

COMINCO LTD.

EXPLORATION
NTS: 94 B/5

WESTERN DISTRICT
28 SEPTEMBER 1983

ASSESSMENT REPORT

GEOLOGICAL SURVEY

ON THE

ALEY CLAIMS

SITUATED AT: 123°45'W, 56°27'N

OMINECA MINING DIVISION

BRITISH COLUMBIA

**GEOLOGICAL BRANCH
ASSESSMENT REPORT**

12,018

K.R. PRIDE

REPORT BY:

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ASSESSMENT REPORT
GEOLOGICAL SURVEY REPORT
ON THE
ALEY CLAIMS
OMINECA MINING DISTRICT
BRITISH COLUMBIA

I. INTRODUCTION

The Aley claims were staked in October, 1982 to cover a large mass of carbonatized Lower Paleozoic sedimentary rocks interpreted to be a carbonatite.

The property is underlain by the Cambrio-Ordovician Kechika Group, the Ordovician Skoki Formation and the Ordovician to M. Devonian Road River Group.

II. SUMMARY

Geological field work on the Aley property was carried out during the period July 5 to August 31, 1983. Personnel involved in the program were P. LeCouteur, (Geologist); K.R. Pride, (Geologist); and F. Dubois, (cook and geological assistant).

III. LOCATION AND ACCESS

The Aley property is located approximately 140 Km north of Mackenzie and 13 Km east of the Ospika River at Lat. 56°57'N, Long. 123°45'W on NTS sheet 94 B/5. Access to the property is by fixed wing aircraft to Ingenika and then 64 Km southeast by helicopter.

IV. TENURE

The Aley property consisting of four-20 unit claims, is owned 100% by Cominco Ltd. and is located in the OMINECA Mining District.

<u>CLAIMS</u>	<u>UNITS</u>	<u>RECORD NO.</u>	<u>RECORDED</u>
Aley 1	20	4792	October 7, 1982
2	20	4793	October 7, 1982
3	20	4794	October 7, 1982
4	20	4795	October 7, 1982

2.

V. REGIONAL GEOLOGY

Kechika Group

The Kechika Group comprises three main lithofacies: phyllitic, calcareous and non-calcareous silty shale; argillaceous limestone with interbedded calcareous silty shale is the most common lithology and is characterized by its penetrative cleavage, indistinct bedding, and thin interbeds of calcareous shale containing limestone lenses and nodules. The argillaceous limestone comprises beds up to three meters thick of medium grey fine-crystalline limestone separated by beds of calcareous shale. This cyclical alternation of limestone and shale results in a ribbed weathering pattern. The upper contact of the Kechika Group with the overlying Skoki Formation is gradational and conformable.

Skoki Formation

The Skoki Formation consists of three distinctively coloured units: a middle light grey dolomite is bounded by dark grey more massive dolomite units. The middle light grey dolomite unit contains a conspicuous dark-green weathering volcanic unit consisting of basaltic flows and pyroclastics.

The rest of the section consists of medium bedded sandy dolomite and dolomite. Oncolites and black chert nodules are abundant, and some beds contain crinoid ossicle debris. Mottled weathering bioturbated beds with well preserved burrows are common through the formation.

The Skoki Formation has a definite western limit beyond which it changes facies to black shales, cherts, and siltstones in the lower part of the Road River Group.

The upper contact is conformable, comprising a gradation from dolomite, silty dolomite and dolomitic siltstone to brown weathering parallel laminated siltstone of the Road River Group.

Road River Group

Five separate lithofacies are recognized within the Road River Group: an Upper Ordovician graptolitic shale and quartzite-dolomite succession, a Silurian carbonaceous limestone succession, a Silurian dolomite breccia unit, an Upper Silurian through Lower Devonian brown siltstone succession and a (mid)? Devonian dolomitic quartz sandstone succession.

Within the Aley property, the Road River Group is represented by the Ordovician graptolitic shale and quartzite-dolomite succession. This unit comprises three sub-units: A basal thin bedded sandy dolomite with chert lenses and nodules; a middle black fissile graptolitic shale; and an upper thick bedded sandy dolomite with maroon weathering argillaceous partings. A few kilometers to the west, the succession changes facies to a deeper water graptolitic shale and argillaceous limestone succession overlain by rusty weathering quartzite turbidites three to ten meters thick separated by two to five meters of black shale.

