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SALT SPINES, BOUNDARY SHEAR ZONES AND ANOMALOUS SALTS: THEIR CHARACTERISTICS, DETECTION AND INFLUENCE ON SALT DOME STORAGE CAVERNS

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Abstract

Salt spine movement and the variability between spines, their accompanying boundary shear zones and the presence of anomalous salts can influence the placement, design and operation of salt dome storage caverns. Data and knowledge developed from the oil and gas, sulphur mining and storage industries over the past hundred years provide a basis for understanding the origin and many of the characteristics of these features. Techniques that have been used to define the geologic framework of salt domes such as geologic mapping, profiles and seismic data both 2D and 3D can provide the means to delineate or infer the occurrence of the salt spines and their accompanying boundary shear zones. When information from the geologic framework of the salt dome is integrated with information derived from salt cavern in the form of well logs, salt cores, sonar surveys and operational histories; an understanding of the internal geologic framework of the salt diapir can evolve. The origin and characteristics, the use of geologic mapping and seismic interpretation and the integration with cavern data and histories are discussed. Numerous examples are discussed on how salt spine movement, boundary shear zones and anomalous salts have affect cavern placement, cavern design and cavern operations. Understanding the internal geologic framework of a salt diapir provides for better placement of caverns, addressing cavern problems and lends itself to assist in more efficient storage operations.

Keywords: Domal salt, Evaporites, Geology, Gulf Coast of US and Mexico, Salt domes, Salt properties