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### **Sequence Stratigraphy of the Carboniferous Lisburne Group Carbonates, Northeastern Brooks Range, Northern Alaska**

The Carboniferous Lisburne Group carbonates, specifically the proximal upper Lisburne, is an important oil-producing reservoir at Prudhoe Bay. We have found that distal lower Lisburne reservoir facies are in coral boundstone and storm-generated coarse-grained bioclastic units. This differs from the proximal upper Lisburne reservoir influenced by subaerial exposure and later unconformity related diagenesis. A sequence stratigraphic interpretation is necessary to define successful exploration strategies for the distal Lisburne Group.

We have identified four sequences and corresponding systems tracts within the Lisburne Group based on bounding surfaces, parasequence and parasequence set stacking patterns, and lateral lithofacies relationships. The spatial distribution of the sequences documents northward onlap during TST deposition of sequences 1 through 4. The Pre-Permian Unconformity truncates sequence 4 to the north and sequences 3 and 4 to the south. Sequence 1 distal systems tracts are thick and are interpreted to have been deposited during a long-term increase in accommodation space. Proximal systems tracts, with the exception of sequence 1, have a progradational geometry that thins towards the south.

A change in parasequence stacking patterns is observed between We interpret the differences between sequences 2 and 3 to be related to changes in paleoclimate. Relatively thick parasequences and non-cyclic intervals record minor migration of facies in sequences 1 and 2 and are interpreted to have been deposited during a greenhouse climate. Parasequences in sequences 3 and 4 are thin, juxtapose deep over shallow water facies and are interpreted to have been deposited during an icehouse climate.