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OPTIMIZING CAVERN PERFORMANCE IN SALT GAS STORAGE THERMODYNAMICS, MODELING AND PREDICTION, PRESSURE MAINTENANCE

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Abstract

Given the current economics of gas production, trading and storage, the optimization of salt cavern gas storage performance becomes crucial for the storage operators.

The specific requirements of simultaneous gas and liquid movements make the monitoring and prediction of cavern behavior challenging. Geostock US has developed codes and a computational tool to estimate the cavern thermodynamic behavior, principally pressure and temperature. The purpose of this tool is to help storage operators in verifying storage capacity and inventory (monitoring) and to assist with decision making during high activity periods (predicting).

Monitoring the storage caverns (inventory, pressure, temperature, liquid level) is performed by calculating the expected cavern parameters based on site activities and periodically comparing the simulated parameters to measurements.

The calculation routines and results have been verified for actual caverns and the tool is also capable of predicting the cavern performance under different operating scenarios, especially when scheduled/planned gas movements and concurrent liquid movements (fresh water injection, debrining) are in a critical phase (heavy withdrawal/injection or caverns approaching maximum capacity).

Key words: Salt Cavern, Natural Gas Storage, Thermodynamic Modeling, Monitoring, Prediction

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