

= PR-TORREN RIVER 78(1)A =

A PRELIMINARY REPORT
ON THE GEOLOGY OF
THE TORRENS RIVER, B.C. COAL LICENCES
Prepared for Mr. W. Filipek
Edmonton, Alberta

OPEN FILE

**GEOLOGICAL BRANCH
ASSESSMENT REPORT**

Edmonton, Alberta, Canada
25 September 1978

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PR-TORREN RIVER 78(1)A.
WACLAW FILIPEK.

A PRELIMINARY REPORT
ON THE GEOLOGY OF
THE TORRENS RIVER, B.C. COAL LICENSES

Prepared for Mr. W. Filipek of
Edmonton, Alberta

BY

Dr. A. Příbyl

.....
DR. ALOIS PRIBYL, Chief Geologist
Mining Institute of Czechoslovakia,
Prague, Czechoslovakia

and

Robin C. Day

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ROBIN C. DAY, B.SC. (Conc. in Geol.)
Freelance Prospecting Geologist of
Edmonton, Alberta

Edmonton, Alberta, Canada
September 25, 1978

INTRODUCTION

In the summer of 1978 Dr. A. Pribyl and Mr. R. Day were retained by Mr. W. Filipek of Edmonton, Alberta to prepare a preliminary geological map and report on the Torrens River, B.C. coal licenses held by Mr. W. Filipek.

LOCATION

The Torrens River coal licenses are comprised of thirteen sections of land and are located in the Province of British Columbia, Canada on 1:50,000 topographic maps Jarvis Lakes (93-I/1E) and Narraway River (93-I-8E). The licenses are for the most part situated within the Torrens River drainage basin and are bounded to the east by the B.C./Alberta provincial boundary. These licenses are:

License #3886	N.T.S. 93-I-1	Block I	Units 21, 22, 31, 32
License #3887	N.T.S. 93-I-1	Block I	Units 23, 24, 33, 34
License #3888	N.T.S. 93-I-1	Block I	Units 25, 26, 35, 36
License #3889	N.T.S. 93-I-1	Block I	Units 41, 42, 51, 52
License #3890	N.T.S. 93-I-1	Block I	Units 43, 44, 53, 54
License #3891	N.T.S. 93-I-1	Block I	Units 45, 46, 55, 56
License #3892	N.T.S. 93-I-1	Block I	Units 47, 48, 57, 58
License #3893	N.T.S. 93-I-1	Block I	Units 63, 64, 73, 74
License #3894	N.T.S. 93-I-1	Block I	Units 65, 66, 75, 76
License #3895	N.T.S. 93-I-1	Block I	Units 67, 68, 77, 78
License #3896	N.T.S. 93-I-1	Block I	Units 85, 86, 95, 96
License #3897	N.T.S. 93-I-1	Block I	Units 87, 88, 97, 98
License #3898	N.T.S. 93-I-8	Block A	Units 7, 8, 17, 18

ACCESS

Access is possible by helicopter from the Sherman Meadows forestry airstrip located approximately 110 miles southwest of the Town of Grande Prairie, Alberta, on the Wapiti Road.

PHYSIOGRAPHY

Elevations range from 3700' to as high as 8000' at Mt. Minnes. Treeline is at 5800' and the forest cover consists mainly of mature spruce.

SCOPE OF WORK

The undersigned acknowledge herewith that they agree with all opinions and recommendations specified in this preliminary report. They would like to express their gratitude to Mr. W. Filipek from Edmonton, Alberta, who supplied them with valuable information and to Mr. A. Higgins from Edmonton, Alberta, for his assistance in the field and office.

.....
DR. ALOIS PŘIBYL, Chief Geologist
Mining Institute of Czechoslovakia
Academy of Sciences
Prague, Czechoslovakia

and

ROBIN C. DAY, B.Sc. (Conc. in
Geology)
Freelance Prospecting Geologist
of Edmonton, Alberta

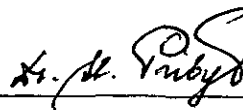
CERTIFICATE

I, Alois Přibyl of Prague, Czechoslovakia, hereby certify that:

1. I am the Chief Geologist of the Mining Institute of Czechoslovak Academy of Sciences, Prague, Czechoslovakia.
2. I am a graduate of the Charles University of Prague with a doctorate degree of RNDr. (Rerum Naturalium Doctoris) in 1951 in Geology, Petrology and Palaeontology and later received a D.Sc. degree in 1963.
3. I am a member of the Society of Mineralogy and Geology in Czechoslovakia, The Palaeontological Society of Great Britain, the Palaeontological Society of the U.S.A., etc.
4. I have practiced my profession as a geologist for more than 35 years.
5. I have published to date over 340 geological and palaeontological books and papers which were published in various languages (Czech, German, English, Russian, etc.).
6. I have no direct or indirect interest, nor do I expect to have any interest in the Torrens River B.C. coal licenses held by Mr. W. Filipek, or in any of his mineral claims.

7. The report and recommendations are based on a personal examination of the above coal licenses mentioned during the period between August, 1978 and September 1978.

Dated this 25th day of September, 1978



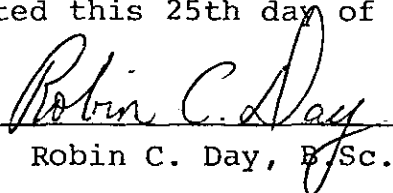
Dr. A. Přibyl

CERTIFICATE

I, Robin C. Day of Edmonton, Alberta hereby certify that:

1. I am a graduate of the University of Alberta with a B.Sc. (Concentration in Geology) obtained in 1975.
2. Experience
One summer during 1972 field season as a junior assistant to Dr. G. Taylor of the G.S.C. in Paleozoics in the Rocky Mountains north of the Peace River; one summer as a junior mapping assistant to Dr. B. Thompson of the G.S.C. at Robb Lake, B.C. during the field season of 1974; freelance consulting for gravel resources in the Edmonton area during the summer of 1975; placer mining on Burwash Creek, Yukon during 1976; base metal prospecting in the Yukon Plateau in 1977; prospecting for base metals and gold/silver in the Kutcho Creek area, B.C. in the spring of 1978.
3. I have no direct or indirect interest, nor do I expect to have any interest in the Torrens River B.C. coal licenses held by Mr. Filipek, or in any of his mineral claims.
4. This report and recommendations are based on a personal examination of the above licenses mentioned during the period between August, 1978 and September, 1978.

Dated this 25th day of September, 1978



Robin C. Day, B.Sc.

THE GEOLOGY OF THE TORRENS RIVER B.C. COAL LICENSE

STRUCTURAL GEOLOGY

The main structural features of the map area are complex folds and thrust faults striking northwest. Deformation of the bedding has been moderately intense. Folds range in size from small drag folds giving the bedding an intricately crenulated appearance to large structures over a mile in width.

The area of the licenses is divided in half by the Torrens River Thrust Fault which follows the Torrens River valley. Here, the Nikanassin Fm. in the southwest is thrust over the Commotion Fm. in the northeast. The Commotion Fm. is in turn thrust over the Shaftsbury Fm. along the northeastern boundary of the licenses. The Commotion Fm. thrust sheet generally dips to the southwest and the age of the faulting is post-Cretaceous.

