

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	25.6			
[1]	2	5.0	130.5	104.9		
	3	10.0	208.7	78.2		
	4	15.0	298.8	90.1		
	5	20.0	381.5	82.7		
	6	25.0	445.0	63.5		
	7	30.0	486.4	41.4		
	8	35.0	525.1	38.7		
	9	40.0	562.5	37.4		
C	10	46.1	606.8	44.3		
		FIRST CLOSED-IN				
C	1	0.0	606.8			
	2	4.0	1125.9	519.1	3.7	1.101
	3	8.0	1140.0	533.2	6.8	0.831
	4	12.0	1146.8	540.0	9.5	0.684
	5	16.0	1150.9	544.1	11.9	0.589
	6	20.0	1153.6	546.8	13.9	0.520
	7	24.0	1155.3	548.5	15.8	0.466
	8	28.0	1156.7	549.9	17.4	0.423
	9	32.0	1157.6	550.8	18.9	0.387
	10	36.0	1158.5	551.7	20.2	0.358
	11	40.0	1159.0	552.2	21.4	0.333
	12	44.0	1160.1	553.3	22.5	0.312
	13	48.0	1160.3	553.5	23.5	0.292
	14	52.0	1160.9	554.1	24.4	0.276
	15	56.0	1161.3	554.5	25.3	0.261
D	16	59.5	1161.8	555.0	26.0	0.249
		SECOND FLOW				
E	1	0.0	620.8			
	2	5.0	645.9	25.0		
	3	10.0	679.6	33.7		
	4	15.0	711.4	31.8		
	5	20.0	741.5	30.1		
	6	25.0	770.1	28.6		
	7	30.0	797.0	26.8		
	8	35.0	822.4	25.4		
	9	40.0	845.9	23.5		
F	10	44.6	867.6	21.7		
		SECOND CLOSED-IN				
F	1	0.0	867.6			
	2	4.0	1139.6	272.1	3.9	1.372
	3	8.0	1148.9	281.4	7.4	1.089

REF		MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta t}{t + \Delta t}$	$\log \frac{t+\Delta t}{\Delta t}$
		SECOND CLOSED-IN - CONTINUED				
	4	12.0	1153.6	286.0	10.6	0.
	5	16.0	1156.0	288.4	13.6	0.
	6	20.0	1157.4	289.9	16.4	0.
	7	24.0	1158.5	290.9	19.0	0.
	8	28.0	1159.5	291.9	21.4	0.
	9	32.0	1160.3	292.7	23.6	0.
	10	36.0	1160.3	292.7	25.8	0.
	11	40.0	1160.3	292.7	27.7	0.
	12	44.0	1161.0	293.4	29.6	0.
	13	48.0	1161.6	294.0	31.4	0.
	14	52.0	1161.8	294.2	33.0	0.
	15	56.0	1162.4	294.8	34.6	0.
G	16	59.8	1162.8	295.2	36.0	0.

LEGEND:
[1] STAIR-STEP

REMARKS:

TICKET NO. 09698300

		O.D.	I.D.	LENGTH	DEPTH
1	DRILL PIPE.....	4.500	3.826	4110.0	
50	IMPACT REVERSING SUB.....	5.750	2.750	1.0	4110.0
1	DRILL PIPE.....	4.500	3.826	93.0	
5	CROSSOVER.....	5.750	2.750	1.0	
12	DUAL CIP VALVE.....	5.000	0.870	6.0	
60	HYDROSPRING TESTER.....	5.000	0.750	5.0	4215.0
80	AP RUNNING CASE.....	5.000	2.250	4.0	4217.0
15	JAR.....	5.000	1.750	5.0	
16	VR SAFETY JOINT.....	5.000	1.000	3.0	
70	OPEN HOLE PACKER.....	6.750	1.530	6.0	4232.0
70	OPEN HOLE PACKER.....	6.750	1.530	6.0	4238.0
20	FLUSH JOINT ANCHOR.....	5.000	2.370	11.0	
83	HT-500 TEMPERATURE CASE.....	5.000		1.0	4251.0
81	BLANKED-OFF RUNNING CASE.....	5.000		4.0	4253.0
	TOTAL DEPTH				4256.0

EQUIPMENT DATA

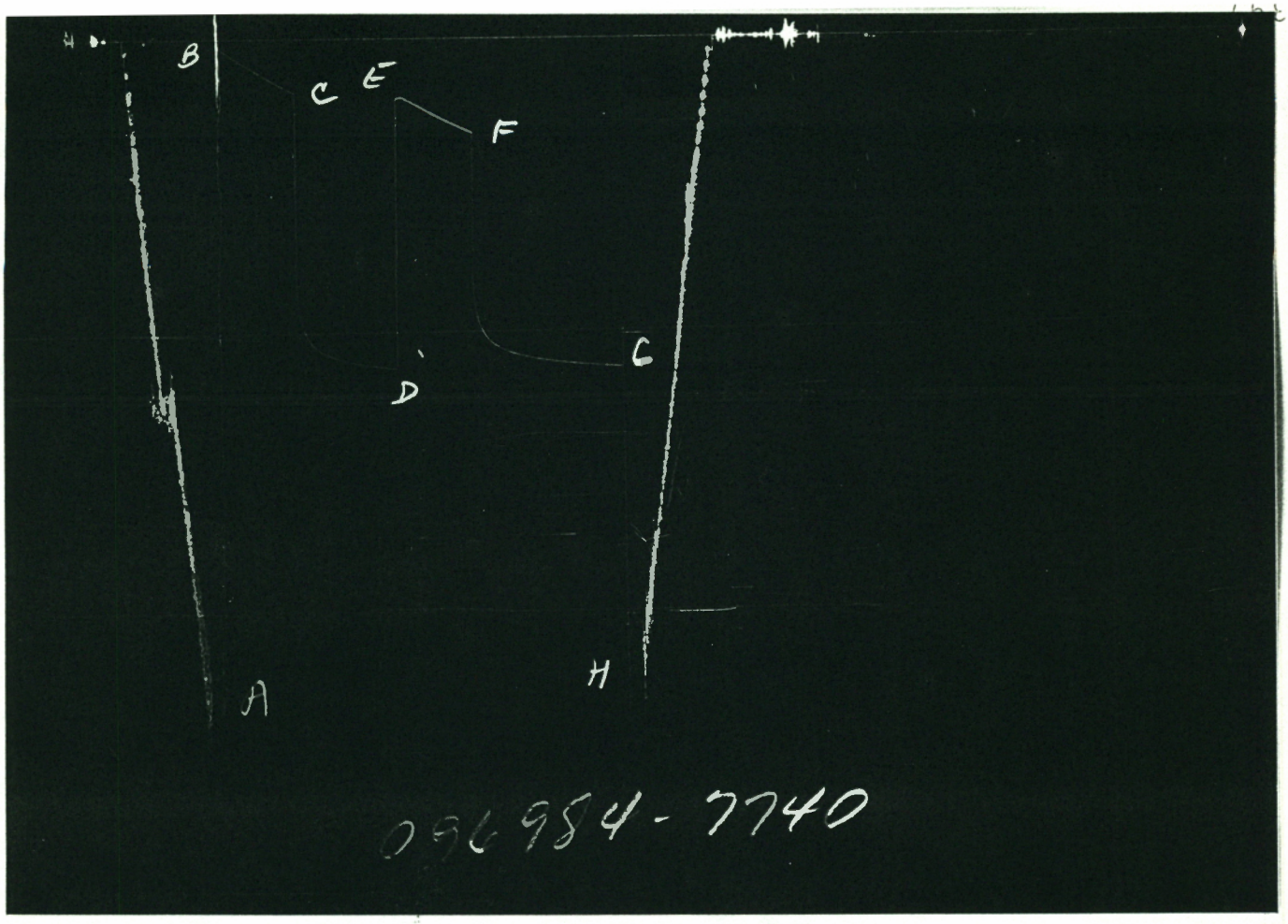
HALLIBURTON
SERVICES

TICKET NO. 09698400
23-JUL-85
NESS CITY

FORMATION TESTING SERVICE REPORT

A. GOERING	1	2	4425.0 - 4450.0	GRUSS PETROLEUM MANAGEMENT INCORPORATED
LEASE NAME	WELL NO.	TEST NO.	TESTED INTERVAL	LEASE OWNER/COMPANY NAME

