



RELATION OF GETHING FORMATION COAL MEASURES TO MARINE PALEOSHORELINES* (93P, 93I)

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INTRODUCTION

In a recent correlation of Lower Cretaceous coalmeasures in the Peace River Coalfield, Duff and Gilchrist (1983) documented the presence of a major marine tongue in the Gething Formation. It separates the Gething Formation into upper and lower coal-bearing members over an area extending southeastward from the Sukunka River. 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. The upper coal measures of the Gething Formation are termed Chamberlain Member by Duff and Gilchrist (1983).

The author has evaluated the subsurface extent of the continental Chamberlain Member into the plains, by an examination of oil and gas well logs (Legun, 1985). The loss of a coal facies between one well and the next was equated with crossing the continental/marine boundary. The trace of the boundary (paleoshoreline) defined the presence of two subaerial deltas in the vicinity of Gwillim Lake and South Kiskatinaw River respectively (Figure 5-5-1 and Table 5.5.1).

Other work related to this study includes Kilby (1985) on correlation of tonsteins immediately above the Chamberlain Member, Oppelt (1986) on the sedimentology of the Bluesky Formation (Gething marine tongue equivalent), and Smith *et al.* (1984) on paleogeography of the Bluesky and Gething Formations.

AIMS

The aims of the present study are:

- (1) Locate all coal and petroleum boreholes that intersect the upper and middle Gething members;
- (2) Establish major lines of section and correlation;
- (3) Identify coal-bearing intervals of economic interest in the Gething Formation;
- (4) Determine depositional environments in the Chamberlain Member;
- (5) Determine the relationship between coal thickness trends and the paleoshoreline.

1986 WORK

Work in 1986 consisted of filing logs from over 200 boreholes that intersected the upper and middle Gething members (with some overlap to the lower Gething member). Locations were plotted on a 1:100 000 base map and selective logs were reduced to a 1:600 scale for correlation. Albert Terry, summer assistant, began compilation of coal thickness data from each borehole location. Two field sections were measured near Mount Reesor.

PRELIMINARY RESULTS

Initial results are discussed in the context of two lines of section, parallel and perpendicular to the trend of the foothills (Figures 5-5-2 and 5-5-3).

UPPER GETHING FORMATION (CHAMBERLAIN MEMBER)

The Chamberlain Member maintains a thickness of 40 to 60 metres along the foothills trend from the Sukunka River to Babcock Creek. Southeast of Babcock Creek it thins to 20 metres or less. Perpendicular to the foothills trend, the Chamberlain Member thickens from 0 metre in the plains (northeast of the line of section) to 50 metres or more in the foothills. In the westernmost exposures of the member at Mount Reesor up to 90 metres may be present.

A marine interval within the Chamberlain Member has been documented northwest of the Wolverine River by Duff and Gilchrist (1983). An upward coarsening sequence is noted on geophysical logs. The marine interval separates the Skeeter and Chamberlain seams from the Bird seam above. This marine interval apparently pinches out to the southeast, near QWD7115, and is replaced by upward fining sequences interpreted as deposits of delta distributaries or fluvial channels.

The Bird seam lies at or just below the Moosebar-Gething Formation contact in the foothills. Additional continental strata may lie

**TABLE 5-5-1
LINE OF SECTION LOCATIONS
(SEE FIGURE 5-5-1)**

Location No.	Oil and Gas Wells
(1)	Dome PCI Sukunka (d-55-A/93-P-15)
(10)	BP <i>et al</i> Murray (b-92-J/93-I-14)
(13)	Oakwood <i>et al</i> Murray (d-99-E/93-I-15)
(14)	Quasar <i>et al</i> Murray (a-89-E/93-I-15)
(17)	Texaco Flatbed (a-21-F/93-I-15)
(21)	Quasar Mobil Flatbed (d-57-D/93-P-2)
(22)	Quasar Mobil Flatbed (d-76-D/93-P-2)
(23)	Canhunter Tumbler (c-40-F/93-P-2)
	Measured Section
(16)	Stott 59-10
	Coal Boreholes
(2)	Sukunka SK 1
(3)	Sukunka BP 53
(4)	Sukunka C 35
(5)	Sukunka BP 6
(6)	Mount Spieker MS 1
(7)	Quintette QWD 7115
(8)	Quintette WDH 1
(9)	Quintette QMR 8122
(11)	Quintette QBR 8121
(12)	Quintette QBD 7102
(15)	Quintette QBD 7403
(18)	Monkman MDH 7807
(19)	Quintette QFD 7220
(20)	Quintette QBD 8106