STRATIGRAPHY

The coal licenses are underlain by the following Upper Jurassic and Lower Cretaceous Formations:

NIKANASSIN FM: The Nikanassin Fm. is the oldest formation outcropping in the Torrens River area. This formation consists of grey to dark grey, fine to medium grained, ripple marked, carbonaceous, grey to buff weathering, quartzitic sandstones and black siltstones of marine and non-marine origin. The thickness approaches 4000'. The lower part of this formation is Upper Jurassic in age and the upper part of this formation belongs to the Lower Cretaceous. There are a few thin coal seams from 1' to 3' thick in the upper part of the Nikanassin Formation.

CADOMIN FORMATION: The Cadomin Formation lies unconformably over the Nikanassin Formation. The Cadomin Formation is 20' to 80' thick and is a hard, massive, quartzitic, conglomerate comprised of well rounded, well cemented, black grey and green pebbles of chert and quartzite ranging in size from 1/4" to 6" in diameter. There are some sandstone and siltstone lenses. This formation is an excellent marker and often outlines the structural geology. No coal seams are present.

GETHING FORMATION: The Gething Formation lies conformably over the Cadomin Formation, is 200' to 300' thick and is mainly non-marine sandstone and siltstone with some shale and minor conglomerate. A coal seam is at the top of this formation and is from 3' to 10' thick.

MOOSEBAR FORMATION: The Moosebar Formation lies conformably over the Gething Formation, is 150' to 200' thick and is comprised of grey marine shale with thin siltstones weathering to a rusty maroon color. No coal seams are present.

COMMOTION FORMATION: The main coal bearing formation is the Commotion Formation. This formation along with the Gething and Moosebar Formations correspond to the Luscar Formation to the south in the Smoky River area of Alberta. The boundaries of the Commotion Formation need revision, especially from the point of view of the cycle of sedimentation. For example, the Cadomin Formation may be the basal member of the Gething Formation and the pebble conglomerate in the upper part of the Commotion Formation may belong to a new cycle of sedimentation represented by the Shaftsbury Formation, comprised of black marine siltstones and shales.

Two mineable coal seams are present in the lower and middle part of the Commotion Formation with the coal seams being the most persistent marker beds. Both coal seams belong to the same great cycle of sedimentation. Another valuable marker is a salt and pepper textured, grey weathering sandstone immediately below seam #3.

The Commotion Formation is 1700' to 1800' thick. The lower part of the Commotion Formation is roughly 430' thick and has coal seam #3a with a thickness of 1' to 5' at the top. Coal seam #3 has a thickness from 12' to 30' with an average thickness of 20' and is about 150' to 200' below coal seam #3a.

The middle part of the Commotion Formation is about 600' thick with a pebbly, cross-bedded sandstone at the top. Coal seam #4 has a thickness of 26' to 35' averaging 30' thick and is about 250' to 300' above coal seam #3a.

The upper part of the Commotion Formation is about 700' to 800' thick. Coal seam #7 is 3' to 10' thick averaging 5' and is about 200' above coal seam #4. At least three thin coal seams 1' to 3' thick are present near the top of the Commotion Formation, but drag folded bedding with an intricately crenulated appearance makes it impossible to fix their stratigraphic position accurately. The bottom of a persistent, grey weathering pebble conglomerate marks the top of the Commotion Formation.

SHAFTSBURY FORMATION: The Shaftsbury Formation is a grey to black, alternating marine siltstone and shale about 1000' thick. This formation overlies the Commotion Formation. The beds in the Shaftsbury Formation are very poorly exposed in the map area because of its recessive nature.

COAL SEAMS

Five coal seams have been found in outcrop within the boundary of the coal licenses. Namely:

COAL SEAM #1: This seam is found at the top of the Gething Formation and is 3' to 10' thick. This coal seam can be seen in Wolverine Creek. At this locality, it is interesting that the coal seam is split in three by a sandstone and shale parting. Although this coal seam was not seen in Black Creek, it can be expected to show up in any boreholes drilled to the Gething Formation.

COAL SEAM #3: This coal seam occurs in the lower part of the Commotion Formation and is 12' to 30' thick with an average thickness of about 20'. This coal seam may be followed continuously from the Kakwa area in Alberta and down into Wolverine Creek. It is also present in Black Creek. This coal seam dips to the southwest at all outcrop localities and can be expected in about 200' above coal seam #1 in boreholes drilled through the Commotion Fm. along the north side of the Torrens River.

COAL SEAM #3a: This coal seam is only 1' to 5' thick, and is seen in Wolverine Creek. It is a valuable marker and is 150' to 200' above coal seam #3.

COAL SEAM #4: This is the thickest coal seam within the boundary of the licenses. It may be traced continuously from the Kakwa area in Alberta to Wolverine Creek. At this locality, the seam is about 35' thick with a 1' shale parting roughly in the middle. This seam is also seen on Black Creek but

it is interesting to note that coal seam #4 is only 26' thick here. It may have been thinned on the limb of a fold as the coal appears much harder and slickensided. Coal seam #4 also dips to the southwest in all outcrops and may be expected in any boreholes drilled along the north side of the Torrens River. This seam averages 30' in thickness and is 250' to 300' above coal seam #3a.

COAL SEAM #7: Coal seam #7 is 3' to 10' thick and may be traced from the Kakwa area in Alberta to Wolverine Creek. This coal seam also dips to the southwest and may be found about 200' above coal seam #4.

REMARKS: There are 3 thin coal seams 1' - 3' thick in the upper part of the Commotion Fm. but intense drag folding in the Upper Commotion Fm. makes it difficult to fix their stratigraphic position accurately. These coal seams outcrop on the ridge west of Wolverine Creek and may also be seen along the ridge northwest of Black Creek. The numerical system for the coal seams was borrowed from the Cyprus Anvil Mining Corp. Torrens Coal Project - 1972 - 73.

Only coal seams #4 and #3 appear to be mineable. An oxide zone of 10' - 30' should be expected at the outcrop face.

CONCLUSIONS & RECOMMENDATIONS

From the information obtained from the preliminary geological mapping of coal licenses at the Torrens River in B.C., the authors arrived at the following conclusions which are submitted to Mr. W. Filipek for his consideration.

COMPOSITION AND QUALITY OF COAL SEAMS CHEMICAL ANALYSIS

(See following pages)

FILIPEK HOLDINGS LTD.

September 21, 1978

Sample #: 1

Seam #: 4

B. C. Coal License #: 3889

PROXIMATE ANALYSIS:

	<u>Air-dry basis</u>	<u>Dry basis</u>
Ash %	6.11	6.22
R.M. %	1.74	--
V.M. %	22.75	23.15
F.C. %	69.40	70.63
<u>TOTAL SULPHUR %:</u>	0.28	0.28
<u>CALORIFIC VALUE:</u>		
Cal/gm.	7,850	7,990
BTU/lb.	14,130	14,380

FREE SWELLING INDEX:

2 1/2

CYCLONE ENGINEERING SALES LTD.

