

**Stability Analysis of a Solution Cavity  
Resulting from Underground Injection  
at Louisville, Kentucky**

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**Abstract**

Underground disposal of aqueous HCl in carbonate rocks at 3000 feet depth at Du Pont's Louisville Works has resulted in the formation of cavities. We present here a combined stress/failure analysis which leads us to predict that the cavities will be stable against collapse and that elastic deformation of the rock mass will be quite small. With measurements of rock elastic properties, cavity geometry, and pre-existing stresses, we employed a numerical code to calculate the stresses due to the presence of the cavities. Measurements of rock cores defined the failure envelope of the formation. The net stresses predicted in the stress analysis fall well within the stable region of the envelope, demonstrating the cavities to be stable against collapse.