TABLE OF FORMATIONS

Stage	Unit Formation	Lithology	Thickness (m)
M. DEVONIAN	Dolomitic sandstone unit	Light grey dolomitic quartz sandstone.	0 - 360
L - DEVONIAN AND U - SILURIAN	Brown siltstone unit	Brown weathering calcareous siltstone; silty crinoidal limestone; dark grey argillaceous siltstone and shale.	1000
M - SILURIAN	Carbonaceous limestone unit	Dark grey, argillaceous limestone, calcareous silty shale.	200
L - SILURIAN	Breccia unit	Medium grey, chaotic breccia; angular, sub-rounded dolomite pebbles and cobbles in a dolomite cement; bedded, dark grey limestone with black chert nodules and lenses.	50 - 100
U. ORDOVICIAN	Graptolitic shale and quartzite unit	Black shale, calcareous shale, argillaceous limestone; rusty weathering quartzite turbidites	700
M. ORDOVICIAN	Skoki Formation	Light and dark-grey, fine crystalline dolomite; silty and sandy limestone; bioturbated beds; oncolite beds. Basaltic flows and pyroclastics.	140 - 1300
L. ORDOVICIAN AND U. CAMBRIAN		Phyllitic, calcareous and non-calcareous silty shale; argillaceous limestone; calcareous quartz siltstone and sandstone.	1500

VI. LOCAL GEOLOGY

The Paleozoic sediments occurring on the Aley property have been altered metasomatically by Late Devonian carbonate-rich hydrothermal fluids. The resulting alteration product is interpreted to be a carbonatite which is roughly circular in plan and measures approximately 3.5 Km across. Three map units comprising the carbonatite have been recognized on the property to date: A Dolomite Core; an Amphibolitic - Hornfelsed Margin; and an outer alteration halo of Carbonatized Sediments.

Dolomite Core (Unit A)

The dolomite core measures roughly 2.0 Km in diameter and forms approximately 60% of the exposed carbonatite. This unit consists mainly of dolomite (80 - 95%) and apatite (5 -15%) with minor variable mica, pyrite, magnetite, zircon and rutile. In outcrop the unit weathers buff-orange to red-brown, and is light grey to cream on fresh surface. It is fairly uniformly grained at 0.5 mm to 3 mm in size but occasionally grains are as coarse as 1 cm. Crudely developed banding is the result of small aggregates of the above mentioned accessory minerals.

Amphibolitic - Hornfelsed Margin (Unit B)

The Amphibolitic - Hornfelsed Margin is roughly ring-shaped in plan with an inside diameter of 2.0 Km and an outside diameter of 3.0 Km. This unit can be subdivided into two members: a massive member and a breccia member.

The massive member constitutes the majority of the unit and consists of a resistant dark green rock, originally quartzite and siliceous sediments, consisting largely of silica with lesser alkali amphibole (richterite) and minor alkali pyroxene (aegirine-augite).

The Breccia member is not as extensive as the massive member and is generally confined to the contact zones with the Dolomite Core. It, like the massive member is a resistant dark green rock but contains fragments of quartzite, finely laminated siliceous mudstone, and calcareous siltstone. Fragments are generally angular to sub-rounded giving the rock a conglomeratic appearance. Close to the Dolomite Core contact, the breccia unit is characterized by a high matrix to clast ratio. Here, the fragments are diverse in composition and range from < 1 cm to several meters across but are generally 5 cm to 50 cm across. Accessory minerals included pyrite, pyrrhotite, magnetite and chalcopyrite.

Carbonatized Sediments (Unit C)

The Carbonatized Sediments form the outer alteration halo of the main carbonatite mass and surrounds the Amphibolitic - Hornfelsed Margin. The inside diameter of the alteration halo is 3.0 Km and the outside diameter is 3.5 Km.

