

The Long Term Effects of High Pressure Natural Gas Storage On Salt Caverns

ABSTRACT

Operational designs of most natural gas storage caverns call for maximum pressure cycling on a daily and seasonal basis, unlike reservoir natural gas storage which is seasonal with only one cycle per year. A salt cavern in natural gas storage may have as many as eight (8) to ten (10) cycles per year. As cycling occurs the salt is expanded and contracted along the walls and roof of the cavern. This creates operational problems with salt sluffing and closure of the caverns. One of the main problems with salt falling from the roof and walls of the caverns, is that quite often large slabs of salt either bend or break the pipe hanging strings in the cavern area. Another problem occurring is the filling of the lower portion of the cavern thereby rearranging the storage volumes. As in the two caverns reviewed in this paper, salt falling to the lower portion of the caverns looks like loss of storage space until it can be quantified as displacement rather than cavern closure. With only the brine/gas interface and total depth surveys, the raising level of the cavern floor can indicate cavern closure. Additional methods were used to further discriminate between cavern closure and sluffing effect. The use of material balance calculations and additional sonars were used to define what was taking place in the two caverns discussed in this paper.