

Flow Time	1st 8 Min.	2nd 90 Min.	Date	9-15-64	Ticket Number	419182 S
Closed in Pres. Time	1st 37 Min.	2nd 32 Min.	Kind of Job	OPEN HOLE	Halliburton District	GREAT BEND
Pressure Readings	Field	Office Corrected	Tester	JOE M. OLIVER	Witness	--
Depth Top Gauge	4355 Ft.	no Blanked Off	Drilling Contractor	POOL BROTHERS INCORPORATED		LC
BT. P.R.D. No.	1463	12 Hour Clock	Elevation	--	Top Pecker	--
Initial Hydro Mud Pressure	2270	2263	Total Depth	4383'	Bottom Pecker	4366'
Initial Closed in Pres.	1347	1351	Interval Tested	4366' - 4383' (16')	Formation Tested	--
Initial Flow Pres.	5	13	Casing or Hole Size	7 7/8"	Casing Perf. } Top	
	9	18			Casing Perf. } Bot.	
Final Flow Pres.	14	14	Surface Choke	1"	Bottom Choke	7/8"
Final Closed in Pres.	1209	1203	Size & Kind Drill Pipe	4 1/2" ACME	Drill Collars Above Tester	--
Final Hydro Mud Pressure	-	2236	Mud Weight	9.8	Mod Viscosity	44
Depth Con. Gauge		Blanked Off	Temperature	100	Anchor Size & Length	1D 4 1/2" X 17'
BT. P.R.D. No.		Hour Clock	Depths Meas. From	Kelly Bushing	Depth of Tester Valve	4354 Ft.
Initial Hydro Mud Pres.			Cushion	--	Depth Back Pres. Valve	--
Initial Closed in Pres.			Recovered	80	Feet of oily mud.	
Initial Flow Pres.		1	Recovered		Feet of	
Final Flow Pres.		1	Recovered		Feet of	
Final Closed in Pres.		2	Recovered		Feet of	
Final Hydro Mud Pres.			Oil A.P.I. Gravity		Water Spec. Gravity	
Depth Bot. Gauge	4378 Ft.	yes Blanked Off	Gas Gravity		Surface Pressure	ps
BT. P.R.D. No.	396	12 Hour Clock	Tool Opened	2:40 P.M.	A.M. P.M. Tool Closed	5:30 P.M. A.M. P.M.
Initial Hydro Mud Pres.	2265	2275	Remarks	Tool opened for a 8 minute first flow. with		
Initial Closed in Pres.	1371	1361		a weak blow. Closed tool for a 37 minute initial		
Initial Flow Pres.	13	1 26		closed in pressure. Reopened tool for a 90 minute		
Final Flow Pres.	17	1 26		second flow with a very weak blow throughout test.		
Final Closed in Pres.	1213	1211		Closed tool for a 32 minute final closed in pressure.		
Final Hydro Mud Pres.	2265	2247				

FORMATION TEST DATA

SPECIAL PRESSURE DATA

419182-376

Legal Location Sec. - Twp. - Rng. 30 19S 21W
 Full Area
 County
 NESS
 State KANSAS

(1)	Q - PRODUCING RATE, BPD,	<u>11.2</u>
(2)	U - VISCOSITY, CENT,	<u>3.0</u>
(3)	B - FVF	<u>1.2^v</u>
(4)	M - SLOPE OF B-U CURVE, PSI/CYCLE	<u>330</u>
(5)	H - THICKNESS OF PRODUCING ZONE, FEET,	<u>17</u>
(6)	K - FEHM, MD. = 162.5 Q U B / M H	<u>1.17</u>
(7)	P ₁ - PRESSURE ON SLOPE @ 1 HOUR, PSI,	<u>1369</u>
(8)	P ₂ - PRESSURE @ 1 SEC. = (P ₁ - 3.56 M)	<u>94</u>
(9)	P _f - FLOWING PRESSURE, PSI,	<u>43</u>
(10)	2.302(P ₂ - P _f) / M	<u>358</u>
(11)	R _w - RADIUS OF DRILLED HOLE, INCHES,	<u>2.394</u> $\rho_w^2 = 15.52$
(12)	F - POROSITY, FRACTION, (ESTIMATE)	<u>.15</u>
(13)	C - COMPRESS., VOL/VOL/PSI X 10 ⁶	<u>10</u>
(14)	1.50 LOG ₁₀ { $\frac{10.5 K}{F C U R_w R_w}$ } + 0.8	<u>-1.095</u>
(15)	S - SKIN, DIMENSIONLESS, = [(10) - (14)] / 2	<u>+727</u>
(16)	ΔP _s - PRESS. DROP DUE TO SKIN = (.262 M S)	<u>+208</u>
(17)	P _f [*] - FLOWING PRESS. W/NO SKIN = (P _f + ΔP _s)	<u>-251</u>
(18)	P _i - FINAL PRESSURE, PSI,	<u>1405</u>
(19)	(P ₂ - P _f)	<u>136</u>
(20)	2.302(P ₂ - P _f) / M	<u>475</u>
(21)	T - DIMENSIONLESS TIME @ 1 HOUR (FIG.1)	<u>180</u>
(22)	P ₁ [*] = 254 K / U C T	<u>57.2</u>
(23)	(P ₂ - P _f [*])	<u>1154</u>
(24)	LOG ₁₀ T = (23) / 2/M	<u>1.75</u>
(25)	R - DRAINAGE RADIUS/RADIUS DRILLED HOLE	<u>56</u>
(26)	R _E - DRAINAGE RADIUS, FT. = (25) X R _w / 12	<u>18.4</u> $R_E^2 = 338$
(27)	φ - POROSITY, FRACTION, = (22) / (25) (25)	<u>.169</u>
(28)	PI - PRODUCTIVITY INDEX = Q / (P ₂ - P _f)	<u>.0082</u>
(29)	P _f [*] - PI W/NO SKIN = Q / (P ₂ - P _f [*])	<u>6077</u> $Q = 11.2$
(30)