Per: B. Y. H. Wong
B. Y. H. Wong

FILIPEK HOLDINGS LTD.

September 21, 1978

Sample #: 2

Seam #: 3

B. C. Coal License #: 3889

PROXIMATE ANALYSIS:

	<u>Air-dry basis</u>	<u>Dry basis</u>
Ash %	10.48	10.86
R.M. %	3.48	--
V.M. %	20.73	21.48
F.C. %	65.31	67.66

TOTAL SULPHUR %: 0.23 0.24

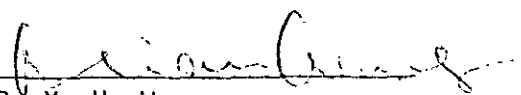
CALORIFIC VALUE:

Cal/gm.	7,220	7,480
BTU/lb.	13,000	13,470

FREE SWELLING INDEX:

N. A.

CYCLONE ENGINEERING SALES LTD.

Per: 
B. Y. H. Wong

FILIPEK HOLDINGS LTD.

September 21, 1978

Sample #: 5

Seam #: 4

B. C. Coal License #: 3893

PROXIMATE ANALYSIS:

	<u>Air-dry basis</u>	<u>Dry basis</u>
Ash %	3.09	3.18
R.M. %	2.80	--
V.M. %	26.32	27.08
F.C. %	67.79	69.74

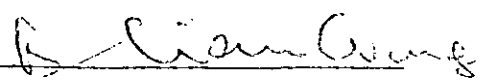
TOTAL SULPHUR %: 0.25 0.26

CALORIFIC VALUE:

Cal/gm.	7,870	8,100
BTU/lb.	14,170	14,580

FREE SWELLING INDEX: 2 1/2

CYCLONE ENGINEERING SALES LTD.

Per: 
B. Y. H. Wong

FILIPEK HOLDINGS LTD.

September 21, 1978

Sample #: 6

Seam #: 3

B. C. Coal License #: 3893

PROXIMATE ANALYSIS:

	<u>Air-dry basis</u>	<u>Dry basis</u>
Ash %	5.92	6.01
R.M. %	1.51	--
V.M. %	27.09	27.51
F.C. %	65.48	66.48

TOTAL SULPHUR %:

0.69 0.70


CALORIFIC VALUE:

Cal/gm.	7,910	8,030
BTU/lb.	14,240	14,460

FREE SWELLING INDEX:

8

CYCLONE ENGINEERING SALES LTD.

Per: 
B. Y. H. Wong

1. The Nikanassin Fm. outcrops over the southwest half of the licensed area of approximately 13 square miles. A few coal seams from 1" to 3" are present. The following license numbers should be dropped:

License # 3887	93-I-1	Block I	Units 23, 24, 33, 34
License # 3888	93-I-1	Block I	Units 25, 26, 35, 36
License # 3892	93-I-1	Block I	Units 48, 57, 58

The following licenses should be retained:

License # 3886	93-I-1	Block I	Units 31, 32, 21, 22
License # 3889	93-I-1	Block I	Units 41, 42, 51, 52
License # 3890	93-I-1	Block I	Units 43, 44, 53, 54
License # 3891	93-I-1	Block I	Units 45, 46, 55, 56
License # 3893	93-I-1	Block I	Units 63, 64, 73, 74
License # 3894	93-I-1	Block I	Units 65, 66, 75, 76
License # 3895	93-I-1	Block I	Units 67, 68, 77, 78
License # 3896	93-I-1	Block I	Units 85, 86, 95, 96
License # 3897	93-I-1	Block I	Units 87, 88, 97, 98
License # 3898	93-I-8	Block A	Units 7, 9, 17, 18

2. The coal bearing Commotion Fm. outcrops along the north-east half of the licensed area. Mineable coal seams outcrop in 2 square miles identified by coal license no.'s 3889 and 3893. The upper part of the Commotion Fm. outcrops northwest along strike from Black Creek.

3. It is necessary to continue the geological mapping in the licensed area at Torrens River B.C., Within the boundaries of the licensed area, the preliminary geological map should be rendered more detailed. The geological and technical works should be concentrated by more extensive trenching of coal outcrops.

4. Drilling boreholes along the north side of Torrens River into the Commotion Fm. should penetrate coal seams # 4 & 3 between 750' - 1400' depth, depending on where the boreholes are situated. A few boreholes will be necessary here to prove the true thickness, extent, quality and orientation of coal seams #4 and #3 north-west of Black Creek. Three or four key cored boreholes should penetrate the Commotion Formation from seam #7 to the Cadomin Formation at proposed cored borehole locations (see geological map):

D.D.H. #1	License #3889	NTS	93-I-1	Block I	SE corner Unit 52
D.D.H. #2	License #3893	NTS	93-I-1	Block I	SE corner Unit 63
D.D.H. #3	License #3894	NTS	93-I-1	Block I	Upper ½ Unit 65
D.D.H. #4	License #3897	NTS	93-I-1	Block I	SW corner Unit 97

Further boreholes may be drilled without core and should penetrate below coal seam #3 only. These boreholes must be gamma logged. The bore hole locations are:

B.H. 1	License #3889	NTS	93-I-1	Block I	NE corner Unit 41
B.H. 2	License #3893	NTS	93-I-1	Block I	south ½ Unit 64
B.H. 3	License #3893	NTS	93-I-1	Block I	NE corner Unit 74
B.H. 4	License #3894	NTS	93-I-1	Block I	NW corner Unit 76
B.H. 5	License #3896	NTS	93-I-1	Block I	SE corner Unit 95
B.H. 6	License #3898	NTS	93-I-8	Block A	South ½ Unit 8
B.H. 7	License #3898	NTS	93-I-8	Block A	Centre of Unit 18

5. We recommend to check up in greater detail the outcrops of the coal seams during drilling, especially in the places where the results of drilling would be very promising. Further we suggest for consideration whether in a chosen area, in one or two boreholes, pumping tests should be undertaken on water-bearing horizons where these would be found.

6. Coal license applications should be made for the following areas totalling 9 sections:

NTS	93-1-8	Block A	Units	9, 10, 19, 20
NTS	93-1-8	Block B	Unit	1, 2, 11, 12
NTS	93-1-8	Block B	Units	29, 30, 40
NTS	93-1-8	Block B	Units	21, 22, 31, 32
NTS	93-1-8	Block B	Unit	23, 24, 33, 34
NTS	93-1-8	Block B	Units	41, 42, 52
NTS	93-1-8	Block B	Units	43, 44, 53, 54
NTS	93-1-8	Block B	Units	45, 46, 55, 56
NTS	93-1-8	Block B	Units	64, 74
NTS	93-1-8	Block B	Units	65, 66, 75, 76

This area should undergo preliminary geological mapping during the 1979 field season to establish the extent and area of the upper Commotion Formation.

