FM21L_11926

XXI International Congress of Theoretical and Applied Mechanics
Warsaw, Poland, August 15–21, 2004

Salt Precipitation in Geothermal Reservoirs

George G. Tsypkin[(1)], Andrew W. Woods[(2)]

(1) *Institute for Problems in Mechanics, Moscow, Russia*
(2) *BP Institute for Multiphase Flow, Cambridge, UK*

We model the motion of the boiling front which develops when hot saline solution migrates towards a low pressure well from a geothermal reservoir which is initially saturated with hot saline solution. We derive a family of self-similar solutions which describe the motion of the liquid and vapour towards the well, as the boiling front migrates out into the reservoir. These solutions take into account the reduction in permeability and porosity due to salt precipitation at the boiling front. We find that for low reservoir pressure or small salt concentration there are two distinct branches of self-similar solutions. For each salt concentration, these branches coincide at a critical reservoir pressure. For larger reservoir pressure, the self-similar solutions cease to exist and we propose that in this regime, the pore space becomes fully clogged with salt precipitate.

View the extended summary