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REPORT
on the
TANGO, TAG & CAVE CLAIMS
KANGAROO MOUNTAIN AREA
CARIBOO MINING DIVISION
MAP SHEET M93A/12E HYDRAULIC

for
NCN EXPLORATION & DEVELOPMENT CORP.

BY:
Coastal Mountain Engineering Ltd.
3626 West 1st Avenue
Vancouver, B.C.
V6R 1H2
D.J. Copeland, P.Eng.
November 29, 1983

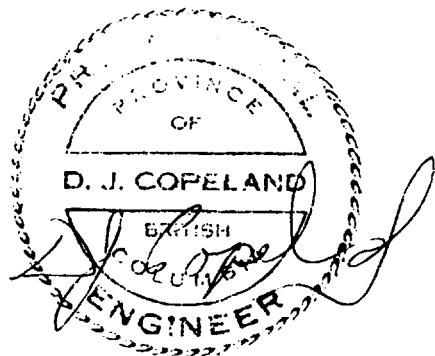


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I. SUMMARY AND CONCLUSIONS

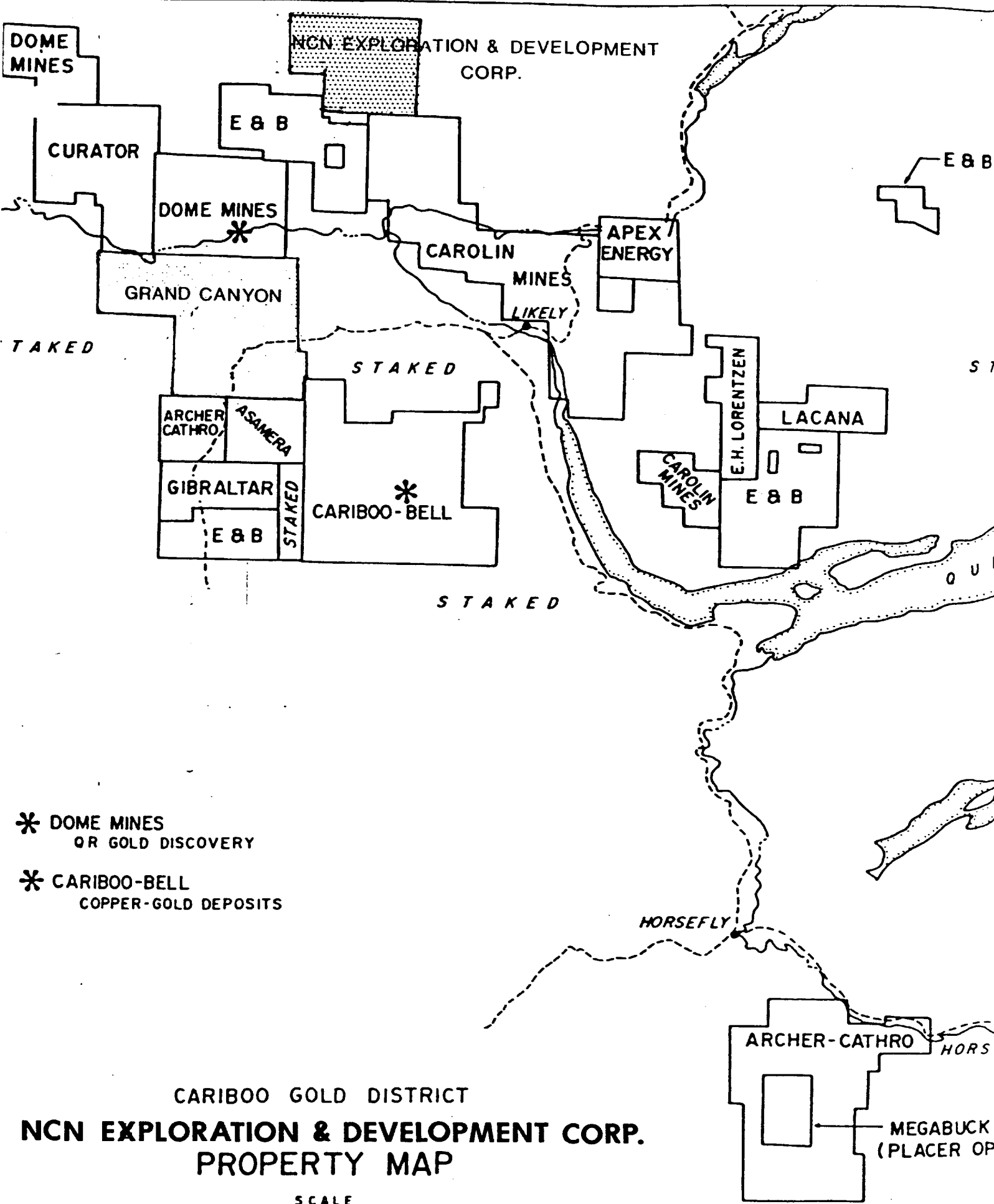
The Kangaroo Group of mineral claims is located geologically in the Quesnel Trough and north-east of the Cariboo-Bell and Quesnel River mineral deposits where proven reserves of copper-gold mineralization are presently being evaluated.

