

**EXPLORATION OF A SALT DOME FOR UGS DEVELOPMENT IN A COMPLEX
TECTONIC AREA: GEOLOGICAL MODEL EVOLUTION OF A STRUCTURE
AFFECTED BY REGIONAL TECTONICS IN THE SOUTH WEST OF FRANCE**

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Abstract

Salins des Landes is an EDF underground natural gas storage project in salt caverns in the foreland basin of the French Pyrenees. The project was based on the creation of around twelve caverns in order to store around 600 million m³ of natural gas under normal conditions. Leaching of the caverns required the use of a dual water and brine pipe linking the site to the ocean. To date, the information gathered during the exploration phase shows that the salt dome studied is not compatible with the planned development. The presentation will therefore show the development of the knowledge on this structure, initially only defined at the surface and subsurface in its Northern part. Indeed, we will describe the contribution of each exploration phase, stage by stage, in order to reduce uncertainty regarding the definition of the geological model, i.e. interpretations of existing 2D seismic lines, information regarding salt exploratory wells, a gravity survey and two drilling surveys. Finally, we will provide feedback on the innovative methods and tools used for exploration of a salt structure.

In short, exploration of the structure began in 2006 with the identification of several salt domes in the Bas-Adour region. This initial work was based on the summaries and available data from the salt production wells mined in the Northern part of the structure. An exploration licence was obtained by EDF in 2009. An initial exploratory well (SDL1) was drilled in 2010 in the axial part of the structure. It reached a final depth of 1,954 m, with more than 1,200 m of drill cores. Rock salt is characterised here by its favourable mechanical properties, despite a high content of insoluble materials. Based on these initial results, the development of caverns was considered possible at a usual cut depth for underground storage facilities (1,000 to 1,500 m) and the technical feasibility of the project was confirmed.

A second well was drilled in 2012 (SDL2), close to the Eastern flank of the not yet clearly defined structure. Planned to be vertical down to 1,500 m, it was interrupted then diverted towards the axis of the diapir and reached a final depth of 1,750 linear metres (MD). It would appear that the results from this second well were fairly misleading as regards the quality of the salt and the distribution of insolubles. At this stage, the definition of the shape of the dome and its boundaries had been significantly modified. To confirm the change in interpretation, an additional gravity survey was carried out a few months later. The final image of the structure shows a dome size smaller than planned six years ago, before the start of exploration, linked to a thick overhang to the East of the structure.

Key words: Caverns for Gas Storage, exploration, wells, seismic, salt dome, insolubles.