15-185-20302 19-23s-12w

FLUID SAMPLE DATA

Sampler Pressure _____ P.S.I.G. at Surface
Recovery: Cu. Ft. Gas _____
cc. Oil _____
cc. Water _____
cc. Mud _____
Tot. Liquid cc. _____
Gravity _____ ° API @ _____ °F.
Gas/Oil Ratio _____ cu. ft./bbl.

	RESISTIVITY			CHLORIDE CONTENT
Recovery Water	____	@ ____	°F.	____ ppm
Recovery Mud	____	@ ____	°F.	
Recovery Mud Filtrate	____	@ ____	°F.	____ ppm
Mud Pit Sample	____	@ ____	°F.	
Mud Pit Sample Filtrate	____	@ ____	°F.	____ ppm
Mud Weight	9.7	vis 44		cp

Date 11-23-70 Ticket Number 277335
Kind of Job OPEN HOLE Halliburton District PRATT
Tester THOMPSON Witness SMITH
Drilling Contractor H-30 DRILLING, INCORPORATED NM S

EQUIPMENT & HOLE DATA

Formation Tested Lansing
Elevation 1867' G.L. Ft.
Net Productive Interval 10' Ft.
All Depths Measured From Kelly Bushing
Total Depth 3515' Ft.
Main Hole/Casing Size 7 7/8"
Drill Collar Length - I.D. _____
Drill Pipe Length 3331' I.D. 3.826"
Packer Depth(s) 3457' Ft.
Depth Tester Valve 3437' Ft.

Cushion TYPE NONE AMOUNT _____ Ft. Depth Back Pres. Valve NONE Surface Choke 1" Bottom Choke 3/4"

Recovered 20' Feet of gas cut mud
Recovered 60' Feet of slightly oil and gas cut water - 60' heavy oil & gas cut mud
Recovered 150' Feet of heavy mud cut oil - 30' of water - mud cut oil
Recovered 180' Feet of oil cut water
Recovered 660' Feet of water

Meas. From Tester Valve

Remarks Tool opened for a 30 minute first flow with a strong blow. Gas to the surface in 28 minutes. Rotated tool for a 30 minute first closed in pressure. Tool reopened for a 30 minute second flow and gas would not measure. Took a 60 minute second closed in pressure.

TEMPERATURE	Gauge No. 1831	Gauge No. 1830	Gauge No.	TIME
	Depth: 3447' Ft.	Depth: 3511' Ft.	Depth: Ft.	
	12 Hour Clock	12 Hour Clock	Hour Clock	Tool A.M.
Est. °F.	Blanked Off NO	Blanked Off YES	Blanked Off	Opened 10:45 ~~A.M.~~
Actual 109 °F.	Pressures	Pressures	Pressures	Tool 999999 Closed 1:15 P.M.

		Field	Office	Field	Office	Field	Office	Reported Minutes	Computed Minutes
Initial Hydrostatic		1849	1833	1849	1862				
First Period	Flow Initial	102	73	102	127			___	___
	Flow Final	324	291	324	319			30	30
	Closed in	1308	1277	1308	1300			30	30
Second Period	Flow Initial	343	317	343	346			___	___
	Flow Final	472	447	472	476			30	30
	Closed in	1308	1283	1308	1310			60	60
Third Period	Flow Initial							___	___
	Flow Final								
	Closed in								
Final Hydrostatic		1830	1804	1830	1834			___	___

Legal Location Sec. - Twp. - Rng. 19 - 23S - 12W
Lease Name MEYER
Well No. 1
Test No. 1
Field Area WILDCAT
Tested Interval 3457' - 3515'
County STAFFORD
State KANSAS
Lease Owner/Company Name BRADEN DRILLING, INCORPORATED

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FORMATION TEST DATA

LITTLE'S

5

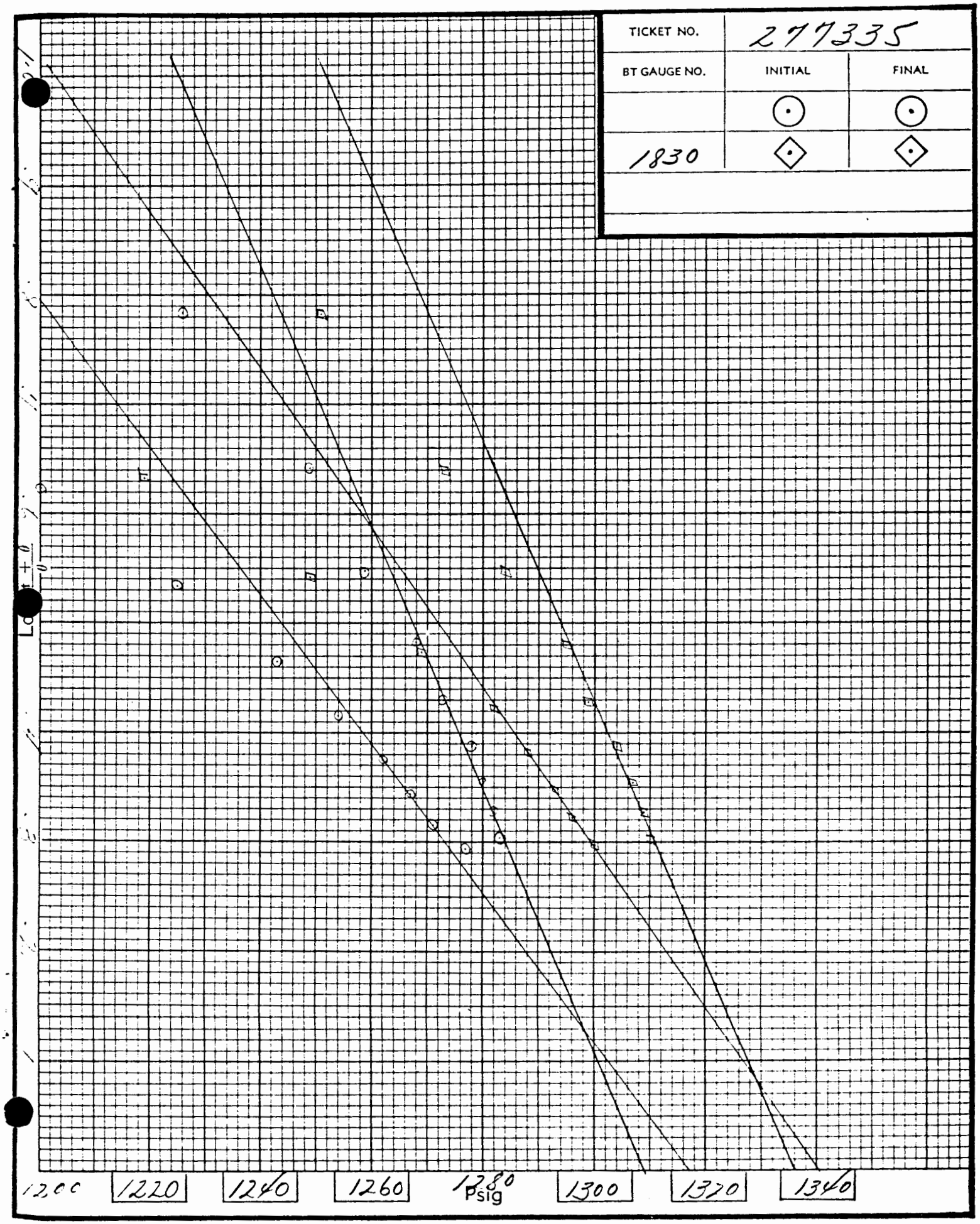
Gauge No.	1831		Depth	3447'		Clock No.	??		12 hour	Ticket No.	277335	
	First Flow Period		First Closed In Pressure			Second Flow Period		Second Closed In Pressure			Third Flow Period		Third Closed In Pressure		
	Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.	Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.	Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.
0	.000	73	.000	------	291	.000	317	.000	------	447					
1	.0322	151	.020	1.027	1095	.0345	338	.0393	1.048	1177					
2	.0644	177	.040	.765	1159	.0690	361	.0786	.784	1226					
3	.0966	206	.060	.624	1200	.1035	385	.1179	.642	1249					
4	.1288	235	.080	.533	1225	.1380	407	.1572	.549	1259					
5	.1610	265	.100	.466	1243	.1725	428	.1965	.482	1268					
6	.193	291	.120	.416	1254	.207	447	.2358	.430	1273					
7			.140	.376	1262			.2751	.389	1278					
8			.160	.343	1267			.3144	.356	1280					
9			.180	.316	1270			.3537	.328	1282					
10			.200	.293	1277			.393	.304	1283					
11															
12															
13															
14															
15															

Gauge No.	1830		Depth	3511'		Clock No.	3722		hour	12		
0	.000	127	.000	------	319	.000	346	.000	-------	476		
1	.0337	167	.0204	1.037	1098	.0343	363	.0403	1.046	1193		
2	.0674	199	.0408	.774	1179	.0686	386	.0806	.782	1251		
3	.1011	229	.0612	.633	1219	.1029	410	.1209	.640	1273		
4	.1348	258	.0816	.541	1249	.1372	432	.1612	.547	1284		
5	.1685	289	.1020	.474	1269	.1715	455	.2015	.480	1295		
6	.202	319	.1224	.423	1282	.206	476	.2418	.429	1299		
7			.1428	.382	1288			.2821	.388	1304		
8			.1632	.349	1293			.3224	.355	1307		
9			.1836	.322	1296			.3627	.327	1309		
10			.204	.298	1300			.403	.303	1310		
11												
12												
13												
14												
15												
Reading Interval	5		3			5		6				Minutes

REMARKS:

5

TICKET NO.	277335	
BT GAUGE NO.	INITIAL	FINAL
	⊙	⊙
1830	◇	◇



EXTRAPOLATED PRESSURE GRAPH

Liquid Production

B.T. Gauge Numbers			1831	1830	Ticket Number		277335
			PRESSURE	PRESSURE			
Initial Hydrostatic			1833	1862	Elevation		1867 ft.
Final Hydrostatic			1804	1834	Indicated Production	1st Flow	281 bbls./day
1st Flow	Initial	Time	73	127		2nd Flow	208 bbls./day
	Final	30	291	319		3rd Flow	- bbls./day
	Closed In Pressure	30	1277	1300	Drill Collar Length		0 ft.
2nd Flow	Initial	Time	317	346	Drill Collar I.D.		0 in.
	Final	30	447	476	Drill Pipe Factor		0.0142 bbls./ft.
	Closed In Pressure	60	1283	1310	Hole Size		7.875 in.
3rd Flow	Initial	Time	-	-	Footage Tested		10 ft.
	Final		-	-	Mud Weight		9.7 lbs./gal.
	Closed In Pressure		-	-	Viscosity, Oil or Water		0.64 cp
Extrapolated Stotic Pressure		1st	1317	1341	Oil API Gravity		- —
		2nd	1309	1336	Water Specific Gravity EST.		1.022 —
		3rd	-	-	Temperature		109 °F
Slope P/10		1st	1203	1171			
		2nd	1225	1252			
		3rd	-	-			

Remarks: ALL CALCULATIONS RESULTS BASED ON WATER OF 1.022 SPECIFIC GRAVITY.
THE INITIAL FLOW RATES ARE SOMEWHAT HIGHER DUE TO FLUSH PRODUCTION..