The claims appear to cover polymictic volcanic breccia, basalts, tuffs and some type of intrusive, but little detailed geology has been completed to confirm the lithology.

The claims geology certainly seems to fit the exploration model of being part of a volcanic pile associated with plutonism.

To this end a two phase exploration program of geochemistry, geophysics, detailed geology and trenching are recommended at an estimated cost of \$90,000.00

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NCN EXPLORATION & DEVELOPMENT CORP.

DOMINE MINES

E & B

CURATOR

DOMINE MINES *

CAROLIN

APEX ENERGY

GRAND CANYON

MINES LIKELY

TAKED

STAKED

ARCHER CATHRO

ASAMERA

E.H. LORENTZEN

LACANA

GIBRALTAR

CARIBOO-BELL *

CAROLIN MINES

E & B

E & B

STAKED

STAKED

* DOMINE MINES
OR GOLD DISCOVERY

* CARIBOO-BELL
COPPER-GOLD DEPOSITS

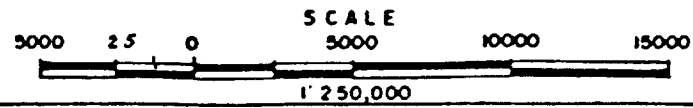
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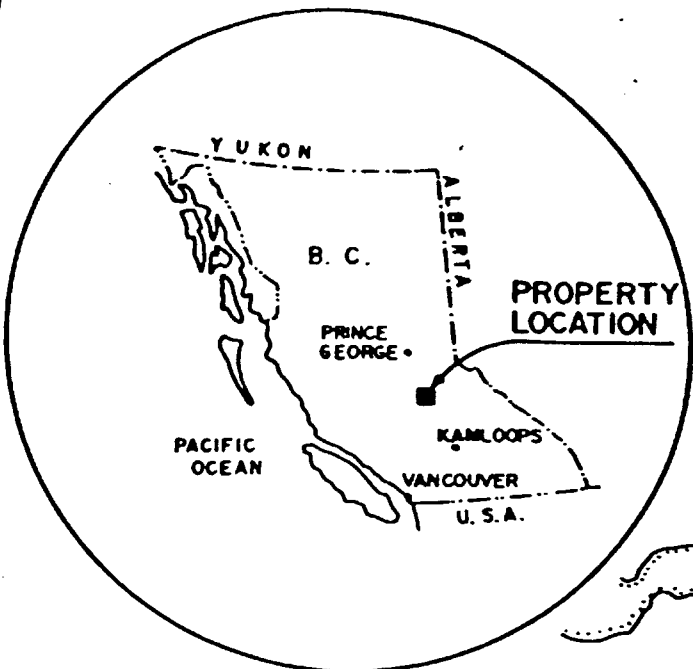
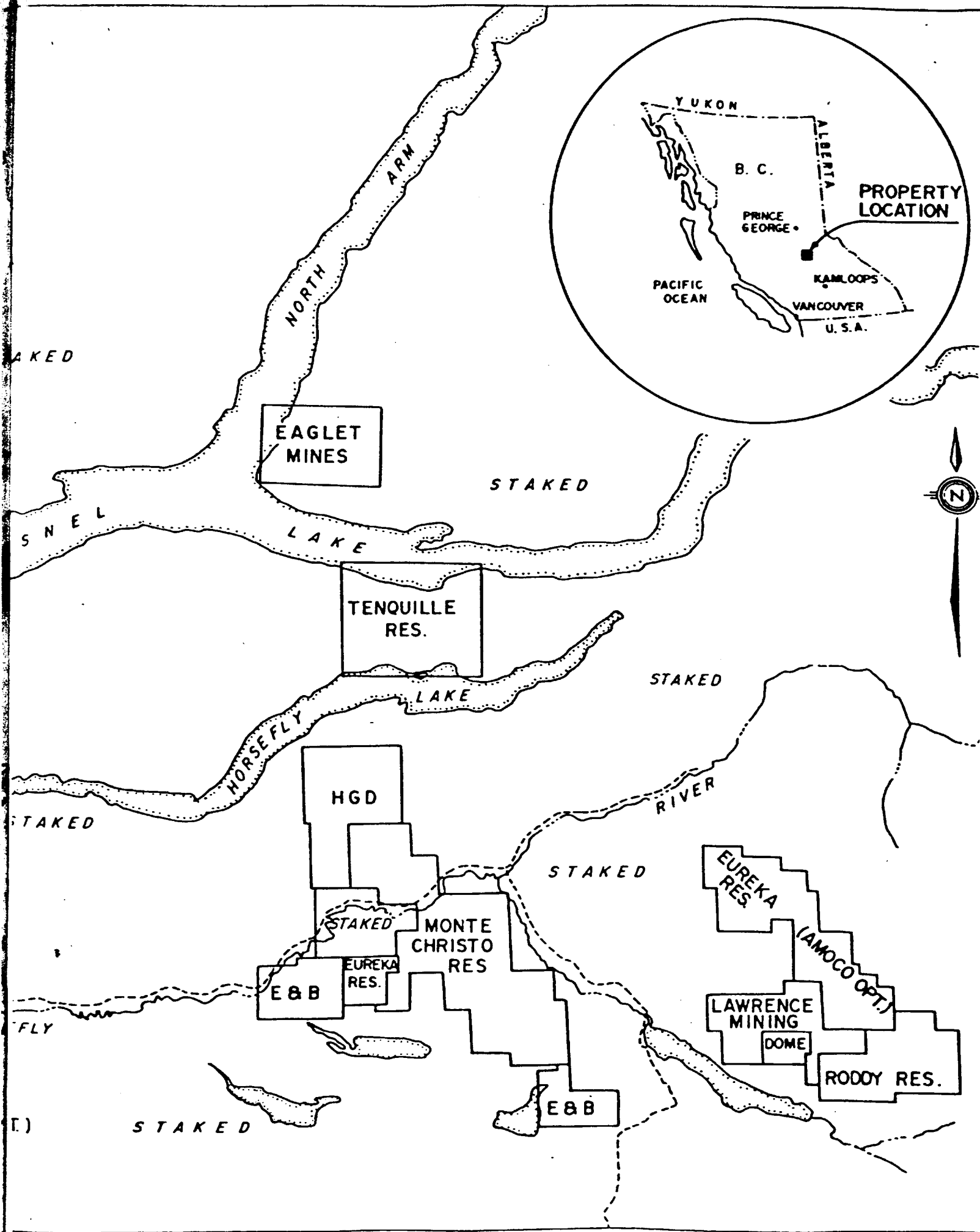
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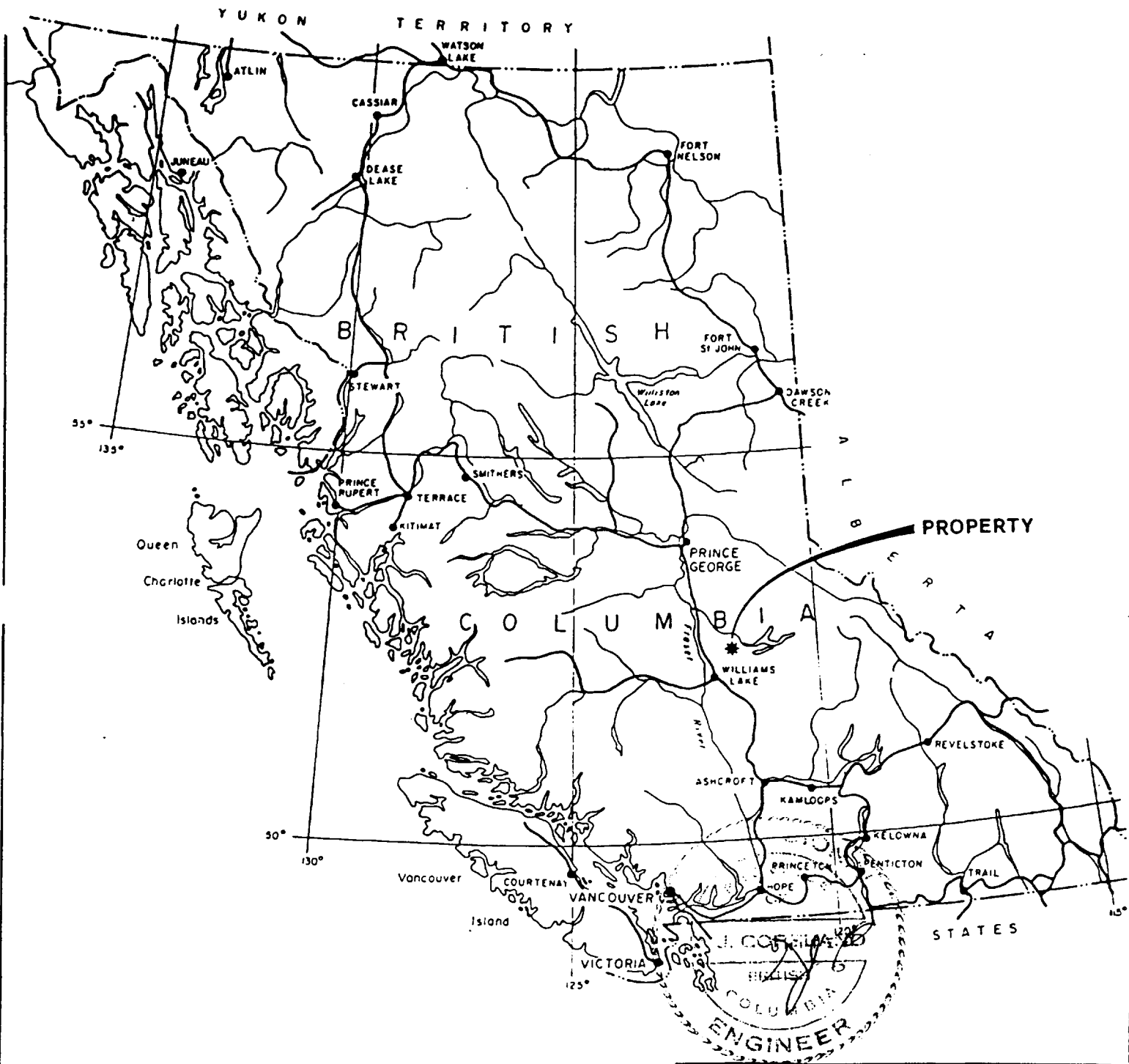
MEGABUCK
(PLACER OP)

