FRED WONDRA | 2 | 1 | 3358.0 - 3380.0 | RAMCO DRILLING SERVICES, INCORPORATED

LEASE NAME | WELL NO. | TEST NO. | TESTED INTERVAL | LEASE OWNER/COMPANY NAME

LEGAL LOCATION SEC. - TWP. - RNG. | FIELD AREA | COUNTY | STATE

5 - 17 - 13 WEST | | BARTON | KANSAS | PF

5-17-13W

I-C

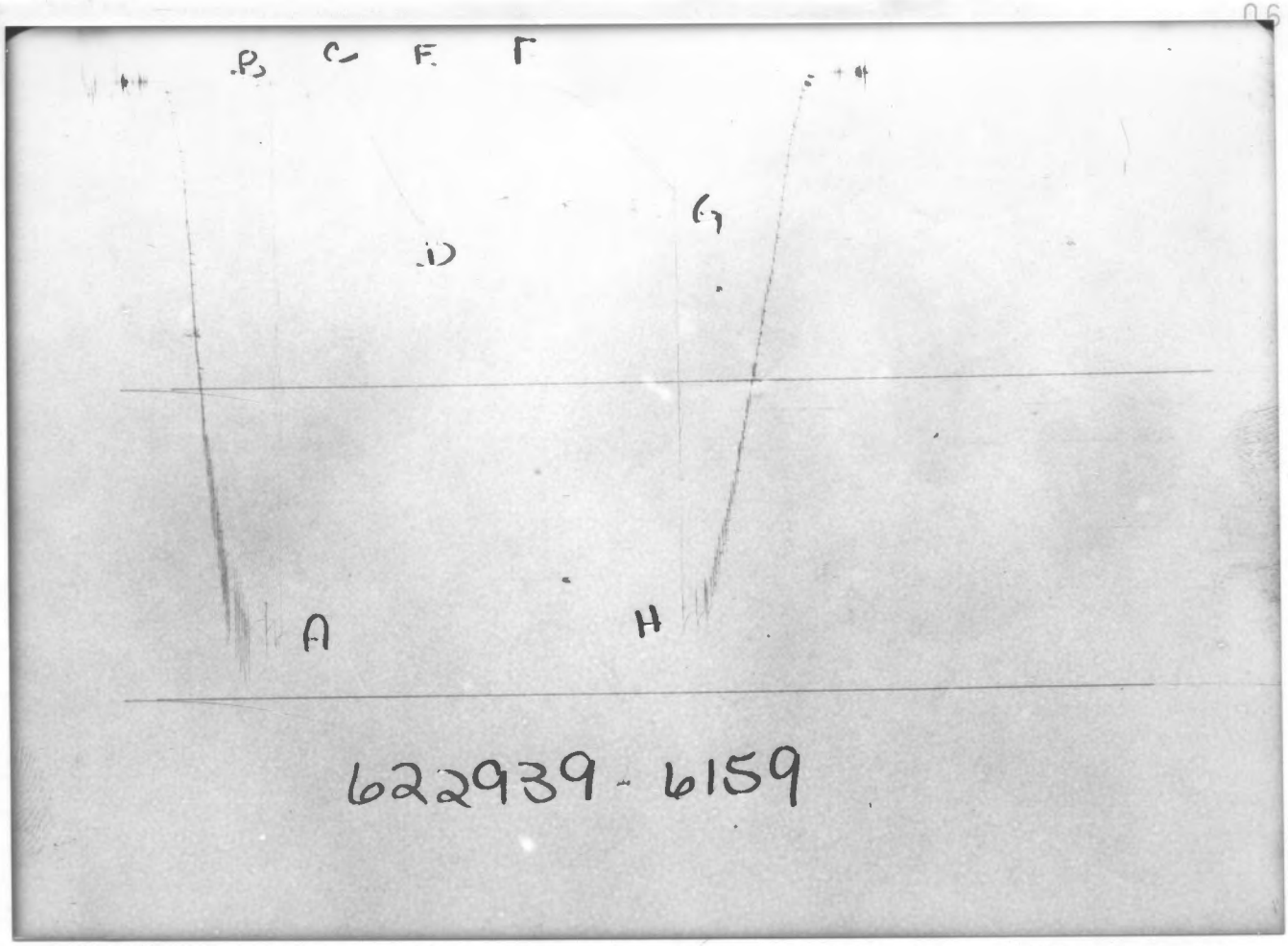
HALLIBURTON SERVICES

TICKET NO. 62293900

04-DEC-87

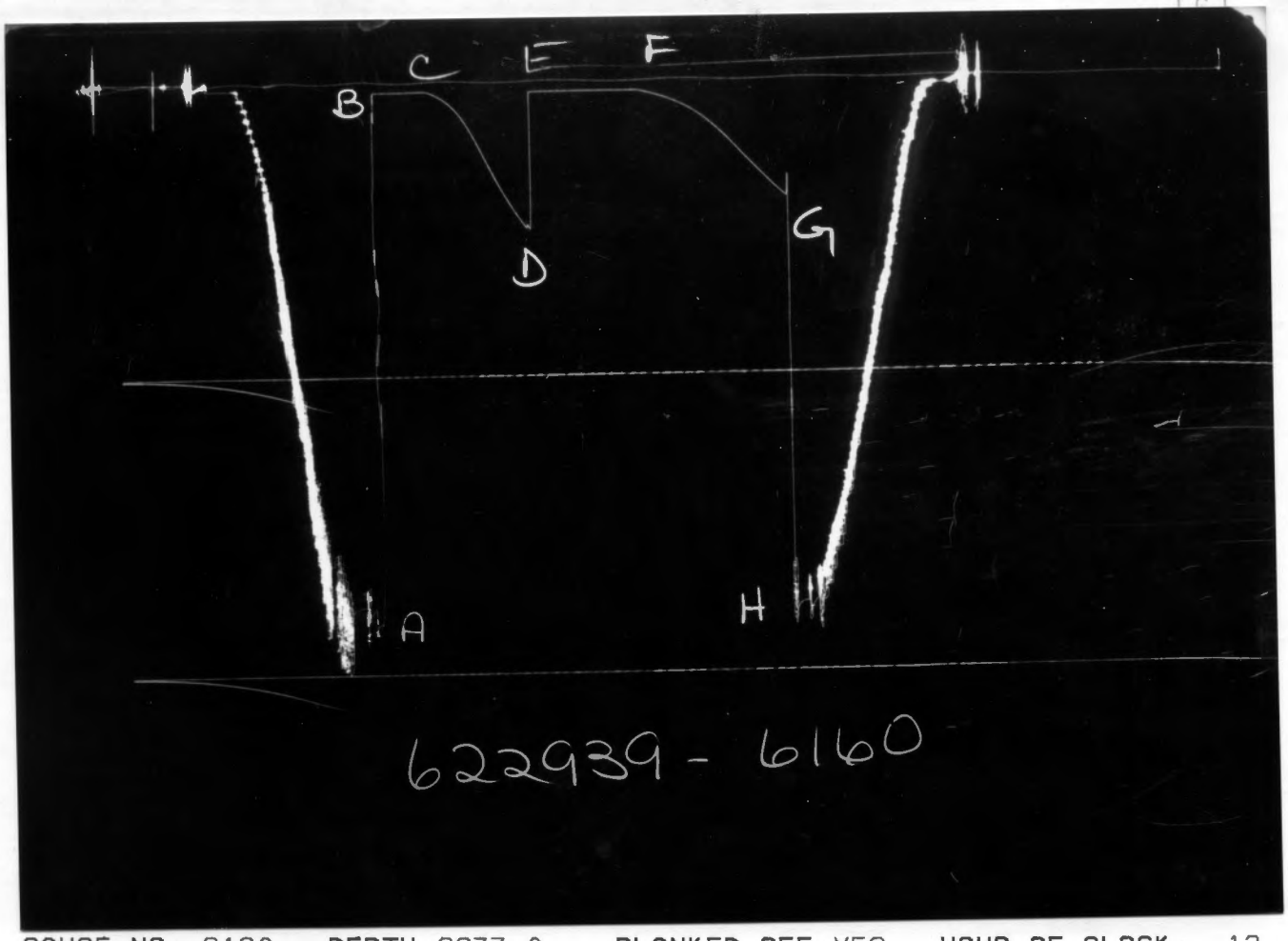
GREAT BEND

FORMATION TESTING SERVICE REPORT



GAUGE NO: 6159 DEPTH: 3336.8 BLANKED OFF: NO HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC		1747.2			
B	INITIAL FIRST FLOW		8.6	30.0	30.0	F
C	FINAL FIRST FLOW		8.6			
C	INITIAL FIRST CLOSED-IN		8.6	60.0	60.0	C
D	FINAL FIRST CLOSED-IN		473.7			
E	INITIAL SECOND FLOW		17.2	60.0	60.0	F
F	FINAL SECOND FLOW		12.1			
F	INITIAL SECOND CLOSED-IN		12.1	90.0	90.0	C
G	FINAL SECOND CLOSED-IN		372.6			
H	FINAL HYDROSTATIC		1743.9			



