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Reflection Seismic Surveys For Basin and Range Geothermal Areas -
An Assessment

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Several state-of-the-art reflection seismic surveys have been completed in high-temperature geothermal areas of the Northern Basin and Range Province. The survey data have been made public through the cooperative Department of Energy/Division of Geothermal Energy Industry Coupled Case Studies and Exploration Technology programs. Data have been studied for the Stillwater, Dixie Valley, Beowawe, San Emidio, and Soda Lake resource areas. The data, their interpretation, and the geology are generalized in this paper.

Reflection quality and hence usefulness of the reflection method can be highly variable in the complex basin and range environment. Certainly survey design and proper processing are required to enhance the quality of the data. The most severe geologic condition appears to be the presence of surface or near-surface layered volcanic rocks, which result in strong early reflections, substantial ringing and poor energy penetration to depth, as is the case at Beowawe. In areas of thick alluvial cover, or Tertiary gravels and lake bed sedimentation (San Emidio, Soda Lake, Stillwater) data quality is often sufficient to map basin border faults and major displacements on volcanic or bedrock surfaces beneath 2000 to 4000 feet of cover. Faulting is indicated primarily by the systematic

termination of coherent reflections. Diffraction patterns are sometimes recognized but often obscured by the complex faulting and lithologic variations. The identification of a given ^{reflector} across major structures, and accurate time-to-depth conversion present difficult interpretation problems. Excellent data quality at Stillwater and Dixie Valley should contribute to the development of these resources.