

A Three-Dimensional Geometric Model of the Bayou Choctaw Salt Dome, Southern Louisiana, Using 3-D Seismic Data

Christopher A. Rautman¹, Karl M. Loeff², and Kurt M. Loeff³

1. Sandia National Laboratories, Albuquerque New Mexico
2. Geologic Consultant, Lovelady Texas
3. Geostock US. Houston Texas

ABSTRACT

The United States Strategic Petroleum Reserve Project has conducted a geological study of the Bayou Choctaw salt dome (and SPR site) using existing three-dimensional seismic data, which has been reprocessed to emphasize features in the vertical interval of principal interest for underground storage. This is believed to be the first openly published study of an onshore Gulf Coast salt dome using such 3-D data. The margin of the salt stock, as mapped using data with a spatial resolution on the order of 100 ft, exhibits vastly more small-scale complexity, both vertically and horizontally, than is typically of published representations of salt domes. Features on the salt flanks may be classed as flutes, outward bulges, and downward tapering wedges. Although the different types of features are somewhat gradational with one another, they reasonably be interpreted in terms of emplacement of the salt diapir as a collection of individual salt spines, separated by boundary shear zones, moving somewhat independently over time. This interpretation has implications for the internal fabric of the salt mass, particularly closer to the periphery of a dome. Salt fabric, in turn, has implications for the leaching and operation of underground storage caverns.

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