GAUGE NO: 6160 DEPTH: 3377.0 BLANKED OFF: YES HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC	1750	1773.3			
B	INITIAL FIRST FLOW	34	37.9	30.0	30.0	F
C	FINAL FIRST FLOW	34	36.0			
C	INITIAL FIRST CLOSED-IN	34	36.0	60.0	60.0	C
D	FINAL FIRST CLOSED-IN	492	503.0			
E	INITIAL SECOND FLOW	34	43.9	60.0	60.0	F
F	FINAL SECOND FLOW	34	39.1			
F	INITIAL SECOND CLOSED-IN	34	39.1	90.0	90.0	C
G	FINAL SECOND CLOSED-IN	390	402.3			
H	FINAL HYDROSTATIC	1750	1769.6			

EQUIPMENT & HOLE DATA

FORMATION TESTED: ARBUCKLE
NET PAY (ft):
GROSS TESTED FOOTAGE: 22.0
ALL DEPTHS MEASURED FROM: KB
CASING PERFS. (ft):
HOLE OR CASING SIZE (in): 7.875
ELEVATION (ft): 1912.0 GROUND LEVEL
TOTAL DEPTH (ft): 3380.0
PACKER DEPTH(S) (ft): 3352, 3358
FINAL SURFACE CHOKE (in):
BOTTOM HOLE CHOKE (in): 0.750
MUD WEIGHT (lb/gal): 9.90
MUD VISCOSITY (sec): 42
ESTIMATED HOLE TEMP. (°F):
ACTUAL HOLE TEMP. (°F): 97 @ 3375.0 ft

