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N.T.S. 82-J-6, 7, 10, 11

VINCENT OPTION
UPPER ELK VALLEY, BRITISH COLUMBIA
GEOLOGICAL REPORT

January 20, 1971
Toronto, Ontario.

Rolands A. Benkis
Robert C. Hart

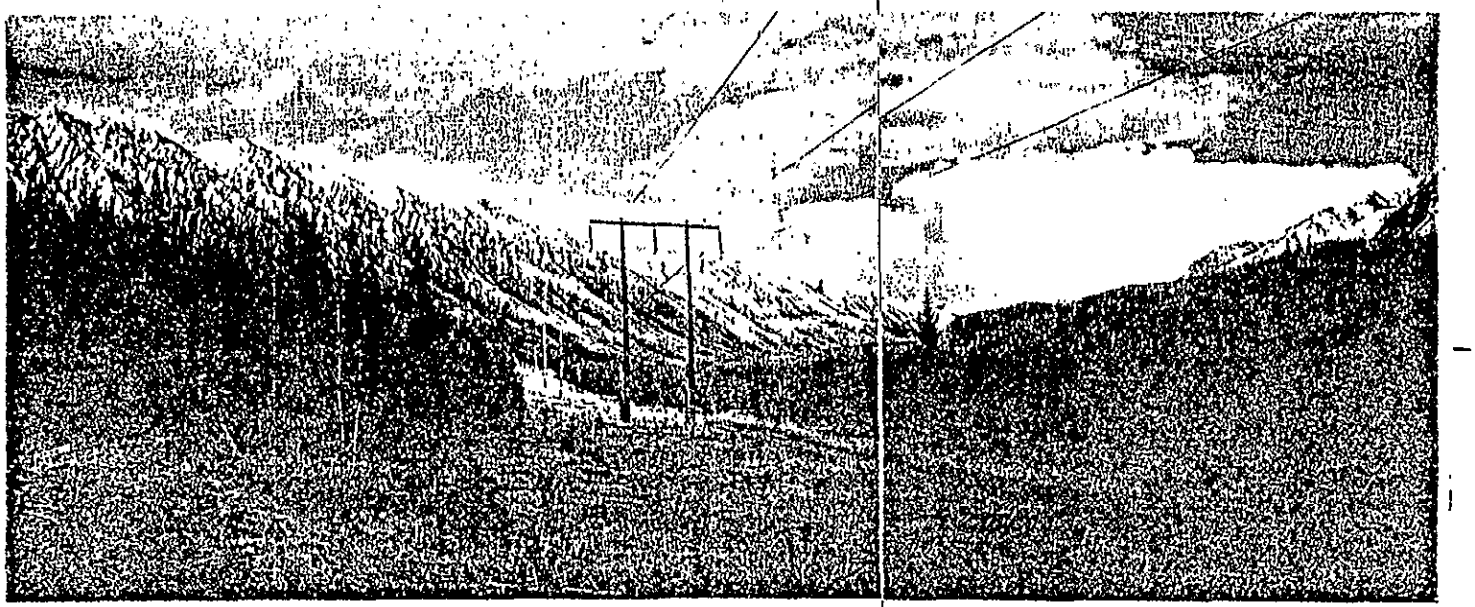

PLATE 1

Elk Valley (looking S.E.). Elk Range in background, Front Range at right. Elevated tree covered area at right represents Kootenay Formation, depressed area in centre of photo is underlain by Fernie Group.

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UPPER ELK VALLEY, BRITISH COLUMBIA

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SUMMARY

A program of geological mapping and prospecting on a coal property owned by C. Vincent Construction Ltd. in the Upper Elk Valley, located certain coal occurrences. Steep structural dips and unfavourable topography over most of the property make the mining potential of this prospect doubtful. However, the possibility cannot be ruled out that additional studies, concentrated on the northwestern portion of the property, might disclose an area with mine-making potential.

ACKNOWLEDGEMENT

This report is the result of work done by a group of individuals with common interests in geology, under the able supervision of Owen Cullingham. Cullingham's report summarizing the summer's activities has been quoted liberally in this presentation. B. Coulter and R. A. Chaudhry made excellent contributions in their role as leaders of mapping parties; they were assisted greatly by junior student assistants. Everyone involved in this project is most grateful to Mr. W. J. Hennessey of Calgary whose experience and guidance did much to make this project a success. Garry Forman and Dirk Havler of Alpine Helicopters Ltd. must be complimented for their virtuosity in piloting a helicopter as they made our work easier and less time consuming.

GEOLOGICAL REPORT

VINCENT OPTION

UPPER ELK VALLEY, BRITISH COLUMBIA

N.T.S. 82-J-6,7,10,11

INTRODUCTION

General Statement

During the early part of 1970, Rio Tinto Canadian Exploration Limited signed an agreement with C. Vincent Construction Ltd. of Dawson Creek, British Columbia, to option certain coal lands held by the company in upper Elk Valley near the British Columbia - Alberta provincial boundary. Geological mapping and prospecting for coal was carried out over the property during the month of June and part of July; this report presents the results of this work.

Property

When first optioned, the property comprised 9,256 acres held under 19 coal licences; last July, before our crews left the area, seven additional coal licences were staked covering 3,680 acres:

COAL LICENCE	LOT NO.	ACRES
C.L. 572	L. 8477	640
C.L. 573	L. 8479	320
C.L. 574	L. 8480	640
C.L. 575	L. 8481	640
C.L. 576	L. 8482	640
C.L. 577	L. 8483	640
C.L. 578	L. 8484	320
C.L. 579	L. 8485	640
C.L. 580	L. 8486	640
C.L. 581	L. 8487	320
C.L. 582	L. 8488	320
C.L. 583	L. 8489	640
C.L. 584	L. 8490	592
C.L. 585	L. 8491	233

COAL LICENCE	LOT NO.	ACRES
C.L. 586	L.8492	12
C.L. 587	L.8493	129
C.L. 798	Unsurveyed	640
C.L. 799	Unsurveyed	610
C.L. 800	Unsurveyed	640
C.L. 1012	Unsurveyed	320
C.L. 1013	Unsurveyed	640
C.L. 1014	Unsurveyed	640
C.L. 1015	Unsurveyed	640
C.L. 1016	Unsurveyed	640
C.L. 1017	Unsurveyed	640
C.L. 1018	Unsurveyed	160
	TOTAL	12,936 acres

Location and Accessibility

The Vincent property lies in the Upper Elk Valley on the British Columbia side of the Alberta-British Columbia provincial boundary. It is some 55 air miles and 85 road miles southwest of Calgary, Alberta and 55 miles north of Sparwood, B. C. Geographically, the centre of the Vincent property is at:

50° 30' north latitude
115° 00' west longitude
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Access to the property is via the Elk Pass road which is maintained by Calgary Power Limited to service their transmission line crossing the property. The road is in dismal condition and at best should be negotiated only by four-wheel drive vehicle. During the spring break-up in May and June it is impassable. The Elk Pass Road connects Kananaskis Highway to the north of Vincent property with Sparwood to the south. Recently,

the B.C. Forest Service constructed a new road on the west bank of Elk River which provides reasonably good access to part of the Upper Elk Valley; the new road joins the Elk Pass road approximately five miles south of the property.

Presently, the nearest railroad is C.P. rail line under construction to the mine site of Fording Coal Ltd.; the new line leaves Elk Valley and enters Fording River Valley approximately 40 miles south of our claims. It is expected that another rail line will be constructed northwards to Weary Ridge in Emkay-Scurry property, nine miles south of the Vincent property.

A Calgary Power Ltd. high-voltage transmission line (132,000 volts) crosses the entire length of the Vincent property. The line transmits power from the Elko plant south of Fernie, B.C. to as far north as Edmonton, Alberta.

Topography

The Upper Elk Valley is a narrow, north-south situated, depression between the Elk Range to the east and the Front Range of Rocky Mountains to the west (Plates 1 & 2). The elevations in both ranges reach 9,000 ± feet above sea level whereas the highest point in the valley is on Elk Pass near the provincial boundary at 6,700 feet. The valley floor drops towards the south and at the south end of the property the elevation is 5,300 feet above sea level.

The Elk River, flowing out of Elk Lakes near the

northern end of the property, winds its way down the valley along the length of the Vincent property and carries considerable volume of water for the better part of the year. A number of creeks enter Elk River off both mountain ranges, but as these streams carry mostly spring run-off water they are dry during most of the year. The south end of the property is crossed by Cadorna Creek, a major tributary of Elk River from the west and which, similar to the Elk River, also carries considerable volume of water for most of the year.

The valley floor lies under a thick cover of gravel and till, and rock outcrops are sparse. The vegetation cover is mostly second growth, spruce and balsam. Forest fires during the 1930's destroyed vegetation in upper Elk Valley and left numerous upright dead trees or "snags", which make helicopter landings difficult or impossible.

Previous Work

Very little is known regarding coal exploration in the Upper Elk Valley prior to the mapping and prospecting by Rio Tinto Canadian Exploration Limited last summer. Geological Survey of Canada Memoir 53 (Dowling, pp. 74) reports analyses of three coal samples, apparently taken from seams near Elk Lakes at the northern end of Elk Valley; the memoir was published in 1914 and thus indicates some investigations during the early part of this century. During the course of our mapping, several old coal adit sites were

discovered in the southern part of C.L. 576 and on the east side of C.L. 579. The physical appearance of these workings suggest that they also date back to the early 1900's.

In the summer of 1969, Rio Tinto Canadian Exploration Geologists mapped certain coal lands north of the Vincent property on the Alberta side of the provincial boundary. During the course of this work, a reconnaissance survey was made of the Upper Elk Valley between Elk Pass and Weary Ridge. Several positive and possible coal occurrences which were found on the Elk Pass Road and on Tobermory Hill between Tobermory Creek and the road near the north end of the property, contributed to the subsequent optioning of the property.

Other known geological investigations in the general area have been at Weary Ridge, approximately six miles south of the confluence of Cadorna Creek and Elk River on a property now being readied for production by EmKay-Scurry Ltd.

During the past two summers Rio Tinto Canadian Exploration Limited has been exploring a coal property north of the Vincent property on the Alberta side of the provincial boundary.

FIELD WORK

The first attempt to enter the Elk Valley was by R. A. Benkis and R. A. Chaudhry on May 2nd. It was an abortive scouting trip because deep snow on the Elk Pass Road forced us back at a point some 45 miles north of Sparwood.

It had been intended to start the field season late in May; although the first trip into Elk Valley was made on May 22, it was June 6 before work could get underway. Poor ground conditions during spring thaw made entering the valley difficult (Plates 5 & 6) and caused delays in establishing a camp. Camp trailers being towed to the property became stuck in the mud and it was necessary to bring in a bulldozer from Sparwood to tow the trailers the last four miles to the selected camp site.

The field work was done by four two-man parties flown into the field daily by a helicopter or driven to work in four-wheel drive vehicles. The aircraft, a Bell 47G3B-1 model equipped with supercharger for high altitude operations, was under charter to Rio from Alpine Helicopters Ltd. of Calgary. The availability of a helicopter contributed to rapid coverage of the property. Our parties left Elk Valley on July 8.

The mapping was done by traversing across the formations in search of outcrop, mainly along stream beds. Dead fall timber from forest fires in the 1930's covered the ground almost everywhere and made walking difficult and hazardous, particularly during wet periods. The information gathered in the field was plotted on overlays of air photos to the scale of 4" = 1 mile and later transferred to a base map of the same scale. The base map

was a blow-up of 1:50,000 scale maps of the National Topographic Series. Where indications of coal were found, attempts were made to locate and explore the concealed seams through trenching by hand. These attempts were not always successful because of a heavy cover of drift in the valley.

The crews were housed in industrial trailers leased from ATCO (Western) Ltd. in Calgary; catering service was provided by Classic Catering Ltd. of Calgary.

GEOLOGY

General Geology

Rocks ranging in age from Palaeozoic to Lower Cretaceous underlie the Vincent property; however, the major lithological unit encountered on the property is the Kootenay formation of Jurassic-Cretaceous age. This formation consists of a sequence of shale, conglomerate and non-marine sandstone beds. The coking coal deposits of southeastern British Columbia and southern Alberta all occur in the Kootenay formation. It is typical of the beds that they generally do not outcrop well but become converted to soil easily and are hidden under dense vegetation (Plate 3).

The topography of Upper Elk Valley closely relates to

its geology. The bordering mountain ranges are formed by competent Palaeozoic carbonates which have been thrust upon and now overlie the much softer Mesozoic sediments. Along the west side of the valley, Palaeozoic formations have been thrust along Borgeau Thrust upon Kootenay beds which occupy a lower topographical position. The Kootenay, in turn, overlies the soft shales of the Fernie group at the bottom of the valley; over most of its way the course of the Elk River has been confined to the Fernie. Along the east side of the valley the topography is rising again, passing through progressively harder formations of Mesozoic and Palaeozoic age.

The Laramide orogeny at the beginning Eocene time elevated the Rocky Mountains and resulted in tectonic deformation of sediments of the preceding eras, particularly of the coal-bearing Kootenay beds.

Stratigraphy

No attempt will be made to give a detailed description of the stratigraphic column; instead, only formations on, or near the Vincent property will be considered. Lower Mesozoic and Palaeozoic rocks will be considered as an undivided unit.

TABLE OF FORMATIONS

Era	Period of Epoch	Group or Formation	Lithology	Thickness in Feet
Cenozoic	Quaternary		Gravel, soil, till	
	U N C O N F O R M I T Y			
Mesozoic	Lower Cretaceous	Elk Formation	Conglomerate, sandstone, shale minor coal. Deltaic.	900±
	Lower Cretaceous-Jurassic	Kootenay Formation	Coarse and fine grained sandstone, conglomerate, conglomeritic sandstone, siltstone, shale, COAL. Non-marine.	2000±
	Jurassic	Fernie Group	Black shale, interbeds of siltstone and silty shale. Marine.	750±
	D I S C O N F O R M I T Y			
	Triassic	Spray River Formation	Siltstone & silty shale. Marine.	1000±
	D I S C O N F O R M I T Y			
Palaeozoic			Carbonate rocks, limestone, dolomite calcareous shale, etc. Mostly Marine.	

Palaeozoic

Lower Mesozoic-Palaeozoic formations form the mountains of Elk Range east of the Vincent property and Eastern Frontal Range of the Rocky Mountains along the west side of the ground. The formations consist of limestone, calcareous shales and dolomitic rocks.

Spray River Formations

The rocks of the Triassic Spray River formation outcrop east of the Vincent property along the west flank of Elk Range.

The Spray River formation is in an erosional contact with the underlying Palaeozoic formations. The estimated thickness of this formation in Upper Elk Valley is 1,000 ± feet. The formation is decreasing in thickness from west towards the east; near Banff its thickness is approximately 1,800 feet whereas along the west flank of Highwood Range it is estimated to be only 200 to 400 feet thick.

The Spray River rocks are moderately competent, thin bedded, grey to dark grey siltstones, silty shales and white quartzose sandstones.

Fernie Group

The Fernie Group underlies a strip of ground along the east side of the property. Being the most recessive formation in the area the Fernie occupies topographically lowest positions of upper Elk Valley and outcrops only rarely.

The Fernie rocks are in disconformable contact with the Spray River formation. The thickness of the Fernie strata in the Highwood area is known to be approximately 700 feet; as the Fernie sediments thicken towards the west in Upper Elk Valley their thickness is in excess of 700 feet.

Kootenay Formation

At least two thirds of the total acreage of the Vincent property is underlain by Kootenay formation which occupies the area between Borgeau thrust fault and the ground underlain by Fernie Group.

The bulk of the Kootenay formation consits of medium grey, silty shales, siltstones, very fine to medium grained argillaceous sandstones and coal seams. Conglomerate lenses appear throughout the formation but become more extensive, and the size of the pebbles increases, towards the top of the sequence. All units are lenticular and laterally grade into one another making correlation difficult. The formation lacks a definite marker horizon.

The contact between the Kootenay formation and the Fernie group is gradational and is arbitrarily placed at the base of a massive bedded, fine to medium grained sandstone unit. This basal-sandstone unit is commonly medium to dark grey with "salt and pepper" texture, but in the Upper Elk Valley it has a medium light olive color; it weathers to a medium brown-grey color and becomes iron stained. The thickness of the basal-sandstone is 40 to 150 feet. The thickness of the Kootenay formation in Upper Elk Valley

is estimated at 1,200 to 2,000 feet; repetition through thrust faulting render an accurate measurement of the true thickness impossible. Generally the thickness of the formation varies considerably from area to area but on the whole the formation thickens from the east towards the west.

With the exception of the basal-sandstone member, all Kootenay beds are commonly of non-marine origin.

Elk Formation

The Elk formation overlies conformably the Kootenay formation. It occurs in the Elk Valley as far north as Lower Elk Lake; the absence of the formation further north might be explained by lateral facies change, pre-Blairmore erosion or having been cut off by the Borgeau thrust fault. At its maximum development in the southern regions of Elk Valley the formation attains a thickness of approximately 1,700 feet whereas in the Upper Elk Valley it is estimated to be some 900 feet thick. On the Vincent property the Elk formation underlies the northwestern corner near Lower Elk Lake, and again an area near the southeastern third of the property.

The Elk formation consists of resistant, commonly ridge forming, chert pebble conglomerate interbedded with medium to light grey, fine to coarse grained sandstone with gradational contacts. The formation weathers to a light grey color with iron staining. Commonly the pebble diameter is 4 to 40 mm; the size decreases towards the north. The matrix of the conglomerate is siliceous, fine to coarse grainded sandstone; it fractures through the matrix

rather than the pebbles which distinguishes it from the Blairmore (Cadomin) conglomerate.

The Elk formation represents a deltaic depositional environment.

Quaternary

The Quaternary is represented by a considerable cover of unconsolidated river deposits and glacial debris, such as gravel, till, clay, etc.

Structural Geology

The Kootenay formation in the Upper Elk Valley lies in the Lewis Thrust Plate and generally strikes 330° to 350° although local variations in the strike are common. The lower contact of the Kootenay formation is exposed in several locations on the Vincent property, where it is seen in conformable contact with Fernie group. The upper contact of the Kootenay is lost under the Borgeau thrust in the areas where the Elk formation is absent.

For the most part, the structure in the area under study is relatively simple; this may be more apparent than real because the drift covering the valley floor makes outcrop information sporadic. Folding is apparent in the area; a southwards plunging major syncline and anticline follow the length of the property. Thrust faulting and minor folding are also present and had more outcrop information been available, probably would account for a more complex structural picture than the one presented in this report. The structural dips in the area are mainly SW although

NE dips were also located; the magnitude of the dips vary between 35° and 85° with the average being approximately 60°. The steeper dips generally occur in the upper Kootenay on the southwest side of the valley whereas the more gentle dips are prevalent in lower Kootenay along the northeastern side of the property.

At Elk Pass near the B.C.-Alberta boundary, thrust faulting appears the major structural element complicating the geological setting. Folding is also apparent and could have a profound effect on the structural picture. The strata here dip 25° to 50° SW with the average dip on Tobermory Hill being somewhat less than 40° SW. Dips towards NE are also encountered. The absence of good marker horizons in the Kootenay formation as well as the interfingering relationship of individual beds make a structural analysis of the area difficult.

Seven cross sections have been constructed (DWG.G-3352) to present the structural interpretation for the Vincent property. The dotted lines are structural lines rather than traced horizons; however, lithology was taken into consideration in placing the structure lines.

