

The Debrining and Operation of a Gas Cavern with variable Cushion Gas due to an adjustable Gas Brine Contact

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Abstract

In the Zuidwending gas storage operated by EnergyStock the newly leached cavern A7 came into operation at the end of 2013. Due to uncertain and varying demand in cavern capacity EnergyStock decided not to use the total cavern gas capacity. A concept to use the cavern with varying brine volume had to be developed and integrated to the existing cavern supervisory software which is used for calculation of cavern storage parameters and the nomination of the cavern capacity. Giving the fact that NomiX and the integrated CavBase Gas Storage® were already implemented on-site an add-on called CavBox was developed.

CavBox is a console program written in C++. It reads the gas and brine rates and calculates the cavern pressures and temperatures. For the debrining process the cavern volume and the fluid level in the cavern are calculated according to the sonar measurements giving a relation between depth and cumulative cavern volume. The gas temperature in the cavern is calculated regarding heat flow to the surrounding rock and the brine. The wellhead pressures are calculated considering the gas properties, flow rates, and the well tubing diameter.

This paper presents the results of the calculations during the debrining process as well as operational results over one year where CavBox is connected to NomiX and CavBase to embed cavern A7 into the existing cavern pool with four gas caverns in operation with high cyclic production and injection rates.

Key words: Caverns for Gas Storage, Computer Modeling