

ABSTRACTS

Petroleum Potential of Upper Mesozoic Strata in Lower Cook Inlet Basin on the Basis of Outcrops in Katmai National Monument

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A thick sequence of Upper Jurassic to Tertiary sedimentary rocks is exposed in Katmai National Monument. Five lithologically different units of late Mesozoic age have been studied. Interbedded siltstone and sandstones of the Oxfordian to Kimmeridgian Naknek Formation are the oldest rocks studied. These marine sandstones are typically olive gray and fine to medium grained and contain abundant plagioclase with lesser amounts of hornblende, fine-grained volcanic rock fragments, and significant laumontite cement. Unnamed Kimmeridgian to Valanginian sandstones with minor siltstones overlie and possibly intertongue with the Naknek Formation. These sandstones, deposited in a shallow shelf environment, show abundant crossbedding and moderate to good sorting. Quartz and plagioclase are the predominant framework grains, with only minor amounts of volcanic rock fragments and hornblende. Calcite is the primary cement. Overlying this unit is the Hauterivian to Barremian Herendeen Limestone, whose rock types range from *Inoceramus*-rich limestones to calcareous, quartz-rich sandstones with interbedded siltstones. Clean sandstones similar to those found in the unnamed Kimmeridgian to Valanginian unit also occur within the Herendeen Limestone. Unnamed marine

Albian sandstones and siltstones appear to overlie the Herendeen Limestone unconformably. Sandstones here are predominantly silty, volcanolithic, and plagioclase rich. The youngest Mesozoic unit studied, the Campanian to Maestrichtian Kaguyak Formation, unconformably overlies the unnamed Albian rocks. This unit consists of a basal marine sandstone, high in volcanic rock fragments and plagioclase, which grades upward into a marine siltstone and finally to an interbedded siltstone and turbidite sandstone sequence.

The unnamed Kimmeridgian to Valanginian sandstones show the highest reservoir potential of any units in the area. Over 1,000 feet of these sandstones have been measured. Low porosity (2.9 percent average) and low permeability (0.01 md average) measurements can be attributed to calcite cement and the fact that the area sampled is an active volcanic and tectonic belt. It is possible that these rocks have better reservoir qualities elsewhere. Potential source rocks were found along the Shelikof Strait coast near Hallo Bay. Here, organic carbon contents greater than 1.5 percent were measured in immature rocks from the Naknek and Kaguyak Formations. Some samples yielded a strong petroliferous odor when broken.