# An Alternative Interpretation of Linear Dipping Events on 2-D Seismic Data from the Wichita Mountains Frontal Zone

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Accurate geologic interpretations of seismic data are essential to successful oil and gas exploration. Computer simulations and analyses can be cost effective methods of validating an interpretation. A geological cross section incorporating all available well control provides the foundation for simulating seismic data. Geometric and kinematic constraints contribute to a viable cross section. A geological cross section paralleling SEI 5223 includes an overturned syncline, a reverse fault and an overturned anticline. Well control for this cross section includes Lone Star Producing Company's #1 Earnest Baden with a total depth of 30,050 feet and El Paso Natural Gas Company's #1 Alpha Jones, that drilled to 24,550 ft. A dip meter well log from the Alpha Jones provided critical structural information for the cross section.

The complex subsurface structure of the Wichita Mountains Frontal Zone in southwestern Oklahoma remains difficult to image clearly with seismic data. Seismic ray trace modeling can enhance the acquisition, processing and interpretation of seismic data. The complex structures on the cross section combine with large velocity contrasts between Permian sediments and Precambrian basement to give rise to complex seismic ray paths. High-amplitude linear dipping events visible on this 2D seismic line were initially thought to be steeply dipping faults. Analysis of synthetic ray paths clearly shows the reflections originate from a different structure. Synthetic seismic traces created from ray tracing results can be migrated and depth converted to give a more detailed picture of complex structures.