LEGAL LOCATION SEC. - TWP. - RNG.	FIELD AREA	COUNTY	STATE
30-19S-30W		LANE	KANSAS IC



GAUGE NO: 7740 DEPTH: 4447.0 BLANKED OFF: YES HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC		2241.9			
B	INITIAL FIRST FLOW		32.8	45.0	45.9	F
C	FINAL FIRST FLOW		183.5			
C	INITIAL FIRST CLOSED-IN		183.5	60.0	59.6	C
D	FINAL FIRST CLOSED-IN		1145.1			
E	INITIAL SECOND FLOW		208.6	45.0	45.1	F
F	FINAL SECOND FLOW		323.1			
F	INITIAL SECOND CLOSED-IN		323.1	90.0	89.5	C
G	FINAL SECOND CLOSED-IN		1145.8			
H	FINAL HYDROSTATIC		2214.3			

TYPE & SIZE MEASURING DEVICE: ______________________

TICKET NO: 09698400

TIME	CHOKE SIZE	SURFACE PRESSURE PSI	GAS RATE MCF	LIQUID RATE BPD	REMARKS
7-15-85					
0945					CALLED OUT
1110					ON LOCATION - RIG WAITING
1125					PICKED UP AND MADE UP TOOL
1145					SET TOOL IN TABLE - STARTED
					DRILL PIPE
1243					ON BOTTOM
1245					OPENED TOOL WITH A WEAK BLOW
					INCREASING TO 9" IN BUCKET
1330					CLOSED TOOL
1430					OPENED TOOL WITH A WEAK BLOW
					INCREASING TO 7" IN BUCKET
1515					CLOSED TOOL
1645					OFF BOTTOM
1800					TOOL IN TABLE
1830					TOOL BROKE AND LAID DOWN
1845					JOB COMPLETED

TICKET NO: 09698400

CLOCK NO: 26738 HOUR: 12

HALLIBURTON SERVICES

GAUGE NO: 7740

DEPTH: 4447.0

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	32.8			
	2	5.0	45.0	12.2		
	3	10.0	64.8	19.8		
	4	15.0	82.7	17.9		
	5	20.0	100.1	17.4		
	6	25.0	117.2	17.0		
	7	30.0	134.7	17.5		
	8	35.0	151.4	16.8		
	9	40.0	166.3	14.9		
	10	45.0	181.2	14.9		
C	11	45.9	183.5	2.4		
			FIRST CLOSED-IN			
C	1	0.0	183.5			
	2	4.0	995.5	811.9	3.7	1.092
	3	8.0	1046.1	862.6	6.8	0.827
	4	12.0	1072.0	888.4	9.5	0.682
	5	16.0	1088.4	904.9	11.8	0.588
	6	20.0	1099.1	915.6	13.9	0.518
	7	24.0	1108.1	924.6	15.8	0.464
	8	28.0	1115.9	932.3	17.4	0.421
	9	32.0	1121.5	938.0	18.8	0.386
	10	36.0	1125.9	942.3	20.2	0.357
	11	40.0	1130.5	947.0	21.4	0.332
	12	44.0	1134.6	951.1	22.5	0.310
	13	48.0	1138.6	955.1	23.4	0.292
	14	52.0	1141.2	957.7	24.4	0.275
	15	56.0	1143.6	960.1	25.2	0.260
D	16	59.6	1145.1	961.6	25.9	0.248
			SECOND FLOW			
E	1	0.0	208.6			
	2	5.0	205.7	-3.0		
	3	10.0	220.7	15.0		
	4	15.0	236.4	15.7		
	5	20.0	252.5	16.1		
	6	25.0	266.8	14.2		
	7	30.0	281.3	14.5		
	8	35.0	295.5	14.2		
	9	40.0	309.8	14.2		
F	10	45.1	323.1	13.3		
			SECOND CLOSED-IN			
F	1	0.0	323.1			
	2	6.0	1017.1	694.1	5.6	1.208
	3	12.0	1059.0	736.0	10.6	0.934

REF		MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta t}{t+\Delta t}$	$\log \frac{t+\Delta t}{\Delta t}$
			SECOND CLOSED-IN - CONTINUED			
	4	18.0	1080.6	757.5	15.1	0.781
	5	24.0	1093.9	770.9	19.0	0.680
	6	30.0	1103.8	780.8	22.6	0.606
	7	36.0	1112.7	789.6	25.8	0.547
	8	42.0	1118.0	794.9	28.7	0.500
	9	48.0	1123.9	800.8	31.4	0.461
	10	54.0	1128.4	805.3	33.9	0.429
	11	60.0	1132.8	809.8	36.2	0.401
	12	66.0	1135.9	812.9	38.2	0.376
	13	72.0	1139.0	816.0	40.2	0.355
	14	78.0	1142.1	819.0	42.0	0.336
	15	84.0	1144.1	821.0	43.7	0.318
G	16	89.5	1145.8	822.8	45.1	0.305

REMARKS:

EQUATIONS FOR DST LIQUID WELL ANALYSIS

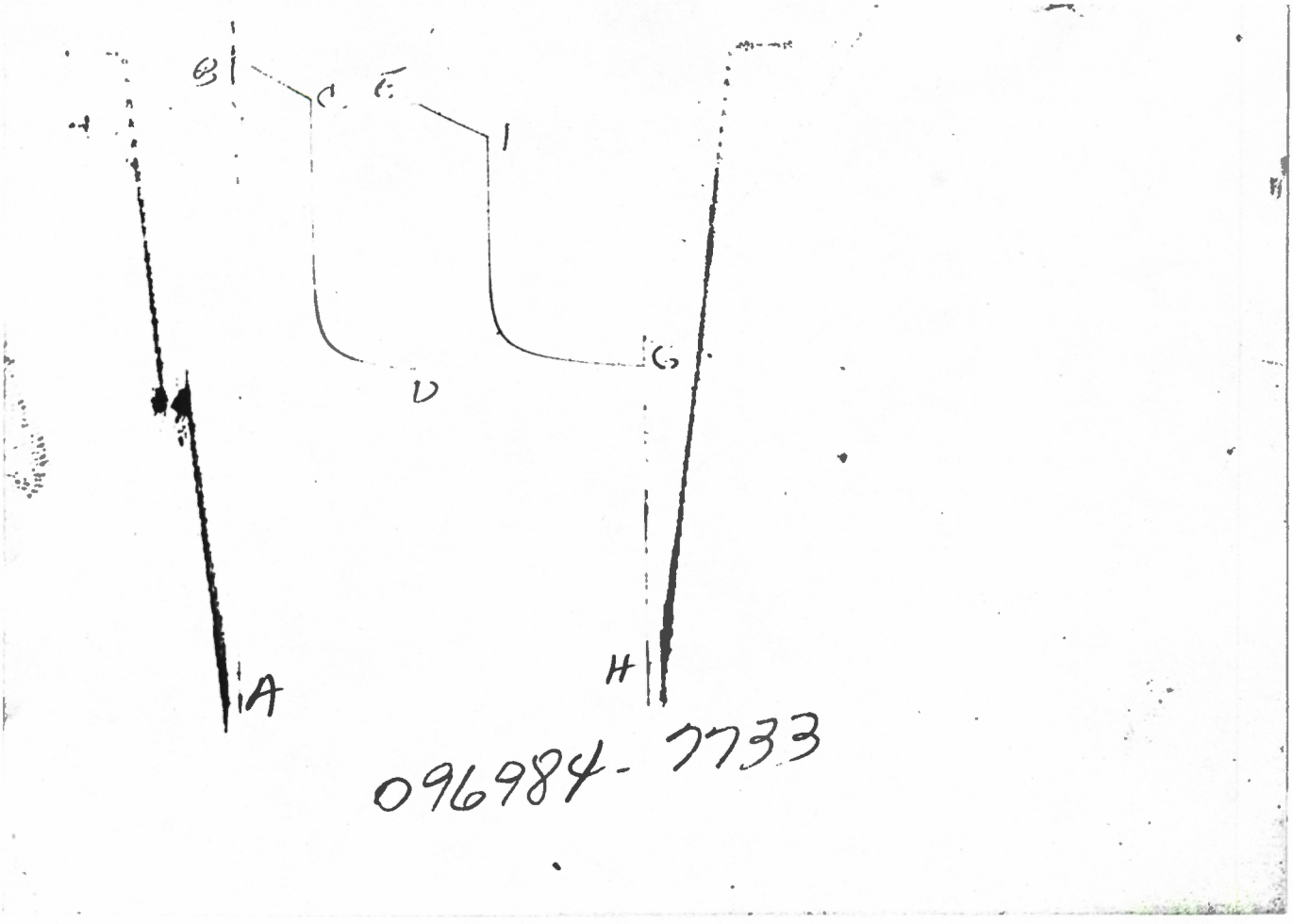
Transmissibility	$\frac{kh}{\mu} = \frac{162.6\ QB}{m}$	$\frac{md\text{-}ft}{cp}$
Indicated Flow Capacity	$kh = \frac{kh}{\mu}\ \mu$	md-ft
Average Effective Permeability	$k = \frac{kh}{h}$	md
Skin Factor	$S = 1.151\left[\frac{P^* - P_f}{m} - LOG\left(\frac{k(t/60}{\phi\ \mu\ c_t r_w^2}\right) + 3.23\right]$	—
Damage Ratio	$DR = \frac{P^* - P_f}{P^* - P_f - 0.87\ mS}$	—
Theoretical Potential w / Damage Removed	$Q_1 = Q\ DR$	BPD
Approx. Radius of Investigation	$r_i = 0.032\sqrt{\frac{k(t/60)}{\phi\mu c_t}}$	ft

