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RECONNAISSANCE SURVEY,
COALS OF THE GETHING FORMATION
PEACE RIVER-PINE RIVER REGION,
BRITISH COLUMBIA

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**GEOLOGICAL BRANCH
ASSESSMENT REPORT**

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SUMMARY-ABSTRACT

Three areas, which are potentially attractive with regard to coal production, were investigated during preliminary field studies of Cretaceous coals in the Peace River-Pine River region. These three are, in what we feel is the order of their importance, Carbon Creek area, Sukunka River area, and Peace River-Portage Mountain area.

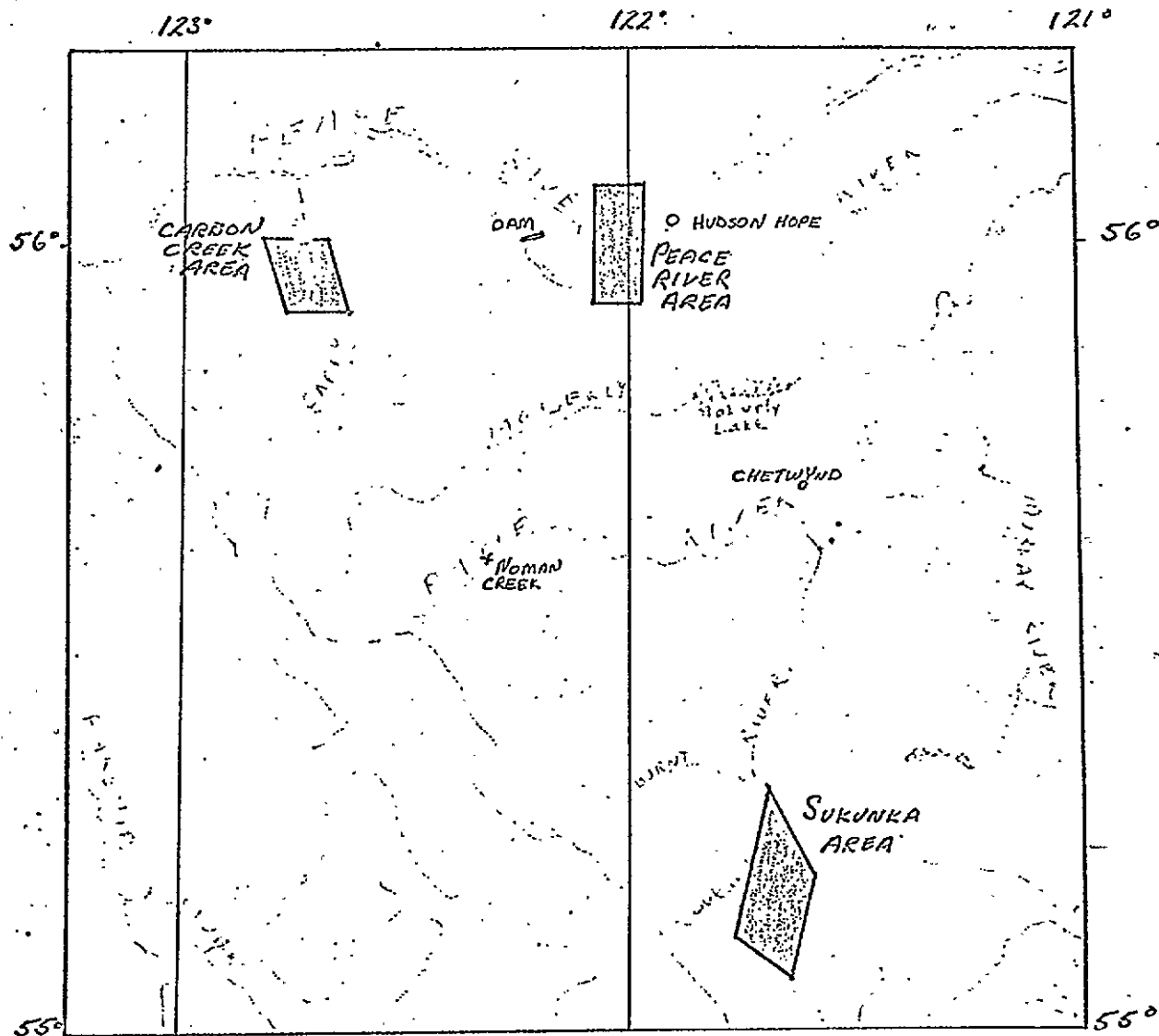
1. A number of relatively thick coal seams crop out in the Carbon Creek basin. The thicker coals occur along Eleven Mile Creek and are found in the more intensely folded central portion of the Carbon Creek Syncline. North of Eleven Mile Creek the coal bearing strata within the Gething Formation are more gently dipping and are structurally favorable for mining. We did not observe coals over five feet thick in this area but feel that the portion of the stratigraphic section which we did not observe may represent 90 percent of the rock units present. If thicker seams are found to be present with sufficient lateral extent, this more gently folded area would then represent a large mineable reserve. It is necessary to drill this area to further explore for coal. Three drill hole sites are suggested. Drilling equipment could possibly be transported into the area on barges on the new Peace River Reservoir. Otherwise transportation within this area is difficult.