The Cambrio - Ordovician Kechika Group and the Ordovician Skoki Formation calcareous argillaceous sediments and dolomites comprise the majority of the lithologies included in the alteration halo. These sediments are characterized by a gradational colour change which reflects changes in whole rock chemistry from light grey in unaltered outcrops grading to cream, buff-yellow and then orange close to the Amphibolitic - Hornfelses contact. The resulting alteration is essentially a "dolomitization" of calcareous sediments which produces dolomitic lenses 1 cm to 50 m thick developed along bedding planes. Accessory minerals include purple fluorite, barite, and pyrite.

SEE
NEXT
PAGE

MORE GEOLOGY.

by: K.R. Pride
K.R. Pride, Project Geologist

by: A.B. Mawer
A.B. Mawer, Senior Geologist

by: G. Harden
G. Harden, Manager
Exploration
Western District

KRP/cgs

Rare Earth Dykes

Rare earth element enriched dykes or swarms occur throughout the complex but are most commonly developed in the ^{outer} alteration

halo. The dykes weather a dark reddish brown colour, are generally intruded parallel to bedding and average 0.5-1.5 m in thickness. The primary component of these dykes is dolomite. Accessory minerals include purple fluorite, pyrite, barite, bastnaesite $[(Ce, La)CO_3F]$ and other rare earth carbonate minerals (K. Pride, U. Mader pers comm).

Preliminary Geochemistry

Preliminary results of geochemical analyses are presented in Table 1 and Figure 1. Only four samples have been analysed to date; 3 lanthanide enriched dykes and one sample from the amphibolitic margin. All have high rare earth concentrations typical of carbonatites. The three samples of dyke rocks have a much greater light/heavy lanthanide enrichment ratio than does the sample from the amphibolitic margin.

Table 1 Preliminary Geochemistry

	1	2	3	4
Si %	< 1.0	< 1.0	< 1.0	8.0
Al %	< 0.5	< 0.5	< 0.5	3.0
Mg %	> 5	> 5	> 5	3.0
Ca %	> 10	> 10	> 10	> 10
Na %	< 0.3	< 0.3	0.3	1.5
K %	< 0.3	< 0.3	< 0.3	0.6
Mn %	0.7	1.0	2.0	1.0
Fe %	4.0	6.0	6.5	2.5
Ti %	tr	tr	tr	0.15
Sr ppm	1,000	800	5,000	3000
Ba ppm	300	900	10,000	1500
Nb ppm	500	100	—	800
Ce ppm	12,100	12,500	4,000	2070
Th ppm	151.0	105.0	61.5	108.0

Table 1. Analyses 1-3, from REE dykes (3 contains fluorite);

