PSS diagnostic plots

Plotting BHP $p_{wf}(t)$ and formation pressure $p_e(t)$ vs cumulatives $Q(t) = \int_0^t q_t(\tau)d\tau$

It shows unit slope for PSS flow regime:

(1) $p_{wf}(t) = p_i - J^{-1} q_t - \frac{1}{V_\phi \, c_t} Q(t)$	(2) $p_e(t) = p_i - \frac{1}{V_\phi \, c_t} Q(t)$

while $p_{wf}(t)$ and $p_e(t)$ are being parallel to each other.

The difference between two straight lines $\Delta p = |p_e(t) - p_{wf}(t)| = \text{const}$ is related to productivity index J and flowrate q_t which stay constant during the PSS flow regime:

(3) $$J = \frac{q_t}{\Delta p} = \text{const}$$

The increase/decrease in gap between parallel lines is indicating increase/decrease in productivity index J.

The increase/decrease of the parallel lines slope is indicating decrease/increase (inverse response) of the drainage volume.

Flattening out of parallel lines is indicating transition to Steady-State flow regime.

See Also

Petroleum Industry / Upstream / Production / Subsurface Production / Field Study & Modelling / Production Analysis

0D Material Balance @model