



# British Columbia Geological Survey Geological Fieldwork 1983

## STRATIGRAPHIC AND DEPOSITIONAL RELATIONSHIPS BETWEEN THE BLUESKY MARKER UNIT, GETHING MARINE TONGUE, AND UPPER COAL MEASURES OF THE GETHING FORMATION (93O, P)

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A recent correlation of Lower Cretaceous coal measures in the Peace River coalfields (Duff and Gilchrist, 1981) documented the presence of a major marine tongue in the Gething Formation south of Sukunka River (Figs. 45 and 46). This tongue divides the Gething Formation into upper and lower coal-bearing sequences. Prominent coals in the upper sequence include the Bird, Skeeter, and Chamberlain seams of BP Exploration (Canada) Limited's Sukunka property. Deposits of the marine tongue thin to the southeast and thicken to the northwest. They consist of an upward coarsening sequence of interbedded siltstones and sandstones that is free of coal; they commonly contain the marine bivalve *Entolium irenense*. Deposits 'shale out' to the northwest into the Moosebar Formation, while becoming sandy and even pebbly to the southeast where they thin. To the northwest coal drill-hole data from BP's Sukunka and Teck Corporation's Burnt River East properties indicate that the Bird, Skeeter, and Chamberlain seams pinch out (in that order) and are replaced by marine sandstone and siltstone. Similarly, gamma and density logs from petroleum and gas wells show that the upward coarsening sequence of the marine tongue persists to the northwest but loses coal 'density kicks' at the top (for example, see Quasar et al Oetco, 6200' to 6600' in Duff and Gilchrist, 1981).

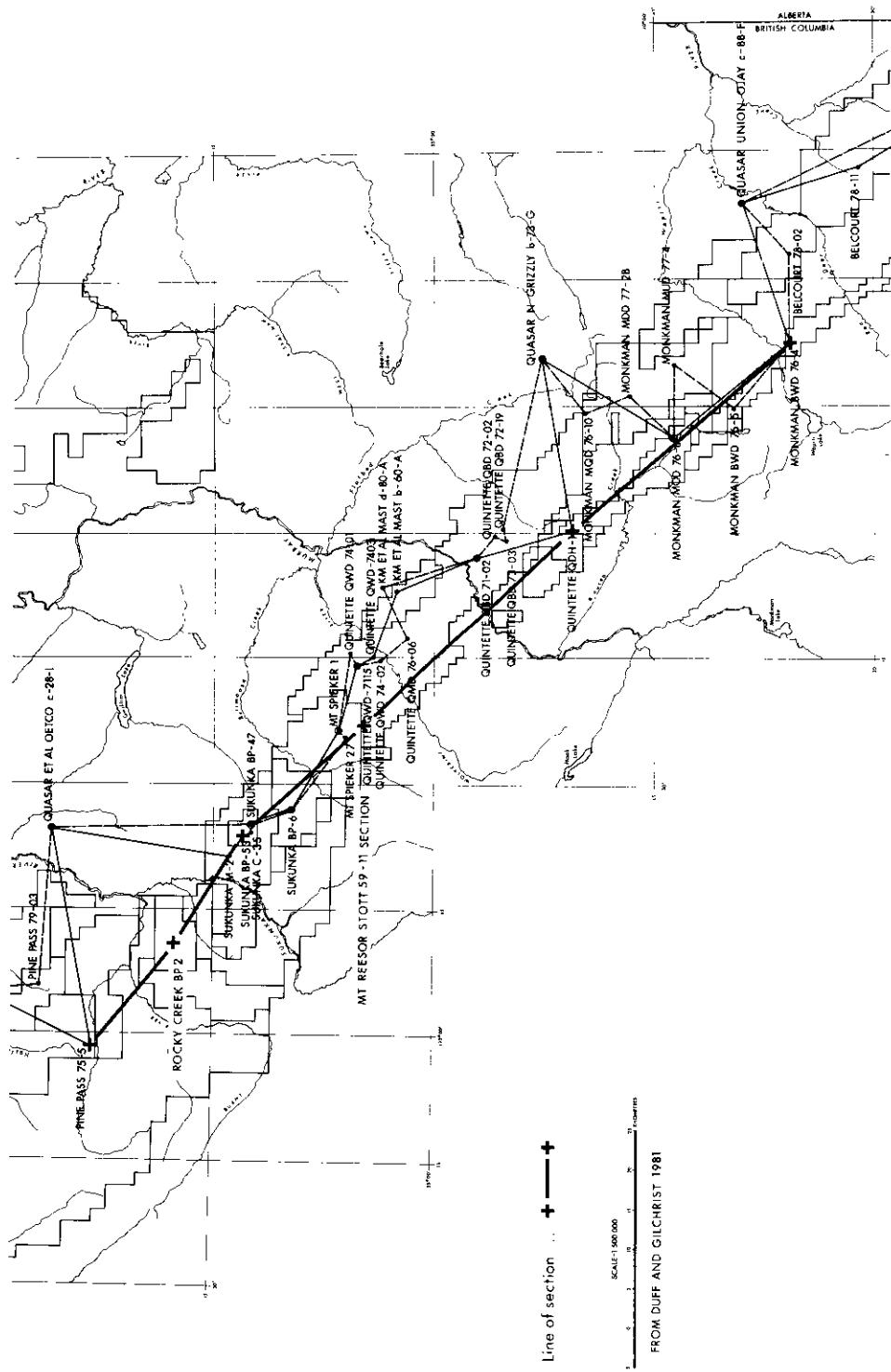
The presence or absence of coal may be used as a measure of the areal limit of the upper coal-bearing sequence. This is illustrated on Figures 47 and 48 for the Sukunka-Gwillim Lake area. The data indicates the presence of a deltaic lobe that trends northeast and is bordered by marine deposits of the Moosebar Formation.