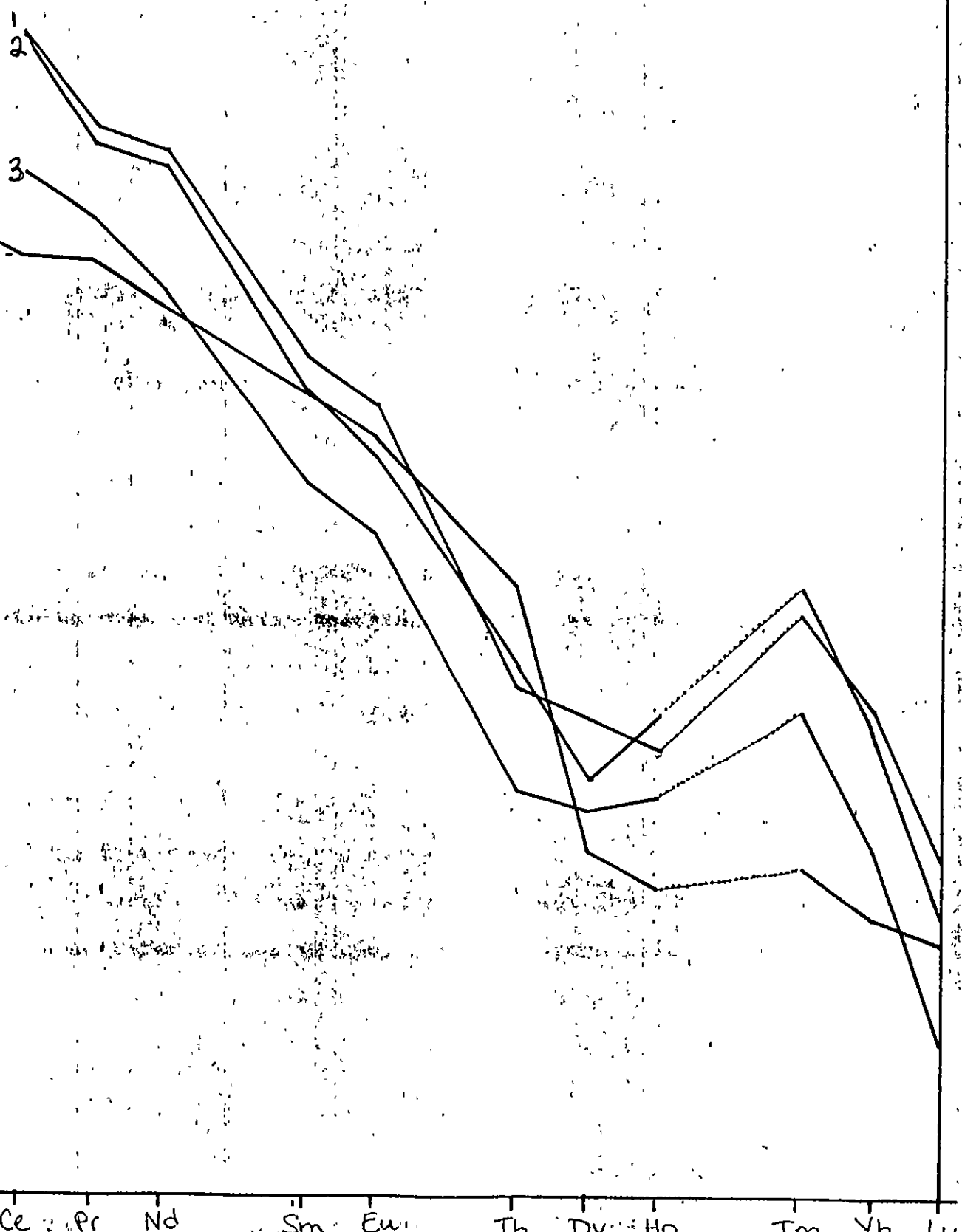
4 - Locally developed basic phase of the amphibolitic margin. The analyses for Si to Nb are semi-quantitative emission spec., performed in house. Ce and Th were analysed using induced neutron activation by Bondar-Clegg. See also Fig 1.

Caption

Figure 1: Chondrite normalized REE plot
see Table 1 for sample descriptions.

Sample/Chondrite

10^4
 10^3
 10^2
10
1



APPENDIX "A"

IN THE MATTER OF A GEOLOGICAL SURVEY CARRIED OUT ON THE MINERAL CLAIMS OF THE ALEY PROPERTY LOCATED IN THE OMINECA MINING DIVISION, BRITISH COLUMBIA, MORE PARTICULARLY N.T.S. 94 B/5.

A F F I D A V I T

I, K.R. PRIDE OF THE VILLAGE OF LIONS BAY, IN THE PROVINCE OF BRITISH COLUMBIA, HEREBY DECLARE:-

- (1) THAT I am employed as a geologist by Cominco Ltd., and, as such, have a personal knowledge of the facts to which I hereinafter depose;
- (2) THAT annexed hereto and marked as APPENDIX "B" to this report is a true copy of expenditures incurred in connection with a geological survey on the ALEY PROPERTY;
- (3) THAT the said expenditures were incurred between the 5th day of July and the 31st day of August, 1983 for the purpose of conducting a geological survey on the ALEY PROPERTY.