Sections 1-1' and 7-7':

There is evidence of folding in the upper, and of thrust faulting, in the lower Kootenay. A syncline is suspected beneath the overburden east of Lower Elk Lake.

Two coal horizons exist in this part of the property which are believed to be a repetition of the same horizon through thrust faulting.

Section 2-2':

The evidence of folding in the lower Kootenay and a small thrust fault near the Kootenay-Elk contact do not adequately account for the 4000 foot thickness of the Kootenay in the section. It must be assumed that additional faulting and/or folding has gone undetected. Evidence of coal was found in the drift near the section line, but the thickness of the cover defeated the attempt to expose bedrock.

Section 3-3'

Thrust faulting in upper Kootenay and evidence of folding elsewhere in the sequence partially explain the total mapped thickness of Kootenay strata; however, at least another thrust fault or additional folding is required to explain the apparent thickness.

Coal wash was found along the line of section, but no bedrock could be located. A 3-foot coal seam, believed to represent a similar stratigraphical horizon, was found some 700 feet northwest of the section line.

Section 4-4':

Evidence of folding in this area was found in the lower part of the Kootenay. To account for the apparent thickness of the Kootenay strata it must be assumed that a syncline in the southwestern half of the section, well developed in sections 5-5' and 6-6', has gone undetected beneath the overburden. Coal wash and two old adits were found along the line of section. Where bedrock could be exposed, a few coal seams were found, one approximately 8 feet thick.

Coal was also found approximately half way between sections 3-3' and 4-4'; it would appear to be in the same horizon as coal in section 4-4'.

Section 5-5':

A well developed syncline is present east of Borgeau thrust. Between the syncline and the fault, additional complex folding has occurred. Northeast of the syncline are some minor folds giving an apparent thickness of the Kootenay in excess of 2,000 feet.

Coal wash was found in the section but overburden prevented locating the source. It is possible that coal here lies in the same horizon as coal in section 4-4'.

Section 6-6':

As presented in this section, the Kootenay formation northeast of the syncline at the centre of the section line has an apparent thickness of 2,500 feet. To reduce this to the estimated thickness of 1,200 to 2,000 feet, thrust faulting or tight folding must exist in the area northeast of the syncline. No evidence to support such an assumption was found in the field.

Coal

Coal sufficiently interesting to warrant further consideration was found in the area immediately south of British Columbia-Alberta boundary. It does not mean that coal in similar quantities does not exist elsewhere on the Vincent property; overburden may have prevented us from finding it. However, interpretation of the structural information presently available nowhere indicates that a situation favourable for open-cut or underground mining might exist on the Vincent property beyond the height of land at Elk Pass. Considering this, an expensive exploration programme, which would be necessary because of the thick overburden, does not appear to be warranted.

Along the west flank of Tobermory Hill, a chance exists that some open-cut mining might be possible. The formations dip in the same direction as the topography; although the dips are steeper than the hill slope, additional work here could possibly outline a limited area for mining of coal.

RECOMMENDATIONS

No additional field work is recommended for the present. The assembled geological data should be analyzed further, with an emphasis on the Tobermory Hill area. Should the office work suggest that the area warrants more attention, the next step in the field will have to be a diamond drill programme supplemented by bulldozer trenching on the southwest flank of Tobermory Hill.

January, 1971

Rolands A. Benkis

Robert C. Hart

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
R. C. HART

Expiry Date: Mar. 3, 1972

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PLATE 2

Elk Valley (looking NW). Cadorna Creek Valley in left-central part of photo. Note the sharp contact between vegetation-covered Mesozoic sediments and barren Palaeozoic carbonates.

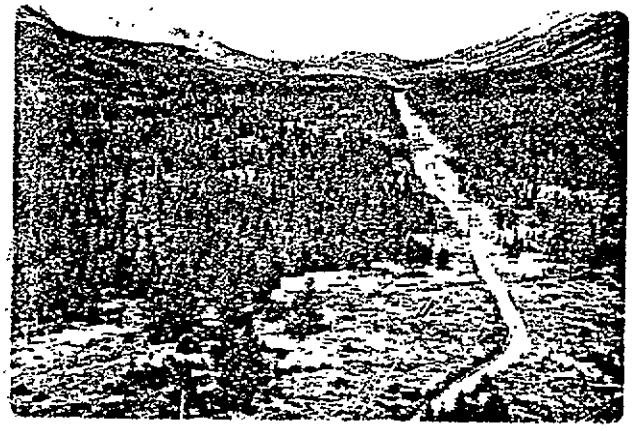


PLATE 3

Camp in Elk Valley (looking NW). Elk Pass and Tobermory Hill in upper-central part of photo.

PLATE 4

Hand trench across a steeply dipping coal seam. Light coloured shale parting in upper part of the seam.

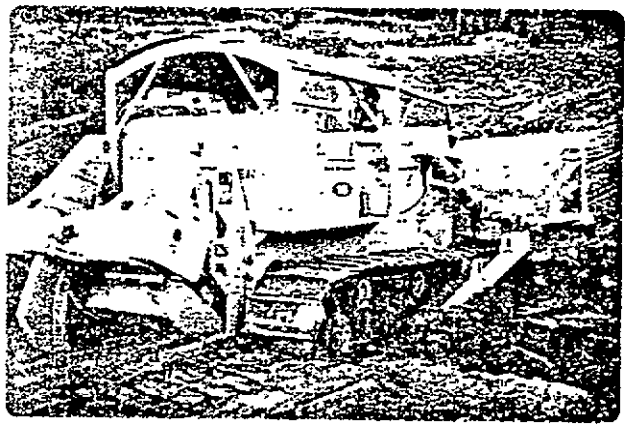
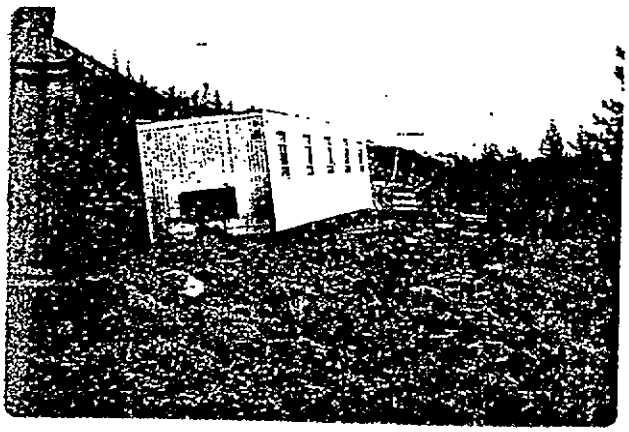


PLATE 5

Both photos illustrate road conditions in Elk Valley during the early part of field season.

PLATE 6



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November 1971 O. Cullingham

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GEOLOGICAL REPORT

SUMMARY

A drilling programme consisting of three bore holes was carried out in August of 1971 by Rio Tinto Canadian Exploration Limited on a property optioned from C. Vincent Construction Ltd. in the Upper Elk Valley of British Columbia. The drilling consisted of 2,400 feet of reverse circulation rotary drilling and intersected a total of 384 feet of coal in all three holes. An indication as to the quality of coal was obtained from twenty-five samples analysed by Cyclone Engineering Sales Ltd. of Edmonton and is dealt with later in the report.

References are made to a fourth hole drilled on an adjoining property, the Cassidy Option, which lies directly to the north of the Vincent Option in Alberta.

ACKNOWLEDGEMENTS

The work done by W. J. Hennessey of Calgary on behalf of Rio Tinto is gratefully acknowledged and his advice and assistance enabled the programme to run more efficiently. Mr. R. A. Benkis is gratefully acknowledged for his advice and assisstance during the full course of operations and he is responsible for the statistical summation of the qualitative coal analysis included in this report.

VINCENT OPTION

UPPER ELK VALLEY, BRITISH COLUMBIA

GEOLOGICAL REPORT

INTRODUCTION

The Vincent property lies in the Upper Elk Valley of southeast British Columbia and extends south from the Alberta-British Columbia provincial boundary for approximately 11 miles to the confluence of the Elk River and Cadorna Creek.

An unimproved forestry road, maintained by Calgary Power, traverses the property and provides access from the north and south. To the north, the road links up with the Kananaskis Hwy., an improved forestry road, which joins the Trans-Canada Highway (#1) near Seebe some 40 miles west of Calgary, Alberta. To the south, the road links up with an improved forestry road which joins the Crowsnest Highway (#3) at Sparwood, British Columbia.

The Elk Valley is a northwest-southeast trending valley between the Front Range of the Rocky Mountains to the southwest and the Elk Range to the northeast. The Elk Pass at the north end of the property has an elevation of 6,500 feet while the south end of the property is at 5,300 feet above sea level. Tobermory Hill in the region of the Elk Pass is the highest point on the property with an elevation of 6,750 feet above sea level.

For a fuller description of topography and location, refer to "Geological Report, Vincent Option, Upper Elk Valley, British Columbia" of January 1971, by R. A. Benkis.

PREVIOUS WORK

Little is known regarding coal exploration in the Upper Elk Valley of British Columbia prior to excursions into the field by Rio Tinto Canadian Exploration Limited. It is recognized, however, that some work was done in the early years of this century. A few old adits were encountered during a property examination in June of 1970 which were believed to have been worked in the early 1900's.

Geological Survey of Canada Memoir 53 (Dowling, pp 74) published in 1914, resulted from investigations in the early part of the century and reports analysis of three coal samples taken from seams near Elk Lakes at the northern end of the property.

In 1969, a reconnaissance of the Upper Elk Valley by Rio Tinto Canadian Exploration Limited recognized several coal occurrences which resulted in the optioning of the property and a mapping and prospecting excursion in the summer of 1970. During this visit (June and July 1970) numerous coal occurrences were mapped and although the structural geology of the area appeared complicated, the quantity of coal found led to additional work in August 1971.

EXPLORATION - AUGUST 1971

A drilling programme consisting of seven holes was laid out for the Vincent Option, but owing to higher overall costs, only three of the holes were drilled. The purpose of the programme was to intersect the coal-bearing Kootenay Formation and to obtain coal samples for qualitative analysis.

Armsco Exploration Limited of Calgary moved a D-8 'Cat' into the area in early August and after improving the Elk Valley road, prepared the drill sites. A setback in the commencement of drilling occured when Rig 58, owned and operated by Big Indian Drilling Ltd. of Calgary, was rolled enroute to the property. Drilling commenced on the Vincent Option with the completion of C.V.-1 on the Cassidy Option, August 19th and was concluded with the completion of hole C.V.-4, August 31st, 1971. (Plate 4).

A trailer camp, supplied by Corab Services Ltd. of Calgary was established at Riverside Flats along the Elk River some ten miles south of the area of operations. (Plate 2)

The three holes drilled were along the Elk Pass Road separated by approximately ¼ of a mile. C.V.-2 was the most northerly of the three and was located ¼ of a mile south of the Alberta-British Columbia Provincial Boundary. All holes were drilled to a depth of approximately 800 feet. Downhole caving in hole C.V.-2 prevented deeper penetration and also prevented a complete log of the hole. Roke Oil Enterprises Ltd. of Calgary probed the holes with Gamma-Ray, Neutron and sidewall density tools.

Armsco Exploration Ltd. commenced the 'clean'up' operation September 3rd and brought the programme to completion September 9th, 1971 when it was inspected and approved by the British Columbia Forest Service.

GEOLOGY

General

Kootenay strata in this area is part of the Lewis Thrust Plate and owes its present position to deformation and erosion subsequent to the Laramide Orogeny. The rocks strike northwest-southeast and dip fairly steeply to the west. (Plate #3) The regular succession of strata is interrupted by thrusting and folding which strikes or trends subparallel to the strike of the rocks.

The lower contact of the Kootenay lies conformably on the Fernie Shales and is exposed at various places along the eastern edge of the property. The upper contact is overlain by the Elk formation in the south and north, but disappears under the Bourgeau Thrust in the centre region.

Outcrop over the property is poor due to a thick cover of glacial till, soil and other debris.

Stratigraphy

TABLE OF FORMATIONS

Era	Period	Group or Formation	Brief Description	Thickness
Cenozoic	Quarternary		Overburden of gravel, glacial till, and soil	
		--- UNCONFORMITY ---		
Mesozoic	Cretaceous	Blairmore Group	Non-marine conglomerates sandstones and shales	?

Era	Period	Group or Formation	Brief Description	Thickness
		--- DISCONFORMITY ---		
	Cretaceous	Elk Formation	Non-marine sandstone, conglomeratic sandstone, and conglomerate	± 900'
	Cretaceous Jurassic	Kootenay Formation	Non-marine, sandstone, shale conglomeratic sandstone and coal	± 2000'
	Jurassic	Fernie Group	Marine shale, siltstone and sandstone	± 700'
		--- DISCONFORMITY ---		
	Triassic	Spray River Formation	Marine, siltstones, silty shales and white quartzose sandstones. Dolomitic in part	± 1000'
		--- DISCONFORMITY ---		
Palaeozoic	Undivided		Limestones, dolomites, quartzites, chert & dark shale mostly marine.	2500'-3400'

Undivided Paleozoics

Limestones, dolomites, quartzites, chert beds and dark grey calcareous shales mostly of marine origin make up this group. The formations of the Palaeozoic form the mountains of the Elk Range to the east and the Eastern Front Range to the west of the property. The Palaeozoics of the Eastern Front Range are thrust over the less competent beds of the Kootenay Formation by the Bourgeau Thrust.

Spray River Formation

The rocks of the Spray River Formation lie disconformably on the Palaeozoics. These rocks are moderately competent and consist of gray to dark gray siltstones, silty

shales and white quartzose sandstones which are in part dolomitic. The formation in this area is about 1000 feet thick and is found outcropping on the southwestern flank of the Elk Range.

Fernie Group

The rocks of the Fernie Group lie disconformably on the Spray River Formation and consist mainly of marine black and gray fissile shale with siltstone and silty shale interbeds. Some green glauconitic shales are found in this group.

Kootenay Formation

The Kootenay Formation conformably overlies the Fernie Group and is for the most part composed of non-marine strata. An exception is the basal sandstone unit which is marine and transitional.

The basal sandstone unit is commonly a massive, medium to dark gray, fine to medium grained with subangular to subrounded grains, salt and pepper sandstone. Locally this unit is of a medium olive gray colour and is 40' to 60' thick.

The bulk of the Kootenay consists of medium gray shales, silty shales, siltstones and sandstones. In the upper part of this formation, some conglomeratic sandstones have been observed. The beds are lenticular and grade laterally into one another making correlation difficult.

Coal is an important constituent of the Kootenay Formation and seams have been found up to thirty-four feet thick.

Elk Formation

The Elk Formation lies conformably on the Kootenay Formation and outcrops in the northwest and southeast regions of the property. The Elk Formation is commonly a resistant ridge forming chert pebble conglomerate interbedded with medium to light gray, fine to coarse grained sandstones. The conglomerate beds are markedly different from the basal Blair more conglomerate. The Elk conglomerate fractures through the matrix and weathers more readily than does the Blairmore conglomerate which is very siliceous and fractures through the pebbles.

Blairmore Group

The Blairmore Group rests disconformably on the Elk Formation but is absent in the property area; it is probably lost under the Bourgeau Thrust.

The Blairmore Group commonly consists of a basal chert, pebble conglomerate which is extremely resistant overlain by sandstone and shales of non-marine origin.

Quaternary

The Quarternary is represented by the overburden consisting of gravel, glacial till, clay soil.

Correlation

The absence of any good continuous marker horizons, probably due to deltaic deposition and modification to the strata by tectonism, renders correlation difficult. Using the Gamma-Ray and Neutron Logs, correlation of strata penetrated by the bore holes has been attempted but is not entirely convincing. A number of marker horizons were isolated but the strata between these horizons is inconsistent. The variation in lithology and thickness is explained by structural and depositional features. The table below lists possible correlative points which were used to facilitate a correlation.

POSSIBLE CORRELATIVE POINTS THROUGH HOLES C.V.-1 to C.V.-4

C.V.-1	C.V.-2	C.V.-3	C.V.-4
347	-	-	26
403	-	-	79
601	-	170	263
641	-	249	398
728	-	332	457
-	49	442	514
-	-	656	708
-	297	680	730
-	340	733	-
-	364	758	-

Assuming the above correlation to be accurate, then the purpose of the drilling programme to intersect successive intervals of the Kootenay Formation, with a little overlap was not realized.

Because of the distance separating the drill holes and the variation in lithology of the continental deposits, the author questions the validity of attempting correlation at this time, but does so with reservations. (See correlation chart submitted with this report; pocket G-3374)

Structure

Little more can be added to the structural picture of the Vincent property over and above that described in a previous geological report of January 1971. Generally, thrusting subparallel to the strike of the beds interupts the normal succession of stratigraphic events. Because of lithology variations, and scarce outcrop, these thrust slices cannot be accurately located rendering a structural interpretation which is generalized and not accurate.

Three structural cross sections were prepared passing through each of the bore holes and approximately at right angles to the strike. Where available, surface exposures were incorporated into the sections. One section through all the bore holes was prepared in an attempt to show the relationship between the holes and surface exposure. (Included in this report in pocket G-2567 to 2570)

If the above correlation is accepted as accurate, then thrust faults presumably are responsible for bringing sections of the Kootenay strata back to the surface. The surface trace of the thrusts would pass between the holes striking north to northwest.

COAL

A total of 384 feet of coal in all three bore holes was intersected but of this over 100 feet of coal occupied seams of less than six feet in thickness. The calculated true thickness (using dips measured at the surface of each hole) of what is considered mineable coal is only 180 feet giving an overall approximate stripping ratio of 8:1. The identifiable coal horizons were picked from the Gamma-Ray and sidewall Density Logs and are listed below:

COAL HORIZONS C.V.-2

No.	Interval	Thickness	*True Thickness	Comments
1.	9' - 12'	3'	2.2'	Not analysed- Prbly weathered
2.	50' - 53'	3'	2.2'	Horizon in 3 benches. Not sampled because of high ash Content and small size of seams
	64' - 68'	4'	2.8'	
	69' - 72'	3'	2.2'	
3.	178' - 184'	6'	4.2'	Horizon badly split small coal intervals Samples showed predominantly shale therefore no samples analysed.
	184' - 195'	1'	1.0'	
	199' - 204'	5'	3.5'	
	217' - 220'	3'	2.2'	
	229' - 231'	2'	1.5'	
4.	276' - 278'	2'	1.5'	Horizon in 2 benches. Only 5' of coal sampled No analysis
	286' - 296'	10'	7.1'	
5.	341' - 350'	9'	6.4'	Horizon in 2 benches. Higher bench predominantly shale. Lower bench analysed.
	353' - 363'	10' Sampled	7.1'	
6.	439' - 453'	14'	9.9'	Horizon in 2 benches. Upper bench sampled. Lower bench showed predominantly coaly sh and was not analysed.
	473' - 481'	8'	5.7'	
7.	505' - 515'	10'	7.1'	Samples showed carbonaceous to coal shale and were not analysed

No.	Interval	Thickness	*True Thickness	Comments
8.	748' - 798'	50' 3 samples	35.4'	Interval divided into 3 samples for analysis. No log obtained for this seam.

* True Thickness of the coal was calculated using a dip of 45° S.W.

