

Flow Calculation

1 Perforation

L FSC 10 #2

1/2

$$FTP = 650 \text{ PSIA}$$

$$BHFP = 821 \text{ PSIA} \quad Z = .9356$$

$$T_{Res} = 170^\circ\text{F} = 630^\circ\text{R}$$

$$V_{oi} = 18 \text{ BCPO}$$

$$B_o = 2.0$$

$$\therefore V_{oBH} = 36 \text{ BCPO}$$

$$V_{mBH} = 30 \text{ BWU}$$

$$\Sigma \text{ Fluid} = 66 \text{ BFD} = 370 \text{ ft}^3/\text{Day}$$

$\therefore$ Fluid Impact on downhole volume is negligible.

$$\frac{V_{BH} P_{BH}}{Z_{BH} T_{BH}} = \frac{V_{sc} P_{sc}}{Z_{sc} T_{sc}}$$

$$\therefore V_{BH} = \frac{P_{sc}}{P_{BH}} \frac{T_{BH}}{T_{sc}} Z_{BH} V_{sc} = \left(\frac{14.7}{821}\right) \left(\frac{630}{520}\right) (.9356) (2.825 \cdot 10^6)$$

$$\therefore V_{BH} = 57,335 \text{ ft}^3/\text{Day} @ \text{BHFP}$$

This confirms fluid effect is negligible: $\Sigma V_{BH} = 57,700 \text{ ft}^3/\text{Day}$

Station @ 10,500' (above all perfs.) = 26.5 RPS

Perfs. @ 10,743' - 10,753'

Station @ 10,775' (Top set perfs. above) = 26.5 RPS : Top Set Contributes zero flow.

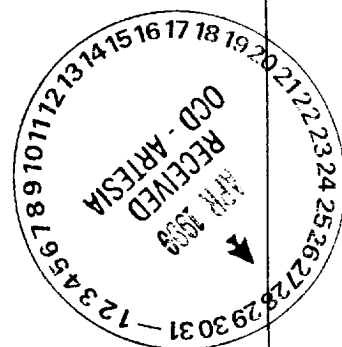
Perfs. @ 10,810' - 10,816': Most Productive : 93.4% of flow.

Station @ 10,817' (Below 10,816' perf.) = 1.25 RPS : Lower flow suppressed by compressor

Perfs. @ 10,819' - 10,822': No flow

Station @ 10,830' = 2.25 RPS

Perfs. @ 10,845' - 10,848': 1.5% of flow



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Station @ 10,870' (Below all Morrow 'B' Pebb.) = 1.25 RPS

∴ Flow past CIBP & Cement Plug = 5.1% of flow.

BUT: Density is as crucial in driving spinner as Volume:

$$\rho_w V_w + \rho_o V_o + \rho_g V_g = \rho_a V_a$$

$$\rho_g = .04$$

$$\rho_o = .59$$

$$\rho_w = 1.02$$

$$(1.02)(168.5 \text{ ft}^3) + (.59 \cdot 202.1 \text{ ft}^3) + (.04 \cdot 57,335 \text{ ft}^3) = \rho_a V_a$$

$$\therefore \rho_a V_a = 172 + 119 + 2,293 = 2,585 \text{ ft}^3$$

$$\therefore \frac{172}{2,585} = .0665 = 6.65\% \text{ of Flow } \approx 5.1\% \text{ of Flow Calc. by Spinner.}$$

∴ ALL of water is H/ Morrow 'C' moving past plug.

Concluded on 4/27/99

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