

ANOMALOUS SUBSIDENCE AT MONT BELVIEU, TEXAS

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ABSTRACT

The Barbers Hill salt dome at Mont Belvieu, Texas, is home to 131 brine production and liquid hydrocarbon storage caverns. This underground storage complex is the largest in the world with more than 200 million barrels of refined product storage space. In late 1987, the Mont Belvieu Operators installed a subsidence-monitoring system. The extensive monitoring has allowed the development of an accurate characterization of ground subsidence at Mont Belvieu. Most of the ground subsidence is related to storage and brine-mining caverns in the salt. However, two regions over the salt dome exhibit subsidence that does not directly relate to the underground storage caverns. The Mont Belvieu Operators commissioned an extensive microgravity survey, a two-dimensional seismic survey, and numerous borehole gyroscopic surveys to study the subsidence anomalies. The study results indicate that the anomalous subsidence may be related to differential movement between two spines of the salt dome. The spines in this part of the Barbers Hill salt dome have been mapped from the planes of preferred dissolution observable in the sonar surveys of the caverns. Differential movement of adjacent spines has been observed in a preliminary sense from a study of periodic borehole gyroscopic surveys. Precise horizontal position surveys of surface benchmarks and storage wellheads have been initiated and will eventually confirm or discount the differential movement of the salt spines.

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