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A PRELIMINARY EVALUATION OF THE HOLLEBEKE MOUNTAIN AREA, SOUTH EASTERN BRITISH COLUMBIA

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CONFIDENTIAL

September, 1980.

Submitted by:
Stephen Gardner

CERTIFICATION

I, Stephen L. Gardner, of 274 Westwood Rd., R.R.#3, Nanaimo, British Columbia, hereby certify that:

a) I am a registered Professional Geologist, belonging to the Association of Professional Engineers, Geologists and Geophysicists of Alberta since 1977.

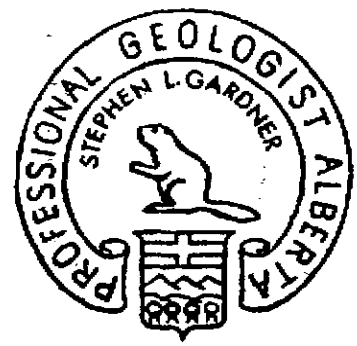
b) I received a 4 yr. Bachelor of Science degree specializing in soft-rock Geology from the University of Alberta (Edmonton) in 1974.

c) I have 5 yrs. experience in the coal industry, and have acted as an independent for the past 2 yrs.

d) I examined the Hollebeke Mountain area, in particular the coal licence held by Mr. William Shenfield (Licence #5313) in July 1980, the resulting report of which is attached.

Respectfully Submitted,

Stephen L. Gardner



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INTRODUCTION

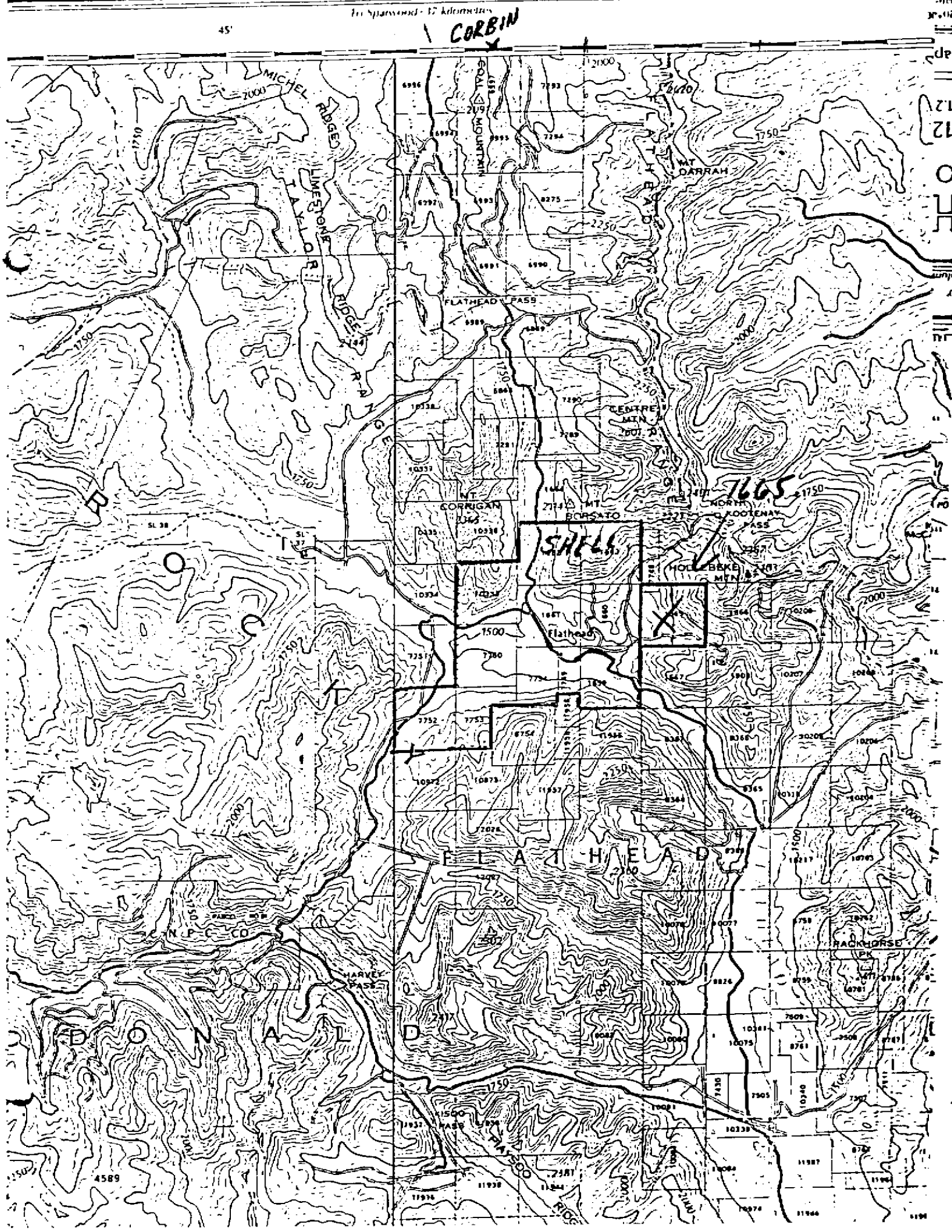
Coal measures occur over a wide area in the south-eastern part of the Province of British Columbia. These coal occurrences for the most part are found in the Jurassic-Lower Cretaceous Kootenay Formation. The Kootenay is exposed in the Flathead River Valley, south of the town of Sparwood. At least three coal seams of a significant thickness occur in the upper part of the Kootenay Formation in this area.

