

4-D Seismic Integration from Interpretation to History Match: A Case Study from a Mature Deepwater Field

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An ExxonMobil deepwater production team has utilized two 4D seismic monitor surveys in conjunction with a baseline pre-production 3D survey for a large deepwater oil field.

4D seismic surveillance data has proven useful for mapping water and gas sweep in a very heterogeneous deepwater levee-channel reservoir system. In addition to defining gas and water sweep, integration of 4D seismic data has resulted in better definition of pre-production contacts, reservoir sand presence, sources of water production, and reservoir connectivity. 4D seismic has reduced uncertainty and better defined risks associated with future infill drilling. Integrating 4D seismic observations in an iterative manner during the modeling process and simulation model feedback have led to significant model enhancements resulting in an improved history match, and ultimately, in superior predictive capabilities for opportunity generation for an upcoming drilling campaign.

Key conclusions from this work include:

1. Integration of 4D seismic data with well data, pressure data, production data, and baseline seismic data has led to an improved understanding of dynamic reservoir connectivity.
2. Improved understanding of dynamic reservoir connectivity produces more accurate reservoir models resulting in better performance predictions.

This talk will focus on a case study that illustrates the integration of multiple 4D monitor surveys from interpretation to reservoir simulation history match in a large deepwater oil field.