

SOLUTION MINING RESEARCH INSTITUTE

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**Meeting
Paper**



Cavern Evaluation by Means of Temperature and Pressure Profile Surveys

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Introduction

Domal salt caverns in gas storage service will lose effective space over time, as pressures are cycled during injection and withdrawal, due to cavern creep and closure caused by lithostatic pressure and salt plasticity - sometimes significant closure may occur in a short period of time if the cavern pressure is allowed to remain near the design minimum pressure for sustained intervals.

Gas material balances (inventory) will deviate from actual volumes as metering errors tend to accumulate when gas is continually being injected and withdrawn. If separate meters are used to measure gas in and out, inventory error may be much greater over time.

In the interest of due diligence during sale of several gas storage properties over the past two years, IGC has had the interesting opportunity to inspect the creep and closure rates of several inservice natural gas storage caverns in domal salt. The usual storage industry practice of "guesstimating" cavern temperatures and then calculating downhole pressures and Z factors is crude, and the reported calculation results are at best, a rough estimate.

The following described exercise provides a comparison with the numerous methods of determining cavern volume. They are: 1) daily cavern space creation from solution mining records, 2) sonar volume, 3) metered debrining volume, and total metered gas volume injected at maximum pressure during the initial debrining.