SUMMARY

PRODUCT	EQUATION	B.T. Gauge No. 1831/ Depth 3447' FIRST	SECOND	THIRD	B.T. Gauge No. 1830/ Depth 3511' FIRST	SECOND	THIRD	UNITS
Production	$Q = \frac{1440\ R}{t}$	258	201		281	209		bbls. day
Transmissability	$\frac{Kh}{\mu} = \frac{162.6\ Q}{m}$	369.2	390.1		268.8	404.4		$\frac{\text{md. ft.}}{\text{cp}}$
Indicated Flow Capacity	$Kh = \frac{Kh}{\mu}\ \mu$	236.2	249.6		172.0	258.8		md. ft.
Average Effective	$K = \frac{Kh}{h}$	-	-		-	-		md.
Permeability	$K_I = \frac{Kh}{h_f}$	23.629	24.967		17.203	25.883		md.
Damage Ratio	$DR = .183\ \frac{Ps - Pf}{m}$	1.6	1.8		1.1	1.8		—
Theoretical Potential w/ Damage Removed	$Q_I = Q\ DR$	426	378		309	391		bbls. day
Approx. Radius of Investigation	$b \backsimeq \sqrt{Kt}$ or $\sqrt{Kt_0}$	-	-		-	-		ft.
	$b_1 \backsimeq \sqrt{K_I t}$ or $\sqrt{K_I t_0}$	26.6	38.7		22.7	39.4		ft.
Potentiometric Surface *	$Pot. = El - GD + 2.319\ Ps$	1474.	1455		1465	1454		ft.

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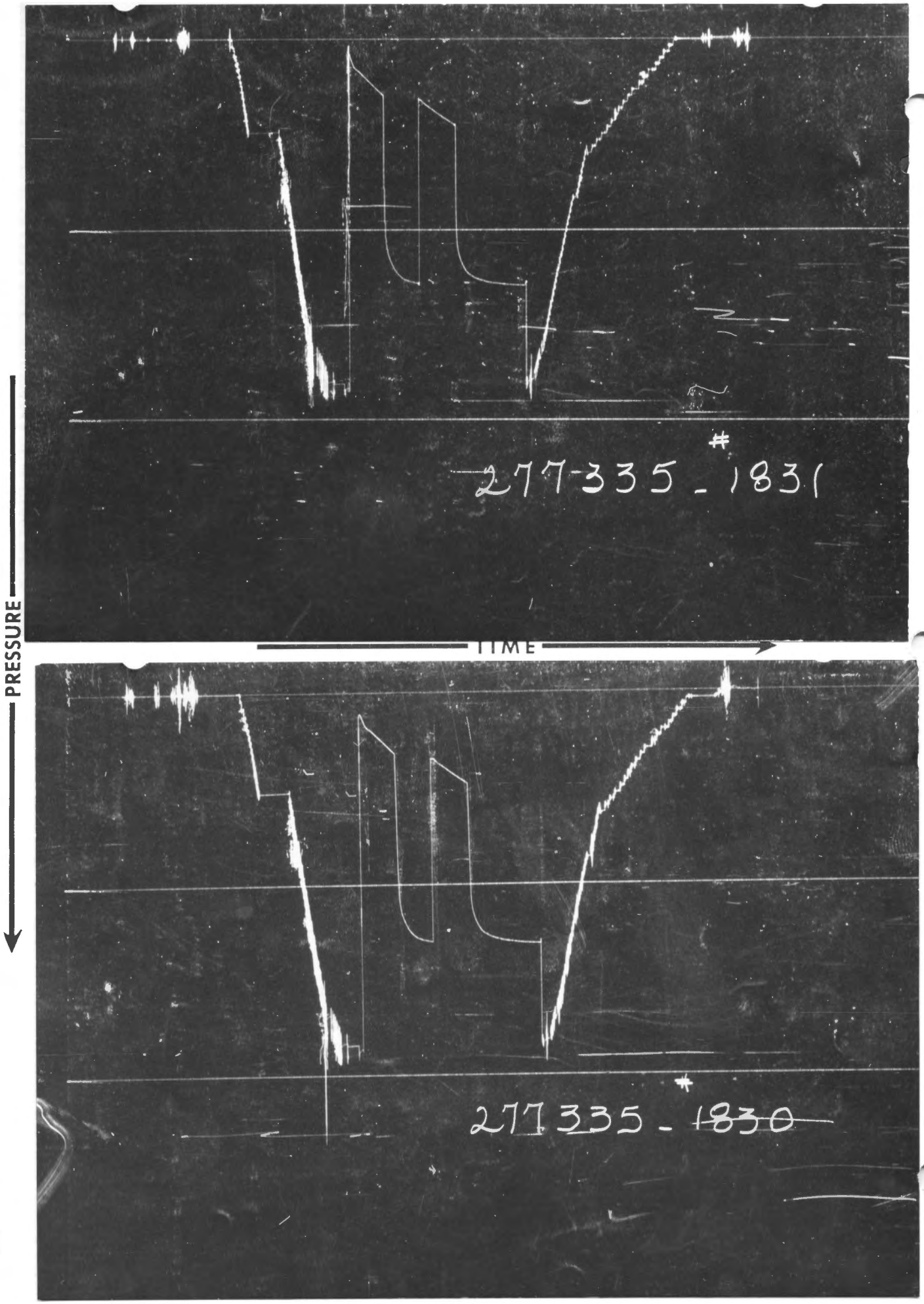
	O. D.	I. D.	LENGTH	DEPTH
Reversing Sub	5 5/8"	2"	1½'	
Water Cushion Valve				
Drill Pipe	4½" F.H.	3.826"	3331'	
Drill Collars	-	-		
Handling Sub & Choke Assembly	5¼"	2½"	2½'	
Dual CIP Valve	5"	3/4"	6'	
Dual CIP Sampler				
Hydro-Spring Tester	5"	3/4"	5'	3437'
Multiple CIP Sampler				
Extension Joint				
AP Running Case	5"	2¼"	4'	3447'
Hydraulic Jar				
VR Safety Joint	5"	1½"	3'	
Pressure Equalizing Crossover				
Packer Assembly	6 3/4"	3/4"	4'	3457'
Distributor				
Packer Assembly				
Flush Joint Anchor	5"	2½"	58'	
Pressure Equalizing Tube				
Blanked-Off B.T. Running Case	1"	2½"	4'	3511'
Drill Collars				
Anchor Pipe Safety Joint				
Packer Assembly				
Packer Assembly				
Anchor Pipe Safety Joint				
Side Wall Anchor				
Drill Collars				
Flush Joint Anchor				
Blanked-Off B.T. Running Case				



Each Horizontal Line Equal to 1000 p.s.i.

FLUID SAMPLE DATA

Sampler Pressure _____ P.S.I.G. at Surface
Recovery: Cu. Ft. Gas _____
cc. Oil _____
cc. Water _____
cc. Mud _____
Tot. Liquid cc. _____
Gravity _____ ° API @ _____ °F.
Gas/Oil Ratio _____ cu. ft./bbl.

		RESISTIVITY		CHLORIDE CONTENT
Recovery Water	_____ @	_____	°F.	_____ ppm
Recovery Mud	_____ @	_____	°F.	
Recovery Mud Filtrate	_____ @	_____	°F.	_____ ppm
Mud Pit Sample	_____ @	_____	°F.	
Mud Pit Sample Filtrate	_____ @	_____	°F.	_____ ppm
Mud Weight	9.7	vis 44		cp

Date 11-23-70 Ticket Number 277336
Kind of Job OPEN HOLE Halliburton District PRATT
Tester BILL THOMPSON Witness MR. SMITH
Drilling Contractor H-30 DRILLING, INCORPORATED BC S

EQUIPMENT & HOLE DATA

Formation Tested Lansing
Elevation 1867' GL Ft.
Net Productive Interval 14' Ft.
All Depths Measured From Kelly Bushing
Total Depth 3515' Ft.
Main Hole/Casing Size 7 7/8"
Drill Collar Length - I.D. -
Drill Pipe Length 3376' I.D. 3.826"
Packer Depth(s) 3501' Ft.
Depth Tester Valve 3480' Ft.

Cushion TYPE AMOUNT Ft. Depth Back Pres. Valve — Surface Choke 1" — Bottom Choke 3/4"

Recovered 30 Feet of Slightly oil and gas cut mud
Recovered 60 Feet of oil cut muddy water
Recovered 180 Feet of water
Recovered Feet of
Recovered Feet of

Meas. From Tester Valve

Remarks Tool opened for 30 minute first flow. Closed tool for 30 minute first closed in pressure. Reopened tool for 31 minute second flow with good blow. Closed tool for 59 minute second closed in pressure.