COAL HORIZONS C.V.-3

No.	Interval	Thickness	*True Thickness	Comments
1.	19' - 22'	3'	1.9'	
	36' - 40'	4'	2.7'	
2.	67' - 70'	3'	1.9'	Samples are small and many showed high ash and were not sent for analysis
	86' - 90'	4'	2.7'	
	95' - 98'	3'	1.9'	
3.	129' - 132'	3'	1.9'	
	135' - 137'	2'	1.1'	
4.	172' - 176'	4'	2.7'	
5.	249' - 254'	5'	3.4'	Only 3' of coal recovered-not analysed
6.	332' - 352'	20' both sampled	13.7'	Horizon in 2 benches. Both benches were analysed
	366' - 373'	7'	4.8'	
7.	442' - 465'	23' 3 samples	15.3'	Interval divided into 3 samples of analysis

No.	Interval	Thickness	*True Thickness	Comments
8.	496' - 498'	2'	1.1'	Horizon is badly broken up into small seams. Samples showed high ash and recovery was not good. No samples were analysed.
	501' - 509'	8'	5.5'	
	519' - 522'	3'	1.9'	
	525' - 527'	2'	1.1'	
	532' - 534'	2'	1.1'	
	549' - 552'	3'	1.9'	
	554' - 556'	2'	1.1'	
9.	657' - 663'	6'	4.0'	Horizon in 2 benches. Both benches were sampled and analysed.
	672' - 679'	7' (both sampled)	4.8'	
10.	734' - 757'	23' (2 samples)	15.3'	Horizon divided into 2 samples for analysis

*The true thickness of the coal was calculated using a dip of 48° S.W.

COAL HORIZONS C.V.-4

No.	Interval	Thickness	*True Thickness	Comments
1.	18' - 25'	7'	5.0'	Seam analysed Weathered
2.	80' - 95'	15' (sample)	10.6'	Horizon in 2 benches. Only upper bench sampled for analysis
	105' - 107'	2'	1.5'	
3.	164' - 167'	3'	2.2'	Seams did not show in samples and may not exist
4.	191' - 193'	2'	1.5'	
	203' - 204'	1'	1.0'	
	232' - 236'	4'	2.8'	
5.	266' - 272'	6' (sampled)	4.2'	Seam was sampled and analysed.

No.	Interval	Thickness	*True Thickness	Comments
6.	328' - 329'	1'	1.0'	
	347' - 351'	4'	2.8'	
	356' - 358'	2'	1.5'	
7.	398' - 400'	2'	1.5'	Seams are small and many showed high ash
	408' - 409'	1'	1.0'	
	414' - 416'	2'	1.5'	
	434' - 436'	2'	1.5'	
	458' - 462'	4'	2.8'	
	478' - 486'	8'	5.7'	
8.	514' - 523'	9' sampled	6.4'	Sample was analysed
9.	569' - 571'	2'	1.5'	Horizon in 3 benches. Poor recovery. Only 4' of last bench sampled for analysis
	586' - 589'	3'	2.2'	
	611' - 622'	11' ~ only 4' sampled	7.8'	
10.	714' - 724'	10' ~ sampled	7.1'	Horizon sampled and analysed.

* The true thickness of the coal was calculated by using a dip of 45° S.W.

Twenty five samples of coal from the three bore holes were sent to Cyclone Engineering Sales Ltd. of Edmonton for qualitative analysis. The results of the analysis are included in this report as an appendix but a summary of calculated characteristics of ¼"xO float at - 1.55 specific gravity is given below.

Drill Hole	Interval Drillers Depths	Apparent Thickness	True Thickness	Weight %	Ash %	Volatile Matter %	Fixed Carbon %	Sulphur %	F.S.I.
CV-2	356 - 364	8'	5.7'	86.58	5.28	27.6	65.9	0.62	5.80
	448 - 454	6'	4.2'	54.47	11.81	25.2	61.8	0.50	5.91
	748 - 754	6'	4.2'	71.46	10.9	24.8	63.1	0.49	6.93
	754 - 792	38'	26.9'	66.57	10.9	25.2	62.8	0.35	7.74
	792 - 798	6'	4.2'	35.27'	23.3	25.1	56.3	0.34	7.45
	748 - 792	44'	31.1'	67.3	10.9	25.1	62.9	0.36	7.92
	748 - 798	50'	35.4'	63.5	12.0	25.2	62.6	0.36	7.75
CV-3	331 - 347	16'	10.7'	96.44	3.49	33.6	61.9	0.60	8.40
	361 - 367	6'	4.0'	95.79	3.08	32.6	61.8	0.51	8.94
	442 - 452	10'	6.7'	84.26	6.26	33.8	58.5	0.47	9.35
	452 - 458	6'	4.0'	92.88	2.88	32.9	63.2	0.36	8.89
	458 - 464	6'	4.0'	69.82	10.85	31.8	58.2	0.47	8.85
	442 - 458	16'	10.7'	87.4	4.50	33.5	60.2	0.43	8.82+
	442 - 464	22'	14.7'	82.6	6.30	33.4	59.4	0.43	8.87+
	656 - 660	4'	2.7'	92.44	5.65	27.3	66.1	0.42	7.21
	672 - 677	6'	3.4'	63.61	10.84	28.0	60.4	0.48	7.40
	736 - 746	10'	6.7'	56.98	7.01	27.7	64.4	0.39	7.76
	746 - 757	11'	7.4'	60.38	10.54	26.7	61.8	0.62	7.39
	736 - 757	21'	14.1'	58.8	9.15	27.2	61.9	0.50	7.57
CV-4	22 - 28	6'	4.2'	87.17	3.11	34.7	60.8	0.52	3.97
	85 - 96	11'	7.8'	78.67	4.73	34.7	59.2	0.37	6.30
	272 - 276	4'	2.8'	84.93	2.92	34.6	61.2	0.87	6.87
	518 - 526	8'	5.7'	82.71	3.99	32.2	62.7	0.58	7.37
	617 - 621	4'	2.8'	95.68	3.96	32.6	62.5	0.59	8.40
	714 - 724	10'	7.1'	78.54	7.91	31.0	60.2	0.50	8.33

The raw ash content of the coal appears high but after washing is fairly reasonable. However, in the larger seams, the ash content appears to be a little on the high side even after washing. The volatile matter falls in the category of medium to high and high which would probably be an unfavourable aspect in securing a market.

The sulphur content is variable between 0.35% and 0.62% with the exception of one sample from bore hole C.V.-4, 272'-276', which has a value of 0.87%. The coking characteristics appear very good with the F.S.I. ranging from 5.8 to 9.35. One seam, from 22'-28' in hole C.V.-4, shows and F.S.I. of only 3.97 but it is felt this is due to oxidation because of its proximity to the surface. The sampling technique employed by Big Indian Drilling is explained in detail in a geology report on the J.A.Cassidy Option of October 1971 and will not be dealt with here. However, it should be noted that the technique was deemed very satisfactory, by the author, for retaining nearly 100% of the fines (Plate 5). Contamination of the samples was very little to non-existent and it is therefore felt that the results of the analysis should be taken as a good indication as to the quality of the coal. It should be noted that in some cases, the raw ash content seems unreasonably high.

CONCLUSIONS

1. Bore hole C.V.-2 penetrated the deepest in the Kootenay Formation. Bore holes C.V.-3 and C.V.-4 essentially penetrated the same horizon.

2. The stratigraphic record is probably interrupted by thrust faulting of small magnitude.

3. Shale partings and splits in the coal seams are numerous and common.

4. A high percentage of volatile matter in the coal could be unfavourable in securing a market.

5. Correlation with any degree of confidence is difficult.

6. Structural interpretation is very generalized and is not accurate.

7. The thickest coal seams appear to occur in the lower Kootenay.

RECOMMENDATIONS

Any future investigation of the Vincent Property should be carried out by a drilling operation designed to facilitate a better understanding of the structure as well as sampling the coal intersected for qualitative analysis. A programme consisting of a number of holes drilled in close proximity and at right angles to the strike would give the best results. Emphasis should be placed on investigating the lower Kootenay horizon and at least one hole should penetrate in the Fernie Group to allow definite recognition of the Lower Kootenay.

Tobermory Hill at the north end of the property has a more favourable topography for a mining situation and additional drilling throughout the hill would shed more light on the potential of the entire Elk Pass area. It has been recognized that without this area, the southern end of the property holds little interest.

In view of the amount of activity regarding coal exploration being conducted adjacent to the southern boundary of the Vincent property, a programme in the south might prove interesting. The best location for such a programme would be to the west of the Elk River on the west half of the area covered by Coal Licence 572.

:kw

Owen Cullingham

R. C. Hart

PROFESSIONAL ENGINEERS PROVINCE OF BRITISH COLUMBIA R. C. HART

Expiry Date: Mar. 3, 1972

REFERENCES

Benkis, R. A.:
1971: "Geological Report, Vincent Option, Upper Elk Valley, British Columbia" - Private Report of January 1971.

Cullingham, O. R.:
1970: "Report of Geology, Vincent and Cassidy Options" - Private Report of December 1970.

Hennessey, W. J."
1971: Correspondence re: "Cassidy-Vincent Drill Holes" - Private Report of September 1971.

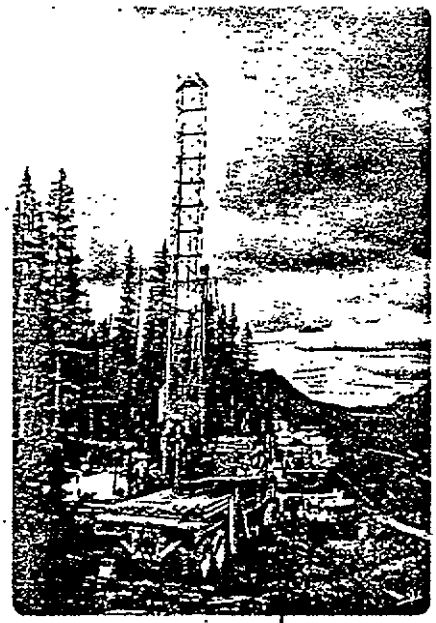


PLATE 4

Rotary Drilling rig. Looking south into Elk Valley from Tobermory Hill.

PLATE 5

Apparatus used for coal sampling.

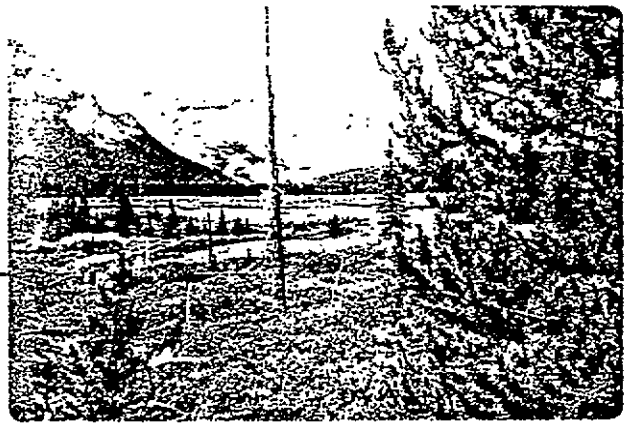


PLATE 1

View of Elk Valley looking northwest toward the Elk Lakes.

PLATE 2

Trailer camp established at Riverside Flats - Elk Valley.

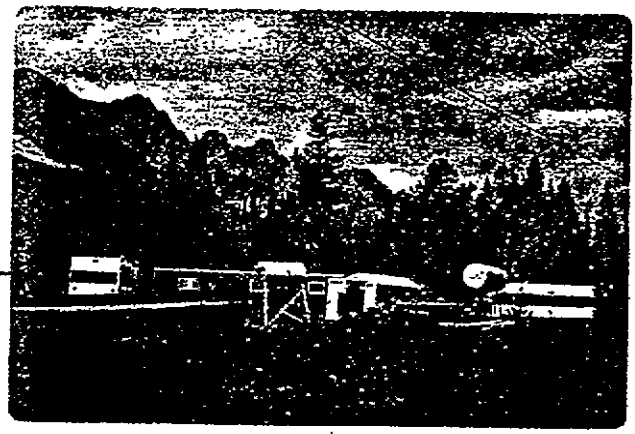


PLATE 3

Prepared drill site #C.V.-3 showing steeply dipping strata.

BOREHOLE SAMPLES: REPORT OF ANALYSES ON RAW MATERIAL

CLIENT: Rio Tinto Canadian Exploration Limited

DATE: Sept. 23, 1971.

PROJECT:

C.E.S. PROJECT NO.: S1-71

CLIENT SAMPLE NO.: C-21884
CV-2 (356' - 358') CV-2 (358' - 360')
CV-2 (360' - 362') CV-2 (362' - 364')

C.E.S. SAMPLE NO.: 144

ANALYSES ON AIR DRY BASIS:

ASH:	15.39%
VOLATILE MATTER:	24.71%
RESIDUAL MOISTURE:	0.96%
FIXED CARBON:	58.94%
FREE SWELLING INDEX:	5
B.T.U./lb.:	12,260
SULPHUR:	0.57%
RANK:	mvb

DATE: August 29th '71
LOCATION: Vincent Option
Rtl. C.V.-2
WIDTH: 2'
REMARKS: 356'-364'
Core Depth

CYCLONE ENGINEERING SALES LTD.

Per: R. S. Sehgal, P. Eng.
Laboratory Manager.

RIOCANEX C 21884

BOREHOLE SAMPLES — REPORT OF ANALYSES ON FLOAT-SINK MATERIAL

CLIENT: Rio Tinto Canadian Exploration Limited DATE: Sept. 23, 1971.

PROJECT: C.E.S. PROJECT NO. S1-71

SAMPLE NO: C-21884 C.E.S. SAMPLE NO. 144

TABLE 1. Float-Sink Analyses on 1/4" x 0

Property / Fraction	Wt.%	Ash%	RM%	VM%	FC%	S.%	FSI	
- 1.45	82.70	4.68		27.85	66.51	0.63	6	
1.45-1.55	3.88	18.18		23.52	57.34	0.55	1½	
+ 1.55	13.42	75.33					N.A.	
TOTAL	100.00	14.69						

Remarks:

C.E.S. Form 34

CYCLONE ENGINEERING SALES LTD.

Per: R.S. Sehgal, P. Eng.,
Laboratory Manager

RSS:hg

BOREHOLE SAMPLES: REPORT OF ANALYSES ON RAW MATERIAL

CLIENT: Rio Tinto Canadian Exploration Limited

DATE: Sept. 23, 1971.

PROJECT:

C.E.S. PROJECT NO.: S1-71

CLIENT SAMPLE NO.: C-21885
CV-2 (448' - 450')
CV-2 (450' - 452') CV-2 (452' - 454')

C.E.S. SAMPLE NO.: 145

ANALYSES ON AIR DRY BASIS:

ASH:	42.17%
VOLATILE MATTER:	17.73%
RESIDUAL MOISTURE:	0.92%
FIXED CARBON:	39.18%
FREE SWELLING INDEX:	2
B.T.U./lb.:	8,330
SULPHUR:	0.49%
RANK:	mvb

DATE: August 24 '71

LOCATION: Vincent Option

C.V. - 2

WIDTH: 6'

REMARKS: 4/4.5" = 5/5" sf

CYCLONE ENGINEERING SALES LTD.

Per: R. S. Schgal, P. Eng.
Laboratory Manager.

RIOCANEX

C 21885

BOREHOLE SAMPLES — REPORT OF ANALYSES ON FLOAT-SINK MATERIAL

CLIENT: Rio Tinto Canadian Exploration Limited — DATE: Sept. 23, 1971.

PROJECT: — C.E.S. PROJECT NO. S1-71

SAMPLE NO: C-21885 — C.E.S. SAMPLE NO. 145

TABLE 1. Float-Sink Analyses on 1/4" x 0

Property / Fraction	Wt.%	Ash%	RM%	VM%	FC%	S.%	FSI	
- 1.45	39.85	10.55		25.54	62.99	0.53	6½	
1.45-1.55	14.62	16.12		24.21	58.75	0.46	5	
+ 1.55	45.53	78.70					N.A.	
TOTAL	100.00	42.39						

Remarks:

C.E.S. Form 34

CYCLONE ENGINEERING SALES LTD.

Per: _____

R.S. Sehgal, P. Eng.,
Laboratory Manager.

RSS:hg

BOREHOLE SAMPLES: REPORT OF ANALYSES ON RAW MATERIAL

CLIENT: Rio Tinto Canadian Exploration Limited

DATE: Sept. 23, 1971.

PROJECT:

C.E.S. PROJECT NO.: S1-71

CLIENT SAMPLE NO.: C-21886

C.E.S. SAMPLE NO.: 146

ANALYSES ON AIR DRY BASIS:

ASH:	30.31%
VOLATILE MATTER:	20.33%
RESIDUAL MOISTURE:	0.99%
FIXED CARBON:	48.37%
FREE SWELLING INDEX:	4
B.T.U./lb.:	10,530
SULPHUR:	0.45%
RANK:	mvb

DATE: August 27 '71

LOCATION: Vimiet Option

Ref. C.V-3

WIDTH: 6'

REMARKS: 295-357

Drillers Depth

CYCLONE ENGINEERING SALES LTD.

Per: R. S. Sehgal, P. Eng.
Laboratory Manager.

RIOCANEX

C 21886

BOREHOLE SAMPLES — REPORT OF ANALYSES ON FLOAT-SINK MATERIAL

CLIENT: Rio Tinto Canadian Exploration Limited DATE: Sept. 23, 1971.

PROJECT: C.E.S. PROJECT NO. S1-71

SAMPLE NO: C-21886 C.E.S. SAMPLE NO. 146

TABLE 1. Float-Sink Analyses on 1/4" x 0

Property / Fraction	Wt.%	Ash%	RM%	VM%	FC%	S.%	FSI	
- 1.45	62.48	9.57		25.51	63.93	0.50	7½	
1.45-1.55	8.98	20.05		22.18	56.78	0.39	3	
+ 1.55	28.54	76.19					N.A.	
TOTAL	100.00	29.52						

Remarks:

C.E.S. Form 34

CYCLONE ENGINEERING SALES LTD.

Per: _____

R.S. Sehgal, P. Eng.,
Laboratory Manager.

RSS:hg

BOREHOLE SAMPLES: REPORT OF ANALYSES ON RAW MATERIAL

CLIENT: Rio Tinto Canadian Exploration Limited

DATE: Sept. 23, 1971.

PROJECT:

C.E.S. PROJECT NO.: S1-71

CLIENT SAMPLE NO.: C-21887

C.E.S. SAMPLE NO.: 147

ANALYSES ON AIR DRY BASIS:

ASH:	31.53%
VOLATILE MATTER:	21.34%
RESIDUAL MOISTURE:	1.09%
FIXED CARBON:	46.04%
FREE SWELLING INDEX:	3½
B.T.U./lb.:	10,270
SULPHUR:	0.32%
RANK:	mvb

ATE: August 24th

OCATION: Kearett Option

R.H C.V. - 2

3X

IDTH: 704 -- 742

MARKS:

Orebody

CYCLONE ENGINEERING SALES LTD.

Per: R. S. Sehgal, P. Eng.

C 21887

BOREHOLE SAMPLES — REPORT OF ANALYSES ON FLOAT-SINK MATERIAL

CLIENT: Rio Tinto Canadian Exploration Limited — DATE: Sept. 23, 1971.

PROJECT: — C.E.S. PROJECT NO. S1-71

SAMPLE NO: C-21887 — C.E.S. SAMPLE NO. 147

TABLE 1. Float-Sink Analyses on 1/4" x 0

Property / Fraction	Wt.%	Ash%	RM%	VM%	FC%	S.%	FSI	
- 1.45	59.03	10.00		25.44	63.47	0.35	8	
1.45-1.55	7.54	17.75		22.94	58.22	0.33	5	
+ 1.55	33.43	70.49					9½	
TOTAL	100.00	30.81						

Remarks:

C.E.S. Form 34

CYCLONE ENGINEERING SALES LTD.

