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

*Amoco Production Company, Tulsa, Okla.

NEARSHORE-MARINE SANDSTONES, ROCKY MOUNTAIN CRETACEOUS

D. G. McCUBBIN*

March 8, 1971

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 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.

*Marathon Oil Corporation, Littleton, Colo.

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

DEAN L. MORGRIDGE*

November 7, 1970

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

discovery with estimated reserves of 20 to 100 million barrels in Cretaceous sandstones. The high finding costs experienced by the Navy tended to discourage industry exploration.

In 1963, several wells were drilled by BP Exploration Company (Alaska) Inc. and Sinclair Oil and Gas Company, in an attempt to extend the Navy foothills Cretaceous play. BP-Sinclair and Union Oil Company of California each later drilled unsuccessful Paleozoic tests near the Arctic coast.

In 1964 Humble Oil and Refining Company joined Richfield Oil Corporation (now Atlantic Richfield) in evaluation of Federal acreage south of Prudhoe Bay. Regional seismic data and Federal leasing policy in existence at that time caused Humble to shift the exploration effort from the Federal acreage to the eastern Arctic coastal area. The major portion of the Prudhoe Bay structure was leased jointly by Humble and Richfield, and by BP at the State of Alaska Sale in July 1965. The ARCO-Humble Prudhoe Bay No. 1 State was completed as the discovery well in June, 1968.

*Humble Oil and Refining Company, Los Angeles, California

OMEGA OF HYDROCARBONS

MERRILL J. REYNOLDS

Omega of Hydrocarbons is a history of the development of thought on the origin, environment, geochemistry, migration and and accumulation of hydrocarbons and documented by thoughts of those who have made important contributions.

During the last twenty years the knowledge of the genesis of hydrocarbons has greatly improved. This knowledge, when completely integrated into our thinking, will enable us to become more sophisticated in our search for new reserves of hydrocarbons.

*Ceja Corporation, Tulsa, Oklahoma

HILIGHT OIL FIELD

Campbell County, Wyoming

TOM SPRINKLE*

October 12, 1970

Hilight Oil Field, located on the east flank of Powder River Basin, was discovered in February, 1969. Development of the field has been rapid and continuous until now there are about 240 producing wells spaced on 160 acre tracts. Oil and gas are produced from an isolated body of Lower Cretaceous Muddy sandstone penetrated at an approximate average depth of 9700 feet. Contours of Muddy marker indicate regional basinward or southwestward dip without structural anomalies. Isopachous analyses indicate an average net effective reservoir of 9 feet. This relatively low pore volume reservoir surprisingly has a history of high productivity. Original reservoir limit tests and recent pressure interference tests indicate a per well drainage area greater than 320 acres and that the field production boundaries are not established. No free formational waters have been produced from the Muddy reservoir.

*Apache Corporation, Tulsa, Oklahoma

THE CAPABILITY OF THE OFFSHORE OIL INDUSTRY AND THE MARINE ENVIRONMENT

BURVON B. TETTLETON*

February 2, 1971

The strong feeling against the oil industry's offshore operations by the general public is basically unjustified. The general public has based its opinion on inaccurate reporting and this is what must be corrected. The offshore oil industry and the industries which derive their livelihood from the sea are actually allies in the common pursuit of the ocean's natural resources. The offshore oil industry does strive to be, and is, more than compatible. It is, on the other hand, inherently beneficial to most of these opposing interests. Personal observations over the past several years, beneath platforms in the Gulf of Mexico, show that each production platform be-