

R. B. JOHNSON (1980)
BYRON CREEK COLLIERY
712.

A

GEOLOGICAL APPRAISAL

OF THE

OPEN FILE

COAL POTENTIALS

OF

LOTS 6994, 6996 AND 6998
(IN NTS MAP 82G/7 AND 82G/10)

UNDER

(COAL PROSPECTING LICENCES 3933, 3934 AND 3935)

FOR

BYRON CREEK COLLIERIES LIMITED

P.O. BOX 270, BLAIRMORE, ALBERTA

DATA GATHERED FROM AUGUST 8 TO SEPTEMBER 13
**GEOLOGICAL BRANCH
ASSESSMENT REPORT**

REPORT DATED SEPTEMBER 12, 1978

00 260

BY: VARD H. JOHNSON, Ph.D., C.P.G.
LICENCED PROFESSIONAL GEOLOGIST

VARD H. JOHNSON, CONSULTING GEOLOGIST

ILLUSTRATIONS

- 1.) Index and Location Map
- 2.) Geologic Map and Sections

Emphasis in illustrating has been placed on the three lots covered by the licences. Only major features are shown for Coal Mountain and Lot 7000; these are presented for comparison and contrast.

- 3.) Geologic Survey of Canada, Geologic Map 1164A is attached to show general regional relations on the south.

(A Geological Survey of Canada map in scale of 1:50000 was not available for Lot 6998).

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GENERAL STATEMENT

Pursuant to fulfilling the requirements for coal prospecting licences number 3933, 3934 and 3935 (dated June 23, 1978) I have examined the area of Lots 6994, 6996 and 6998 of the East Kootenay Land District of British Columbia in a search for coal and/or coal bearing formations. The sequence of licence numbers and the lot numbers may not be in the same order. The licences were granted in response to applications filed on June 26, 1975 by Byron Creek Collieries Limited. These lots are in the broad glacial valley of Michel Creek, south of the old town of Corbin, and west of Byron Creek Collieries Limited active mines on Coal Mountain.

Coal-bearing Kootenay beds were not found in the subject licenced area; the bedrock strata were mostly of the middle member of the underlying Fernie shale formation. Most of the bedrock is covered by unsorted glacial debris and/or recent stream sediments which consist of reworked glacial deposits. There are also some soil slump or landslide materials. Sufficient bedrock exposures were found in small stream channels, meanders, railroad cuts, road cuts and in slide scars to serve the purpose of this examination, and to show that most, or all of the potentially coal-bearing strata have been eroded; at least to the point where there is no incentive to spend money in further exploration for coal.

The evidence also shows that there are no potentially viable coal deposits whose recovery would be adversely affected by using the eastern parts of these lots for stowing mine spoil from mining or adjacent lots.

AUTHORIZATION

This examination has been made at the request of Mr. E. Fabro, Executive Vice President of Byron Creek Collieries Limited. It is submitted to them for their use in filling the requirements of coal prospecting licence numbers 3933, 3934 and 3935, and for their guidance in determining further interest in any or all of the three subject lots.

CREDENTIALS

The writer holds a doctoral degree in Geology from the University of Arizona (1941), is registered in California both as a Geologist and Engineering Geologist, is licenced as a Professional Geologist in the Province of British Columbia, and is a Charter member of the Association of Professional Geological Scientists. Association with the geology of the Fernie Basin and Crowsnest Pass region began in the late 1950's.

PURPOSE

The search for coal has been extended to the lower slopes of Coal Mountain and the valley of Michel Creek, and for this study to cover the areas of Lots 6994, 6996 and 6998 in the area south of Corbin. In particular, at this time, the study has been tailored to provide the geologic maps and data required by the issuance of coal prospecting licences on these three lots, which licences are numbered 3933, 3934 and 3935 without designation of lots. The work on the three licences is "Grouped" as prescribed in the Coal Act of 1975 in Article 31.

Initially Byron Creek Collieries had hopes of finding some concealed coal deposits, and also needed lands on which to construct drainage facilities and to dispose of mining spoils. If coal could be discovered, and a coal lease obtained, the appropriate leases could cover these combined needs; the mining excavations would provide additional places to stow the spoils from mountain top mining on the adjacent Lots 6997, and 6999, these latter lots are owned by Byron Creek Collieries Limited and contain large deposits of coal in deep narrow synclines.

