

F.I.T. PRESSURE BUILDUP
METHOD OF ANALYSIS

Letter 18/11/1977

The estimation of original reservoir pressure and formation permeability thickness is performed using the radial flow equation as applied to a pressure build-up curve.

A semi-log plot of Horner's Equation



$$P_w = P_o - \frac{88.4Q\mu}{Kh} \log \left(\frac{\Delta T}{T+\Delta T} \right)$$

results in a straight line, after after-flow effects have subsided.

where the slope $z = \frac{P_w - P_o}{\log \left(\frac{\Delta T}{T+\Delta T} \right)}$

and therefore $Kh = \frac{88.4Q\mu}{z}$

where P_w = pressure at well bore at time ΔT secs after shut-in (psi)
 P_o = static reservoir pressure (psi)
 Q = tester recovery rate in cc/sec
 μ = viscosity of produced fluid at reservoir conditions (cp)
 K = average formation permeability (md)
 h = producing interval (ft)
 T = producing time prior to shut-in.
 ΔT = time after shut-in for build-up (sec).

Extrapolation of this plot to its intersection with

$\left(\frac{\Delta T}{T+\Delta T} \right) = 1$ gives the static reservoir pressure (P_o).

It should be noted that the Kh values obtained from an FIT analysis are only preliminary estimates based on a very small sampling volume and uncertain flow characteristics. We will be in a better position to comment upon the reliability of the current interpretation method after core analysis data on Cobia-2, Kingfish-7 and Barracouta-4 becomes available for comparison.

TABLE I

SWORDFISH-1 F.I.T. DATA (16.1.1977)

F.I.T. No.	Depth* (ft.ss)	Sand Unit	Recoveries			Estimated Static Pressure (psig)	Estimated kh (md-ft)**	Remarks
			Gas (cu.ft.)	Oil (cc)	Mud/Filtrate (cc)			
1	7867	M. diversus	-	-	-	-	-	Unsuccessful Tool Failure
2	-	-	-	-	-	-	-	Unsuccessful Tool Failure
3	7867	M. diversus	-	-	22,000	3,431	54	
4	6727	P. asperopolus	-	-	22,000	2,942	1,537	

?
5

* ft.KB = ft.ss + 83 ft. for Ocean Endeavour

** For Schlumberger Tool recommended h = 1 ft.