EQUATIONS FOR DST GAS WELL ANALYSIS

Indicated Flow Capacity	$kh = \frac{1637\ Q_g\ T}{m}$	md-ft
Average Effective Permeability	$k = \frac{kh}{h}$	md
Skin Factor	$S = 1.151\left[\frac{m(P^*) - m(P_f)}{m} - LOG\left(\frac{k(t/60)}{\phi\ \mu\ c_t r_w^2}\right) + 3.23\right]$	—
Damage Ratio	$DR = \frac{m(P^*) - m(P_f)}{m(P^*) - m(P_f) - 0.87\ mS}$	—
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	$r_i = 0.032\sqrt{\frac{k(t/60)}{\phi\mu c_t}}$	ft

NOMENCLATURE

B	=	Formation Volume Factor (Res Vol / Std Vol)	——
c_t	=	System Total Compressibility	(Vol / Vol) / psi
DR	=	Damage Ratio	——
h	=	Estimated Net Pay Thickness	Ft
k	=	Permeability	md
m	=	(Liquid) Slope Extrapolated Pressure Plot	psi/cycle
		(Gas) Slope Extrapolated m(P) Plot	MM psi^2/cp/cycle
m(P*)	=	Real Gas Potential at P*	MM psi^2 cp
$m(P_f)$	=	Real Gas Potential at P_f	MM psi^2 cp
AOF_1	=	Maximum Indicated Absolute Open Flow at Test Conditions	MCFD
AOF_2	=	Minimum Indicated Absolute Open Flow at Test Conditions	MCFD
P*	=	Extrapolated Static Pressure	Psig
P_f	=	Final Flow Pressure	Psig
Q	=	Liquid Production Rate During Test	BPD
Q_1	=	Theoretical Liquid Production w Damage Removed	BPD
Q_g	=	Measured Gas Production Rate	MCFD
r_i	=	Approximate Radius of Investigation	Ft
r_w	=	Radius of Well Bore	Ft
S	=	Skin Factor	
t	=	Total Flow Time Previous to Closed-in	Minutes
Δt	=	Closed-in Time at Data Point	Minutes
T	=	Temperature Rankine	°R
ϕ	=	Porosity	——
μ	=	Viscosity of Gas or Liquid	cp
Log	=	Common Log	



096984-7733

GAUGE NO: 7733 DEPTH: 4404.0 BLANKED OFF: NO HOUR OF CLOCK: __

ID	DESCRIPTION	PRESSURE		TIME		TYP
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC	2215	2221.6			
B	INITIAL FIRST FLOW	18	16.4	45.0	45.9	F
C	FINAL FIRST FLOW	161	164.8			
C	INITIAL FIRST CLOSED-IN	161	164.8	60.0	59.6	C
D	FINAL FIRST CLOSED-IN	1119	1127.9			
E	INITIAL SECOND FLOW	179	187.0	45.0	45.1	F
F	FINAL SECOND FLOW	304	303.7			
F	INITIAL SECOND CLOSED-IN	304	303.7	90.0	89.5	G
G	FINAL SECOND CLOSED-IN	1128	1129.9			
H	FINAL HYDROSTATIC	2187	2197.4			

EQUIPMENT & HOLE DATA

FORMATION TESTED: MARMATON
NET PAY (ft): 10.0
GROSS TESTED FOOTAGE: 25.0
ALL DEPTHS MEASURED FROM: KELLY BUSHING
CASING PERFS. (ft):
HOLE OR CASING SIZE (in): 7.875
ELEVATION (ft): 2936.0 KELLY BUSHING
TOTAL DEPTH (ft): 4450.0
PACKER DEPTH(S) (ft): 4419, 4425
FINAL SURFACE CHOKE (in):
BOTTOM HOLE CHOKE (in): 0.750
MUD WEIGHT (lb/gal): 9.30
MUD VISCOSITY (sec): 44
ESTIMATED HOLE TEMP. (°F): 130
ACTUAL HOLE TEMP. (°F): ___ @ _____ ft

TICKET NUMBER: 09698400

DATE: 7-15-85 TEST NO: 2

TYPE DST: OPEN HOLE

HALLIBURTON CAMP: NESS CITY

TESTER: B. CROSSWHITE

WITNESS: S. MURPHY

DRILLING CONTRACTOR: STRATA 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	WEI

RECOVERED:

618 FEET OF OIL SPECKED SALTWATER

REMARKS:

CHART FROM HT-500 TEMPERATURE GAUGE WAS NOT SENT IN FOR PROCESSING.

TICKET NO: 09698400	GAUGE NO: 7733
CLOCK NO: 26748 HOUR: 12	DEPTH: 4404.0

HALLIBURTON SERVICES

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	16.4			
	2	5.0	30.5	14.1		
	3	10.0	47.2	16.8		
	4	15.0	63.9	16.7		
	5	20.0	81.0	17.1		
	6	25.0	98.2	17.2		
	7	30.0	115.9	17.7		
	8	35.0	131.8	15.9		
	9	40.0	147.4	15.6		
	10	45.0	161.7	14.3		
C	11	45.9	164.8	3.0		
			FIRST CLOSED-IN			
C	1	0.0	164.8			
	2	4.0	974.2	809.4	3.7	1.099
	3	8.0	1024.4	859.6	6.8	0.830
	4	12.0	1050.9	886.1	9.5	0.684
	5	16.0	1067.7	903.0	11.8	0.588
	6	20.0	1080.7	915.9	13.9	0.517
	7	24.0	1089.4	924.7	15.8	0.464
	8	28.0	1096.5	931.7	17.4	0.421
	9	32.0	1102.8	938.0	18.9	0.386
	10	36.0	1108.5	943.7	20.2	0.357
	11	40.0	1112.7	947.9	21.4	0.332
	12	44.0	1116.7	951.9	22.5	0.310
	13	48.0	1120.6	955.8	23.5	0.291
	14	52.0	1123.8	959.0	24.4	0.275
	15	56.0	1125.8	961.1	25.2	0.260
D	16	59.6	1127.9	963.1	25.9	0.248
			SECOND FLOW			
E	1	0.0	187.0			
	2	5.0	187.1	0.1		
	3	10.0	200.7	13.5		
	4	15.0	216.5	15.8		
	5	20.0	231.8	15.3		
	6	25.0	246.9	15.1		
	7	30.0	261.5	14.6		
	8	35.0	276.6	15.2		
	9	40.0	290.2	13.5		
F	10	45.1	303.7	13.5		
			SECOND CLOSED-IN			
F	1	0.0	303.7			
	2	6.0	997.6	693.9	5.7	1.207
	3	12.0	1040.4	736.6	10.6	0.933

REF		MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta t}{t+\Delta t}$	$\log \frac{t+\Delta t}{\Delta t}$
			SECOND CLOSED-IN - CONTINUED			
	4	18.0	1062.6	758.9	15.0	0.7
	5	24.0	1077.4	773.7	19.0	0.6
	6	30.0	1087.0	783.2	22.6	0.6
	7	36.0	1095.1	791.4	25.8	0.5
	8	42.0	1101.8	798.0	28.7	0.5
	9	48.0	1107.5	803.8	31.4	0.4
	10	54.0	1112.4	808.7	33.9	0.4
	11	60.0	1116.9	813.2	36.1	0.4
	12	66.0	1119.8	816.1	38.2	0.3
	13	72.0	1123.5	819.8	40.2	0.3
	14	78.0	1125.8	822.0	42.0	0.3
	15	84.0	1128.4	824.6	43.7	0.
G	16	89.5	1129.9	826.2	45.1	0.

