SOLUTION MINING RESEARCH INSTITUTE

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DIFFUSION OF BRINE THROUGH ROCK SALT ROOF OF CAVERNS

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Abstract

Operational experience has shown that a fluid filled cavity in rock salt is tight at normal operating pressures which are below the ambient lithostatic salt stress. However, little is known about the tightness at pressures above lithostatic. It was shown in an experimental set up that fluid will permeate through the cavity roof under these conditions. The process is largely governed by a threshold pressure, being the ambient litho-static stress. Below this threshold flow is negligible; above the threshold pressure the fluid is opening up intercrystalline boundaries in the rock salt. Once a flowpath has been opened, flow appears to be driven by the excess pressure above lithostatic only and not to be affected by the pressure drop from lithostatic to hydrostatic. The permeability decreases about proportional to consolidation pressure and consolidation time of the salt sample on a log-log scale.