7. We suppose that for securing all the recommendations of all the operations of geological exploration the following team would be necessary: Two expert geologists and a coal technologist at least. In addition, two or three men would also be needed for excavating trenches and other work operations. Furthermore, a helicopter and one or two bulldozers and several trucks would be necessary.

PRELIMINARY CALCULATION OF COAL RESERVES

The preliminary calculation of coal reserves in the above mentioned area at Torrens River, B.C. must be worked out by the method of geological sections. Because we know there are two mineable coal seams (no.'s 3 and 4 - coal seam No. 3 has an average thickness of 20' and no. 4 has an average thickness of 30') From just two square miles we could only estimate the coal reserves for 7/3 of the mapped area, i.e. 50,000,000 to as much as 60,000,000 short tons of coal reserves.

The coal seam No.'s 1, 3a and 7 as well as other coal layers have not been taken into account; separate layers less than 5' thick have not been included into the coal thickness. Several parts of the mapping area (over four square miles) where the upper part of Commotion Fm. is exposed have been excluded for the time being from the calculation.

The reserves of coal at the locality of Torrens River (i.e. Wolverine Creek, Black Creek) have been calculated on the basis of the evidence obtained during the geological mapping of this area during August to September, 1978, the first stage of reconnaissance which has an informational character only. A supplementing reconnaissance should provide further information especially on the structure of the deposit, thicknesses and the variability of the seams and the variation in quality of the coal.

After finishing the proposed exploration stage, it will be necessary to carry out a new calculation of coal reserves. Attention should be concentrated on the determination of the coking properties of coal seams 4 and 3. The new calculations

of coal reserves would be based on the elaboration of a number of alternatives on the selection of the most suitable miningtechnical conditions of recovery. It should be also necessary to construct several structural maps which would represent the base for possible hydraulic mining.

USEFUL REPORTS

- a) Baykal, D., 1967, Photogeological Report on the Caw Creek Coal Prospect, Alberta (Prepared for Export Coking Coals of Alberta Ltd.), pp. 1-23 and maps and cross sections.
- b) Blackstock, W.J., 1970, Preliminary Report on the Kakwa River Coal Lands held by Kakwa Mines Ltd. prepared by Alcon Engineering Ltd., Calgary, Alberta pp 1-33 & maps.
- c) Muraoka, M, 1966, Preliminary Report of Caw Creek Coal Field, Alberta, Canada, pp 1-27 & maps.
- d) Příbyl, A., 1970, Preliminary Report on the Geology of the Territory between the Kakwa and Torrens Rivers in Northwestern Alberta, Canada (Prepared for W. Filipek of Kakwa Mines Ltd.) pp 1-17 & maps.
- e) Příbyl, A. and Vach, J., 1971, Preliminary Report on the Geology of the Territory between the Coal Ridge and Rim Ridge in northwestern Alberta, Canada (prepared for Coal Ridge Mines Ltd.), pp 1-7 & maps.

- f) Příbyl, A, and team of experts, 1973, Opinion and Recommendations of order magnitude, feasibility study no. 8, 1972 Kakwa Coal Project, Alberta, Notus Exploration Company, Vancouver, B.C., pp 1-53 (geology), 1-29 (mining) part/texts and maps).
- g) Robertson, D.B. and McFall, C.E., 1972, Progress Reports, Kakwa Coal Project - Notus Exploration Company - Suppl. App. Nos. I-II (Text & Drill Hole Logs).
- h) Pt III - A report to Notus Exploration Company on the Preparation Analysis and Washing of Seams 3, 3a, and 4 of the Kakwa Coal Project - Birtley Engineering (Canada) Ltd. Calgary, Alberta, pp 1-174.
- i) Vogan, Ross S., 1970, Report on Geology of Kakwa River Coal Prospect (Prepared for Woods Petroleum of Canada Ltd. Calgary), pp 1-36 & maps.

PUBLICATIONS

- a) Irish, E.J., 1965, Geology of the Rocky Mountain Foothills, Alberta (between latitudes 50° - 15' and 54° - 25') Geological Survey of Canada, Dept. of Mines & Technical Surveys, Memoir 334, pp 1-241 & maps. Ottawa.
- b) Pearson, G.R., 1960, Evaluation of some Alberta Coal Deposits (Part I The Wizard Lake District; Part II. The Westlock-Barrhead District; Part III The Sheep Creek-Wildhay River District); Research Council of Alberta, Preliminary Report 60-1, pp 1-61 & map, Edmonton.

- c) Spivak, J., 1949, Jurassic Sections in Foothills of Alberta and Northwestern British Columbia; Bull Amer. Assoc. Petrol. Geol., vol. 33, pp 533-546.

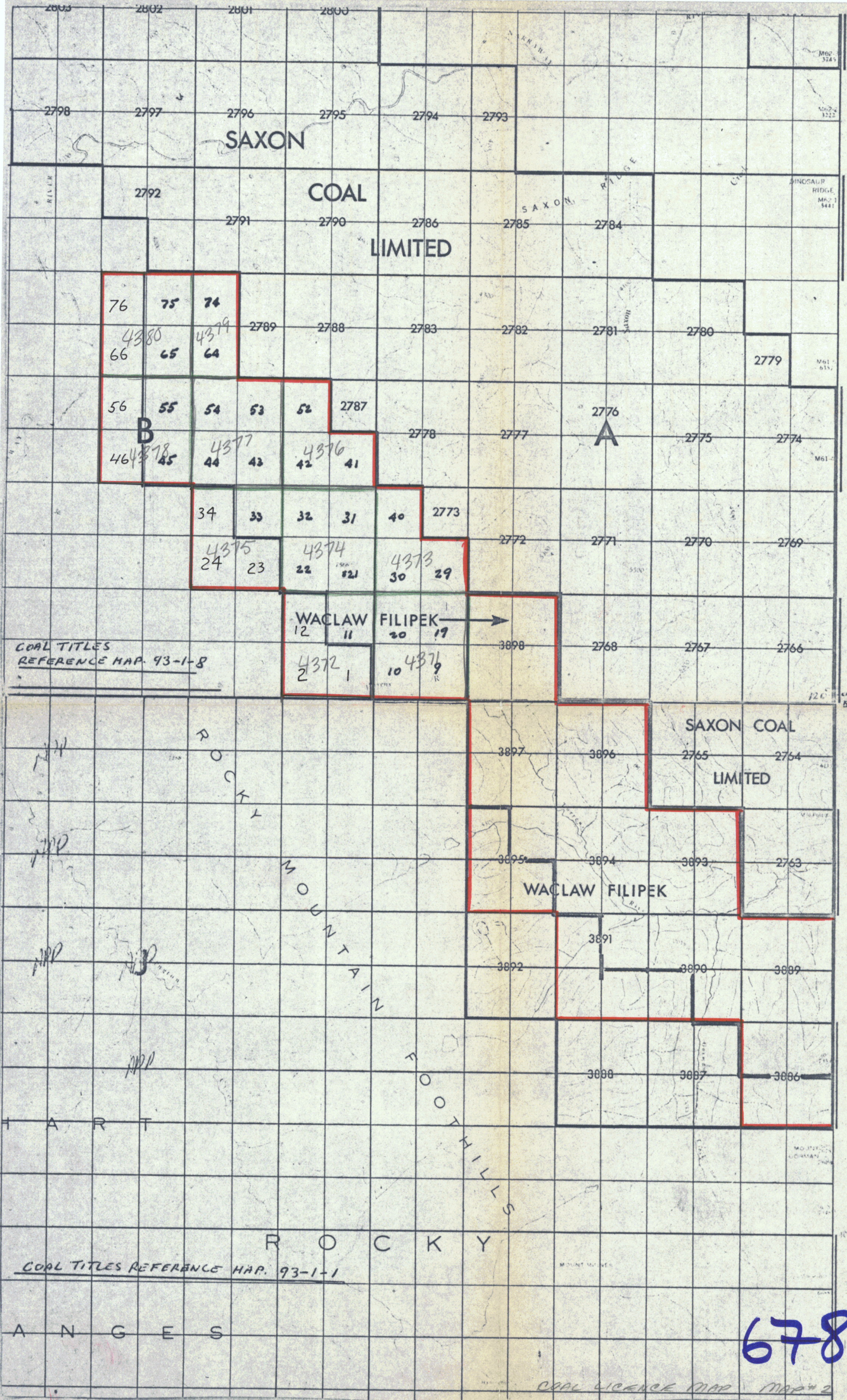
- d) Stott, J., 1960, Cretaceous Rocks between Smoky and Pine Rivers, Rocky Mountain Foothills, Alberta and British Columbia; Geological Survey of Canada, Dept. of Mines and Technical Surveys, Paper 68-16, pp 1-62, Ottawa.

