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3-D Seismic-Geologic Model of North La Barge Field, Sublette County, Wyoming

North La Barge field, which produces oil and gas from Cretaceous Mesaverde sandstone reservoirs, is located on the northern extension of the Moxa Arch in southwestern Wyoming. To date, North LaBarge field has produced over 16 million barrels of oil (MMBO) and over 0.6 trillion cubic feet (TCF) of gas from all productive zones.

The objective of this study is to characterize, seismically and geologically, the sandstones of the Mesaverde Group in North La Barge field, Wyoming. The first step required the loading and verification of a 3-D seismic model based on previously interpreted horizons and faults. After that, a velocity model based on a synthetic seismogram was used to perform time-to-depth conversion of the seismic horizons and faults. Horizons and faults were adjusted to log tops using a back-interpolation process.

Depth-converted horizons and faults were used to create a 3-D structural model. This model honors the geometry of the formations that were deposited in the study area. This geometry has been verified by comparing the model to previously constructed cross sections. Within the structural model, a 3-D property model was created using SP logs from 161 wells to help to understand the lateral continuity of the hydrocarbon producing sandstones.

Integrating the structural maps, 3-D geological model and SP properties made it possible to analyze the distribution of the sand bodies and identify locations for infill or horizontal drilling. These proposed wells were mainly located in thick, continuous sand bodies in the Almy and Mesaverde sands.