calcareous phyllites of the Hadrynian to Lower Cambrian Mt. Mye Formation and the Lower Cambrian to Lower Ordovician calcareous phyllites of the Vangorda Formation.

The Grum deposit is similar to other Anvil deposits and can be divided into four major ore facies. These occur in stratigraphic succession from a basal and marginal "ribbon-banded" graphitic quartzite (representing both sedimentary and hydrothermal inputs) upward through pyritic quartzites, massive pyritic sulfides, and finally baritic massive sulfides and sulfates. This zonation is well developed in one of the sulfide horizons at Grum, and could be caused by increasing fO_2 and pH or by decreasing temperature. A sericitized alteration envelope incompletely surrounds the ore horizons and is related to ore fluid influx. Deposition most likely occurred in localized sea-floor deeps from anoxic hydrothermal brines.

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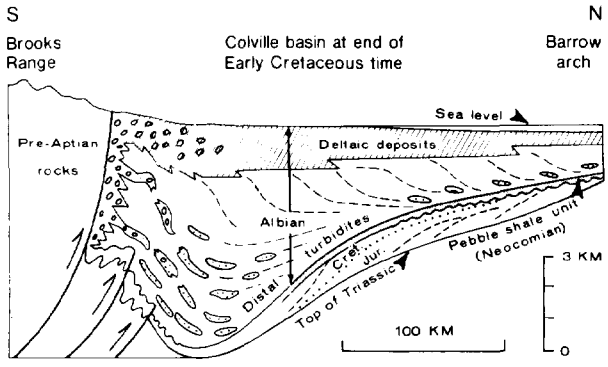
Depositional History and Seismic Stratigraphy of Lower Cretaceous Rocks, National Petroleum Reserve, Alaska and Adjacent Areas

Knowledge of depositional history of Lower Cretaceous rocks in the National Petroleum Reserve in Alaska is necessary for predicting the occurrence of potential sandstone reservoirs. These rocks range in thickness from 7,000+ m along the Colville basin axis to about 1,200 m on the Barrow arch. Lower Neocomian strata on the north flank of the basin consist of southward prograding marine shelf and slope deposits of shale and minor sandstone units. Uplift, erosion, and subsequent transgression on the northernmost flank of the basin resulted in deposition of the pebble-shale unit in late Neocomian time and termination of the northern provenance. Following this, the basin was downwarped, and little deposition occurred on the north flank until distal, deep-water deposits of the Torok Formation onlapped and downlapped the south-dipping flank of the basin in middle or late Albian time.



On the south flank of the basin, southern-source turbidites of the Okpikruak Formation (early Neocomian) accumulated in a subsiding foredeep and were subsequently thrust northward in late Neocomian or Aptian time. The Fortress Mountain Formation (early Albian), which consists of as much as 3,000 m of mainly deep-water deposits, unconformably overlies the Okpikruak and older rocks on the southernmost flank of the basin. Filling of the Colville basin occurred in middle to late Albian time as thick prodeltaic and deltaic deposits of the Torok Formation and Nanushuk Group, respectively, prograded across the basin from the south on the south side of the basin, but prograded principally from the west-southwest over most of the basin.

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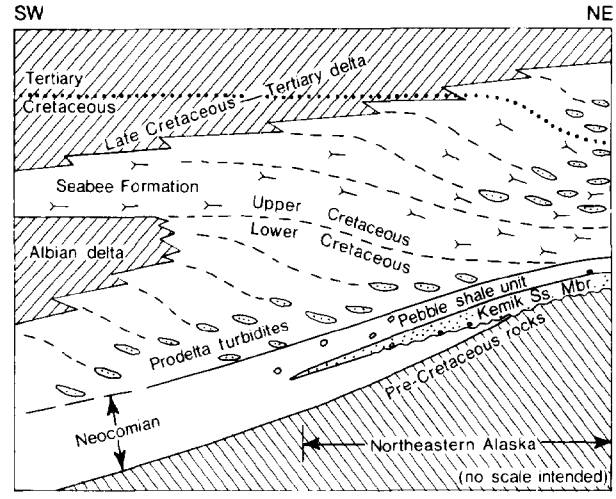
Cretaceous-Lower Tertiary Depositional Relations, Northeastern Alaska

Analysis of depositional environments and new paleontologic data indicate the need for a revised interpretation of Cretaceous and lower Tertiary stratigraphy in northeastern Alaska. A revision is important to the understanding of these rocks in unexplored areas to the north. In the Sadlerochit Mountains area, the late Neocomian transgressive Kemik Sandstone Member and pebble shale unit of the Kongakut Formation unconformably overlie Jurassic and Triassic rocks. The unconformity, which is present throughout northernmost Alaska, apparently grades to a conformable shelf sequence to the south. In the Sadlerochit Mountains area, Upper Cretaceous organic-rich shale and bentonite of



the Seabee Formation overlie the pebble shale unit; the intervening Aptian and Albian strata are either absent by nondeposition or are a thin, condensed section. Subsequent deposits of Late Cretaceous and early Tertiary(?) turbidites and shale were probably derived from east-northeasterly prograding deltas that are exposed west of the Canning River.

Cretaceous strata in the Sadlerochit Mountains area are about 700 m thick and contain no erosional unconformities. The comparatively thin section is attributed to the area being high (although still in deep water) relative to the Colville basin axis to the south, which was a sediment trap.

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Correlation of Thermal Conductivity with Physical Properties Obtained from Geophysical Well Logs

Thermal maturation studies of hydrocarbons in sedimentary basins require knowledge of the regional heat flow. Thermal conductivity data are necessary in deriving heat-flow estimates, but at present the only method available for obtaining conductivity values is by individual sample measurement in the laboratory. Many of the physical properties that are measured during geophysical well logging of petroleum boreholes are related to the same properties that determine thermal conductivity. The object of this study has been to derive an empirical relation in order to determine thermal conductivities from well-log data alone.