CHARTS INDICATE PARTIAL PLUGGING OF ANCHOR PERFORATIONS DURING FIRST FLOW PERIOD

TEMPERATURE	Gauge No. 1831 Depth: 3490 Ft.		Gauge No. 1830 Depth: 3511 Ft.		Gauge No. Depth: Ft.		TIME	
	12 Hour Clock		12 Hour Clock		Hour Clock		Tool Opened 6:15	~~A.M.~~ P.M.
Est. °F.	Blanked Off No		Blanked Off Yes		Blanked Off			
3509' @ Actual 109 °F.	Pressures		Pressures		Pressures		Tool Closed 8:45	A.M. P.M.
	Field	Office	Field	Office	Field	Office	Reported Minutes	Computed Minutes
Initial Hydrostatic	1881	1836	1881	1859				
First Period Flow Initial	19	26	19	198*			—	—
First Period Flow Final	83	81	83	276*			30	30
First Period Closed in	1056	1056	1056	1068			30	30
Second Period Flow Initial	83	89	83	105			—	—
Second Period Flow Final	157	151	157	167			30	31
Second Period Closed in	1075	1079	1075	1094			60	59
Flow Initial							—	—
Flow Final								
Closed in								
Final Hydrostatic	1862	1814	1862	1833			—	—

*Plugging - Questionable

Legal Location Sec. - Twp. - Rng. 19 - 23S - 12W
Lease Name MEYER Well No. 1 Test No. 2
Field Area WILDCAT
County STAFFORD State KANSAS
Tested Interval 3501' - 3515'
Lease Owner/Company Name BRADEN DRILLING COMPANY

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FORMATION TEST DATA

LITTLE'S

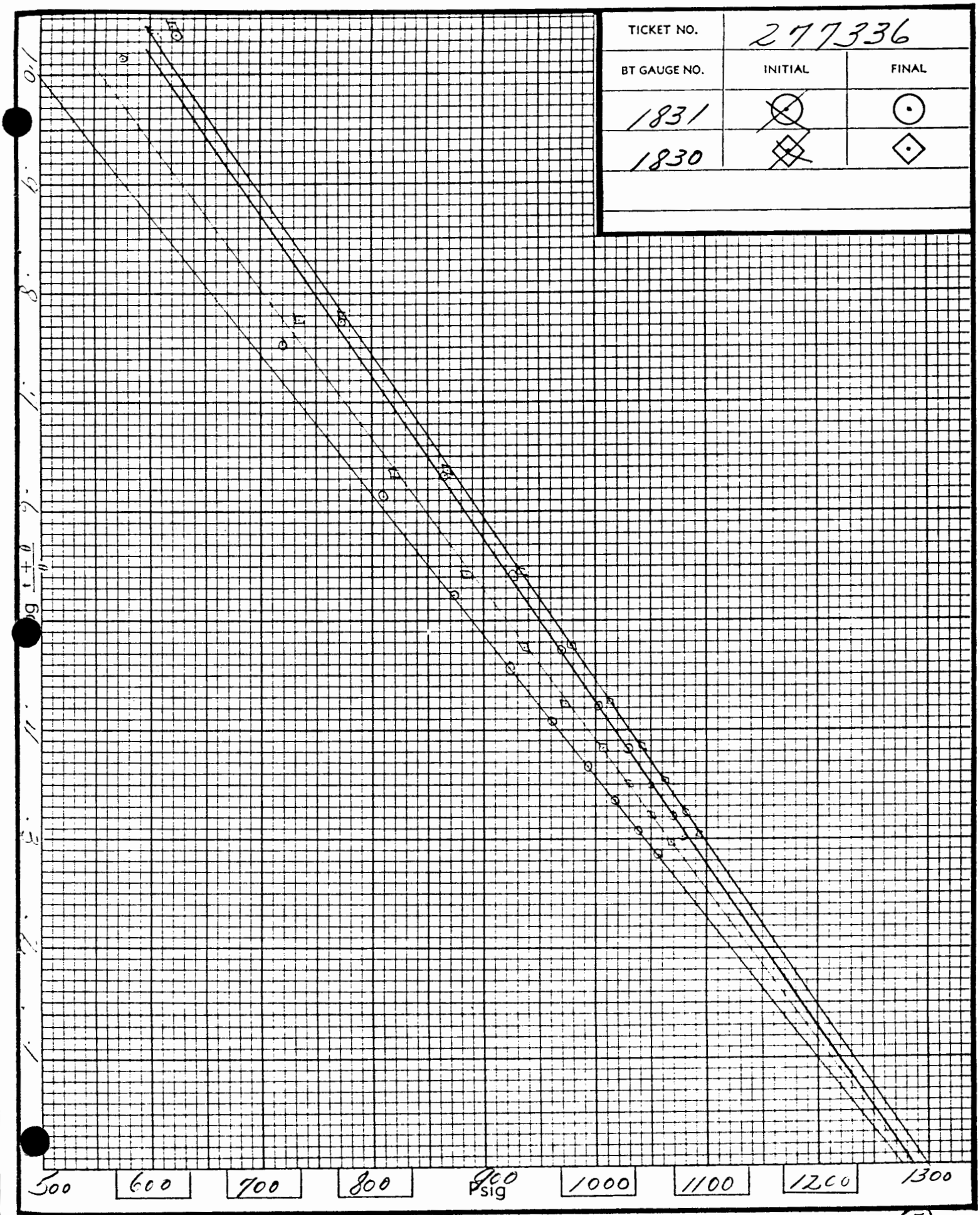
(5)

Gauge No. 1831			Depth 3490'			Clock No. 3004			12 hour	Ticket No. 277336				
	First Flow Period		First Closed In Pressure			Second Flow Period		Second Closed In Pressure			Third Flow Period		Third Closed In Pressure		
	Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.	Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.	Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.
0	.0000	26	.0000	----	81	.0000	89	.0000	----	151					
1	.0380	33	.0203	1.015	575	.0331	102	.0400	1.036	623					
2	.0760	48	.0406	0.754	720	.0661	113	.0800	0.773	772					
3	.1140	61	.0609	0.614	810	.0992	123	.1200	0.632	866					
4	.1520	71	.0812	0.523	873	.1323	132	.1599	0.540	928					
5	.1900	81	.1015	0.458	923	.1654	140	.1999	0.473	970					
6			.1218	0.408	961	.2050	151**	.2398	0.422	1004					
7			.1421	0.368	993			.2798	0.382	1030					
8			.1624	0.336	1019			.3198	0.349	1050					
9			.1827	0.309	1039			.3597	0.321	1069					
10			.2030	0.286	1056			.3930	0.302	1079***					
11															
12															
13															
14															
15															

Gauge No. 1830				Depth 3511'			Clock No. 3722		12 hour					
0	.0000	198	.0000	----	276	.0000	105	.0000	-----	167					
1	.2000	276*	.0201	1.039	600	.0332	116	.0404	1.043	620					
2			.0402	0.776	735	.0665	128	.0807	0.780	774					
3			.0603	0.635	820	.0997	138	.1211	0.638	868					
4			.0804	0.542	885	.1329	147	.1615	0.545	933					
5			.1005	0.475	937	.1662	156	.2019	0.478	978					
6			.1206	0.424	973	.2060	167**	.2422	0.427	1012					
7			.1407	0.384	1006			.2826	0.386	1040					
8			.1608	0.350	1030			.3230	0.353	1062					
9			.1809	0.323	1050			.3633	0.325	1081					
10			.2010	0.299	1068			.3970	0.305	1094***					
11															
12															
13															
14															
15															
Reading Interval		6			3		5			6					Minutes

REMARKS: *Unable to read due to plugging **Interval = 6 minutes ***Interval = 5 minutes

TICKET NO.	277336	
BT GAUGE NO.	INITIAL	FINAL
1831	⊗	⊙
1830	◈	◈



EXTRAPOLATED PRESSURE GRAPH

(5)

Liquid Production

B.T. Gauge Numbers			1831	1830	Ticket Number		277336	
			PRESSURE	PRESSURE				
Initial Hydrostatic			1836	1859	Elevation		1867	ft.
Final Hydrostatic			1814	1833	Indicated Production	1st Flow		bbls./day
1st Flow	Initial	Time	26	198		2nd Flow	89	bbls./day
	Final	30	81	276		3rd Flow	-	bbls./day
	Closed In Pressure	30	1056	1068	Drill Collar Length		0	ft.
2nd Flow	Initial	Time	89	105	Drill Collar I.D.		0	in.
	Final	31	151	167	Drill Pipe Factor		0.01422	bbls./ft.
	Closed In Pressure	59	1079	1094	Hole Size		7.875	in.
3rd Flow	Initial	Time			Footage Tested		14	ft.
	Final				Mud Weight		9.7	lbs./gal.
	Closed In Pressure				Viscosity, Oil or Water		0.68	cp
Extrapolated Static Pressure		1st			Oil API Gravity		-	—
		2nd	1285	1298	Water Specific Gravity	ESTIMATED	1.036	—
		3rd			Temperature		109	°F
Slope P/10		1st						
		2nd	612	625				
		3rd						

Remarks:

No calculations attempted for first flow due to partial plugging.

All calculation results based on water of 1.036 specific gravity (5% salt water).

SUMMARY

PRODUCT	EQUATION	B.T. Gauge No. 1831 Depth 3490' FIRST	SECOND	THIRD	B.T. Gauge No. 1830 Depth 3511' FIRST	SECOND	THIRD	UNITS
Production	$Q = \frac{1440\ R}{t}$		86			89		bbls. day
Transmissability	$\frac{Kh}{\mu} = \frac{162.6\ Q}{m}$		20.76			21.61		$\frac{\text{md. ft.}}{\text{cp}}$
Indicated Flow Capacity	$Kh = \frac{Kh}{\mu}\ \mu$		14.12			14.69		md. ft.
Average Effective	$K = \frac{Kh}{h}$		--			--		md.
Permeability	$K_1 = \frac{Kh}{h_1}$		1.009			1.050		md.
Damage Ratio	$DR = .183\ \frac{Ps - Pf}{m}$		1.0			1.0		—
Theoretical Potential w/ Damage Removed	$Q_1 = Q\ DR$		86			89		bbls. day
Approx. Radius of Investigation	$b \leftrightarrows \sqrt{Kt}$ or $\sqrt{Kt_0}$							ft.
	$b_1 \leftrightarrows \sqrt{K_1 t}$ or $\sqrt{K_1 t_0}$		7.8			8.0		ft.
Potentiometric Surface *	$Pot. = El - GD + 2.319\ Ps$		1357			1366		ft.

