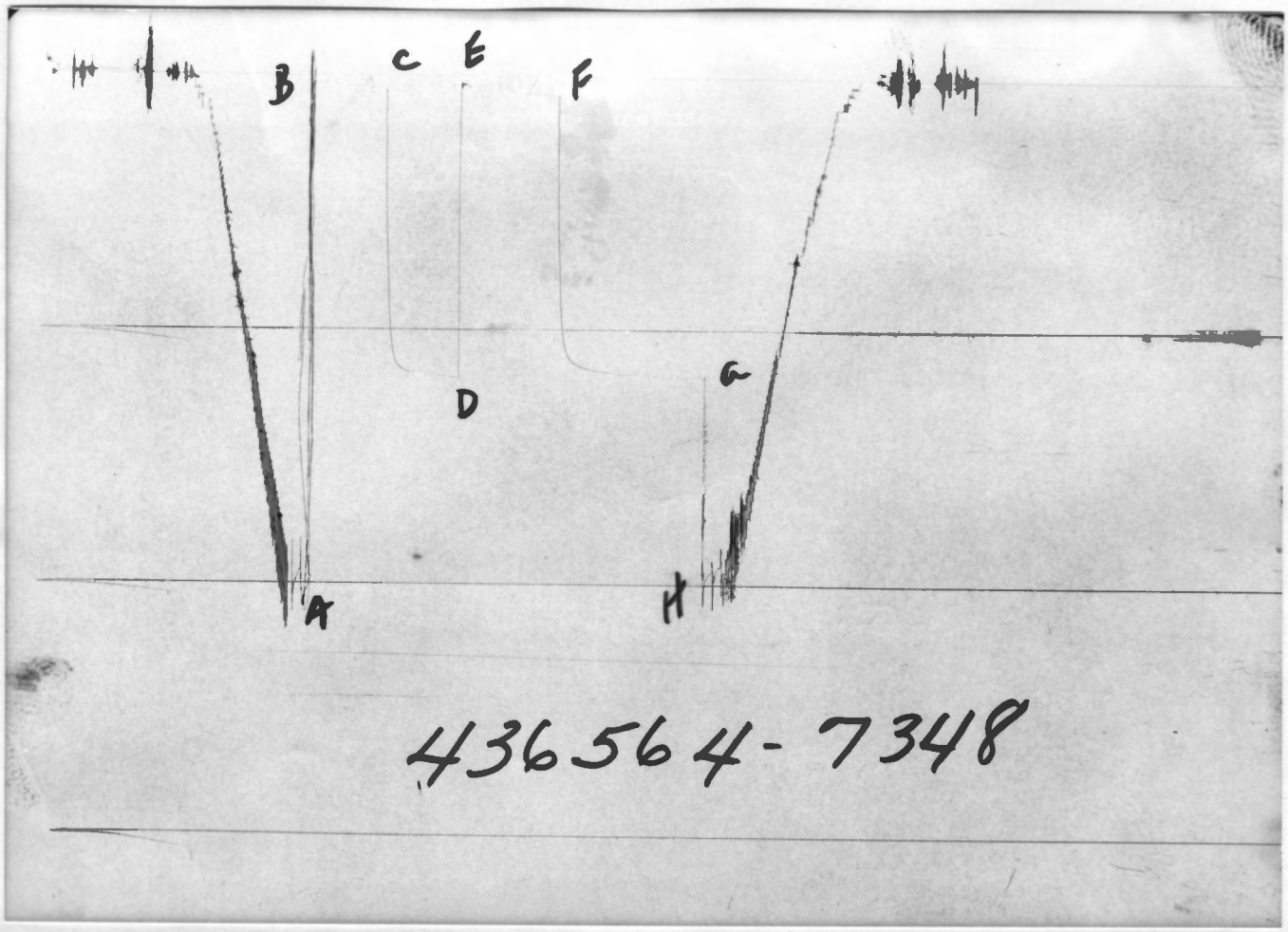
HALLIBURTON
SERVICES

TICKET NO. 43656400
12-SEP-86
PRATT

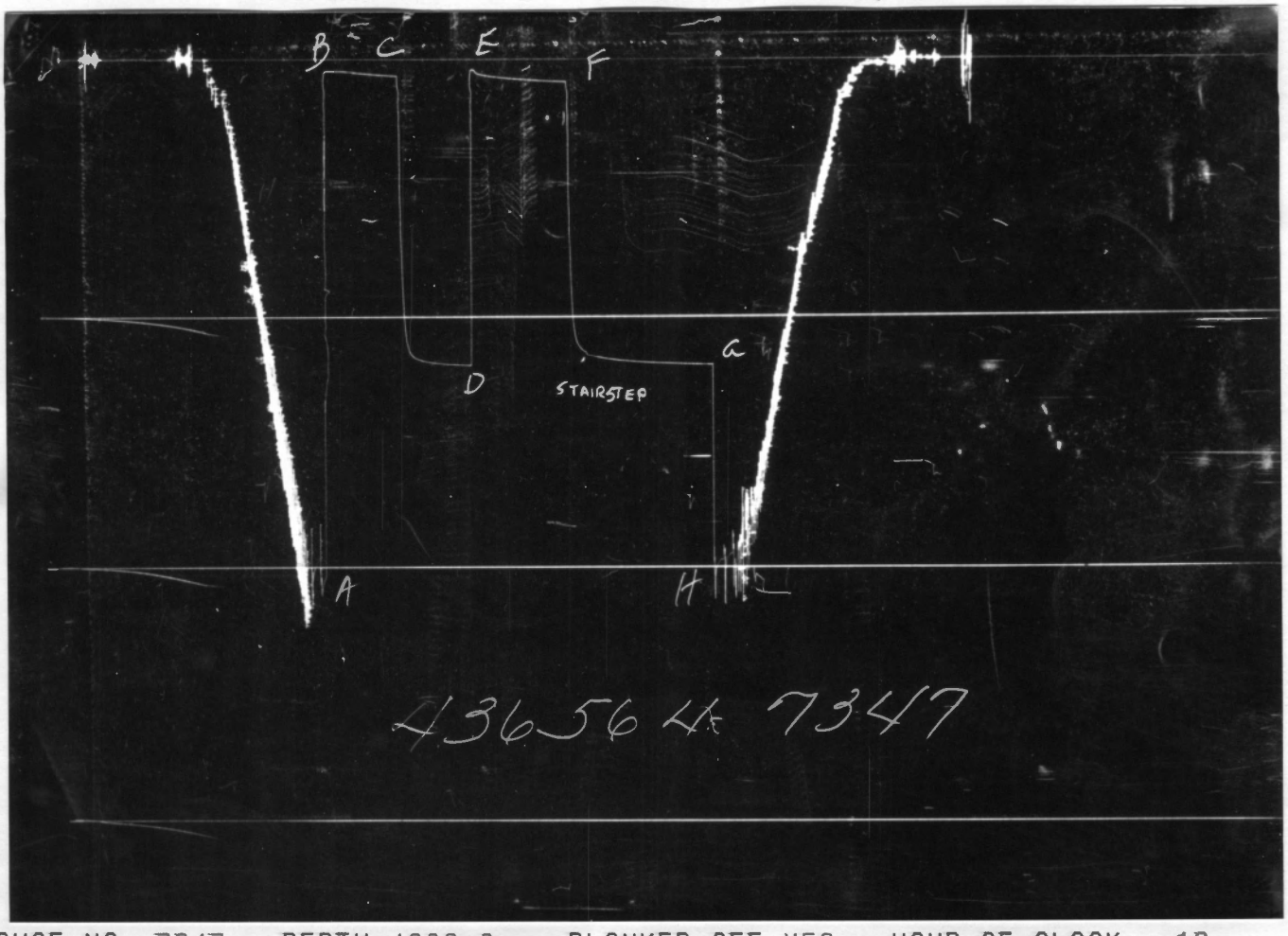
FORMATION TESTING SERVICE REPORT

BARSTOW	1	2	4170.0 - 4205.0		MCNEISH OIL OPERATIONS
LEASE NAME	WELL NO.	TEST NO.	TESTED INTERVAL		LEASE OWNER/COMPANY NAME
SEC. - TWP. - RNG. 3-26S-15W	FIELD AREA	COUNTY STAFFORD	STATE KANSAS	SW	
LEGAL LOCATION					