REMARKS:

TICKET NO. 09698400

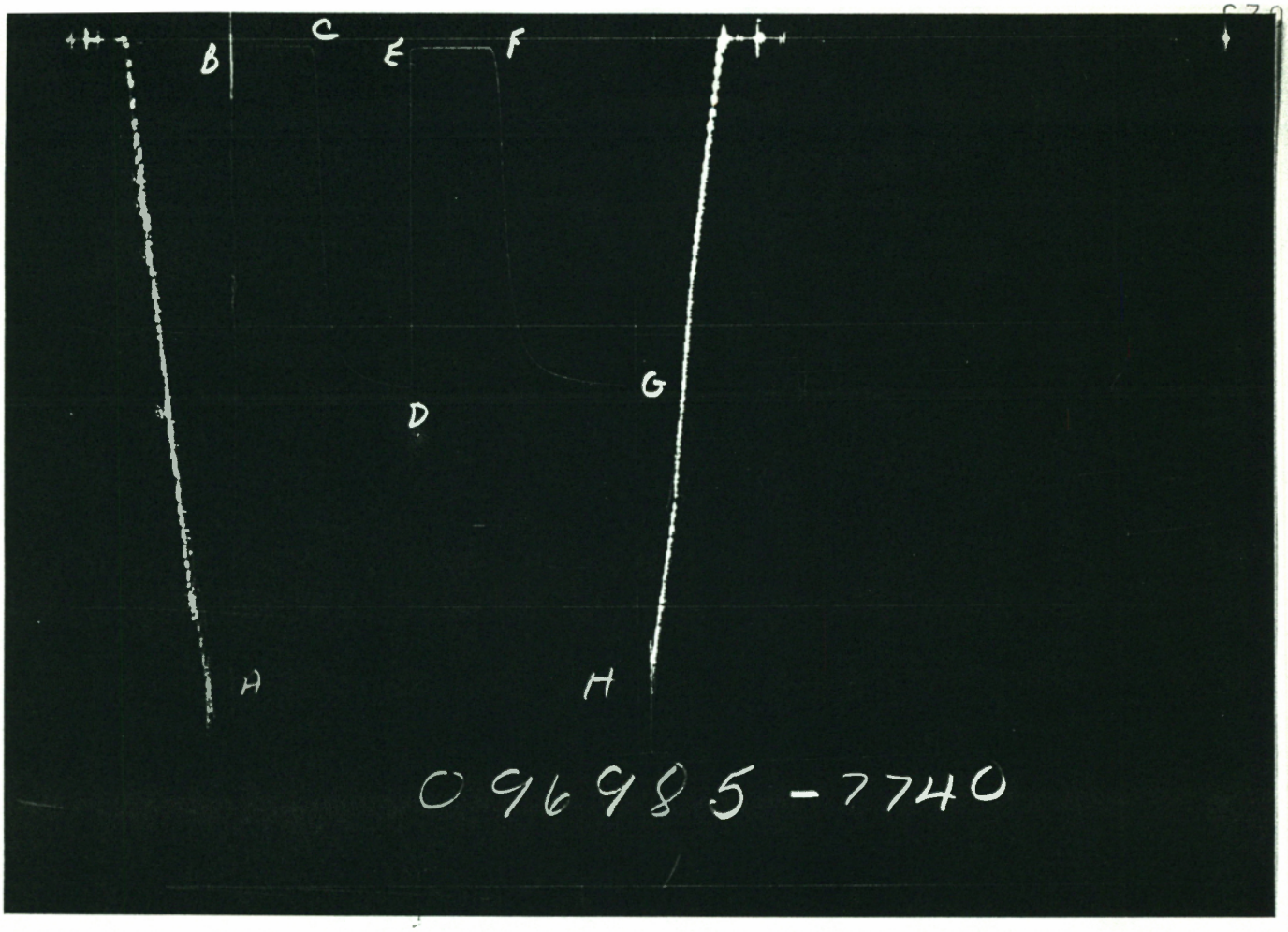
		O.D.	I.D.	LENGTH	DEPTH
1	DRILL PIPE.....	4.500	3.826	4297.0	
50	IMPACT REVERSING SUB.....	5.750	2.750	1.0	4297.0
1	DRILL PIPE.....	4.500	3.826	93.0	
5	CROSSOVER.....	5.750	2.750	1.0	
12	DUAL CIP VALVE.....	5.000	0.870	6.0	
60	HYDROSPRING TESTER.....	5.000	0.750	5.0	4402.0
80	AP RUNNING CASE.....	5.000	2.250	4.0	4404.0
15	JAR.....	5.000	1.750	5.0	
16	VR SAFETY JOINT.....	5.000	1.000	3.0	
70	OPEN HOLE PACKER.....	6.750	1.530	6.0	4419.0
70	OPEN HOLE PACKER.....	6.750	1.530	6.0	4425.0
20	FLUSH JOINT ANCHOR.....	5.000	2.370	18.0	
83	HT-500 TEMPERATURE CASE.....	5.000		1.0	4445.0
81	BLANKED-OFF RUNNING CASE.....	5.000		4.0	4447.0
	TOTAL DEPTH				4450.0

EQUIPMENT DATA

TICKET NO. 09698500
23-JUL-85
NESS CITY

FORMATION TESTING SERVICE REPORT

H. GOERING	1	3	4478.0 - 4495.0	GRUSS PETROLEUM MANAGEMENT INCORPORATED	
LEASE NAME	WELL NO.	TEST NO.	TESTED INTERVAL	LEASE OWNER/COMPANY NAME	
LEGAL LOCATION SEC. - TWP. - RNG.		FIELD AREA	COUNTY	STATE	
30-19S-30W			LANE	KANSAS OR	



GAUGE NO: 7740 DEPTH: 4492.0 BLANKED OFF: YES HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC	2244.3				
B	INITIAL FIRST FLOW	23.3		45.0	46.1	F
C	FINAL FIRST FLOW	23.3				
C	INITIAL FIRST CLOSED-IN	23.3		60.0	59.8	C
D	FINAL FIRST CLOSED-IN	1215.1				
E	INITIAL SECOND FLOW	39.8		45.0	47.0	F
F	FINAL SECOND FLOW	30.6				
F	INITIAL SECOND CLOSED-IN	30.6		90.0	87.2	C
G	FINAL SECOND CLOSED-IN	1210.4				
H	FINAL HYDROSTATIC	2241.4				

TYPE & SIZE MEASURING DEVICE: _____ TICKET NO: 09698500

TIME	CHOKE SIZE	SURFACE PRESSURE PSI	GAS RATE MCF	LIQUID RATE BPD	REMARKS
7-16-85					
0225					CALLED OUT
0330					ON LOCATION, RIG PULLING DRILL
					PIPE
0405					PICKED UP AND MADE UP TOOL
0420					SET TOOL IN TABLE, STARTED
					DRILL PIPE
0533					TOOL ON BOTTOM
0535					OPENED TOOL WITH A WEAK
					SURFACE BLOW, DIED IN 15
					MINUTES
0620					CLOSED TOOL
0720					OPENED TOOL WITH NO BLOW
0805					CLOSED TOOL
0935					TOOL OFF BOTTOM
1035					TOOL IN TABLE
1055					TOOL BROKE AND LAID DOWN
1115					JOB COMPLETED

