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Influence of Basement Faulting and Reef-Induced Topography on the Formation of the Prolific Falher F Conglomerate Trend, Wapiti Field, Deep Basin, Alberta

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ABSTRACT

The Falher F unit is subdivided into four prograding parasequences labeled F1 to F4. F1, F2, and F4 consist of shallowing-upwards successions typical of prograding sandy shorelines with minor amounts of pebbles. The F3 parasequence, however, contains an anomalously thick (12m) succession of prograding, upper-shoreface and foreshore conglomerate. The conglomerates within the F3 parasequence form a NE-SW trending linear body that terminates longshore in section 27-66-7W6 and have produced over 8.5 x $10^9 m^3$ (330 Bcf) of natural gas within the study area.

Detailed log and seismic mapping indicates that the conglomerates were deposited along a linear topographic feature, which coincides with the northern edge of the underlying Gold Creek (Smokey) reef trend. Further, the northeastern termination of the conglomerate trend is coincident with a NW-SE striking basement fault that was re-activated during Falher F time.

Two models may explain the deposition of conglomerates. The first proposes that the landward movement of a pebbly barrier, formed during flooding at the end of F2 deposition, was halted at the topographic high. The second proposes that an abrupt slowdown in progradation rate of the F3 parasequence and steepening of the shoreface profile at the topographic feature lead to concentration of pebbles by normal shoreface processes. Both models explain how the reef-induced topography could lead to the formation of a conglomeratic shoreface and foreshore within the dominantly sandy Falher F. In either case, movement on the basement fault prevented longshore drift from carrying pebbles to the northeast portion of the study area.