chosen using only the gross geometry and stratigraphy of the tongue. This could be de-determined from sparse control early in the play. This sedimentologic model of the sand tongue can be used to determine exploration strategy.

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sandstone bodies are as much as 50-ft. thick, a few miles wide, and tens of miles long. They rest directly on the erosion surface, thin laterally by onlap, and are overlain by marine shales. Sandstones of this type contain stratigraphic oil accumulations, but appear to be relatively uncommon.

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NEARSHORE-MARINE SANDSTONES, ROCKY MOUNTAIN CRETACEOUS

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Important types of sandstone bodies in the Cretaceous sequence of the Rocky Mountain region include regressive shoreline sandstones and more restricted barrier-island and transgressive-marine deposits. Each is supplied by longshore transport and deposited in nearshore-marine environments. Differences depend, in part, on the rate of sediment supply in relation to the rate of subsidence. Recognition of type and knowledge of similarities and differences provide useful guides in exploration.

Regressive shoreline complexes were formed by seaward progradation of beach and shoreface deposits. They are as much as 100-ft. thick and sheet-like in geometry, extending tens of miles both parallel and perpendicular to the shore. They are replaced laterally and overlain by alluvial deposits, with channels locally scoured into the marine sequence. These sandstones are very common in the Rocky Mountain Cretaceous but rarely contain stratigraphic oil accumulations.

Barrier-island sandstone bodies were formed by upward (and seaward or lagoonward) accretion of beach and nearshore-marine deposits. They also are as much as 100-ft. thick, 10 mi. wide, and tens of miles long parallel to shore. They commonly overlie nonmarine or lagoonal deposits and are overlain by lagoonal or marine shales. Some contain stratigraphic oil accumulations.

Transgressive-marine sandstones occur in significant thicknesses only where transgression was slowed locally by topographic relief. In one example where the paleotopography is related to differential erosion of the truncated sequence ("strike valleys"), the

THE GEOLOGY AND DISCOVERY OF PRUDHOE BAY FIELD, EASTERN ARCTIC SLOPE, ALASKA

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The Prudhoe Bay Field is recognized as one of the largest oil fields in North America with estimated reserves of five to ten billion barrels. Reconstruction of the geologic history suggests that the combination of geologic controls on the field will be difficult to find duplicated elsewhere.

Hydrocarbons are present in Jurassic and Permo-Triassic sandstone and Pennsylvanian-Mississippian carbonate reservoirs. These strata, locally folded into a westerly-plunging, faulted anticlinal nose, are truncated by a pre-Cretaceous unconformity resulting in the subcropping of progressively older reservoirs to the northeast. Most of the hydrocarbons are trapped below the unconformity and are contained in the Permo-Triassic Sadlerochit formation. This reservoir is present in the field area as a uniform wedge of alluvial-deltaic standstone and conglomerate.

The pre-Cretaceous clastic reservoirs were derived from the ancient Beaufort Arch, north of the present coastline. In contrast, the unconformably overlying Cretaceous and Tertiary sandstone and marine shale were derived from uplifts on the steep south flank of the basin, near the present Brooks Range.

In 1944, during World War II, the U.S. Navy initiated the first extensive Arctic exploration program. This program was carried on for ten years at a cost of over $55 million. Drilling was conducted principally in two areas, the Barrow High and the Arctic Foothills belt. The Umiat Field, located on a foothills anticline, was the largest oil