

Sequence Stratigraphy: An Integrated Technique for Exploration and Exploitation — Seismic Examples

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Exxon's concepts of sequence stratigraphy developed from the stratigraphic interpretation of reflection seismic data, a technique known as seismic stratigraphy. Differentiation of chronostratigraphy from lithostratigraphy is critical in interpreting sequences on seismic data. Extensive experience indicates that reflections follow time lines in the rock record and that facies variations are recorded by lateral changes in reflection attributes. Integration of all available well, outcrop, and literature data in a seismic interpretation is essential to reducing the risks associated with predictions of play parameters using seismic stratigraphy.

Predictions based on seismic stratigraphy have been confirmed by drilling in frontier and developing areas. The level of stratigraphic detail needed from a seismic interpretation varies with technical and business objectives. The interpretation of sequence sets may suffice to establish basin history, but seismic identification of individual sequences or system tracts may be required to establish plays and prospects. Even with little or no well control, the presence, distribution, and continuity of individual reservoir and source units can be predicted using seismic stratigraphy, as illustrated by applications in lacustrine and deep-marine settings.

Although limited by seismic resolution, detailed stratigraphic interpretations of thin intervals have significant impact in mature areas. The geometry and seismic attributes of even individual reflections provide critical data about reservoir distribution, reservoir continuity, and field segmentation, as illustrated by applications in reservoir modeling and reservoir management.

Biographical Sketch

Wendy Burgis has worked at Exxon Production Research Company since 1977 as

a seismic sequence stratigrapher. Her experience includes reservoir and source prediction from seismic data in exploration and exploitation settings.

Wendy earned a B.A. in geology from Wellesley College in 1967. She did her graduate work at the University of Michigan, where her research in glacial geomorphology and the history of the Great Lakes led to M.S. (1970) and Ph.D. (1977) degrees. From 1970 to 1973, she worked as a stratigrapher for the Bureau of Mineral Resources in Canberra, Australia. ■