Oral Presentation Abstracts Continued

Bone Spring (Leonardian) Carbonate Gravity-Flow Complexes and Turbidites, Delaware Basin: Facies Examples, Rock-Body Geometries, and Depositional Models

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The Bone Spring Formation in the Delaware Basin comprises Leonardian-age deep-water carbonates and siliciclastics. Carbonates are dominantly conglomerates deposited as gravity flows originating in the shelf margin that form dip-elongate rock bodies on slopes and strike-elongate rock bodies along toes of slope. Textural variations in gravity flows probably reflect energy variations across gravity-flow lobes or tongues during deposition. Carbonate clasts become less prominent as distances basinward of the toes of slope increase. Carbonate-dominated intervals ranging to 1,200 ft. in thickness are informally referred to as First, Second, and Third Carbonates. These intervals show overall uniformity in thickness along the Northwest Shelf and Central Basin Platform, although local variations occur that probably reflect point sources for flows.

Siliciclastics occur in turbidites and include sandstone deposited in channel-overbank complexes. They also occur as silt-rich mudrock deposited in overbank areas and as laterally extensive drapes. Sandstone occurs mainly in intervals characterized by gamma-ray responses higher than those of carbonate-dominated units. Siliciclastic-dominated intervals ranging up to 1,000 ft. in thickness are informally referred to as First, Second, and Third Sands. Sandstone and siltstone decrease in prominence and transition to mudrock as distances basinward of the toes of slope increase, and generally toward the south as distance from siliciclastic source areas in New

Mexico increase. Prevailing models favor carbonate deposition occurring mainly during sea-level highstands and siliciclastic deposition occurring during sea-level lowstands and transgressions. In these models, carbonate-siliciclastic couplets (e.g., First Sand-First Carbonate) form third-order sequences.

Reservoirs are preferentially formed in peloid- and bioclast-rich packstone and in quartz-sand- and silt-rich parts of turbidites. Hydrocarbon production varies geographically among different stratigraphic intervals and different rock types. Hydrocarbon sources may be largely, organic-bearing mudrock that occurs more frequently within siliciclastic-dominated intervals.

The Bone Spring produces hydrocarbons in Texas from a few thin sand units within the Third Sand interval. At Warwink field, hydrocarbons are produced from sand beds generally less than 10 ft. thick, whose well log responses include moderately low gamma-ray values (60–75 API units), separation between shallow- and deep-resistivity curves, and neutron-porosity/density-porosity log crossover if logs are run on a limestone matrix (a common practice).