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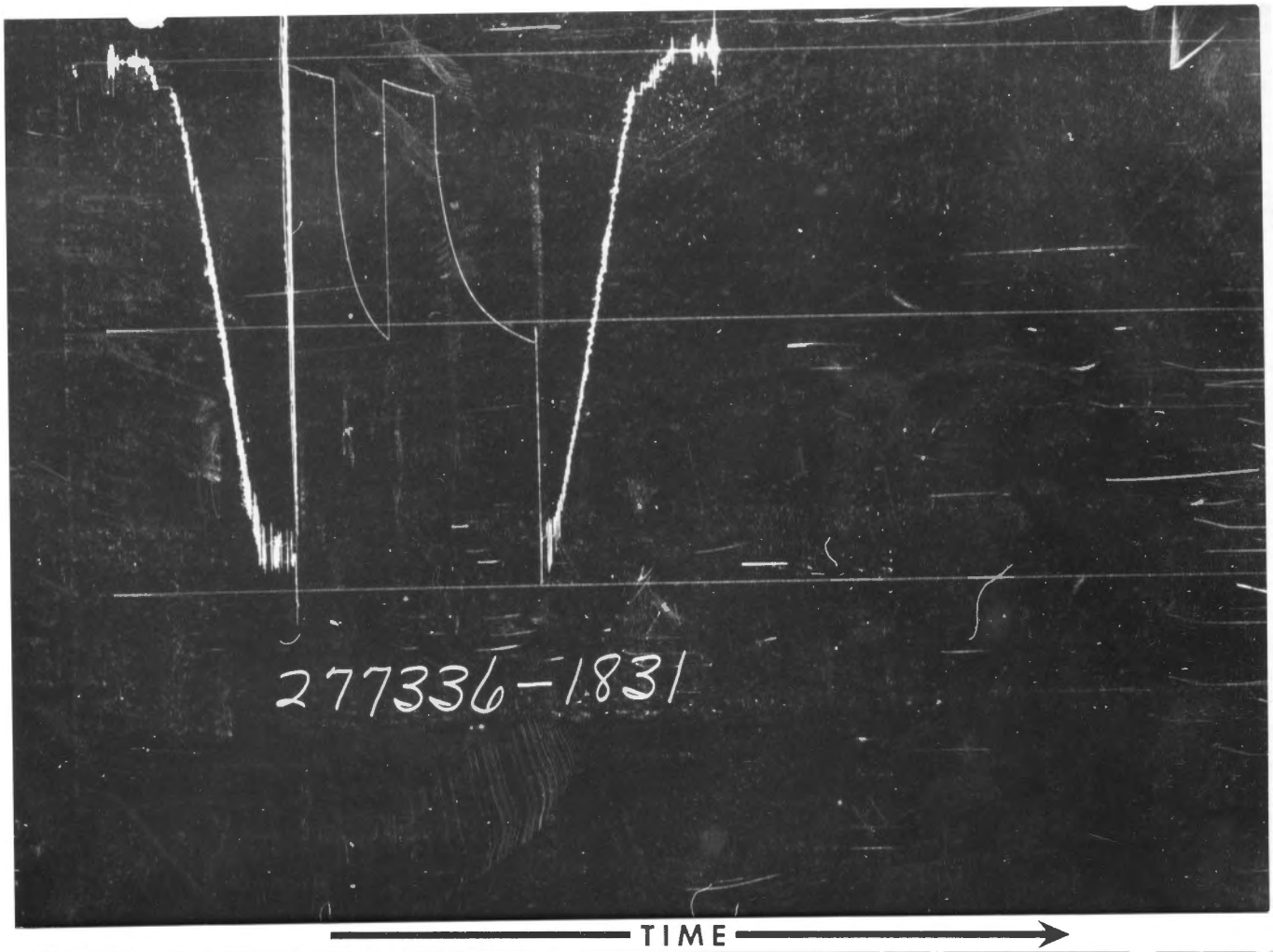
INTERPRETATIONS AND CALCULATIONS

LITTLE C-83415 SM 3/69—84-9

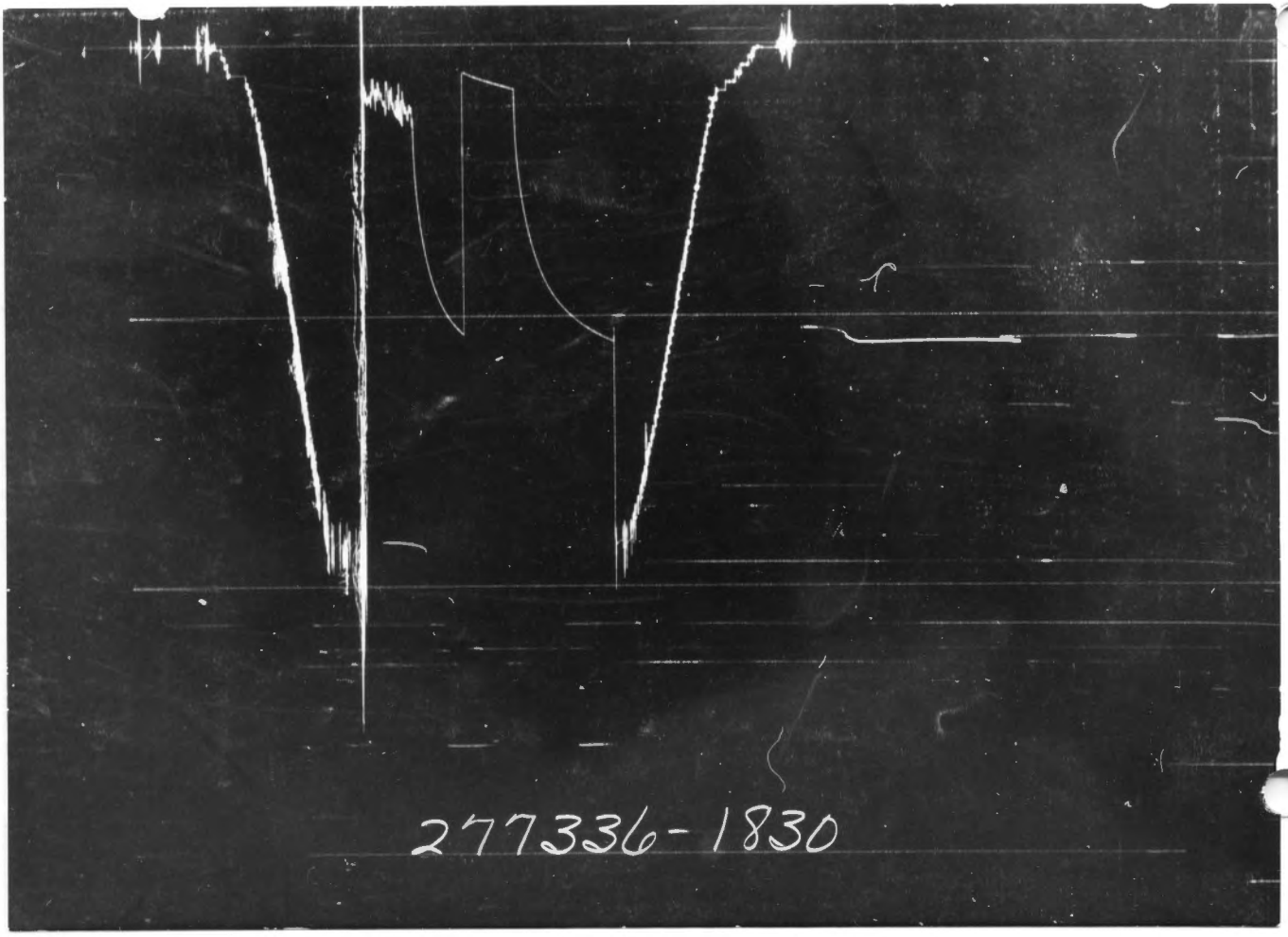
277336

	O. D.	I. D.	LENGTH	DEPTH
Reversing Sub	5 5/8"	2"	1'	
Water Cushion Valve				
Drill Pipe	4½"	3.826"	3376'	
Drill Collars				
Handling Sub & Choke Assembly	5 3/4"	2¼"	2¼'	
Dual CIP Valve	5"	2¼"	6'	
Dual CIP Sampler				
Hydro-Spring Tester	5"	2¼"	5'	3480'
Multiple CIP Sampler				
Extension Joint				
AP Running Case	5"	2¼"	4'	3490'
Hydraulic Jar				
VR Safety Joint	5"	1½"	3'	
Pressure Equalizing Crossover				
Packer Assembly	6 3/4"	3/4"	4'	3501'
Distributor				
Packer Assembly				
Flush Joint Anchor	5"	2¼"	14'	
Pressure Equalizing Tube				
Blanked-Off B.T. Running Case	5"	2½"	4'	3511'
Drill Collars				
Anchor Pipe Safety Joint				
Packer Assembly				
Packer Assembly				
Anchor Pipe Safety Joint				
Side Wall Anchor				
Drill Collars				
Flush Joint Anchor				
Blanked-Off B.T. Running Case				