TICKET NO: 09698500

CLOCK NO: 26738 HOUR: 12

HALLIBURTON SERVICES

GAUGE NO: 7740

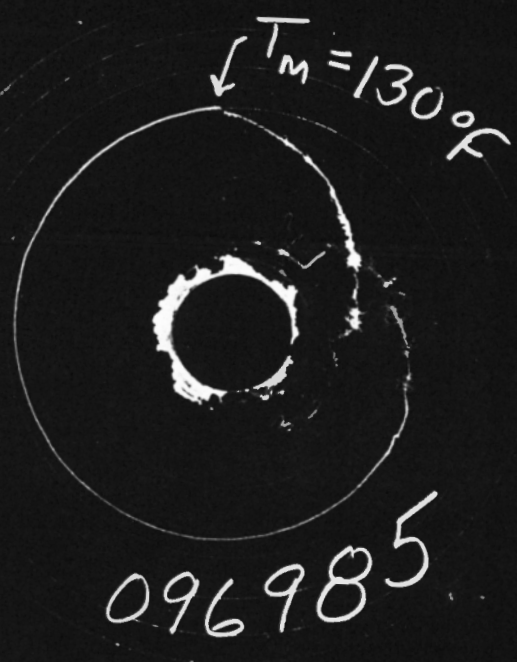
DEPTH: 4492.0

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	23.3			
C	2	46.1	23.3	0.0		
			FIRST CLOSED-IN			
C	1	0.0	23.3			
	2	4.0	104.0	80.7	3.7	1.094
	3	8.0	716.0	692.7	6.8	0.831
	4	12.0	978.2	955.0	9.5	0.685
	5	16.0	1075.1	1051.8	11.9	0.589
	6	20.0	1124.1	1100.8	14.0	0.519
	7	24.0	1149.7	1126.4	15.8	0.465
	8	28.0	1167.0	1143.7	17.4	0.423
	9	32.0	1179.0	1155.7	18.9	0.388
	10	36.0	1188.3	1165.0	20.2	0.358
	11	40.0	1195.2	1171.9	21.4	0.333
	12	44.0	1201.8	1178.5	22.5	0.311
	13	48.0	1206.0	1182.7	23.5	0.292
	14	52.0	1209.8	1186.5	24.4	0.276
	15	56.0	1212.5	1189.2	25.3	0.261
D	16	59.8	1215.1	1191.8	26.0	0.248
			SECOND FLOW			
E	1	0.0	39.8			
F	2	47.0	30.6	-9.2		
			SECOND CLOSED-IN			
F	1	0.0	30.6			
	2	6.0	189.4	158.8	5.7	1.216
	3	12.0	811.6	780.9	10.6	0.943
	4	18.0	1029.1	998.5	15.1	0.790
	5	24.0	1105.5	1074.8	19.1	0.689
	6	30.0	1140.8	1110.2	22.7	0.613
	7	36.0	1160.3	1129.6	26.0	0.554
	8	42.0	1173.3	1142.7	28.9	0.507
	9	48.0	1182.6	1152.0	31.7	0.468
	10	54.0	1189.9	1159.3	34.2	0.435
	11	60.0	1195.8	1165.1	36.5	0.407
	12	66.0	1199.4	1168.7	38.6	0.382
	13	72.0	1203.4	1172.7	40.6	0.360
	14	78.0	1206.8	1176.2	42.4	0.341
	15	84.0	1208.7	1178.0	44.1	0.324
G	16	87.2	1210.4	1179.8	45.0	0.315

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

REMARKS:

TEMPERATURE RECORDER CHART



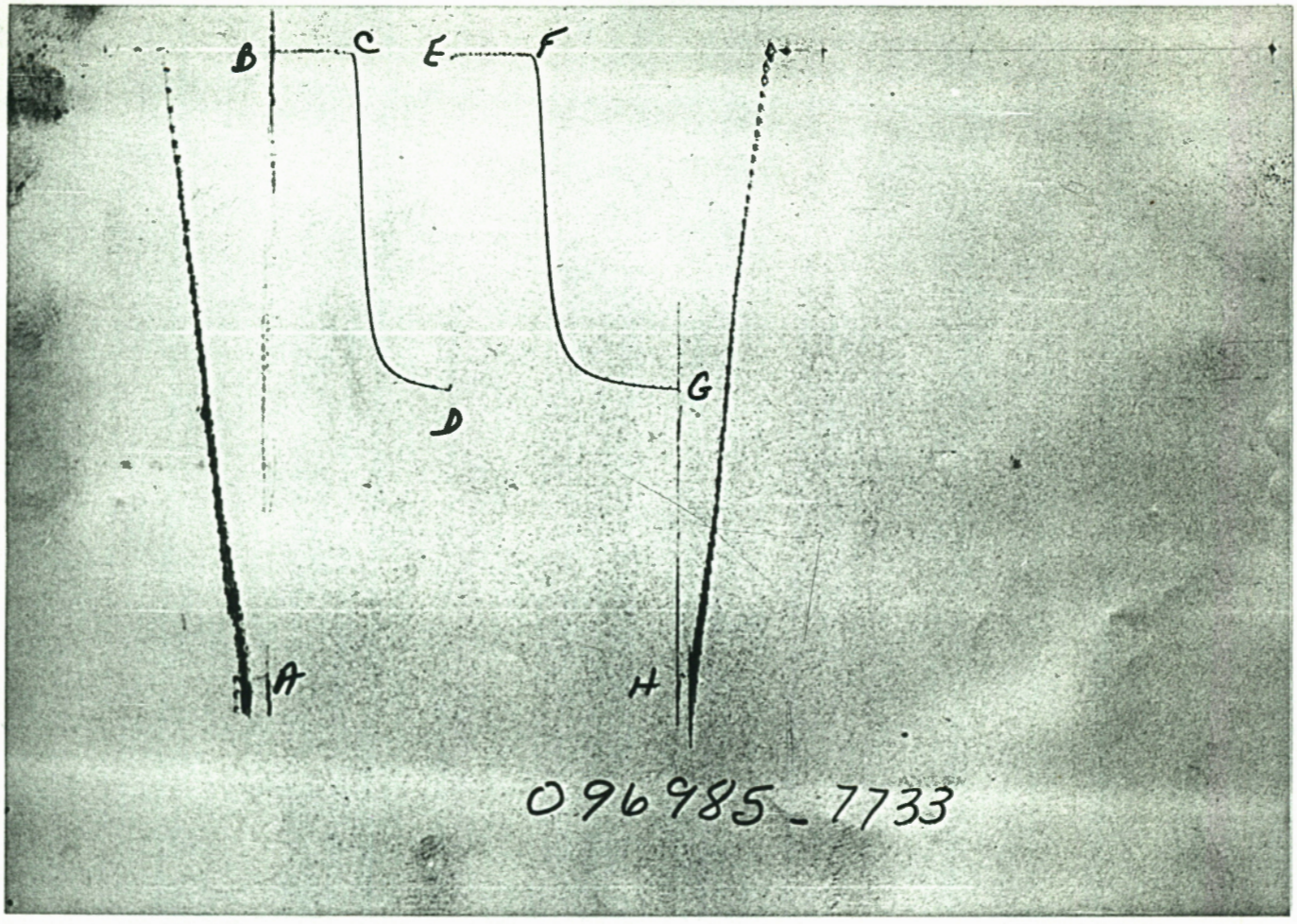
10° each circle

GAS WELL ANALYSIS

Indicated Flow Capacity	$kh = \frac{1637\ Q_g\ T}{m}$	md-ft
Average Effective Permeability	$k = \frac{kh}{h}$	md
Skin Factor	$S = 1.151 \left[\frac{m(P^*) - m(P_f)}{m} - \text{LOG}\left(\frac{k(t/60)}{\phi\ \mu\ c_t r_w^2}\right) + 3.23 \right]$	—
Damage Ratio	$DR = \frac{m(P^*) - m(P_f)}{m(P^*) - m(P_f) - 0.87\ mS}$	—
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	$r_i = 0.032 \sqrt{\frac{k(t/60)}{\phi \mu c_t}}$	ft

