

## **Application of a Novel Plug-and-Abandonment Method in a U.S. Gulf Coast Salt Dome**

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### **Abstract**

An inactive solution-mined salt cavern located in the Barbers Hill salt dome was plugged using a novel method developed by Solution Mining Research Institute research and designed for long-term cavern abandonment. During post-abandonment, brine warming and creep closure will cause a sealed salt cavern to have increased pressure. The subject cavern well described in this paper was opened to the porous and permeable caprock formation overlying the salt dome to allow for long-term brine-pressure relief from the salt cavern to the caprock.

A solution-mined salt cavern should be abandoned in a manner that ensures no leaks or failures exist that would lead to cavern collapse, negatively impact useable sources of drinking water, or other unintended fluid release from the cavern system. To ensure this, the cavern pressure should not exceed the lithostatic pressure or fall to a critically low pressure. Earlier works have shown, through numerical modeling, that opening a cavern well to the caprock can prevent caverns from reaching critically high pressures during postclosure.

The suitability of applying the plugging method at the Barbers Hill salt dome is evaluated. The subject cavern construction and development, operational history, and current conditions are discussed as well as a detailed review of the planning and regulatory compliance. The challenges and limitations specific to this well are also presented with a detailed account of the plugging methods.

**Keywords:** Abandonment, Cavern Plugging and Abandonment, Domal Salt, Gulf Coast of the U.S. and Mexico, P&A (Plug and Abandonment of Wells), Regulations, Texas