Preliminary observations indicate that near-surface strippable coal reserves are present in this area, a portion of which occurs on the Coal Licence #5313 held by Mr. William Shenfield. Depending on the geological interpretation of the structure of the area, additional deep underground reserves may be found to the east, under Hollebeke Mountain.

This report outlines some of the basic structure and stratigraphy of the area, as interpreted by numerous geologists who have undertaken in-depth geological studies here. It also records observations of the field trip of July 1980 by the author.

The report also proposes a short exploration drilling program in order to test some of the theory put forth by Bethune (1936) regarding the continuation of the upper Kootenay strata beneath Hollebeke Mountain.

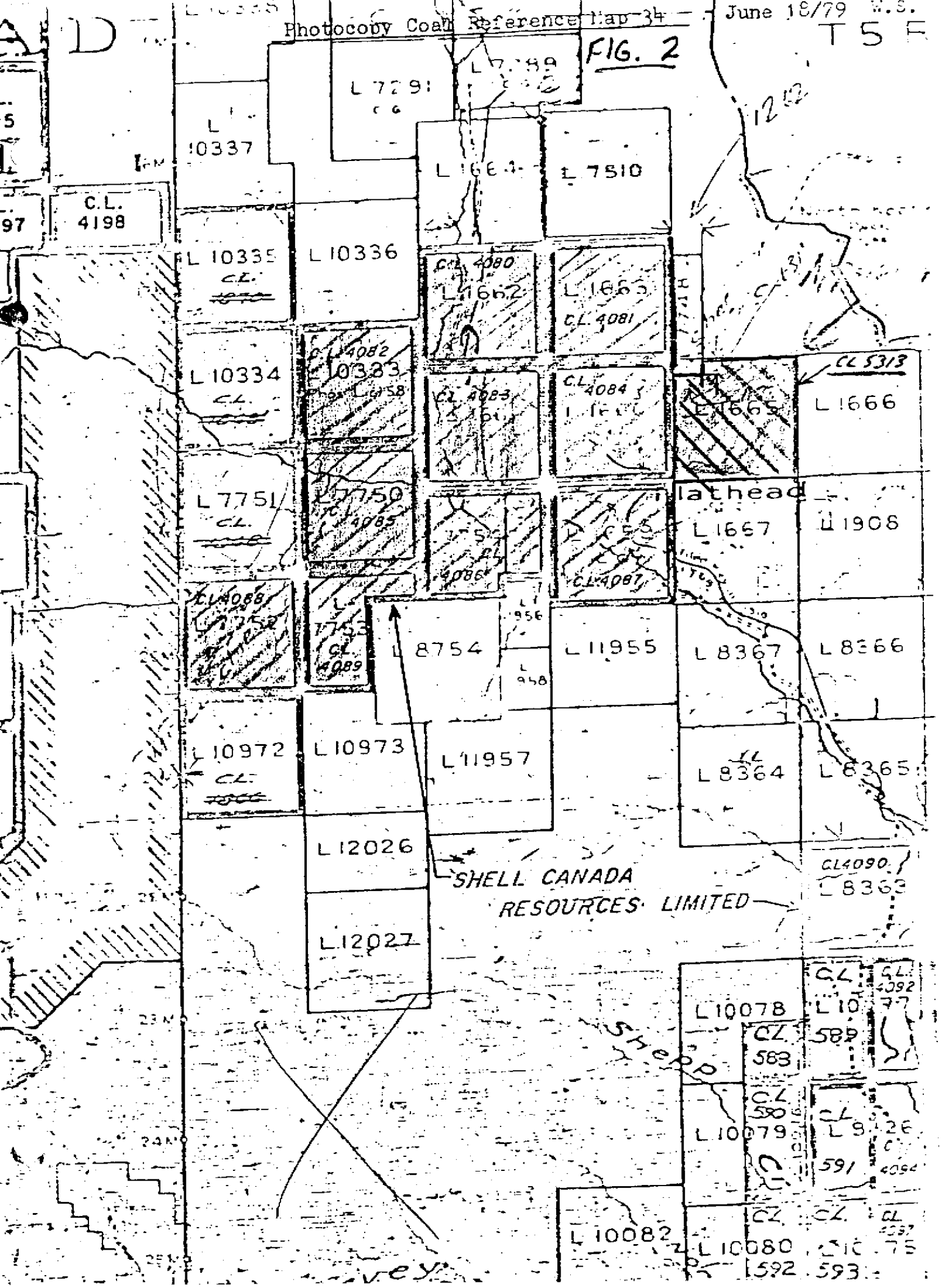
FIGURE 1 : Location Map



LOCATION AND ACCESSIBILITY

Hollebeke Mountain is located on the Alberta-British Columbia boundary approximately 53 km. south-east of the town of Sparwood, B. C. The Flathead River valley is located south and west of Hollebeke Mountain, which forms the eastern boundary of the valley in this area. Coal licence #5313 is located on the west flank of the mountain, legally described as District Lot No. 1665 on Map 82 G/SE (1:125,000 scale). Flathead townsite, which is now abandoned, is about 2 km. west of the south-west corner of the coal licence.

Access to the Hollebeke area is limited to a gravel forestry road that heads south from the town of Sparwood to Corbin. The Flathead townsite is approximately 21 km. south of Corbin. A rail spur connects Corbin to the main C.P.R. line at Sparwood.


Photocopy Coal Reference Map 34
June 18/79
FIG. 2
T 5
L 7291
L 7510
L 10337
C.L. 4198
L 10335
C.L.
L 10336
C.L. 4080
L 1662
L 1663
C.L. 4081
L 10334
C.L.
C.L. 4082
L 10333
C.L. 4083
C.L. 4084
C.L. 5313
L 1666
L 7751
C.L.
L 7750
C.L. 4085
C.L. 4086
C.L. 4087
lathead
L 1667
L 1908
C.L. 4088
L 7753
C.L. 4089
L 8754
L 11955
L 8367
L 8366
L 10972
C.L.
L 10973
L 11957
L 8364
L 8365
L 12026
SHELL CANADA
RESOURCES LIMITED
C.L. 4090
L 8363
L 12027
L 10078
C.L. 583
C.L. 589
C.L. 4092
Sheep
C.L. 580
L 10079
C.L. 591
C.L. 4094
L 10082
L 10080
592
593

GENERAL GEOLOGY