NOMENCLATURE

B	=	Formation Volume Factor (Res Vol / Std Vol)	——
c_t	=	System Total Compressibility	(Vol / Vol) / psi
DR	=	Damage Ratio	——
h	=	Estimated Net Pay Thickness	Ft
k	=	Permeability	md
m	=	(Liquid) Slope Extrapolated Pressure Plot	psi/cycle
		(Gas) Slope Extrapolated m(P) Plot	MM psi^2/cp·cycle
$m(P^*)$	=	Real Gas Potential at P^*	MM psi^2/cp
$m(P_f)$	=	Real Gas Potential at P_f	MM psi^2/cp
AOF_1	=	Maximum Indicated Absolute Open Flow at Test Conditions	MCFD
AOF_2	=	Minimum Indicated Absolute Open Flow at Test Conditions	MCFD
P^*	=	Extrapolated Static Pressure	Psig
P_f	=	Final Flow Pressure	Psig
Q	=	Liquid Production Rate During Test	BPD
Q_1	=	Theoretical Liquid Production w Damage Removed	BPD
Q_g	=	Measured Gas Production Rate	MCFD
r_i	=	Approximate Radius of Investigation	Ft
r_w	=	Radius of Well Bore	Ft
S	=	Skin Factor	
t	=	Total Flow Time Previous to Closed-in	Minutes
Δt	=	Closed-in Time at Data Point	Minutes
T	=	Temperature Rankine	°R
ϕ	=	Porosity	——
μ	=	Viscosity of Gas or Liquid	cp
Log	=	Common Log	



GAUGE NO: 7733 DEPTH: 4462.0 BLANKED OFF: NO HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC	2233	2233.2			
B	INITIAL FIRST FLOW	9	7.7	45.0	46.1	F
C	FINAL FIRST FLOW	9	7.7			
C	INITIAL FIRST CLOSED-IN	9	7.7	60.0	59.8	C
D	FINAL FIRST CLOSED-IN	1201	1203.3			
E	INITIAL SECOND FLOW	18	25.3	45.0	47.0	F
F	FINAL SECOND FLOW	18	15.0			
F	INITIAL SECOND CLOSED-IN	18	15.0	90.0	87.2	C
G	FINAL SECOND CLOSED-IN	1201	1202.7			
H	FINAL HYDROSTATIC	2233	2228.3			

EQUIPMENT & HOLE DATA

FORMATION TESTED: PAWNEE
NET PAY (ft): 5.0
GROSS TESTED FOOTAGE: 17.0
ALL DEPTHS MEASURED FROM: KELLY BUSHING
CASING PERFS. (ft): _____
HOLE OR CASING SIZE (in): 7.875
ELEVATION (ft): 2936.0 KELLY BUSHING
TOTAL DEPTH (ft): 4495.0
PACKER DEPTH(S) (ft): 4472, 4478
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): 130 @ 4490.0 ft

TICKET NUMBER: 09698500

DATE: 7-16-85 TEST NO: 3

TYPE DST: OPEN HOLE

HALLIBURTON CAMP: NESS CITY

TESTER: B. CROSSWHITE

WITNESS: S. MURPHY

DRILLING CONTRACTOR: STRATA #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	WEIGH
_____	_____	_____
_____	_____	_____

RECOVERED:

15' OF DRILLING MUD WITH NO SHOW OF OIL

REMARKS:

TICKET NO: 09698500	GAUGE NO: 7733
CLOCK NO: 26748 HOUR: 12	DEPTH: 4462.0

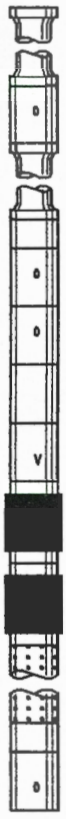
HALLIBURTON SERVICES

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			
C	2	46.1	7.7	0.0		
			FIRST CLOSED-IN			
C	1	0.0	7.7			
	2	4.0	92.4	84.7	3.7	1.095
	3	8.0	719.5	711.8	6.8	0.831
	4	12.0	970.3	962.5	9.5	0.686
	5	16.0	1065.3	1057.6	11.9	0.589
	6	20.0	1111.8	1104.1	14.0	0.518
	7	24.0	1137.7	1130.0	15.8	0.465
	8	28.0	1154.6	1146.9	17.4	0.423
	9	32.0	1167.1	1159.4	18.9	0.387
	10	36.0	1176.1	1168.4	20.2	0.358
	11	40.0	1182.9	1175.2	21.4	0.333
	12	44.0	1187.8	1180.1	22.5	0.311
	13	48.0	1192.7	1185.0	23.5	0.292
	14	52.0	1198.2	1190.5	24.4	0.276
	15	56.0	1201.8	1194.1	25.3	0.261
D	16	59.8	1203.3	1195.6	26.0	0.248
			SECOND FLOW			
E	1	0.0	25.3			
F	2	47.0	15.0	-10.3		
			SECOND CLOSED-IN			
F	1	0.0	15.0			
	2	6.0	157.4	142.4	5.6	1.219
	3	12.0	813.0	798.0	10.7	0.941
	4	18.0	1022.6	1007.6	15.1	0.790
	5	24.0	1094.8	1079.8	19.1	0.688
	6	30.0	1130.6	1115.6	22.7	0.613
	7	36.0	1150.9	1135.8	26.0	0.554
	8	42.0	1164.5	1149.5	28.9	0.507
	9	48.0	1174.7	1159.7	31.7	0.468
	10	54.0	1181.0	1166.0	34.2	0.435
	11	60.0	1187.0	1172.0	36.5	0.407
	12	66.0	1192.2	1177.2	38.6	0.382
	13	72.0	1195.6	1180.6	40.6	0.360
	14	78.0	1199.1	1184.1	42.4	0.341
	15	84.0	1201.8	1186.8	44.1	0.324
G	16	87.2	1202.7	1187.7	45.0	0.315

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

REMARKS:

TICKET NO. 09698500



		O.D.	I.D.	LENGTH	DEPTH
1	DRILL PIPE.....	4.500	3.826	4355.0	
50	IMPACT REVERSING SUB.....	5.750	2.750	1.0	4355.0
1	DRILL PIPE.....	4.500	3.826	93.0	
5	CROSSOVER.....	5.750	2.750	1.0	
12	DUAL CIP VALVE.....	5.000	0.870	6.0	
60	HYDROSPRING TESTER.....	5.000	0.750	5.0	4460.0
80	AP RUNNING CASE.....	5.000	2.250	4.0	4462.0
16	VR SAFETY JOINT.....	5.000	1.000	3.0	
70	OPEN HOLE PACKER.....	6.750	1.530	6.0	4472.0
70	OPEN HOLE PACKER.....	6.750	1.530	6.0	4478.0
20	FLUSH JOINT ANCHOR.....	5.000	2.370	10.0	
83	HT-500 TEMPERATURE CASE.....	5.000		1.0	4490.0
81	BLANKED-OFF RUNNING CASE.....	5.000		4.0	4492.0
	TOTAL DEPTH				4495.0