Northwest of Sukunka River the upper coal-bearing sequence is absent. Between the Pine and Sukunka Rivers 'lower' Gething rocks are overlain by silty sedimentary rocks of the Moosebar Formation, these being lateral equivalents of the Gething marine tongue. At Peace River Canyon rocks of the 'lower' Gething Formation are overlain by mudstone of the Moosebar Formation.

The top of the 'lower' Gething Formation is in sharp contact with a pebbly and glauconitic marker unit called the Bluesky (Pugh, 1960). The Bluesky is generally regarded as a thin lag deposit formed during initial transgression of the Moosebar Sea. However, it varies considerably in thickness (<1 to 40 metres) and lithology in the Peace-Pine Rivers region, where it consists variably of pebbly mudstone, pebbly arenite, or quartz arenite.

*Southward the Bluesky persists as a distinct marker unit to the area of the Sukunka River. There it 'merges' with and forms the base (?) of sandy and glauconitic sedimentary rocks of the Gething marine tongue (for example, in BP Sukunka diamond-drill hole C-35 and on Figs. 45 and 48 of this report). Together these rocks represent sediments deposited in shallow offshore conditions in the Moosebar Sea; they lie near the southern limit of its transgression.*

Some workers, for example, oil company personnel and White (1983), classify the entire marine tongue as the Bluesky. For this reason, White's isopach map shows pronounced thickening of the Bluesky in the Gwillim Lake area. Because it is part of the marine tongue, it is clear that the Bluesky disappears as the



