

TRILOBITE TESTING, L.L.C.

P.O. Box 362 • Hays, Kansas 67601

Drill-Stem Test Data

Well Name HERTEL #2 Test No. 1 Date 1/9/93
Company EDWIN C. SCHUETT & SHARP ENGINEERING Zone ARBUCKLE
Address 1616 GLENARM PLACE DENVER CO 80202 Elevation 2010
Co. Rep./Geo. EDWIN C. SCHUETT Cont. EMPHASIS RIG #6 Est. Ft. of Pay 18
Location: Sec. 17 Twp. 8S Rge. 18W Co. ROOKS State KS

Interval Tested 3445-3463
Anchor Length 18
Top Packer Depth 3440
Bottom Packer Depth 3445
Total Depth 3463

Drill Pipe Size 4.5" XH
Wt. Pipe I.D. - 2.7 Ft. Run _____
Drill Collar - 2.25 Ft. Run _____
Mud Wt. 8.9 lb/Gal.
Viscosity 45 Filtrate 8.9

Tool Open @ 4:40 AM Initial Blow WEAK-BUILDING TO 10" FAIR BLOW

Final Blow WEAK-BUILDING TO BOTTOM OF BUCKET IN 55 MINUTES

Recovery - Total Feet 179 Flush Tool? NO

Rec. 191 Feet of GAS IN PIPE
Rec. 117 Feet of CLEAN GASSY OIL-10%GAS/90%OIL
Rec. 62 Feet of MUD CUT GASSY OIL-10%GAS/70%OIL/20%MUD
Rec. _____ Feet of _____
Rec. _____ Feet of _____

BHT 103 °F Gravity _____ °API @ _____ °F Corrected Gravity 28 °API
RW _____ @ _____ °F Chlorides _____ ppm Recovery Chlorides 3000 ppm System

(A) Initial Hydrostatic Mud 1780.5 PSI AK1 Recorder No. 13754 Range 4000

(B) First Initial Flow Pressure 27.5 PSI @ (depth) 3449 w / Clock No. 8376

(C) First Final Flow Pressure 49.6 PSI AK1 Recorder No. 7437 Range 4200

(D) Initial Shut-in Pressure 721.3 PSI @ (depth) 3459 w / Clock No. 27567

(E) Second Initial Flow Pressure 60.6 PSI AK1 Recorder No. _____ Range _____

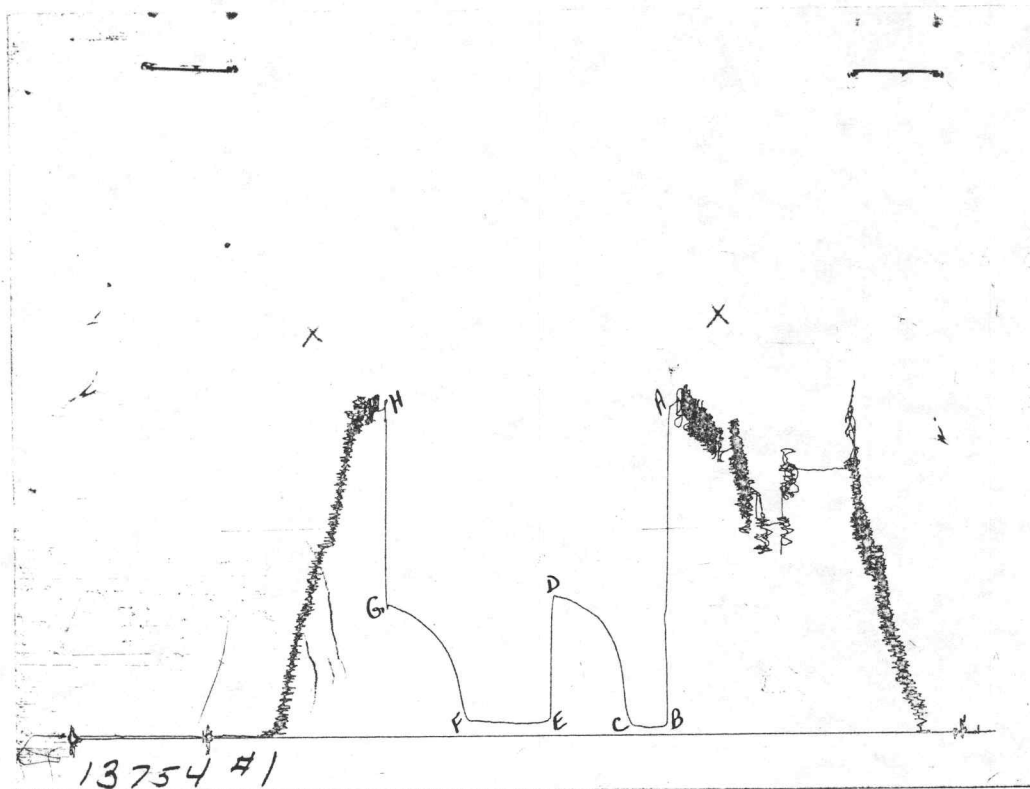
(F) Second Final Flow Pressure 85.9 PSI @ (depth) _____ w / Clock No. _____

