EASTERN LIMIT OF UPPER COAL MEASURES OF THE GETHING FORMATION (CHAMBERLAIN MEMBER) PEACE RIVER COALFIELD (93P)

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INTRODUCTION

In a recent correlation of Lower Cretaceous coal measures in the Peace River Coalfield, Duff and Gilchrist (1983) documented the presence of a major marine tongue in the Gething Formation. The marine tongue separates the Gething Formation into upper and lower coal measures for an area extending southeastward from the Sukuna River (Fig. 87). Northwest of the Sukunka River the upper coal measures pinch out and the marine tongue passes laterally into the Moosebar Formation. To the southeast at Kinuseo Creek the marine tongue pinches out and upper and lower coal measures merge (Fig. 88). The upper coal measures of the Gething Formation are termed Chamberlain member by Duff and Gilchrist (1983).

Examination by the writer of additional coal drill hole data, together with gas and oil well data from the plains, support the Duff and Gilchrist correlations and tentatively define the areal limits of the Chamberlain member in the Sukunka-Gwillim Lake area (Legun, 1984). A delta-like lobe was delineated which pinched out both to the north and east against marine units. Work this year was focused on tracing the marine boundary of the Chamberlain member to the southeast of Gwillim Lake. The work was facilitated by the B.Sc. thesis of Williams (1984) on the Bluesky Formation of the plains.

The Bluesky, as defined by Williams and oil company geologists, corresponds to the interval between lower coal measures of the Gething Formation, and the Moosebar Formation; therefore it includes the marine tongue, Chamberlain member, and its lateral (marine) equivalents (*see* Fig. 88). Williams subdivided the Bluesky into a number of units based on geophysical signature. Her continental unit, B1, is roughly equivalent to the Chamberlain member, though it is isopached into areas where no coal is present.

This writer reviewed Williams' work and reinterpreted the eastern limit of the upper coal measures based on the presence or absence of coal. Results are shown on Figure 87. The figure shows the boundary to continue east-southeast from the Gwillim Lake area, swing toward the north in the vicinity of West Kiskatinaw River, then revert to a southeast trend near Kiskatinaw River. This boundary indicates the maximum eastern extension of continental deposits (delta and coastal plain) into the Moosebar Sea during regression.