The upper part of the Kootenay Formation is exposed in the Pincher Creek valley on the west side of Hollebeke Mountain. The upper Kootenay in this area is characterized by grey carbonaceous mudstones, shales, siltstones, fine-grained sandstones and coal seams. It is easily erodable and in the Pincher Creek area of the Flathead Valley is usually covered by 3 to 6 meters of overburden.

The upper Kootenay strata in this area have been structurally disturbed by thrusting forces from the west, resulting in the low-angle westerly-dipping thrust fault known as the Lewis overthrust. This large thrust fault has a lateral displacement of up to 50 km. in some areas. PreCambrian limestones, such as the Siyeh Formation, which forms the upper part of Hollebeke Mountain, have been emplaced above younger Kootenay strata as a result of this major structural event.

In addition to the Lewis thrust, a large gravity fault known as the Flathead fault has formed the eastern boundary of a graben structure that generally follows the Flathead River Valley. In the Hollebeke Mountain area, there is some question as to the exact surface trace of this fault structure and how it affects the Kootenay coal measures.

Table of Formations

Era	Period or Epoch	Group Formation	Lithology	Thickness (feet)
Cenozoic	Pleistocene and Recent		Till, gravel, sand, silt	
		Unconformity		
	Eocene and Oligocene	Kishenehn Formation	Conglomerate	
		Unconformity		
Mesozoic	Upper Cretaceous	Belly River Formation	Green and grey sandstone; mudstone and shale	1,500
		Alberta Group		
		Wapiabi Formation	Dark grey shale, silty shale, sandstone	1,800
		Cardium Formation	Dark grey sandstone, siltstone, silty shale	125
		Blackstone Formation	Dark grey shale, silty shale, siltstone	300
		Disconformity		
	Lower Cretaceous	Crowsnest Formation	Trachyte agglomerate, tuff, volcanic-rich sandstone, mudstone, conglomerate	500
	Lower Cretaceous, may be younger		Trachyte, syenite, volcanic breccia	
	Lower Cretaceous	Blairmore Group	Grey and greenish grey sandstone, arkosic sandstone, green and red mudstone; minor brown limestone	1,800–3,750
		Disconformity?		
	Jurassic and (?) Cretaceous	Kootenay Formation	Dark grey, carbonaceous sandstone and conglomeratic sandstone, siltstone, shale; coal	500–1,700
	Jurassic	Fernie Group	Grey calcareous shale, shaly limestone, silty limestone; dark grey shale, limestone; sandstone	1,250
		Disconformity		
	Triassic	Spray River Formation	Grey dolomitic siltstone and sandstone; brown siltstone and silty shale	300?