(G) Final Shut-in Pressure 678.2 PSI Initial Opening 30 Final Flow 60

(H) Final Hydrostatic Mud 1746.8 PSI Initial Shut-in 60 Final Shut-in 60

Our Representative DAN BANGLE

CHART PAGE



This is an actual photograph of recorder chart

	FIELD READING	OFFICE READING
(A) INITIAL HYDROSTATIC MUD	1796	1780.5
(B) FIRST INITIAL FLOW PRESSURE	39	27.5
(C) FIRST FINAL FLOW PRESSURE	49	49.6
(D) INITIAL CLOSED-IN PRESSURE	719	721.3
(E) SECOND INITIAL FLOW PRESSURE	78	60.6
(F) SECOND FINAL FLOW PRESSURE	88	85.9
(G) FINAL CLOSED-IN PRESSURE	679	678.2
(H) FINAL HYDROSTATIC MUD	1716	1746.8

COMPUTER EVALUATION BY TRILOBITE TESTING, L.L.C.

EDWIN C. SCHUETT

HERTEL #2

DST 1

17

8S

18W

ROOKS KS

ELEVATION:	2010	KB	EST. PAY	18	FT
DATUM:	-1450		ZONE TESTED:	ARBUCKLE	
TEST INTERVAL:	3445-3463		TIME INTERVALS:	30-60-60-60	
RECORDER DEPTH:	3459		VISCOSITY:	23.552	CP
BOTTOM HOLE TEMP:	103		HOLE SIZE:	7.875	IN

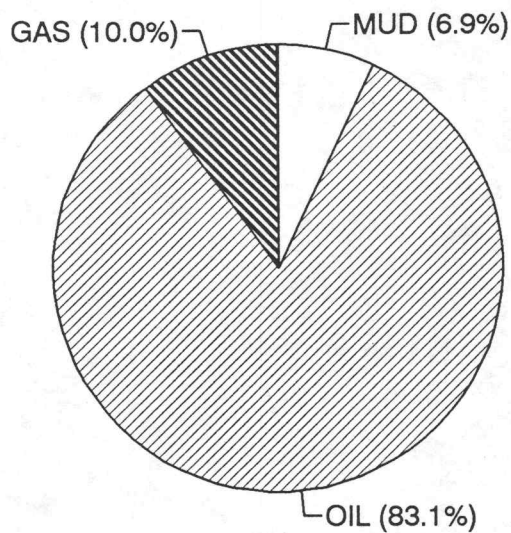
CUBIC FEET OF GAS IN PIPE:	15.25				
TOTAL FEET OF RECOVERY:	179.00		CORRECTED PIPE FILLUP:	223.698	
TOTAL BARRELS OF RECOVERY:	2.55		CORR. BARRELS OF RECOVERY:	3.171	BBL
BARRELS IN DRILL PIPE:	2.55		API GRAVITY:	28	
BARRELS IN WEIGHT PIPE:	0.00		FLUID GRADIENT:	0.384	
BARRELS IN DRILL COLLARS:	0.00				
GAS OIL RATIO:	5.9910		CU.FT/BBL		
BUBBLE POINT PRESSURE:	49.277				
UNCORRECTED INITIAL PRODUCTION:				40.73	BBL
INITIAL PRODUCTION CORRECTED TO FINAL FLOW PRESSURE:				50.74	BBL/DAY
INITIAL PRODUCTION CORRECTED TO PSEUDO STEADY FLOW STATE:				23.132	