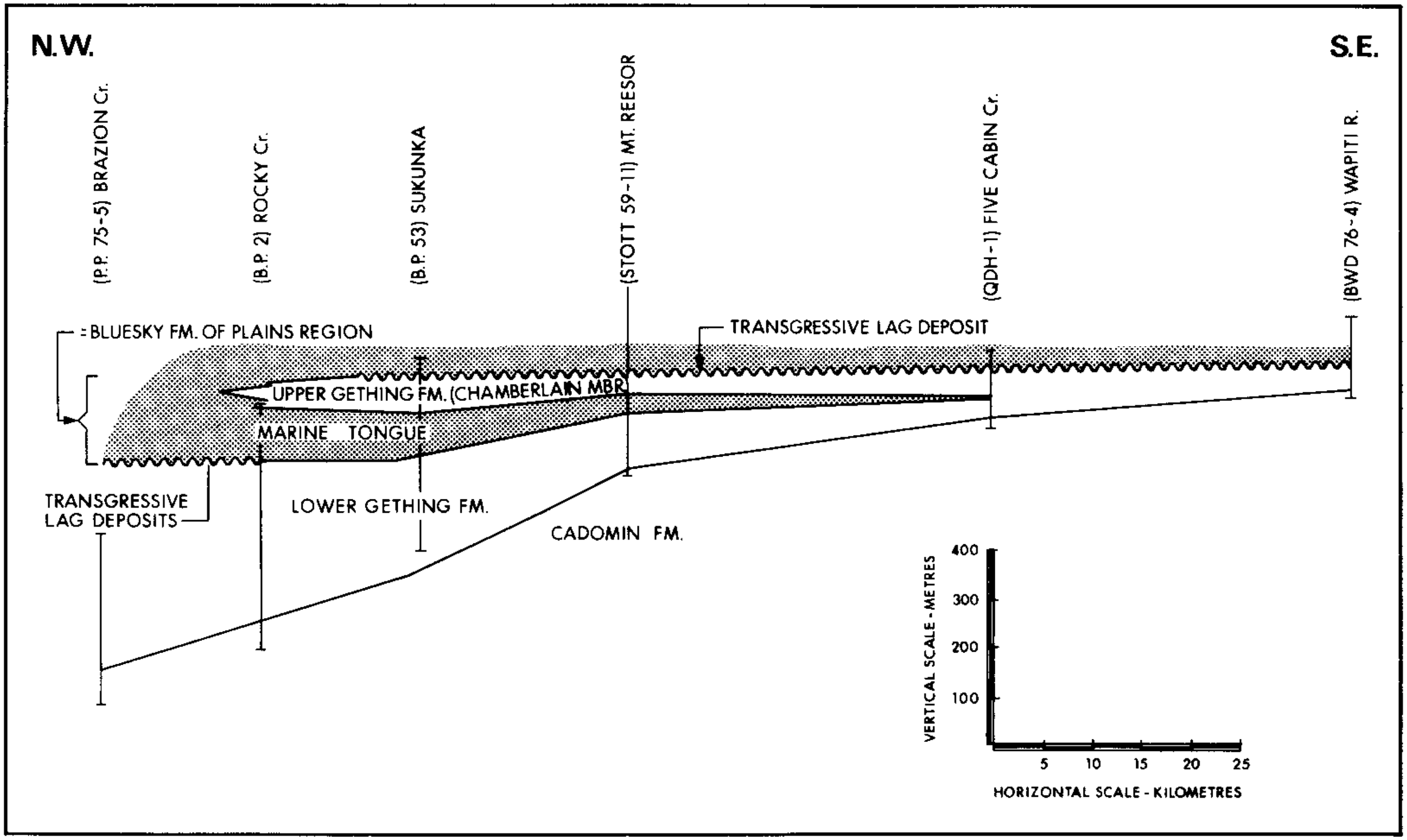

Figure 88. Northwest-southeast line of section showing relationship of marine tongue to Gething Formation coal measures in the Peace River coalfield (modified after Legun, 1984).

In the Getty et al Gwillim well, Williams failed to recognize the upper coal measures (Chamberlain member) and the great thickness (110 metres) of marine tongue below. Only 20 metres is designated as marine tongue (Williams' unit B) and traced to the north in section A-A'. As a result, Williams' unit B of the Bluesky corresponds with the marine tongue of Duff and Gilchrist only in the eastern portion of her study area. In the west the true marine tongue (which includes her Spirit River No. 4 unit in section A-A') passes into Moosebar Formation shales northward, as it does in the Northeast Coalfield. The geophysical trace of Chamberlain member equivalents in the Peace River area is well within the Moosebar Formation, 85 metres above its base.

To confirm correlations and rapid thickening of the marine tongue to the west, a line of section from Canhunter Esso Steeprock to HB et al Oetco is presented (Fig. 89). At Canhunter Esso Steeprock the marine tongue is thin (35 metres), upward coarsening, and bounded by coal measures. The tongue has thickened at Canhunter Esso Puggins and Canhunter et al Moose but there are no overlying coal measures; these well localities correspond to positions east of the marine/continental boundary on Figure 87. Upper coal measures reappear at Getty et al Gwillim but are on the point of pinching out at HB et al Oetco where the marine tongue is 150 metres thick. To the southwest, in the coalfield, Duff and Gilchrist show 120 metres of marine tongue in diamond-drill hole BP-53.

Northwest of HB et al Oetco, the geophysical trace of upper coal measure equivalents within Moosebar Formation shales can be traced in drill holes and well logs to the Peace River Canyon area, where they lie some 115 metres above the base of the Moosebar Formation. Continuing work by Kilby (1984) on tonstein markers in the Moosebar Formation should verify this correlation.

DEPOSITIONAL HISTORY

A marine transgression penetrated southward and drowned coastal and deltaic peat environments represented by the Lower Gething Formation. The western position of the shoreline at this time is not known and may have been in eroded terrane west of the coalfield. By the time marine waters reached their southern limits of extension at Kinuseo Creek, a considerable amount of marine sediment (85 to 115 metres) had been deposited in the Peace River area to the north.

