

TECHNICAL SOLUTION AND MONITORING RESULTES OF THE CONTROLLED COLAPSE OF FIELD 1 SALT CAVERN, OCNELE MARI, ROMANIA

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Abstract

The exploitation by dissolution in Ocnele Mari area, Romania, started in 1956-1960 through a triangular network consisting of ten wells well known as the "Field I". During the process, the resulted ten dissolution holes joined together. The reduced accuracy of cavity measurements during the exploitation (finalized in 1973), did not allowed identifying a potential common cavern. The measurements made in four wells in 2006 revealed the presence of a large cavern joining six well-cavities, with a total volume of 1.000.000 cubic meters and the absence of salt in some areas of the seal pillar. The cavernometric monitoring of the ceiling evolution during 2006 - 2009 revealed its migration to the surface and the increase of the subsiding slope. To avoid the impact of an imminent accidental collapse, a controlled collapse program of the seal pillar was applied. A complex microseismic network has been put in place to monitor the rock displacements. The decline of the piezometric level of the brine in the common cavern was achieved via three pumps located in the adjacent dissolution cavities, in hydraulic connection with the main one. In the first eight days (starting since 15 July 2009), the drawdown of the brine level was about one meter/day. Following the initial eight days period a higher drawdown, of two meters/day was imposed. The collapse process started on the 8th of August 2009, after 23 days of continuous pumping. The entire fill up of the dissolution cavities in the "Field 1" with sterile material from the upper seal pillar was achieved in about three months from the start of the collapse. The total volume of brine discharged from the system was about 840.000 cubic meters. A funnel-shaped sink area of around 39.000 square meters (with no brine) was left behind at the surface of the terrain.

It is worth mentioning that the entire procedure progressed as planned even in small details. Considering the contamination potential and the amount of the fluids (diesel oil and brine) in the cavern, special attention has been paid to the environment. Consequently, during the controlled collapse procedure no contaminant spread over the slopes or reached the hydrographical network.

Key words: Salt Exploitation by Dissolution, Subsidence, Monitoring Systems, The Pumped Brine, Computer Modeling