FIELD Sulfur Hill WELL Wave D" #1
 FORMATION Miss PRODUCING INTERVAL 4366-4383'
 PRESSURE BUILDUP CALCULATIONS

Flow Time	1st 10	Min.	2nd 90	Min.	Date	9-16-64	Ticket Number	419183 - S
Closed In Pres. Time	1st 30	Min.	2nd 30	Min.	Kind of Job	OPEN HOLE	Harrison District	GREAT BEND
Pressure Readings	Field		Offices Contacted		Tester	OLIVER	Witness	-
Depth Top Gauge	4372'	ft.	NO	Blanked Off	Drilling Contractor	PEEL BROTHERS, INCORPORATED		BM
BT. P.R.D. No.	1463		12	Hour Clock	Elevation	2275' K.B.	Top Pecker	-
Initial Hydro Mud Pressure	2289		2311		Total Depth	4398'	Bottom Pecker	4383'
Initial Closed in Pres.	1356		1350		Interval Tested	(NET PAY 15') 4383' - 4398'	Formation Tested	MISSISSIPPI
Initial Flow Pres.	18	1	21		Casing or Hole Size	7 7/8"	Casing Perfs.	Top - Bot. -
Final Flow Pres.	72	1	64		Surface Choke	1"	Bottom Choke	-
Final Closed in Pres.	335	2	322		Size & Kind Drill Pipe	4 1/2" ACME	Drill Collars Above Tester	I.D. - LENGTH -
Final Hydro Mud Pressure	2289		2236		Mud Weight	9.9	Mud Viscosity	47
Depth Cen. Gauge		ft.		Blanked Off	Temperature	100	Anchor Size & Length	ID - OD - X -
BT. P.R.D. No.				Hour Clock	Depth Meas. From	KELLY BUSHING	Depth of Tester Valve	4371' ft.
Initial Hydro Mud Pres.					Cushion	NONE	Depth Back Pres. Valve	NONE ft.
Initial Closed in Pres.					Recovered	750'	Foot of	muddy gassy oil
Initial Flow Pres.		1			Recovered	100'	Foot of	oily mud
Final Flow Pres.		1			Recovered		Foot of	
Final Closed in Pres.		2			Recovered		Foot of	
Final Hydro Mud Pres.					Oil A.P.I. Gravity	-	Water Spec. Gravity	-
Depth Bot. Gauge	4393'	ft.	YES	Blanked Off	Gas Gravity	40.5 - 60	Surface Pressure	psi
BT. P.R.D. No.	396		12	Hour Clock	Tool Opened	12:38	Tool Closed	3:18
Initial Hydro Mud Pres.	2282		2334		Remarks	Tool opened for a 10 minute first flow,		
Initial Closed in Pres.	1354		1353			with a fair blow. Rotated tool for a 30 minute		
Initial Flow Pres.	26	1	30			initial closed in pressure. Tool reopened with		
Final Flow Pres.	70	2	85			a good blow - increasing to a strong blow. Took		
Final Closed in Pres.	27	1	68			a 30 minute final closed in pressure.		
Final Hydro Mud Pres.	339	2	327					
Final Hydro Mud Pres.	2282		2242					