CARIBOO GOLD DISTRICT

**NCN EXPLORATION & DEVELOPMENT CORP.
PROPERTY MAP**



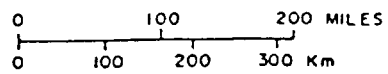




**NCN EXPLORATION & DEVELOPMENT
CORP.**

PROPERTY LOCATION MAP

CARIBOO MINING DIVISION
BRITISH COLUMBIA



Drawn	J. Yu	Checked	J. Yu	Plan No.
Scale	As shown	Date	1983-11-10	1

II. INTRODUCTION

The Tango, Tag, and Cave claims consisting of 95 units are located in the upper reaches of Kangaroo Creek on the flanks of Kangaroo Mountain and are owned by NCN Exploration & Development Corp.

Attention to this area was initiated by work on the Cariboo-Bell mineral occurrence and more recently by new discoveries at Maud Creek, Quesnel River and Eureka.

A property visit was made to the claims by the author on October 25 and 26, 1983.

This report reviews the property geology, the ore deposition model, and makes recommendations for additional work.

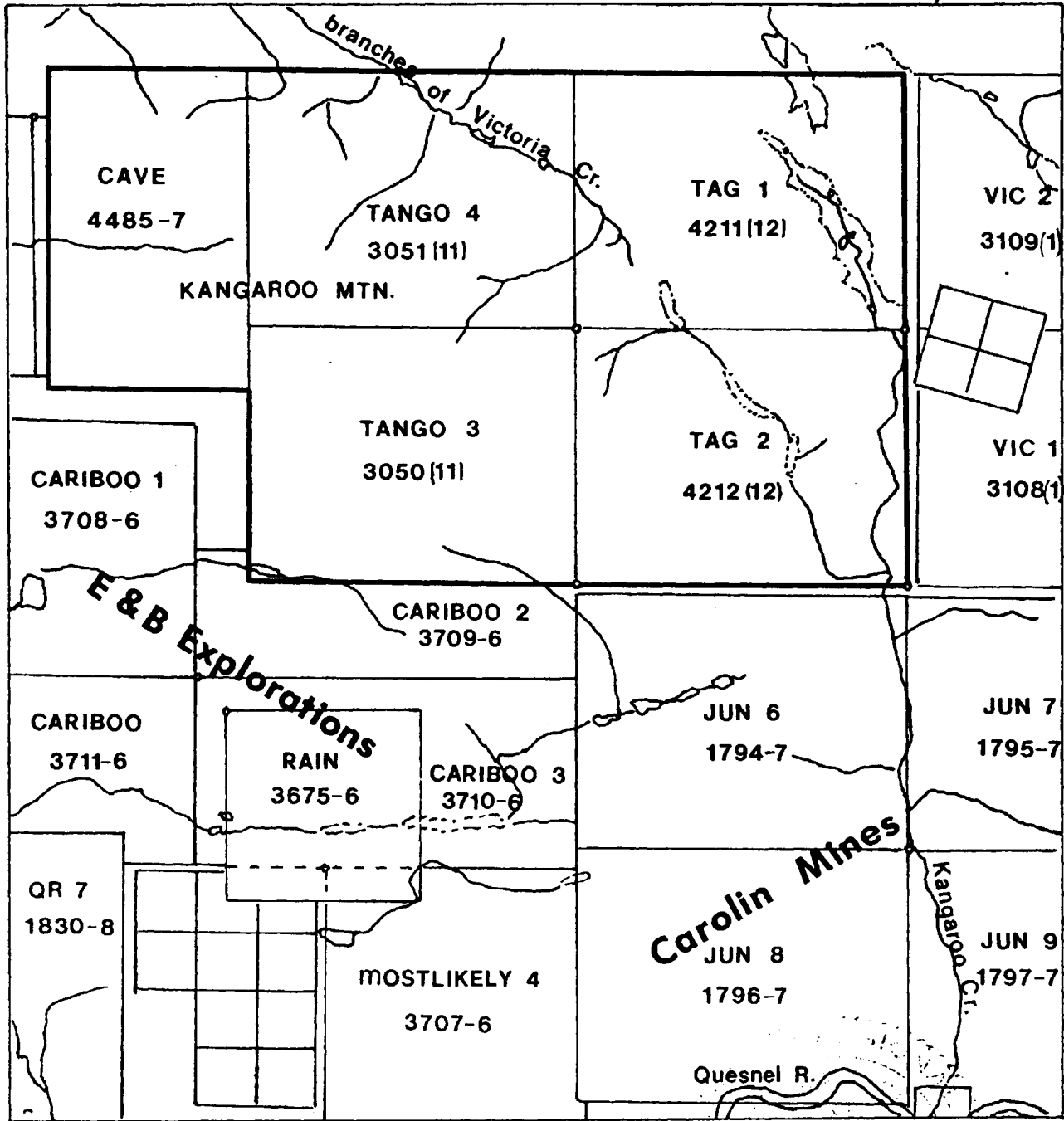
III. LOCATION AND ACCESS

The Tango, Tag and Cave claims are located at Kangaroo Mountain in the southern tip of the Cottonwood Provincial Forest. The geographic coordinates at the centre of the claims are:

52° 43' 30" N latitude by 121° 42' 30" W longitude.