SUPPLEMENTS

- 1. Preliminary Geological map - Scale 1:20,000

- 2. Geographical map with location of licenses.

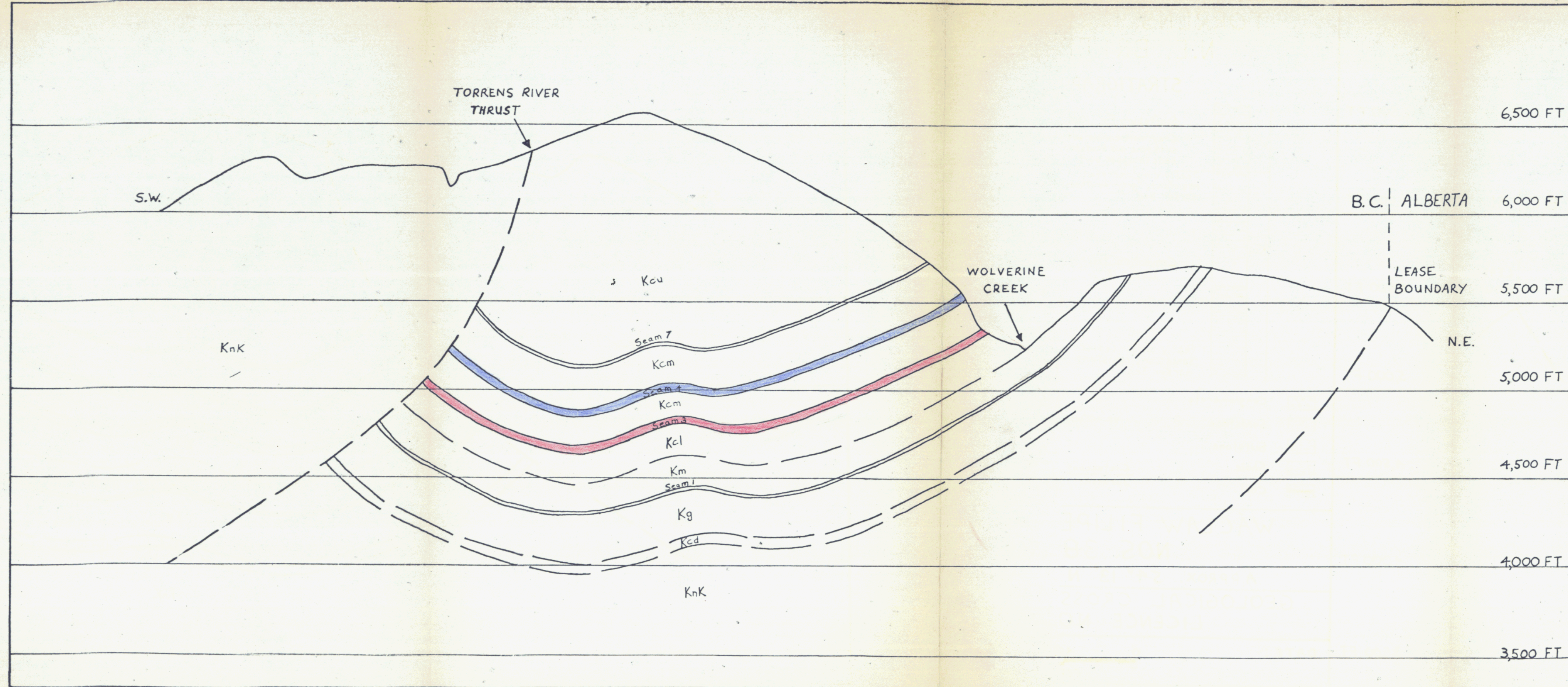
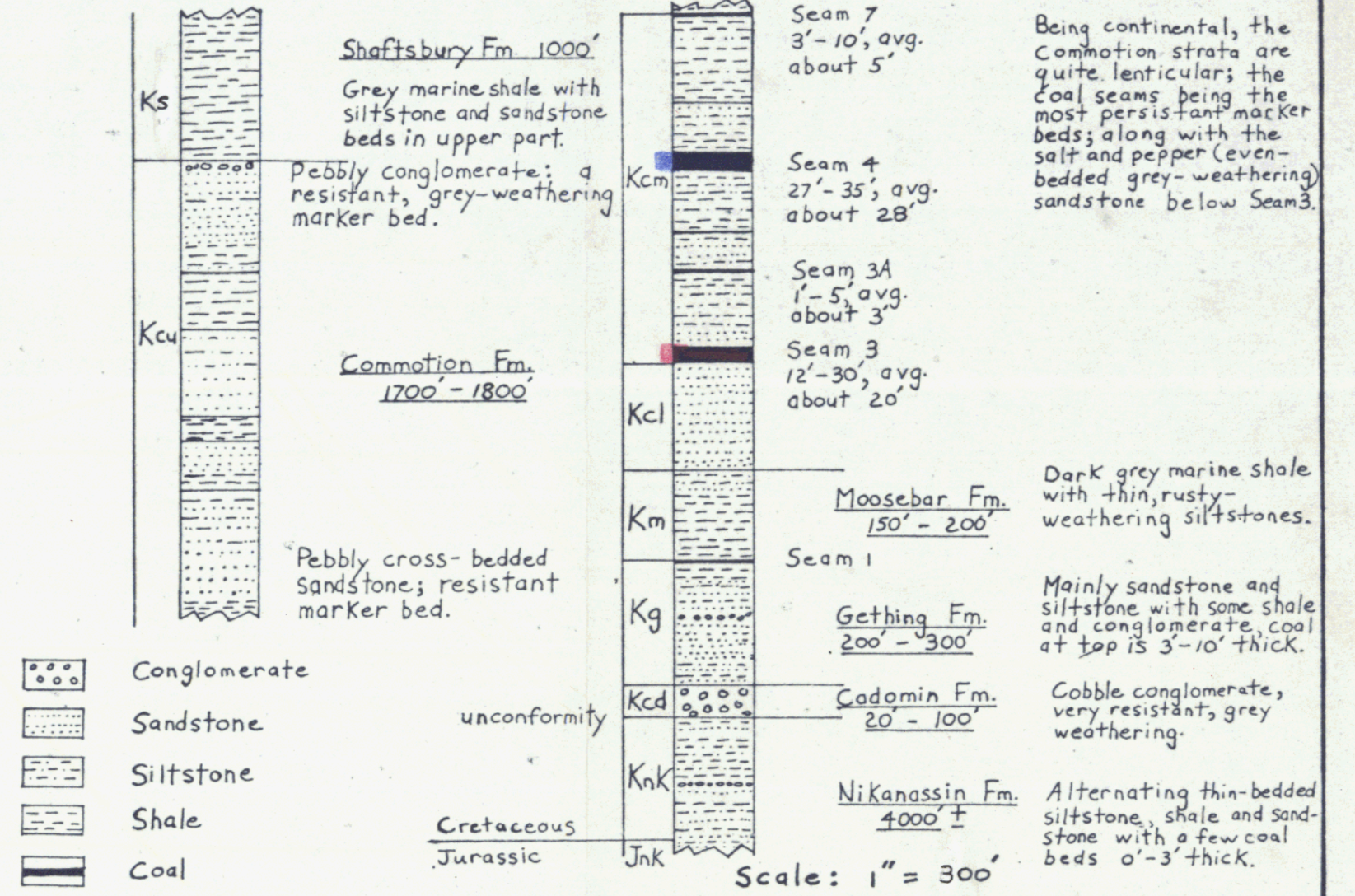
- 3. Geological cross sections:
 - A. Cross Section across the Wolverine Creek (SW-NE) License 3889
 - B. Cross Section across the Torrens River (SW-NE) License 3890, 3891
 - C. Cross Section across the Torrens River (NW from - to cross section B), license No.'s 3895, 3894 and 3896.