Per: _____

R.S. Sehgal, P. Eng.,
Laboratory Manager.

RSS:hg

BOREHOLE SAMPLES: REPORT OF ANALYSES ON RAW MATERIAL

CLIENT: Rio Tinto Canadian Exploration Limited

DATE: Sept. 23, 1971.

PROJECT:

C.E.S. PROJECT NO.: S1-71

CLIENT SAMPLE NO.: C-21888

C.E.S. SAMPLE NO.: 148

ANALYSES ON AIR DRY BASIS:

ASH:	53.42%
VOLATILE MATTER:	16.79%
RESIDUAL MOISTURE:	1.35%
FIXED CARBON:	28.44%
FREE SWELLING INDEX:	2
B.T.U./lb.:	6,660
SULPHUR:	0.31%
RANK:	mvb

DATE: August 24 '71

LOCATION: Mount Opla

RH. CV-3

WIDTH: 6'

REMARKS: 72'-77'

Drill Depth

CYCLONE ENGINEERING SALES LTD.

Per: R. S. Sehgal, P. Eng.

C 21888

BOREHOLE SAMPLES — REPORT OF ANALYSES ON FLOAT-SINK MATERIAL

CLIENT: Rio Tinto Canadian Exploration Limited — DATE: Sept. 23, 1971.

PROJECT: — C.E.S. PROJECT NO. S1-71

SAMPLE NO: C-21888 — C.E.S. SAMPLE NO. 148

TABLE 1. Float-Sink Analyses on 1/4" x 0

Property / Fraction	Wt.%	Ash%	RM%	VM%	FC%	S.%	FSI	
- 1.45	27.92	12.74		26.16	59.75	0.35	8½	
1.45-1.55	7.35	32.00		21.37	45.28	0.30	3½	
+ 1.55	64.73	73.31					½	
TOTAL	100.00	53.36						

Remarks:

C.E.S. Form 34

CYCLONE ENGINEERING SALES LTD.

Per: _____

R.S. Sehgal, P. Eng.,
Laboratory Manager.

RSS:hg

BOREHOLE SAMPLES — REPORT OF ANALYSES ON FLOAT-SINK MATERIAL

CLIENT: Rio Tinto Canadian Exploration Limited — DATE: Sept. 28, 1971.

PROJECT: — C.E.S. PROJECT NO. S1.71

SAMPLE NO: C-21889 (331' - 347') — C.E.S. SAMPLE NO. 149

TABLE 1. Float-Sink Analyses on 1/4" x 0

Property / Fraction	Wt.%	Ash%	RM%	VM%	FC%	S.%	FSI	
- 1.45	94.27	3.10		33.68	62.07	0.60	8½	
1.45-1.55	2.17	19.94		27.96	50.95	0.54	4	
+ 1.55	3.56	62.88					½	
TOTAL	100.00	5.59						

Remarks:

C.E.S. Form 34

CYCLONE ENGINEERING SALES LTD.

Per: _____

R.S. Sehgal, P. Eng.,
Laboratory Manager.

RSS:hg

BOREHOLE SAMPLES: REPORT OF ANALYSES ON RAW MATERIAL

CLIENT: Rio Tinto Canadian Exploration Limited

DATE: Sept. 28, 1971.

PROJECT:

C.E.S. PROJECT NO.: S1-71

CLIENT SAMPLE NO.: C-21889 (331' - 347')

C.E.S. SAMPLE NO.: 149

ANALYSES ON AIR DRY BASIS:

ASH:	5.85%
VOLATILE MATTER:	31.24%
RESIDUAL MOISTURE:	1.15%
FIXED CARBON:	61.76%
FREE SWELLING INDEX:	7½
B.T.U./lb.:	14,000
SULPHUR:	0.58%
RANK:	hvAd

DATE: August 28th 71

LOCATION: Island Option

RH. - C.J. - 3

WIDTH: 16'

REMARKS: 331 - 347

Drill Depth

CYCLONE ENGINEERING SALES LTD.

Per: R. S. Sehgal, P. Eng.
Laboratory Manager.

RIOCANEX

C 21889

BOREHOLE SAMPLES: REPORT OF ANALYSES ON RAW MATERIAL

CLIENT: Rio Tinto Canadian Exploration Limited

DATE: Sept. 28, 1971.

PROJECT:

C.E.S. PROJECT NO.: S1-71

CLIENT SAMPLE NO.: C-21890 (361' - 367')

C.E.S. SAMPLE NO.: 150

ANALYSES ON AIR DRY BASIS:

ASH:	6.21%
VOLATILE MATTER:	31.95%
RESIDUAL MOISTURE:	1.02%
FIXED CARBON:	60.82%
FREE SWELLING INDEX:	8
B.T.U./lb.:	13,970
SULPHUR:	0.55%
RANK:	hvAb

DATE: August 25 '71

LOCATION: Diamond Option

R.H. - C.V. - 3

WIDTH: 6

REMARKS: 361 - 367

Dallas Path

CYCLONE ENGINEERING SALES LTD.

Per: R. S. Sehgal, P. Eng.
Laboratory Manager.

RIOCANEX

C 21890

BOREHOLE SAMPLES — REPORT OF ANALYSES ON FLOAT-SINK MATERIAL

CLIENT: Rio Tinto Canadian Exploration Limited — DATE: Sept. 28, 1971.

PROJECT: — C.E.S. PROJECT NO. S1-71

SAMPLE NO: C-21890 (361' - 367') — C.E.S. SAMPLE NO. 150

TABLE 1. Float-Sink Analyses on 1/4" x 0

Property / Fraction	Wt.%	Ash%	RM%	VM%	FC%	S.%	FSI	
- 1.45	93.89	2.79		34.15	62.04	0.51	9	
1.45-1.55	1.90	17.21		27.18	54.59	0.65	6	
+ 1.55	4.21	70.85					N.A.	
TOTAL	100.00	5.93						

Remarks:

C.E.S. Form 34

CYCLONE ENGINEERING SALES LTD.

Per: _____

R.S. Sehgal, P. Eng.,
Laboratory Manager.

RSS:hg

BOREHOLE SAMPLES — REPORT OF ANALYSES ON FLOAT-SINK MATERIAL

CLIENT: Rio Tinto Canadian Exploration Ltd. DATE: Sept. 28/71

PROJECT: C.E.S. PROJECT NO. S1 - 71

SAMPLE NO: C-21891 (442' - 452') C.E.S. SAMPLE NO. 151

TABLE 1. Float-Sink Analyses on 1/4" x 0

Property / Fraction	Wt.%	Ash%	RM%	VM%	FC%	S.%	FSI	
- 1.45	76.19	5.34		34.72	58.94	0.46	9+	
1.45-1.55	8.07	14.99		30.25	53.76	0.58	8	
+ 1.55	15.74	72.06					1/2	
TOTAL	100.00	16.62						

Remarks:

C.E.S. Form 34

CYCLONE ENGINEERING SALES LTD.

Per: R.S. Sehgal, P. Eng.,
Laboratory Manager.

RSS:hg

BOREHOLE SAMPLES: REPORT OF ANALYSES ON RAW MATERIAL

CLIENT: Rio Tinto Canadian Exploration Ltd.

DATE: Sept. 28/71

PROJECT:

C.E.S. PROJECT NO.: S1 - 71

CLIENT SAMPLE NO.: C-21891 (442' - 452')

C.E.S. SAMPLE NO.: 151

ANALYSES ON AIR DRY BASIS:

ASH:	16.29%
VOLATILE MATTER:	28.88%
RESIDUAL MOISTURE:	1.00%
FIXED CARBON:	53.83%
FREE SWELLING INDEX:	7½
B.T.U./lb.:	12,440
SULPHUR:	0.48%
RANK:	hvAb

DATE: August 28 / 71

LOCATION: Vincent Ophir

RH - B.V. - 3

WIDTH: 10'

REMARKS: 442 - 452

Drilling Depth

CYCLONE ENGINEERING SALES LTD.

Per: [signature]

R. S. Sehgal, P. Eng.
Laboratory Manager.

RIOCANEX

C 21891

BOREHOLE SAMPLES — REPORT OF ANALYSES ON FLOAT-SINK MATERIAL

CLIENT: Rio Tinto Canadian Exploration Ltd. DATE: Sept. 28/71

PROJECT: C.E.S. PROJECT NO. S1 - 71

SAMPLE NO: C-21892 (452' - 458') C.E.S. SAMPLE NO. 152

TABLE 1. Float-Sink Analyses on 1/4" x 0

Property / Fraction	Wt.%	Ash%	RM%	VM%	FC%	S.%	FSI	
- 1.45	82.71	2.38		33.12	63.56	0.35	9	
1.45-1.55	10.17	6.90		31.36	60.80	0.44	8	
+ 1.55	7.12	70.73					1/2	
TOTAL	100.00	7.71						

Remarks:

C.E.S. Form 34

CYCLONE ENGINEERING SALES LTD.

Per: R.S. Sehgal, P. Eng.,
Laboratory Manager.

RSS:hg

BOREHOLE SAMPLES: REPORT OF ANALYSES ON RAW MATERIAL

CLIENT: Rio Tinto Canadian Exploration Ltd. DATE: Sept. 28/71

PROJECT: C.E.S. PROJECT NO.: S1 - 71

CLIENT SAMPLE NO.: C-21892 (452' - 458') C.E.S. SAMPLE NO.: 152

ANALYSES ON AIR DRY BASIS:

ASH:	7.40%
VOLATILE MATTER:	30.01%
RESIDUAL MOISTURE:	0.94%
FIXED CARBON:	61.65%
FREE SWELLING INDEX:	8
B.T.U./lb.:	13,860
SULPHUR:	0.34%
RANK:	hvAb

ATE: August 25th 71

OCATION: Mount Ophir

P.H. 24 - 3

IDTH: 6

MARKS: 452 - 458

Drill Depth

CYCLONE ENGINEERING SALES LTD.

Per: R. S. Sehgal, P. Eng.
Laboratory Manager.

RIOCANEX

C 21892

BOREHOLE SAMPLES: REPORT OF ANALYSES ON RAW MATERIAL

CLIENT: Rio Tinto Canadian Exploration Ltd. DATE: Sept. 28/71

PROJECT: C.E.S. PROJECT NO.: S1 - 71

CLIENT SAMPLE NO.: C-21893 (458' - 464') C.E.S. SAMPLE NO.: 153

ANALYSES ON AIR DRY BASIS:

ASH:	30.57%
VOLATILE MATTER:	23.76%
RESIDUAL MOISTURE:	0.95%
FIXED CARBON:	44.72%
FREE SWELLING INDEX:	6
B.T.U./lb.:	9,660
SULPHUR:	0.37%
RANK:	hvAb

TE: August 25th 1971

CATION: Vinicat Option

H - C.V - 3

TH: 6'

ARKS: 458 - 464

Drill Core, Depth

CYCLONE ENGINEERING SALES LTD.

Per: R. S. Sehgal

R. S. Sehgal, P. Eng.
Laboratory Manager.

RIOCANEX

C 21893

BOREHOLE SAMPLES — REPORT OF ANALYSES ON FLOAT-SINK MATERIAL

CLIENT: Rio Tinto Canadian Exploration Ltd. DATE: Sept. 28/71

PROJECT: C.E.S. PROJECT NO. S1 - 71

SAMPLE NO: C-21893 (458' - 464') C.E.S. SAMPLE NO. 153

TABLE 1. Float-Sink Analyses on 1/4" x 0

Property / Fraction	Wt.%	Ash%	RM%	VM%	FC%	S.%	FSI	
- 1.45	52.18	9.98		32.31	56.76	0.44	9	
1.45-1.55	17.64	13.55		30.24	55.26	0.50	8	
+ 1.55	30.18	76.97					1/2	
TOTAL	100.00	30.83						

Remarks:

C.E.S. Form 34

CYCLONE ENGINEERING SALES LTD.

Per: R.S. Sehgal

R.S. Sehgal, P. Eng.,
Laboratory Manager.

RSS:hg

BOREHOLE SAMPLES — REPORT OF ANALYSES ON FLOAT-SINK MATERIAL

CLIENT: Rio Tinto Canadian Exploration Limited — DATE: Sept. 29, 1971.

PROJECT: — C.E.S. PROJECT NO. S1-71

SAMPLE NO: C-21894 CV-3 (656' - 660') — C.E.S. SAMPLE NO. 154

TABLE 1. Float-Sink Analyses on 1/4" x 0

Property / Fraction	Wt.%	Ash%	RM%	VM%	FC%	S.%	FSI	
- 1.45	87.83	4.90		27.49	66.62	0.41	7½	
1.45-1.55	4.61	19.73		22.24	57.04	0.50	1½	
+ 1.55	7.56	62.41					½	
TOTAL	100.00	9.93						

Remarks:

C.E.S. Form 34

CYCLONE ENGINEERING SALES LTD.

Per: R.S. Sehgal, P. Eng.,
Laboratory Manager.

RSS:hg

BOREHOLE SAMPLES: REPORT OF ANALYSES ON RAW MATERIAL

CLIENT: Rio Tinto Canadian Exploration Limited

DATE: Sept. 29, 1971.

PROJECT:

C.E.S. PROJECT NO.: S1-71

CLIENT SAMPLE NO.: C-21894
CV-3 (656' - 660')

C.E.S. SAMPLE NO.: 154

ANALYSES ON AIR DRY BASIS:

ASH:	10.93%
VOLATILE MATTER:	26.25%
RESIDUAL MOISTURE:	0.99%
FIXED CARBON:	61.83%
FREE SWELLING INDEX:	6
B.T.U./lb.:	13,420
SULPHUR:	0.43%
RANK:	mvb

DATE: August 26th 71

LOCATION: Elkford Optic

DH. C.V.-3

WIDTH: 4'

REMARKS: 656-660

Drillers Depth

CYCLONE ENGINEERING SALES LTD.

Per: R. S. Schaal

R. S. Schaal, P. Eng.
Laboratory Manager.

RIOCANEX

C 21894

BOREHOLE SAMPLES — REPORT OF ANALYSES ON FLOAT-SINK MATERIAL

CLIENT: Rio Tinto Canadian Exploration Limited — DATE: Sept. 29, 1971.

PROJECT: — C.E.S. PROJECT NO. S1-71

SAMPLE NO: C-21895 CV-3 (672' - 677') — C.E.S. SAMPLE NO. 155

TABLE 1. Float-Sink Analyses on 1/4" x 0

Property / Fraction	Wt.%	Ash%	RM%	VM%	FC%	S.%	FSI	
- 1.45	57.01	10.40		28.26	60.48	0.47	7½	
1.45-1.55	6.60	14.69		25.75	58.70	0.59	6½	
+ 1.55	36.39	74.86					½	
TOTAL	100.00	34.14						

Remarks:

C.E.S. Form 34

CYCLONE ENGINEERING SALES LTD.

Per: _____

R.S. Sehgal, P. Eng.,
Laboratory Manager.

RSS:hg

BOREHOLE SAMPLES: REPORT OF ANALYSES ON RAW MATERIAL

CLIENT: Rio Tinto Canadian Exploration Limited

DATE: Sept. 28, 1971.

PROJECT:

C.E.S. PROJECT NO.: S1-71

CLIENT SAMPLE NO.: C-21895
CV-3 (672' - 677')

C.E.S. SAMPLE NO.: 155

ANALYSES ON AIR DRY BASIS:

ASH:	33.79%
VOLATILE MATTER:	21.33%
RESIDUAL MOISTURE:	0.86%
FIXED CARBON:	44.02%
FREE SWELLING INDEX:	4
B.T.U./lb.:	9,350
SULPHUR:	0.45%
RANK:	mvb

DATE: August 28th 71
LOCATION: Vernet Option
R.H. — C.V.-3
WIDTH: 5
REMARKS: 672 - 677

CYCLONE ENGINEERING SALES LTD.

Per: R. S. Sehgal, P. Eng.
Laboratory Manager.

RIOCANEX

C 21895

BOREHOLE SAMPLES: REPORT OF ANALYSES ON RAW MATERIAL

CLIENT: Rio Tinto Canadian Exploration Limited — DATE: Sept. 29, 1971.

PROJECT: — C.E.S. PROJECT NO.: SI-71

CLIENT SAMPLE NO.: C-21896
CV-3 (736' - 746') — C.E.S. SAMPLE NO.: 156

ANALYSES ON AIR DRY BASIS:

ASH:	36.97%
VOLATILE MATTER:	21.17%
RESIDUAL MOISTURE:	0.94%
FIXED CARBON:	40.92%
FREE SWELLING INDEX:	3½
B.T.U./lb.:	8,830
SULPHUR:	0.41%
RANK:	mvb

ATE: August 25-A '71
OCATION: Kimberley Option
RH. - CV - 3
DTH: 10'
MARKS: 736 - 746
Drilling Depth

CYCLONE ENGINEERING SALES LTD.

Per: R. S. Sehgal, P. Eng.
Laboratory Manager.

RIOCANEX C 21896

736 - 746

BOREHOLE SAMPLES — REPORT OF ANALYSES ON FLOAT-SINK MATERIAL

CLIENT: Rio Tinto Canadian Exploration Limited — DATE: Sept. 29, 1971.

PROJECT: — C.E.S. PROJECT NO. S1-71

SAMPLE NO: C-21896 CV-3 (736' - 746') — C.E.S. SAMPLE NO. 156

TABLE 1. Float-Sink Analyses on 1/4" x 0

Property / Fraction	Wt.%	Ash%	RM%	VM%	FC%	S.%	FSI	
- 1.45	50.18	5.87		28.10	65.09	0.38	8	
1.45-1.55	6.80	16.87		24.66	57.53	0.45	6	
+ 1.55	43.02	77.13					½	
TOTAL	100.00	37.27						

Remarks:

C.E.S. Form 34

CYCLONE ENGINEERING SALES LTD.

Per: _____

R.S. Sehgal, P. Eng.,
Laboratory Manager.

RSS:hg

BOREHOLE SAMPLES: REPORT OF ANALYSES ON RAW MATERIAL

CLIENT: Rio Tinto Canadian Exploration Limited

DATE: Sept. 29, 1971.

PROJECT:

C.E.S. PROJECT NO.: S1-71

CLIENT SAMPLE NO.: C-21897
CV-3 (746' - 757')

C.E.S. SAMPLE NO.: 157

ANALYSES ON AIR DRY BASIS:

ASH:	35.25%
VOLATILE MATTER:	20.80%
RESIDUAL MOISTURE:	0.92%
FIXED CARBON:	43.03%
FREE SWELLING INDEX:	4
B.T.U./lb.:	11,760
SULPHUR:	0.51%
RANK:	mvb

ATE: August 25th, 71
OCATION: Mont Wright
RH, CV-3
DTH: 11
MARKS: 746 - 757
Core Depth

CYCLONE ENGINEERING SALES LTD.

Per: R. S. Sehgal, P. Eng.
Laboratory Manager.

RIOCANEX C 21897

746 -- 757

BOREHOLE SAMPLES — REPORT OF ANALYSES ON FLOAT-SINK MATERIAL

CLIENT: Rio Tinto Canadian Exploration Limited — DATE: Sept. 29, 1971.

