

Re-Applying Old Caverns for Solution Mining

by

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Abstract

NEDMAG INDUSTRIES Mining & Manufacturing wish to expand their high-grade magnesium chloride (bischofite) brine producing capacity as a result of an ever growing demand of this high density and high purity product. Presently, only four out of NEDMAG's ten (operating) caverns produce bischofite brine with a total production capacity of 100 m³/hour. The other eight caverns produce a lower grade carnallitic brine from the carnallite deposits on top of the bischofite; this according to the previously applied strip mining method in these caverns (up to 1995) involving a pulling the production string after reaching mining limits. The new mining method however, applies cavern convergence by salt creep to keep cavern sizes more or less constant, hence allowing for much more bischofite to be mined per well.

Instead of drilling new wells to initiate the development of new caverns for bischofite recovery, it is now envisaged to re-enter the bischofite layers once more through an existing wellbore. Apparent benefits are the significant cost reduction in drilling, well completion, surface connections and cavern development. Major disadvantage is the risk of not being able to reach the bischofite layers, hence being stuck in the overlying carnallitic cavern section. A 40 m thick bridge forming rocksalt layer, which is still in place, is separating the carnallitic and bischofite sections and needs to be passed by drilling.

Conventional drilling is not possible in this case, since it is impossible to lower the production tubing through a cavern exactly into the freshly drilled hole at the bottom of this cavern section (the good old needle in the haystack). Therefore, one needs to install the tubings while drilling, which involves drilling with the production tubing itself.

A try out will be performed on a 1976 well (VE-2), which is due for repairs. A new 7" cemented casing will be installed inside the 10 3/4" to regain the lost casing integrity here. A 5" production / injection string will be drilled originating from the 7" shoe (at 1400 m TV) downwards to the bischofite (at 1500 m TV). After completion, production and water injection will take place intermittently via the same tubing, by which NEDMAG abandons the original dual completion concept.

NEDMAG and Well Engineering Partners (WEP) are now in an advanced stage of planning of the recompletion of the well. It is envisaged to drill with the future production string. Once the string is at depth, the bit and mud motor will be left behind, where the drill string becomes a production string. Actual drilling is expected between October 1998 and April 1999.