

Water Injection Wellbore Temperature Profile @model

Motivation

For the stabilized flow the [wellbore](#) pressure profile is constant and [wellbore](#) temperature profile is changing very slowly.

This allows solving the pressure-temperature problem iteratively:

- 1. Iterations
 - [Water Injection Wellbore Temperature Profile @model](#)
 - [Water Injection Wellbore Pressure Profile @model](#)
- 2. Iteration
 - [Water Injection Wellbore Temperature Profile @model](#)
 - [Water Injection Wellbore Pressure Profile @model](#)
- 3. Iteration ...

Outputs

$T(l)$	Temperature distribution along the wellbore trajectory
--------	--

Inputs

T_s	Intake temperature	$z(l)$	Pipeline trajectory TVDss
p_s	Intake pressure	$\theta(l)$	Pipeline trajectory inclination , $\cos \theta(l) = \frac{dz}{dl}$
q_s	Intake flowrate	d	Flow pipe diameter (tubing or casing depending on where flow occurs)
$\rho(T, p)$	Fluid density	ϵ	Inner pipe wall roughness
$\mu(T, p)$	Fluid viscosity		

Assumptions

Stationary fluid flow	Isothermal or Quasi-isothermal conditions	Constant cross-section pipe area A along hole
---------------------------------------	---	---

Incompressible fluid $\rho(T, p) = \rho_s = \text{const}$	ISOVISCIOUS $\mu(T, p) = \mu_s = \text{const}$	
--	--	--

The stabilized water injection profile satisfies the assumptions of the [Stationary Quasi-Isothermal Incompressible Isoviscous Pipe Flow Pressure Profile @model](#).

The water injection [wellbore](#) temperature profile can be split into the following components:

- Upward vertical heat conduction from Earth's Centre towards Earth's surface leading to a static geothermal profile
- Upward & Downward vertical heat conduction from reservoir with non-geothermal temperature (invaded by injection water)
- Heat exchange between [wellbore](#) fluid and surrounding rocks above and below the invaded reservoir
- The temperature in water invaded reservoir stays constant from top to bottom

Equations

(1)	$T(l) = Ts + \dots$

where

See Also

[Petroleum Industry](#) / [Upstream](#) / [Subsurface E&P Disciplines](#) / [Production Technology](#) / [Well Flow Performance](#) / [Lift Curves \(LC\)](#) / [Water Injection Wellbore Profile @model](#)

[[Water Injection Wellbore Pressure Profile @model](#)] [[Homogenous Pipe Flow Temperature Profile @model](#)]