TICKET NUMBER: 62293900
DATE: 12-1-87 TEST NO: 1
TYPE DST: OPEN HOLE
HALLIBURTON CAMP: GREAT BEND
TESTER: M.R. BOLYARD
WITNESS: ???
DRILLING CONTRACTOR: RED TIGER DRILLING COMPANY

FLUID PROPERTIES FOR RECOVERED MUD & WATER

SOURCE	RESISTIVITY	CHLORIDES
PIT MUD (STARCH)	@ °F	59000 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:

5 FEET OF DRILLING MUD

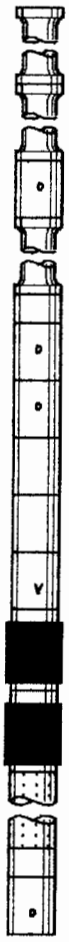
MEASURED FROM TESTER VALVE

REMARKS:

TYPE & SIZE MEASURING DEVICE:	TICKET NO: 62293900

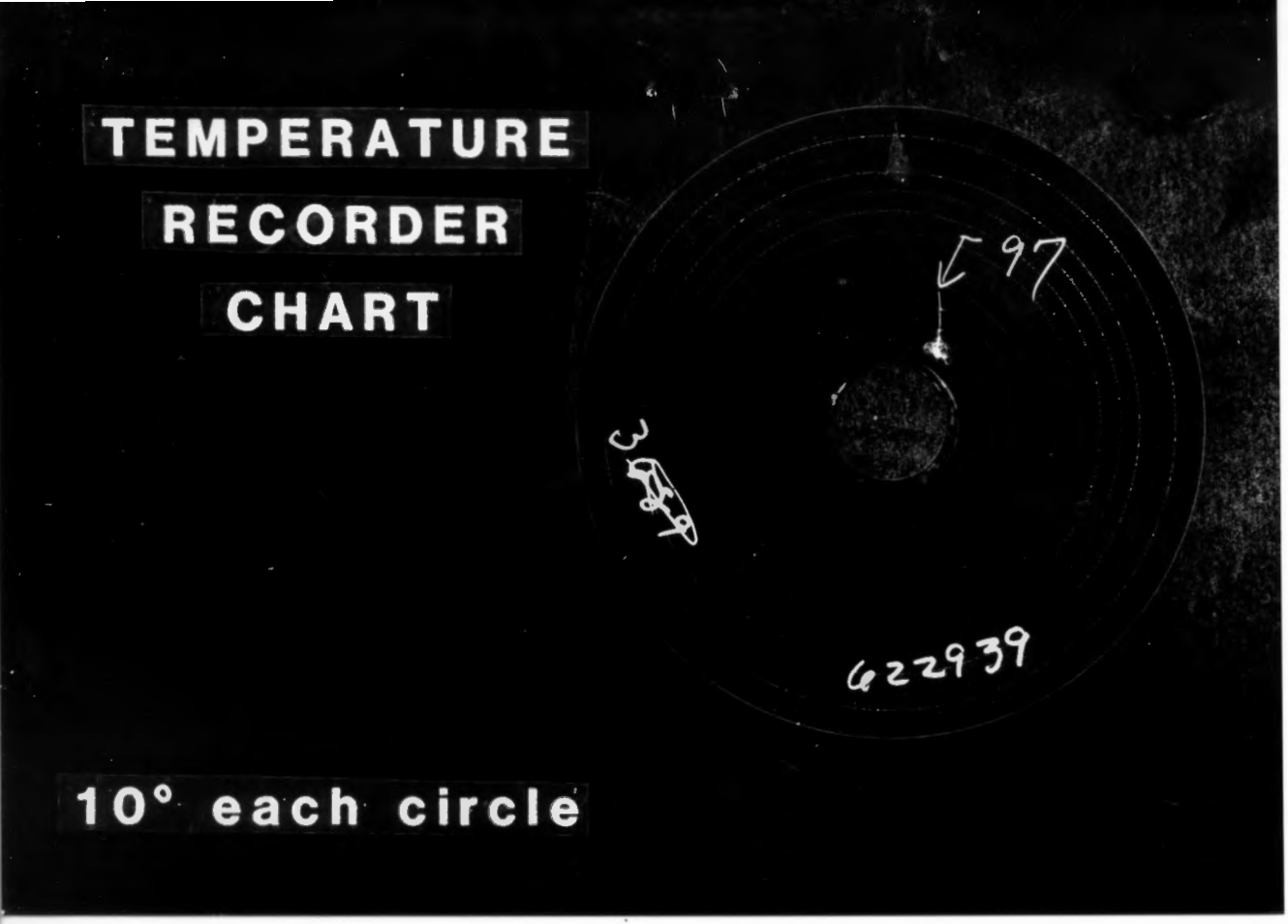
TIME	CHOKE SIZE	SURFACE PRESSURE PSI	GAS RATE MCF	LIQUID RATE BPD	REMARKS
11-30-87					
2110					CALLED OUT
2215					ON LOCATION - PULLED PIPE
2310					MADE-UP TOOL
2340					TOOL IN TABLE
2400					WENT IN HOLE
12-1-87					
0120					TOOL ON BOTTOM
0123	BH				OPENED TOOL - 1/8" BLOW IN
					5 GALLON BUBBLE BUCKET.
0153					CLOSED TOOL - 1/8" BLOW
0253	BH				REOPENED TOOL - NO BLOW TO
					BUCKET.
0353					CLOSED TOOL
0523					TOOL OFF BOTTOM