FIG. 3.

GEOLOGY OF THE KOOTENAY COAL MEASURES

Coal in the Flathead River valley is documented by J. D. McKenzie (Memoir #87 - 1916) as being good quality metallurgical coking coal, with an average 24% Volatile Matter, 57 % Fixed Carbon, and 10 - 20 % Moisture and Ash.

The Minister of Mines Annual Report for 1910 documents the opening of four seams in the area, thicknesses of which are 1.8 m., 2.4 m., 3.0 m., and 4.9 m.. These seams occur in the top 180 m. of the Kootenay Formation.

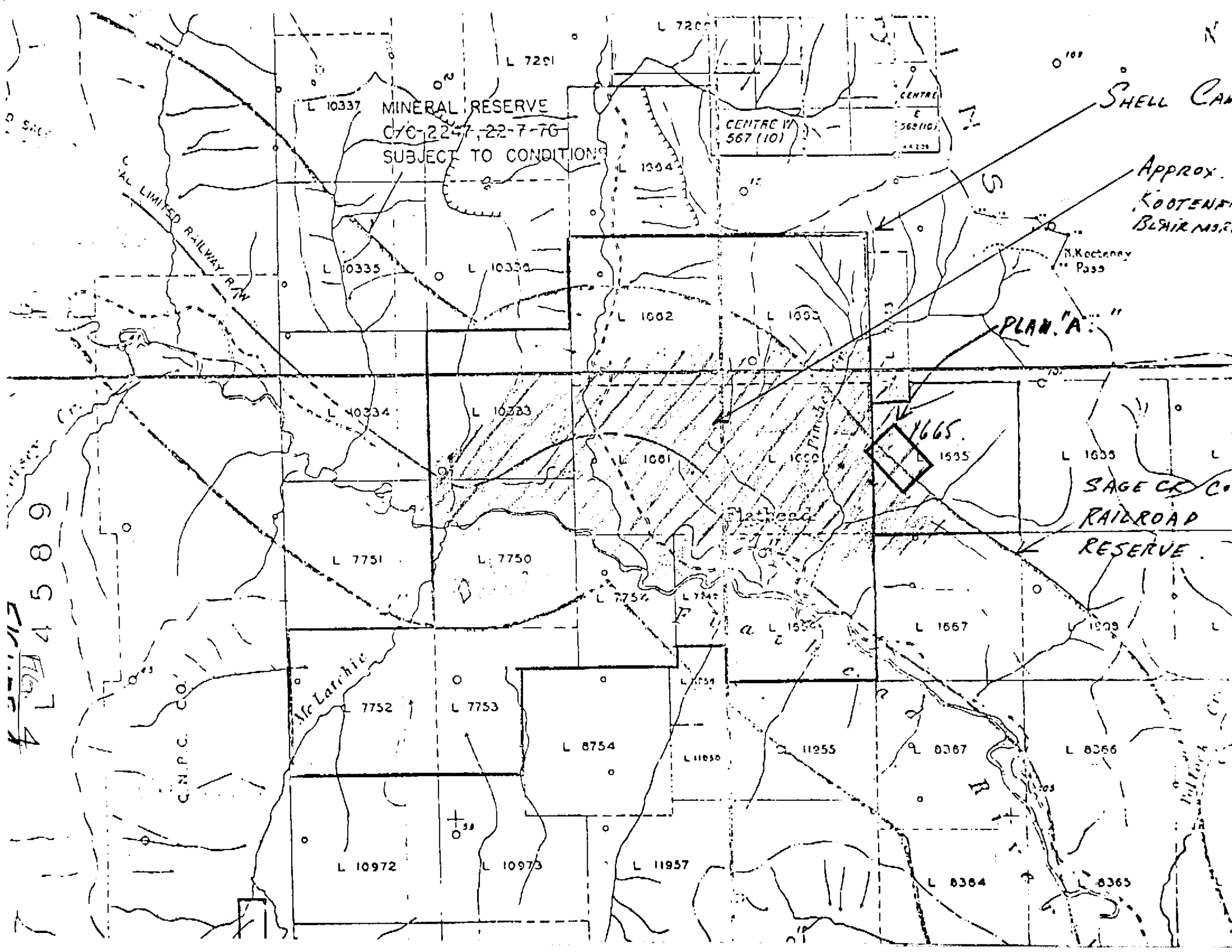
Recent exploration work on adjacent freehold property has exposed a coal section estimated to be at least 12 m. thick, however the location of this outcrop and its high angle of dip indicates that the section may have been structurally thickened.

