

Edge of Salt Definition for Salt Domes and Other Deformed Salt Structures – Geologic and Geophysical Considerations

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ABSTRACT

For salt storage caverns in close proximity to the edge of salt, an accurate assessment of the edge of salt is critical for prudent and efficient cavern operation. It should be noted that the edge of salt does not necessarily correspond with the limits of “good quality salt” as salt quality tends to degrade toward the peripheral edge of a salt structure. Geologic mapping utilizing well data and geophysical data provides the best means to delineate the geometry of a salt structure. The distance to the edge of salt needs to be addressed by examining the three-dimensional aspects of the salt edge in conjunction with cavern shape. Every salt structure is unique and the ability to resolve the edge of salt is determined by the local geology as well as the distribution, density, and quality of the subsurface data set. Depending upon the data available there are several mapping techniques available. A greater degree of resolution can be obtained when the salt geometry is assessed in conjunction with analysis of the flank sediments. An understanding of the local geologic scenario will determine which geophysical methodology will yield the best results. No matter which methodology is chosen, the accuracy of the results of any geophysical survey will be highly dependant upon the quality and detail of the pre-existing geologic model and the petrophysical data available for calibration or validation.

Resolution is generally a function of data quality and distribution. In exceptional cases, the edge of salt may be determined to a few ten's of feet or less, however geologic complexity coupled with limitations of the data may limit resolution to as much as several hundreds of feet. Flank resolution to within approximately one hundred feet is typical of most Gulf Coast salt domes that are well constrained by well control.

No stand-alone methodology is currently available to definitively locate the edge of salt. An integrated assessment of all of the currently existing geologic and geophysical data for the area surrounding the salt cavern will be needed to obtain the most accurate edge of salt depiction possible. The power of resolution is therefore directly dependent upon an optimum synergy of all available geologic and geophysical data.