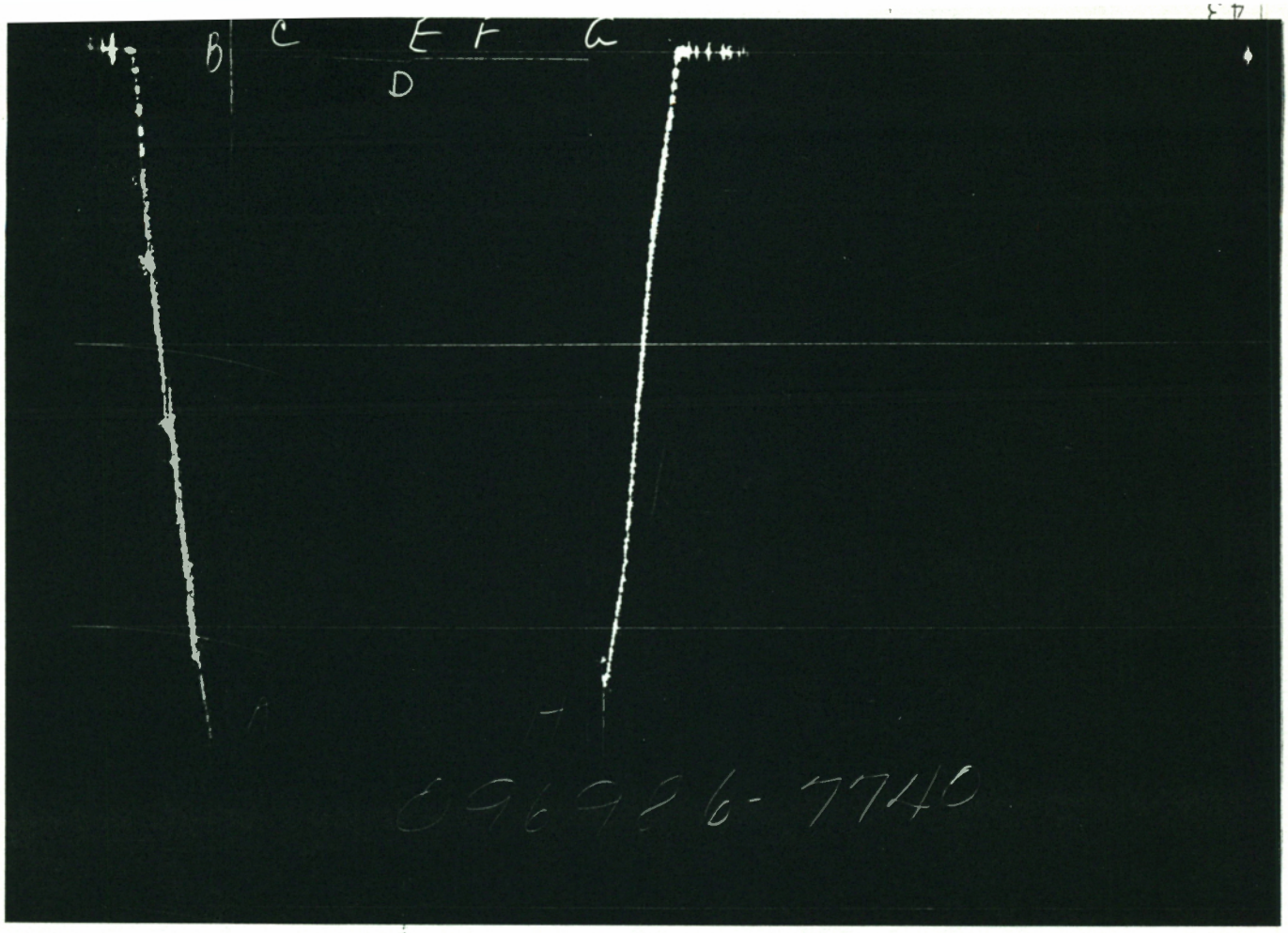
EQUIPMENT DATA

HALLIBURTON
SERVICES

TICKET NO. 09698600
22-JUL-85
NESS CITY

FORMATION TESTING SERVICE REPORT

A. GOERING	1	4	4599.0 - 4615.0	GRUSS PETROLEUM MANAGEMENT INCORPORATED	
LEASE NAME	WELL NO.	TEST NO.	TESTED INTERVAL	LEASE OWNER/COMPANY NAME	
LEGAL LOCATION SEC. - TWP. - RNG.	FIELD AREA	COUNTY	STATE		
30 19S 30W		LANE	KANSAS SM		



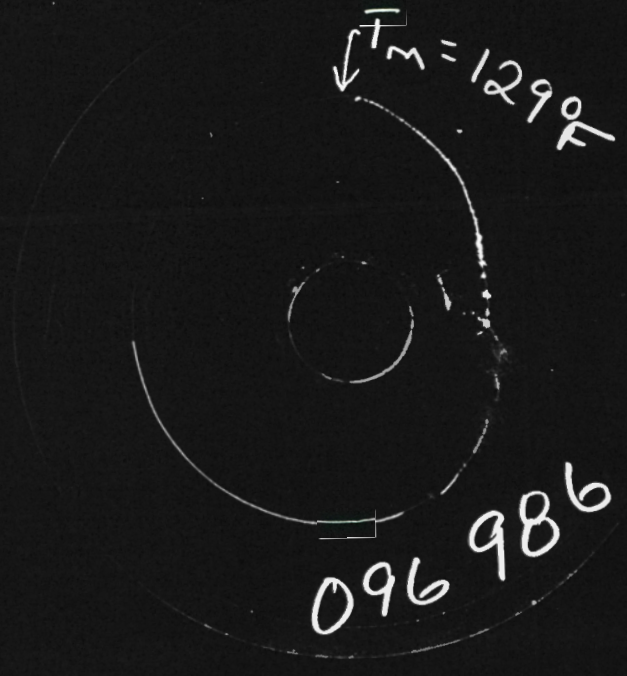
GAUGE NO: 7740 DEPTH: 4612.0 BLANKED OFF: YES HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC		2312.6			
B	INITIAL FIRST FLOW		18.7	45.0	45.0	F
C	FINAL FIRST FLOW		22.4			
C	INITIAL FIRST CLOSED-IN		22.4	60.0	60.0	C
D	FINAL FIRST CLOSED-IN		36.7			
E	INITIAL SECOND FLOW		33.4	45.0	45.0	F
F	FINAL SECOND FLOW		24.2			
F	INITIAL SECOND CLOSED-IN		24.2	60.0	60.0	C
G	FINAL SECOND CLOSED-IN		27.0			
H	FINAL HYDROSTATIC		2272.5			

TYPE & SIZE MEASURING DEVICE: ______ | TICKET NO: 09698600

TIME	CHOKE SIZE	SURFACE PRESSURE PSI	GAS RATE MCF	LIQUID RATE BPD	REMARKS
7-17-85					
0150					CALLED OUT
0300					ON LOCATION, RIG PULLING
					COLLARS
0315					PICKED UP AND MADE UP TOOL
0330					SET TOOL IN TABLE
					STARTED DRILL PIPE
0430					TOOL ON BOTTOM
0432					OPENED TOOL WITH WEAK SURFACE
					BLOW WHICH DIED IN 17 MINUTES.
0517					CLOSED TOOL
0617					OPENED TOOL WITH NO BLOW
0702					CLOSED TOOL
0802					TOOL OFF BOTTOM
0905					TOOL IN TABLE
0930					TOOL BROKE AND LAID DOWN
0945					JOB COMPLETED