INITIAL SLOPE	797.76	PSI/CYCLE	FINAL SLOPE	440.75	PSI/CYCLE
INITIAL P*	862	PSI	FINAL P*	848	PSI

TRANSMISSIBILITY	18.72	(MD.-FT./CP.)
PERMEABILITY	24.49	(MD.)
INDICATED FLOW CAPACITY	440.84	(MD.FT)
PRODUCTIVITY INDEX	0.02	(BARRELS/DAY/PSI)
DAMAGE RATIO	0.32	
RADIUS OF INVESTIGATION	46.95	(FT,)
POTENTIOMETRIC SURFACE	517.62	(FT.)
DRAWDOWN FACTOR	1.594	(%)

CALCULATED RECOVERY ANALYSIS						DRILL	PIPE		
DST #	1	TICKET				5861			
SAMPLE	TOTAL	GAS	OIL		WATER		MUD		
#	FEET	%	FEET	%	FEET	%	FEET	%	FEET
1	117	10	11.7	90	105.3	0	0	0	0
2	62	10	6.2	70	43.4	0	0	20	12.4
3			0		0		0		0
4			0		0		0		0
5			0		0		0		0
TOTAL	179	10	17.9	83.1	148.7	0	0	6.93	12.4

	HRS	BBL/DAY
BBL OIL=	2.114514	*
BBL WATER=	0	*
BBL MUD=	0.176328	
BBL GAS	0.254538	



INITIAL FLOW

RECORDER # 7437

DST # 1

TIME(MIN)	PRESSURE	<> PRESSURE
-----	-----	-----
0	27.5	27.5
3	27.5	0
6	30.8	3.3
9	33	2.2
12	36.3	3.3
15	38.5	2.2
18	40.7	2.2
21	42.9	2.2
24	45.2	2.3
27	47.4	2.2
30	49.6	2.2

FINAL FLOW

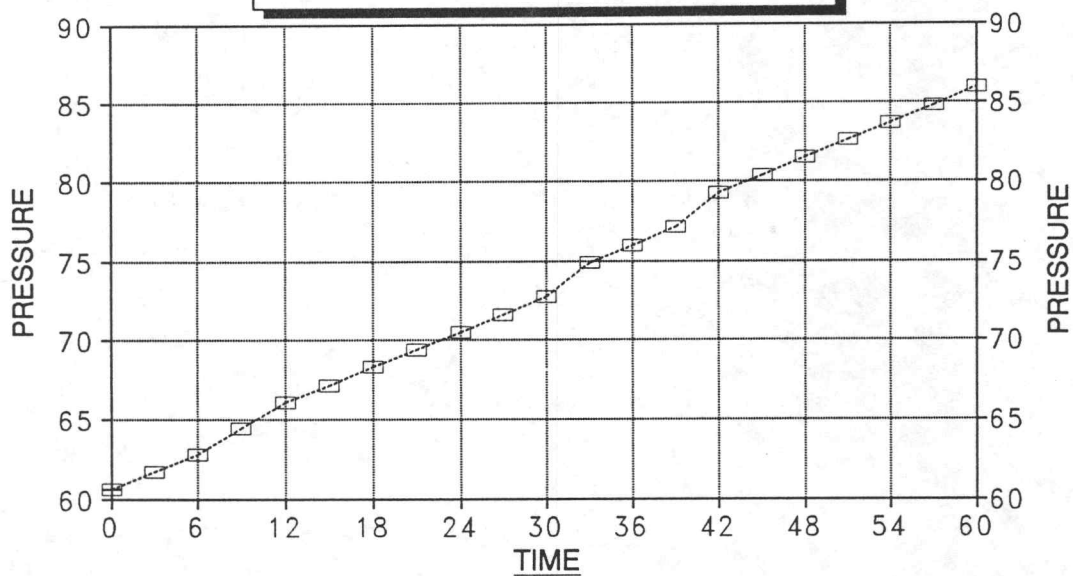
RECORDER # 7437

DST # 1

TIME(MIN)	PRESSURE	<> PRESSURE
-----	-----	-----
0	60.6	60.6
3	61.7	1.1
6	62.8	1.1
9	64.4	1.6
12	66.1	1.7
15	67.2	1.1
18	68.3	1.1
21	69.4	1.1
24	70.5	1.1
27	71.6	1.1
30	72.7	1.1
33	74.9	2.2
36	76	1.1
39	77.1	1.1
42	79.3	2.2
45	80.4	1.1
48	81.5	1.1
51	82.6	1.1
54	83.7	1.1
57	84.8	1.1
60	85.9	1.1

