

14211-2626

PRESSURE

TIME

14211-3108

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

14211-3175

Legal Location Sec. - Twp. - Rng. **2/4**
 Lease Name **7X**
 Well No. **2**
 Test No. **10,940-11,028'**
 Tested Interval
 Field Area **TORFIELD**
 County **NORTH SEA**
 State **NORWAY**
 Lease Owner/Company Name **PHILLIPS PETROLEUM COMPANY**

FLUID SAMPLER 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 **.18 @ 68 °F.** 29000 ppm
 Recovery Mud _____ @ _____ °F.
 Recovery Mud Filtrate _____ @ _____ °F. _____ ppm
 Mud Pit Sample _____ @ _____ °F.
 Mud Pit Sample Filtrate **14.3 @ _____ °F.** _____ ppm
 Mud Weight **14.3** vis **44** cp

Date **9-11-71** Ticket Number **14211**

Kind of Job **HOOK WALL** Halliburton District **TANANGER**

Tester **F. WISIAN** Witness **H. YOUNGBLOD**

Drilling Contractor **ZAPATA "MAERSK EXPLORER"** SM S

EQUIPMENT & HOLE DATA

Formation Tested **Danian**

Elevation **112.5'** Sea level - **337.5'** Sea floor Ft.

Net Productive Interval **10'** Ft.

All Depths Measured From **Kelly bushings**

Total Depth **11028'** PBD Ft.

Main Hole/Casing Size **7" 29 lb. Liner**

Drill Collar Length **534.80'** I.D. **2.00"**

Drill Pipe Length **10393'** I.D. **2.992"**

Packer Depth(s) **10940.35'** Ft.

Depth Tester Valve **10925.61'** Ft.

TYPE AMOUNT Depth Back Surface Bottom
 Cushion Fresh water 7000 Ft. Pres. Valve Choke None Choke 5/8"

Recovered	88.74	Feet of Salt water between Hydrospring and Dual CIP valve - salt	Med. From Tester Valve
Recovered		Feet of was .4785 ppm	
Recovered		Feet of	
Recovered		Feet of	
Recovered		Feet of	

Remarks Set clocks 0815 - 9-11-71. Started tools in hole at 0920. On bottom at 1920. Test surface equipment to 6000#. Set tool at 2127. Tool opened at 21:29 with no blow, picked up and by-passed tool - reopened at 2144 with a very weak blow on 1/4" valve. Well continued very weak blow until closed in at Dual CIP valve at 2248. Started reversing water cushion at 2253. Closed tool and unseated packer at 0116 9-12-71. Pulled out of hole.

TEMPERATURE	Gauge No. 2626		Gauge No. 3108		Gauge No. 3175		TIME		
	Depth:	10,974 Ft.	Depth:	10,980 Ft.	Depth:	10,987 Ft.			
Est. °F.	48	Hour Clock	48	Hour Clock	72	Hour Clock	Tool	7 A.M.	
	Blanked Off yes		Blanked Off yes		Blanked Off yes		Opened	2129 P.M.	
Actual 265F.	Pressures		Pressures		Pressures		Tool	A.M.	
							Closed	0116 P.M.	
	Field	Office	Field	Office	Field	Office	Reported	Computed	
Initial Hydrostatic	-	8136	7907	8145	7891	8126	Minutes	Minutes	
First Period	Flow Initial	-	3254	3165	3241	3144	3211	---	---
	Flow Final	-	3461	3357	3456	3341	3439	77	82
	Closed in	-	7079	6878	7091	6869	7067	150	145
Second Period	Flow Initial								
	Flow Final								
	Closed In								
Third Period	Flow Initial								
	Flow Final								
	Closed in								
Final Hydrostatic	-	8044	7819	8062	7811	8045			