TICKET NO. 62293900



		O.D.	I.D.	LENGTH	DEPTH
1	DRILL PIPE	5.000	4.408	3005.0	
4	FLEX WEIGHT	4.500	2.764	256.0	
50	IMPACT REVERSING SUB	5.750	2.750	1.0	3262.0
4	FLEX WEIGHT	5.000	2.764	62.0	
5	CROSSOVER	5.000	4.408	1.0	
12	DUAL CIP VALVE	5.750	0.870	6.0	
60	HYDROSPRING TESTER	5.000	0.750	5.0	3335.5
80	AP RUNNING CASE	5.000	2.250	4.1	3336.8
15	JAR	5.000	1.750	5.0	
16	VR SAFETY JOINT	5.000	1.000	2.8	
70	OPEN HOLE PACKER	6.750	1.530	5.8	3352.0
70	OPEN HOLE PACKER	6.750	1.530	5.8	3358.0
20	FLUSH JOINT ANCHOR	5.000	2.370	15.0	
83	HT-500 TEMPERATURE CASE	5.000		1.5	3375.0
81	BLANKED-OFF RUNNING CASE	5.000		4.1	3377.0
	TOTAL DEPTH				3380.0

EQUIPMENT DATA


TEMPERATURE
RECORDER
CHART
10° each circle

Inc

JAN 19 1988

HALLIBURTON SERVICES

TICKET NO. 62294000

04-DEC-87

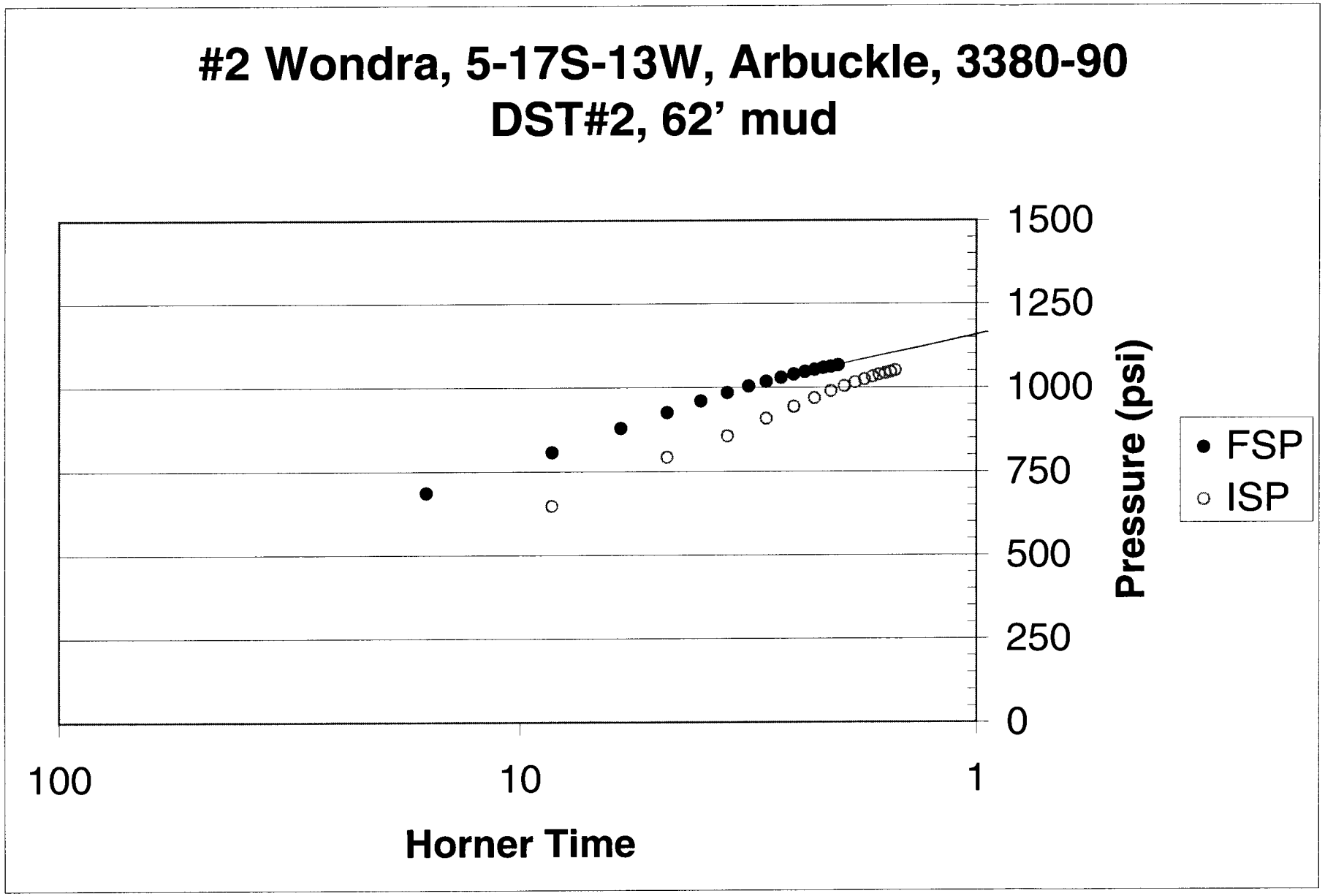
GREAT BEND

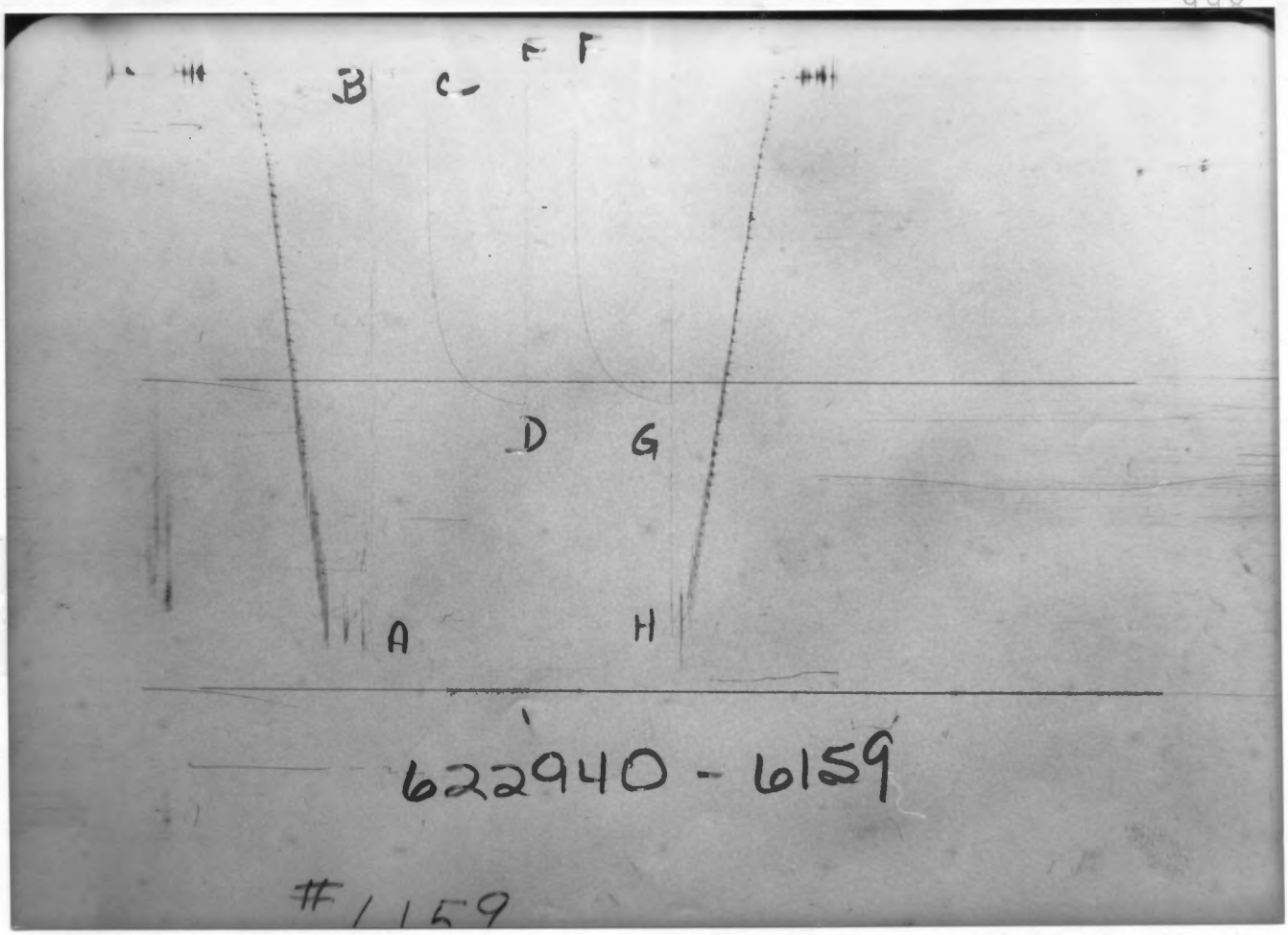
FORMATION TESTING SERVICE REPORT

LEASE NAME	WELL NO.	TEST NO.	TESTED INTERVAL			
MONDRA	2	2	3380.0 - 3390.0			
LEGAL LOCATION SEC. - THP - RNG.	FIELD AREA	COUNTY	STATE	LEASE OWNER/COMPANY NAME		
5 - 17 - 13 WEST		BARTON	KANSAS	RAMCO DRILLING SERVICES, INCORPORATED		PF