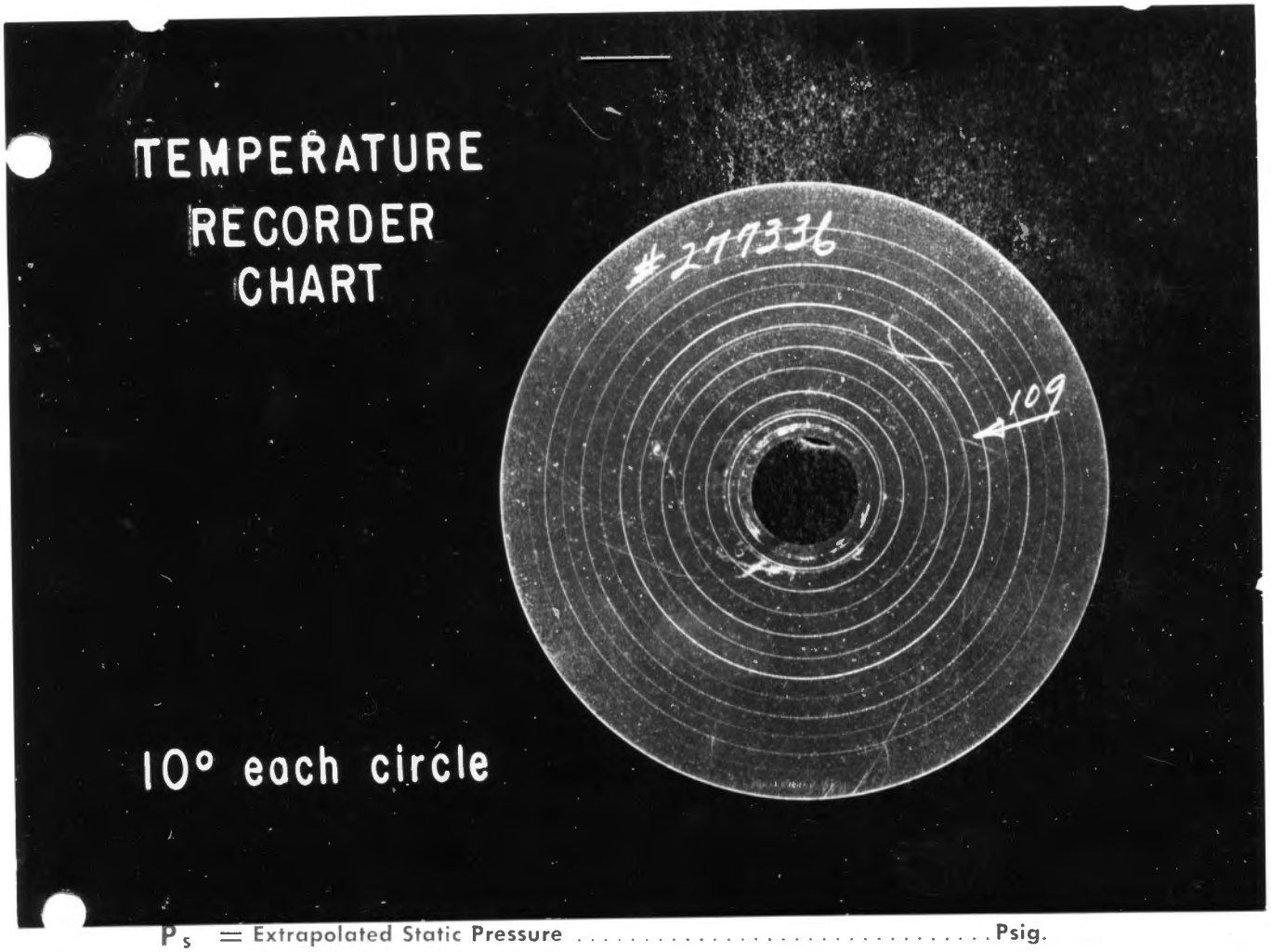


PRESSURE

TIME



Each Horizontal Line Equal to 1000 p.s.i.



P_s = Extrapolated Static Pressure ..... Psig.

P_F = Final Flow Pressure ..... Psig.

P_{ot} = Potentiometric Surface (Fresh Water *) ..... Feet

Q = Average Adjusted Production Rate During Test ..... bbls/day

Q_1 = Theoretical Production w/Damage Removed ..... bbls/day

Q_g = Measured Gas Production Rate ..... MCF/D

R = Corrected Recovery ..... bbls

r_w = Radius of Well Bore ..... Feet

t = Flow Time ..... Minutes

t_o = Total Flow Time ..... Minutes

T = Temperature Rankine ..... °R

Z = Compressibility Factor ..... ——

μ = Viscosity Gas or Liquid ..... CP

Log = Common Log

* Potentiometric Surface Reference to Rotary Table When Elevation Not Given, Fresh Water Corrected to 100° F.

TIGHT HOLE

#4

Home Office: Great Bend, Kansas
P. O. Box 793 (316) 793-7903

Company Braden Drilling Inc. Lease & Well No. Meyer #1

Elevation 1867 Ground Level Formation Kansas City Effective Pay 7 Ft. Ticket No. 15339

Date 11-25-70 Sec. 19 Twp. 23S Range 12W County Stafford State Kansas

Test Approved by R. Kenneth Smith Western Representative Guy Max Knipe

Formation Test No. 4 O.K. X Misrun Interval Tested From 3578' to 3620' Total Depth 3620'

Size Main Hole 7 7/8" Rat Hole Conv. B.T. X Damaged Yes X No Conv. B.T. X Damaged Yes X No

Packer Depth 3573 Ft. Size 6 3/4" Packer Depth 3578 Ft. Size 6 3/4"

Straddle Yes No X Conv. B.T. Damaged Yes No

Packer Depth Ft. Size

Tool Size 5 1/2" O.D. Tool Jt. Size 4 1/2" F.H. Anchor Length 42 Ft. Size 5 1/2" O.D.

RECORDERS Depth 3612 Ft. Clock No. 6800 Depth 3615 Ft. Clock No. 9712

Top Make Kuster Cap. 4150 No. 2605 Inside ~~Outside~~ Bottom Make Kuster Cap. 4250 No. 1051 ~~Inside~~ Outside

Below Straddle: Depth Clock No. Inside Outside Depth Ft. Clock No. Inside Outside

Top Make Cap. No. Inside Outside Bottom Make Cap. No. Inside Outside

Time Set Packer 4:42 A. M

Tool Open I.F.P. From 4:45 M. to 5:15A.M. Hr. 30 Min. From (B) 264 P.S.I. To (C) 260 P.S.I.

Tool Closed I.C.I.P. From 5:15 M. to 5:45A.M. Hr. 30 Min. (D) 1364 P.S.I.

Tool Open F.F.P. From 5:45 M. to 6:45 A.M. 1 Hr. Min. From (E) 258 P.S.I. To (F) 260 P.S.I.

Tool Closed F.C.I.P. From 6:45 M. to 7:15A. M. Hr. 30 Min. (G) 1360 P.S.I.

Initial Hydrostatic Pressure (A) 1880 P.S.I. Final Hydrostatic Pressure (H) 1880 P.S.I.

SURFACE INFORMATION	Size Choke	Max. Press. P.S.I.	Time	Description of Flow
	3/4 In.		M.	
See attached sheet			M.	
			M.	

BLOW Strong gas - surface immediately (See remarks) Bottom Choke Size 3/4 In.

Did Well Flow X Yes No Recovery Total Ft. 75 feet gas cut mud

Reversed Out Yes X No Mud Type Starch Viscosity 44 Weight 10 Water Loss 10 cc. Maximum Temp. 110 °F

Type Circ. Sub. Pin Did Tool Plug? No Jars: Size Make Ser. No.

EXTRA EQUIPMENT: Dual Packers 2 Safety Joint No Did Packer Hold? Yes Where?

Length Drill Pipe 3158 ft. I.D. Drill Pipe 3.8 in. Length Weight Pipe 400 ft. I.D. Weight Pipe 2.7 in. Length Drill Collars ft.

I. D. Drill Collars in. Length D.S.T. Tool 62 ft.

Remarks Gas stablized 1,710,000 M.C.F.

FORM WTC 3

WESTERN TESTERS

P. O. BOX 793
GREAT BEND, KANSAS

COMPANY Braden Drilling Inc. LEASE & WELL NO. Meyer #1

TEST NO. 4 INTERVAL TESTED FROM 3578' TO 3620'

TIME PRE-FLOW	MAX PRESS. P.S.I.	DESCRIPTION OF FLOW
15 min.	5.5	1,710,000 MCF
30 "	5.5	1,710,000 MCF
SECOND FLOW		
15	5.5	1,710,000 MCF
30	5.5	1,710,000 MCF
45	5.5	1,710,000 MCF
60	5.5	1,710,000 MCF

SIZE CHOKE SURFACE 3/4 IN. BOTTOM 3/4 IN.

REMARKS Gas to surface immediately

WESTERN TESTING CO., INC.
Pressure Data

Date 11-25-70 Test Ticket No. 15339

Recorder No. 2605 Capacity 4150 Location 3612 Ft.

Clock No. 6800 Elevation 1867 Ground Level Well Temperature 110

Point	Pressure		Time Given	Time Computed
A Initial Hydrostatic Mud	1880 P.S.I.	Open Tool	4:42 A.M	
B First Initial Flow Pressure	264 P.S.I.	First Flow Pressure	30 Mins.	30 Mins.
C First Final Flow Pressure	260 P.S.I.	Initial Closed-in Pressure	30 Mins.	30 Mins.
D Initial Closed-in Pressure	1364 P.S.I.	Second Flow Pressure	60 Mins.	60 Mins.
E Second Initial Flow Pressure	258 P.S.I.	Final Closed-in Pressure	30 Mins.	30 Mins.
F Second Final Flow Pressure	260 P.S.I.			
G Final Closed-in Pressure	1360 P.S.I.			
H Final Hydrostatic Mud	1880 P.S.I.			

PRESSURE BREAKDOWN

First Flow Pressure
Breakdown: 6 Inc.
of 5 mins. and a
final inc. of ____ Min.

Point Mins.	Press.
P 1 0	264
P 2 5	264
P 3 10	264
P 4 15	264
P 5 20	260
P 6 25	260
P 7 30	260
P 8	
P 9	
P10	
P11	
P12	
P13	
P14	
P15	
P16	
P17	
P18	
P19	
P20	

Initial Shut-In
Breakdown: 10 Inc.
of 3 mins. and a
final inc. of ____ Min.

Point Minutes	Press.
0	260
3	1296
6	1339
9	1352
12	1358
15	1360
18	1362
21	1364
24	1364
27	1364
30	1364

Second Flow Pressure
Breakdown: 12 Inc.
of 5 mins. and a
final inc. of ____ Min.

Point Minutes	Press.
0	258
5	259
10	259
15	260
20	260
25	260
30	260
35	260
40	260
45	260
50	260
55	260
60	260

Final Shut-In
Breakdown: 10 Inc.
of 3 mins. and a
final inc. of ____ Min.

Point Minutes	Press.
0	260
3	1296
6	1333
9	1344
12	1350
15	1354
18	1358
21	1360
24	1360
27	1360
30	1360

This is an actual photograph of recorder chart.

POINT		PRESSURE Field Reading	Office Reading	
(A)	Initial Hydrostatic Mud	1880	1880	PSI
(B)	First Initial Flow Pressure	254	264	PSI
(C)	First Final Flow Pressure	254	260	PSI
(D)	Initial Closed-in Pressure	1368	1364	PSI
(E)	Second Initial Flow Pressure	254	258	PSI
(F)	Second Final Flow Pressure	254	260	PSI
(G)	Final Closed-in Pressure	1348	1360	PSI
(H)	Final Hydrostatic Mud	1880	1880	PSI

Test #4

FLUID SAMPLE DATA

Sampler Pressure _____ P.S.I.G. at Surface
Recovery: Cu. Ft. Gas _____
cc. Oil _____
cc. Water _____
cc. Mud _____
Tot. Liquid cc. _____
Gravity _____ ° API @ _____ °F.
Gas/Oil Ratio _____ cu. ft./bbl.

