

POSSIBLE TECTONIC INFLUENCE ON AND  
FACIES DISTRIBUTION OF SHANNON  
SHELF-RIDGE SANDSTONE, WYOMING

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In the Powder River Basin of Wyoming, Upper Cretaceous Shannon Sandstone shelf sand-ridges are formed along the crest of a broad, subtle, southwest to northeast-trending paleo-arch. During Shannon deposition, relief on the arch was great enough to alter shelf energies and cause sand-ridges to develop within a predominantly silty shale interval.

Possible recurrent movement in the Salt Creek Anticline created a paleo-high which strongly localized the development of thick sand ridge complexes in the Shannon Sandstone. During Shannon deposition, relief on the paleo-high apparently was strong enough to cause ridges to build laterally as well as vertically. Shannon ridge complexes at Salt Creek are more lobate, bigger, thicker, and more closely spaced than most central Powder River Basin ridges. Also, there are two vertically stacked ridge systems developed within the Shannon Sandstone. While the lower ridge system is coeval with the Shannon ridge system in the central basin, the upper ridge system is only developed locally and, we believe, is related to active

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growth on the paleo-high during Shannon deposition. At no time, however, did the paleo-high cause ridges to be sub-aereally exposed.

Eleven Shannon shelf ridge and ridge-associated facies were defined in outcrops on the Salt Creek anticline. Vertical and lateral changes in facies are relatively abrupt where observed in closely spaced outcrop sections, and, in general, facies are stacked in coarsening-upward sequences with Central Bar Facies commonly immediately overlying Interbar Sandstone Facies. Porous and permeable potential reservoir facies include: Central Bar Facies, a clean, cross-bedded sandstone; Bar Margin Facies (Type 1), a highly glauconitic, cross-bedded sandstone containing abundant shale and limonite (after siderite) rip-up clasts and lenses; and Bar Margin Facies (Type 2), a cross-bedded to rippled sandstone. These facies were formed by sediment transported and deposited in the form of medium to large scale troughs and sand waves on and across the tops of ridges by moderate to high energy shelf currents.