

Stabilized reservoir flow

A [boundary dominated Reservoir flow](#) around the well with [well productivity index](#) is not changing over time:

(1) $J(t) = J = \text{const}$

There should be no confusion between [stabilised reservoir flow](#) and constant-rate production.

Constant-rate production may not represent [stabilised reservoir flow](#) as [productivity index](#) maybe still in transition after the last rate change.

On the other hand, a [stabilised reservoir flow](#) may go through a gradually changing flow rate due to formation pressure change with [productivity index](#) staying constant.

The [WFP](#) methods are not applicable if the well flow is not [stabilised](#) even if the flow rate is maintained constant.

There are two special reservoir flow regimes which are both [stabilised](#) and maintain constant flow rate:

- [Steady State flow regime \(SS\)](#)

and

- [Pseudo-Steady State flow regime \(PSS\)](#).

The [Steady State flow regime \(SS\)](#) is reached when the flow is [stabilised](#) with the full pressure support at the external boundary.

The [Pseudo-steady State flow regime \(PSS\)](#) is reached when the flow is [stabilised](#) with no pressure support at the external boundary.

In both above cases, the [drawdown](#) and flow rate will stay constant upon productivity [stabilisation](#).

The formation pressure $p_e(t)$ and bottom-hole pressure $p_{wf}(t)$ in [PSS](#) they will be synchronously varying while in [SS](#) they will be staying constant.

The table below is summarising the major differences between [SS](#) and [PSS](#) regimes.

		Steady state regime (SS)	Pseudo-steady state (PSS)
Boundary		Full pressure support	No pressure support
Productivity index (PI)	$J(t) = \frac{q}{\Delta p}$	constant	constant
Flowrate	$q(t)$	constant	constant
Drawdown	$\Delta p(t) = p_e(t) - p_{wf}(t)$	constant	constant
Botomhole pressure (BHP)	$p_{wf}(t)$	constant	varying

Formation pressure	$p_e(t)$	constant	varying
--------------------	----------	----------	---------

It's again important to avoid confusion between the term:

- [Stationary \(or Steady State\) reservoir flow](#), which means that all dynamic properties are not changing in time,
- and
- [Stabilised reservoir flow](#) which may happen during pressure variation.

See Also

[Physics](#) / [Mechanics](#) / [Continuum mechanics](#) / [Fluid Mechanics](#) / [Fluid Dynamics](#)