

Carlsbad South-Y: A Sinkhole that Waits to Open

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Abstract

In 2008, the roofs of two solution-mined salt caverns collapsed in the barren countryside 40 and 50 km NNE of Carlsbad, New Mexico. These unpleasant surprises prompted a state government agency to identify the potential for similar failure in another solution cavern, but this one underlying a significant infrastructure junction (South-Y) on the town's south side. Numerous studies since then converged on the assessment that this cavern (estimated 100m wide, 200m long, and 40m deep; top 135m and bottom 180m below surface), were it to collapse, would result in a sinkhole (estimated diameter 100m, depth 30m) which, together with its associated fractures, could interrupt two regional highways and an irrigation canal, and destroy several buildings.

Solution mining ended, and the last of two brine wells was plugged, in 2008. The cavern remains filled with brine, whose hydrostatic pressure continues to support the roof. Forecasts of roof stability duration range from 10 to 50 years, depending on assumed failure mechanisms.

Various options, some already implemented for early warning of, and others still under consideration for preventing, an impending collapse, include intensive monitoring, institutional controls, and filling the cavern with sand, crushed rock, low-strength flowable concrete, or potash tailings, or combinations thereof.

Cost estimates for implementing the more effective appearing support strategies range from \$15 to 25 million, while the cost for an unpalatable alternative, a controlled collapse with the necessary relocation of infrastructure, is estimated at \$50 million (all numbers in 2014 dollars).

Stay tuned, that you might discover which, if any, support option will be funded and implemented BEFORE the seemingly inevitable collapse of this cavern and the opening of a new sinkhole.

Key words: Brine Cavern, Prospective Sinkhole, Remedies, Alternatives, History and Status.