A localized regression followed due to increased sediment supply in the study area. This is reflected in the coarsening upward (that is, shallowing) nature of marine deposits in the Moosebar embayment. Continental deposits prograded to the east and a wide coastal-deltaic plain extended from Gwillim Lake east-southeastward to beyond the Alberta border. Peat environments in the plain formed future coal measures of the Chamberlain member at this time. The plain did not extend north of the Sukunka River; the shoreline probably swung to the west and the embayment widened northward.

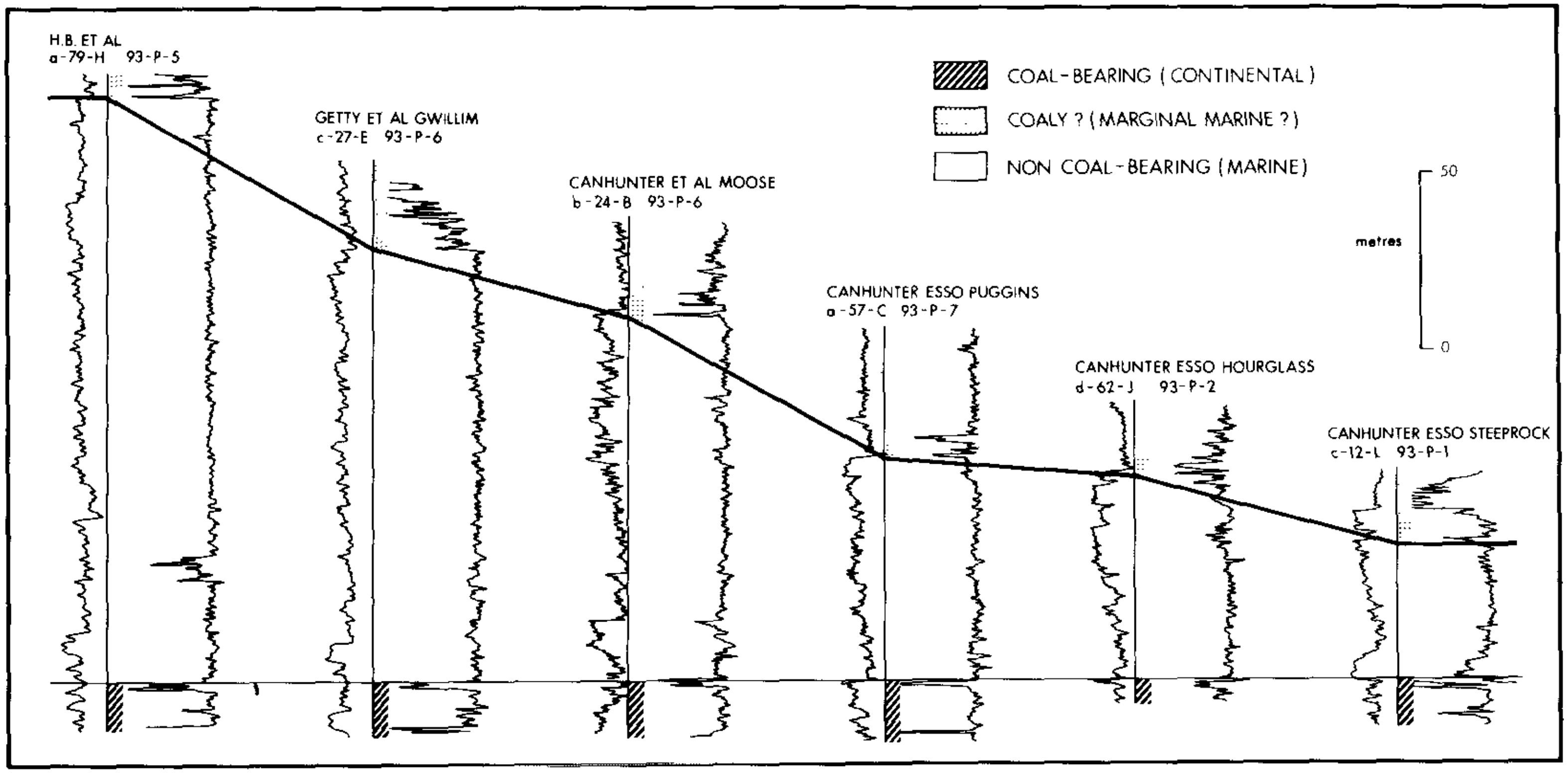

Figure 89. Correlation of marine tongue, upper and lower member of the Gething Formation (for line of section, see Fig. 87).