DELTA T DELTA P

FINAL FLOW - DST #1



---[]--- HERTEL #2

INITIAL PRODUCTION CORRECTED TO PSEUDO STEADY FLOW STATE:

23.132

HERTEL #2
INITIAL

DST #1
SHUTIN

30 TOTAL FLOW TIME

Slope
P *

797.76 psi/cycle
862 psi

	TIME(MIN)	Pws (psi)	Log Horn T	<> PRESSURE	Horn T
	3	149.7	1.041	149.7	11
	6	335.9	0.778	186.2	6
	9	440.5	0.637	104.6	4
	12	484.7	0.544	44.2	4
	15	517.0	0.477	32.3	3
	18	552.4	0.426	35.4	3
	21	576.6	0.385	24.2	2
	24	603.9	0.352	27.3	2
	27	618.5	0.325	14.6	2
	30	633.2	0.301	14.7	2
	33	645.7	0.281	12.5	2
	36	658.2	0.263	12.5	2
	39	669.8	0.248	11.6	2
	42	678.2	0.234	8.4	2
	45	688.7	0.222	10.5	2
	48	697.1	0.211	8.4	2
	51	703.4	0.201	6.3	2
X	54	708.7	0.192	5.3	2
	57	716.0	0.184	7.3	2
X	60	721.3	0.176	5.3	2

