

GEOMECHANICAL ANALYSES TO DETERMINE THE ONSET OF DILATION AROUND NATURAL GAS STORAGE CAVERNS IN BEDDED SALT

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ABSTRACT

Geomechanical analyses are often used to assess the operating pressure range of natural gas storage caverns in salt that will ensure the structural stability of the salt and nonsalt strata surrounding the cavern and the gas containment capability of the cavern. A new stressed-based design criterion was recently developed that provides a more accurate description for the onset of salt dilation under varying states of stress expected around natural gas storage caverns. Finite element analyses are described in this paper that assess the effects of various cavern design parameters on the stability of salt caverns in a bedded formation using the newly developed criterion for predicting the potential for salt dilation. The results determined by the new criterion are compared with those obtained by an existing criterion that has been used to assess several natural gas storage caverns in the United States.

Keywords: Caverns for Gas Storage, Rock Mechanics, Computer Modeling, Bedded Salt Deposits