PROJECT: — C.E.S. PROJECT NO. S1-71

SAMPLE NO: C-21897 CV-3 (746' - 757') — C.E.S. SAMPLE NO. 157

TABLE 1. Float-Sink Analyses on 1/4" x 0

Property / Fraction	Wt.%	Ash%	RM%	VM%	FC%	S.%	FSI	
- 1.45	48.25	8.58		27.13	63.37	0.56	8	
1.45-1.55	12.13	18.32		24.79	55.97	0.79	5	
+ 1.55	39.62	73.21					½	
TOTAL	100.00	35.37						

Remarks:

C.E.S. Form 34

CYCLONE ENGINEERING SALES LTD.

Per: R.S. Sehgal, P. Eng.,
Laboratory Manager.

RSS:hg

BORFHOLE SAMPLES: REPORT OF ANALYSES ON RAW MATERIAL

CLIENT: Rio tinto Canadian Exploration Limited

DATE: Sept. 29, 1971.

PROJECT:

C.E.S. PROJECT NO.: SI-71

CLIENT SAMPLE NO.: C-21898
CV-4 (22' - 28')

C.E.S. SAMPLE NO.: 158

ANALYSES ON AIR DRY BASIS:

ASH:	14.13%
VOLATILE MATTER:	30.72%
RESIDUAL MOISTURE:	1.33%
FIXED CARBON:	53.82%
FREE SWELLING INDEX:	3½
B.T.U./lb.:	9,450
SULPHUR:	0.52%
RANK:	hvCb

DATE: August 30th '71

LOCATION: Kimberley

WIDTH:

REMARKS:

CYCLONE ENGINEERING SALES LTD.

Per: R. S. Sehgal, P. Eng.
Laboratory Manager.

RIOCANEX

C 21898

BOREHOLE SAMPLES — REPORT OF ANALYSES ON FLOAT-SINK MATERIAL

CLIENT: Rio Tinto Canadian Exploration Limited Limited — DATE: Sept. 29, 1971.

PROJECT: — C.E.S. PROJECT NO. S1-71

SAMPLE NO: C-21898 CV-4 (22' - 28') — C.E.S. SAMPLE NO. 158

TABLE 1. Float-Sink Analyses on 1/4" x 0

Property / Fraction	Wt.%	Ash%	RM%	VM%	FC%	S.%	FSI	
- 1.45	84.20	2.77		34.86	61.04	0.52	4	
1.45-1.55	2.97	12.75		29.10	56.82	0.68	3	
+ 1.55	12.83	82.72					N.A.	
TOTAL	100.00	13.32						

Remarks:

C.E.S. Form 34

CYCLONE ENGINEERING SALES LTD.

Per: _____

R.S. Sehgal, P. Eng.,
Laboratory Manager.

RSS:hg

BOREHOLE SAMPLES: REPORT OF ANALYSES ON RAW MATERIAL

CLIENT: Rio Tinto Canadian Exploration Limited

DATE: Sept. 29, 1971.

PROJECT:

C.E.S. PROJECT NO.: S1-71

CLIENT SAMPLE NO.: C-21899
CV-4 (85' - 96').

C.E.S. SAMPLE NO.: 159

ANALYSES ON AIR DRY BASIS:

ASH:	19.29%
VOLATILE MATTER:	30.83%
RESIDUAL MOISTURE:	1.30%
FIXED CARBON:	48.58%
FREE SWELLING INDEX:	4½
B.T.U./lb.:	11,660
SULPHUR:	0.38%
RANK:	hvAb

TE: Nov. 3rd 71
CATION: Mount Ophir
RH - CV - 4
OTH: 11'
MARKS: S1-71
Drill Depth

CYCLONE ENGINEERING SALES LTD.

Per: R. S. Sehgal, P. Eng.
Laboratory Manager.

RIOCANEX C 21899

BOREHOLE SAMPLES — REPORT OF ANALYSES ON FLOAT-SINK MATERIAL

CLIENT: Rio Tinto Canadian Exploration Limited — DATE: Sept. 29, 1971.

PROJECT: — C.E.S. PROJECT NO. SI-71

SAMPLE NO: C-21899 CV-4 (85' - 96') — C.E.S. SAMPLE NO. 159

TABLE 1. Float-Sink Analyses on 1/4" x 0

Property / Fraction	Wt.%	Ash%	RM%	VM%	FC%	S.%	FSI	
- 1.45	75.02	4.11		35.03	59.56	0.37	6½	
1.45-1.55	3.65	17.60		28.74	52.36	0.44	2½	
+ 1.55	21.33	71.17					½	
TOTAL	100.00	18.91						

Remarks:

C.E.S. Form 34

CYCLONE ENGINEERING SALES LTD.

Per: R.S. Sehgal

R.S. Sehgal, P. Eng.,
Laboratory Manager.

RSS:hg

BOREHOLE SAMPLES: REPORT OF ANALYSES ON RAW MATERIAL

CLIENT: Rio Tinto Canadian Exploration Ltd. DATE: October 5, 1971

PROJECT: C.E.S. PROJECT NO.: S1 - 71

CLIENT SAMPLE NO.: C-21900
CV-4 (272' - 276') C.E.S. SAMPLE NO.: 160

ANALYSES ON AIR DRY BASIS:

ASH:	13.36%
VOLATILE MATTER:	29.70%
RESIDUAL MOISTURE:	1.29%
FIXED CARBON:	55.65%
FREE SWELLING INDEX:	5½
B.T.U./lb.:	12,070
SULPHUR:	2.73%
RANK:	lvAb

DATE: August 24/71

LOCATION: Kaiser Explor

N.H., C.V. -2

WIDTH: 4'

REMARKS: 272' - 276'

Drill Depth

CYCLONE ENGINEERING SALES LTD.

Per: _____
R. S. Sehgal, P. Eng.
Laboratory Manager.

RIOCANEX C 21900

BOREHOLE SAMPLES — REPORT OF ANALYSES ON FLOAT-SINK MATERIAL

CLIENT: Rio Tinto Canadian Exploration Ltd. DATE: October 5, 1971

PROJECT: C.E.S. PROJECT NO. S1 - 71

SAMPLE NO: C-21900 , CV-4 (272' - 276') C.E.S. SAMPLE NO. 160

TABLE 1. Float-Sink Analyses on 1/4" x 0

Property / Fraction	Wt.%	Ash%	RM%	VM%	FC%	S.%	FSI	
- 1.45	82.22	2.38		34.80	61.53	0.86	7	
1.45-1.55	2.71	19.49		27.97	51.25	1.15	2½	
+ 1.55	15.07	72.31				13.05	n.a.	
TOTAL	100.00	13.38				2.70		

Remarks:

C.E.S. Form 34

CYCLONE ENGINEERING SALES LTD.

RSS:hg

Per: _____
R.S. Sehgal, P. Eng.,
Laboratory Manager.

BOREHOLE SAMPLES: REPORT OF ANALYSES ON RAW MATERIAL

CLIENT: Rio Tinto Canadian Exploration Limited

DATE: Sept. 29, 1971.

PROJECT:

C.E.S. PROJECT NO.: S1-71

CLIENT SAMPLE NO.: C-21901
CV-4 (518' - 526')

C.E.S. SAMPLE NO.: 161

ANALYSES ON AIR DRY BASIS:

ASH:	16.11%
VOLATILE MATTER:	28.25%
RESIDUAL MOISTURE:	1.03%
FIXED CARBON:	54.61%
FREE SWELLING INDEX:	6½
B.T.U./lb.:	12,190
SULPHUR:	0.51%
RANK:	hvAb

ATE: Aug. 31st '71

OCATION: Vault Explor.

RH. — C.V.-4

IDTH: 5'

MARKS: 5.5 - 5.6

CYCLONE ENGINEERING SALES LTD.

Per: R. S. Sehgal, P. Eng.
Laboratory Manager.

RIOCANEX

C 21901

BOREHOLE SAMPLES — REPORT OF ANALYSES ON FLOAT-SINK MATERIAL

CLIENT: Rio Tinto Canadian Exploration Limited DATE: Sept. 29, 1971.

PROJECT: C.E.S. PROJECT NO. S1-71

SAMPLE NO: C-21901 C.E.S. SAMPLE NO. 161
CV-4 (518' - 526')

TABLE 1. Float-Sink Analyses on 1/4" x 0

Property / Fraction	Wt.%	Ash%	RM%	VM%	FC%	S.%	FSI	
- 1.45	78.63	3.49		32.63	62.85	0.58	7½	
1.45-1.55	4.08	15.16		26.49	57.32	0.49	5	
+ 1.55	17.29	72.38					½	
TOTAL	100.00	15.53						

Remarks:

C.E.S. Form 34

CYCLONE ENGINEERING SALES LTD.

Per: R.S. Sehgal, P. Eng.,
Laboratory Manager.

RSS:hg

BOREHOLE SAMPLES: REPORT OF ANALYSES ON RAW MATERIAL

CLIENT: Rio Tinto Canadian Exploration Limited

DATE: Sept. 29, 1971.

PROJECT:

C.E.S. PROJECT NO.: S1-71

CLIENT SAMPLE NO.: C-21902
CV-4 (617' - 621')

C.E.S. SAMPLE NO.: 162

ANALYSES ON AIR DRY BASIS:

ASH:	7.08%
VOLATILE MATTER:	31.41%
RESIDUAL MOISTURE:	1.00%
FIXED CARBON:	60.51%
FREE SWELLING INDEX:	8
B.T.U./lb.:	13,000
SULPHUR:	0.60%
RANK:	hvAb

DATE: Aug. 30th '71

LOCATION: Mount Ogden

R.H. E.W. F.

WIDTH: -"

REMARKS: 617 - 621

Drill Hole Report

CYCLONE ENGINEERING SALES LTD.

Per: R. S. Sehgal, P.Eng.
Laboratory Manager.

RIOCANEX

C 21902

BOREHOLE SAMPLES — REPORT OF ANALYSES ON FLOAT-SINK MATERIAL

CLIENT: Rio Tinto Canadian Exploration Limited — DATE: Sept. 29, 1971.

PROJECT: — C.E.S. PROJECT NO. S1-71

SAMPLE NO: C-21902 CV-4 (617' - 621') — C.E.S. SAMPLE NO. 162

TABLE 1. Float-Sink Analyses on 1/4" x 0

Property / Fraction	Wt.%	Ash%	RM%	VM%	FC%	S.%	FSI	
- 1.45	93.47	3.56		32.81	62.63	0.59	8½	
1.45-1.55	2.21	22.96		24.67	51.37	0.68	4	
+ 1.55	4.32	64.02					½	
TOTAL	100.00	6.60						

Remarks:

C.E.S. Form 34

CYCLONE ENGINEERING SALES LTD.

Per: _____

R.S. Sehgal, P. Eng.,
Laboratory Manager.

RSS:hg

BOREHOLE SAMPLES: REPORT OF ANALYSES ON RAW MATERIAL

CLIENT: Rio Tinto Canadian Exploration Limited
DATE: Sept. 29, 1971.

PROJECT:
C.E.S. PROJECT NO.: S1-71

CLIENT SAMPLE NO.: C-21903
CV-4 (714' - 724')
C.E.S. SAMPLE NO.: 163

ANALYSES ON AIR DRY BASIS:

ASH:	19.81%
VOLATILE MATTER:	28.02%
RESIDUAL MOISTURE:	0.93%
FIXED CARBON:	51.24%
FREE SWELLING INDEX:	7
B.T.U./lb.:	11,730
SULPHUR:	0.49%
RANK:	hvAb

DATE: Dec. 31st 71
LOCATION: Lancel Option
CV-4
WIDTH: 10'
REMARKS: 714' - 724'
Hole Depth

CYCLONE ENGINEERING SALES LTD.

Per: R. S. Sehgal, P. Eng.
Laboratory Manager.

RIOCANEX

C 21903

BOREHOLE SAMPLES — REPORT OF ANALYSES ON FLOAT-SINK MATERIAL

CLIENT: Rio Tinto Canadian Exploration Limited — DATE: Sept. 29, 1971.

PROJECT: — C.E.S. PROJECT NO. S1-71

SAMPLE NO: C-21903 CV-4 (714' - 724') — C.E.S. SAMPLE NO. 163

TABLE 1. Float-Sink Analyses on 1/4" x 0

Property / Fraction	Wt.%	Ash%	RM%	VM%	FC%	S.%	FSI	
- 1.45	69.28	6.20		32.78	60.09	0.50	8½	
1.45-1.55	9.26	20.65		17.21	61.21	0.53	7	
+ 1.55	21.46	59.89					1	
TOTAL	100.00	19.06						

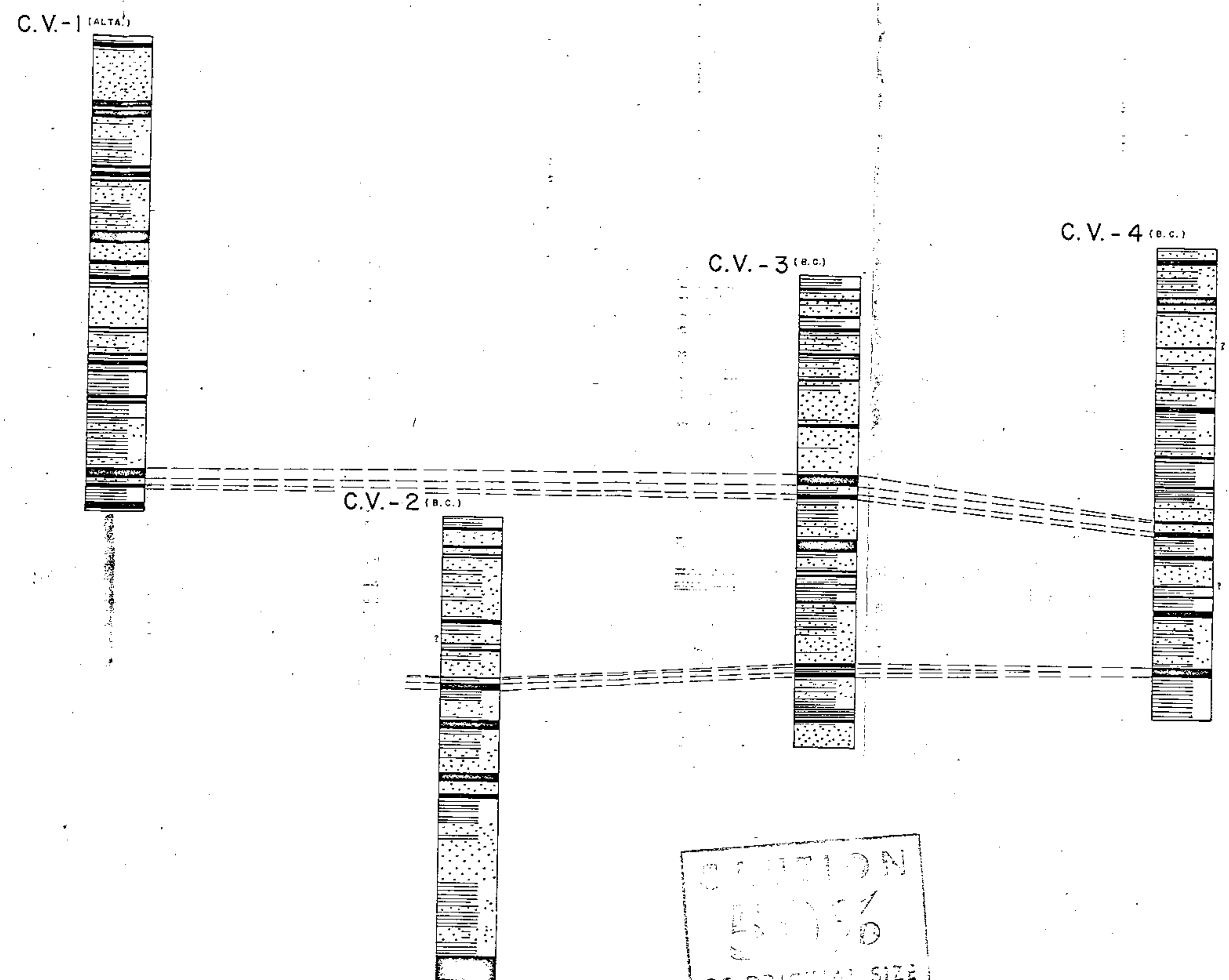
Remarks:

C.E.S. Form 34

CYCLONE ENGINEERING SALES LTD.

Per: _____
R.S. Sehgal, P. Eng.,
Laboratory Manager.

RSS:hg



LEGEND

- SANDSTONE
- SILTSTONE
- SHALE
- COAL

N.T.S
82 - J - 6,7,10,11

Vertical Scale

100 0 100 200 300 400

One Inch = 100 Feet

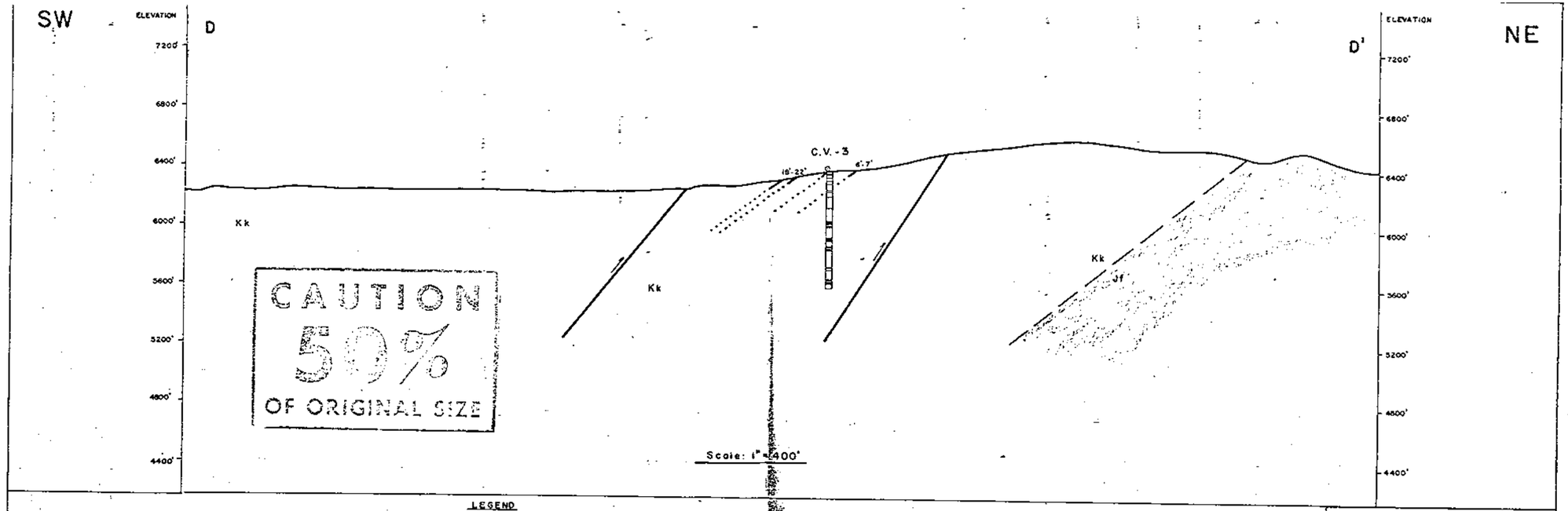
RIO TINTO CANADIAN EXPLORATION LIMITED

VINCENT OPTION - B.C., CASSIDY OPTION - ALBERTA

STRATIGRAPHIC CORRELATION

DRILL HOLES C.V.-1 - C.V.-4

NOV. - 1971	O. C. / e.k.	DWG. G - 3374

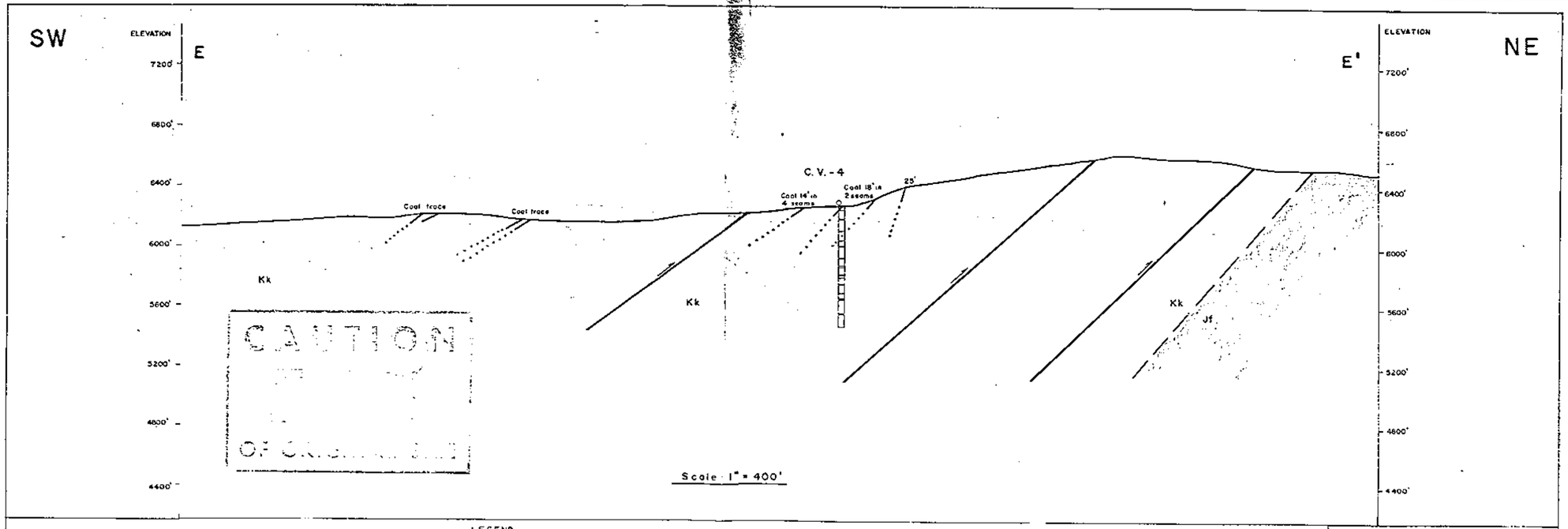


LEGEND

- Kk — Lower Cretaceous — Kootenay Formation
- Jurassic — Fernie Group
- CV-1 Drill Hole
- Coal
- Thrust Fault
- Geological Boundary

