

Geology and Hydrocarbon Potential of the Kotzebue Basin, Northwest Alaska

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The Kotzebue Basin, located offshore under the Chukchi Sea and onshore in northwest Alaska, may contain significant oil, gas and coalbed methane reserves and could become an important petroleum producing province. The Kotzebue (or Selawik) Basin is one of the major sedimentary basins of North America. Its dimensions are approximately 80 by 350 miles and it contains up to approximately 20,000 feet of Tertiary and probably Cretaceous basin-fill that unconformably overlie thick pre-Late Devonian strata. NANA, the Regional Corporation for Northwest Alaska, controls the onshore portion of the basin (mineral interests covering 2.2 million acres) and is working jointly with NW Alaska, LLC to advance an exploration and development project.

SOCAL in the 1970s acquired extensive seismic, gravity, aeromagnetic and other data, and identified approximately thirty prospects, some of which are potential giants. Prospects include anticlines, horst blocks and stratigraphic pinchouts. Impressive hydrocarbon potential is demonstrated. The Cape Espenberg Prospect, located near the cape, is a shallow anticlinal dome with approximately 70 square miles of structural closure. The Amaouk Creek Prospect, located north of the Kobuk Delta, is an anticline with approximately 30 square miles of structural closure. SOCAL drilled two stratigraphic test wells that encountered thick, highly-prospective sequences of interbedded sandstone, conglomerate, mudstone and coal, with minor oil and gas shows. These stratigraphic test wells did not evaluate the prospective anticlines, but demonstrate that the components critical for hydrocarbon accumulations are present - highly porous and permeable reservoirs (sandstone and conglomerate), source (shale and coal), seal (shale), and trap (structural and stratigraphic). There is also potential in fractured and/or weathered basement reservoirs, and in shallow traps sealed by permafrost. Structural and maturation histories, and proximity of prospects to deep depocenters, appear favorable for charging prospects with hydrocarbons. The hydrocarbon system in the Cook Inlet Basin is considered a partial analogue for that of the Kotzebue Basin, which remains essentially unexplored.