186-29
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 187-08
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 187-16
 187-19
 187-22

TORRENS RIVER COAL PROJECT N.E. BRITISH COLUMBIA

STRATIGRAPHIC COLUMN



WACLAW FILIPEK COAL LICENCES
NOS. 3886 - 3898
APPROX. 54° 13' N 120° 03' W Map #4

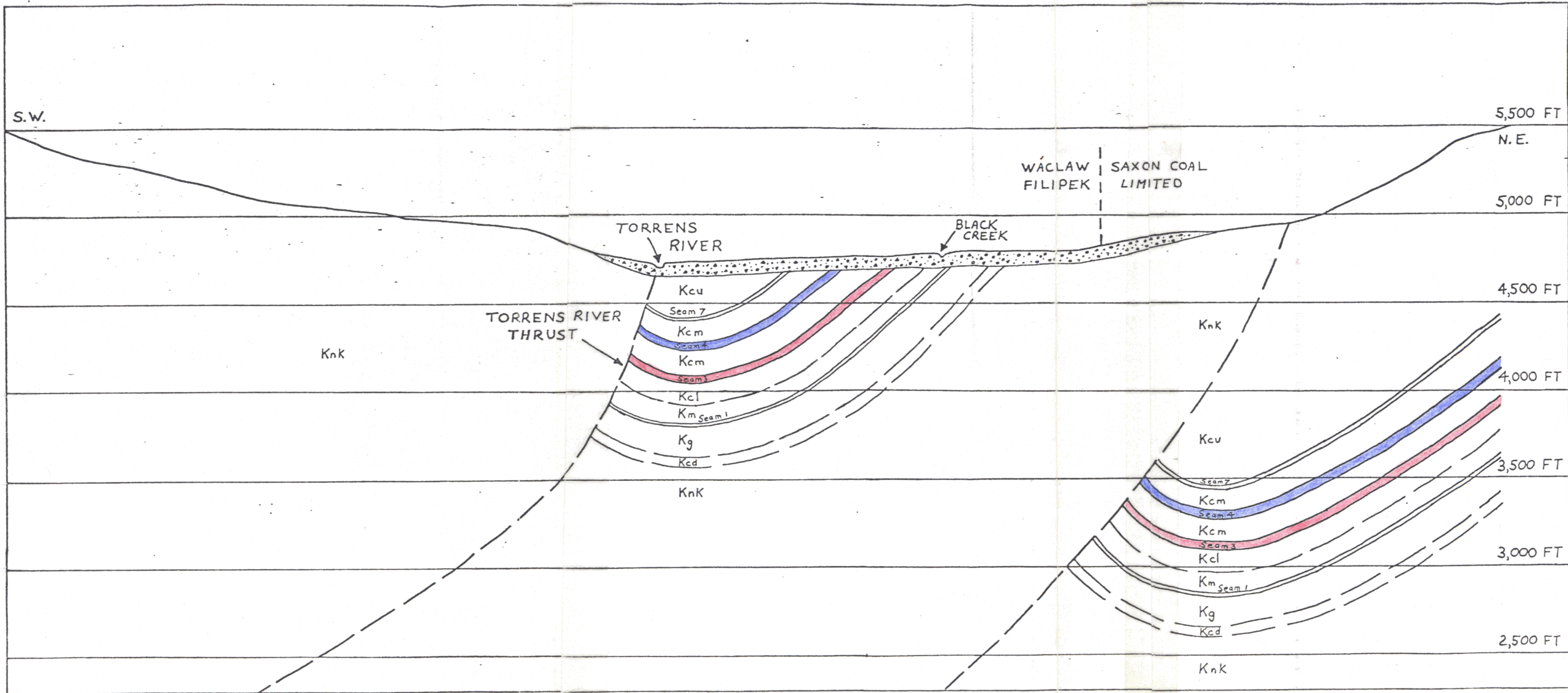
678

GEOLOGICAL CROSS SECTION A
LICENCE NO. 3889 LOOKING N.W.

