

Preliminary Investigation of the Carboniferous Lisburne Group, Nanushuk River Region, Central Brooks Range

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The Carboniferous Lisburne Group, a succession of carbonate rocks, has been identified in the Brooks Range Endicott Mountains allochthon, parautochthonous rocks in the northeastern Brooks Range, and in the North Slope subsurface. The Lisburne Group was the original reservoir exploration target in the Lisburne field at Prudhoe Bay. Its importance as both a potential subsurface source and reservoir rock warrants further investigation into the carbonate facies, lithologies, and conodont microfacies for continued correlation with other stratigraphic sections and well data across the Brooks Range and North Slope of Alaska. The Lisburne Group is a potential reservoir target in the National Petroleum Reserve, Alaska and in the Arctic National Wildlife Refuge (ANWR) 1002 Area. The variation in carbonate depositional environments, stratigraphy, facies, and long distances between the western, central, and eastern Brooks Range make correlation of units within the Lisburne difficult.

A total of 1271 meters of Kayak Shale and Carboniferous Lisburne Group outcrop were measured, sampled, and described in the central Brooks Range near the headwaters of the Nanushuk River to gather high resolution stratigraphic data to better interpret depositional environments and improve stratigraphic correlations with application of conodont biostratigraphy. The Nanushuk River section (Alapah Mountain Section of Armstrong and Mamet, 1978) records marginal marine depositional environments in the uppermost Kayak shale. Carbonate ramp sedimentation began on a marginal marine platform, followed by gradational slope and deep water starved basin-euxinic sediments, followed by continued open marine sedimentation (Armstrong and Mamet, 1978). The section is overlain by the Permian Etivluk Group, Siksikpuk Formation.