**Figure 45.** Location map – Peace River Coalfield correlation (from Duff and Gilchrist, 1981).

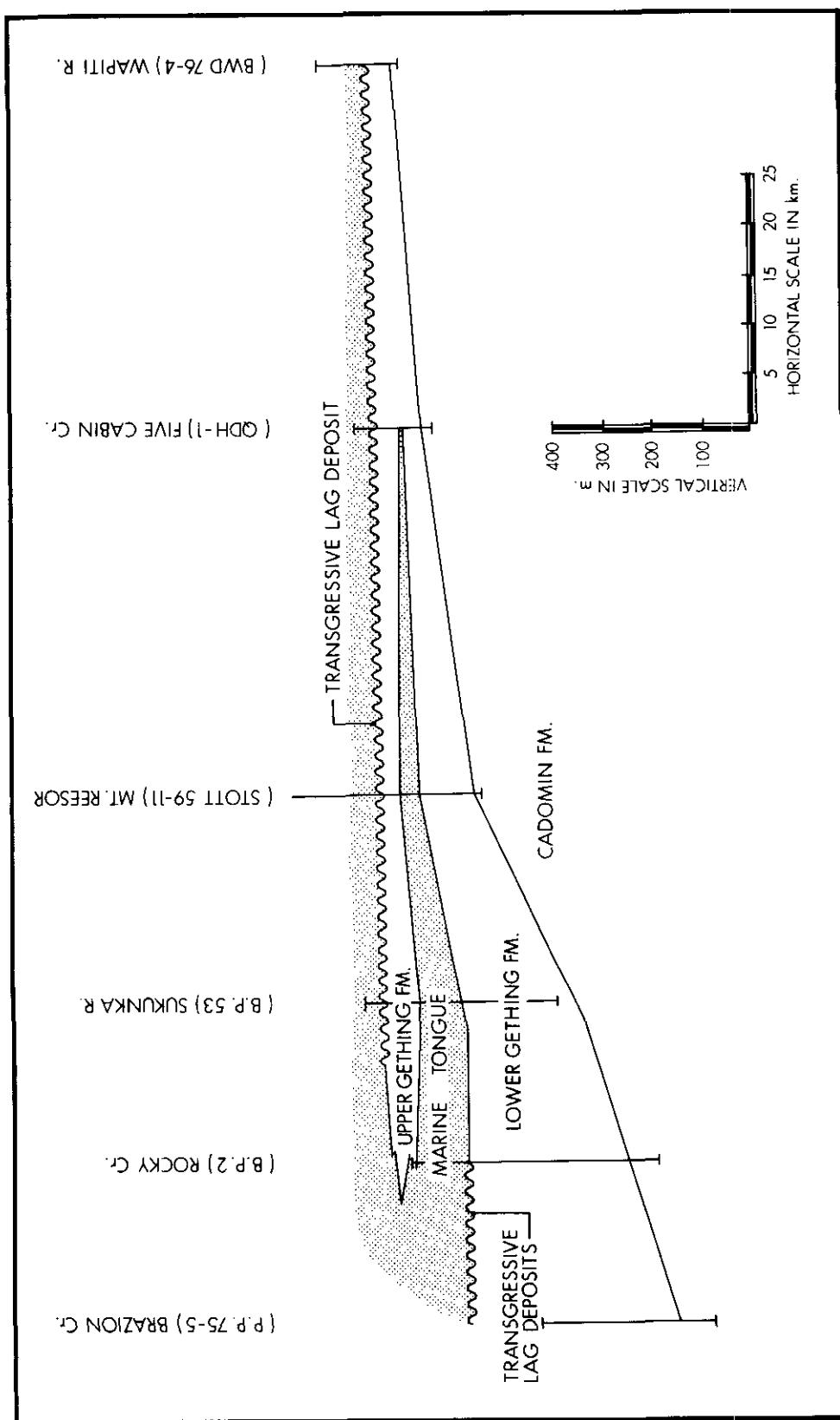


Figure 46. Northwest-southeast line of section showing marine tongue in the Gething Formation. Note the two transgressive lag deposits, they are not stratigraphically equivalent.