GAUGE NO: 7348 DEPTH: 4149.0 BLANKED OFF: NO HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC		1956.7			
B	INITIAL FIRST FLOW		27.7	45.0	45.4	F
C	FINAL FIRST FLOW		49.1			
C	INITIAL FIRST CLOSED-IN		49.1	45.0	45.2	C
D	FINAL FIRST CLOSED-IN		1191.6			
E	INITIAL SECOND FLOW		27.4	60.0	59.2	F
F	FINAL SECOND FLOW		73.3			
F	INITIAL SECOND CLOSED-IN		73.3	90.0	90.2	C
G	FINAL SECOND CLOSED-IN		1188.1			
H	FINAL HYDROSTATIC		1962.2			



GAUGE NO: 7347 DEPTH: 4202.0 BLANKED OFF: YES HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC	1968	1973.5			
B	INITIAL FIRST FLOW	39	45.6	45.0	45.4	F
C	FINAL FIRST FLOW	68	63.9			
C	INITIAL FIRST CLOSED-IN	68	63.9	45.0	45.2	C
D	FINAL FIRST CLOSED-IN	1211	1200.8			
E	INITIAL SECOND FLOW	39	41.2	60.0	59.2	F
F	FINAL SECOND FLOW	77	86.3			
F	INITIAL SECOND CLOSED-IN	77	86.3	90.0	90.2	C
G	FINAL SECOND CLOSED-IN	1201	1197.1			
H	FINAL HYDROSTATIC	1968	1980.2			

EQUIPMENT & HOLE DATA

FORMATION TESTED: MISSISSIPPI
NET PAY (ft): 20.0
GROSS TESTED FOOTAGE: 35.0
ALL DEPTHS MEASURED FROM: KELLY BUSHING
CASING PERFS. (ft):
HOLE OR CASING SIZE (in): 7.875
ELEVATION (ft): 2040.0
TOTAL DEPTH (ft): 4205.0
PACKER DEPTH(S) (ft): 4164, 4170
FINAL SURFACE CHOKE (in): 0.25000
BOTTOM HOLE CHOKE (in): 0.750
MUD WEIGHT (lb/gal): 9.20
MUD VISCOSITY (sec): 50
ESTIMATED HOLE TEMP. (°F):
ACTUAL HOLE TEMP. (°F): 133 @ 4200.0 ft

TICKET NUMBER: 43656400

DATE: 9-9-86 TEST NO: 2

TYPE DST: OPEN HOLE

HALLIBURTON CAMP: PRATT

TESTER: L.R. PARKER

WITNESS: M. DUBOIS

DRILLING CONTRACTOR: EAGLE DRILLING COMPANY

FLUID PROPERTIES FOR RECOVERED MUD & WATER

SOURCE	RESISTIVITY		CHLORIDES
PIT	@	°F	12000 ppm
TOP	@	°F	14000 ppm
BOTTOM	@	°F	14500 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:

90 FEET OF DRILLING MUD

MEASURED FROM TESTER VALVE

REMARKS:

TYPE & SIZE MEASURING DEVICE: _____ TICKET NO: 43656400

TIME	CHOKE SIZE	SURFACE PRESSURE PSI	GAS RATE MCF	LIQUID RATE BPD	REMARKS
9-9-86					
0430					CALLED OUT
0600					ON LOCATION, RIG SHORT TRIPPING
0800					STARTED OUT OF HOLE
0950					PICKED UP TOOL
1010					TOOL IN TABLE
1015					TOOL THROUGH TABLE
1126					ON BOTTOM
1130					TOOL OPENED WITH STRONG BLOW
1135					OPENED 2" LINE, 1 1/2" CHOKE
1140					CHANGED TO 1/4" CHOKE
1155	1/4	8	27		GAS TO THE SURFACE
1205	1/4	10	30.8		
1215	1/4	12	34		CLOSED TOOL
1300					REOPENED TOOL, 1/4" CHOKE
1310	1/4	13	35.9		
1320	1/4	19	45.5		
1330	1/4	23	51.8		
1340	1/4	25	54.7		
1350	1/4	27	57.7		
1400	1/4	29	60.4		CLOSED TOOL
1530					OFF BOTTOM
1705					TOOL IN TABLE