5-17-13W

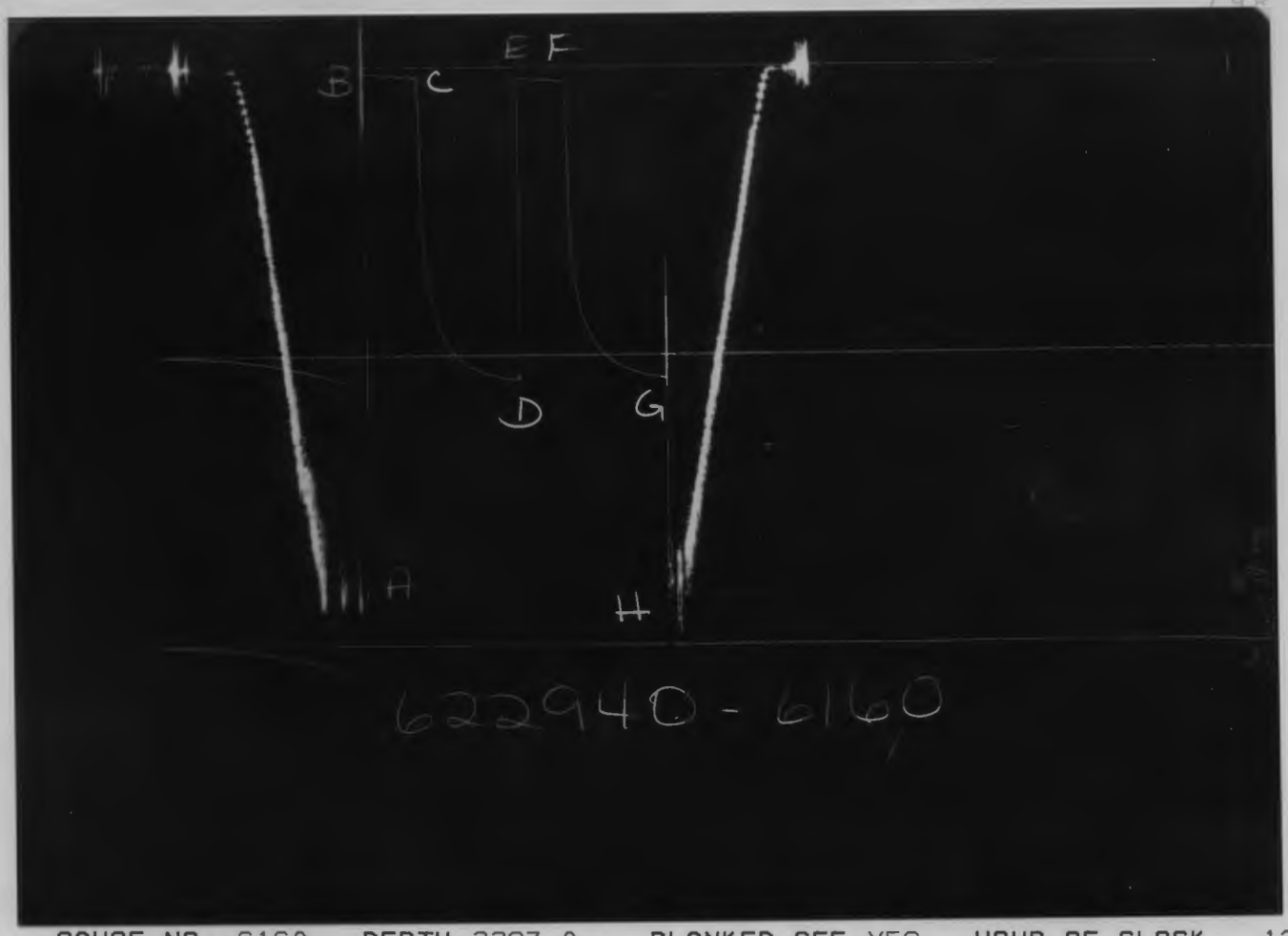
Static Res pr from FSI = 1155 psi





GAUGE NO: 6159 DEPTH: 3358.7 BLANKED OFF: NO HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC		1806.0			
B	INITIAL FIRST FLOW		7.2	30.0	32.8	F
C	FINAL FIRST FLOW		19.9			
C	INITIAL FIRST CLOSED-IN		19.9	60.0	60.6	C
D	FINAL FIRST CLOSED-IN		1070.7			
E	INITIAL SECOND FLOW		32.6	30.0	29.1	F
F	FINAL SECOND FLOW		34.9			
F	INITIAL SECOND CLOSED-IN		34.9	60.0	60.2	C
G	FINAL SECOND CLOSED-IN		1065.7			
H	FINAL HYDROSTATIC		1739.3			



GAUGE NO: 6160 DEPTH: 3387.0 BLANKED OFF: YES HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC	1750	1815.4			
B	INITIAL FIRST FLOW	17	20.0	30.0	32.8	F
C	FINAL FIRST FLOW	34	34.0			
C	INITIAL FIRST CLOSED-IN	34	34.0	60.0	60.6	C
D	FINAL FIRST CLOSED-IN	1081	1082.0			
E	INITIAL SECOND FLOW	34	43.5	30.0	29.1	F
F	FINAL SECOND FLOW	51	47.5			
F	INITIAL SECOND CLOSED-IN	51	47.5	60.0	60.2	C
G	FINAL SECOND CLOSED-IN	1081	1076.1			
H	FINAL HYDROSTATIC	1750	1750.6			