TEMPERATURE RECORDER CHART



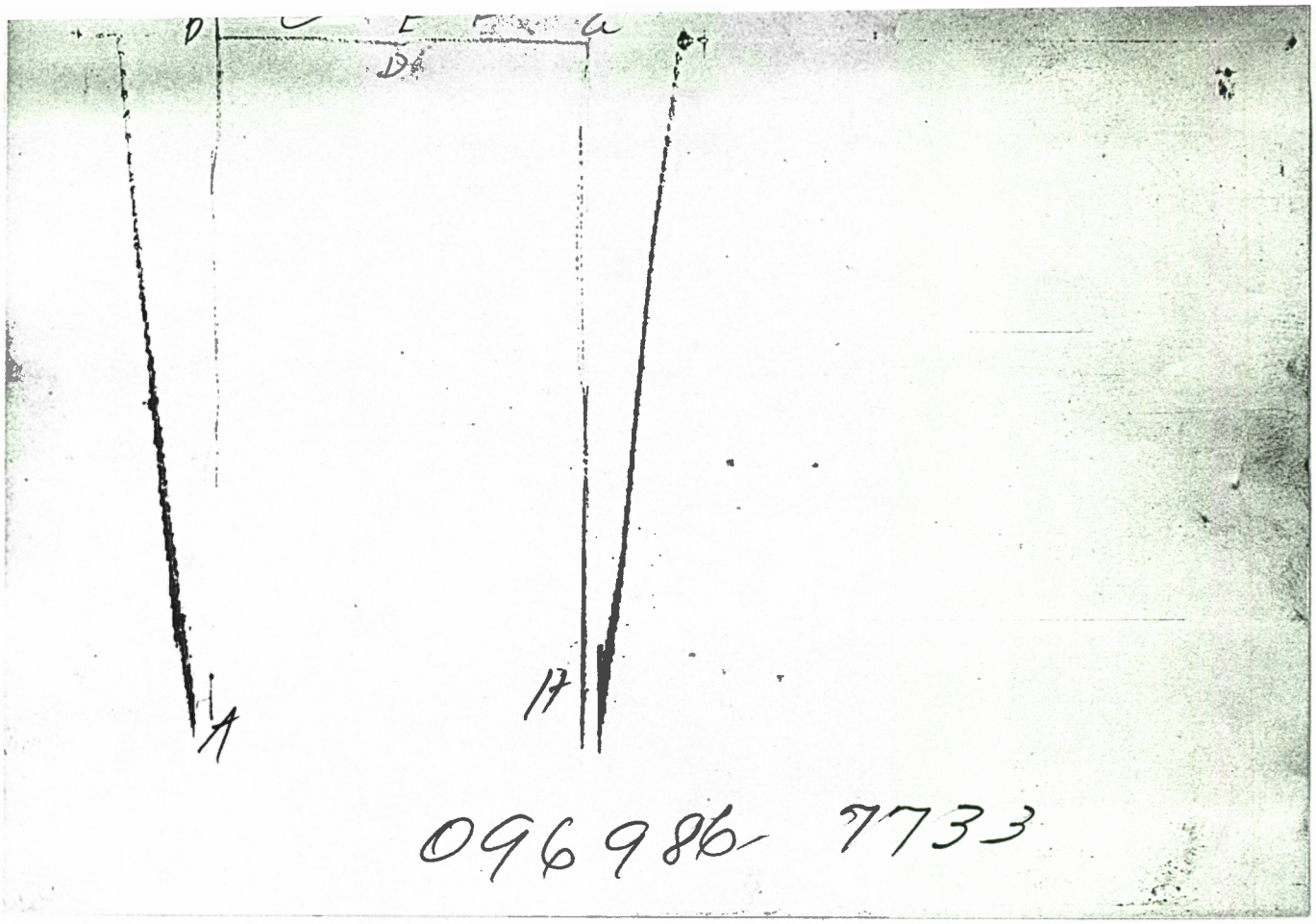
10° each circle

EQUATIONS FOR DST GAS WELL ANALYSIS

Indicated Flow Capacity	$kh = \frac{1637\ Q_g\ T}{m}$	md-ft
Average Effective Permeability	$k = \frac{kh}{h}$	md
Skin Factor	$S = 1.151 \left[\frac{m(P^*) - m(P_f)}{m} - \text{LOG}\left(\frac{k(t/60)}{\phi\ \mu\ c_t r_w^2}\right) + 3.23 \right]$	—
Damage Ratio	$DR = \frac{m(P^*) - m(P_f)}{m(P^*) - m(P_f) - 0.87\ mS}$	—
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	$r_i = 0.032 \sqrt{\frac{k(t/60)}{\phi \mu c_t}}$	ft

NOMENCLATURE

B	=	Formation Volume Factor (Res Vol / Std Vol)	——
c_t	=	System Total Compressibility	(Vol / Vol) / psi
DR	=	Damage Ratio	——
h	=	Estimated Net Pay Thickness	Ft
k	=	Permeability	md
m	=	(Liquid) Slope Extrapolated Pressure Plot	psi cycle
		(Gas) Slope Extrapolated m(P) Plot	MM psi^2/ cp cycle
$m(P^*)$	=	Real Gas Potential at P^*	MM psi^2 cp
$m(P_f)$	=	Real Gas Potential at P_f	MM psi^2 cp
AOF_1	=	Maximum Indicated Absolute Open Flow at Test Conditions	MCFD
AOF_2	=	Minimum Indicated Absolute Open Flow at Test Conditions	MCFD
P^*	=	Extrapolated Static Pressure	Psig
P_f	=	Final Flow Pressure	Psig
Q	=	Liquid Production Rate During Test	BPD
Q_1	=	Theoretical Liquid Production w Damage Removed	BPD
Q_g	=	Measured Gas Production Rate	MCFD
r_i	=	Approximate Radius of Investigation	Ft
r_w	=	Radius of Well Bore	Ft
S	=	Skin Factor	
t	=	Total Flow Time Previous to Closed-in	Minutes
Δt	=	Closed-in Time at Data Point	Minutes
T	=	Temperature Rankine	°R
ϕ	=	Porosity	——
μ	=	Viscosity of Gas or Liquid	cp
Log	=	Common Log	



GAUGE NO: 7733 DEPTH: 4583.0 BLANKED OFF: NO HOUR OF CLOCK: 1

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC	2297	2302.6			
B	INITIAL FIRST FLOW	4	6.8	45.0	45.0	F
C	FINAL FIRST FLOW	4	6.0			
C	INITIAL FIRST CLOSED-IN	4	6.0	60.0	60.0	C
D	FINAL FIRST CLOSED-IN	18	21.1			
E	INITIAL SECOND FLOW	9	18.1	45.0	45.0	F
F	FINAL SECOND FLOW	9	8.3			
F	INITIAL SECOND CLOSED-IN	9	8.3	60.0	60.0	C
G	FINAL SECOND CLOSED-IN	13	14.0			
H	FINAL HYDROSTATIC	2260	2267.5			

EQUIPMENT & HOLE DATA

FORMATION TESTED: MISSISSIPPIAN
NET PAY (ft): 5.0
GROSS TESTED FOOTAGE: 16.0
ALL DEPTHS MEASURED FROM: KELLY BUSHING
CASING PERFS. (ft): _____
HOLE OR CASING SIZE (in): 7.875
ELEVATION (ft): 2936.0 KELLY BUSHING
TOTAL DEPTH (ft): 4615.0
PACKER DEPTH(S) (ft): 4593, 4599
FINAL SURFACE CHOKE (in): _____
BOTTOM HOLE CHOKE (in): 0.750
MUD WEIGHT (lb/gal): 9.60
MUD VISCOSITY (sec): 51
ESTIMATED HOLE TEMP. (°F): _____
ACTUAL HOLE TEMP. (°F): 129 @ 4610.0 ft

TICKET NUMBER: 09698600
DATE: 7-17-85 TEST NO: 4
TYPE DST: OPEN HOLE
HALLIBURTON CAMP: NESS CITY
TESTER: B. CROSSWHITE
WITNESS: S. MURPHY
DRILLING CONTRACTOR: STRATA #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

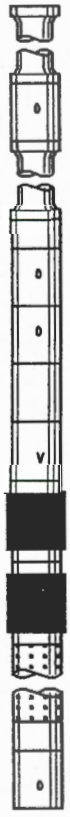
TYPE	AMOUNT	WEIGI
_____	_____	_____
_____	_____	_____

RECOVERED:

1 FOOT OF DRILLING MUD WITH NO SHOW OF OIL

REMARKS:

TICKET NO. 096986



		O.D.	I.D.	LENGTH	DEPTH
1	DRILL PIPE.....	4.500	3.826	4476.0	
50	IMPACT REVERSING SUB.....	5.750	2.750	1.0	4476.0
1	DRILL PIPE.....	4.500	3.826	93.0	
5	CROSSOVER.....	5.750	2.750	1.0	
12	DUAL CIP VALVE.....	5.000	0.870	6.0	
60	HYDROSPRING TESTER.....	5.000	0.750	5.0	4581.0
80	AP RUNNING CASE.....	5.000	2.250	4.0	4583.0
16	VR SAFETY JOINT.....	5.000	1.000	3.0	
70	OPEN HOLE PACKER.....	6.750	1.530	6.0	4593.0
70	OPEN HOLE PACKER.....	6.750	1.530	6.0	4599.0
20	FLUSH JOINT ANCHOR.....	5.000	2.370	9.0	
83	HT-500 TEMPERATURE CASE.....	5.000		1.0	4610.0
81	BLANKED-OFF RUNNING CASE.....	5.000		4.0	4612.0

TOTAL DEPTH 4615.0

EQUIPMENT DATA