

Abstracts of Papers

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Permian Stratigraphy, Sedimentary Facies, and General Petroleum Geology, Wyoming and Adjacent Area

Distribution of Permian cyclic lithofacies and carbonate reservoir belts in Wyoming and southeast Idaho was influenced by growth of late Paleozoic structural elements, penecontemporaneous with deposition. Identification of paleostructural growth is based on interpretations of depositional environments of Permian facies, along with thickness patterns of Permian as well as pre- and post-Permian stratigraphic units.

The Phosphoria Formation and equivalent beds of the Park City and Goose Egg Formations are divisible into two main depositional cycles, comprising the Franson and Ervay Members, each of which is separated into subcycles, based on a marker-bed correlation framework, applicable throughout most of the Wyoming shelf province. Marker beds are thin sandy and shaly units that represent widespread clastic deposition across the carbonate shelf and evaporite deposition in the Goose Egg facies during low sea level stages at the termination of each subcycle. Petroleum reservoir beds are associated with early diagenetic dolomitization of coarse-grained skeletal carbonate mounds or banks, concentrated along paleostructural high areas of the shelf. Initial dolomitization of these beds is believed to have been caused by gravity-reflux of high-magnesium waters during low sea-level stages at the termination of depositional cycles, with a general westward shelf-to-basin gradient. Deposition of phosphorite and organic-rich petroleum source rock shale occurred at the time of maximum regressive and early transgressive stages of the two main cycles. Carbonate mound or bank buildup of bryozoan, crinoid, brachiopod, oolite-pellet, phylloid algae, and other skeletal debris occurred during maximum transgressive stages when optimum normal seawater circulation systems were present across the shelf.

Maximum thickness of organic-rich dark shale is in southeast Idaho and western Wyoming, but a substantial thickness also is present in the Green River, Wind River and Bighorn Basins. Generation and migration of petroleum probably began by Jurassic time in the west and late in Mesozoic time in the basins to the east.