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MAPPING STRUCTURAL GEOLOGY FROM SOLUTION-MINED STORAGE CAVERN WELLBORES FOR SELECTING CASING SHOE AND LEACHING STRING DEPTHS

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Abstract

Geologic structures in salt domes can be of great importance in the development and operation of hydrocarbon storage caverns in the United States Gulf Coast. A single-well acoustic reflection survey methodology was recently developed to image geologic structures in the vicinity of a borehole drilled into a salt dome. The borehole acoustic wave frequency is in the kilohertz range and acoustic propagation in salt usually has a high velocity and low attenuation. Thus the borehole survey allows for obtaining high-resolution structural images hundreds of feet across the wellbore. The images reveal salt dome structural geology characteristics believed to correspond to spine boundaries, mineralogic planes, and/or planes of preferred dissolution, which are impossible to map with only surface or typical borehole seismic data. This paper describes several case histories of structural geology impacts on solution-mined caverns, the data acquisition and processing procedures for mapping geologic structure before solution mining, and an inside dome imaging result that is validated with other measurement results.

Key Words: Cavern Design, Drilling, Geology, Salt Domes, Storage Cavern, Well Logging

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