

**Texas A & M University  
Department of Geophysics**

**ELECTROMAGNETIC WAVE PROBING FOR  
SALT DISCONTINUITIES**

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## CHAPTER I

## TWO PAGE SUMMARY

This report covers the radar probing research we have accomplished in Cargill's Belle Isle salt mine, Morton's Weeks Island salt mine, and International's Avery Island salt mine. These are discussed briefly.

Belle Isle - One week was spent using our high frequency, low powered Charlie ID radar system to probe the top of salt configuration around Shaft No. 2. Results were negative, so high powered, low frequency Bravo I was tried for another week. Again almost zero radar probing results were obtained, leading us to believe that water in the salt was the cause of high attenuation of the radar waves. Only two legitimate radar signals from inside salt were observed in all the research done at Belle Isle. Mine salt samples were taken and porosity and permeability measurements indicate that rock salt properties are such that water content of rock salt is most probable. More sampling is needed to be done to verify initial measurements.

Weeks Island - Almost two weeks of research probing with radar yielded no results whatsoever. Again salt sample measurements indicate porosity of rock salt but except for one case, the salt has no permeability. Mining operations also indicate wet salt. Again, more salt sampling and measuring are needed to verify initial data.

Avery Island - Excellent results were obtained using radar probing methods for top of salt configuration, as well as salt flank and other horizontal radar probings. Ranges of over 1100 feet were obtained in Avery similar to results in Hockley, Jefferson, and Grand Saline salt mines. Radar transmissions in certain places were super good. We penetrated two salt pillars at a time using the low powered radar equipment. This is the first time that has ever happened in any salt mine. Many new top of salt determinations were obtained generally substantiating (but in a few cases making suspect) the contours of top of salt as International has drawn from the available drill hole data. Additionally we obtained a possible radar reflection from a known oil well drilled into the salt and a rare radar return signal indicating a 90° change in polarization of the original emitted wave. These great results indicate much more work can profitably be done to give Avery mine personnel additional data concerning their salt mine. So much data was obtained using the low powered Charlie ID, that the higher powered (more penetrating) Bravo I was not even used. It will be in the near future.