

SEDIMENTOLOGY, STRATIGRAPHY, AND SUBSURFACE EXPRESSION OF UPPER CRETACEOUS STRATA IN THE SAGAVANIRKTOK RIVER AREA, EAST-CENTRAL NORTH SLOPE, ALASKA

Decker, P.L.^{1*}; Lepain, D.L.²; Wartes, M.A.²; Gillis, R.J.²; Mongain, J.R.²; Kirkham, R.A.³; and Shellenbaum, D.P.¹

¹Alaska Division of Oil and Gas: *Corresponding author: paul.decker@alaska.gov;

²Alaska Division of Geological & Geophysical Surveys; ³Alaska Division of Mining, Land, and Water

Alaska's North Slope remains one of the most promising onshore oil and gas provinces in North America. However, much of the Colville foreland basin remains only lightly explored and many key stratigraphic relationships remain poorly understood. In an effort to improve Brookian sequence stratigraphic models and codify regional formation nomenclature, we have begun integrating detailed outcrop observations with available well and 2-D seismic data. This study presents measured sections from Upper Cretaceous rocks exposed along an unnamed drainage (known informally as Sagashak Creek) located between the Sagavanirktok and Ivishak rivers in the Sagavanirktok A-3 quadrangle, and relates these strata to well log data from the Echooka Unit 1 well approximately 30 km to the northeast. The total thickness of the composite outcrop section is estimated at 2,460 m, including covered intervals. The base of the section is exposed at the axis of the Aufeis anticline, and consists of lower Turonian deepwater sandstones and recessive weathering shales assigned here to the Seabee Formation. Some sandstone beds in this interval exhibit a strong, fresh hydrocarbon odor and locally strong oil stain. The middle part of the succession begins in brown, organic-rich paper shale and tuffaceous claystone here considered a tongue of condensed Hue Shale. Much of this interval also has strong hydrocarbon odor. Kerogen microscopy on multiple samples reveals a predominance of oil-prone amorphous kerogen at early to peak oil window maturity. The base of the overlying Canning Formation consists of highly contorted, probably slump-folded, thin- to medium-bedded, fine-grained turbidites and associated sediment gravity flow deposits of Santonian age. Continuing up-section, Campanian parts of the Canning Formation include fine- to medium-grained sandy turbidites interpreted as toe-of-slope fan facies punctuated by multiple thin, channelized conglomeratic beds that likely occur at lowstand sequence boundaries. These units pass upward into very thin-bedded, very fine-grained sandstone and siltstone interpreted as upper Canning Formation slope facies. The upper third of the exposure belt includes Schrader Bluff Formation sandstones and finer rocks with abundant trace fossils of the *Cruziana* ichnofacies and physical structures indicative of deposition above storm wave-base in a low-energy setting. The stratigraphic top includes upward-coarsening, dominantly fine-grained Campanian sandstones with abundant wave ripple cross lamination and other structures suggestive of deposition in shorezone settings. This important succession provides insight into the time-transgressive northeastward progradation of genetically related shelf, slope and deep water facies. In particular, this area allows an examination of seismic scale, internally regressive depositional sequences recorded by the Upper Cretaceous Tuluvak-Seabee and Prince Creek-Schrader Bluff-Canning Formations.