

3-D Seismic Recognition of the Jurassic Smackover Reservoir of Grayson Field Using Leading-Edge Reservoir Characterization Seismic Processing

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Winner of the 2001 GCAGS A.I. Levorsen Award

2001 GCAGS Thomas A. Philpott 1st Place Excellence of Presentation Award

Abstract

The discovery well at Grayson Field was drilled on a four-way dip closure defined by only three 2D seismic lines. Investors were hoping to find a maximum of 30- 40 feet of pay. After the discovery of 140 feet of gross pay in the Jurassic Smackover limestone in February 1993, the participants decided that a 3D seismic program was needed. The objective of the 3D seismic program was to define the structural and stratigraphic limits of the new field.

This paper compares the results of different processing techniques on the Grayson 3D seismic volume. Specific processing and interpretive tools available to the explorationist will be covered, illustrated with many different seismic displays. Evidence will be presented that 1) relative amplitude of the Smackover reflector does not define the reservoir's stratigraphic parameters, 2) attributes of the acoustic impedance data (velocity) show good statistical correlation to key reservoir parameters, 3) A.V.O. analysis shows a hydrocarbon indicator over the reservoir, and 4) reservoir characterization (petrophysical) data generated with the 3D seismic data delineates the production.

Through the use of this fully integrated sub-surface well information and 3D seismic data set, the thinner upper pay interval can be discerned from the thicker main pay. The reprocessed seismic data defines a new pay interval in the field. Results of recent drilling prove that the 3D seismic data expense was well worth the money.

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