PROCEDURE

The writer has had several seasons acquaintance with the coal-bearing Kootenay formation on the upper part of Coal Mountain, and also the upper part of the Fernie formation which underlies the Kootenay.

In this examination, a search was made for exposures of bedrock that is in place and sufficiently unweathered to permit identification of the Kootenay and the sub-divisions of the Fernie formation. Road cuts, old railroad grade cuts, and the bottoms of gullies and small streams on the steep sides of the valley provided most of these "in-place" exposures. Other surfaces are mostly covered by soils of a mixture of bedrock and glacially transported erratic boulders that are not representative of the subjacent bedrock.

After having identified a large number of exposures and comparing them with small scale geologic maps by Price,^{*} and others, the writer prepared a reconnaissance geologic map in which the structural and stratigraphic data are interpreted at a scale of 1/20,000.

* R.A. Price Geological Survey of Canada. Map 1154 A, and Paper 61-24.

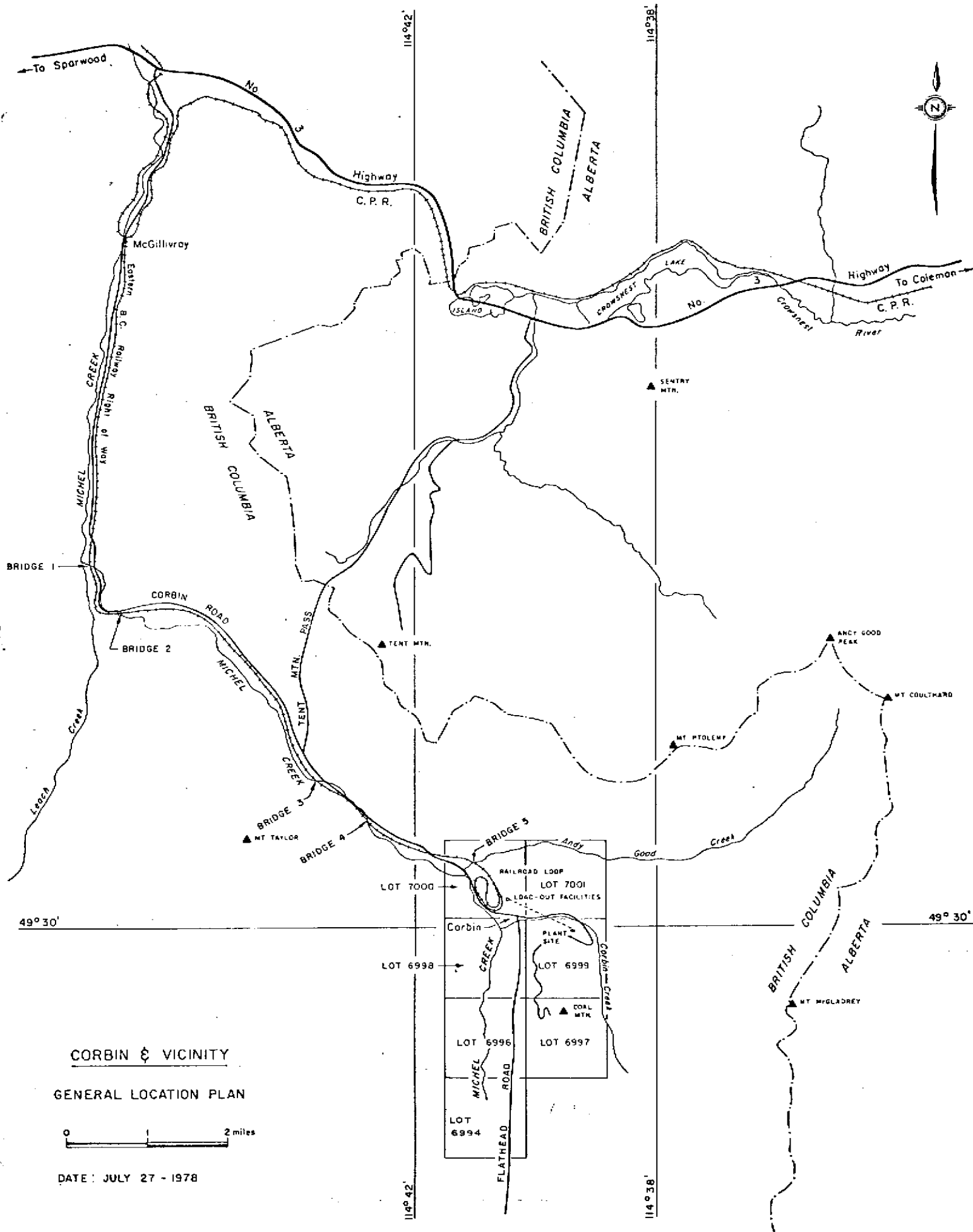
LOCATION

The three lots covered by the subject licences are in the upper valley of Michel Creek, south of Corbin and in the East Kootenay Land District. Corbin and Lot 6998 are shown along the southern edge of the Crowsnest (82 G/10 E) topographic map sheet and Lots 6996 and 6994 are shown at the top of Upper Flathead topographic map sheet 82 G/7 E.

By way of reference to other land marks, Corbin is 15 miles up Michel Creek from Highway 3, and 8 miles south of the Crowsnest Pass. It is 4 miles west of the Continental Divide.

These lots are apparently part of the lands originally patented by Corbin Coal & Coke Co., and subsequently relinquished in lieu of taxes during depression years.

The subject Lots adjoin Lots 6999 and 6997 on Coal Mountain which are owned by Bryon Creek Collieries and on which they are mining coal. Lot 6994 is south of Lot 6996, and only a few miles from the pass on to the Flathead River drainage.



GEOLOGYPENNSYLVANIAN-PERMIAN ROCKS

The oldest rocks exposed in the area of these licences are of the Rocky Mountain formation which consists of limestone, dolomite and chert. It is resistant to erosion and forms steep slopes on the south side of the small Creek in the southwest corner of Lot 6994. The Lot corner is only approximately known, and the area of exposure is small; not more than a few acres of this formation are at the surface within the lot. That exposure is on the narrow northward plunging Squaw Creek anticline as mapped by Price, and published by the Geological Survey of Canada in 1978, as Map 1154A. These rocks form a small bluff south of the creek at about 4300N. and 5,000 E. coordinates as used for the maps of Coal Mountain Mine. The formation is 1500 feet thick, but only the upper tip is exposed here. (Mine system coordinates are indicated on the accompanying Geologic map.)

