

Applying UBRO-Model Simulations to Solving Untypical Solution Mining Problems

by

Andrzej S. Kunstman
Kazimierz M. Urbanczyk
CHEMKOP

Abstract:

Starting cavern leaching on a new salt deposit generates specific kinds of problems. Very often there is no possibility to dispose of unsaturated brine, and thus the first phases of leaching must be specially designed so as to produce brine of saturation levels acceptable to the customer. The method frequently used in this case consists in starting leaching with borehole pipe shoes wide apart. However, such a method results in a substantial loss of salt reserves in the lower part of already drilled borehole which gets quickly covered by the sump.

There is yet another method available: unsaturated brine can be pumped through few boreholes, or even a single cavern can be leached with brine cycle closed periodically. The UBRO model (in its version accessible to SMRI members) makes it possible to custom design the leaching technology for such a method, by adjusting pumping rates, leaching time, and pipe positioning to brine saturation and cavern shape required.

Another example of UBRO-model application in an untypical first phase of leaching is the case of leaching without isolating medium. In one of the deep boreholes prepared for leaching, the outer tubing was caught up and tightened due to creeping and recrystallisation. Thus, leaching was carried out without blanket, and the UBRO model offered a good estimate of the moment when the outer tubing can be freed. The prediction was done by fitting model coefficients (leaching coefficient along pipes) to brine concentration measured in the field, without previous sonar measurement of cavern shape.

©2023 – Solution Mining Institute

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