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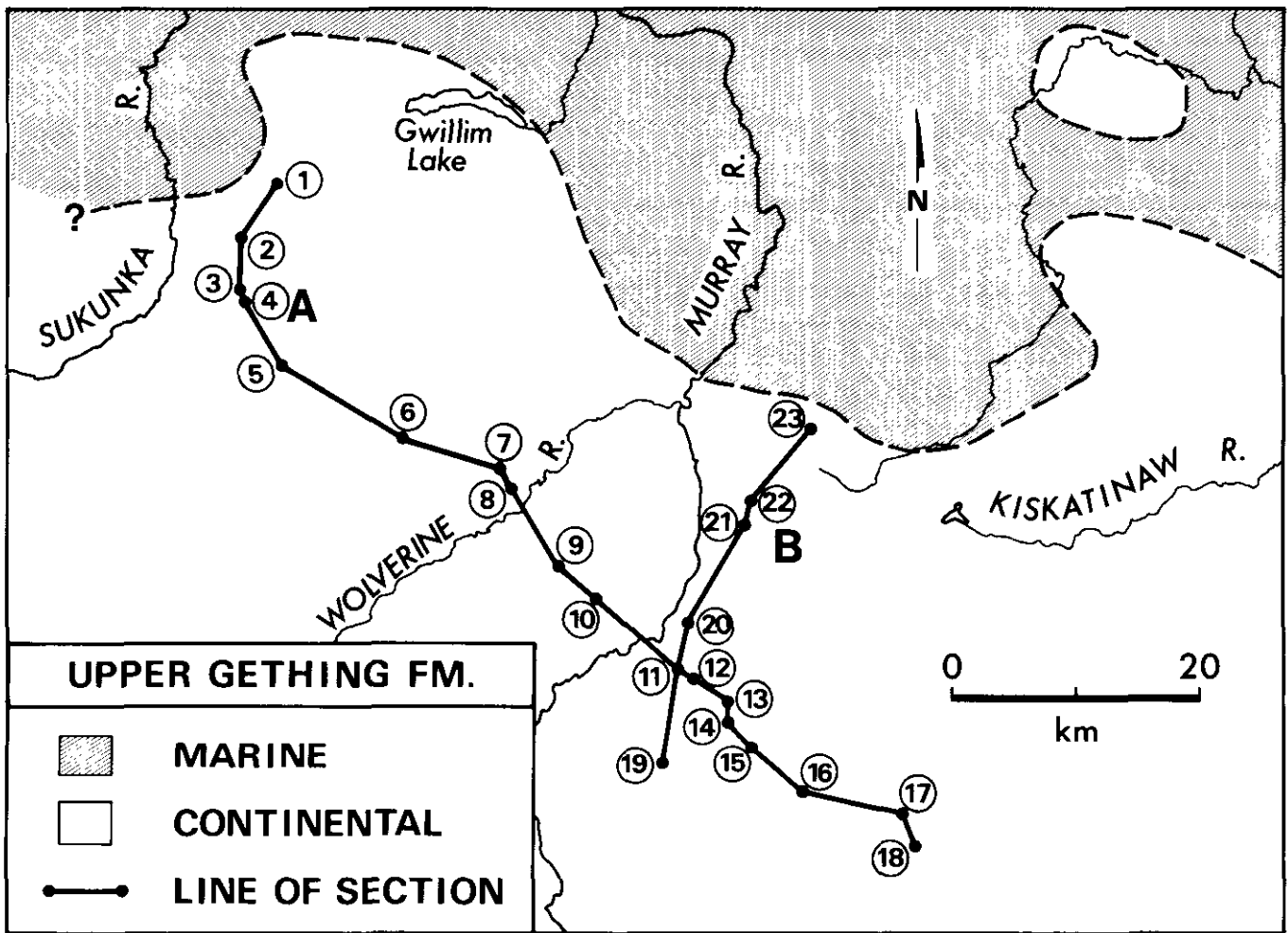


Figure 5-5-1. Study area with locations of two lines of borehole sections. Dashed line marks approximate limits of continental Chamberlain Member beds. Hole identifications are given in Table 5.5.1.