TICKET NO: 43656400	GAUGE NO: 7348
CLOCK NO: 26864 HOUR: 12	DEPTH: 4149.0

HALLIBURTON SERVICES

FIRST FLOW

REF		MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta t}{t+\Delta t}$	$\log \frac{t+\Delta t}{\Delta t}$
B	1	0.0	27.7			
	2	3.0	27.8	0.2		
	3	6.0	29.2	1.4		
	4	9.0	29.3	0.1		
	5	12.0	30.8	1.5		
	6	15.0	33.3	2.5		
	7	18.0	35.5	2.2		
	8	21.0	37.4	1.9		
	9	24.0	39.4	2.1		
	10	27.0	41.1	1.7		
	11	30.0	42.7	1.6		
	12	33.0	44.6	1.9		
	13	36.0	45.7	1.1		
	14	39.0	47.2	1.5		
	15	42.0	48.4	1.3		
C	16	45.4	49.1	0.7		

FIRST CLOSED-IN

C	1	0.0	49.1			
	2	1.0	460.5	411.3	1.0	1.670
	3	2.0	732.0	682.8	1.9	1.372
	4	3.0	914.2	865.0	2.8	1.205
	5	4.0	1013.3	964.2	3.7	1.092
	6	5.0	1076.4	1027.3	4.5	1.001
	7	6.0	1107.5	1058.4	5.3	0.932
	8	7.0	1125.8	1076.6	6.0	0.876
	9	8.0	1138.4	1089.2	6.8	0.825
	10	9.0	1147.6	1098.5	7.5	0.780
	11	10.0	1153.6	1104.5	8.2	0.742
	12	12.0	1161.9	1112.8	9.5	0.679
	13	14.0	1168.3	1119.2	10.7	0.628
	14	16.0	1173.0	1123.9	11.8	0.583
	15	18.0	1176.1	1126.9	12.9	0.547
	16	20.0	1178.5	1129.4	13.9	0.514
	17	22.0	1180.9	1131.8	14.8	0.486
	18	24.0	1182.9	1133.8	15.7	0.461
	19	26.0	1184.5	1135.3	16.5	0.439
	20	28.0	1185.4	1136.3	17.3	0.418
	21	30.0	1186.8	1137.7	18.1	0.400
	22	35.0	1188.8	1139.6	19.8	0.361
	23	40.0	1190.4	1141.3	21.3	0.329
D	24	45.2	1191.6	1142.5	22.7	0.302

SECOND FLOW

E	1	0.0	27.4	
	2	5.0	40.2	12.9
	3	10.0	48.7	8.5
	4	15.0	54.0	5.2

SECOND FLOW – CONTINUED

	5	20.0	58.4	4.4
	6	25.0	60.9	2.6
	7	30.0	63.6	2.7
	8	35.0	66.3	2.7
	9	40.0	67.7	1.4
	10	45.0	69.4	1.8
	11	50.0	70.8	1.4
	12	55.0	71.8	1.0
F	13	59.2	73.3	1.5

