

# High Resolution Seismic Detection of Trona Solution Cavities Between Wellbores

by

William G. Fischer, PE

## PREFACE

The trona brining operations that produced the cavities under study are considered to be industrial trade secrets because of the very nature of the competitive soda ash industry. Therefore this paper will not address any of the patented or unpatented brining techniques developed by FMC. It begins with the early efforts to detect solution cavities in trona and leads into the detection of unusual geologic features that could represent a hazard to the operation if ignored during mine planning and development. It was the age of the computer that eventually made massive data analysis and visual presentation possible. The thought process that led up to the use of a video comparator to display change in composite waveforms over time (making cavity detection visual) was a result of discussions between the author and James Wright & Associates<sup>1</sup>, our consulting seismologists in 1989.

This paper presumes that the reader is at least somewhat familiar with the fundamental theories behind reflective seismic measurement and interpretation, or has access to people who can help explain it later. It is intended to be more historical and instructive than complex. The equations and field layout designs are left to the practitioner.

Time constraints have made it impossible to obtain peer review and verification of the field and processing parameters prior to final-copy deadlines for the Hannover fall meeting of SMRI in September 1994. Any corrections to this draft-copy will be made in the form of an addendum to be attached at the time of the meeting.

Do not make the mistake of assuming the methods explained in this text are universally applicable to cavity detection in other fields. They may or may not be, depending upon geologic circumstances and the nature of the deposit. The factors controlling success or failure are addressed as pitfalls of interpretation.

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<sup>1</sup> James F. Wright & Associates, Inc., Consulting Geophysicists, PO Box 2328, Littleton, Colorado 80160-2328