Field work on Licence #5313 undertaken by Mr. William Shenfield consisted of hand trenching and trenching with a small tractor-mounted backhoe. Three locations were tested (see Fig.5.). Coal in-place was only encountered in one. This seam was at least 12.5 ft. (3.8m) thick, but the entire true thickness of the seam was not reached due to the limitations of the equipment. Coal float in substantial amounts is present in the other two trenches, although the thickness of the overburden prevented the backhoe from reaching bedrock. Because of the sketchy nature of the information it is difficult to correlate the one good showing with that of previous work in the Flathead as documented in the government reports. However, this showing appears to be along strike from the large

continued...

coal exposure that has been traced for more than 500 m. on the adjacent freehold block to the west. It is reasonable to assume a tentative correlation between the two.

Figure 5. illustrates the location of the trenches on Licence #5313, and related exploration work on the adjacent freehold property.



MINERAL RESERVE
C/C-2247, 22-7-76
SUBJECT TO CONDITIONS
SHELL CAN
APPROX.
PLAN "A"
1665
SAGE CK
RAILROAD
RESERVE
N.Kootenay Pass
CENTRE W 567 (10)
L 10337
L 7291
L 1364
L 10335
L 1662
L 10334
L 10333
L 1661
L 7751
L 7750
L 1667
L 7752
L 7753
L 8754
L 11255
L 8367
L 10972
L 10973
L 11957
L 8364
Flathead
McLatchie
C.N.P.C. Co.
RAILWAY R/W