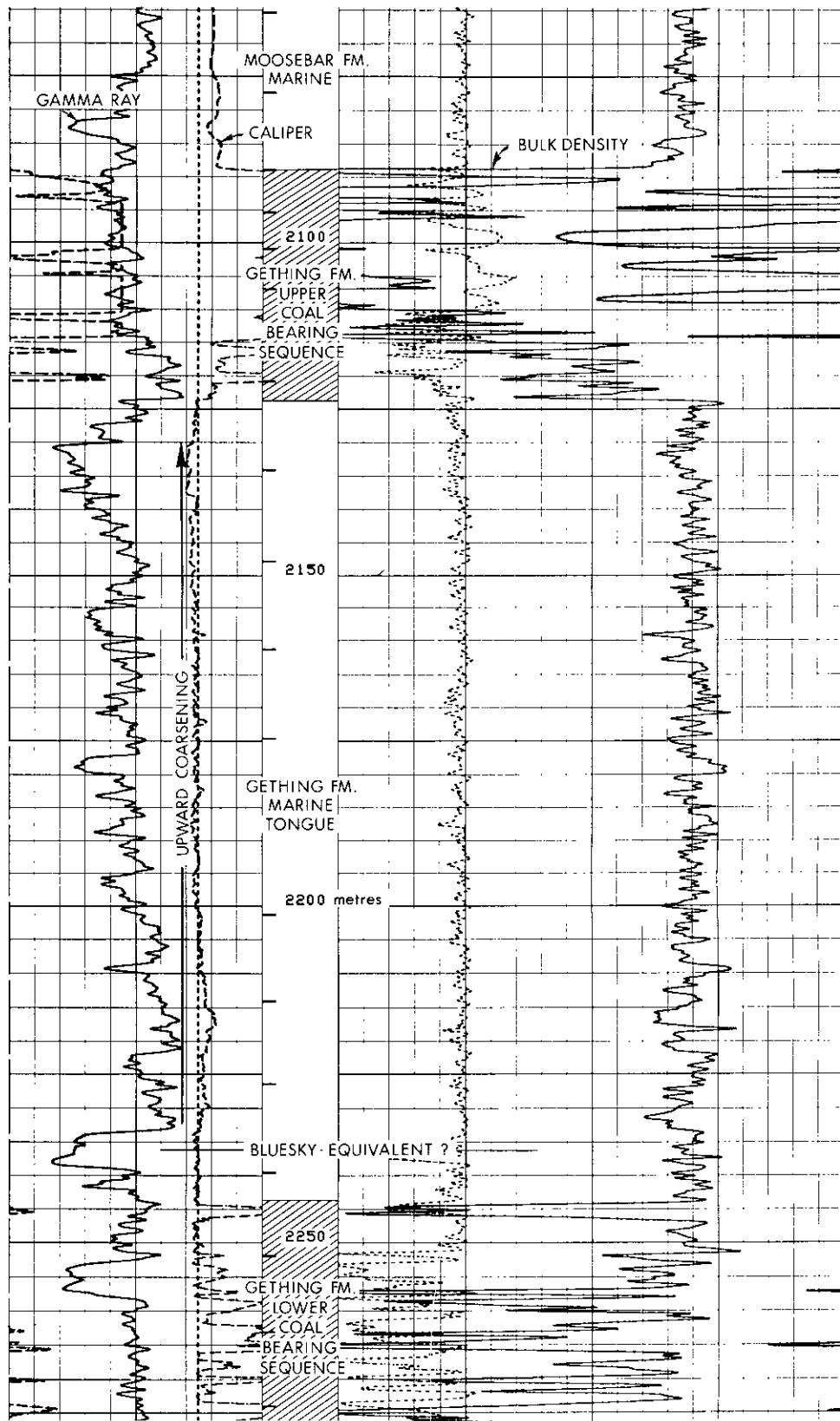


Figure 47. Interpretation of gamma ray and bulk density log data for GETTY ET AL GWILLIM c-27-E, 93P/6.