Signed: K.R. Pride
K.R. Pride
Project Geologist

APPENDIX "B"

ALEY PROPERTY - ASSESSMENT REPORT

STATEMENT OF EXPENDITURES

(July 5th to August 31st, 1983)

SALARIES

F. DuBois	50 days @ \$132/day	\$ 6,600.00
P. LeCouteur	50 days @ \$175/day	8,750.00
K. Pride	50 days @ \$175/day	8,750.00

GEOLOGICAL AND CAMP EQUIPMENT

5,500.00

DOMICILE

150 man days @ \$59.27/man day 5,500.00

SURVEYING

Ground control - orthophoto map 8,964.00

TRANSPORTATION

Fixed wing		4,319.00
Helicopter	35 hr. @ \$475/hr.	16,625.00
4X4 truck rental		<u>2,665.00</u>

TOTAL COST \$71,063.00

APPENDIX "C"

STATEMENT OF QUALIFICATIONS

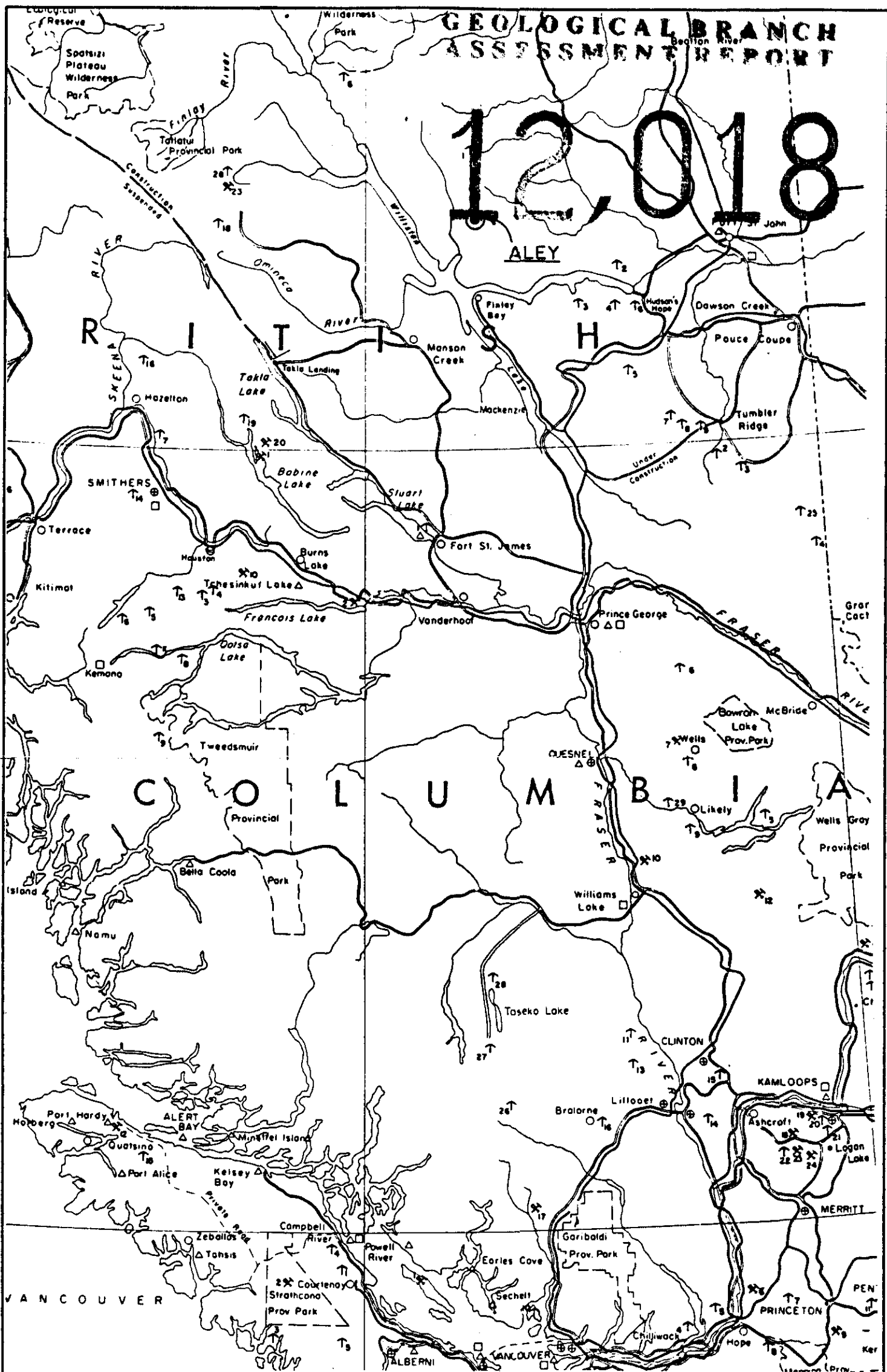
I, K.R. PRIDE, GEOLOGIST, WITH BUSINESS ADDRESS AT 700-409 GRANVILLE STREET, VANCOUVER, BRITISH COLUMBIA AND RESIDENTIAL ADDRESS AT 160 SUNSET DRIVE, LIONS BAY, BRITISH COLUMBIA, HEREBY CERTIFY:-