N. T. S.
82 - J - 6,7,10,11

RIO TINTO CANADIAN EXPLORATION LTD.
VINCENT OPTION - B.C.
STRUCTURAL SECTION D-D'
NOV. — 1971 | D. C. / k. h. | DWG: 0-2569



LEGEND

- Kk — Lower Cretaceous — Kootenay Formation
- Jurassic — Fernie Group
- CV-1 Drill Hole
- Coal
- Thrust Fault
- Geological Boundary

N. T. S.
82 - J - 6,7,10,11

RIO TINTO CANADIAN EXPLORATION LTD.
VINCENT OPTION - B.
STRUCTURAL SECTION E-E'
NOV. — 1971 | D. C. / k. h. | DWG: 0-2570

B

B. C. ALTA.

ELEVATION

7200'
6800'
6400'
6000'
5600'
5200'
4800'
4400'

C.V. - 4 (B.C.)
Projected 330°
Along strike 330°

C.V. - 3 (B.C.)

C.V. - 2 (B.C.)
Projected 290°
Along strike of 145° ? ? ? ?

C.V. - 1 (Alta)
Projected 290°
Along strike of 65°

10-15' Coal 14' in 4 seams 25' Coal 18-22' in 2-3 seams 6'-7'

Kk

Kk

Kk

Kk Jf

Scale 1" = 400'

LEGEND

Kk Lower Cretaceous — Kootenay Formation

Jf Jurassic — Fernie Group

CV-1 Drill Hole

Coal

Thrust Fault

Geological Boundary

PROFESSIONAL ENGINEER OF B.C. R.C. HART BRITISH COLUMBIA ENGINEER

Expiry Date Mar. 3, 1972

N. T. S.
82 - J - 6,7,10,9

RIO TINTO CANADIAN EXPLORATION

VINCENT OPTION - B.C., CASSIDY OPTION - ALTA.

STRUCTURAL SECTION B

NOV. — 1971 | D. C. / K. N. | DWG: G-2

SW

C

ELEVATION

7200'
6800'
6400'
6000'
5600'
5200'
4800'
4400'

C.V. - 2

Kk

Kk

Kk

Kk

Jf

Scale: 1" = 400'

C'

NE

ELEVATION

7200'
6800'
6400'
6000'
5600'
5200'
4800'
4400'

LEGEND

Kk Lower Cretaceous — Kootenay Formation

Jf Jurassic — Fernie Group

CV-1 Drill Hole

Coal

Thrust Fault

Geological Boundary

PROFESSIONAL ENGINEER OF B.C. R.C. HART BRITISH COLUMBIA ENGINEER

Expiry Date Mar. 3, 1972

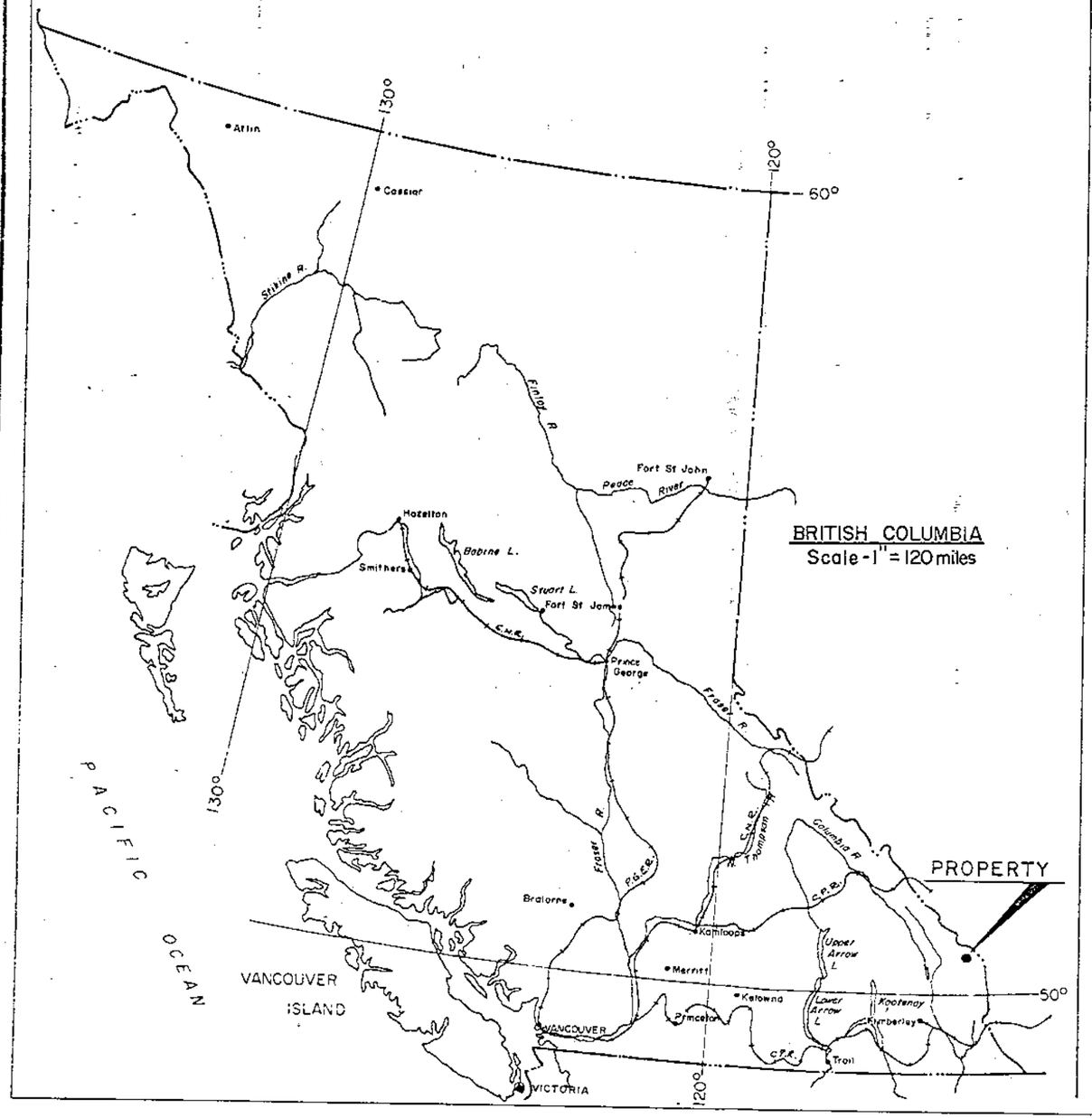
N. T. S.
82 - J - 6,7,10,9

RIO TINTO CANADIAN EXPLORATION LTD.

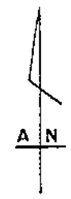
VINCENT OPTION - B.C.

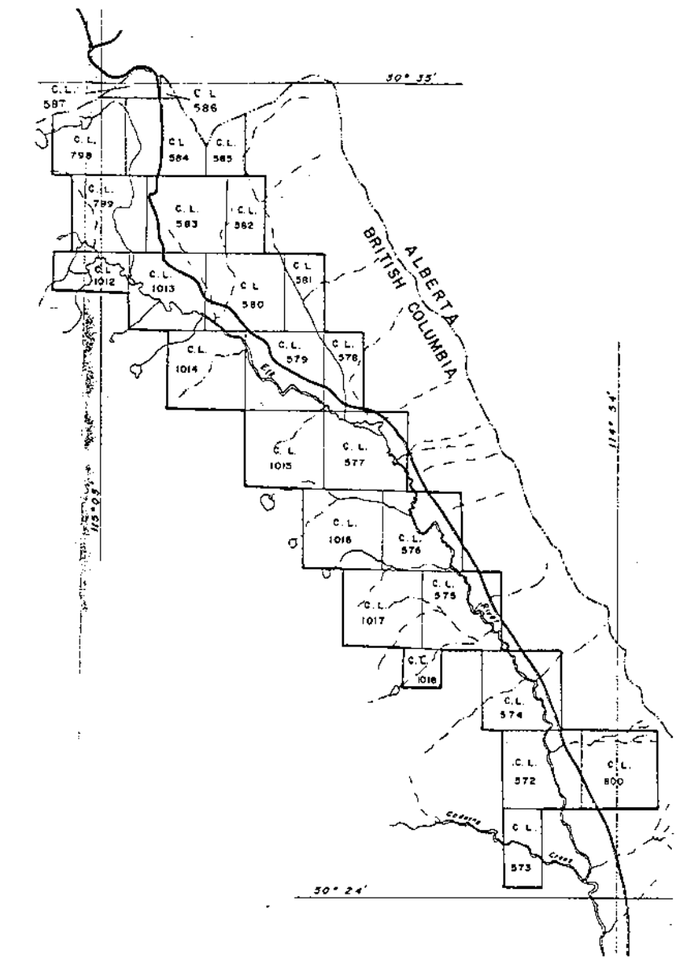
STRUCTURAL SECTION C-C'

NOV. — 1971 | D. C. / K. N. | DWG: G-2568



BRITISH COLUMBIA
Scale - 1" = 120 miles





Scale 1"= 2 miles

N.T.S.
82 - J - 11

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
R. C. HART

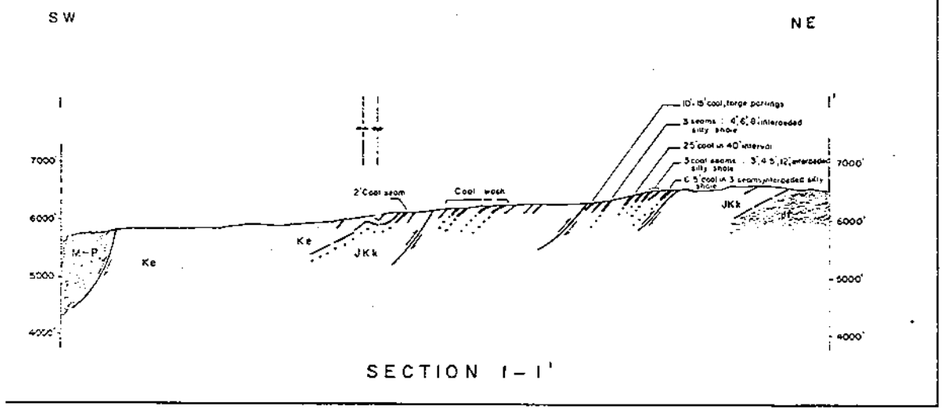
Expiry Date: Mar. 3, 1972

RIO TINTO CANADIAN EXPLORATION LTD.

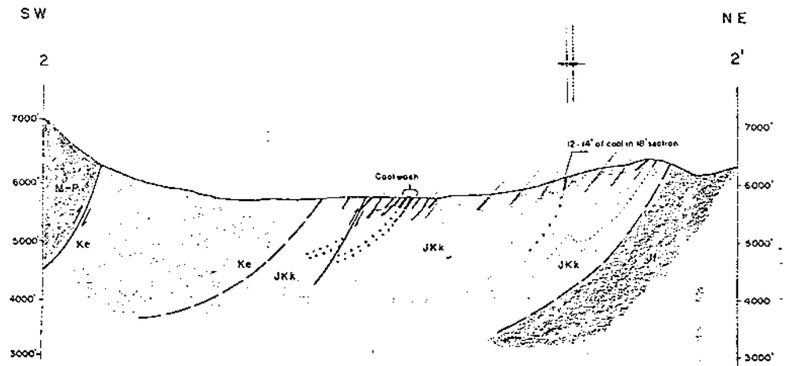
VINCENT OPTION — ELK VALLEY — B.C.

LOCATION MAP

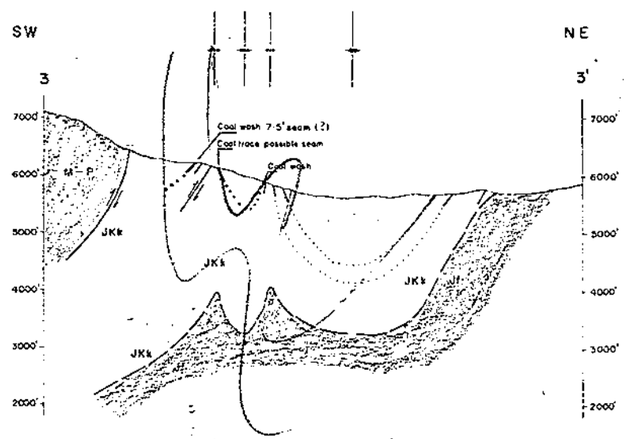
DEC. 1970 R.A.B. /e. k DWG L-2556



SECTION 1-1'

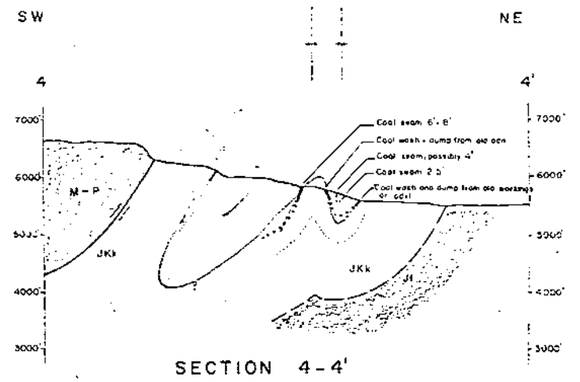


SECTION 2-2'

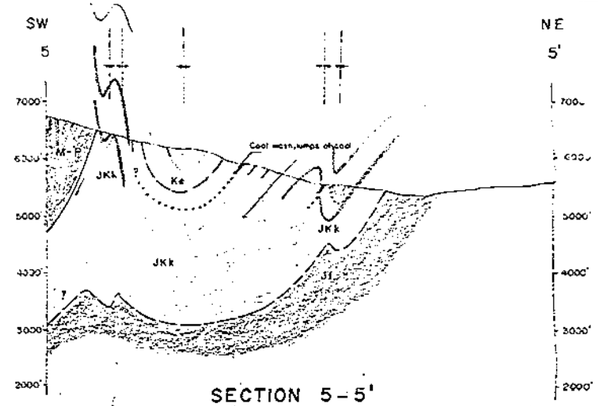


SECTION 3-3'

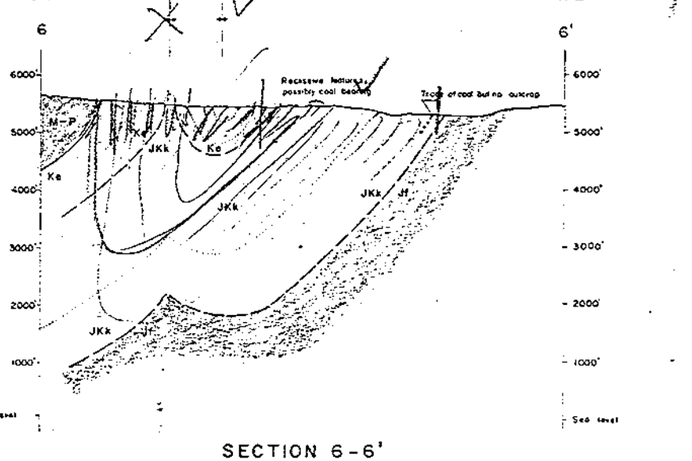
SECTION 7-7'



SECTION 4-4'



SECTION 5-5'



SECTION 6-6'

CAUTION
50%
OF ORIGINAL SIZE

LEGEND

LOWER CRETACEOUS
Ke — Elk Formation
CRETACEOUS - JURASSIC
JKk — Kootenay Formation
JURASSIC
Fernie Group
PALEOZOIC
Lower Mesozoic, Paleozoic, undivided

Coal seam
Thrust fault
Geological boundary

N.T.S.
82-J-6, 7, 10, 11

PROFESSIONAL ENGINEER PROVINCE OF B.C. R.C. HART 7911 LICENCE
Expiry Date: Dec. 31, 1970

SCALE
1320 0 1320 2640 3960 5280
One Inch = 1320' Feet

RIO TINTO CANADIAN EXPLORATION LIMITED

VINCENT OPTION - ELK VALLEY - B.C.