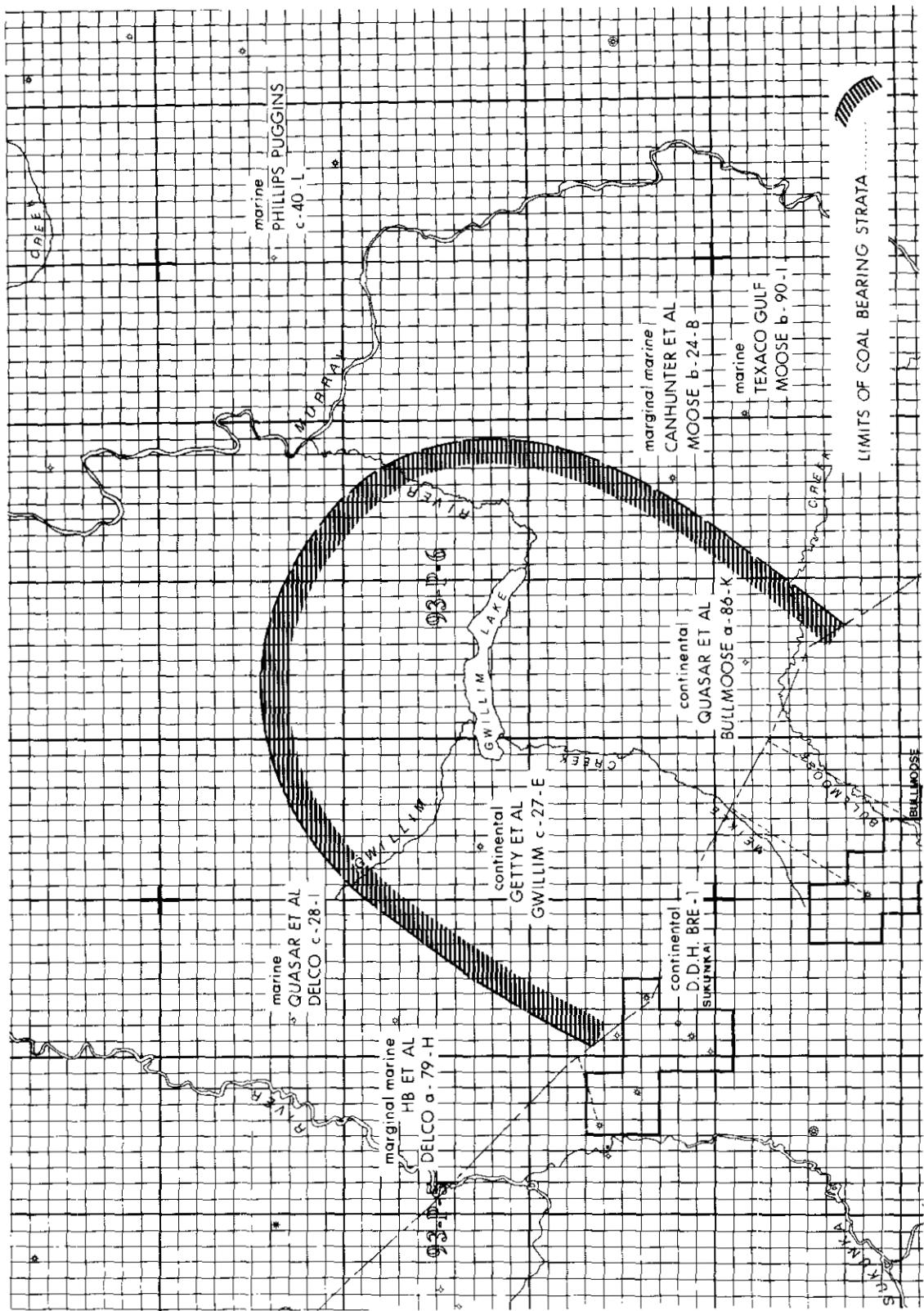


Figure 48. Aerial limits of coal-bearing strata above the Gething marine tongue.

marine tongue pinches out. Southeast of Sukunka River the top of the 'upper' Gething is in sharp contact with another pebbly unit. This unit cannot be correlated or isopached together with the Bluesky on top of the 'lower' Gething Formation; they are deposits of separate transgressions; there is a regressive deltaic sequence stratigraphically between them.

A northeast-trending basement high called the Peace River Arch probably controlled large-scale migration of the land/sea boundary, shallowing of the Moosebar Sea, and orientation of the 'upper' Gething delta lobe. Stott (1974) documented the position of the arch and its effect on sedimentation patterns throughout much of Early Cretaceous time.

Thickest accumulations of the Bluesky appear to coincide with the edges of basins of subsidence. In the south, this occurs where there is rapid thickening of the Gething Formation at the edge of the Peace River Arch at Sukunka River. To the north, substantial thicknesses (up to 40 metres) of Bluesky arenite and conglomerate on the Moberly licenses (Gulf Canada Resources Inc.) and Butler Ridge accumulated along the north and south edges of a major east-west trough of subsidence between the Peace and Pine Rivers (see report on Butler Ridge map-area, this volume and Stott, 1968, Fig. 10, p. 31). It is in this trough that the maximum thickness of Gething Formation was deposited.

Areas of maximum subsidence would quickly be drowned by marine waters; hinge zones on the edges of basins might be expected to be reworked with longshore drift, beach, and offshore bar development. McLean and Wall (1981) suggested that extensive estuaries formed during transgression of the Moosebar Sea in Alberta; the thickness and distribution of the Bluesky Formation may be related to similar estuaries developed in northeastern British Columbia.

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