
Application of Integrated Geophysical Methods in a Reservoir Characterization Study of the Upper Blinebry Interval, South Justis Unit, Lea County, New Mexico

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ABSTRACT

GeoSpectrum, Inc., performed a comprehensive reservoir study of the Upper Blinebry Formation at South Justis Unit. Previous petrophysical analyses indicated that roughly 80 percent of remaining recoverable reserves are in this Formation.

ARCO supplied GeoSpectrum with detailed core descriptions from 4 cored wells, 4 vertical seismic profiles (VSPs) from the cored wells, and 3-D seismic data that was acquired at 110 ft group spacing. Additionally, digital data from 43 injection wells with modern suites of logs were used for further petrophysical analysis and pore type determination.

The South Justis Unit is undergoing secondary recovery from a waterflood designed with a five-spot injection pattern and developed on 20 acre spacing. Oil production from the secondary recovery operations has been less than anticipated. A number of previous reservoir studies (both in-house and by contractors) have been conducted to address production problems. However, this study is the first at the South Justis Unit to integrate 3-D seismic attribute analysis and pore typing from advanced petrography and petrophysical analysis.

The presentation will review the methodology applied to integrate the large database for defining porosity development within the study interval. Geophysical methods applied in the reservoir analysis include: three versions of seismic data processing, integration of VSP data, phase analysis, seismic amplitude normalization, coherency, and seismic inversion. The seismic inversion compared favorably to cumulative oil and water production from individual wells. After removal of a few outliers, a Kendall Tau significance coefficient of about .9 is obtained.

Several recommendations have been made to increase production at the Unit, including a recommendation for selective infill drilling.