2. The coal bearing Gething Formation, lying to the southeast of the Sukunka River also appears to be in a structurally favorable region with respect to coal recovery. A seam in excess of seven feet (total thickness 89 inches) has been found as well as several thinner seams. The area of relatively gently folded, coal bearing strata extends at least three miles further southeast than shown on

published maps of the region. Further field work to delineate the areal extent of the Gething Formation and drilling to ascertain the extent of the 7 feet 5 inch coal seam are both strongly recommended.

The area of outcrop of the Gething Formation from this Sukunka area to Hasler Creek has yet to be geologically mapped at any scale. Reconnaissance mapping of this area should also be undertaken.

3. Several small coal mines have operated in the Portage Mountain area, site of the new W.A.C. Bennett Dam. Published geologic maps suggest that the dips in the coal-bearing units eastward from Portage Mountain flatten somewhat and may be at mineable depths on the broad, flat, alluvium covered area between Portage Mountain and Hudson Hope. Some drilling has been reported in this area and drilling may also have been done in this region in conjunction with construction of the dam. Coal prospecting by drilling in this area could possibly prove a deep coal reserve.



Scale, 1:1,000,000
 0 10 20 30 miles

FIGURE 1 INDEX MAP SHOWING
 AREAS OF INTEREST
 DISCUSSED IN REPORT

INTRODUCTION

Outcrop areas of the Upper Cretaceous Gething Formation, as mapped on several of the Geological Survey of Canada's 4 inches to the mile geologic maps, were examined in an effort to delineate those areas where a combination of thick coal beds and relatively gentle structure would warrant subsequent exploration. Outcrops in this heavily wooded area, a portion of the Inner Foothill Belt of the Rocky Mountains, are scarce and for the most part, confined to stream cuts. Outcrops of coal seem to be found more easily under two conditions: when the coal is overlain rather closely by sandstone, and when the beds are steeply dipping.

Essentially the entire sequence of the Gething appears to be non-marine, made up of numerous lenticular units of sandstone generally less than 50 feet thick, intercalated with siltstone, shale, and claystone, along with numerous coal beds. These coals appear to be lenticular and are characterized by several splits composed of sandstone, siltstone, shale or claystone. These coal beds can be seen to change in thickness and in amount of impurities (in the form of splits) laterally along the outcrop whenever a considerable length of outcrop can be observed. Several chemical analyses in published reports indicate the coal to be Medium to Low Volatile Bituminous rank, and are characterized by a low total sulfur content and relatively good swelling (caking) properties when fresh unoxidized coal samples were tested.

Because of the paucity of outcrops, the lenticular nature of the coals, the lack of marker beds, and the intense folding,

(INTRODUCTION continued)

correlation of coal beds is extremely difficult and will be accomplished in most areas only by drilling. Before mining is contemplated this should be carefully carried out because of the considerable number of coal beds and their lenticular nature.