Access is from Williams Lake, the central supply centre with air, rail and highway links to Vancouver and Edmonton, via Highway 97 to Likely. From Likely, a gravel road proceeds to Poquette Lake and then crosses the Cariboo River where one turns north onto a logging road along Spinks Creek to Wolverine Lake and then northwest to the headwaters of Kangaroo Creek. The road proceeds down Kangaroo Creek to the camp at the south bend of Kangaroo Creek.

The claims are located in an area of intense exploration being conducted by well seasoned companies such as Asamera, E. & B. Explorations, Noranda, Gibraltar, Carolin Mines Ltd. and Archer-Cathro.



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CARIBOO LAND DISTRICT, B.C.

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The claims are covered by Hemlock, Spruce and Fir which has little undergrowth in the higher elevations at 1144 m and heavy undergrowth is encountered in creek drainages and lower elevations. Portions of the area have been logged.

IV. PHYSICAL FEATURES

The claims cover moderately gentle, partially logged terrain with elevations ranging from 1007 m to 1434 m on Kangaroo Mountain. The major creeks do incise, creating steep sided gulleys.

Heavy snowfalls in winter and frequent summer rains are typical of the precipitation of the area.

V. CLAIMS

NCN Exploration and Development Corp. has purchased all the interest in the Tango No. 3, No. 4, Tag No. 1, Tag No. 2 and Cave claims. These claims are contiguous to the E. & B. Explorations' ground to the west and south, and to Carolin Mines' claims to the south.

The location posts were inspected in the field and are in order, the transfers of ownership were not examined at the Ministry of Mines.

Assessment work has been completed on the property in the form of a grid baseline along the east boundary of Tag #2 and north boundary of Tag #2 and Tango #3.

The recorded cost of this work is some \$8,206.00.

The claims have the following record numbers.

Tango 3	3050	20 units
Tango 4	3051	20 units
Tag 1	4211	20 units

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Tag 2	4212	20 units
Cave	4485	15 units

VI. GENERAL GEOLOGY

The Quesnel Lake area in south central British Columbia forms part of the Quesnel Trough, a Mesozoic tectonic feature occurring between the Omineca Crystalline Belt to the east and the oceanic-deposited rocks of the Cache Creek Group to the west. The Quesnel Trough forms the western margin of the southern part of the Columbian Orogen.

The Quesnel Lake area is underlain by about 7,000 metres of Upper Triassic - Lower Jurassic volcanic and sedimentary rocks which have been intruded by comagmatic felsic plutons. The volcanic and sedimentary rocks comprise an Upper Triassic basalt sequence of green and grey alkali olivine basalt and alkali basalt which are analcite-bearing towards the top, and which grade up into maroon basalts of the same composition as the underlying rocks. Overlying the basaltic sequence is a sequence of felsic breccias derived by phreatic eruption and submarine laharc activity.

Intruding the volcanic and sedimentary sequences are small syenite and monzonite stocks whose associated volcanics and intrusive margins are hosts to copper-gold deposits. Felsic volcanism, plutonism and ore deposition were essentially coeval events during the Lower Jurassic period.

Overlying the Upper Triassic - Lower Jurassic rocks, are shallow water sedimentary rocks of mainly mid-Jurassic age. The provenance of these rocks was the Paleozoic Cache Creek Group to the west of the Quesnel Trough.

The chemical compositions of the rocks of the Quesnel Lake area are characteristic of alkalic volcanic suites such as those of Hawaii and the Lesser Antilles. Although similar to basalts forming at accreting plate margins, and in the intraplate environment, work by various researchers suggests these basalts are more typical of those formed at consuming plate margins.

The copper-gold deposits seem to be associated with two stages of development, the high level propylitic basalts and the deeper seated margins of the alkalic stocks.

VII. ECONOMIC GEOLOGY

The region surrounding the property has had little consistent exploration until recently, although placer gold exploration and production has been conducted since the 1880's.