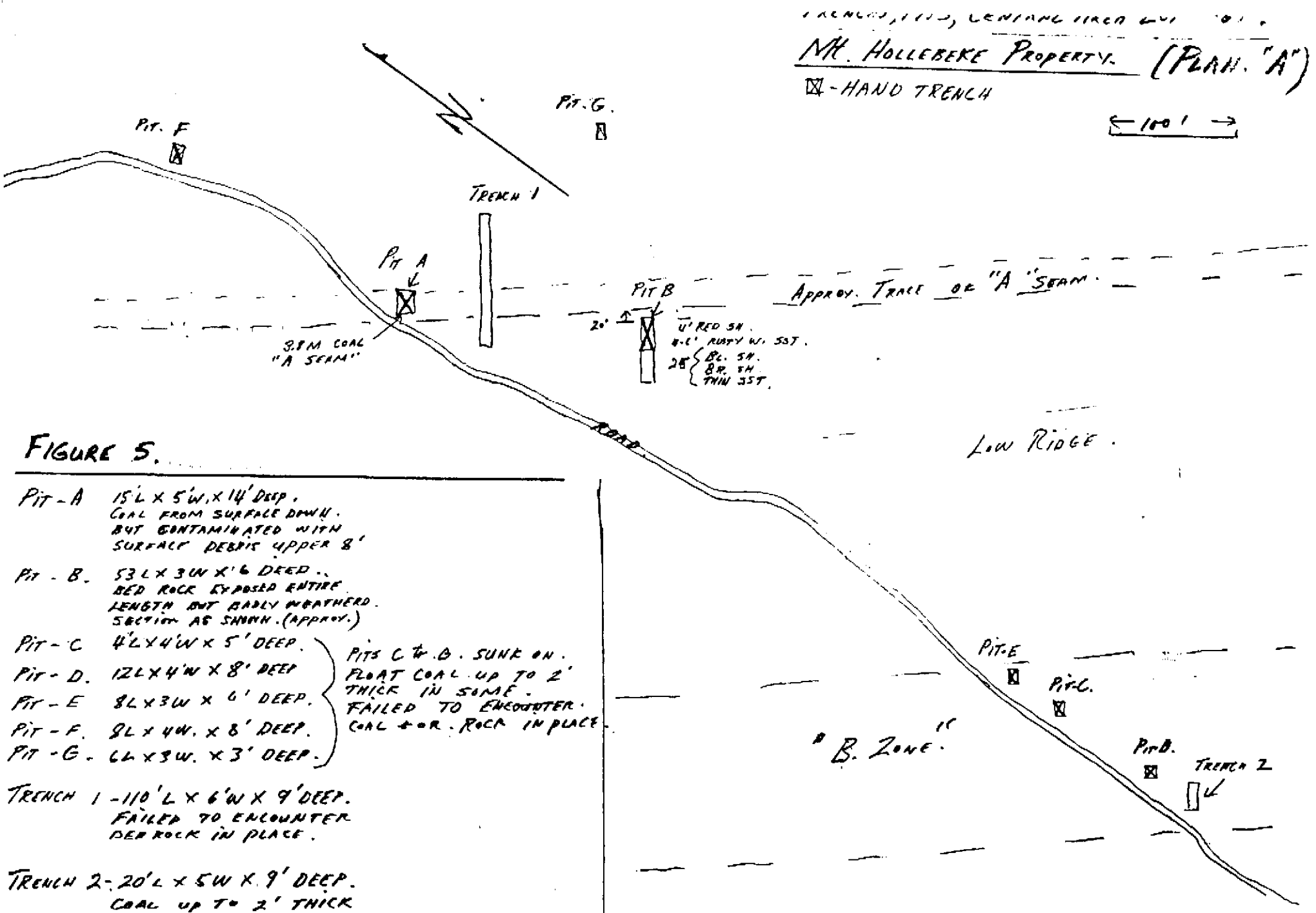


FIGURE 5.

PIT - A	15'L x 5'W. x 14' DEEP. COAL FROM SURFACE DOWN. BUT CONTAMINATED WITH SURFACE DEBRIS UPPER 8'	
PIT - B.	53'L x 3'W x 1'6 DEEP.. BED ROCK EXPOSED ENTIRE LENGTH BUT BADLY WEATHERED. SECTION AS SHOWN. (APPROX.)	
PIT - C	4'L x 4'W x 5' DEEP.	PITS C & D. SUNK ON FLOAT COAL UP TO 2' THICK IN SOME. FAILED TO ENCOUNTER COAL & OR. ROCK IN PLACE.
PIT - D.	12'L x 4'W x 8' DEEP	
PIT - E	8'L x 3'W x 6' DEEP.	
PIT - F.	8'L x 4'W. x 8' DEEP.	
PIT - G.	6'L x 3'W. x 3' DEEP.	

TRENCH 1 - 110'L x 6'W x 9'DEEP.
FAILED TO ENCOUNTER BED ROCK IN PLACE.

TRENCH 2 - 20'L x 5'W x 9' DEEP.
COAL UP TO 2' THICK BUT UNABLE TO REACH. COAL & OR ROCK IN PLACE.

STRUCTURE

A structural model can be hypothesized for the Pincher Creek area of the Flathead valley, based mainly on the evidence set forth by Bethune in his 1936 thesis of the area. Exploration drilling would be required to ascertain the validity of the hypothesis.