	RESISTIVITY	CHLORIDE CONTENT
Recovery Water	_____ @ _____ °F.	_____ ppm
Recovery Mud	_____ @ _____ °F.	
Recovery Mud Filtrate	_____ @ _____ °F.	_____ ppm
Mud Pit Sample	_____ @ _____ °F.	
Mud Pit Sample Filtrate	_____ @ _____ °F.	_____ ppm
Mud Weight	9.9 vis	44 cp

Date 11-25-70 Ticket Number 277337
Kind of Job STRADDLE OPEN HOLE Holliburton District GREAT BEND
Tester MR. GORDLEY Witness MR. SMITH
Drilling Contractor H-30 DRILLING COMPANY DR S

EQUIPMENT & HOLE DATA

Formation Tested Kansas City
Elevation 1877' KB Ft.
Net Productive Interval 5' Ft.
All Depths Measured From Kelly Bushing
Total Depth 3620' Ft.
Main Hole/Casing Size 7 7/8"
~~Drill Collar Length~~ WP 400' I.D. 2.764"
Drill Pipe Length 3161' I.D. 3.826"
Packer Depth(s) 3551'-3556'-3577' Ft.
Depth Tester Valve 3541' Ft.

Cushion TYPE AMOUNT Ft. Depth Back Pres. Valve Surface Choke 1" Bottom Choke 3/4"

Recovered 75 Feet of gas cut mud with a few oil specks on top of tool.
Recovered Feet of
Recovered Feet of
Recovered Feet of
Recovered Feet of

Meas. From Tester Valve

Remarks Opened tool for 36 minute first flow with a strong blow, gas to surface in 2 minutes. 1495 MCF in 5 minutes, 1540 MCF in 10 minutes, 1585 MCF in 20 minutes, 1585 MCF in 25 minutes. Closed tool for 31 minute first closed in pressure. Reopened tool for 59 minute second flow with a strong blow, stabelized on second flow in 15 minutes, 1750 MCF. Closed tool for 31 minute second closed in pressure.

TEMPERATURE	Gauge No. 684 Depth: 3544' Ft.	Gauge No. 528 Depth: 3570 Ft.	Gauge No. 1838 Depth: 3616 Ft.	TIME
	12 Hour Clock	12 Hour Clock	12 Hour Clock	Tool Opened A.M.
Est. 105 °F.	Blanked Off -	Blanked Off -	Blanked Off -	11:55 P.M.
3569' Actual 94 °F.	Pressures	Pressures	Pressures	Tool Closed -A.M. 2:32 P.M.

		Field	Office	Field	Office	Field	Office	Reported Minutes	Computed Minutes
Initial Hydrostatic		1832	1842	1858	1850		1871		
First Period Flow	Initial	162	161	180	180			———	———
	Final	188	193	197	199			37	36
	Closed in	1313	1339	1339	1345			30	31
Second Period Flow	Initial	162	178	180	192			———	———
	Final	188	193	197	199	HYDROSTATIC		60	59
	Closed in	1305	1330	1331	1334	RELEASE:	1489	30	31
Third Period Flow	Initial							———	———
	Final								
	Closed in								
Final Hydrostatic		1815	1832	1841	1840		1862	———	———

Legal Location Sec. - Twp. - Rng. 19-23-12
Lease Name MEYER
Well No. 1
Test No. 5
Tested Interval 3556'-3577'
Field Area
County STAFFORD
State KANSAS
Lease Owner/Company Name BRADEN DRILLING COMPANY

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FORMATION TEST DATA

LITTLE'S

(5)

Gauge No.	684	Depth	3544'	Clock No.	-	12 hour	Ticket No.	277337

	First Flow Period		First Closed In Pressure			Second Flow Period		Second Closed In Pressure			Third Flow Period		Third Closed In Pressure		
	Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.	Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.	Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log $\frac{t+\theta}{\theta}$	PSIG Temp. Corr.
0	.000	161	.000	---	193	.000	178	.000	---	193					
1	.0625	203	.0198	1.134	1307	.0676	194	.0196	1.532	1290					
2	.1250	198	.0396	.864	1318	.1352	194	.0392	1.244	1299					
3	.1875	194	.0594	.716	1325	.2028	194	.0588	1.080	1311					
4	.2500	193	.0792	.618	1330	.2704	194	.0784	.967	1316					
5			.0990	.547	1333	.3380	193	.0980	.882	1321					
6			.1188	.491	1335	.3990	193**	.1176	.814	1324					
7			.1386	.447	1337			.1372	.758	1326					
8			.1584	.411	1338			.1568	.710	1328					
9			.1782	.380	1339			.1764	.670	1329					
10			.2050	.346	1339*			.2030	.622	1330***					
11															
12															
13															
14															
15															

Gauge No.	528	Depth	3570'	Clock No.	-	12 hour

0	.000	180	.000	---	199	.000	192	.000	---	199					
1	.0633	214	.0202	1.131	1311	.0680	201	.0201	1.525	1293					
2	.1266	205	.0404	.861	1323	.1360	201	.0402	1.237	1308					
3	.1899	201	.0606	.713	1330	.2040	201	.0603	1.073	1316					
4	.2530	199	.0808	.616	1334	.2720	201	.0804	.960	1322					
5			.1010	.544	1337	.3400	200	.1005	.875	1327					
6			.1212	.489	1341	.4010	199**	.1206	.807	1329					
7			.1414	.445	1341			.1407	.751	1331					
8			.1616	.409	1342			.1608	.704	1333					
9			.1818	.378	1343			.1809	.664	1334					
10			.2090	.344	1345*			.2080	.617	1334***					
11															
12															
13															
14															
15															

Reading Interval	9	3	10	3			Minutes

REMARKS: * Last interval equal to 4 minutes **=9 minutes ***-4 minutes.

(5)

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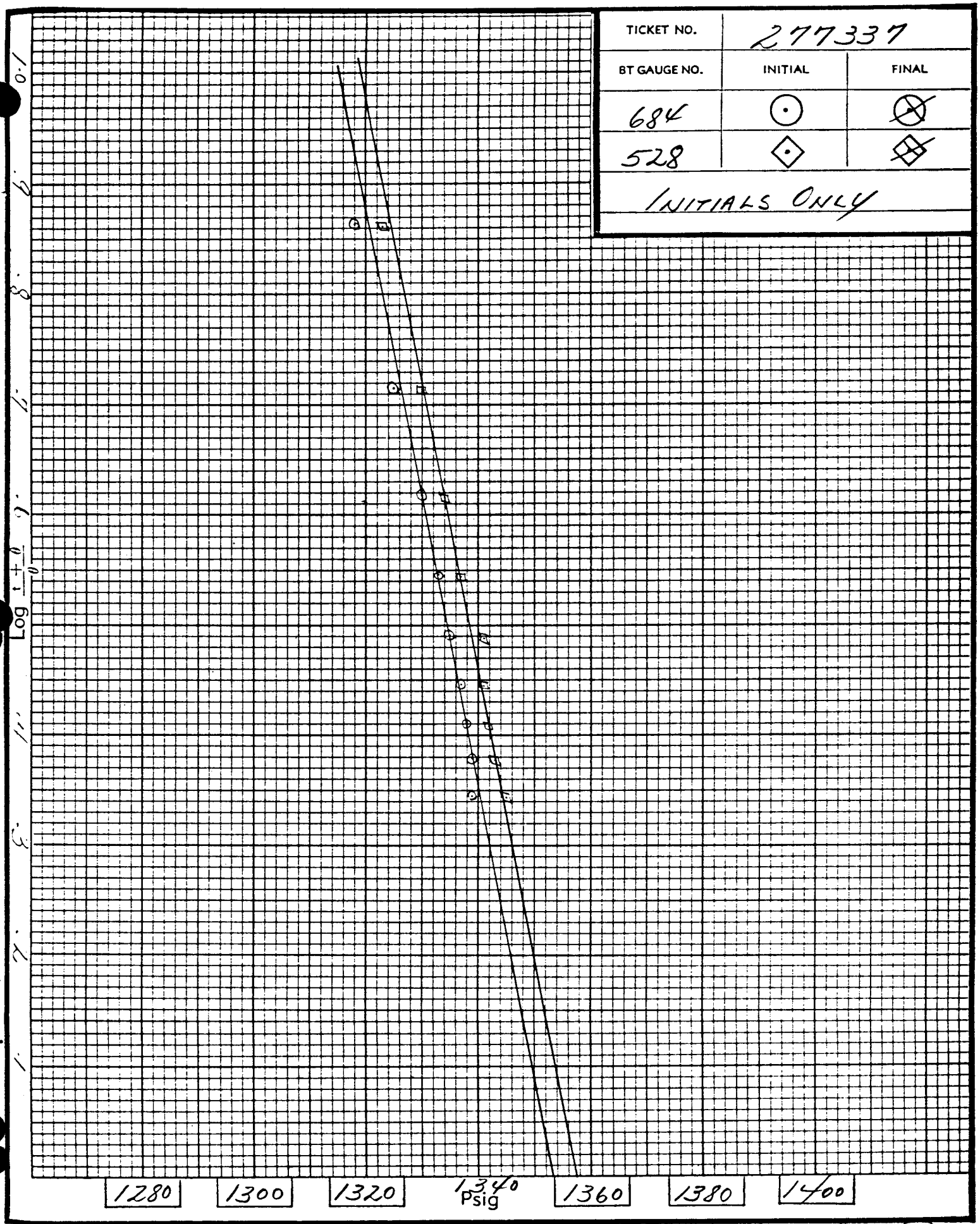
SPECIAL PRESSURE DATA