- (1) THAT I am a graduate in Geological Sciences with a B.Sc. (Hons.) in 1973 from the University of British Columbia.
- (2) THAT from 1973 to the present I have been employed by Cominco Ltd. as a geologist and have been actively engaged in mineral exploration in British Columbia, Yukon and Northwest Territories.
- (3) THAT I personally participated in the field work on the ALEY PROPERTY and have interpreted all the data resulting from this work.

Signed: K.R. Pride
K.R. Pride
Project Geologist

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ASSESSMENT REPORT

12,018



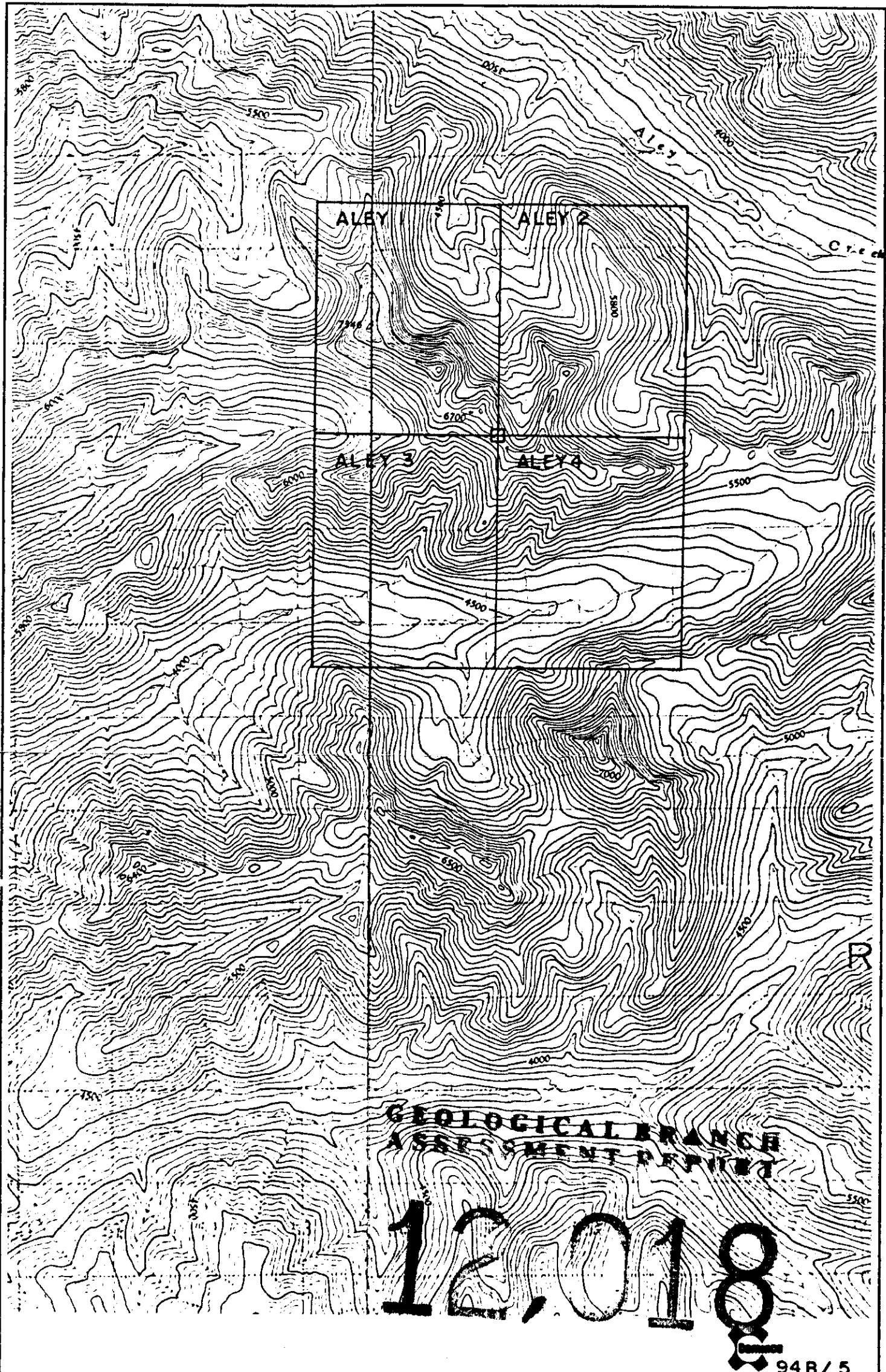
Drawn by: K.R.P.		Traced by:	
Revised by	Date	Revised by	Date