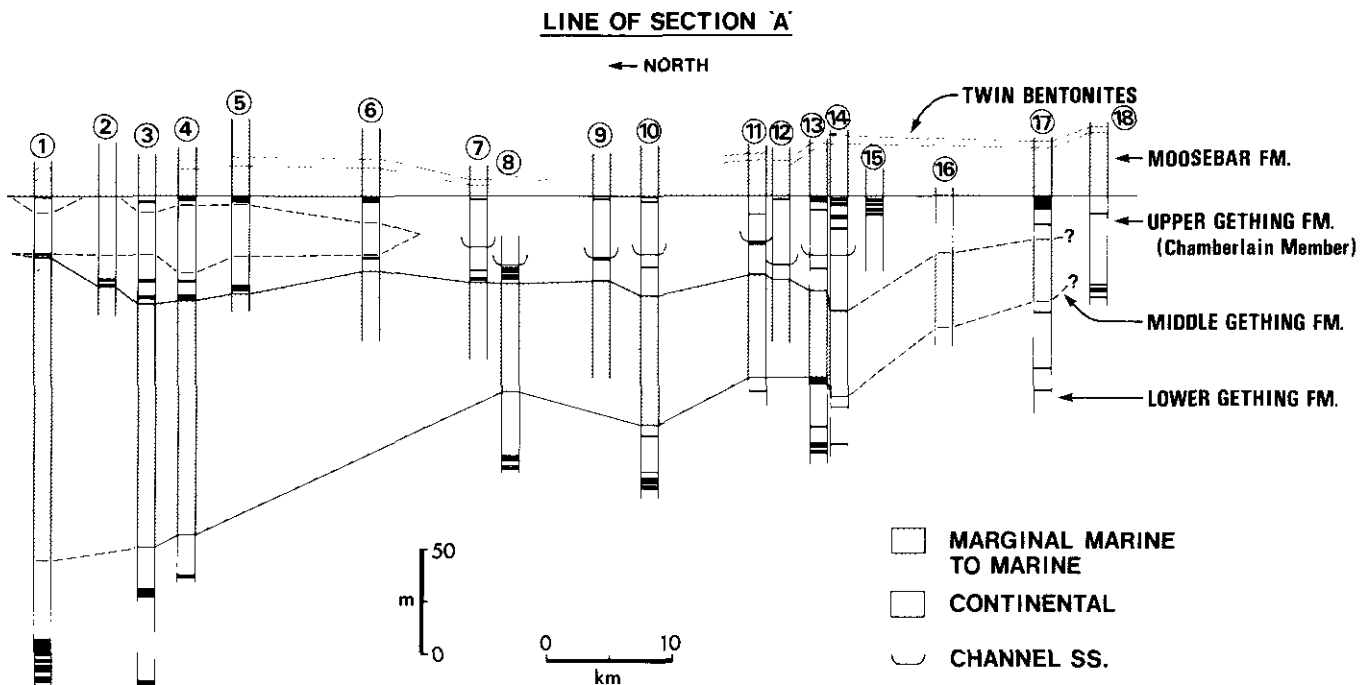


Figure 5-5-2. Section A oriented parallel to the present structural trend of the study area. Major coal seams are shown in black.