Three areas are discussed in some detail. These are:

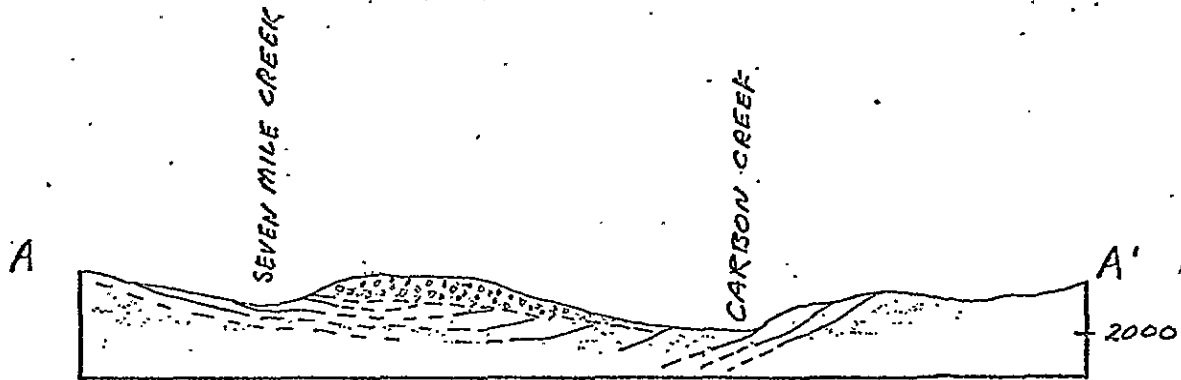
1. Carbon Creek, 2. Sukunka River, and 3. Peace River areas.

1. CARBON CREEK AREA

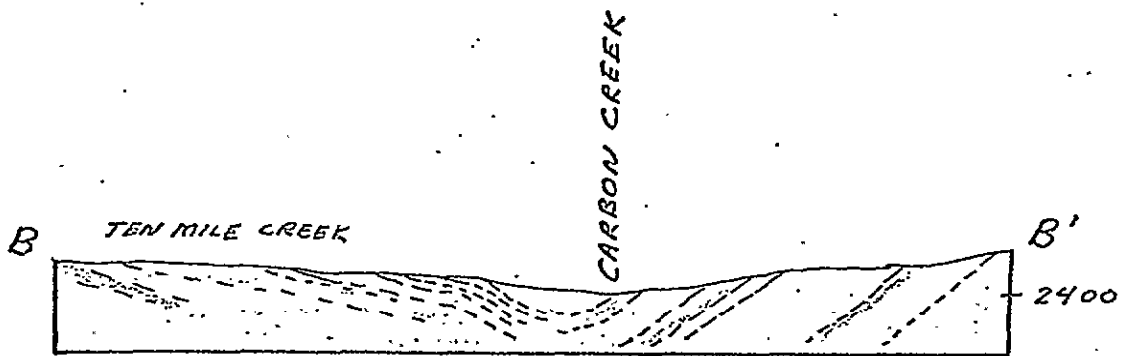
The area between Seven Mile and Eleven Mile Creeks both east and west of Carbon Creek was investigated in detail. Structurally this area lies in the south-southeast plunging Carbon Creek Syncline, the axial trace and dip measurements of which are shown on Figure 3. This syncline is steeper on its east flank where dips generally exceed 20° . On the west side, however, in the area of Seven, Nine, and Ten Mile Creeks all dips measured on the west limb of the structure, with one exception, are less than 20° and most are less than 15° .

In the southern part of the area examined, that is, on the two forks of Eleven Mile Creek, dips are very high near the axis of the syncline and several rather intense, minor folds, sometimes with vertical beds, are found. Such folds were not seen to the north where the folding apparently is more gentle.

Coal exposures in the Carbon Creek area are confined to the stream cuts. According to Mathews (1946) the entire area along and adjacent to Carbon Creek is underlain by the Gething Formation. Underlying rocks were observed only in the upper part of the tributary draining Carbon Lake in the southeastern part of the area. Mathews (1946) points out that coals are more numerous in the upper part of the Gething, i.e., those rocks which are exposed near the axial portion of the syncline. Our observations would seem to support this although outcrops of both coal and other rocks were more numerous in the axial region along Eleven Mile Creek than in the remainder of the area. Several coal beds from



SCALE, VERTICAL AND HORIZONTAL
1:50000



SCALE, VERTICAL AND HORIZONTAL
1:50000

SECTION PROJECTED ALONG LINE TRENDING
N55°E. ALL ATTITUDES TAKEN IN CREEKS

FIGURE 4. CROSS SECTIONS, CARBON
CREEK AREA

six feet to ten feet thick were seen in this area.

