

# **SOLUTION MINING RESEARCH INSTITUTE**

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**MEETING  
PAPER**



**GROUND SUBSIDENCE  
AT  
MONT BELVIEU, TEXAS**

**BY**

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## 1.0 INTRODUCTION

The salt domes along the Gulf Coast have been used for underground storage of Liquefied Petroleum Gases (LPG) since 1951 [Jacoby and Paul, 1974]. The world's largest underground LPG storage facility is located in the Barbers Hill salt dome at Mont Belvieu, Texas, which has a capacity to store more than 200 million barrels of product.

The first solution-mined wells in the Barbers Hill dome at Mont Belvieu were created in the 1940's, and LPG storage began in the early 1950's. Today, there are 124 solution-mined storage wells in the dome operated by nine companies: Conoco, Enterprise, Exxon, Diamond Shamrock, Lyondell, Tenneco, Texas Eastern, Warren, and XRAL. The storage wellhead locations are illustrated in Figure 1.

Barbers Hill salt dome is located in northwestern Chambers County about 20 miles east of Houston. It is one of several domes which are part of the Houston diapir province of the Tertiary Gulf Coast Basin. Sediments overlying the dome rise in relief about 40 feet above the surrounding flat-lying coastal plain. The dome is slightly elongated with the long axis oriented northwest-southeast. The maximum cross-sectional area occurs about 2,000 feet below sea level. At that level, the long axis is about 2.2 miles in length and the short axis is about 1.7 miles. The diapir axis plunges westward about 70 degrees giving the dome an eastward tilt. There is a well-developed overhang on all sides except the southwest, but particularly on the eastern side. The top of the salt is fairly flat, forming a planar surface about 1,300 feet below sea level. A more detailed summary of the Mont Belvieu operations and the Barbers Hill geology is provided by Ratigan and Vogt [1991a].

In 1987, the Mont Belvieu Industry Association commissioned the development of a ground subsidence monitoring system. Since late 1987, regular precision level surveys have been performed by the Fisher Company of Houston, Texas. The purpose of this paper is to describe the subsidence monitoring system and the subsidence determined from the level surveys during 1988. The measured subsidence is compared to the subsidence calculated by the SALT\_SUBSID computer code being developed by RE/SPEC for the Solution Mining Research Institute.

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