TEST STRING
TEST NO. 2

14211
PERFORATIONS
10975 to 10985'

No.	I.D.	O.D.	Description	Length	Depth
1			Baker Test Head		
1	2.68"	10.24"	LT-20 Swivel Assembly	4.02'	
1	2.58"	6.25"	Sub - 3 1/2" IF Box x 4" IF Pin	0.83'	
1	2.87"	7.38"	Emsco Safety Valve	3.50'	
1	2.75"	6.25"	Sub - 4" IF Box x 3 1/2" EUE 8rd Pin	0.87'	10' above Rotary table
337	2.99"	3.50"	Joints 3 1/2" EUE 8rd Tubing	10393.31'	
1	2.10"	4.30"	Sub 3 1/2" EUE 8rd Box x 2 7/8" IF Pin	0.85'	10382.24'
15	2.00"	4.125"	Drill Collars	446.06'	10383.19'
1	2.10"	4.10"	Sub 2 7/8" IF Box x 2 3/8" DP Box	0.71'	10829.25'
1	0.87"	3.88"	Dual Closed in Pressure Valve	5.41'	10829.96'
1	2.10"	4.10"	Sub 2 7/8" DP Box x 2 7/8" IF Pin	0.73'	10835.37'
3	2.00"	4.125"	Drill Collars	88.74'	10836.74'
1	2.10"	4.10"	Sub 2 7/8" IF Box x 2 7/8" DP Box	0.77'	10924.84'
1	0.62"	3.90"	Hydrospring Tester	5.09'	10925.61'
1	1.25"	3.90"	Jars	5.00'	10930.70'
1	0.75"	3.88"	VR Safety Joint	2.52'	10935.70'
1	2.55"	5.75"	RTTS - Hook Wall Packer	4.25'	C.P. 10940.35'
1	2.12"	3.75"	Sub - 2 7/8" EUE Pin x 3 1/2" EUE Pin	0.43'	10942.47'
1	2.99"	3.50"	Perf. Joint 3 1/2" EUE Tubing	30.10'	10942.90'
1	2.15"	4.30"	Sub-3 1/2" EUE Box x 3 1/8" 8 Pin	0.96'	10973.00'
1	3.50"	3.75"	BT Recorder no. 2626-48 Hour	4.12'	10974.00'
1	3.50"	3.75"	BT Recorder no. 3108 -48 Hour	4.12'	10980.00'
1	1.62"	3.75"	Sub - 3 1/8" 8n-3th Box X 2 3/8" IF Pin.	0.92'	10981.00'
1	2.50"	3.75"	BT Recorder no. 3175 - 72 Hour	4.12'	10987.00'
			Bottom of tools		10991.12'

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PHILLIPS PETROLEUM COMPANY
LEASE 2/4

TICKET NO. 14211
9-11-71

BT # 2626

10974'

Clock # 8109

48 Hour clock

First Flow Period

First Closed in Pressure

Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log $\frac{L+D}{D}$	PSIG Temp. Corr.
0 .0000	3254	.000	-	3461
1 .0079	3268	.0085	1.212	6537
2 .0158	3298	.0170	.936	6686
3 .0237	3320	.0255	.785	6755
4 .0316	3351	.0340	.683	6799
5 .0395	3373	.0425	.608	6834
6 .0474	3395	.0510	.550	6869
7 .0553	3408	.0595	.503	6891
8 .0632	3417	.0680	.464	6913
9 .0711	3425	.0765	.431	6930
10 .0790	3430	.0850	.403	6943
11 .0869	3434	.0935	.378	6961
12 .0948	3439	.1020	.356	6969
13 .1027	3443	.1105	.337	6978
14 .1106	3447	.1190	.320	6991
15 .1185	3452	.1275	.305	7000
16 .1264	3461	.1360	.291	7009
17 .1300*	3461	.1445	.278	7018
18		.1530	.267	7022
19		.1615	.256	7026
20		.1700	.246	7035
21		.1785	.237	7039
22		.1870	.229	7044
23		.1955	.221	7053
24		.2040	.214	7061
25		.2125	.207	7061
26		.2210	.200	7066
27		.2295	.194	7075
28		.2380	.189	7075
29		.2460	.184	7079

5 Minute intervals

5 Minute intervals

*Last interval is equal to 2 minutes.

(2)

(3)

BT # 3108

10980'

Clock # 9467

48 Hour Clock

First Flow Period

First Closed in Pressure

Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log	PSIG Temp. Corr.
0	.000	3241	-	3456
1	.0077	3253	1.222	6635
2	.0154	3278	.946	6743
3	.0231	3315	.794	6797
4	.0308	3340	.691	6838
5	.0385	3361	.616	6871
6	.0462	3382	.557	6896
7	.0539	3394	.510	6917
8	.0616	3411	.471	6934
9	.0693	3415	.438	6950
10	.0770	3423	.409	6967
11	.0847	3427	.384	6975
12	.0924	3432	.362	6992
13	.1001	3436	.343	7000
14	.1078	3440	.326	7008
15	.1155	3448	.310	7017
16	.1232	3452	.296	7025
17	.1270*	3456	.283	7029
18			.272	7037
19			.261	7046
20			.251	7050
21			.242	7054
22			.233	7058
23			.225	7062
24			.218	7071
25			.211	7075
26			.204	7079
27			.198	7083
28			.193	7087
29			.187	7091

5 Minute intervals

5 Minute intervals

*Last interval is equal to 2 minutes.