EQUIPMENT & HOLE DATA

FORMATION TESTED: ARBUCKLE
NET PAY (ft):
GROSS TESTED FOOTAGE: 10.0
ALL DEPTHS MEASURED FROM: KB
CASING PERFS. (ft):
HOLE OR CASING SIZE (in): 7.875
ELEVATION (ft): 1912.0 G.L.
TOTAL DEPTH (ft): 3390.0
PACKER DEPTH(S) (ft): 3374, 3380
FINAL SURFACE CHOKE (in):
BOTTOM HOLE CHOKE (in): 0.750
MUD WEIGHT (lb/gal): 9.90
MUD VISCOSITY (sec): 42
ESTIMATED HOLE TEMP. (°F):
ACTUAL HOLE TEMP. (°F): 95 @ 3385.0 ft

TICKET NUMBER: 62294000

DATE: 12-1-87 TEST NO: 2

TYPE DST: OPEN HOLE

HALLIBURTON CAMP:
GREAT BEND

TESTER: M.R. BOLYARD
BYERLY/BROZEK

WITNESS: ???

DRILLING CONTRACTOR:
RED TIGER DRILLING COMPANY

FLUID PROPERTIES FOR RECOVERED MUD & WATER

SOURCE	RESISTIVITY		CHLORIDES
PIT MUD (STARCH)	@ °F		59000 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:

62 FEET OF DRILLING MUD

MEASURED FROM TESTER VALVE

REMARKS:

TYPE & SIZE MEASURING DEVICE: _____					TICKET NO: 52294000
TIME	CHOKE SIZE	SURFACE PRESSURE PSI	GAS RATE MCF	LIQUID RATE BPD	REMARKS
12-1-87					
					ON LOCATION
1530					MADE-UP TOOL
1600					TOOL IN TABLE
1620					TOOL WENT IN HOLE
1729					TOOL ON BOTTOM
1733					OPENED TOOL - INSTANT BLOW 1/4"
					IN 5 GALLON BUCKET.
1737					1" BLOW IN BUCKET
1758					2" BLOW IN BUCKET
1803					CLOSED TOOL - 2" BLOW IN BUCKET
1903					REOPENED TOOL - 1/16" BLOW
					IN BUCKET.
1915					DIED
1933					CLOSED TOOL
2033					TOOL OFF BOTTOM

TICKET NO: 62294000	GAUGE NO: 6159
CLOCK NO: 4153 HOUR: 12	DEPTH: 3358.7

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	7.2			
	2	5.0	8.4	1.2		
	3	10.0	11.1	2.7		
	4	15.0	13.5	2.4		
	5	20.0	16.1	2.5		
	6	25.0	17.8	1.7		
	7	30.0	19.5	1.7		
C	8	32.8	19.9	0.4		
			FIRST CLOSED-IN			
C	1	0.0	19.9			
	2	4.0	647.3	627.4	3.6	0.962
	3	8.0	792.6	772.7	6.4	0.710
	4	12.0	875.7	855.8	8.8	0.573
	5	16.0	927.2	907.3	10.7	0.485
	6	20.0	962.7	942.8	12.4	0.422
	7	24.0	988.6	968.7	13.9	0.375
	8	28.0	1009.4	989.5	15.1	0.337
	9	32.0	1024.4	1004.5	16.2	0.307
	10	36.0	1035.3	1015.4	17.2	0.282
	11	40.0	1044.7	1024.8	18.0	0.260
	12	44.0	1052.1	1032.2	18.8	0.242
	13	48.0	1058.2	1038.3	19.5	0.226
	14	52.0	1062.6	1042.7	20.1	0.212
	15	56.0	1066.7	1046.8	20.7	0.200
D	16	60.6	1070.7	1050.8	21.3	0.188
			SECOND FLOW			
E	1	0.0	32.6			
	2	5.0	29.2	-3.3		
	3	10.0	29.6	0.3		
	4	15.0	30.0	0.4		
	5	20.0	31.2	1.2		
	6	25.0	32.9	1.6		
F	7	29.1	34.9	2.0		
			SECOND CLOSED-IN			
F	1	0.0	34.9			
	2	4.0	685.6	650.7	3.7	1.218
	3	8.0	807.3	772.4	7.1	0.940
	4	12.0	878.8	843.9	10.1	0.788
	5	16.0	925.5	890.6	12.7	0.688
	6	20.0	959.0	924.1	15.1	0.613
	7	24.0	984.0	949.1	17.3	0.554
	8	28.0	1003.5	968.6	19.3	0.507
	9	32.0	1017.8	982.9	21.1	0.468

REF		MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta t}{t + \Delta t}$	$\log \frac{t + \Delta t}{\Delta t}$
		SECOND CLOSED-IN - CONTINUED				
	10	36.0	1029.1	994.2	22.8	0.435
	11	40.0	1038.9	1004.0	24.3	0.406
	12	44.0	1046.8	1011.9	25.7	0.382
	13	48.0	1053.0	1018.1	27.0	0.360
	14	52.0	1058.1	1023.2	28.3	0.341
	15	56.0	1061.9	1027.0	29.4	0.324
G	16	60.2	1065.7	1030.8	30.5	0.307

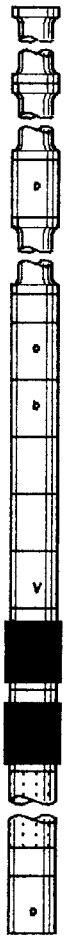
REMARKS:

