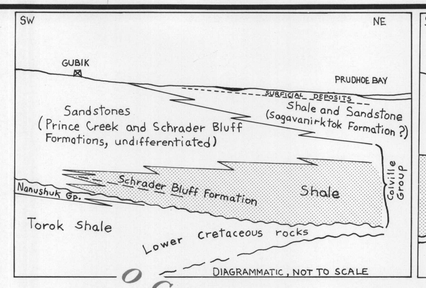
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

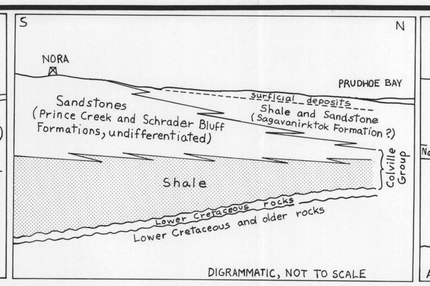
PREPARED IN COOPERATION WITH THE STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES, DIVISION OF GEOLOGICAL
AND GEOPHYSICAL SURVEYS AND DIVISION OF OIL AND GAS

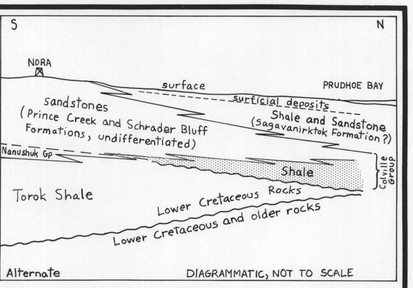
MISCELLANEOUS FIELD STUDIES
MAP MF– 928E

PESSEL, TAILLEUR, BIRD

ISOPACH, SHALE IN COLVILLE GROUP







Notes

A thick sequence of shale and siltstone underlies the unit of sandstone in the Colville Group (Map D) in the Prudhoe Bay area. In the subsurface, the lower part of the Colville Group commonly includes a section of bentonites and bentonitic shales probably correlative with similar rocks of the Shale Wall Member of the Seabee Formation in outcrop (Detterman and others, 1963, 1975). The section produces distinctive electric logs, but the base is difficult to determine in some wells. In the vicinity of Prudhoe Bay, the base generally appears to be a few hundred feet above the major unconformity that forms the stratigraphic trap for the oil pools.

In cross sections of the Stratigraphic Committee of the Alaska Geological Society (Fackler, 1971; Mangus and Pessel, 1972), the base of the Colville Group is shown as an unconformity, and there is demonstrable discordance at this boundary in the outcrops near Umiat (Detterman, 1975). A discordance is also apparent in the subsurface near Point Barrow (Robinson, 1959). In the subsurface of the Prudhoe Bay region, however, the rocks above and below this boundary appear generally conformable, although minor cross-cutting can be demonstrated locally on the basis of electric logs.

According to the Stratigraphic Committee of the Alaska Geological Society, the Colville Group is underlain by a few hundred feet of shale of Early Cretaceous age in the vicinity of Prudhoe Bay. These shales are not included in the series of isopach maps because they are very thin throughout most of the map area, and the thickness trends are too uncertain to be useful, even in a regional sense.

An important interpretive assumption has been made in the determination of the base of the Colville Group in the area of the Arco Susie No. 1 well (T. 2 N., R. 13 E.). In this well, the base of the Colville Group has been placed in a position thought to be correlative with its position as determined in the Texaco West Kavik No. 1 well (T. 5 N., R. 20 E.) by the Stratigraphic Committee of the Alaska Geological Society. The writers are aware of an alternate interpretation, held by some oil industry geologists, that the base of the Colville Group is at a point about 6,000 feet higher in this well. This interpretation is shown on the alternate stratigraphic diagram accompanying this map. It should be noted that this alternate interpretation would change the shape of the contours by a significant amount in the southern part of the map area and would shift to the north the apparent depositional axis of the sedimentary basin during Late Cretaceous time.

CONTOUR INTERVAL: 1000 FEET
Scale 1:500,000
1 inch equals approximately 8 miles

Base from Harrison Bay, Beechey Point, Flaxman Island, 1955, Umiat, Sagavanirktok and Mount Michelson, 1956, 1:250,000
U.S. Geological Survey

GENERALIZED ISOPACH MAP OF SHALE IN THE COLVILLE GROUP EASTERN NORTH SLOPE PETROLEUM PROVINCE, ALASKA

BY G.H. PESSEL, I.L. TAILLEUR AND K.J.BIRD 1978

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