

SOLUTION MINING RESEARCH INSTITUTE

**1745 Chris Court
Deerfield, Illinois 60015-2079
847-374-0490**

**Meeting
Paper**



Well Casing Damage Above Compacting Formation

**Mike Bruno,
A. Dorfmann**

**Terralog Technologies USA, Inc.
332 East Foothill Boulevard, Suite B
Arcadia, California, USA**

**Presented at the Spring 1996 Meeting
Houston, Texas, U.S.A.
April 15-16, 1996**

Well Casing Damage Above Compacting Formations and Caverns

by M.S. Bruno and A. Dorfmann, Terralog Technologies USA, Inc.

Introduction

Formation compaction can occur due to a variety of extraction processes, including groundwater withdrawal, production of oil and gas, Frasch sulfur mining, and cavern creation in domal and bedded salt formations. This deformation often produces bedding plane slip and faulting in the overburden with time, which can lead to well casing damage. When such well damage occurs, significant costs are incurred not only for the replacement value of the well, but also from lost production or storage operations, increased well abandonment costs, and potential environmental liability. For example, in the oil and gas industry alone the total costs of well damage induced by reservoir compaction during the last ten years has exceeded several hundred million dollars.

In comparison to the significant efforts and studies currently being devoted to the subject in the oil and gas industry, casing damage above compacting formations in the solution mining industry has received relatively little recognition. There are several reasons for this lack of attention. One reason is that when well damage does occur above solution mining operations, it is sometimes mistakenly attributed to corrosion problems rather than to formation movement. Another reason is that the number of wells operated in large solution mining operations is relatively small in comparison to those operated at oil and gas operations of similar size, therefore the well damage is more rare and represents a smaller portion of the project capital costs. And finally, most wells in solution mining operations have historically been located at the center of the process zone, where induced shearing stresses are at a minimum.

With the increasing use of deviated and horizontal wells, and especially with increasing development of bedded salt caverns for gas storage, well casing damage concerns will take on increasing importance in the solution mining industry. This paper presents a summary of casing damage mechanics, describes some field observations, and discusses techniques to analyze and mitigate well damage.