SECOND CLOSED-IN

F	1	0.0	73.3			
	2	1.0	498.5	425.2	1.0	2.017
	3	2.0	780.0	706.7	2.0	1.720
	4	3.0	923.7	850.4	2.9	1.554
	5	4.0	1015.0	941.7	3.9	1.432
	6	5.0	1057.5	984.2	4.7	1.343
	7	6.0	1084.9	1011.6	5.7	1.265
	8	7.0	1100.9	1027.6	6.6	1.202
	9	8.0	1111.6	1038.3	7.4	1.149
	10	9.0	1119.4	1046.1	8.3	1.103
	11	10.0	1126.8	1053.5	9.1	1.058
	12	12.0	1136.0	1062.7	10.8	0.987
	13	14.0	1142.2	1068.9	12.3	0.929
	14	16.0	1147.9	1074.6	13.8	0.878
	15	18.0	1152.7	1079.4	15.4	0.833
	16	20.0	1156.0	1082.7	16.8	0.795
	17	22.0	1159.6	1086.3	18.2	0.760
	18	24.0	1162.1	1088.8	19.5	0.728
	19	26.0	1164.2	1090.9	20.8	0.701
	20	28.0	1165.9	1092.6	22.1	0.675
	21	30.0	1167.5	1094.2	23.3	0.652
	22	35.0	1171.6	1098.3	26.2	0.601
	23	40.0	1174.4	1101.1	28.9	0.558
	24	45.0	1176.8	1103.5	31.5	0.522
	25	50.0	1179.2	1105.9	33.8	0.490
	26	55.0	1180.8	1107.4	36.1	0.462
	27	60.0	1182.3	1109.0	38.1	0.438
	28	70.0	1185.0	1111.7	41.9	0.397
	29	80.0	1186.5	1113.2	45.3	0.363
G	30	90.2	1188.1	1114.8	48.4	0.334

REMARKS:

TICKET NO: 43656400	GAUGE NO: 7347
CLOCK NO: 7046 HOUR: 12	DEPTH: 4202.0

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	45.6			
	2	3.0	46.0	0.4		
	3	6.0	46.1	0.2		
	4	9.0	46.1	0.0		
	5	12.0	46.7	0.6		
	6	15.0	48.4	1.6		
	7	18.0	50.3	1.9		
	8	21.0	53.1	2.8		
	9	24.0	54.8	1.6		
	10	27.0	56.0	1.3		
	11	30.0	57.5	1.5		
	12	33.0	59.3	1.8		
	13	36.0	60.4	1.1		
	14	39.0	61.8	1.5		
	15	42.0	62.8	1.0		
C	16	45.4	63.9	1.2		
			FIRST CLOSED-IN			
C	1	0.0	63.9			
	2	1.0	476.2	412.3	1.0	1.651
	3	2.0	747.5	683.6	1.9	1.369
	4	3.0	910.1	846.1	2.8	1.209
	5	4.0	1018.9	955.0	3.7	1.092
	6	5.0	1085.6	1021.7	4.5	1.002
	7	6.0	1120.7	1056.7	5.3	0.932
	8	7.0	1141.8	1077.9	6.1	0.871
	9	8.0	1153.5	1089.6	6.8	0.826
	10	9.0	1161.9	1097.9	7.5	0.780
	11	10.0	1168.1	1104.2	8.2	0.742
	12	12.0	1174.9	1111.0	9.5	0.679
	13	14.0	1179.9	1115.9	10.7	0.627
	14	16.0	1183.9	1120.0	11.8	0.584
	15	18.0	1186.5	1122.5	12.9	0.546
	16	20.0	1188.7	1124.8	13.9	0.515
	17	22.0	1190.8	1126.9	14.8	0.486
	18	24.0	1192.6	1128.7	15.7	0.461
	19	26.0	1193.9	1129.9	16.5	0.439
	20	28.0	1195.1	1131.2	17.3	0.418
	21	30.0	1196.4	1132.4	18.1	0.400
	22	35.0	1198.3	1134.3	19.8	0.361
	23	40.0	1199.9	1136.0	21.3	0.329
D	24	45.2	1200.8	1136.8	22.7	0.302
			SECOND FLOW			
E	1	0.0	41.2			
	2	5.0	57.0	15.9		
	3	10.0	64.3	7.3		

