**AAPG Annual Meeting**
**March 10-13, 2002**
**Houston, Texas**

Mike Shade[1], Mike Mullen[1], Calvin Kessler[2], Georgios Varsamis[3], Joakim Blanch[3] (1) Halliburton Energy Services, Denver, CO (2) Halliburton Energy Services, Houston, TX (3) Sensorwise, Houston, TX

# Improved Reservoir Understanding Using Crossed Dipole Sonic Anisotropy Analysis

The anisotropy analysis of crossed dipole sonic logging data can be used to improve reservoir understanding. The fast and slow shear wave travel time data and their corresponding orientation provide the needed input to calculate the minimum and maximum principal stresses and near-field stress orientation. The near-field stress orientation and stress anisotropy combined with 3D hydraulic fracture modeling is used to optimize the stimulation treatment design. The near-field stress information is also used for optimizing the perforated interval and phasing of the perforations.

Natural fractures provide many challenges for drilling, zonal isolation, and for production enhancement. The detection and orientation of natural fractures is a needed key for reservoir management. The detection and orientation of open natural fractures can also be determined with crossed dipole anisotropy analysis. The frequency dispersion characteristics of the crossed dipole waveform data are used to determine if the anisotropy is a result of natural fractures or of stresses. Crossed dipole log examples in both clastic and carbonate formations from the Rocky Mountain Region will illustrate how reservoir understanding can be improved with the use of this interpretation process.