TRIASSIC ROCKS

The Spray River formation overlies the Rocky Mountain formation; it is reported to be 300 feet thick in this area by Price (Paper 61-24) Geological Survey of Canada. No bedrock exposures were found, but numerous small boulders of chocolate brown colored siltstone were found in the hillside float in the southwest corner of Lot 6994, where roads and drill sites were dozed in about 1972 and 1973 on a phosphate licence for exploration. The phosphatic rocks were in the Spray River or lowest Fernie shale.

The area of outcrop (sub-crop) is approximately as indicated by Price on Map 1154A, published in 1978 by G.S.C. This formation is the uppermost bedrock in an area of probably less than 60 acres in the southwest corner of the lot.

JURASSIC ROCKS

The Fernie formation (or group) is a marine shale unit of unknown thickness because it is everywhere folded and crumpled, and is especially so in the area of the Canadian Rocky Mountains. These soft, incompetent rocks are crumpled and plastically deformed as well as being folded and faulted. R.A. Price (G.S.C. Paper 61-24) states that regionally the formation is divided into three general lithologic units.

The lower unit is soft, carbonaceous, generally dark grey to black, and contains locally some dark phosphatic pellets. Some of these may weather to a light brownish grey, and may be difficult to distinguish from the upper Spray River. This unit also locally contains dark fissile shales, and seems easily deformed.

The middle units, Price calls the "Grey beds" and describes them as being generally light grey in colour and to weather to a very light grey. These beds consist of thin-banded siltstones with interlayered clay-shale or mixed shale and some chalky limestone. Distinction and identification of this unit is important because of interpretations made in the report. In these, the presence of the Grey beds serves to raise the "restored" position of the overlying coal-bearing strata.

The upper unit consists of generally soft shale with fewer layers of sandy material. The shale may include substantial amounts of glauconite, and limonitic concretions in clay shale. Price calls this 200 to 300 foot unit the "Green beds", and apparently they form most of the upper unit in the vicinity of Corbin.

JURASSIC ROCKS - cont'd:

Most of the bedrock exposures of Fernie formation, in the three lots covered by this report, are of the Grey beds unit, or member. These would be at least 300 feet below the basal Kootenay; folding could well increase this interval to more than 500 feet.

