

Multidisciplinary approach to Cretaceous problems - the sum is greater than the parts.

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The Cretaceous Colorado Group includes reservoirs producing from the Viking/Bow Island formations, Second White Specks Formation, Jumping Pound Sandstone, Barons Sandstone and Medicine Hat Formation. A multidisciplinary approach to basin analysis of the Colorado Group provides a valuable database for exploration and production in western Canada. By combining paleontology, sedimentology, geochemistry, reservoir characterization and petrophysics, the strengths of each discipline complement the studies as a whole. Until recently, the Colorado Group was the thickest, regionally extensive and undifferentiated succession of strata in the basin despite the fact that it contains 14% of hydrocarbon reserves in Western Canada and is a major source rock. Diamonds associated with Cretaceous kimberlite pipes have been explored for in Alberta and Saskatchewan.

Colorado Group sediments were deposited during the Cretaceous eustatic sea-level rise. The predominant sea-level rise was punctuated by multiple, local, tectonically-induced, relative sea-level falls and variable circulation patterns. It is these relative sea-level changes which are responsible for the introduction of coarse clastics into the basin. These are the reservoirs.

Our team's multidisciplinary approach has enabled us to map and name four previously undifferentiated, basin wide shale formations in the Colorado Group: Westgate; Fish Scales; Belle Fourche; and Second White Specks formations. Paleontological analysis in combination with the recognition of erosional surfaces and bioclastic layers identified several regional and local unconformities. Benthic microfossil assemblages supported by geochemical data identified anoxic events in the Cenomanian and early Turonian. In the upper Colorado Group sedimentological, geochemical and paleontological data clearly identify a variable shallow-water depositional setting influenced by the Sweetgrass Arch within an otherwise deep marine basin. An unknown siltstone unit (Sweetgrass Member) with gas reservoir potential was mapped in the Santonian of southeastern Alberta. Nannofossil data, particularly prevent possible miscorrelation of this unit with the underlying Medicine Hat Sandstone. A regional integrated study of the Barons Sandstone outlined stratigraphic position, facies distribution and depositional environment of this sandstone along the Rocky Mountain Foothills, providing an excellent basis for subsurface correlations of this interval.