LOCATION MAP

Scale: 1: 315,000

Date: Sept. 1983

Plate: 1



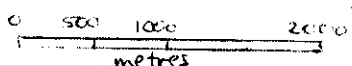
**GEOLOGICAL BRANCH
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Drawn by: K.R.P.		Traced by:	
Revised by	Date	Revised by	Date

CLAIM MAP

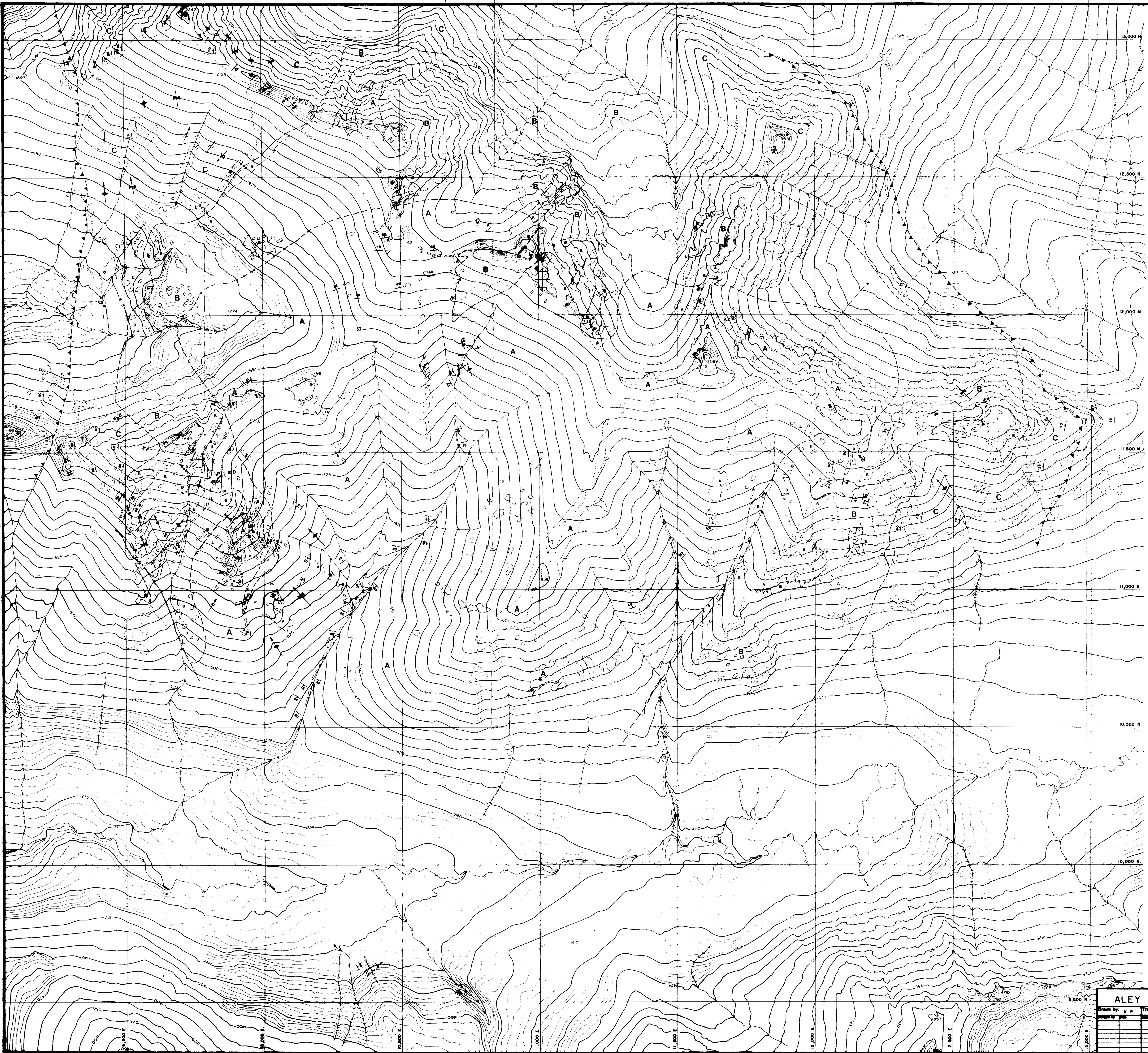
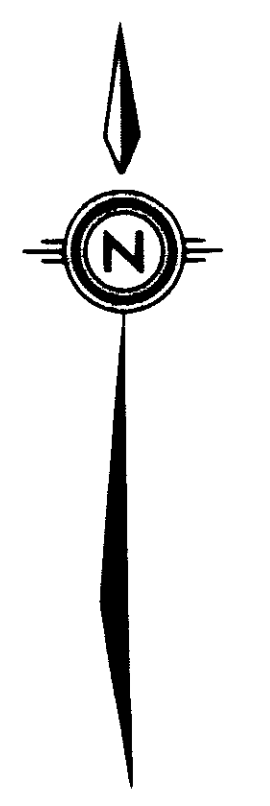