To the north along Seven, Nine, and Ten Mile Creeks, fewer coal beds were observed. Mathews reports several outcrops 3 to 4 feet thick on Seven Mile Creek and a 5 feet 4 inch coal on Nine Mile Creek.

The area which lies between Seven Mile Creek and Ten Mile Creek and extending a short distance north of Seven Mile and south of Ten Mile is structurally less complicated and would appear to be most favorable for mining. It is estimated that because of the nature of the exposures we probably observed perhaps 10% of the total Gething section which occurs in this area. The total number, thickness, and character of the coal beds certainly cannot be discerned from this inadequate sample. A minimum of drilling should enable one to determine whether or not the Gething formation in this area contains coal of adequate thickness to warrant mining consideration,

It is considered that, because of the extremely tightly folded nature of the axial area along Eleven Mile Creek, mining would be too difficult to warrant more detailed investigation at this time.

Three drill sites shown on Figure 3 should provide the maximum stratigraphic interval in this northern area. These three sites would be located on the divides near the axial trace of the syncline, each hole north of each of the three tributaries to Carbon Creek. The optimum position for thick coal in each of these holes would be rather deep, somewhere near the maximum minable depth, which might be as much as 2,500 feet. The deeper coals would have greater lateral extent up the limbs of the syncline. Coals occurring at shallow depths near the axis would be expected to have minimum lateral extent. Shallower holes could be drilled in the creeks near the axis,

realizing that portions of the section lying above the drill sites would not be encountered.

Roughly the area of most favorable structural relations is about 4.5 miles in a northwest-southeast direction and 1.5 miles in a northeast-southwest direction, totalling 13.5 square miles. Not considering the increase in area resulting from dipping beds, a five foot coal underlying this area would constitute a resource of some 77 million tons of coal in the ground. Because of the nature of the Gething Formation to contain numerous coal beds, it is considered likely that multiple-seam operations might be carried on, at least over part of the area. Complications resulting from thickening and thinning and the presence of shale, siltstone and claystone splits in the coals are also likely to be encountered, but these should be resolved by additional drilling if results of the initial drilling warrants further study.

It should also be pointed out that at the present water level, the Carbon Creek arm of the Peace River Reservoir extends to within about one-fourth mile from the mouth of Seven Mile Creek. When full (elevation 2200 feet) the reservoir will extend about one mile up Carbon Creek above the mouth of Seven Mile Creek. This will make for somewhat more favorable transportation facilities for this area, allowing for the use of barges in bringing in drilling equipment.

If the initial investigations warrant, reconnaissance study should be started further south in the Carbon Creek and McAllister Creek areas where several coals were reported by Mathews (1946) who stated that the Carbon Creek structure plunges to the northwest and loses its identity near the head of McAllister Creek. However,

(CARBON CREEK AREA continued)

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he does state (p.17) that south of Eleven Mile Creek, the structure is complicated by several minor folds.

