

Smith ZJ No.1

Log Depth	Porosity	ϕh	S_w	$\phi h S_w$
8238-39	5.2%			
-40	3.8	.090	.27	.0243
8240-41	4.6			
-42	4.2	.088	.29	.0255
8242-43	4.7			
-44	4.9	.096	.26	.0250
-45	2.2	-		
-46	2.8	-		
8246-47	3.5	.035	.30	.0105
-48	2.3	-		
-49	2.8	-		
8249-50	4.3	.043	.35	.0150
-51	2.7	-		
8251-52	5.5	.055	.28	.0154
8252-53	8.8			
-54	9.4	.182	.28	.0510
8254-55	8.8			
-56	9.2	.180	.26	.0468
8256-57	7.3	.073	.28	.0204

$$h = 14 \text{ ft} \quad \phi_{\text{avg}} = 6.0\% \quad .842 \quad S_{w_{\text{avg}}} = .278 \quad .2339 \quad \mu_o = 0.325 \text{ cp} \quad C_e = 17 \times 10^{-6} \text{ psi}$$

$$\text{Oil Gravity} = 47.2^\circ \text{ API } (60^\circ \text{F}) \quad \text{Gas Gravity} = 0.968 \text{ (air=1.0)} \quad \text{GOR} = 969/\text{bbl per 36.28}$$

$$\text{Wt of dissolved gas} = \frac{969}{379} (.968) 28.98 = 71.72 \text{ lb} \quad \text{Dissolved Gas Volume} = \frac{71.72}{26.25} = 2.734$$

$$\text{Wt of ST oil} = .7918 (5.615) (62.4) = 277.43 \text{ lb} \quad \text{Volume 1 STBO} = \frac{277.43}{5.615} = 49.41$$

$$\text{then pseudo-density} = \frac{349.20}{8.349} = 41.825 \text{ lb/cuft} \quad \text{pseudo-Volume of oil + gas} = \frac{349.20}{41.825} = 8.349$$

$$\text{BHP (2795 psig)} - \text{Density correction } 1.15 +$$

$$\text{BHT (142°F)} - \text{Temp. corr } 2.60 - \quad \text{Corr. density} = 40.44 \text{ lb/cuft}$$

$$\text{Formation Volume Factor} = \frac{349.2}{40.44 / 5.615} = \frac{8.644}{5.615} = 1.54 \text{ RB/STB}$$

Estimation of BHP from Fluid Level data:

Static - SION.	CP - 8235 ft	Oil Col - 100 BO	dis gas oil	434.5 ft ³	741 lb	2779' (.221) = 614 psi
	FL - 288 ft	Wtr Col - 186 BW	dis gas wtr	131 ft ³	1102 lb	5168' (.422) = 2181 psi
	Fluid Col 7947 ft			1044	70188	BHP $\approx$ 2795 psi

ay 13	Pmpd 100 BO 63 mcf 284 BW	8235'	dis gas = 928.0 ft ³	4666 lbs	
	Fluid level @ 1577', CP=0	1577'	oil - 561.5	27715	
		6758'	SWR - 1594.7	107170	6758' (.3147) FBHP = 2127 psi
ay 24	Pmpd 284 BO 224 mcf 251 BW	8235'	gas - 5990 ft ³	16618 lbs	
	Fluid level @ 1062', CP=50	1062'	oil - 1595	78710	
		7173'	wtr - 1409	94716	7173' (.132) FBHP = 997 psi
ay 31	Pmpd 348 BO 321 mcf 184 BW	8235'	gas - 15832 ft ³	23765 lbs	
	Fluid level @ 1674', CP=65	1674'	oil - 1954	96447	
		6661'	wtr - 1033	69433	6661' (.0773) FBHP = 580 psi

$$K_o = \frac{141.2 \text{ g/o } \mu_o \ln \frac{r_e}{r_w}}{h \Delta P}$$

$$\text{day 13} - K_o \approx 23.93 \frac{100}{2795-2127} \approx 3.58 \text{ md.}$$

$$\text{day 24} - K_o \approx 23.93 \frac{284}{2795-997} \approx 3.78 \text{ md.}$$

$$\text{day 31} - K_o \approx 23.93 \frac{348}{2795-580} \approx 3.76 \text{ md.}$$

$$\text{Avg } K = 3.70 \text{ md}$$

$$r_e = .029 \sqrt{\frac{Kt}{\phi \mu C_e}} = .029 \sqrt{\frac{3.70 \times 13 \times 24}{.26 \times .278 \times 17 \times 10^{-6}}} = 1711 \text{ ft} \geq 160 \text{ acrespacing in 13 days}$$