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METHODS FOR A PARAMETRIC STUDY OF A PROPOSED GAS STORAGE CAVERN DEVELOPMENT IN SALT

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Abstract

The purpose of the paper is to present methods used to compare the parameters of proposed gas storage salt caverns considering the depths, working gas inventory, base gas inventory, cavern volume, cavern diameter, costs of development, power usage, compression requirements and number of storage cycles. An example case is used to illustrate the methods, comparing the range of cavern casing shoe depths, from 2,000 ft to 4,000 ft.

The PBESS Gas Cavern Configurator spreadsheet was used as a first iteration and its output was used to simulate the cavern on the Salt Cavern Thermal Simulator. The Simulator results were then used to refine the Configurator output. Operational gas flow profiles were developed to conserve compression power, reducing the requirement and saving cost. Gas compressor sizing software was used to outline performance of injection and withdrawal cases, select compressor units for estimating and revise operational gas flow profiles. Cost estimates were developed with the cavern design cases and a data table was set up to compare parameters and cost estimates.

The example results showed a 6 Bcf working gas cavern with casing shoe of 2,600 ft to have a lower capital cost than other cavern depths. Other cavern parameters and cost factors could prompt the developer to select a deeper cavern.

Key words: Cavern Design, Cavern Development, Caverns for Gas Storage, Gas storage, Salt Domes, Storage Cavern,