TICKET NO: 62294000	GAUGE NO: 6160
CLOCK NO: 14235 HOUR: 12	DEPTH: 3387.0

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	20.0			
	2	5.0	22.5	2.5		
	3	10.0	25.2	2.7		
	4	15.0	27.2	1.9		
	5	20.0	29.7	2.5		
	6	25.0	30.9	1.2		
	7	30.0	32.7	1.8		
C	8	32.8	34.0	1.3		
			FIRST CLOSED-IN			
C	1	0.0	34.0			
	2	4.0	644.1	610.1	3.5	0.967
	3	8.0	806.0	772.0	6.4	0.708
	4	12.0	890.6	856.7	8.8	0.572
	5	16.0	942.1	908.1	10.8	0.485
	6	20.0	976.0	942.0	12.4	0.422
	7	24.0	1002.3	968.3	13.9	0.374
	8	28.0	1021.0	987.0	15.1	0.337
	9	32.0	1035.1	1001.2	16.2	0.307
	10	36.0	1046.6	1012.7	17.2	0.281
	11	40.0	1055.6	1021.7	18.0	0.260
	12	44.0	1063.2	1029.2	18.8	0.242
	13	48.0	1068.6	1034.7	19.5	0.226
	14	52.0	1074.0	1040.0	20.1	0.212
	15	56.0	1078.2	1044.2	20.7	0.200
D	16	60.6	1082.0	1048.0	21.3	0.188
			SECOND FLOW			
E	1	0.0	43.5			
	2	5.0	40.7	-2.8		
	3	10.0	42.1	1.4		
	4	15.0	43.8	1.7		
	5	20.0	45.6	1.9		
	6	25.0	47.3	1.7		
F	7	29.1	47.5	0.2		
			SECOND CLOSED-IN			
F	1	0.0	47.5			
	2	4.0	695.9	648.4	3.8	1.215
	3	8.0	823.8	776.3	7.1	0.943
	4	12.0	894.9	847.4	10.1	0.789
	5	16.0	942.0	894.5	12.7	0.687
	6	20.0	974.9	927.4	15.1	0.613
	7	24.0	998.6	951.2	17.3	0.554
	8	28.0	1016.9	969.4	19.3	0.506
	9	32.0	1030.4	982.9	21.1	0.468

REF		MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta t}{t+\Delta t}$	$\log \frac{t+\Delta t}{\Delta t}$
			SECOND CLOSED-IN - CONTINUED			
	10	36.0	1041.4	993.9	22.8	0.435
	11	40.0	1050.6	1003.1	24.3	0.407
	12	44.0	1057.7	1010.2	25.7	0.382
	13	48.0	1063.7	1016.2	27.1	0.360
	14	52.0	1068.5	1021.1	28.3	0.341
	15	56.0	1072.8	1025.3	29.4	0.324
G	16	60.2	1076.1	1028.6	30.5	0.307

REMARKS:



		O.D.	I.D.	LENGTH	DEPTH
1	DRILL PIPE	5.000	4.408	3028.0	
4	FLEX WEIGHT	4.500	2.764	256.0	
50	IMPACT REVERSING SUB	5.750	2.750	1.0	3283.9
4	FLEX WEIGHT	5.000	2.764	62.0	
5	CROSSOVER	5.000	4.408	1.0	
12	DUAL CIP VALVE	5.750	0.870	6.0	
60	HYDROSPRING TESTER	5.000	0.750	5.0	3357.4
80	AP RUNNING CASE	5.000	2.250	4.1	3358.7
15	JAR	5.000	1.750	5.0	
16	VR SAFETY JOINT	5.000	1.000	2.8	
70	OPEN HOLE PACKER	6.750	1.530	5.8	3374.0
70	OPEN HOLE PACKER	6.750	1.530	5.8	3380.0
20	FLUSH JOINT ANCHOR	5.000	2.370	3.0	
83	HT-500 TEMPERATURE CASE	5.000		1.5	3385.0
81	BLANKED-OFF RUNNING CASE	5.000		4.1	3387.0
	TOTAL DEPTH				3390.0

EQUIPMENT DATA

TEMPERATURE
RECORDER
CHART

622940

~95°

#3689
Ticket 622940

10° each circle

EQUATIONS FOR DST LIQUID WELL ANALYSIS

Transmissibility	$\frac{kh}{\mu} = \frac{162.6\ QB}{m}$	$\frac{\text{md-ft}}{\text{cp}}$
Indicated Flow Capacity	$kh = \frac{kh}{\mu}\,\mu$	md-ft
Average Effective Permeability	$k = \frac{kh}{h}$	md
Skin Factor	$S = 1.151\left[\frac{P^*-P_f}{m} - \text{LOG}\left(\frac{k\,(t/60)}{\phi\,\mu\,c_t r_w^2}\right) + 3.23\right]$	
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	$kh = \frac{.001637\ Q_g\ T}{m}$	md-ft
Average Effective Permeability	$k = \frac{kh}{h}$	md
Skin Factor	$S = 1.151\left[\frac{m(P^*)-m(P_f)}{m} - \text{LOG}\left(\frac{k\,(t/60)}{\phi\,\mu\,c_t r_w^2}\right) + 3.23\right]$	
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