In the episodes of folding and faulting, the Fernie beds have been plastically deformed and dragged to fit between and around the more competent overlying and underlying rocks; it is the most common "glide plane unit" of the thrust faults. In many places, and particularly in the upper and lower units, the strike and dip are structurally meaningless and change in a distance of a few feet. However, in the area of these licences, the Grey beds seem to have held a reasonably consistent structural pattern.

Observations on some specific Fernie (Grey bed) exposures are listed below, because these have implications regarding the projected restored altitude of the coal beds in that vicinity. The presence of Grey beds indicates that the coal-bearing strata have been removed along with 300 to possibly more than 800 feet of upper Fernie strata. Rock cuts along the old railroad grades in lots 6996 and 6998 expose only the Grey beds unit.

For a horizontal distance of at least 800 feet the water in the small creek flowing west around mine grid location of 9300 to 9500 N., the water cascades over a thinly ribbed silty shale belonging to the Grey beds. The bedding all trends S. 10 to 20 E. and dips 60 to 70 degrees west. The switching spur between legs 1 and 2 of the old railroad grade extends into the creek near the middle of this zone, and it also shows light grey silty shale beds that are structurally concordant with those in the creek.

JURASSIC ROCKS - cont'd:

The bed of the small creek in the northeastern part of Lot 6994, near grid coordinate 7500 N., is choked with boulders of glacial debris that have slumped into the stream. On the north side of the stream however, are some soil slump scars that expose Fernie Grey beds that strike S 10 to 15 E and dip 60 to 70 degrees west. This structure is consistent with the structures observed to the north, and the beds are apparently slightly overturned.

In railroad cuts near the 9,000 E. grid line, and between 11,000 and 12,000 N. there are steeply dipping Grey beds trending southeasterly. These are on the lower leg (leg 1) of the old rail line. The rocks are very light grey and probably are of the calcareous upper part of the Grey bed unit. The more westerly exposures show slightly steeper dips, becoming near vertical in some places.

Fernie beds exposed along the spur, or tail track between legs 3 and 4 of the old railroad line show more the lithology of the upper, or Green beds unit. These are along the eastern edge of Lot 6996, extending into Lot 6997.

In Lot 6998, the eastern slopes of the valley are covered with glacial moraine materials, with some outwash from past mining activities on top of the morainal material. Ditches dug to control runoff from the mining areas have exposed some Fernie, but it is generally weathered, and at least part of it is of the Grey bed unit.

On the west side of the valley the lower slopes are covered with glacial material, but the steeper slopes have small gullies cut into Fernie shales. The Fernie is exposed in these gullies only along the western line of the lots, except for the northern lot which laps over a ridge topped by Grey beds that dip northwesterly. The Grey beds are important in forming that slope.

CRETACEOUS ROCKS

All of the known coal in this region is in the Kootenay formation, of probably Cretaceous age. The basal Kootenay sandstone overlies the Fernie formation with a gradational contact as the sea was filled, and beaches were built. This basal sandstone (Moose Mountain sandstone) is 100 or more feet in thickness, is hard and resistant to erosion, it forms ledges and steep slopes and underlies all of the coal. The transitional passage beds are here included in the Kootenay because they are mostly sandstone. The coals are in a shaley-sandy mixture that is less durable than the Moose Mountain sandstone, but generally protected by it.

The inspection of the area of these licences is in part a search for Moose Mountain sandstone in a synclinal structure that would form a "nest" for the coal; none was found in significant quantities or location. The east limb of a synclinal structure was observed in Lot 6997, west of the Big Show mine, but it is apparent that the western limb has been eroded, and with it the coal that would have been in Lot 6996. Present surveys are inadequate to determine if this sandstone does extend into Lot 6996, but if it does there is very little remaining. Mine map coordinates of this occurrence are around 10,000 E and 13,000 N. The lot line is at, or just east of the 10,000 east line.

RECENT SEDIMENTS

With the melting of the glaciers in this valley, large boulders of limestone, quartzite, and miscellaneous finer gravels were dumped on the sides and lower slopes of the valley. At one stage a lake occupied the lower part of the Michel valley with a high water mark at near 4900 feet. Debris loaded streams filled the Corbin vicinity to elevations 100 to 200 feet above the present stream level. Michel Creek has been unable to remove all of this material from the sides of the meander plain.

For the purposes of this study, these younger sediments serve only to mask the outcrops of the Fernie formation. The Kootenay beds, with their coal, have been eroded from the areas of these three lots.