This rather localized regression was followed by the principal transgression of the Moosebar Sea. The sea drowned coastal and deltaic deposits of the Chamberlain member and the shoreline retreated far to the west. To the southeast marine waters extended into Alberta.

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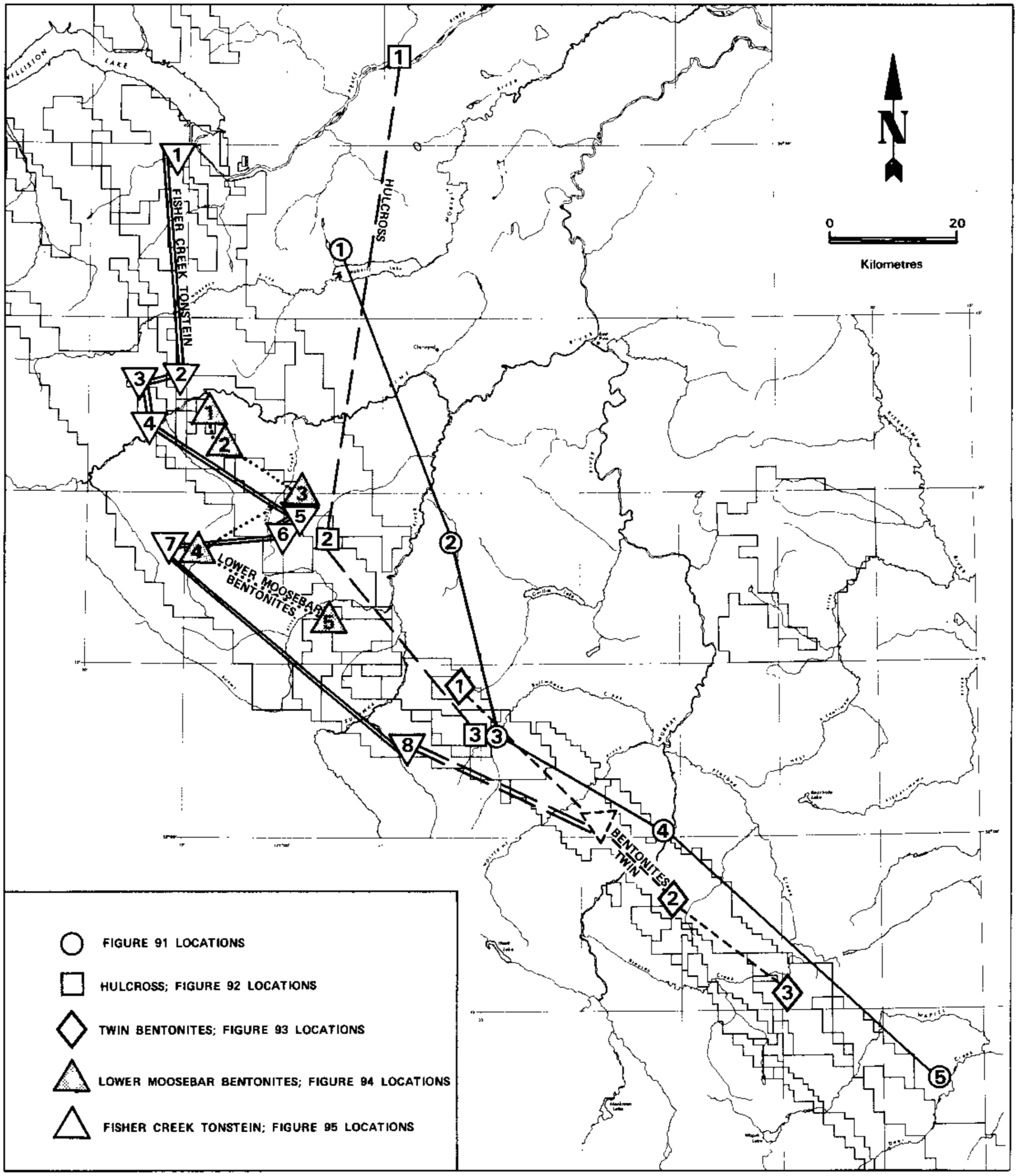

Figure 90. Location map of borehole sites used in the tonstein and bentonite correlation examples. Section lines indicate the order in which the holes appear on the various sections.