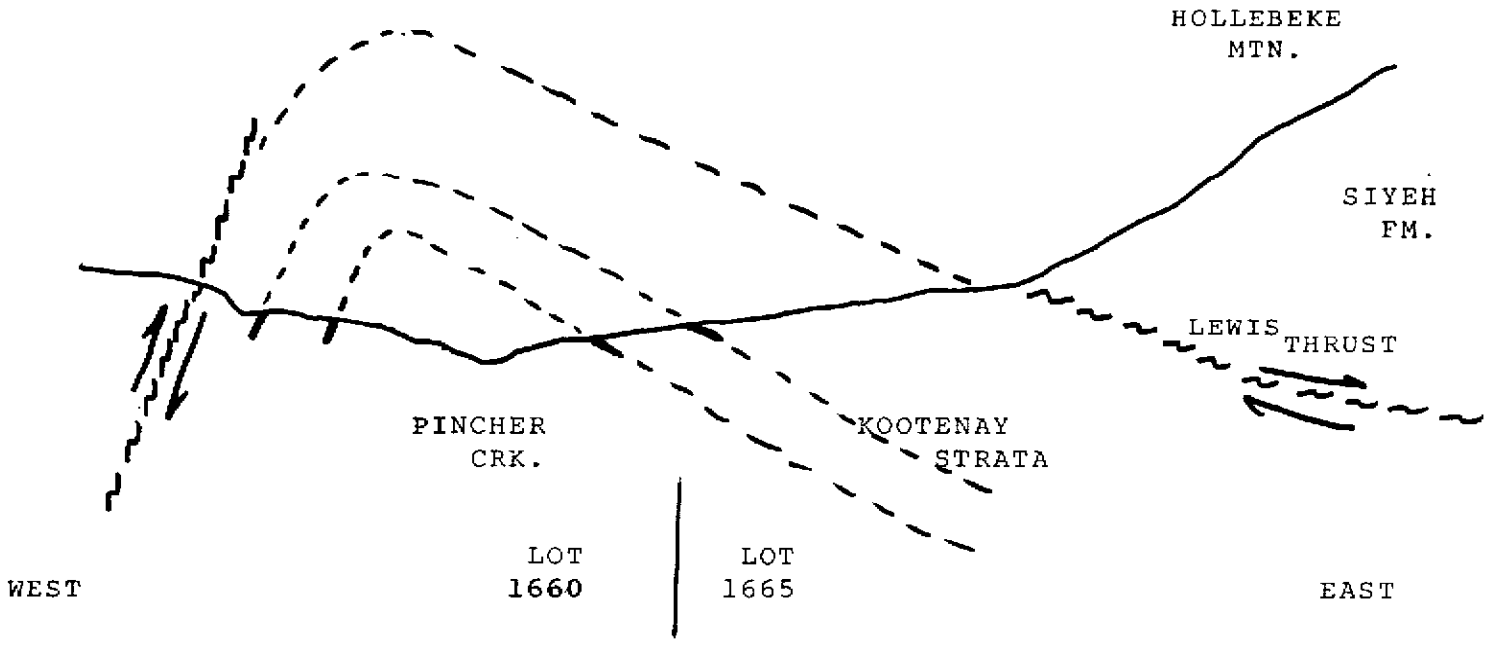


FIGURE 6.- Sketch of section showing partially eroded asymmetrical anticline below Lewis Thrust, PreCambrian Limestones (Siyeh Fm.) overlying younger Kootenay coal measures (Upper Kootenay). Scale: 1 cm. = 160 m. (approx.)

This section extrapolates the coal measures of the upper Kootenay beneath Hollebeke Mountain. The upper Kootenay would then outcrop again on the Alberta side somewhere east of Mt. McCarty, approximately 8 km. to the east of Pincher Creek.

CONCLUSIONS AND RECOMMENDATIONS

It can be concluded that a minimum of two seams of good quality metallurgical coal, for a total thickness of approximately 6 meters is present over a portion of Lot 1665 (Coal Licence #5313). Assuming an easterly dip of 20 degrees, in-place strippable reserves are estimated to be in the order of 5 to 6 million tonnes.

If exploration drilling can prove that these coal measures extend beneath the plane of the Lewis Thrust and under Hollebeke Mountain, an underground-mineable reserve of substantial proportions would result.

It is recommended that a program of exploration drilling be undertaken in order to prove or disprove the theories as outlined in this report, and to assess the quantity and quality of the near-surface coal on the south-western part of the licence. A total of 4 diamond coreholes would satisfactorily complete a first-pass program. Total footage would approximate 2,000 ft. (600 m.). The total cost of a program of this type would be in the order of $70,000.00. Surface trenching of the coal seams would also be included in this figure.

REFERENCES

1. PRICE, R. A. : FLATHEAD MAP-AREA, BRITISH COLUMBIA AND ALBERTA. G.S.C. MEMOIR 336. 1965

2. PRICE, R. A. : FERNIE MAP-AREA, EAST HALF, ALBERTA AND BRITISH COLUMBIA. G.S.C. PAPER 61-24. 1962.

3. BETHUNE, P. de : GEOLOGY OF THE FLATHEAD TOWNSITE AREA, BRITISH COLUMBIA. MEMOIRES DE L'INSTITUT GEOLOGIQUE DE L'UNIVERSITE DE LOUVAIN, TOME X, 1936

Report on Work Sept.21/79 to Sept.21/80.

Coal license #5313
Fort Steele Mining Division.
NTS 82G.

Owner and Operator

Wm. Shenfield
Box 933,
Fernie B.C.

Date

Wm. Shenfield

Location

Coal Licence #5313 is located near the headwaters of the Flathead river in the East Kootenay district, Fort Steele Mining division, It encompasses District Lot # 1665 and is approx. 13 miles south of Corbin B.C.

Access

Access is via B.C. Forest Service road south of Corbin B.C.

Ownership

The property is held under licence by myself, Wm. Shenfield, Box 933, Fernie B.C.

History

The history of Lot 1665 is unknown, but the adjacent freehold is owned by the Lilyburt Syndicate, an English concern who have held that property since the early 1900s and have carried out extensive exploration from time to time since acquiring it. The last such program apparrentl in 1936. This free hold is currently being drilled by Shell Canada.

Summary of work , License # 5313,

Coal float on areas of the license mapped as Pre-cambrian by Price 1961, Bethune 1936, prompted surface prospecting over the entire license area. Four days were spent on this preliminary step. This work yielded no Cretaceous strata, but did disclose widespread coal float over western half of the license.
Hand trenching of these occurrences, while generally unproductive, due to heavy overburden, did disclose the existence of a 12.5 ft.(3.8M) coal seam ("A" seam), but this excavation was abandoned due to water etc.
Later attempts to trace the "A" seam southward with a small back hoe were likewise unsuccessful, again due mainly to heavy overburden and water but also due to the presence of hardpan near bedrock.
Subsquently, the "A" seam and a lower seam ("B") were tentatively traced southeast approximately 3000 ft.(900M) with a tripod and auger.

