

Deep salt cavern abandonment: a pilot experiment

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ABSTRACT: The savoir-faire in term of solution-mined cavern abandonment in a salt formation that has been used for mineral production, hydrocarbon storage, or waste disposal is today a big issue. Nowadays, it is necessary to integrate the abandonment in the design of every new project of storage to convince people and mining authorities that gas storage in salt cavern is safe, reliable and environmentally friendly for long term.

In the late 1980s and early 1990s, Gaz de France performed a series of succinct sealed well and cavern field tests. These tests, realised in cooperation with Ecole Polytechnique (France), were partially funded by the Solution Mining Research Institute (SMRI Inc., USA). As a result of knowledge gained from these tests, the concept of the long term abandonment of salt caverns became more focused.

The main difficulty of the abandonment problematic is linked to fluid pressure increase in the cavern after sealing. This phenomenon is the result of different factors that interact with each other : salt creep, heat transfer between salt formation and cavern fluid, salt dissolution, fluid cavern percolation through the salt... All these factors must be taken into account for designing the abandonment process.

The first part of the paper will discuss these factors with the support of numerical simulation. The second part of the paper will highlight the practical impacts of these factors on a cavern abandonment experiment currently being performed on the Gaz de France natural gas storage of Tersanne (France). Because of the features of the site, the different factors

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