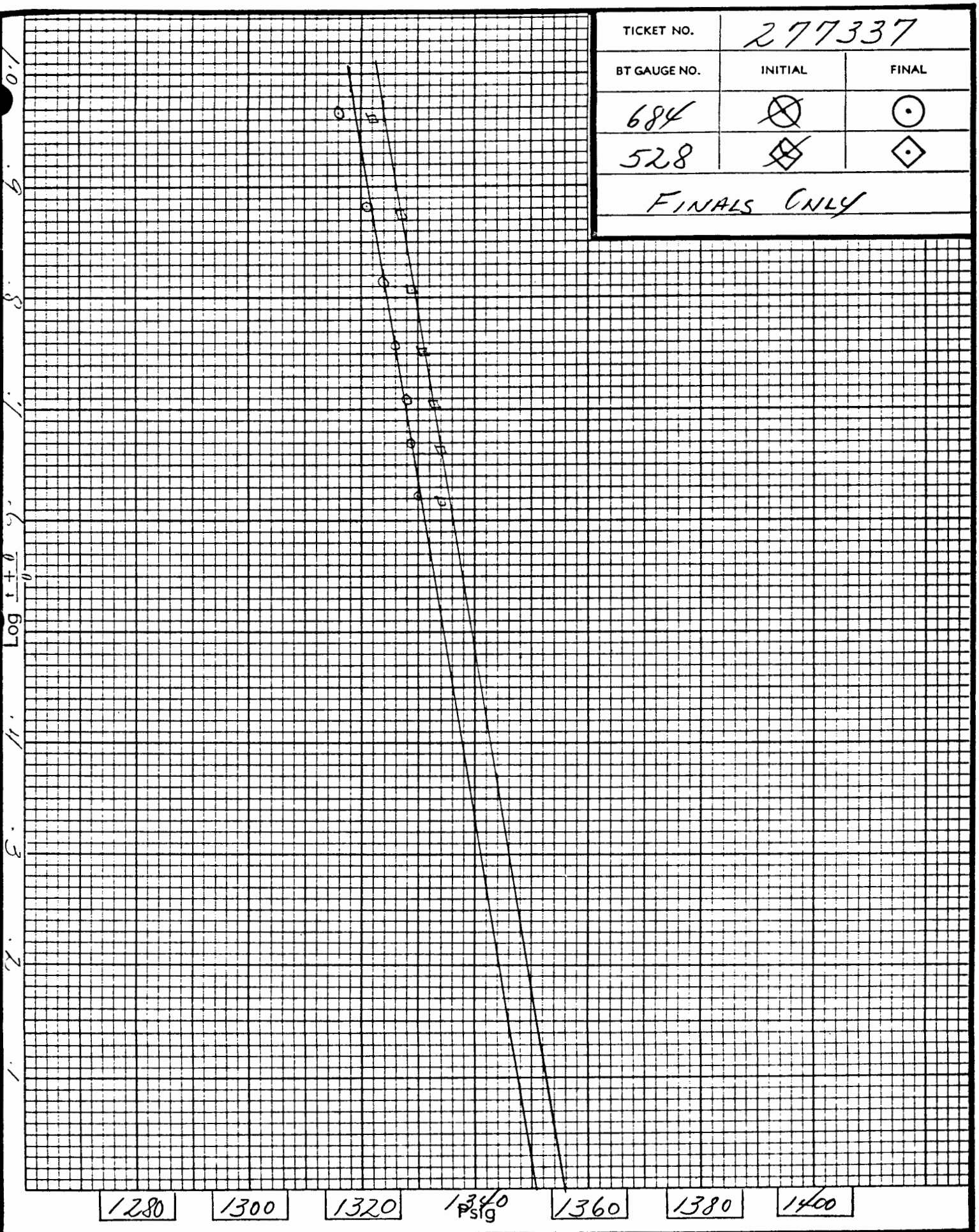
LITTLE'S



EXTRAPOLATED PRESSURE GRAPH

5

TICKET NO.	277337	
BT GAUGE NO.	INITIAL	FINAL
684	⊗	⊙
528	⊗	◇
FINALS ONLY		



EXTRAPOLATED PRESSURE GRAPH

(5)

Gas Production

B.T. Gauge Numbers			684	528	Ticket Number		277337	
			PRESSURE	PRESSURE				
Initial Hydrostatic			1842	1850	Elevation		1867	ft.
Final Hydrostatic			1832	1840	Production Rate	1st Flow	1585	MCF
1st Flow	Initial	Time	161	180		2nd Flow	1750	MCF
	Final	36	193	199		3rd Flow	-	MCF
	Closed In Pressure	31	1339	1345	Hole Size		7.875	in.
2nd Flow	Initial	Time	178	192	Footoge Tested Net		5	ft.
	Final	59	193	199	Mud Weight		9.9	lbs./gal.
	Closed In Pressure	31	1330	1334	Gas Viscosity		0.0155	cp
3rd Flow	Initial	Time			Gas Gravity Est.		0.6	—
	Final				Gas Compressibility		0.83	—
	Closed In Pressure				Temperature		94	°F
Extrapolated Static Pressure		1st	1353	1357				
		2nd	1351	1350				
		3rd						
Slope P/10		1st	1315	1319				
		2nd	1318	1323				
		3rd						

Remarks:

SUMMARY

		B.T. Gauge No. 684 Depth 3544'			B.T. Gauge No. 528 Depth 3570'			
PRODUCT	EQUATION	FIRST	SECOND	THIRD	FIRST	SECOND	THIRD	UNITS
Transmissability	$\frac{Kh}{\mu} = \frac{1637\ Q_g\ ZT}{m}$	11767	14955		11732	14900		$\frac{md.\ ft.}{cp}$
Theoretical Flow Capacity	$Kh = \frac{Kh}{\mu}\ \mu$	182.4	231.8		181.8	230.9		md. ft.
Average Effective	$K = \frac{Kh}{h}$	-	-		-	-		md.
Permeability	$K_1 = \frac{Kh}{h_1}$	36.480	46.363		36.371	46.190		md.
Indicated Flow Capacity	$(Kh)_2 = \frac{3200\ Q_g\ \mu\ ZT\ \log(0.472\ b/r_w)}{P_s^2 - P_f^2}$	35.42	44.62		35.24	44.33		md. ft.
Damage Ratio	$DR = \frac{\text{Theo. Flow Cap}}{\text{Indicated Flow Cap}} \frac{Kh}{(Kh)_2}$	5.15	4.19		5.16	5.21		—
Indicated Flow Rate	$OF_1 = \frac{Q_g\ P_s^2}{P_s^2 - P_f^2}$ Max.	1617	1786		1619	1788		MCFD
	$OF_2 = \frac{Q_g\ P_s}{\sqrt{P_s^2 - P_f^2}}$ Min.	1601	1768		1602	1769		MCFD
Theoretical Potential Rate	$OF_3 = OF_1\ DR$ Max.	8331	9279		8358	9317		MCFD
	$OF_4 = OF_2\ DR$ Min.	8246	9184		8268	9216		MCFD
Approx. Radius of Investigation	$b \backsimeq \sqrt{Kt}$ or $\sqrt{Kt_0}$	-	-		-	-		ft.
	$b_1 \backsimeq \sqrt{K_1 t}$ or $\sqrt{K_1 t_0}$	36.5	63.1		36.5	63.0		ft.
Potentiometric Surface *	$Pot. = (El - GD) + (2.319\ Ps)$	1460	1456		1444	1441		ft.

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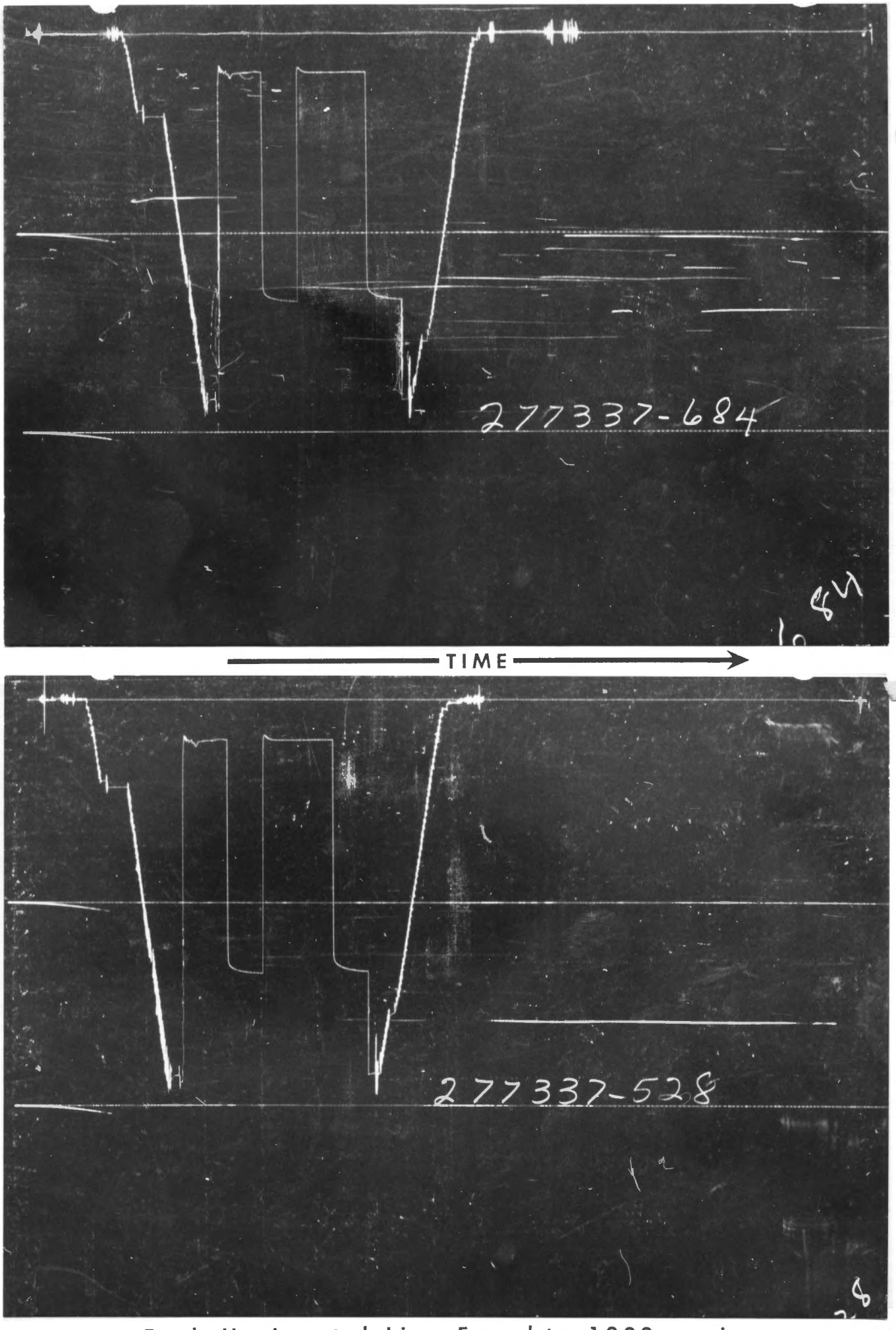
INTERPRETATIONS AND CALCULATIONS