HERTEL #2
* FINAL

DST #1
SHUTIN

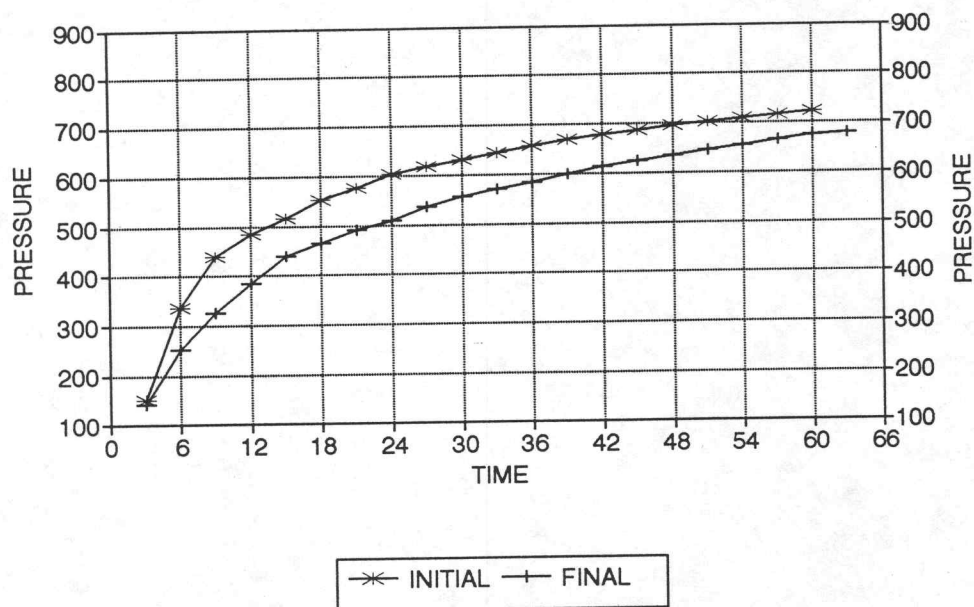
90 TOTAL FLOW TIME

Slope
P *

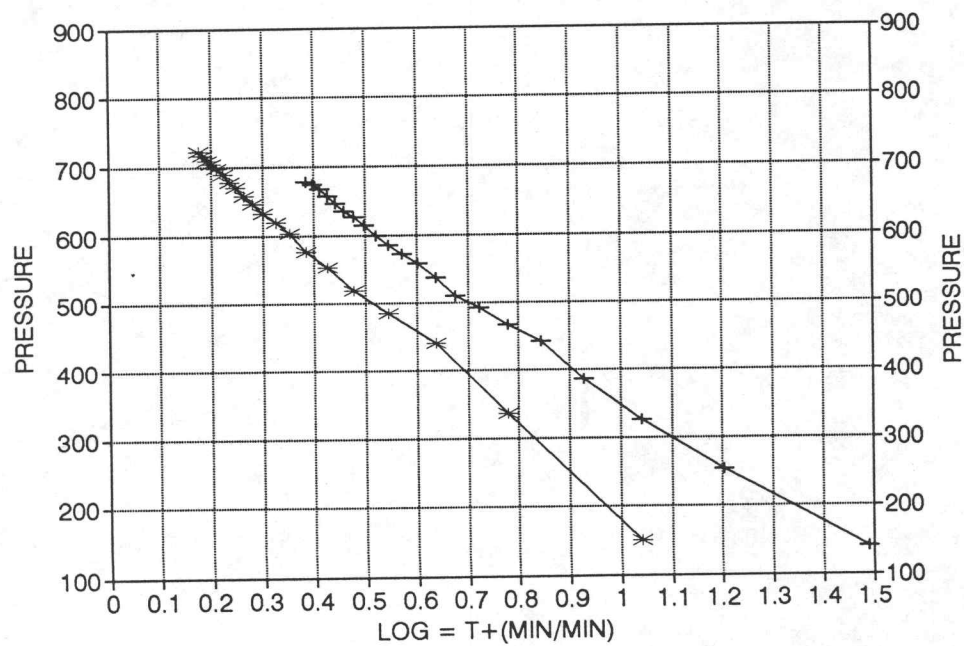
440.75 psi/cycle
848 psi

		Pws (psi)	Log Horn T	<> PRESSURE	Horn T
	3	140.9	1.491	140.9	31
	6	252.2	1.204	111.3	16
	9	324.8	1.041	72.6	11
	12	385.4	0.929	60.6	9
	15	441.1	0.845	55.7	7
	18	466.4	0.778	25.3	6
	21	491.2	0.723	24.8	5
	24	510.6	0.677	19.4	5
	27	537.4	0.637	26.8	4
	30	557.6	0.602	20.2	4
	33	572.4	0.571	14.8	4
	36	586.1	0.544	13.7	4
	39	599.7	0.520	13.6	3
	42	614.4	0.497	14.7	3
	45	625.9	0.477	11.5	3
	48	636.3	0.459	10.4	3
	51	646.7	0.442	10.4	3
	54	656.1	0.426	9.4	3
X	57	666.7	0.411	10.6	3
	60	674.0	0.398	7.3	3
X	63	678.2	0.385	4.2	2

HERTEL #2 / DST #1 DELTA T DELTA P



HORNER PLOT



0.025	27.5
0.025	27.5
0.028	30.8
0.03	33
0.033	36.32475
0.035	38.54375
0.037	40.76475
0.039	42.98775
0.041	45.20045
0.043	47.40105
0.045	49.60125

0.055	60.60083
0.056	61.7008
0.056	61.7008
0.057	62.8007
0.06	66.1
0.061	67.2004
0.062	68.30075
0.063	69.40106
0.064	70.50133
0.065	71.60156
0.066	72.70175
0.068	74.902
0.069	76.00206
0.07	77.10208
0.072	79.302
0.073	80.4019
0.074	81.50175
0.075	82.60156
0.076	83.70133
0.077	84.80106
0.078	85.90075

0.136	149.7686
0.305	335.9054
0.4	440.5
0.441	484.7743
0.471	517.0669
0.504	552.423
0.527	576.655
0.553	603.9449
0.567	618.5944
0.581	633.2121
0.593	645.7165
0.605	658.2717
0.616	669.8595
0.624	678.2785
0.634	688.7921
0.642	697.1949
0.648	703.4923
0.653	708.737
0.66	716.0749
0.665	721.3128

0.128	140.9519
0.229	252.2324
0.295	324.8958
0.35	385.4521
0.684	741.1915
0.424	466.4365
0.447	491.2398
0.465	510.6153
0.49	537.4737
0.509	557.6981
0.523	572.4469
0.536	586.1139
0.549	599.7536
0.563	614.412
0.574	625.9072
0.584	636.3404
0.594	646.7575
0.603	656.1634
0.613	666.7006
0.62	674.0699
0.624	678.2785

TRILOBITE TESTING, L.L.C.