STRUCTURE

The Squaw Creek anticline which enters Lot 6994 along its western edge and apparently plunges gently northward, may extend to hold the Spray River formation very close to the surface beneath the glacial and stream gravels along the west side of the valley. Nearly all of the Fernie that is exposed along the upper edge of the gravel cover resembles the lower member, more than it does the Grey beds. Also black silty highly-carbonaceous shales are exposed in the road cut at the railroad crossing in northwestern Lot 7,000. Either a sharply folded anticline or a fault is needed along that trend to elevate the grey beds from their exposures on the east slopes to the upper walls of the valley on the west side. A fault-querie symbol is shown in the alluvium, to indicate this condition. Nothing is exposed, but a fault or sharp anticlinal fold is necessary to account for these differences, either is possible.

There is a line of saddles along the east side of Lot 6996; it passes near the southeast corner of that lot and into Lot 6995 at a point shortly south of that corner. Price has interpreted that line of erosional weakness to be the trace of a fault. The presence of the long structurally consistent exposure of Grey beds on the west side of that line offers an alternate interpretation, which the writer prefers. That line of weakness follows the eastern contact between the Grey beds and the less erosionally resistant Green beds, or upper portion of the Fernie. If this be true, then the west-dipping Grey beds must be slightly overturned as the contact with the Green beds member is the top of the Grey beds.

This does not completely rule out the possibility of some bedding-plane faulting, as the Green beds unit is very soft. It is generally complexly folded and sheared, and in

STRUCTURE - cont'd:

Coal Mountain is locally thickened far beyond its normal thickness. It also follows, that in places of "pinching", the upper unit may be quite thin and the Kootenay may approach the Grey beds beneath the east limbs of the synclines. They are so thinned on the east side of Coal Mountain.

Not all of the structural breaks have been identified, and only the larger ones are indicated on the maps or sections. All units of the Fernie formation are thicker than is considered to be normal, and hence there must be some internal disturbance. No problem is raised by more than doubling the thicknesses of the upper and lower members of the Fernie formation as they yield to stresses by intricate mullion folding and plastic deformation. The Grey beds are apparently more than 500 feet thick on the east side of the Michel valley, possibly as 700 feet of thickness is indicated in the northern part of Lot 6994. Flexures indicative of faulting were not found in that canyon where the Grey beds are overturned. Part of that apparent thickness may be due to structures sloping in the same direction as the land surface.

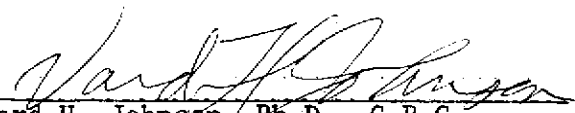
The relative positions of the Grey beds on the two sides of the valley requires that some form of disturbance continue northward along the projection of the Squaw Creek anticline as mapped by Price, but with the major disturbance presently lying beneath the valley fill. Such a disturbance is indicated. It also serves to raise the projected pre-erosional position of the coal-bearing Kootenay formation to well above present land surfaces.

Structure sections have been drawn on grid coordinates 6,000, 10,000, and 15,000 north to illustrate the type of structures that were found, and to indicate the interpretations. Dotted lines are used to show the restored structures above the present land surface.

CONCLUSIONS AND RECOMMENDATIONS

After a careful field examination and application of terrain analysis methods to the areas covered by Coal Prospecting Licences 3933, 3934 and 3935, I have concluded that there is no chance of finding a deposit of commercially exploitable coal. All of the rocks found in the area are of Pre-Kootenay and hence of pre-coal age, and one must conclude that the coal has been removed by erosion, probably during glacial time. It follows, then, that using the area for stowing mining spoil would not jeopardize the future recovery of any coal deposits. So far as I could determine, there is no coal in the subject area.

Unless there are other reasons for maintaining these coal exploration licences, I recommend that they be relinquished.


Vard H. Johnson, Ph.D., C.P.G.
Consulting Geologist
Registered & Licenced in California
and British Columbia
September 12, 1978



BYRON CREEK COLLIERIES LIMITED

Blairmore, Alberta

June 18, 1979

DOUBLE REGISTERED MAIL

Mr. A.R. Corner
Administrator for Coal
Ministry of Energy, Mines & Petroleum Resources
Parliament Buildings
Victoria, B.C.
V8V 1X4

REFERRED TO	DATE	INITIAL
C.G.C.		
D.C.G.C.	7/2/6	
G.C.		
FILE NO.		
FILING CLERK		

Dear Sir:

7231

Re: Coal Licences # 3933-3935 inclusive
Term Extension

Upon reviewing the enclosed report with careful consideration, it has been decided not to extend the term of our above mentioned licences. I am therefore sending you a report outlining the findings on these lots as well as a short summary showing the costs involved in this research.