FORMATION TEST DATA

SPECIAL PRESSURE DATA

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

Lease No. 30-198-21W
 Well No.
 Field Area
 County
 NESS
 STATE OF KANSAS

4

(1)	Q - PRODUCING RATE, BPD,	<u>1105</u>	
(2)	U - VISCOSITY, CENT,	<u>3.0</u>	
(3)	B - FVF	<u>1.2</u>	
(4)	M - SLOPE OF B-U CURVE, PSI/CYCLE	<u>154</u>	
(5)	H - THICKNESS OF PRODUCING ZONE, FEET,	<u>15</u>	
(6)	K - PERM., MD. = 162.5 Q U B / M H	<u>28</u>	
(7)	P ₁ - PRESSURE ON SLOPE @ 1 HOUR, PSI,	<u>1245</u>	
(8)	P ₂ - PRESSURE @ 1 SEC. = (P ₁ - 3.56 M)	<u>797</u>	
(9)	P _F - FLOWING PRESSURE, PSI,	<u>332</u>	
(10)	2.302(P ₂ - P _F) / M	<u>+ 7.10</u>	
(11)	R _W - RADIUS OF DRILLED HOLE, INCHES,	<u>3.74 ¹⁰ = 15.52</u>	
(12)	F - POROSITY, FRACTION, (ESTIMATE)	<u>.17</u>	
(13)	C - COMPRESS., VOL/VOL/PSI X 10 ⁶	<u>10</u>	
(14)	2.30 LOG ₁₀ { $\frac{10.5 K}{F C U R_W R_W}$ } + 0.8	<u>+ 2.11</u>	
(15)	S - SKIN, DIMENSIONLESS, = [(10) - (14)] / 2	<u>+ 2.49</u>	
(16)	ΔP _S - PRESS. DROP DUE TO SKIN = (.868 M S)	<u>4323</u>	
(17)	P _F [*] - FLOWING PRESS. W/NO SKIN = (P _F + ΔP _S)	<u>645</u>	
(18)	P _E - FINAL PRESSURE, PSI,	<u>1377</u>	
(19)	(P _E - P ₁)	<u>32</u>	
(20)	ΔP̄ = 1.151(P _E - P ₁) / M	<u>.220</u>	
(21)	T̄ - DIMENSIONLESS TIME @ 1 HOUR (FIG.1)	<u>.287</u>	
(22)	FR _E ² = 264 K / U C T̄	<u>957</u>	
(23)	(P _E - P _F [*])	<u>732</u>	
(24)	LOG ₁₀ R̄ = (23) / 2 M	<u>2.57</u>	
(25)	R̄ - DRAINAGE RADIUS/RADIUS DRILLED HOLE	<u>245</u>	
(26)	R _E - DRAINAGE RADIUS, FT. = (25) X R _W / 12	<u>78.8</u>	<u>6200</u>
(27)	F - POROSITY, FRACTION, = (22) / (26)(26)	<u>.138</u>	
(28)	PI - PRODUCTIVITY INDEX = Q / (P _E - P _F)	<u>.1048</u>	<i>C_{max} = 144 8/0</i>
(29)	PI* - PI W/NO SKIN = Q / (P _E - P _F [*])	<u>.151</u>	<i>C_{max} = 208 5/0</i>
(30)	E - COMPLETION EFFICIENCY = 100 X (28) / (29)	<u>69.4</u>	