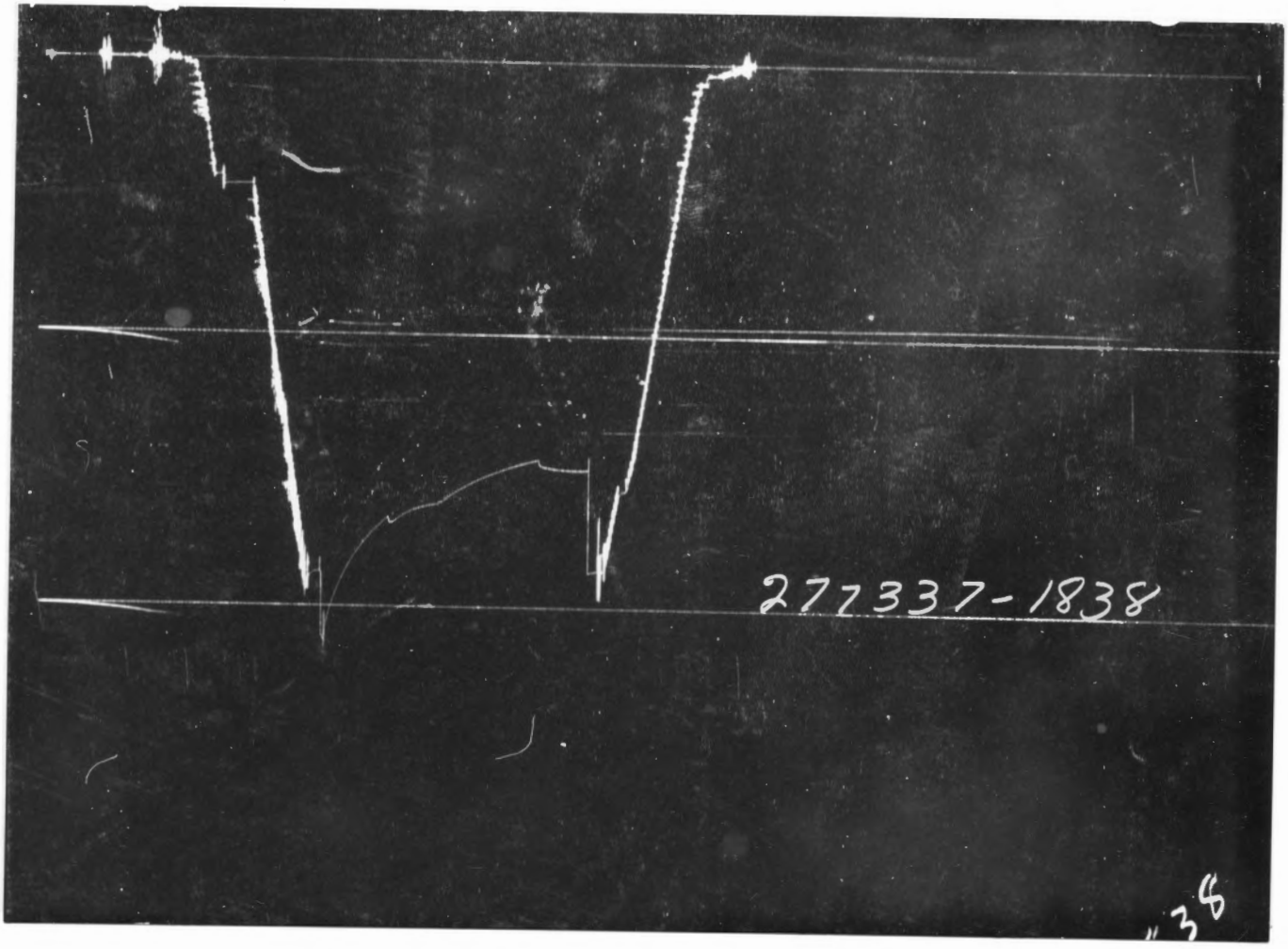
LITTLE'S 93414 PRINTED IN U.S.A. 83-9

277337

	O. D.	I. D.	LENGTH	DEPTH
Reversing Sub	5.75"	2.75"	12"	
Water Cushion Valve				
Drill Pipe	4.50"	3.826"	3161'	
~~Drill Collars~~ - Weight Pipe	4.50"	2.764"	400'	
Handling Sub & Choke Assembly				
Dual CIP Valve	5"	.87"	48.92"	
Dual CIP Sampler				
Hydro-Spring Tester	5"	.75"	60.31"	3541'
Multiple CIP Sampler				
Extension Joint				
AP Running Case	5"	3.06"	49.63"	3544'
Hydraulic Jar				
VR Safety Joint				
Pressure Equalizing Crossover				
Packer Assembly	6 3/4"	1.53"	48.89"	3551'
Distributor				
Packer Assembly	6 3/4"	1.53"	48.89"	3556'
Flush Joint Anchor	5"	2.37"	21'	
Pressure Equalizing Tube				
Blanked-Off B.T. Running Case	5"	3.06"	49.63"	3570'
Drill Collars				
Anchor Pipe Safety Joint				
Packer Assembly	6 3/4"	1.53"	48.89"	3577'
Packer Assembly				
Anchor Pipe Safety Joint				
Side Wall Anchor				
Drill Collars				
Flush Joint Anchor				
Blanked-Off B.T. Running Case	5"	3.06"	49.63'	3616'



Each Horizontal Line Equal to 1000 p.s.i.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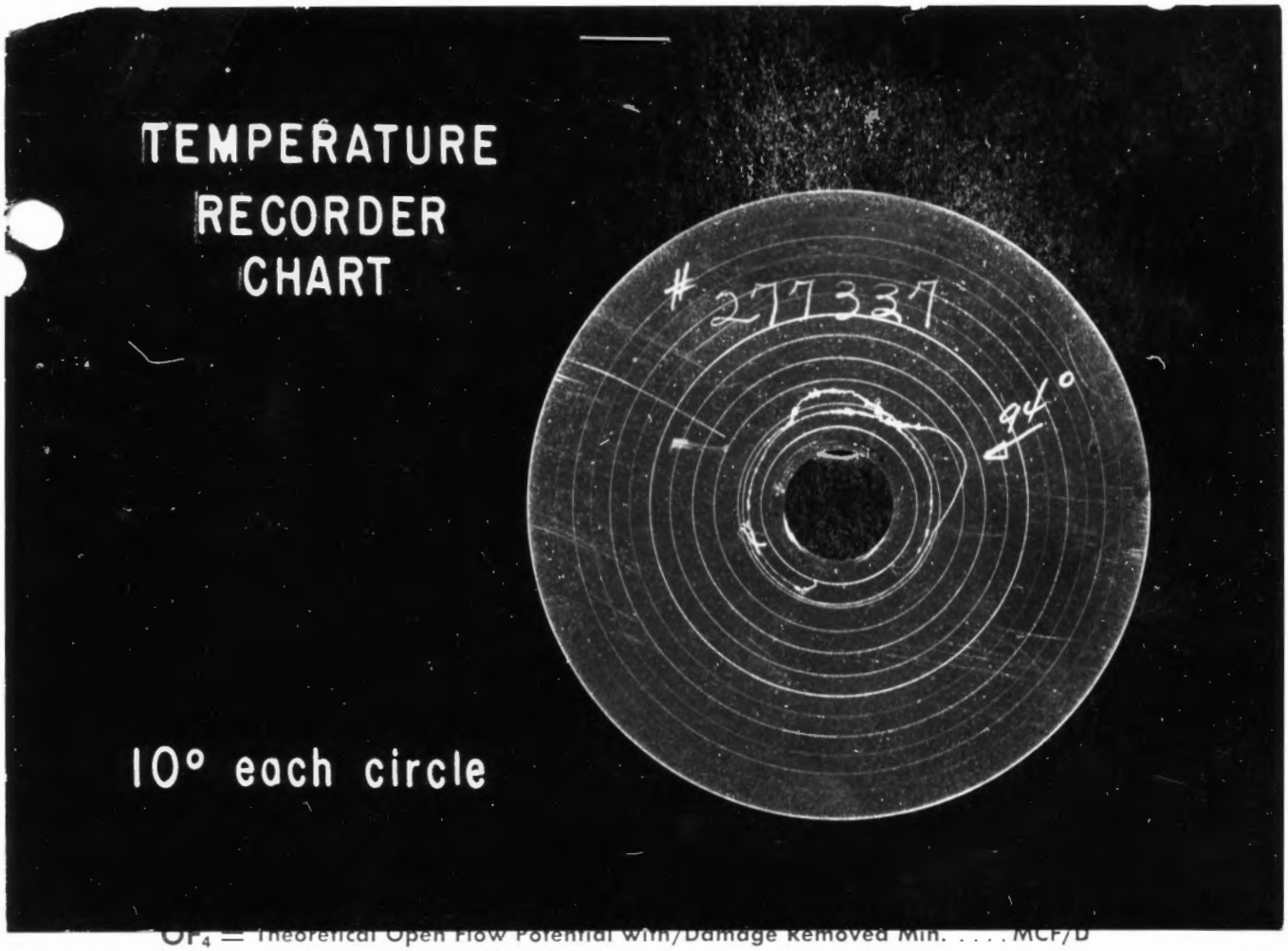
38



OF_4 = Theoretical Open Flow Potential with/Damage Removed Min. . . . . MCF/D

P_s = Extrapolated Static Pressure . . . . . Psig.

P_F = Final Flow Pressure . . . . . Psig.

P_{ot} = Potentiometric Surface (Fresh Water*) . . . . . Feet

Q = Average Adjusted Production Rate During Test . . . . . bbls/day

Q_1 = Theoretical Production w/Damage Removed . . . . . bbls/day

Q_g = Measured Gas Production Rate . . . . . MCF/D

R = Corrected Recovery . . . . . bbls

r_w = Radius of Well Bore . . . . . Feet

t = Flow Time . . . . . Minutes

t_o = Total Flow Time . . . . . Minutes

T = Temperature Rankine . . . . . °R

Z = Compressibility Factor . . . . . ——

μ = Viscosity Gas or Liquid . . . . . CP

Log = Common Log

* Potentiometric Surface Reference to Rotary Table When Elevation Not Given, Fresh Water Corrected to 100° F.