If there are any questions or additional information required please contact me at our Blairmore office.

I would like to take this opportunity to convey my thanks for your help over the past year.

R#884
MINISTRY OF MINES AND
PETROLEUM RESOURCES

Sincerely,
BYRON CREEK COLLIERIES LIMITED

JUN 21 1979

MINERAL TITLES FILE ROOM

James J. Meier
Exploration Manager

JJM/lv
Encls.

SUMMARY

COSTS INVOLVED IN THE GEOLOGICAL MAPPING AND REPORT ON LOTS
6994, 6996 & 6998 UNDER COAL PROSPECTING LICENCES 3933, 3934 & 3935

Field mapping of above lots done by Vard H. Johnson, Ph.D., C.P.G.
Consulting Geologist:

August 8 to 31 inclusive - Mapping

24 days @ \$175.00 U.S. (x1/.87) = Cdn. \$4,827.59

Expenses = 2,114.00

August total \$6,941.59

September 1 to 13 inclusive

September 1 to 6 inclusive - Mapping

6 days @ \$175.00 U.S. (1x/.85) = Cdn. \$1,235.29

September 7 to 13 inclusive - Report

7 days @ \$175.00 U.S. (1x/.85) = Cdn. \$1,441.18

Expenses 1,115.90

September total \$3,792.37

Consulting Geologist Total - \$ 10,733.96

Report Costs: Bob Poulton \$90.00/day x 7 days = \$630.00

(B. Poulton is employed as draftsman for
Byron Creek Collieries Limited) There was
approximately \$100.00 miscellaneous expense
involved in this report: typing, maps, xerox
etc.

\$100.00

\$730.00

Total Costs - \$ 11,463.96

Total costs are equal to 14.75/hectare.

COPY

VARD H. JOHNSON
CONSULTING GEOLOGIST
Ph. D., C. P. G.

Date:
September 30, 1978

To: Byron Creek Collieries Limited
Box 270
Blairmore, Alberta T0K 0E0

For: Prof. Services in September 1978.
Coal prospecting permits 3933, 3934 & 3934. B.C.

Professional Services:

13 days @ \$175 U.S./ .85 = C\$2675.47

C\$2675.47

Expenses:

Lodging (16 days) \$272.00
Meals 234.00
Mileage 1390 x .41 = 569.90
Phone, gratuities & minor misc. 40.00

Total expenses C\$1115.90

ITEM NO.

C\$3791.37

W.O. 78-6

A 2262

Total C\$ 3,791.37

Signed:

Vard H. Johnson

COPY

VARD H. JOHNSON
CONSULTING GEOLOGIST
Ph. D., C. P. G.

Date:
September 9, 1978

Byron Creek Collieries Limited
Box 270
To: Blairmore, Alberta T0K 0E0

For: Professional Services in the Month of August 1978.

Professional Services:

24 days @ US\$175.00 (x 1/.87) = C\$4,827.59

Expenses:

Lodging	C\$485.00
Food	405.00
Transportation	
2900 mi. @ .41	1189.00
Grat's, Phone & misc. minor exp.	35.00

Total Expenses \$2114.00

Total: C\$6,941.59

Total C\$6,941.59

Signed: 