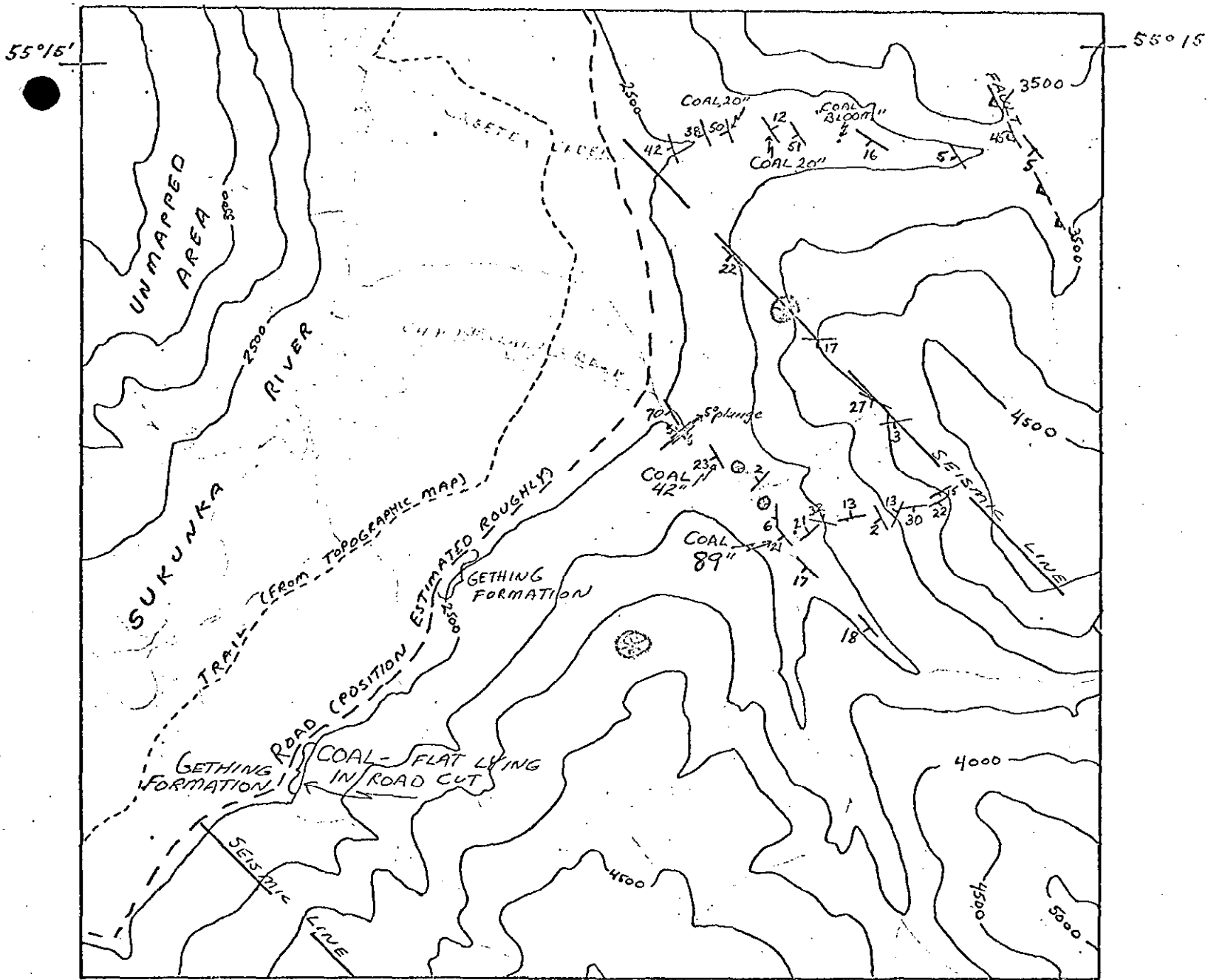
II. SUKUNKA RIVER AREA

A. Geology

Rocks of the Gething Formation crop out along the Sukunka River for several miles upstream of the junction of the Sukunka with the Burnt River and are also exposed in road-cuts along the logging road which lies on the east side of the Sukunka River. This area is indicated on Figure 1 and 2 and is also mapped geologically on the Geological Survey of Canada Map 19-1961, Dawson Creek (one inch to four miles). As mapped in Map 19-1961, the Gething crops out in a belt that is only four miles wide and strikes northwest-southeast. The area in which the Gething is present on the north side of the Sukunka River has not been mapped geologically and is left blank.

Figure 5 includes the southern most portion of the Gething Formation on the southeast side of the river with altitudes taken along Skeeter Creek and Chamberlain Creek. The location of several coals are indicated. A fault of significant proportions was observed in Skeeter Creek but relatively gently folded beds were observed in Chamberlain Creek. The rocks of the younger, gently dipping, Moosebar and Commotion Formations can be seen forming sandstone cliffs above the Gething Formation. The two coals observed in Chamberlain Creek are 42 and 89 inches in thickness and were relatively gently dipping where observed.