DATE: _____

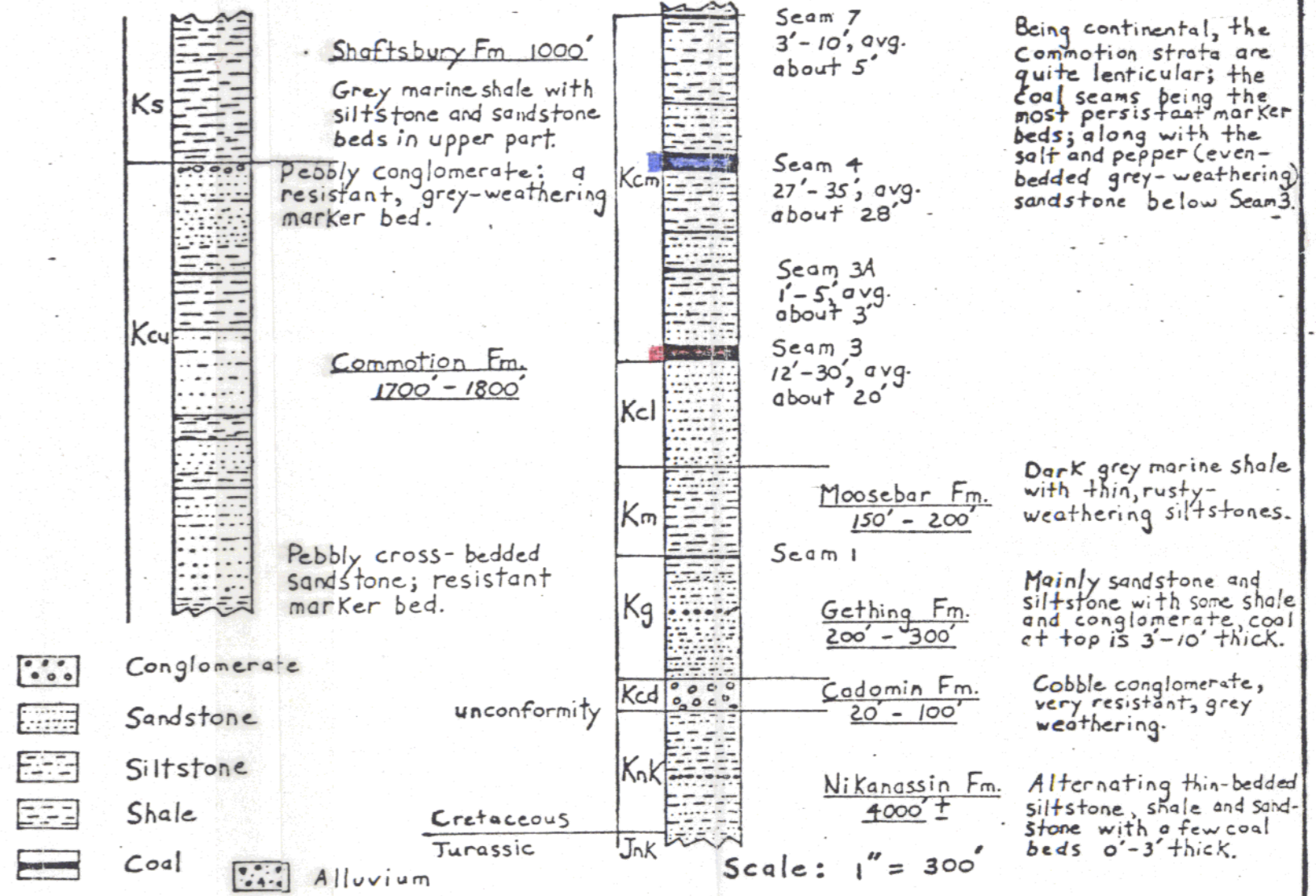
0 400 800
FEET

VERTICAL AND HORIZONTAL SCALE:
1" = 400' (1:4800)



TORRENS RIVER COAL PROJECT N.E. BRITISH COLUMBIA

STRATIGRAPHIC COLUMN



WACŁAW FILIPEK COAL LICENCES

NOS. 3886 - 3898

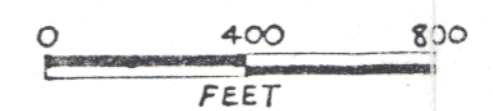
678

APPROX. 54° 13' N 120° 03' W

GEOLOGICAL CROSS SECTION B

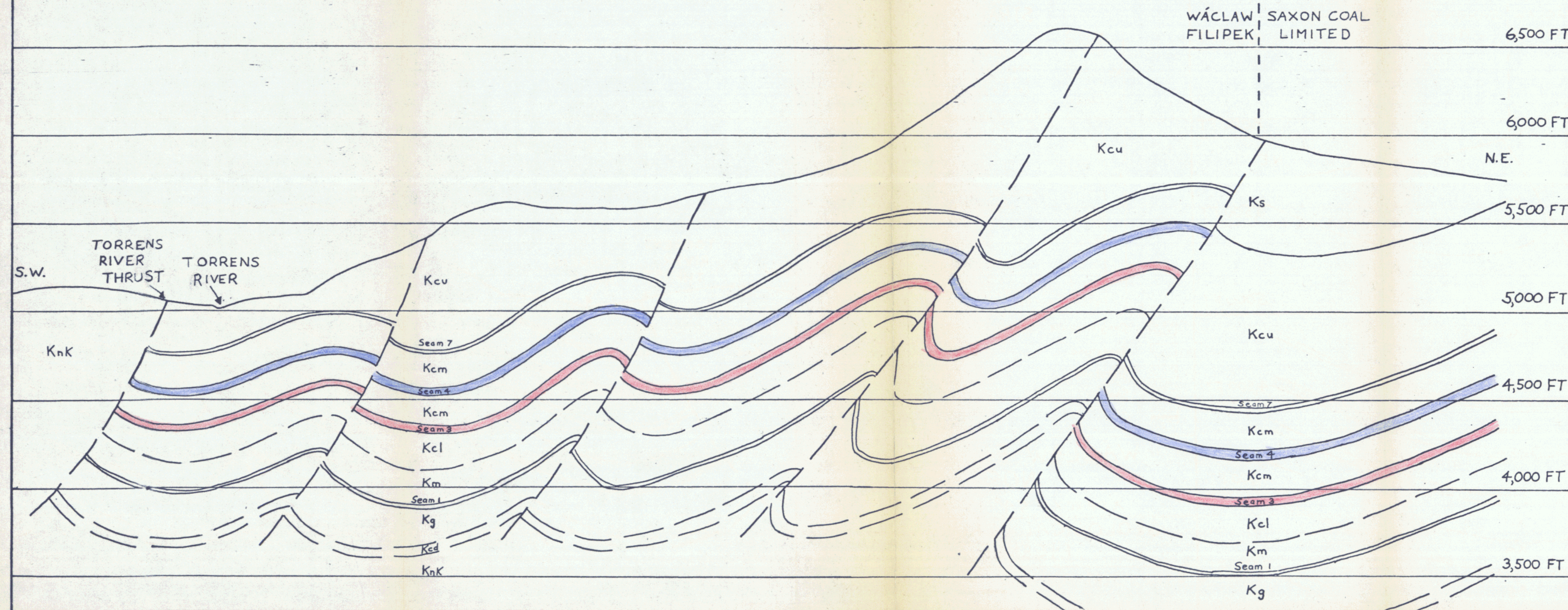
LICENCE NO. 3890, 3893 LOOKING N.W.