Two men were employed for a period of 17 days.

Excerpts from our diary, re Mt. Hollebeke

Sept. 21/79
We travelled to Pincher ck. via MacClatchie ck. Prospected near fault at base of Hollebeke mt. Springs numerous, some P.C. outcrops at higher levels but no Cretaceous, other than that near road where there is some coal float. ("A" seam.)

Sept 22/79

Prospected near south end of property where it appaars to be cut off by a norhh dipping ? fault. Exposures of lmst. in footwall (north dipping) Cretaceous float very numerous north of fault but no outcrops. Outcrop o. Cretaceous? rock just to north of L.O. creek.

Sept 24/79

We prospected west slope of Mt.Holebeke about half way up. Numerous exposures Siyeh lmst., etc., gen. dipping west but no Kootenay or Blairmore. etc.

Sept. 25/79

Old coal mine rumoured to occurr in N.E. sector. Searched entire area with out any luck. Loggers have messed this area up so bad, it is impossible to find ground in original condition. Located outcrops Purcel lava in creek bottom, Vuggy.

Sept. 30/79

Put in trench just to south of A seam to try and pick up bedrock and obtain dips etc.
Beds yellowish(limonitic?) sst and red sh., very badly weathered. Apparent dip 20-25 to east. Strike 140 . Appears to be Blairmore strata underlaying A seam.

Oct. 4/79

Spent day digging trench above A seam but no outcrops.
Diverted creek from A seam. etc.

Oct. 12/79

We dug pit on A seam. 5 ft. deep approx 12 ft. long, 2-3 wide. Apparently all in coal but contains clay balls, boulders, etc.

Oct. 13/79

Deepened pit on A seam to 9 ft., coal getting better. Shale band in coal appears to be dipping to east at low angle. Strike with ridge. Water coming in.

Nov. 12

Arranged for backhoe, then went up to Hollebeke to line up work etc.

Wm. Stanfield.

Cont'd

Nov. 13/80

Hauled backhoe in(Dannys Trucking) Dug out A seam pit to limit of machines depth. 12½/2 feet coal, no bottom, no top. Bottom 4 ft. in relatively unweathered coal. Took sample of this 4 ft. Rest not worth the trouble. Larry has a friend at Kaisers, he will have it assayed. Moved machine to south approx. 100 ft and started crosscut.

Nov. 14/79

Cont'd work on crosscut. Overburden 8-9 ft. deep, underlain by a hard pan layer which is almost inpossible to get through. Coal abundant entir length of trench but not in place. No outcrop encountered.

Nov. 15/79

Moved machine to B seam area, cut coal up to two feet thick but could not get into the solid.
Took machine out as it is obviously a hopeless cause with a machine that small. Larrys friend had coal analysed. 23% ash , non coking, only tests Kaiser runs.

Nov. 16/79

Measured trenches, took another sample of coal from A seam pit, etc.

Nov. 19/79

Filled smaller trenches, put up fence around A seam, coal etc.

Nov./20/79

Set up tripod and come along, and augered 2 holes approx 200 yds. along strike and south of coal excavation.
First hole 8 ft. deep but hit boulder. 2nd hole brought up some coal but apparently also hit boulder.

Nov. 21/79

Terry Hurd, Doug. McFarlane from Island Ck Coal. examined property.

Nov.23/79

Cont'd tracing A seam to south-east. We put down a couple more holes with essentially the same results. Coal float in some holes suggests we are on strike of seam. Topography agrees.

Nov. 24/79

Moved rig back to north side and continued work there. Again no bedrock or coal in place but at least we have reasonable certainty that seam is present along strike length of approx. 3000 ft.

Wm. Mayfield

Work Performed on Mt. Hollebeke

4 Days Prospecting (2Men)------	100.00	800.00/100
10 Days trenching (2 men)----	75.00	2080.00
3 Days tracing seams with auger (2 men)	100.00	600.00
Transportation -1/2 t. P.U. ----17 days --	25-30	425.00
3 HP water pump 3 days ---	?	? 15.00
Equipment hire (Backhoe from L. Sedrovic)		$240.00
Transportation for above (Dannys Trucking)		No. Receipt $160.00
Miscellaneous -- Air Photos, Geological Reports etc, est.		100.00
	TOTAL	4,340.00

Nov. 14 79.

Received from / Reçu de Bill Shenfield

Two hundred and forty dollars Dollars 100

for Back-hoe work in the

$ Flathead.

Larry Sedrovic.