The southwestern contact of the Gething Formation is shown on the GSC map as a fault, placing the Jurassic and lower Cretaceous Nikanassin Formation in contact with the Gething. This fault is not correctly mapped and, at least for three miles further to the southwest than is shown on the GSC map, the coals, siltstones, and



SCALE 1:50000

⊗ SUGGESTED DRILL HOLE LOCATION

FIGURE 5 - SUKUNKA RIVER AREA

From SUKUNKA RIVER TOPOGRAPHIC MAP
93 P14E

SUKUNKA RIVER AREA continued)

carbonaceous shales of the Gething Formation can be seen in road cuts, for the most part rather gently dipping. The rocks capping the hills above this southwestern extension of the Gething Formation are also flat-lying to gently dipping.

Extending the lower contact of the Gething Formation at least three miles to the southwest increases the possibility that a coal seam may be present of sufficient thickness and of sufficient lateral extent to be mined economically.

B. Recommendations

1. The areal extent of the Gething Formation southeast of the Sukunka should be mapped in detail. The structure of these strata should also be determined. This is especially important in the case of that portion of the Gething Formation lying to the southwest of the incorrectly mapped fault on GSC Map 19-1961.

Geologic mapping in this area may be greatly assisted by the air photos. The prominent sandstone, cliff-forming units suggest that this would be an exceptional area within the Cretaceous in that much mapping may be possible from the photographs.

Drilling will, no doubt, be necessary to map the extent of the thicker (greater than seven feet) coal observed in Chamberlain Creek. The first drill hole could be effectively placed along the southeast-trending seismic line between Skeeter Creek and Chamberlain Creek. Bulldozer roads to former drill sites along this line are in fairly good condition and could be made passable with little effort.

Further drilling would then also be necessary on the hill lying to the south of Chamberlain Creek.

2. The area lying to the northwest of the Sukunka River and southwest of Hasler Creek has not been mapped.

The Gething Formation undoubtedly underlies much of this area. Reconnaissance mapping and prospecting for coal in this area is strongly recommended. Access to this region is poor with no roads or trails shown on the topographic maps. The river has recently been bridged, although there is no road on the west side, and seismic lines have been cut through a portion of the area.

III. PEACE RIVER AREA

The outcrop area of the Gething Formation north of the Peace River was briefly examined in the vicinity of a few small drift mines. The most recent mine, on the Summers Ranch, ceased operations about 10 years ago. Each of these mines was hand-operated, and capable of only small production. Dips were rather high in the mines observed.

In the exposures in the Peace River Canyon south and east of the W.A.C. Bennett Dam, several coal beds between 4 and 6 feet thick can be observed (Stott, 1968, measured geologic section). The six-foot bed was mined in the immediate vicinity of the dam.

To the east of the anticlinal belt which passes through Portage Mountain and Bullhead Mountain is a fairly wide area covered by unconsolidated Quaternary deposits. On the Halfway River Geologic Map (No. 22-1963) a rather broad area (Formation 17) is shown in the southeastern corner of the map. The Gething in this area is overlain by the Buckinghorse Formation (equivalent at least in part to the Moosebar Formation of the Pine River area). The pattern of the Buckinghorse outcrop on the geologic map suggests that dips may be less to the east of the Bullhead and Portage Mountain anticlinal areas. The few dip measurements shown on this map further substantiate this structural picture.

The King Gething mines (Nos. 1 and 2) operated on the east side of Portage Mountain in coals 6 to 7 feet thick dipping eastward at about 25° . Other coals of comparable thickness are reported in the area. It is thought that wildcat drilling in the topographic flat to the east of Portage and Bullhead Mountains might establish the thickness, continuity, and structural relations of these coals.

The first drilling should be done relatively near the known outcrops.

Drilling operations would be relatively simple, inasmuch as the area is crossed by fairly good roads. Relatively thick unconsolidated deposits might be expected, which would of course hamper the drilling.

It is advised that an attempt be made to obtain records of core drilling that was certainly conducted relative to the W.A.C. Bennett Dam construction.