DATE: SEPT. 1978

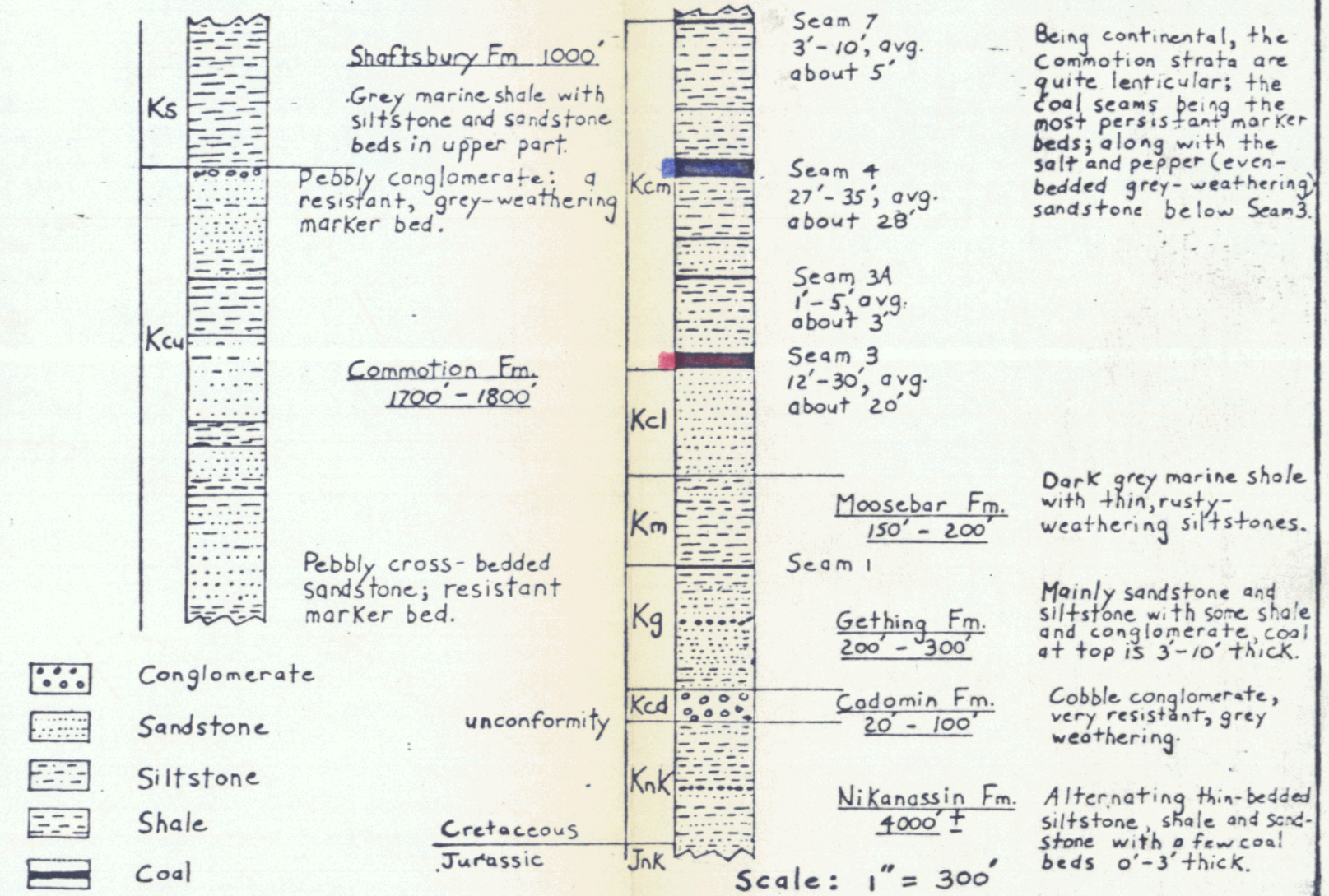


VERTICAL AND HORIZONTAL SCALE: 1" = 400' (1:4800)

TORRENS RIVER COAL PROJECT N.E. BRITISH COLUMBIA



STRATIGRAPHIC COLUMN



- Conglomerate
- Sandstone
- Siltstone
- Shale
- Coal

unconformity

Cretaceous

Jurassic

Being continental, the Commotion strata are quite lenticular; the coal seams being the most persistent marker beds; along with the salt and pepper (even-bedded grey-weathering sandstone below Seam 3).

Dark grey marine shale with thin, rusty-weathering siltstones.

Mainly sandstone and siltstone with some shale and conglomerate, coal at top is 3'-10' thick.

Cobble conglomerate, very resistant, grey weathering.

Alternating thin-bedded siltstone, shale and sandstone with a few coal beds 0'-3' thick.

WACŁAW FILIPEK COAL LICENCES

NOS. 3886 - 3898

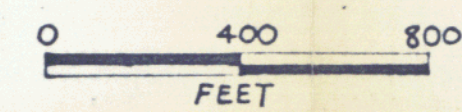
APPROX. 54° 13' N 120° 03' W

MAP #6

GEOLOGICAL CROSS SECTION C.

LICENCE NO. 3894, 3896 LOOKING N.W.

DATE: SEPT. 1978



VERTICAL AND HORIZONTAL SCALE:
1" = 400' (1:4800)

678

678

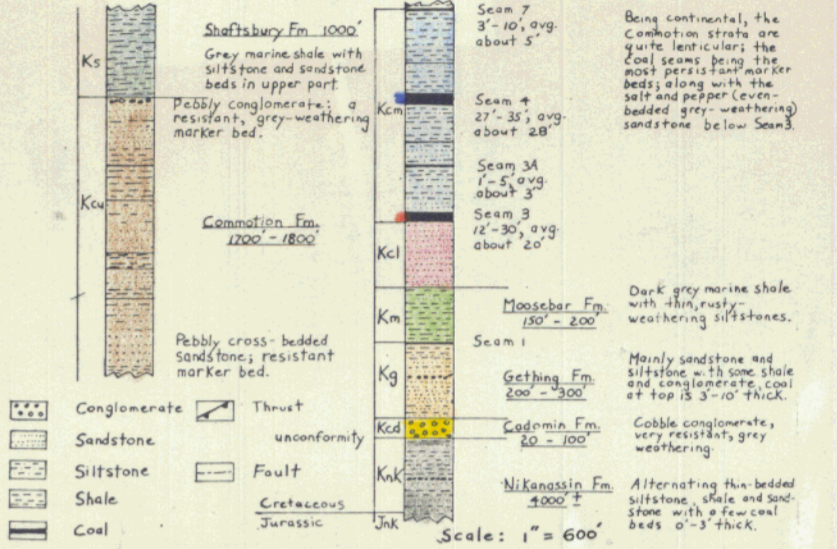
Map # 3.

PRELIMINARY GEOLOGICAL MAP
TORRENS RIVER B.C.

BY
DR. ALOIS PRIBYL
ROBIN C. DAY (B.Sc.)

1978
SCALE 1:20,000
TORRENS RIVER COAL PROJECT
N.E. BRITISH COLUMBIA

STRATIGRAPHIC COLUMN



WACLAW FILIPEK COAL LICENCES
NOS. 3886 - 3898
APPROX. 54° 13' N 120° 03' W