REF		MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta t}{t+\Delta t}$	$\log \frac{t+\Delta t}{\Delta t}$
			SECOND FLOW - CONTINUED			
	4	15.0	68.3	4.1		
	5	20.0	71.5	3.2		
	6	25.0	74.0	2.4		
	7	30.0	76.6	2.6		
	8	35.0	78.5	1.9		
	9	40.0	80.5	2.0		
	10	45.0	82.6	2.0		
	11	50.0	83.4	0.9		
	12	55.0	85.5	2.0		
F	13	59.2	86.3	0.9		
			SECOND CLOSED-IN			
F	1	0.0	86.3			
	2	1.0	543.9	457.6	1.0	2.021
	3	2.0	794.2	707.9	2.0	1.717
	4	3.0	955.7	869.4	3.0	1.550
	5	4.0	1038.7	952.3	3.9	1.429
	6	5.0	1078.6	992.3	4.8	1.337
	7	6.0	1104.0	1017.7	5.7	1.264
	8	7.0	1115.6	1029.3	6.5	1.205
	9	8.0	1125.7	1039.3	7.4	1.149
	10	9.0	1134.7	1048.3	8.3	1.100
	11	10.0	1139.7	1053.3	9.1	1.060
[1]	12	12.0	1147.6	1061.3	10.8	0.986
	13	14.0	1158.2	1071.8	12.4	0.927
	14	16.0	1160.9	1074.6	13.9	0.876
	15	18.0	1164.0	1077.7	15.4	0.832
	16	20.0	1166.3	1080.0	16.8	0.794
	17	22.0	1168.4	1082.1	18.1	0.761
	18	24.0	1171.1	1084.8	19.6	0.728
	19	26.0	1173.1	1086.8	20.8	0.701
	20	28.0	1174.8	1088.5	22.1	0.675
	21	30.0	1176.8	1090.5	23.3	0.652
	22	35.0	1180.1	1093.8	26.2	0.601
	23	40.0	1183.3	1096.9	28.9	0.558
	24	45.0	1185.9	1099.6	31.5	0.522
	25	50.0	1187.9	1101.6	33.8	0.490
	26	55.0	1189.4	1103.1	36.1	0.462
	27	60.0	1190.7	1104.4	38.1	0.438
	28	70.0	1192.9	1106.6	41.9	0.397
	29	80.0	1195.1	1108.8	45.3	0.363
G	30	90.2	1197.1	1110.8	48.4	0.334