Scale: 1 : 50,000

Date: Sept, 1983

Plate: 2





- A** **SEDIMENTARY ROCKS**
 Reddish-brown to reddish weathering, light gray to yellow, indurated. Secondary minerals include quartz, kaolinite, pyrite and barite. Includes: (1) Heavy-bedded sandstone and shale; (2) Sandstone developed as a result of slight approximation of the adjacent strata.
- B** **SEDIMENTARY ROCKS**
 Massive, brown to reddish-brown weathering, dark gray to black, indurated. Includes: (1) Sandstone and shale; (2) Shale. Includes: (1) Heavy-bedded sandstone and shale; (2) Sandstone developed as a result of slight approximation of the adjacent strata.
- C** **SEDIMENTARY ROCKS**
 Very, green, buff, yellow and orange weathering, when the fresh surface is exposed. Includes: (1) Sandstone and shale; (2) Shale. Includes: (1) Heavy-bedded sandstone and shale; (2) Sandstone developed as a result of slight approximation of the adjacent strata.

- SYMBOLS**
- Fault
 - Geological contact
 - Bedding feature of hanging wall
 - Fault axis, direction and amount of plunge
 - Strike-slip fault, direction and amount of plunge
 - Normal fault, direction and amount of plunge
 - Thrust fault, direction and amount of plunge
 - Legal Corner Post
 - 1st class
 - 2nd class
 - 3rd class

**GEOLOGICAL BRANCH
ASSESSMENT REPORT**

12,018

ALEY PROPERTY			94 8/10
Drawn by: K. P.	Traced by: S. B.		
Checked by: J. B.	Checked by: J. B.		
GEOLOGY			
OMNECA M.D., B.C.			
Scale: 1" = 8,000'	Date: Sept. 9, 1983	Page: 3	