BT # 3175		10987'		Clock # 9015		72 Hour Clock	
First Flow Period			First Closed in Pressure				
Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log <u>417</u>	PSIG Temp. Corr.			
0	.0000	3211	.0000	-	3439		
1	.0057	3238	.0056	1.245	6538		
2	.0114	3260	.0112	.968	6682		
3	.0171	3283	.0168	.815	6744		
4	.0228	3305	.0224	.711	6794		
5	.0285	3327	.0280	.635	6825		
6	.0342	3354	.0336	.576	6861		
7	.0399	3372	.0392	.527	6883		
8	.0456	3386	.0448	.487	6901		
9	.0513	3395	.0504	.454	6915		
10	.0570	3399	.0560	.425	6933		
11	.0627	3408	.0616	.399	6946		
12	.0684	3413	.0672	.377	6960		
13	.0741	3417	.0728	.357	6969		
14	.0798	3422	.0784	.339	6982		
15	.0855	3430	.0840	.323	6991		
16	.0912	3435	.0896	.309	7000		
17	.0930*	3439	.0952	.295	7004		
18			.1008	.283	7013		
19			.1064	.272	7022		
20			.1120	.262	7027		
21			.1176	.253	7036		
22			.1232	.244	7040		
23			.1288	.236	7045		
24			.1344	.228	7049		
25			.1400	.221	7054		
26			.1456	.214	7058		
27			.1512	.208	7063		
28			.1568	.202	7067		
29			.1630	.196	7067		

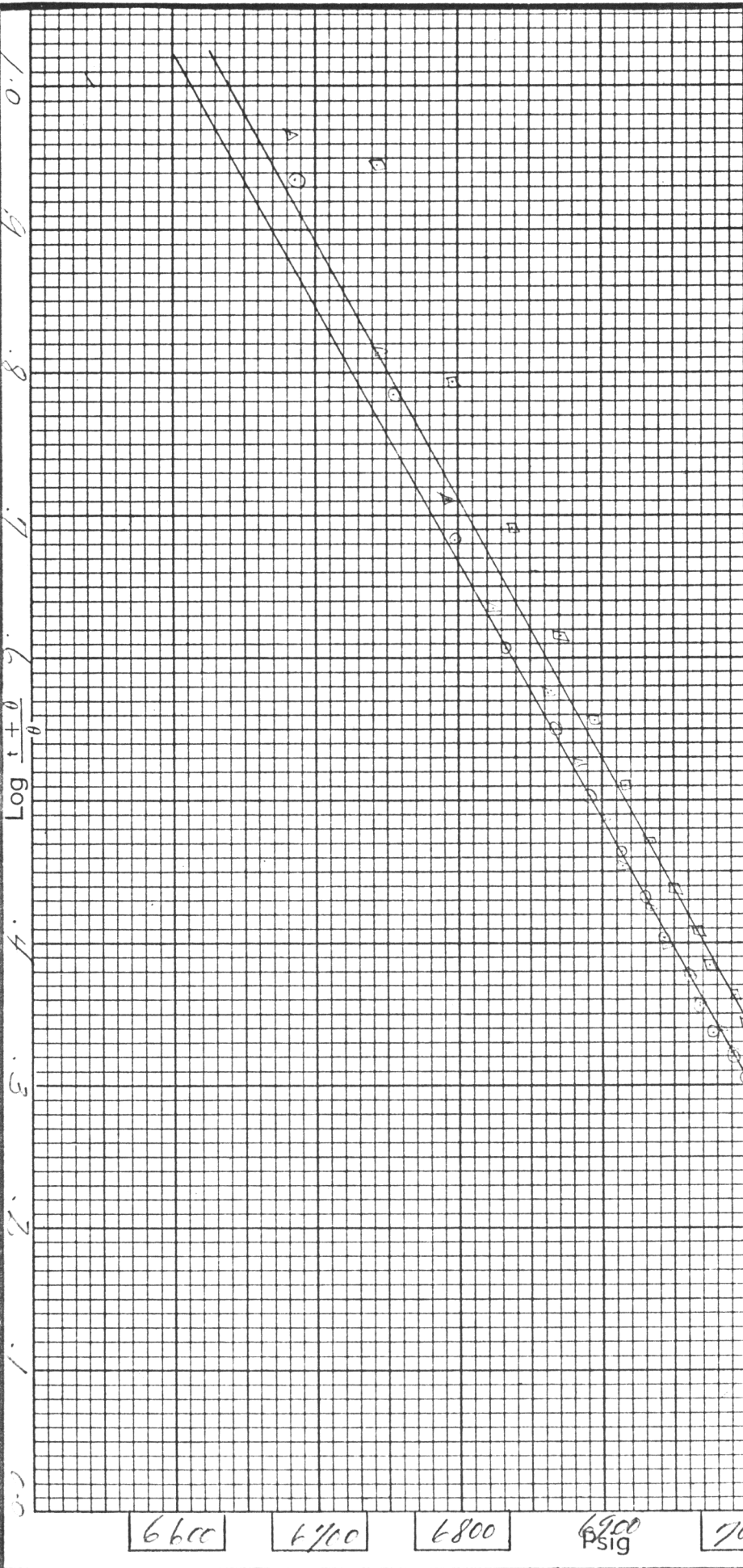
5 Minute Intervals

5 Minute Intervals

*Last interval is equal to 2 minutes.