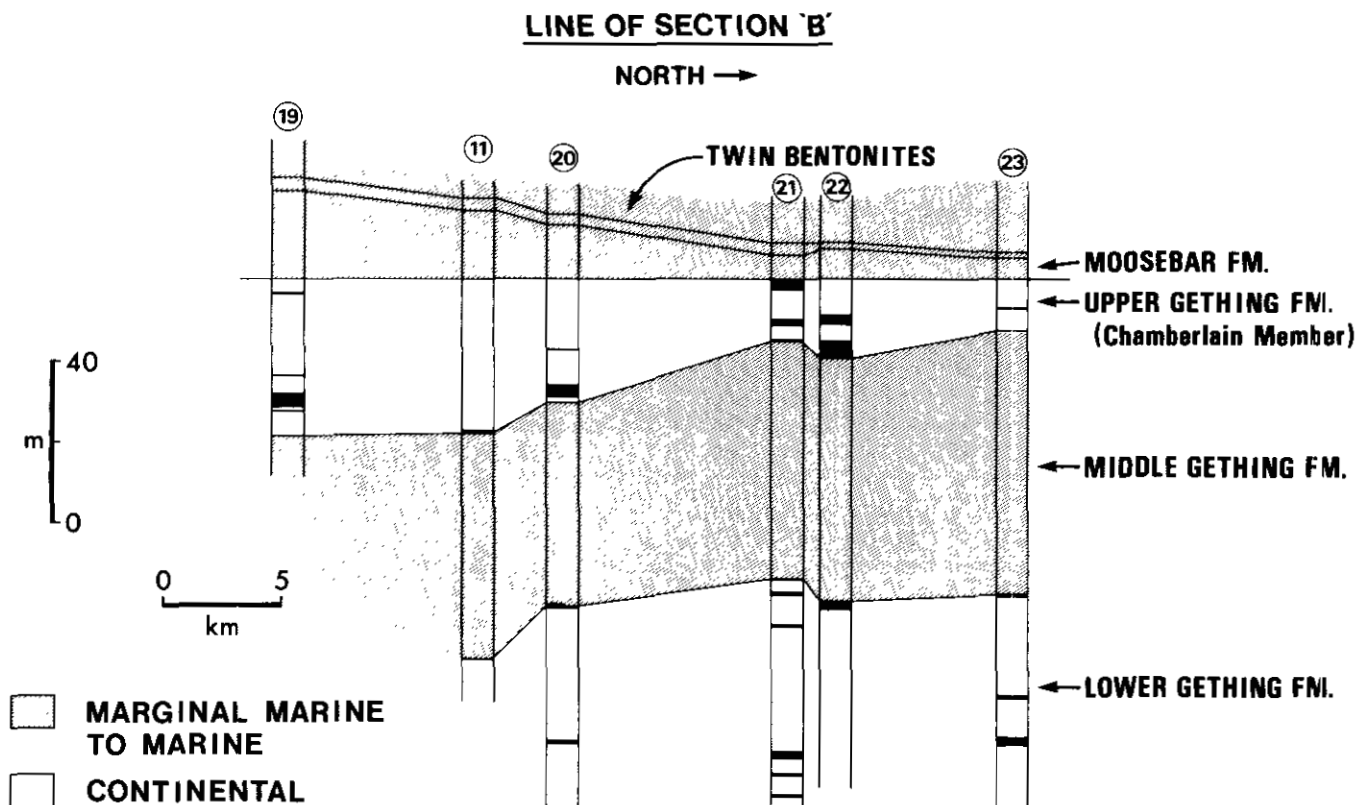


Figure 5-5-3. Section B oriented normal to regional structural trend. Note thinning in Chamberlain Member to east. Major coal seams shown in black.

between the Bird and the Moosebar Formations in westernmost exposures (west flank of Mount Reesor, Saddle Creek). The seam can be traced to the southeast to near Kinuseo Creek, but is missing in the area of QBRB121 and QBD8106 near the Murray River.

The Chamberlain seam is recognized as the first coal above the deposits of the middle Gething marine regression. To the northwest it is the last coal seam in the member to pinch out against marine strata. To the southeast it becomes thin and impersistent across the Wolverine River.

The Skeeter seam lies above the Chamberlain seam and is usually separated from it by 10 metres or less. The Skeeter is thin and impersistent southeast of the Wolverine River.

Thickness trends have not yet been evaluated for these seams but in the Sukunka deposit the Chamberlain is occasionally 5 metres or more thick with the Bird and Skeeter rarely exceeding 2.5 metres.