LEGEND:
[1] STAIR-STEP

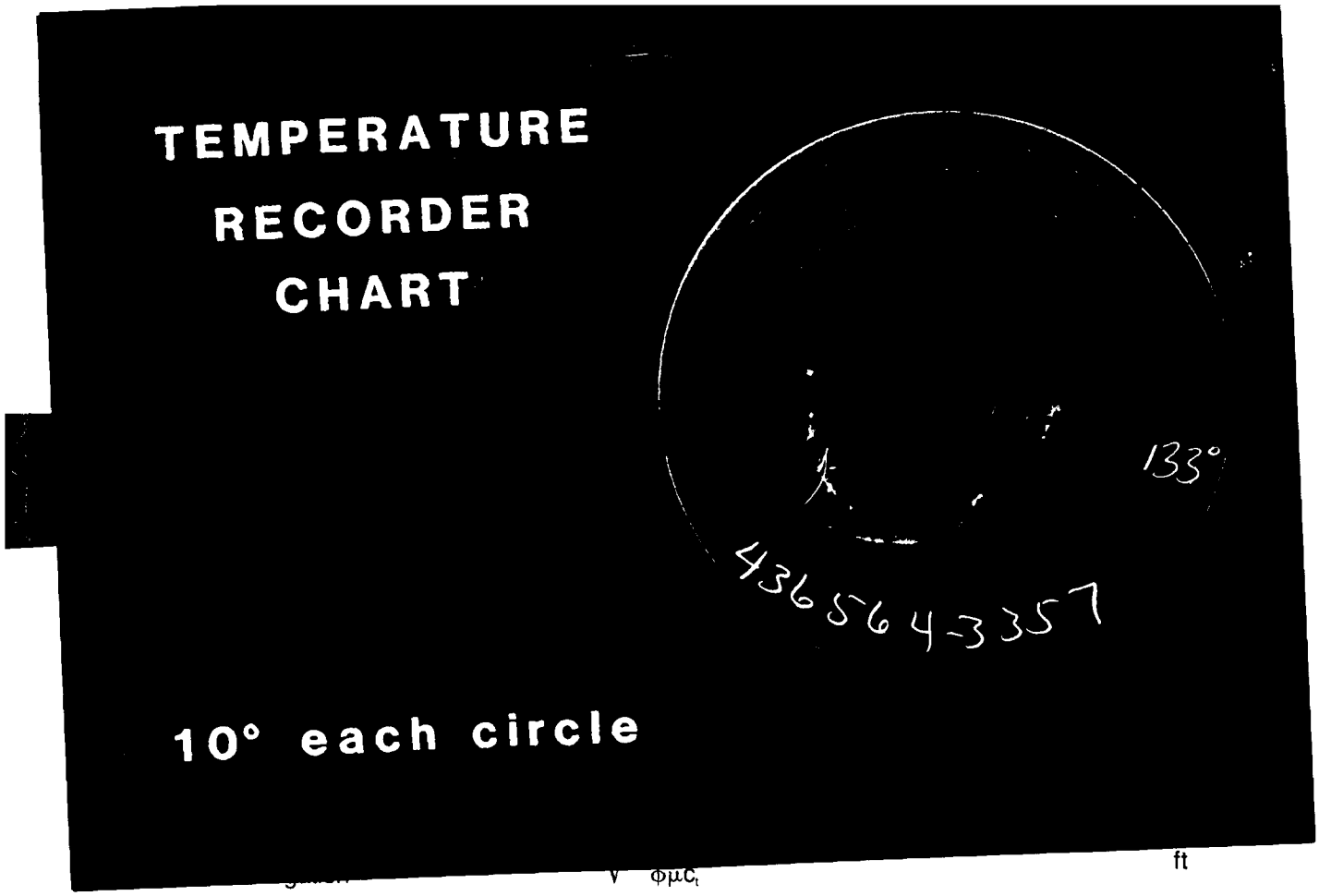
REMARKS:

TICKET NO. 43656400

		O.D.	I.D.	LENGTH	DEPTH
1	DRILL PIPE.....	4.500	3.826	3895.0	
3	DRILL COLLARS.....	6.250	2.250	120.0	
50	IMPACT REVERSING SUB.....	6.000	2.750	1.0	4015.0
3	DRILL COLLARS.....	6.250	2.250	120.0	
5	CROSSOVER.....	6.000	2.250	1.0	
12	DUAL CIP VALVE.....	5.000	0.870	6.0	
60	HYDROSPRING TESTER.....	5.000	0.750	5.0	4147.0
80	AP RUNNING CASE.....	5.000	2.250	4.0	4149.0
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	4164.0
70	OPEN HOLE PACKER.....	6.750	1.530	6.0	4170.0
20	FLUSH JOINT ANCHOR.....	5.000	2.370	28.0	
83	HT-500 TEMPERATURE CASE.....	5.000		1.0	4200.0
81	BLANKED-OFF RUNNING CASE.....	5.000		4.0	4202.0

TOTAL DEPTH 4205.0

EQUIPMENT DATA



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	$S = 1.151 \left[\frac{m(P^*)-m(P_t)}{m} - \text{LOG}\left(\frac{k\ (t/60)}{\phi\ \mu\ c_t r_w^2}\right) + 3.23 \right]$	
Damage Ratio	$DR = \frac{m(P^*) - m(P_t)}{m(P^*) - m(P_t) - 0.87\ mS}$	
Indicated Flow Rate (Maximum)	$AOF_1 = \frac{Q_g\ m(P^*)}{m(P^*) - m(P_t)}$	MCFD
Indicated Flow Rate (Minimum)	$AOF_2 = Q_g \sqrt{\frac{m(P^*)}{m(P^*) - m(P_t)}}$	MCFD
Approx. Radius of Investigation	$r_i = 0.032 \sqrt{\frac{k\ (t/60)}{\phi\ \mu\ c_t}}$	ft