BIBLIOGRAPHY

(Annotated)

The following reports, papers, etc. are concerned with the stratigraphy and areal geology of the Gething Formation in the Peace River-Pine River area.

Beach, H. H., and Spivak, J., 1944, Dunlevy-Portage Mountain

Map area: Geol. Surv. Canada, Paper 44-19, 13 p.

Report of field mapping in Peace River Area. Geologic map included extends from east of Portage Mountain to approximately 10 miles west of site of Dam.

Hughes, J. E., 1964, Jurassic and Cretaceous strata of the Bullhead

Succession in the Peace and Pine River Foothills: British Columbia Dept. Mines and Petroleum Resources, Bulletin No. 51, 73p.

Stratigraphic study including Gething Formation.

Hughes, J.E., 1967, Geology of the Pine Valley: British Columbia

Dept. Mines and Petroleum Resources. Bulletin No. 52, 137p.

Geologic map of Pine Valley, 1 inch = 1 mile, extending from $\frac{1}{2}$ to 5 miles north and south of Pine River. Includes Noman Creek and portions of Willow Creek and Hasler Creek.

Mathews, W. H., 1946, Geology and coal resources of the Carbon Creek-

Mount Bickford Map area: British Columbia Dept. Mines, Bulletin No. 24, 27p.

Report of 1944-1945 field investigations. Intensive field study (without drilling) of Carbon Creek area. Geologic map does not include altitude of bedding.

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McKechnie, N.D., 1948, Pine River Coal Field. Peace River District, British Columbia; Report on work north of Pine River in the vicinity of Noman Creek, September 13, 1948-December 1, 1948. Typewritten report. Xerox copy supplied by Brameda Resources. Includes Report of Summer Field Work, 1948 by F.K. North.

McKechnie, N.D., 1955, Coal reserves of the Hasler Creek-Pine River area, British Columbia: British Columbia Dept. of Mines, Bulletin No. 36.

Detailed mapping and associated drilling, and trenching in Hasler area, Willow Creek area, and Noman-Fisher Creek area. Intensive work on these three coal containing areas.

McLearn, F.H., and Irish, E.J.W., 1944, Some coal deposits of the Peace River Foothills, British Columbia: Geol. Surv. Canada, Paper 44-15, 15p.

Describes Gething Formation in upper Peace River Canyon and King Gething and Packwood mines in detail.

Pringle, D.W., 1969, Report on test coal sample from Pine Pass Coal Company Ltd., Pine Pass., B.C.

Describes collecting of coal sample from adit at Noman Creek.

Pugh, D.C., 1960, The subsurface Gething and Bluesky Formations of Northeastern British Columbia: Geol. Surv. Canada, Paper 60-1, 20p. May be especially important as source of drill hole locations to east of Portage Mountain.

Stott, D.F., 1960, Cretaceous Rocks between Smoky and Pine Rivers, Rocky Mountain Foothills, Alberta and British Columbia: Geological Survey of Canada Paper 60-16, 52p.

This is a preliminary report. See later Stott, 1968.

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Stott, D.F., 1961, Type sections of some formations of the Lower Cretaceous Fort St. John Group near Pine River, British Columbia: Geol. Survey Canada, Paper 61-11. Describes Lower Cretaceous along Hasler Creek.

Stott, D.F., 1962, Stratigraphy of the Lower Cretaceous Fort St. John Group and Gething and Cadomin Formations, Foothills of Northern Alberta and British Columbia: Geological Survey Canada. Paper 62-39. Describes Gething Formation and associated strata from Peace River south to Alberta. Primarily stratigraphic, no geologic map. See Stott, 1968.

Stott, D. F., 1968, Lower Cretaceous Bullhead and Fort St. John Groups, between Smoky and Peace Rivers, Central Rocky Mountain foothills, Alberta and British Columbia, Geological Survey of Canada. Includes description of type section of Gething and colored geologic map (1"= 4 miles).

The following geologic maps all include at least part of the area of interest:

- Dawson Creek, map 19-1961, 1 inch = 4 miles
- Halfway River, Map 22-1963, 1 inch = 4 miles
- Pine Pass, map 11-1961, 1 inch = 4 miles