FIELD Salt Lake Well WELL 11763-4398
 FORMATION Wash PRODUCING INTERVAL 11763-4398
 PRESSURE BUILDUP CALCULATIONS

134
2273
1

Flow Time	1st 10	Min.	2nd 90	Min.	Date	9-17-64	Ticket Number	419184 S
Closed In Pres. Time	1st 30	Min.	2nd 35	Min.	Kind of Job	OPEN HOLE	Halliburton District	GREAT BEND
Pressure Readings	Field		Office Corrected		Tester	JOE M. OLIVER	Witness	--
Depth Top Gauge	4389	Ft.	no	Blanked Off	Drilling Contractor	POOL BROTHERS INCORPORATED		LC
BT. P.R.D. No.	1463		12	Hour Clock	Elevation	2275' KB	Top Pecker	--
Initial Hydro Mud Pressure	2251		2252		Total Depth	4410'	Bottom Pecker	4398'
Initial Closed in Pres.	1347		1342		Interval Tested	4398' - 4410' (12')	Formation Tested	Mississippi
Initial Flow Pres.	13	1	18		Casing or Hole Size	7 7/8"	Casing Perf.	Top
	18	2	33					Bot.
Final Flow Pres.	36	1	25		Surface Choke	1"	Bottom Choke	7/8"
	117	2	112					
Final Closed in Pres.	1319		1303		Size & Kind Drill Pipe	4 1/2" ACME	Drill Collars Above Tester	--
Final Hydro Mud Pressure	2251		2201		Mud Weight	9.6	Mud Viscosity	45
Depth Con. Gauge		Ft.		Blanked Off	Temperature	100	Anchor Size & Length	ID 05 X
BT. P.R.D. No.				Hour Clock	Depth Mea. From	Kelly Bushing	Depth of Tester Valve	4404 Ft.
Initial Hydro Mud Pres.					TYPE AMOUNT		Depth Back Pres. Valve	-- Ft.
Initial Closed in Pres.					Cushion	--		
Initial Flow Pres.		1			Recovered	180	Foot of gas.	
Final Flow Pres.		2			Recovered	210	Foot of slightly muddy, gassy oil.	
Initial Flow Pres.		1			Recovered	45	Foot of oil cut mud.	
Final Flow Pres.		2			Recovered	15	Foot of muddy water.	
Final Closed in Pres.					Oil A.P.I. Gravity		Water Spec. Gravity	
Final Hydro Mud Pres.					Gas Gravity		Surface Pressure	
Depth Bot. Gauge	4405	Ft.		Blanked Off				
BT. P.R.D. No.	396		12	Hour Clock	Tool Opened	21:28 P.M.	A.M. P.M.	Tool Closed
Initial Hydro Mud Pressure	2283		2262		Remarks	Tool opened with a weak blow for 10 minute		
Initial Closed in Pres.	1345		1345			first flow. Closed tool for a 30 minute initial		
Initial Flow Pres.	17	1	28			closed in pressure. Reopened to oil for a 90 minute		
	26	2	46					
Final Flow Pres.	34	1	32			second flow with a weak blow increased to fair blow.		
	122	2	119					
Final Closed in Pres.	1310		1308			Closed tool for a 35 minute final closed in pres-		
Final Hydro Mud Pressure	2283		2210			sure.		

Legal Location Sec. - Twp. - Rng. 30 19S 21W
 Lease No. 30 19S 21W
 Well No. 30 19S 21W
 Test No. 30 19S 21W
 Lease Owner/Company Name NESS
 County KANSAS
 Operator's District

FORMATION TEST DATA

SPECIAL PRESSURE DATA

4

- 1) Q - PRODUCING RATE, BPD, 45
- (2) U - VISCOSITY, CENT, 3.0
- (3) B - FVF 1.2
- (4) M - SLOPE OF B-U CURVE, PSI/CYCLE 174
- (5) H - THICKNESS OF PRODUCING ZONE, FEET, 12'
- (6) K - PERM., MD. = 162.5 Q U B / M H 13.8
- (7) P₁ - PRESSURE ON SLOPE @ 1 HOUR, PSI, 1331
- (8) P₂ - PRESSURE @ 1 SEC. = (P₁ - 3.56 M) 711
- (9) P_F - FLOWING PRESSURE, PSI, 112
- (10) 2.302(P₂ - P_F) / M 7.92
- (11) R_W - RADIUS OF DRILLED HOLE, INCHES, 3.94 $r_w^2 = 15.52$
- (12) F - POROSITY, FRACTION, (ESTIMATE)13
- (13) C - COMPRESS., VOL/VOL/PSI X 10⁶10
- (14) 2.30 LOG₁₀ { $\frac{10.5 K}{F C U R_W R_W}$ } + 0.8 15.29
- 3) S - SKIN, DIMENSIONLESS, = [(10) - (14)] / 2 + 3.195
- (16) ΔP_S - PRESS. DROP DUE TO SKIN = (.868 M S) + 482
- (17) P_F^{*} - FLOWING PRESS. W/NO SKIN = (P_F + ΔP_S) 594
- (18) P_E - FINAL PRESSURE, PSI, 1407
- (19) (P_E - P₁) 76
- (20) ΔP̄ = 1.151(P_E - P₁) / M503
- (21) T̄ - DIMENSIONLESS TIME @ 1 HOUR (FIG.1)168
- (22) FR_E² = 264 K / U C T̄ 723
- (23) (P_E - P_F^{*}) 813
- (24) LOG₁₀ R̄ = (23) / 2 M 2.335
- (25) R̄ - DRAINAGE RADIUS/RADIUS DRILLED HOLE 215
- (26) R_E - DRAINAGE RADIUS, FT. = (25) X R_W / 12 70.6 $r_e^2 = 4990$
- (27) F - POROSITY, FRACTION, = (22) / (26) (26)145
- (28) P_I - PRODUCTIVITY INDEX = Q / (P_E - P_F)0382 $Q_{max} = 538$
- (29) P_I^{*} - P_I W/NO SKIN = Q / (P_E - P_F^{*})0609 $Q_{max} = 94.5$
- (30) E - COMPLETION EFFICIENCY = 100 X (28) / (29) _____

FIELD Scholar Well WELL W-1 PRESSURE BUILDUP CALCULATIONS
 FORMATION W-1 PRODUCING INTERVAL 4388-4410