

EXPERIENCES IN MEXICAN SALT CAVERNS MAPPING THROUGH STEEL PIPE WITH A NEW ULTRASONIC SURVEY PROBE

by

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1. ABSTRACT

This paper describes our experience in surveying through steel pipe, Mexican salt caverns for oil storage using a new Sonar System --SONIMP II consisting of a downhole tool, and surface equipment, developed at the Mexican Petroleum Institute (IMP). The scope of this project was to improve sonar surveys in Mexico, and to produce the best methodology according to the conditions of salt caverns and PEMEX (the Mexican oil company) requirements, and to reduce operational costs.

The SONIMP Sonar Project was supported by PEMEX. It had a duration of two years, plus six months in field tests. It involved a group of MSc's in electronics, computer systems and mechanics. The Project divided into three groups, each responsible for a specific part of the overall design, had a Project Leader, who was responsible for the overall design. Lab and field tests resulted in very interesting results because we were able to verify the theory in real life experiment.

Though we have had positive results in seven wells surveyed under different conditions, such as brine saturation, light and heavy crude oil, various wall thicknesses, it was very time-consuming in some cases, and resolution is poor in some vertical profiles through steel pipe. However, we are still working in the system to overcome these disadvantages, because we are certain that storage and exploitation of salt caverns in salt domes is a cheaper and safer option.

Finally, this paper discusses, though briefly, the theory of the Sonar System, after having described its sections, surface equipment required, powerful control and interpretation software, and downhole tool. Concluding with final reports, with and without pipe, horizontal & vertical cross section plots, 3-D plots, and partial- and total- volume plots.

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