STRUCTURAL SECTIONS

DEC. 1970 | D.C. / e.k | DWG. G - 3352

These cross-sections show the deposit open to the west. I don't believe that it all. DD
under the Marsh fault


WEST ELK PASS
EAST ELK PASS
TOBERMORY HILL
PROVINCIAL FOREST RANGES
MOUNT AOSTA
RIVERSIDE MOUNTAIN
CADORNA CREEK
MT TYRWHITT
STORELK MTN
MOUNT ODLUM
ALBERTA
BRITISH COLUMBIA
ELK RIVER
TP 18 R 6
C.L. 557
C.L. 799
C.L. 1012
C.L. 1013
C.L. 1014
C.L. 1015
C.L. 1016
C.L. 1018
C.L. 579
C.L. 578
C.L. 577
C.L. 581
C.L. 585
C.L. 574
C.L. 572
C.L. 573
C.L. 600
L 8493
L 8492
L 8491
L 8489
L 8486
L 8487
L 8485
L 8484
L 8483
L 8482
L 8481
L 8480
L 8477
L 8479
L 8470
LEGEND
LOWER CRETACEOUS
Ke Elk Formation
CRETACEOUS - JURASSIC
JKk Kootenay Formation
JURASSIC
Jf Fernie Group
PALEOZOIC
M-P Lower Mesozoic, Paleozoic Undivided
SYMBOLS
Bedding, Inclined, Vertical, Overturned
Geological Boundary
Anticlinal Axis
Synclinal Axis
Thrust Fault, Triangle on Overthrust Side
Coal Occurence, Attitude Measured
Coal Occurence, Attitude Uncertain
Outcrop, Attitude Undetermined
Property Boundary
Note: Revision C.V.- 2,3,4, Section: B-B', C-C', D-D', E-E'
Proposed drill sites
N.T.S.
82-J-6,7,10,11
SCALE
1320 0 1320 2640 3960 5280
One inch = 1320 Feet
CAUTION
50%
OF ORIGINAL SIZE
REVISED NOV. 1971
RIO TINTO CANADIAN EXPLORATION LIMITED
VINCENT OPTION - ELK VALLEY - B.C.
GEOLOGICAL MAP
NOV - 1970

ROKE

GAMMA RAY NEUTRON LOG

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO.
LSD
SEC
TWP
RGE
W ____ M

COMPANY: RIO TINTO CANADIAN EXPLORATION LTD.
WELL: C. V. 2
LOCATION: TOBERMORY HILL
FIELD: ELK PASS
PROVINCE: BRITISH COLUMBIA

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — R. C. HART
Expiry Date: Mar. 3, 1972

Permanent Datum: GROUND LEVEL Elev. ______
Log Measured from: GROUND LEVEL, ______ Ft. Above Perm. Datum
Well Depths Measured from ______
K.B. ______
D.F. ______
G.L. ______

Run No.	ONE		
Date	22 AUGUST 71		
First Reading	771		
Last Reading	0		
Footage Logged	771		
Depth Reached	772		
Depth Driller	798		
Casing Roke			
Casing Driller			
Fluid Type			
Liquid Level			
Min. Diam.	4 7/8		
Operating Time	4 HOURS		
Truck No.	30		

Recorded By: SIM
Witnessed By: C[illegible]INGHAM

EQUIPMENT DATA

GAMMA RAY		NEUTRON	
RUN NO	ONE	RUN NO	ONE
TOOL MODEL NO		LOG TYPE	NEUTRON/NEUTRON
DIAMETER	$1\frac{11}{16}$	TOOL MODEL NO	
DETECTOR MODEL NO		DIAMETER	$1\frac{11}{16}$
TYPE	GEIGER	DETECTOR MODEL NO	
LENGTH	18 INCH	TYPE	PROPORTIONAL
DISTANCE TO N. SOURCE	8.55 FT	LENGTH	6 INCH
		SOURCE MODEL NO	MRC-N-SS-W
GENERAL		SERIAL NO	606
HOIST TRUCK NO	30	SPACING	19 INCH
INSTRUMENT TRUCK NO		TYPE	AmBe
TOOL SERIAL NO	CGN27U4CB177	STRENGTH	7.00×10^6 N/S

LOGGING DATA

GENERAL				GAMMA RAY				NEUTRON			
RUN NO	DEPTHS FROM	DEPTHS TO	SPEED FT/MIN	T.C. SEC	SENS SETTINGS	ZERO DIV. L OR R	API G.R. UNITS PER LOG DIV	T.C. SEC.	SENS SETTINGS	ZERO DIV. L OR R	API N. UNITS PER LOG DIV.
1	700	771	11	5	100	0L	9 CPS	3	1000	1L	50 CPS
2	0	748	11	5	100	0L	9 CPS	3	1000	1L	60 CPS

REMARKS: LOGGED THRU DOUBLE WALL PIPE

GAMMA RAY	DEPTHS	NEUTRON
GAMMA RAY INCREASES → CPS 9; 0 – 90		NEUTRON INCREASES → CPS 60; 60 – 660 – 1260

1"=50'

N.T.S.

WELL NAME: Elk Valley #2

LOCATION: LATITUDE ° ' "N. LONGITUDE ° " W.

U.T.M. ZONE E. N.

LOGS AVAILABLE:

K.B.
G.R.
T.D.
R.R.

STATUS:

SAMPLE QUALITY:

LOGGED BY:

DATE:

Units	Lithology	Remarks
14.5' 4.4m		
12.5' 3.8m		
4' 1.2m		
4' 1.2m		
4' 1.2m		
4' 1.2m		
10.5' 3.2m		
6.5' 2.0m		
19' 5.8m		
2' 0.6m		
1.5' 0.5m		
9' 2.9m		
2' 0.6		
2' 0.6		

1:50'

N.T.S.

WELL NAME: Elk Valley # 1

LOCATION: LATITUDE ° ' "N. LONGITUDE ° ' "W.

U.T.M. ZONE E. N.

LOGS AVAILABLE:

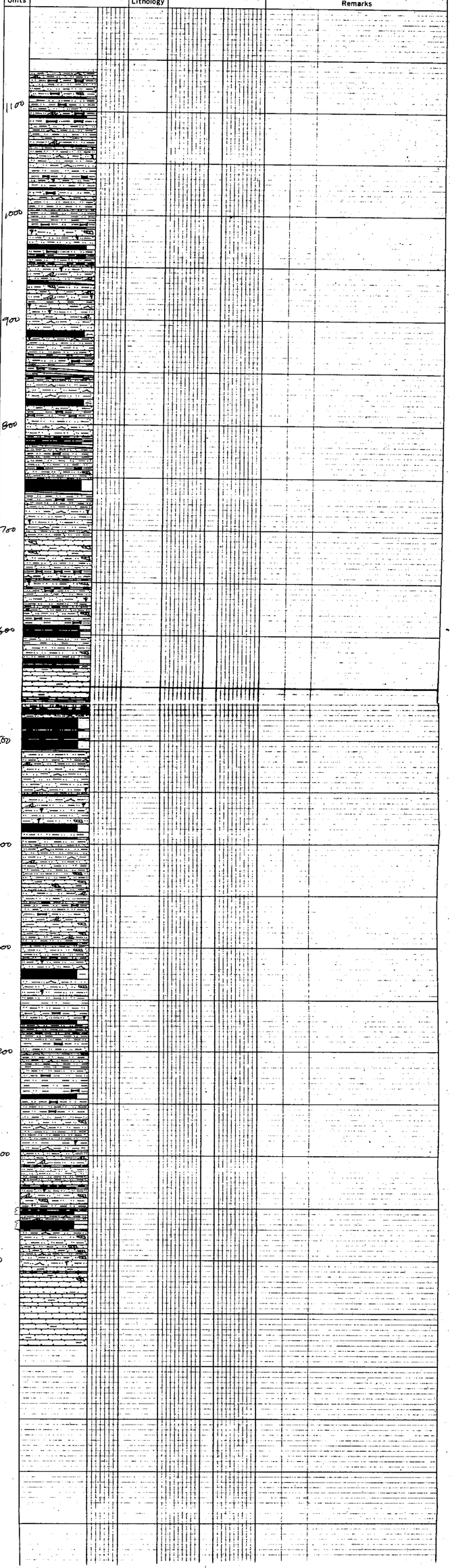
K.B.
G.R.
T.D.
R.R.

STATUS:

SAMPLE QUALITY:

LOGGED BY:

DATE:



ROKE OIL ENTERPRISES LTD. CALGARY, ALBERTA

GAMMA RAY NEUTRON LOG

DENSILOG

FILE NO.	
LSD	
SEC	
TWP	
RGE	
W ___ M	
COMPANY	RIO TINTO CANADIAN EXPLORATION LTD.
WELL	C. V. 4
LOCATION	TOBERMORY HILL
FIELD	ELK PASS
PROVINCE	BRITISH COLUMBIA
Permanent Datum	GROUND LEVEL
Elev.	
Log Measured from	GROUND LEVEL
Ft. Above Perm. Datum	
Well Depths Measured from	
K.B.	
D.F.	
G.L.	

PROFESSIONAL ENGINEER, PROVINCE OF BRITISH COLUMBIA — R. C. HART
Expiry Date Mar. 3, 1972

Run No.	ONE		
Date	31 AUGUST 71		
First Reading	732		
Last Reading	0		
Footage Logged	732		
Depth Reached	733		
Depth Driller	802		
Casing Roke			
Casing Driller			
Fluid Type	WATER		
Liquid Level	FULL		
Min. Diam.	4 7/8		
Operating Time	7 HOURS		
Truck No.	30		
Recorded By	SIM	Witnessed By	C[illegible]LLINGHAM

EQUIPMENT DATA

GAMMA RAY	
RUN NO	ONE
TOOL MODEL NO	
DIAMETER	$1\frac{11}{16}$
DETECTOR MODEL NO.	
TYPE	GEIGER
LENGTH	18 INCH
DISTANCE TO N. SOURCE	8.55 FT
GENERAL	
HOIST TRUCK NO	30
INSTRUMENT TRUCK NO	
TOOL SERIAL NO	CGN27U4CB177

NEUTRON	
RUN NO.	ONE
LOG TYPE	NEUTRON/NEUTRON
TOOL MODEL NO.	
DIAMETER	$1\frac{11}{16}$
DETECTOR MODEL NO	
TYPE	PROPORTIONAL
LENGTH	6 INCH
SOURCE MODEL NO.	MRC-N-SS-W
SERIAL NO	606
SPACING	19 INCH
TYPE	AmBe
STRENGTH	7.00×10^6 N/S

LOGGING DATA

GENERAL				GAMMA RAY				NEUTRON			
RUN NO.	DEPTHS FROM	DEPTHS TO	SPEED FT/MIN	T.C. SEC.	SENS SETTINGS	ZERO DIV. L OR R	API G.R. UNITS PER LOG DIV.	T.C. SEC.	SENS. SETTINGS	ZERO DIV. L OR R	API N. UNITS PER LOG DIV.
1	0	732	11	5	100	0L	7 CPS	3	1000	1L	50 CPS
DENSITY			9	3	5000	0R	300 CPS				

REMARKS

GAMMA RAY	DEPTHS	NEUTRON
GAMMA RAY INCREASES → CPS 7; 0 — 70		NEUTRON INCREASES → CPS 50; 50 — 550 — 1050
		DENSITY 6000 — 3000

GAMMA RAY NEUTRON LOG

DENSILOG

ROKE

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO.	
COMPANY	RIO TINTO CANADIAN EXPLORATION LTD.
LSD	
SEC	
WELL	C. V. 3
TWP	
RGE	
LOCATION	TOBERMORY HILL
W ___ M	
FIELD	ELK PASS
PROVINCE	BRITISH COLUMBIA

Expiry Date: Mar. 3, 1972

Permanent Datum GROUND LEVEL Elev. ____ K.B. ____
Log Measured from GROUND LEVEL ____ Ft. Above Perm. Datum D.F. ____
Well Depths Measured from ____ G.L. ____

Run No.	ONE
Date	31 AUGUST 71
First Reading	799
Last Reading	0
Footage Logged	799
Depth Reached	800
Depth Driller	800
Casing Roke	
Casing Driller	
Fluid Type	WATER
Liquid Level	FULL
Min. Diam.	4 7/8
Operating Time	4 HOURS
Truck No.	30

Recorded By SIM Witnessed By CULLINGHAM

EQUIPMENT DATA

GAMMA RAY		NEUTRON	
RUN NO	ONE	RUN NO.	ONE
TOOL MODEL NO		LOG TYPE	NEUTRON/NEUTRON
DIAMETER	$1\frac{11}{16}$	TOOL MODEL NO.	
DETECTOR MODEL NO.		DIAMETER	$1\frac{11}{16}$
TYPE	GEIGER	DETECTOR MODEL NO.	
LENGTH	18 INCH	TYPE	PROPORTIONAL
DISTANCE TO N. SOURCE	8.55 FT	LENGTH	6 INCH
		SOURCE MODEL NO.	MRC-N-SS-W
GENERAL		SERIAL NO	606
HOIST TRUCK NO	30	SPACING	19 INCH
INSTRUMENT TRUCK NO		TYPE	AmBe
TOOL SERIAL NO.	CGN27U4CB177	STRENGTH	7.00×10^6 N/S

LOGGING DATA

GENERAL				GAMMA RAY				NEUTRON			
RUN NO.	DEPTHS FROM	DEPTHS TO	SPEED FT/MIN	T.C. SEC.	SENS SETTINGS	ZERO DIV. L OR R	API G.R. UNITS PER LOG DIV.	T.C. SEC.	SENS. SETTINGS	ZERO DIV. L OR R	API N. UNITS PER LOG DIV.
1	0	799	11	5	50	0L	5 CPS	3	1000	1L	50 CPS
DENSITY			9	3	5000	0R	300 CPS				

REMARKS

GAMMA RAY	DEPTHS	NEUTRON
GAMMA RAY INCREASES → CPS 5; 0 – 50		NEUTRON INCREASES → CPS 50; 50 – 550 – 1050; DENSITY 6000 – 3000 – 0

ROKE

SIDEWALL DENSILOG

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO.

LSD
SEC
TWP
RGE
W M

COMPANY RIO TINTO CANADIAN EXPLORATION LTD.

WELL C. V. 2

LOCATION TOBERMORY HILL

FIELD ELK PASS

PROVINCE BRITISH COLUMBIA

PROFESSIONAL ENGINEER — R. C. HART — Province of British Columbia

Expiry Date: Mar. 3, 1972

Permanent Datum GROUND LEVEL Elev. K.B.

Log Measured from GROUND LEVEL Ft. Above Perm. Datum D.F.

Well Depths Measured from G.L.

Run No	ONE		
Date	31 AUGUST 71		
First Reading	476		
Last Reading	0		
Footage Logged	476		
Depth Reached	478		
*Depth Driller	798		
Casing Roke			
Casing Driller			
Fluid Type	WATER		
Liquid Level	FULL		
Min. Diam.	4 7/8		
Operating Time	2 HOURS		
Truck No	30		

Recorded By SIM Witnessed By CULLINGHAM

REMARKS

DENSITY — COUNTS PER SECOND — CPS 300 3000 — 0 — 6000

DEPTHS — 000 — 100 — 200 — 300 — 400 — P.B.

CALIPER — HOLE DIAMETER (INCHES)

1"=50'

N.T.S.

WELL NAME: Elk Valley #4

LOCATION: LATITUDE ° ' "N. LONGITUDE ° " W.

U.T.M. ZONE E. N.

LOGS AVAILABLE:

K.B.

G.R.

STATUS: SAMPLE QUALITY: T.D.

LOGGED BY: DATE: R.R.

Units		Lithology		Remarks

WELL NAME: Elk Valley #3

LOCATION: LATITUDE ° ' "N. LONGITUDE ° ' "W.

U.T.M. ZONE E. N.

LOGS AVAILABLE:

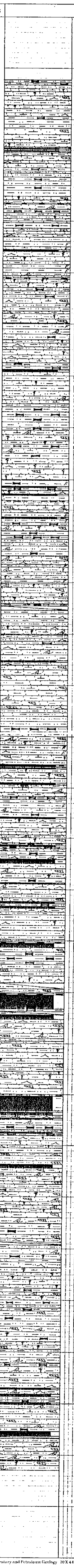
K.B.

G.R.

STATUS: SAMPLE QUALITY: T.D.

LOGGED BY: DATE: R.R.

Units		Lithology		Remarks



RIO TINTO CANADIAN EXPLORATION LIMITED

DRILL & CORE LOG

PROPERTY: Vincent Option, Elk Valley, B.C. — HOLE NO.: [illegible]

LOCATION: 2,200'E, 1,600'S of NW corner, Lot 8890 (C.L. 584) — AZIMUTH:

ELEVATION: 5,350 (approx.) — DIP:

TOTAL DEPTH: 900' — PROBE DEPTH: 799' — DIP TESTS:

HOLE SIZE: AQ — CORE SIZE

DATE STARTED: August 23, 1971 — AIR ☐ WATER ☐

DATE COMPLETED: August 29, 1971 — LOGGED BY: A. Sutherland — DATE: August 24, 1971

CONTRACTOR: [illegible] Drilling — PROBED BY: Geo Phy Logging — DATE: August 24, 1971