MIDDLE GETHING FORMATION (GETHING MARINE TONGUE)

The middle Gething Formation is noncoal-bearing and typified on geophysical logs by an upward coarsening trend (gamma ray curves to left upsection), with or without a sandstone unit (gamma ray blocky profile) at the base. Duff and Gilchrist (1983) recognized a brackish to marine fauna in the middle Gething Formation. In the line of section, the middle Gething Formation thins from 145 metres in the northwest to 30 metres in the southeast where it is last recognized on gamma log in the Texaco Flatbed well (a-21-F, NTS 931/15). South of there it is not present in the foothills but is present in the plains region to the east, indicating the southern shoreline of the marine tongue crosses the line of section near MDH7807.

Oppelt (1986) shows the marine tongue present in the foothills as far south as the Wapiti River. This writer considers his southward

correlation to MDD7804 to be incorrect. The designated interval in MDD7804 correlates below the middle Gething Formation in the Texaco Flatbed well. Oppelt should reconsider the correlation in light of the geophysical log for this well. Oppelt's correlation rests in the Chamberlain Member thickening to the southeast and resting almost directly on the Cadomin Formation.

The middle Gething Formation consists of transgressive and regressive deposits. The basal sandstone unit [Bluesky facies C of Oppelt (1986), Williams (1984)] is interpreted by this writer as reworked coastal or delta margin sands (destructional facies) deposited during the initial transgression. The actual coarsening-up cycle [Bluesky facies B of Oppelt (1986), Williams (1984)] represents deposits of the regression. At Mount Reesor (outside the line of section) there is abundant evidence of storm wave deposits (swaley and hummocky cross-stratification) in this interval.

LOWER GETHING FORMATION

The lower Gething coal measures lie above the pebbly arenites of the Cadomin Formation and below the basal sandstone unit of the Gething marine tongue. Though the coals of the lower Gething Formation were not the focus of this study, significant intervals of coal were found in the member in the course of borehole correlation. This includes a possible 17 metres of coal, over 25 metres of section, in the Dome PCI Sukunka well (d-55-A, NTS 93P/5). The coal interval may be equivalent to the lower zone in BRE 5 (Burnt River East property) consisting of 15 metres of carbonaceous to coaly mudstone and minor coal. Also significant are seams GT1 and GT2 on Quintette's Hermann Gething property near well BP *et al* Murray (b-92-J, NTS 931/14). These seams are 45 metres below the base of the marine tongue and comprise 5 to 6 metres of cumulative coal.

The lower Gething coal measures have been the subject of little exploration activity except on the Teck Corp. Burnt River property to the north, where seams reach 8 to 9 metres in thickness. Economic potential is postulated to slowly decrease southeastward from the Burnt River toward Kinuseo Creek in line with the increasing alluvial (conglomeratic) character of the lower Gething Formation.

DISCUSSION AND CONCLUSIONS

The lower Gething Formation represents alluvial deposits and contains coals of economic significance that have been insufficiently evaluated to date. The lower Gething is overlain by deposits of the middle Gething marine transgression and regression.

The southern shoreline of the middle Gething marine embayment is near Kinuseo Creek in the foothills. The western shoreline is in eroded terrain west of the foothills. The southern extension of the embayment to the Wapiti River by Oppelt (1986) is in error and based on a miscorrelation.

The upper Gething Formation (Chamberlain Member) represents subaerial deposits of a sedimentary wedge (molasse) that extends from the Sukunka River in the northwest to Kinuseo Creek or further in the southeast. North of the Sukunka River the shoreline swings sharply to the west and lies in presently eroded terrain west of the foothills. South of the Sukunka River the shoreline lies east of the foothills and is marked by two delta lobes.

The axis of these delta lobes swings to the northwest suggesting dispersal of sand parallel to the axis of the basin. This has been shown to be true for many Late Jurassic and Cretaceous units (Taylor and Walker, 1984). Such a process of sediment dispersal will result in lateral linkage of delta lobes at the seaward edge and the confinement of large interdeltic lakes on the landward side. The lakes would be suitable environments for the formation of thick and laterally extensive peats. It is postulated that the coals of the Gething Chamberlain Member (as well as the coals of the Gates Formation) formed in such environments.

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