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Reservoir Architecture of Mixed Siliciclastic-Carbonate Shallow Marine Strata: Outcrop Exposures of the Triassic Baldonnel Formation, Western Canada Sedimentary Basin

The Baldonnel Formation (Upper Triassic) in northeastern British Columbia, Canada contains the youngest (and largest) carbonate hydrocarbon reservoirs in northeastern British Columbia. This unit is a mixed siliciclastic-carbonate succession deposited primarily in offshore transition to shoreface settings on the western margin of the North American craton. Despite its economic importance, little published data is available on the Baldonnel Formation and considerable confusion remains concerning its depositional framework and relationship to adjacent stratigraphic units. Existing reservoir models are limited by reliance on well logs and limited core resources from relatively widely spaced wells. Recent field work in the Williston Lake area provides the first detailed sedimentologic models for the Baldonnel Formation. Numerous closely spaced exposures permit three-dimensional characterization of Baldonnel reservoirs through quantification of lateral and vertical lithologic variability, geometry of potential reservoir units, and facies heterogeneity.

Skeletal grainstones/packstones, composed largely of echinoderm elements, bivalves and articulate brachiopods, comprise the Baldonnel Formation's primary reservoir facies. These lithologies occur in shoreface, patch reef and tidal channel facies associations. Numerous stratal surfaces showing evidence of erosion occur within the Baldonnel Formation in outcrop and the subsurface. The surfaces are characterized by sharp-walled, granule-filled burrows (Glossifungites ichnofacies), as well as chert- pebble and phosphate-granule lags. They are correlative throughout the study area and preliminary correlations indicate that they can be extended throughout the subsurface of northeastern British Columbia. These surfaces commonly define the base of individual shallowing-upwards packages and are interpreted as parasequence boundaries.