R. C. HART
Registered Professional Engineer
Province of British Columbia

Expiry Date: Mar. 3, 1972

FORMATION TOPS	DEPTH in Feet	PRIMARY TYPE	LITHOLOGY	GRAIN SIZE / CRYSTAL SIZE in mm	SHADING	SORTING	DESCRIPTION	ANALYSIS	ENGINEERING AREA
							SH: m. gy, blocky, mod. hd. sl. bmsh. colour due to wthrg.		
							Coal: v.f. to fri. w 2-4" vitrain @ 15° to sh.		
							SH: m. gy, minor carb. material		
							SS: quartzose ss. bimodal, f. gr. v.m. gr. hd. sil. tr. calc.		
							Coal Horizon - clean bri. claro-vitrain, few str. pbls. m. ash		
							SS: m. gy. v. arg. greywacke, calc. veinlets, v. hd.		
							SH: m. gy. sdy, few coal pbls.		
							SS: m. gy greywacke, arg. sl., mod. hd.		
							Coal Horizon:		
							SH: m. to m.-dk. gy, sdy, blocky, hd. few coal pbls. r. sl. micro-mica		
							Coal Horizon:		
							SH: m. to m. dk. gy, sl. carb. mod. hd.		
							Coaly SH: dk. gy, brn. v. to 1/2" sh, sl. carb. 30% coal pbls.		
							SS: m. gy. quartzite bimodal, f. v.m. gr. r. sil, hd, tr. calc. veinlets.		
							SH: m. dk. gy. sdy, sl. carb. mod. hd. calc. veinlets		
							SS/SH: SS: m. dk. gy sl. arg. sil. calc. veinlets bimodal		
							SH: m. dk. gy. sdy, carb. in part. blocky m. hd.		
							Coal Horizon: v.f. grad. claro-vitrain, sh pbls at top & bot.		
							SH: coaly, few coal frag. pl. frag. silty in part		
							SH/SS: SH: m. dk. gy. blocky, sdy, hd.		
							SS: m. dk. gy, sil. hd.		
							SS: m. dk. gy. sil to v.f. gr. mod. sort'd gr. sil. sl. arg. few coal frag. sl. calc. veinlets		
							SH: m. dk. gy. to dk. gy. carb. to coaly in part. med. hd. few coal pbls.		
							SS: m. dk. gy. sil quartzitic gr to gr. m. gr. to f. gr. hd. calc. veinlets 20% sh pbls.		
							SH: m. dk. gy. sdy, blocky 20% SS: AA		
							SS: m. to m. dk. gy. arg. sl. calc. in part sil. hd. calc. veinlets - Same almost quartzitic, mod. hd. to hd.		
							SH: dk. gy, platy to blocky, hd.		
							SS, SH SS: m. gm. gy, sil, sl. to v. carb. mod. hd. sl. dk. gy. mod. calc		
							Coal Horizon: v.f. grad. clean vit. to bri, few weath.		
							SS: m. to m. dk. gy, sil. hd. minor calc. veinlets, sl. carb. in part almost quartzitic.		
							Silty SH: m. gy; mod. hd. tr. calc. veinlets		
							SS: AA		
							SH: m. dk. to dk. gy, sdy, carb. to calc. to coal		
							Coal Horizon: mostly clean vit. to bri; claro-vitrain low ash few sdy sh. frag. 748'-756'		
							SS: m. gy. fm. mod. hd. sl. carb. calc. veinlets 2&3		
							SH: m. dk. to dk. gy, carb. some sdy sh pbls. m. coal, m. calc.		
							Coal Horizon: clean vit. to bri. lustre, claro-vitrain few ash - coaly sh. pbls. at base		
							SH: m. dk. gy, silty to sdy, hd, few coal pbls		
							SH, SS, SH - AA; SS: m. dk. gy, sil. hd. sl. arg.		
							SS: m. dk. gy, sil. hd. tr. carb. tr. calc.		
							SH: m. dk. to dk. gy, mod. hd. v. sl. silty		
							SS: m. dk. gy, sil. cmt. hd. v. sl. carb.		
							SH: m. dk. gy. mod. hd. v. sl. silty, blocky minor calc. veinlets		
							SS: m. dk. gy. sil. sl. arg. mod. hd. blocky		
							SS/SH: SS: AA SH: m. dk. gy. silty, hd., v. sl. carb.		
							Coal Horizon: dull to bri; claro-vitrain low to mod. ash, f. grad. Some arg. stgs.		
							SH: m. dk. gy. carb. in part, silty in part, mod. hd. silty to sdy in part greywacke at base		
							SS: m. to m.-dk. gy. hd. sil, tr. calcite veinlets		
							SH: m. dk. gy. minor carb. few coal pbls.		
							Coal Horizon: dull to bri - mod. to hi. ash.		
							SH: dk. gy, carb. in part, coaly in part, few coal frag. silty in part mod. hd.		
							Coal: Coal Horizon - Section - some coaly sh		
							SH: m. dk. gy, carb. in part some coaly SS frag. contains pl. strs. at top of unit mod. hd.		
							SS: m. brn. gy, hd., sil. sl. arg. tr. calc. veinlets		
							SH: m. dk. gy, mod. hd. platy, tr. calcite.		
							SS: m. gy, mod. hd. sl. arg. sil. cmt.		
							SH: m. dk. gy, silty to sdy in part, mod. hd.		
							SS: m. to m. dk. gy. hd. tr. calcite.		
							SH: m. dk. gy. mod. hd. silty to sdy in part v. sl. micro-mica		
							SS: m. to m. dk. gy. mod. hd. arg. tr. calc.		
							SH: m. dk. gy, mod. hd. silty to sdy, blocky		
							SS: m. gy, arg. mod. hd. to calc. veinlets approaching greywacke		
							SH: m. dk. gy, sdy, mod. hd.		
							SS: m. dk. gy, arg. sl. sil. greywacke, tr. calc.		
							Coal Horizon: dull to bri, mostly claroain mod. ash.		
							SH: m. dk. gy. carb. to coaly in part, sl. sdy, mod. hd.		
							Coal Horizon: clean, f. grad. vit. brit. claro-vitrain few ash.		
							SH: m to m dk gy, blocky sl. silty to carb. in part mod. hd.		
							SHst: dk. gy. arg. platy to blocky, some calc. veinlets, hd. tr. calc. cmt.		
							SH: m. dk. gy. sl. silty in part tr. calc. hd.		
							SHst: m. dk. gy. arg. sl. calc. sl. calc. veinlets		
							SH: m. dk. gy. sl. silty in part tr. calc. hd.		
							SH, SHst: m. dk. gy. arg. to silty, sl. sdy, tr. calc. mod. hd. to hd.		
							f. grad. clean vit. to bri:		
							Coal Horizon: claro-vitrain low to med. ash.		
							SH: m. gy. to m. dk. gy. silty hd. few ss frag.		
							SS: m. - m.dk. gy. hd. sil. v. minor arg. gtz. & chert gr. greywacke to quartzitic.		
							Total Depth 900'		

RIO TINTO CANADIAN EXPLORATION LIMITED

DRILL & CORE LOG

PROPERTY: Vincent Option, Elk Valley, B.C.		HOLE NO.
LOCATION: [illegible] 100' [illegible] 100' [illegible] Lot 8490 (G.1. 534)		
AZIMUTH:	ELEVATION: 6,300 (approx.)	DIP:
TOTAL DEPTH: 798'	PROBE DEPTH: 772'	DIP TESTS:
HOLE SIZE: 4 7/8"	CORE SIZE:	
DATE STARTED: August [illegible], 197[illegible]	AIR: ☐ WATER: ☐	
DATE COMPLETED: [illegible] 22, [illegible]	LOGGED BY: [illegible] Cullingham	DATE: August 20-2[illegible], 197[illegible]
CONTRACTOR: [illegible] Drilling	PROBED BY: [illegible] Well Logging	DATE: [illegible]

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — R. C. HART

Expiry Date: Mar. 3, 1977

FORMATION TOPS	DEPTH	POROSITY TYPE	LITHOLOGY	GRAIN or CRYSTAL SIZE in mm's	ROUNDING	SORTING	DESCRIPTION	ANALYSIS	ENGINEERING DATA

SH: m. brn. wthrg. Fe str. mod. hd. m. dk gy

Coal: f. grnd. arg. material hi ash.

SH: m. gy. small amnt. Fe str.

Sltst: m. gy. mod. hd. to hd. blocky, v. sl. arg. some calc. veinlets.

sltst, sh: 1:1, m. gy. arg. to slty, mod. hd.

Coal: clean bri, claro-vitrain, m. ash. 51'-54'

Coal: Dull to bri. some Pb. gy. pots durain. m. ash

Coal: dull to bri. prob. mostly clarain low ash.

SH / Sltst: m. gy. v. sl. carb. arg. to slty, sks mod. hd. to hd.

sltst: m. lt. gy. hd. blocky, few frag. of f. gr. SS. sil.

SH / Sltst: m. gy. slty to arg. hd. v. sl. carb.

sltst: m. gy. hd. blocky, few v. f. gr. ss frag. some calc. veinlets.

SH: m. gy. mod. hd. slty

SS: m. gy. hd. sil. Well cmt.

sltst: m. gy, hd. blocky some calc. veinlets or infilling.

SH: m. gy. v. sl. carb. hd. slty to sdy in part.

coaly SH: dk. gy, carb. to coaly

SS: m. gy. v. hd. sil. some calc. veinlets.

Sltst: m. gy. hd. blocky, few v. f. gr. SS. frag. calc. veinlets.

SH: m. to m. dk. gy, sl. slty to sl. carb. mod. hd. sks. some calc. veinlets.

SS: m. gy, hd. sil.

181'-185' SH: dk. gy. v. carb. to coaly some coal frag.

200'-205' carbargillite ~ 90% coal frag

SS: m. gy. hd. sil. few sltst ptcls.

SS/SH 2:1 SS: m. dk. gy, hd. minor calc. veinlets

SH: m. dk. gy, sdy

SH: dk gy, some sdy sh ptcls, sl. carb. tr. calc.

Sltst: m. gy, hd. tr. calc. coal flecks

SS: m. gy. v. hd. tr. calc. sil. few sltst ptcls.

SH: dk, gy sl. carb. sks, sdy in part calc. veinlets.

SS, Sltst. 2:1 m. gy, hd. sil.

sltst: m. dk. gy. sl. arg. mod. hd. calc. infilling.

SS: m. gy. sil. calc. veinlets or infilling mod. hd.

Sltst, SS, SH: 3:1:1; m. to m dk, gy calc. infilling

SH: m. dk. to dk. gy, sdy, carb. to coaly 20% coal ptcls.

Coal: v. f. grnd. prob. mostly clarain, low ash

SH: m. dk. gy. slty mod. hd. minor calc. infilling tr. pyr.

306'-310' carbargillite few coal frag.

sltst: m. gy. arg. hd. calc. veinlet or infilling

SH: dk. gy, carb. to coaly sks, few coal ptcls.

Coal: f. grnd. shale ptcls. mostly clarain 15-20% ash.

No sample bagged

SH: m. dk. gy. carb. mod. hd.

SH: m. dk. gy. sl. carb. sl. slty tr. calcite

Sltst, SS: m. to m. dk. gy. slt to v. f. gr. mod. sort. sl. carb. in part. calc. veinlets, mod. hd.

SH, Sltst: m. dk. gy. sl. carb. in part. mod. hd.

SH: dk. gy. carb. to coaly slty in part sks.

SH, SS,: m. dk. gy. sl. carb. in part, slty in part blocky, mod. hd. 30% ss ptcls. calc. infilling

Sltst, SS: m. to m. dk. gy. slt. to f. gr. mod. hd. calc. infilling

SH: m. dk. gy. carb. to coaly - few sdy sh ptcls.

SS: m. to m. dk. gy. sil. hd.

Carbargillite / coal frag.

Coal: f. grnd. minor arg. mat. mostly clarain, m. ash.

SS: m. gy, hd. sil. some calc. infilling sks. nr. base, sl. carb. in part.

coal / coaly sh: dull to vit. sks. hi ash.

SS: m. gy, f. gr. & well sort, calc. infilling, hd.

SH: m. to dk. gy. carb. to coaly nr. top sdy nr. base.

Shaly Coal to Coaly Sh:

SH: sl. carb. - few coal frag. sl. slty

sltst, SS 1:1; m. to m dk gy, hd. slt to v. f. gr. ss

SS: m. gy. sil. hd. few sltst ptcls.

SH: m. gy. mod. hd. sdy

SH/SS m. gy. mod. hd. some calcite veinlets

SS/Sltst: m. to m. dk. gy. hd. slt. to v. f. gr.

SS: m. gy. v. sl. arg. mod. hd. to hd. sil. some calc. veinlets & or infilling.

Becomes coarser gr. towards base of unit.

SH: m. gy. hd. sl. slty in part, mod. hd to hd. blocky, carb. in part v. sl. micro - mica in part

SH/SS. m. dk. gy. slt. to sdy, blocky hd.

SH: m. dk, gy, blocky carb in part.

SS, SH: As for 655'-660'

SH: m. gy. to dk. gy. slty in part carb in part mod. hd.

SS / SH : 1:1.

SS: m. gy, sil, sl. arg. hd. tr. calcite

SH: m. gy. to m. dk. gy. slty to sdy in part hd.

SH: m. to m dk. gy. sl. carb. in part v. sl. sdy mod. hd.

few coal ptcls nr. base of unit

Coal: sl. arg. for top 4 ft. m to hi ash.

Mostly claro - vitrain > 20% vitrain, some cone in cone structure, low ash

Last 4 ft. med. ash

coal underclay

Total Depth. 798'


1" = 1320'
WEST ELK PASS
EAST ELK PASS
TOBERMORY HILL
PROVINCIAL FOREST
PROVINCIAL RANGES
MOUNT AOSTA
RIVERSIDE MOUNTAIN
CADORNA CREEK
TYRWHITT
STORELK MTN
MOUNT ODLUM
ALBERTA
BRITISH COLUMBIA
ELK RANGE
TP 18 R 8
50° 30'
115° 00'
LEGEND
LOWER CRIETACEOUS
Ke Elk Formation
CRETACEOUS - JURASSIC
JKk Kootenay Formation
JURASSIC
Jf Fernie Group
PALEOZOIC
M-P Lower Mesozoic, Paleozoic Undivided
SYMBOLS
Bedding, Inclined, Vertical, Overturned
Geological Boundary
Anticlinal Axis
Synclinal Axis
Thrust Fault, Triangle on Overthrust Side
Coal Occurence, Attitude Measured
Coal Occurence, Attitude Uncertain
Outcrop, Attitude Undetermined
Property Boundary
N.T.S.
82 - J - 6,7,10,11
SCALE
1320 0 1320 2640 3960 5280
One Inch = 1320 Feet
1" = 1320'
Reduce to 32%. (~ 1/3)
K-V 70(1) A
82 J- 7l
Expiry Date: Mar. 3, 1972
RIO TINTO CANADIAN EXPLORATION LIMITED
VINCENT OPTION - ELK WALLEY - B. C.
GEOLOGICAL MAP
K-V 70 (1) A
NOV.— 1970
O.C / e.k.
D.W.G. G - 4366

RIO TINTO CANADIAN EXPLORATION LIMITED

DRILL & CORE LOG

PROPERTY: Vincent Option, Elk Valley, B.C.		HOLE NO. [illegible]
LOCATION: 2,500' E, 2,900'S of NW corner, Lot 8490 (C.L.584)		
AZIMUTH:	ELEVATION: 6,310 (approx.)	DIP:
TOTAL DEPTH: 802'	PROBE DEPTH: 732'	DIP TESTS:
HOLE SIZE: 4 7/8"	CORE SIZE:	
DATE STARTED: August 27, 1971	AIR: ☐ WATER: ☐	
DATE COMPLETED: August 31, 1971	LOGGED BY: ?. Cullingham	DATE: August 28-31, 1971
CONTRACTOR: Big Indian Drilling	PROBED BY: Roke Oil Enterprises	DATE: August 31, 1971

Vincent Option

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA R. C. HART

Expiry Date: Mar. 3, 1972

FORMATION TOPS	DEPTH	POROSITY TYPE	LITHOLOGY	GRAIN or CRYSTAL SIZE in mm's	ROUNDING	SORTING	DESCRIPTION	ANALYSIS	ENGINEERING DATA

SH: m. brn. wthrg. mod. hd. m. gy. flesh colour

SS: m. gy. brn. wthrg. m. gy. v.f. to f. gr, a m. sort. sil. sl. arg. hd.

SH: m. gy. sl. slty in part, mod. hd.

Coal Horizon: vit. to bri. shearing.

SS: lt. gy. quartzitic v. hd. well comp., bi- mod. sltst above.

SH: m. gy. brn. carb. to coaly 20% coal frag.

SS: m. gy. sil. hd. minor sh.

SH: m. gy. to m. dk. gy. sdy. to slty in part mod. hd. tr. calcite.

SS: m. gy. hd. sil.

SH: m. gy. mod. hd. tr. calcite, slty to sdy, sl. carb.

Sltst to SS: m. gy, slt. to f. gr. p. sort. sil. cmt. arg. hd.

SH: dk. gy. carb. to coaly ~ 20% coal frag. finely grnd.

Coal Horizon: finely grnd. vit. to bright. claro-vitrain. mostly low ash.

SS: m. gy. sil. hd. some calc. veinlets

Coal Horizon: dull to vit., few coaly sh. frag. m. ash.

SH: m. gy. blocky mod. hd. sl. - slty in part.

SS: m. gy. sil. hd. varies from greywacke to quartzitic, calcite veinlets, sl carb. in part.

SH: m. dk. to dk. gy. carb. in part minor coaly sh. tr calc. infilling abrupt change from above.

SS: m. gy. sl. arg. sil cmt. gr. to gy. hd. tr. calc.

SH: m. dk. gy. slty to sdy blocky, mod. hd.

SS: m. gy, sl. arg. sil. hd. calc. veinlets.

SH: m. dk. gy, slty in part, blocky mod. hd. tr calc.

SH, SS: 3 : 1 AA

SH: m. dk. gy. slty to sdy in part hd.

SS: m. gy. sil. hd. tr. calcite, a, mod. sort.

SH: m. - m. dk gy, slty to sdy, mod. hd. tr. calc. - carb. to coaly in part.

Coal: clean, claro-vitrain ~ 20% vitrain low ash

SH: m. dk. gy. sl. carb. in part brn. tint. sdy in part, ss bnd. below coal mod. hd. tr. calcite.

SS: m. gy. sil. arg. mod. hd. calc. veinlets.

SH: m. dk. gy. sdy mod. hd. calc. veinlets, sl. carb. in part.

SS: m. gy. sil. hd.

Coal: dull to vit. mostly clarain, low ash.

SH: m. dk. gy. carb. to coaly in part slty to sdy in part.

Coal / SH: 2 : 1 dk gy to blk, carb. sh to arg. coal vit. to bri. frag. of coal

SH: m. dk. to dk. gy. platy mod. hd. sl. carb. in part, coaly sh ptcls in part

402' - 404' - sh / coal ~ 30% coal

SS: m. dk. gy. arg. greywacke, some sil. frag. hd.

Coal: dull to bri, claro-vitrain, sks, few coaly sh, ptcls, med. ash.

SH: dk. gy. carb. to coaly brnsh tint, f. grnd.

SS: m. dk. gy. arg. greywacke, hd.

SH: m. dk. gy v. sl. slty in part, mod. hd coaly from 435' - 436'

SS: m. gy. sl. arg. mod. hd. sil. cmt. tr. calc.

Coal Horizon: dull to vit. high ash carb. to coaly sh frag.

SH / SS:

SH: m. dk. gy. slty in part mod. hd.

SS: m. dk. gy. sil. mod. hd. tr. calc. veinlets.

SH: m. dk, to dk, gy, tr. slty in part carb. to coaly in part.

480' - 488' sh / coal dk, gy, brn, tint; 20 - 30% coal ptcls.

SS: m. dk. gy. slt. to v.f. gr. mod. sort. sil. hd. minor arg. mat. sts, hvy calc. infilling abrupt change from above

SH: m. gy. sdy to v. sdy; sl calc. appro. greywacke.

Coal Horizon: vit. to bri. shearing, cleaner, low ash few coaly sh ptcls at base

SH: dk, gy, slty in part, carb to coaly mod. hd.

SS: m. gy. sil. hd. tr. calc.

543' sh dk, gy, carb. sdy.

SH: dk, gy, carb. to coaly, few coal frag. sks wd. struct. in part, sdy sh.

SH: dk, gy, brn. tint, few coal frag. carb. to coaly

SS: m. dk, gy, arg. sil. cmt. some calcite veinlets sl. carb.

SH: m. dk. gy, carb. in part

Coal: clean, vitr. to bri. claro-vitrain, coaly sh. frag. high ash.

SH: m. dk, gy, carb. in part, mod. hd. tr. calc. in part.

Coal Horizon: vit. to bri., claro-vitrain, sks, > 20% vitrain, low ash.

SH: m. dk. gy. brn. tint in part, carb. in part sl. slty to sdy. tr. calc. veinlets.

SS: m. dk, gy, arg. in part, sil. cmt. hd.

SH: m. dk, gy, mod. hd. tr. calcite veinlets sl. carb. in part.

Slt to SS: m. dk. gy, slt. to f. gr. sil. hd. calc. veinlets.

SS / SH: SS: m. dk. gy. slt to f. gr. sil. hd.

SH: m. dk. to dk. gy. carb. in part, platy sl. slty in part.

SH / SS: SH - AA

SS - m. gy. sil. hd. calc. veinlets

690' - 695' - minor pyr.

SS / SH SS - AA

SH - m. dk, gy, sdy, sl. carb.

SH - m - m dk. gy, carb. to coaly sks. mod. hd.

Coal Horizon: dull to bri. sheared., claro-vitrain, coaly sh, ptcls, brn. tint. Possibly some contamination, m to hi. ash.

SH: m. dk, to dk, gy, sl. slty in part, blocky mod. hd. carb. to coaly in part tr. calc. veinlets.

735' - 740' 20% SS frag. m lt. gy. v.f-f, sil. hd. a mod. sort.

745' - 750' 15% coal frag.

755' - 760' - few coal ptcls.

795' - 802' 50% SS m. gy. quartzitic, sil. hd. a, v.f-f gr. mod. sort. calc. veinlets.

Total Depth 802'