

Subsidence and Its Surface Manifestations at the Weeks Island SPR Facility

Stephen J. Bauer and Brian L. Ehgartner
Underground Storage Technology Department
Sandia National Laboratories*
P.O. Box 5800
Albuquerque, NM 87185-0706

Abstract

The ground surface elevation change data measured over the storage mine at the Weeks Island Strategic Petroleum Reserve (SPR) site during the last 16 years has been studied and analyzed. The subsidence rate is not constant with time and while the subsidence rate appears to have increased slightly during the past several years, recently the rate has increased more dramatically. The most recent increase came at a time when the SPR storage mine had been emptied of oil and was in the process of being refilled with brine. Once the mine approached refill completion, the subsidence rate has diminished. The recent greater subsidence rates are believed to be the result of increased pillar shortening in the two mine levels. Damage to surface structures that has been observed during the past 12-18 months is attributed to the continued subsidence and differential subsidence across structures. Structural damage is characterized at Weeks Island according to a number of deformational modes associated with subsidence. The responsible mechanisms are discussed in this paper and will be used to aid further subsidence model development.

Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the U.S. Department of Energy under Contract DE-AC04-94AL04-94AL85000.