

Solution Mining Research Institute Spring 2018 Technical Conference
Salt Lake City, Utah, USA, 18 June 2018

THERMOMECHANICAL STUDY OF THE TEMPERATURE INFLUENCE ON SALT CREEP DURING SOLUTION MINING OF SALT CAVERNS

Sam J. Voegeli
RESPEC, Rapid City, South Dakota

Abstract

During the solution mining of a salt cavern, the injected fresh water is often substantially colder than the in situ salt temperature. Additionally, salt dissolution is an endothermic process that consumes thermal energy. As a result, significant heat can potentially be extracted from the salt formation and a long-term decrease in the salt temperature could occur. Because the creep rate of salt is highly temperature dependent, this cooling could influence the geomechanical behavior of the subject cavern and possibly impact neighboring caverns. To better understand this potential impact, a thermomechanical study was performed to investigate the amount of salt cooling that could be expected during prolonged solution mining of a representative salt cavern and the impact that this cooling effect may have on the geomechanical behavior of the cavern.

Key words: brine production, solution mining, rock mechanics, numerical modeling, heat transfer

©2022 – Solution Mining Institute

Full Paper is Available in the SMRI Library(www.solutionmining.org)