(2)
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TICKET NO.	14211	
BT GAUGE NO.	INITIAL	FINAL
2626	○	○
3108	◇	◇
3175	△	-



EXTRAPOLATED PRESSURE GRAPH

Liquid Production

B.T. Gauge Numbers			2626	3108	Ticket Number	14211
Initial Hydrostatic			PRESSURE 8136	PRESSURE 8145	Elevation	337.5 ft.
Final Hydrostatic			8044	8062	Indicated Production	1st Flow bbls./day
1st Flow	Initial	Time	3254	3241		2nd Flow bbls./day
	Final	82	3461	3456		3rd Flow bbls./day
Closed In Pressure			145	7079	7091	Drill Collar Length
						534.80 ft.
2nd Flow	Initial	Time				Drill Collar I.D.
	Final					2.0 in.
	Closed In Pressure					
						0.00829 bbls./ft.
3rd Flow	Initial	Time				Hole Size
	Final					Liner 7.0 in.
	Closed In Pressure					
						10 ft.
Extrapolated Static Pressure			1st 7170*	7190	Mud Weight	14.3 lbs./gal.
			2nd -	-	Viscosity, Oil or Water	0.23** cp
			3rd -	-	Oil API Gravity	-
			1st 6613	6639	Water Specific Gravity	1.022**
			2nd -	-	Temperature	265 °F
			3rd -	-		

Remarks: *The extrapolated pressures of the top gauge #2626 and of the bottom gauge #3175 have approximately the same static pressures and slopes.

Based on reported salt content of the recovery water of 29,000 ppm and a specific gravity of 1.022.

SUMMARY

		B.T. Gauge No. 2626 10974'			B.T. Gauge No. 3108 10980			UNITS
		FIRST	SECOND	THIRD	FIRST	SECOND	THIRD	
PRODUCT	EQUATION							
Production	$Q = \frac{1440 R}{t}$	27.71			28.48			bbls. day
Transmissability	$\frac{Kh}{\mu} = \frac{162.6 Q}{m}$	8.091			8.406			md. ft. cp
Indicated Flow Capacity	$Kh = \frac{Kh}{\mu} \mu$	1.861			1.933			md. ft.
Average Effective Permeability	$K = \frac{Kh}{h}$	-			-			md.
	$K_1 = \frac{Kh}{h_1}$	0.186			0.193			md.
Damage Ratio	$DR = .183 \frac{Ps - Pf}{m}$	1.21			1.24			-
Theoretical Potential w/Damage Removed	$Q_1 = Q DR$	33.7			35.3			bbls. day
Approx. Radius of Investigation	$b \approx \sqrt{Kt}$ or $\sqrt{Kt_0}$	-			-			ft.
	$b_1 \approx \sqrt{K_1 t}$ or $\sqrt{K_1 t_0}$	3.9			3.9			ft.
Potentiometric Surface *	$Pot. = EI - GD + 2.319 Ps$	5991			6031			ft.

NOTICE: These calculations are based upon information furnished by you and taken from Drill Stem Test pressure charts, and are furnished you for your information. In furnishing such calculations and evaluations based thereon, Halliburton is merely expressing its opinion. You agree that Halliburton makes no warranty express or implied as to the accuracy of such calculations or opinions, and that Halliburton shall not be liable for any loss or damage, whether due to negligence or otherwise, in connection with such calculations and opinions.

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NOMENCLATURE

b	= Approximate Radius of Investigation	Feet
b₁	= Approximate Radius of Investigation (Net Pay Zone h ₁)	Feet
D.R.	= Damage Ratio	—
EI	= Elevation	Feet
GD	= B.T. Gauge Depth (From Surface Reference)	Feet
h	= Interval Tested	Feet
h₁	= Net Pay Thickness	Feet
K	= Permeability	md
K₁	= Permeability (From Net Pay Zone h ₁)	md
m	= Slope Extrapolated Pressure Plot (Psi ² /cycle Gas)	psi/cycle
OF₁	= Maximum Indicated Flow Rate	MCF/D
OF₂	= Minimum Indicated Flow Rate	MCF/D
OF₃	= Theoretical Open Flow Potential with/Damage Removed Max.	MCF/D
OF₄	= 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
Q₁	= 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.