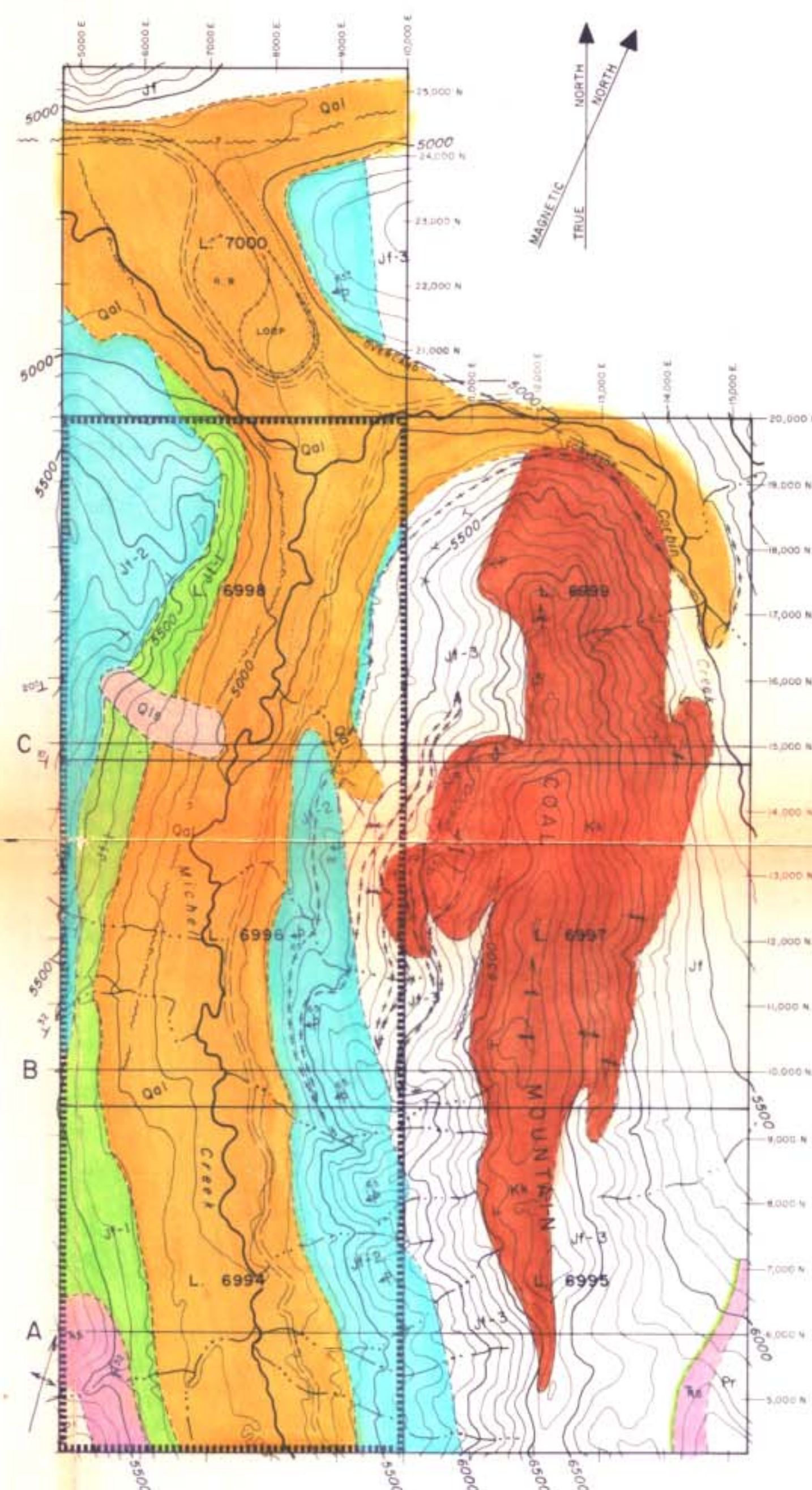
Vard H. Johnson

COPY

EXPLANATION

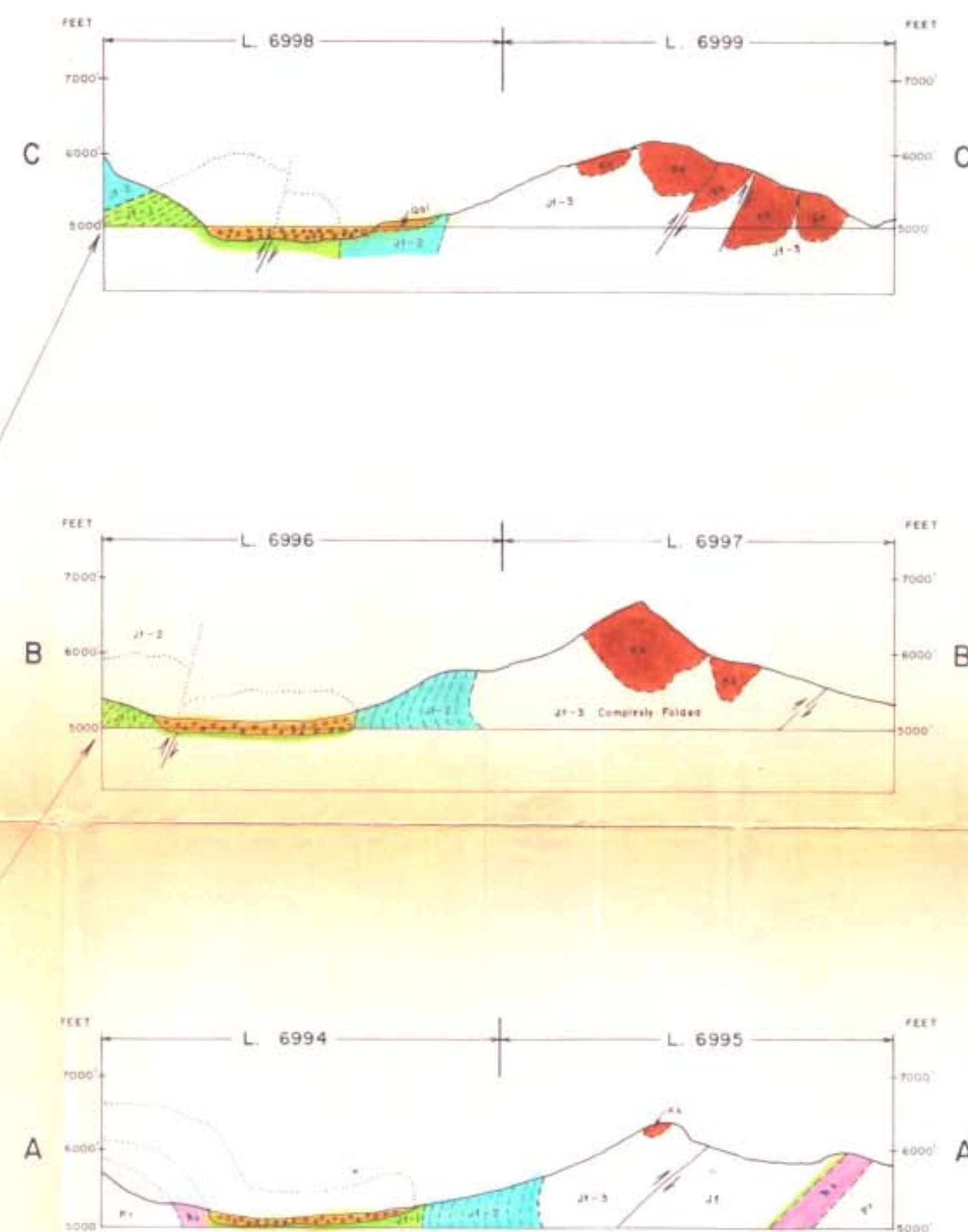
- Qls Recent land slides
- Qal Quaternary alluvium (Glacial + recent stream deposits)
- Kk Kootenay formation of Jura.-Cretaceous age. Members not separated. Lower 100 to 200 ft. is sandstone.
- Jf Fernie formation undistinguished.
Jf-3 Upper soft glauconitic member is highly deformed.
Jf-2 Greybeds member is fairly competent.
Jf-1 Lower soft Carb.-Clay-Shales with some thin black limestone. Local Phosphatic limestones.
- Trs Spray River formation (Triassic) Poorly exposed. Chocolate colored silty marls. Contacts from Price - approx.
- Pr Rocky Mountain formation. Dark grey cherty limestones. Contacts not exposed.
- Dip & strike symbols. The angle of dip if measurable and significant is given in degrees.
- Overturned beds showing dip.
- Well defined contacts.
- Poorly exposed contacts
- Projected contacts
- Plunging anticline } Arrow shows direction of plunge
- Plunging syncline } Arrow shows direction of plunge
- Syncline
- Fault (P) Concealed by alluvium; May be asymmetrical anticline.
- Road
- Railway
- Abandoned railway
- Stream
- Intermittent stream
- Area of Interest

Scale 1:20,000



GEOLOGIC MAP

UPPER MICHEL VALLEY & COAL MOUNTAIN FOR
COAL EXPLORATION LICENCES 3333, 3334, & 3335



DIAGRAMMATIC STRUCTURE SECTIONS

INTERPRETED BY V.H. JOHNSON, C.P.G., P.E.
CONSULTING GEOLOGIST
FOR BYRON CREEK COLLIERIES LIMITED
DATE: September 11-1978

V.H. Johnson



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