P.O. Box 362 • Hays, Kansas 67601

Drill-Stem Test Data

Well Name HERTEL #2 Test No. 2 Date 1/9/93
Company EDWIN C. SCHUETT & SHARP ENGINEERING Zone LKC-"F"
Address 1616 GLENARM PLACE DENVER CO 80202 Elevation 2010
Co. Rep./Geo. EDWIN C. SCHUETT Cont. EMPHASIS RIG #6 Est. Ft. of Pay _____
Location: Sec. 17 Twp. 8S Rge. 18W Co. ROOKS State KS

Interval Tested 3244-3274
Anchor Length 30
Top Packer Depth 3244
Bottom Packer Depth 3274
Total Depth 3463

Drill Pipe Size 4.5" XH
Wt. Pipe I.D. - 2.7 Ft. Run _____
Drill Collar - 2.25 Ft. Run _____
Mud Wt. 8.9 lb/Gal.
Viscosity 45 Filtrate 8.9

Tool Open @ 5:15 PM Initial Blow WEAK-BUILDING TO 1 3/4"

Final Blow NO BLOW - FLUSHED TOOL- GOOD SURGE

Recovery - Total Feet 45 Flush Tool? YES

Rec. 45 Feet of DRILLING MUD W/ SHOW OF OIL ON TOP
Rec. _____ Feet of _____
Rec. _____ Feet of _____
Rec. _____ Feet of _____
Rec. _____ Feet of _____

BHT 104 °F Gravity _____ °API @ _____ °F Corrected Gravity _____ °API
RW _____ @ _____ °F Chlorides _____ ppm Recovery Chlorides 3000 ppm System

(A) Initial Hydrostatic Mud 1644.2 PSI AK1 Recorder No. 13754 Range 4000

(B) First Initial Flow Pressure 31.2 PSI @ (depth) 3248 w / Clock No. 27567

(C) First Final Flow Pressure 31.2 PSI AK1 Recorder No. 7437 Range 4200

(D) Initial Shut-in Pressure 596.5 PSI @ (depth) 3270 w / Clock No. 27501

(E) Second Initial Flow Pressure 50.8 PSI AK1 Recorder No. 13849 Range 4350

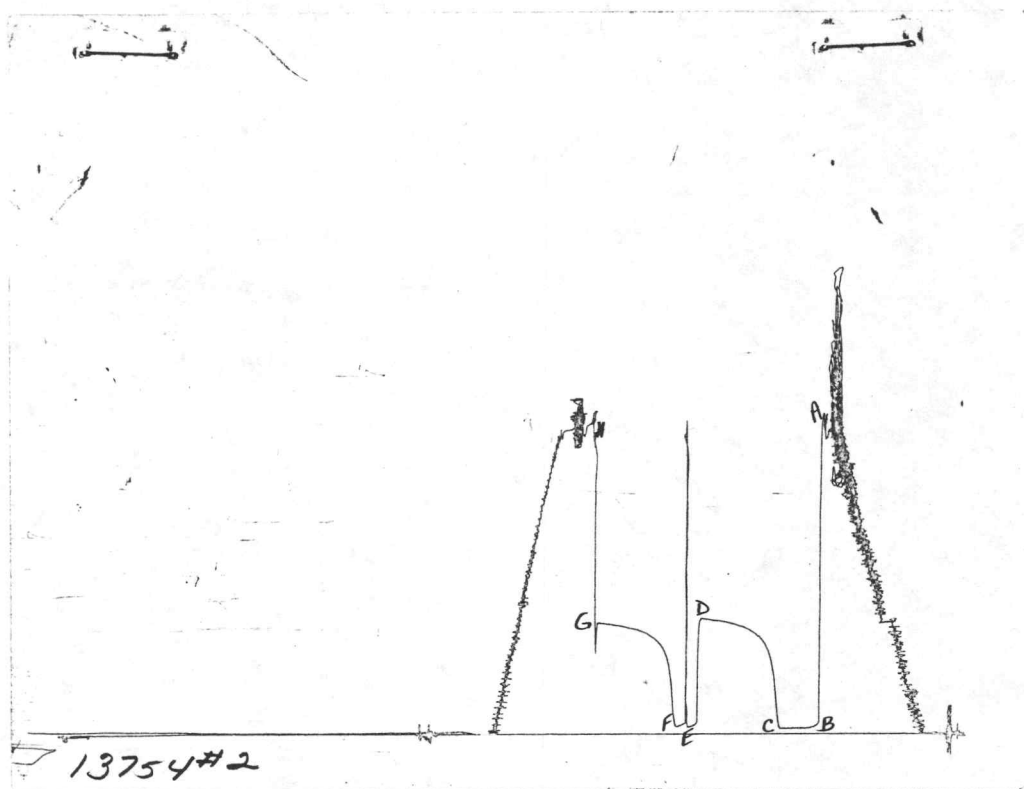
(F) Second Final Flow Pressure 50.8 PSI @ (depth) 3459 w / Clock No. 8376

