

**AAPG Annual Convention
Salt Lake City, Utah
May 11-14, 2003**

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Surface to Subsurface Correlation of the Late Ordovician Montoya Group, Southern New Mexico and Western Texas

A field-based sequence stratigraphic framework including hand-held gamma-ray profiles of the Late Ordovician Montoya Group in southern New Mexico and western Texas was correlated into the subsurface using wireline logs, and core/cuttings descriptions. This analysis indicates that 2nd- and 3rd-order depositional sequences are regionally traceable. In outcrop the Montoya Group rests unconformably on the Early Ordovician El Paso Group, but in the subsurface it lies unconformably on the Middle Ordovician Simpson Group. The 2nd-order TST is characterized by skeletal packstones/wackestones with lower gamma-ray values. Deepwater cherty facies with relatively higher gamma-ray values, characterize the 2nd-order maximum flooding zone. The 2nd-order HST is composed of subtidal carbonates shallowing upward into prograding peritidal carbonate facies; this unit has a higher gamma ray response at its base and lower values at its top. The 2nd-order sequence boundary separating the Montoya Group from the overlying Fusselman Dolomite is a subaerial surface in outcrop but is conformable in the subsurface. Montoya outcrops can be differentiated into six 3rd-order sequences. Sequence 1 is locally present within incised valleys or topographic lows on the underlying El Paso karst surface. Sequence 6 occurs only far downdip being eroded updip. Sequences 2-5 are regionally recognizable and correlative into the subsurface. These sequences are equivalent to the Cable Canyon Sandstone plus Upham Formation, lower Aleman Formation, upper Aleman Formation, and Cutter Formations respectively. Integrating field observations, hand-held gamma-ray log profiles and subsurface data provides a detailed sequence stratigraphic framework to exploit the unusual Montoya Group chert reservoir.