

Miller, R.D., D.W. Steeples, R. Hill, and B. Gaddis, 1990, Identifying intra-alluvial and bedrock structures shallower than 30 meters using seismic reflection techniques: Soc. Explor. Geophys., Investigations in Geophysics no. 5, Stan Ward, ed., *Volume 3: Geotechnical*, p. 89-97.

Shallow seismic-reflection techniques were used successfully to image an intra-alluvial layer as shallow as 4 m and as deep as 30 m in the Texas Panhandle. The major bedrock structure and several associated structural offsets interpreted on seismic-reflection data were confirmed by drilling. Asymmetric grabens were interpreted on two of the seismic lines. The dominant frequency of most of the reflection data is in excess of 150 Hz. The recorded first-arrivals from 3 m out to a source-to-receiver offset at about 23 m were the air-coupled wave indicating that the *P*-wave velocity in the near-surface materials is less than 335 m/s. This shallow seismic technique proved quite valuable in determining aquifer geometry, offset relations of sedimentary materials, and bedrock structural relationships underlying the aquifer. The geophysical interpretations were corroborated by coring and well drilling which was guided by the geophysics. The overall interpretation combining the seismic data, geologic data, and hydrogeologic data suggests this graben provides increased aquifer storage and controls the movement of alluvial fluids along bedrock layers to surface seepage locations.