(G) Final Shut-in Pressure 574.1 PSI Initial Opening 30 Final Flow 15

(H) Final Hydrostatic Mud 1590.3 PSI Initial Shut-in 60 Final Shut-in 60

Our Representative DAN BANGLE

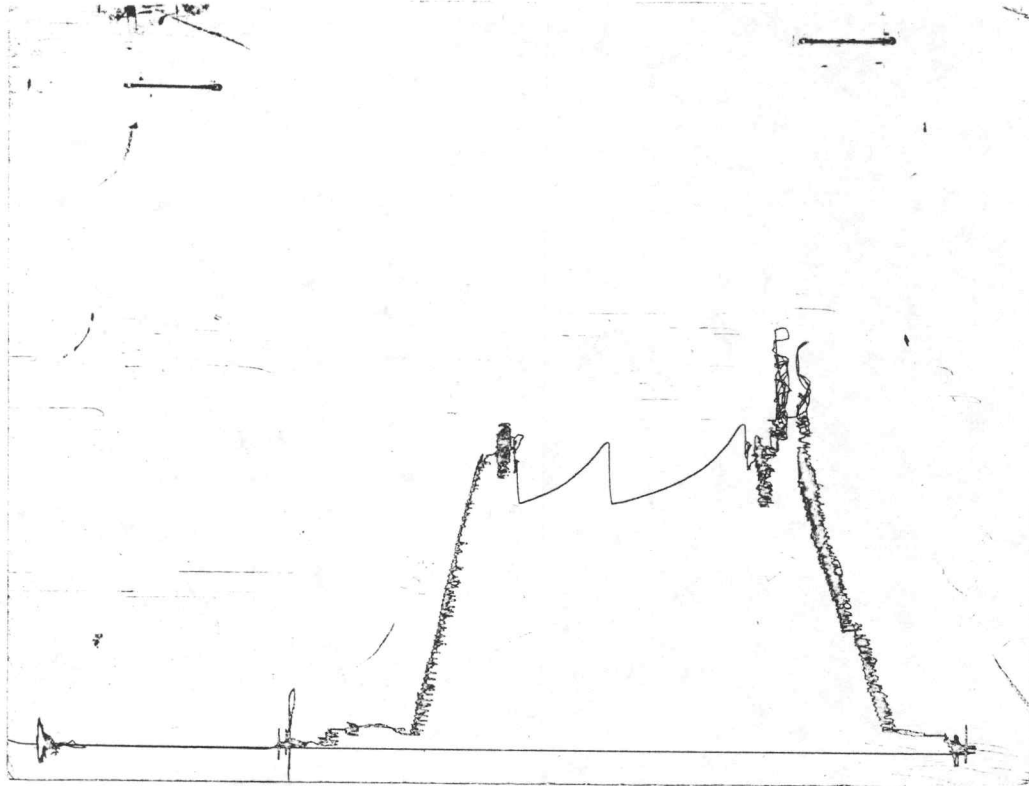
CHART PAGE



This is an actual photograph of recorder chart

	FIELD READING	OFFICE READING
(A) INITIAL HYDROSTATIC MUD	1636	1644.2
(B) FIRST INITIAL FLOW PRESSURE	29	31.2
(C) FIRST FINAL FLOW PRESSURE	29	31.2
(D) INITIAL CLOSED-IN PRESSURE	590	596.5
(E) SECOND INITIAL FLOW PRESSURE	49	50.8
(F) SECOND FINAL FLOW PRESSURE	49	50.8
(G) FINAL CLOSED-IN PRESSURE	571	574.1
(H) FINAL HYDROSTATIC MUD	1586	1590.3

CHART PAGE



This is an actual photograph of recorder chart

FIELD
READING

OFFICE
READING

- (A) INITIAL HYDROSTATIC MUD
- (B) FIRST INITIAL FLOW PRESSURE
- (C) FIRST FINAL FLOW PRESSURE
- (D) INITIAL CLOSED-IN PRESSURE
- (E) SECOND INITIAL FLOW PRESSURE
- (F) SECOND FINAL FLOW PRESSURE
- (G) FINAL CLOSED-IN PRESSURE
- (H) FINAL HYDROSTATIC MUD