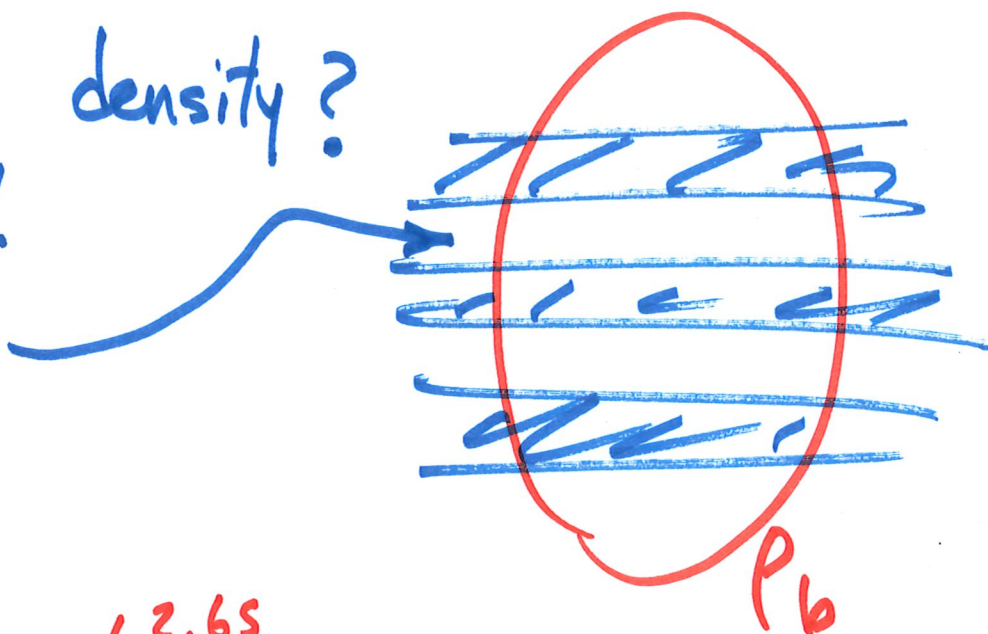Hydrocarbon density?

$C_{sh} = 30.4\%$

$\phi_S = 33\%$

$S_w = 11.6\%$

$$\phi_S = \frac{\rho_S - \rho_m}{\boxed{\rho_f} - \rho_m}$$

(with 2.65 pointing to $\rho_S$ and $\rho_m$ terms, ? under $\rho_f$)

$$\rho_b = \rho_S (1 - C_{sh}) + \rho_{sh} C_{sh} \qquad (*)$$

$$\phi_{D,SS} = 0.39 = \frac{\rho_b - 2.65}{1 - 2.65} \rightarrow \rho_b \approx 2 \ g/cm^3$$

$$(\phi_{D,SS})_{sh} = 0.265 = \frac{\rho_{sh} - 2.65}{1 - 2.65} \rightarrow \rho_{sh} = 2.21 \ g/cm^3$$

$$(*) \longrightarrow \quad P_s = 1.916 \ g/cm^3$$

$$\cancel{R_{SLC}} \quad \phi_s = \frac{P_s - P_m}{P_f - P_m}$$

$$0.33 = \frac{1.916 - 2.65}{P_f - 2.65} \longrightarrow P_f = 0.42 \ g/cm^3$$

$$P_f = S_w P_w + (1 - S_w) P_{HC}$$

$$0.42 = 0.116 (1) + (1 - 0.116) P_{HC}$$

$$\Longrightarrow \boxed{P_{HC} = 0.35 \ g/cm^3}$$