The only activity prior to 1964 is a Ministry of Mines report for 1933 that mentions the P. Shaw property, located some five kilometers southeast of Kangaroo Mountain. Several quartz veins in andesitic rocks were found and contained values in gold and silver.

In the early forties a series of deposits consisting of gold bearing quartz veins were developed. These include the likes of Cariboo Gold Quartz and Mosquito Creek. These are veins and bedded pyritic deposits in faults and fractures in the Paleozoic Cariboo series consisting of black argillites, quartzites, and schists.

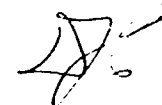
These rocks and deposits are all part of the Omineca Crystalline Belt which lies just east of the Quesnel Trough.

During the early 1960's a distinctly different type of ore deposit was found in the form of the Cariboo-Bell and several similar deposits have been found since then.

(a) Cariboo-Bell

This deposit, currently being developed by E. & B. Explorations is located on the west slope of Polley Mountain beside Polley Lake, some 56 km. northeast of Williams Lake.

This deposit occurs in an alkalic intrusive complex in the Quesnel Trough, a 35 km. wide northwesterly trending volcanic-sedimentary sequence of Early Mesozoic age.



The alkalic complex is centrally located in the trough at Bootjack Lake. Rocks of upper Triassic age consist of volcanoclastics, flows and aquagene tuffs, which are represented by green augite trachy-basalt flows, feldspathic crystal and lapilli tuff and polymictic volcanic breccias.

These are all suggestive of a developing volcanic centre in a marine environment.

The intrusive complex is a multiple laccolith about six km. long by two - three km. wide consisting of several lithological phases. The phases consist of syenodiorite, monzonite porphyry, intrusion breccia and pyroxenite-gabbro.

The most important rock type is the crackle breccia, as the copper-gold mineralization is found in this unit in fractures, networks of veinlets, pods and drusy cavities.

The gold occurs in the chalcopyrite as inclusions and also as free particles.

The grade of mineralization is directly proportional to the intensity of brecciation and to date, proven reserves are given as 100 million tons grading .39 oz/ton combined gold and copper.

(b) Quesnel River

This deposit is being developed by Dome Mines and is situated on the Quesnel River some 10 km. northwest of Likely, some 60 km. northeast of Williams Lake.

This deposit is also found in the main volcanic belt of the Quesnel trough and has an associated stock.

The volcanics, although not as clearly understood, are an assemblage of basaltic tuffs, lapilli tuffs, and trachybasalts. The volcanics near the stock are extensively propylitized and contain pyrite varying from 2% to 15%. The propylitized volcanics also carry gold mineralization.

In areas where the basalts are breccias, i.e., basalt fragments surrounded by tuff, the epidote ground mass can run 4 or 5 grams of gold.

The intrusive complex here is considered to be a stock as opposed to a laccolith as at Cariboo-Bell. This intrusive shows zoning, the interior being monzo-diorite and the outer edge becoming a hornblende porphyry diorite. The hornblende prophyry contains extensive pyrite and chalcopyrite which both in turn have associated gold. to date, the first phase of drilling has indicated approximately one million tons of ore grading .20 oz/ton of gold.

(c) Eureka

This prospect located 110 km. east northeast of Williams Lake near Horsefly is being drilled by Amoco Canada Petroleum.

Work to date has indicated that gold values are being found in another series of polymictic volcanics.

VIII. EXPLORATION MODEL

One of the characteristic features of the Quesnel Trough alkalic porphyry systems is that they occur in volcanic piles which were mainly formed in a submarine environment. Volcanism, plutonism and ore deposition were essentially synchronous, and therefore, the ore deposits formed while the volcano was still mostly submarine. In this respect, the environment of volcanism and plutonism was similar to that of Kuroko-type ore-forming environments. The important difference between the environments of formation of the two types of deposits seems to be that in the Quesnel Trough alkalic porphyry deposits, metal-rich solutions did not ascend through the volcanic pile to as far as the sea water-rock interface.

It is suggested then, that phreatic explosive activity occurred periodically in a sea water hydrothermal system associated with an alkalic felsic intrusion in a submarine volcanic pile. As a consequence, rocks formed by the reaction of sea water with the volcanic rocks, were incorporated as fragments, along with fragments of

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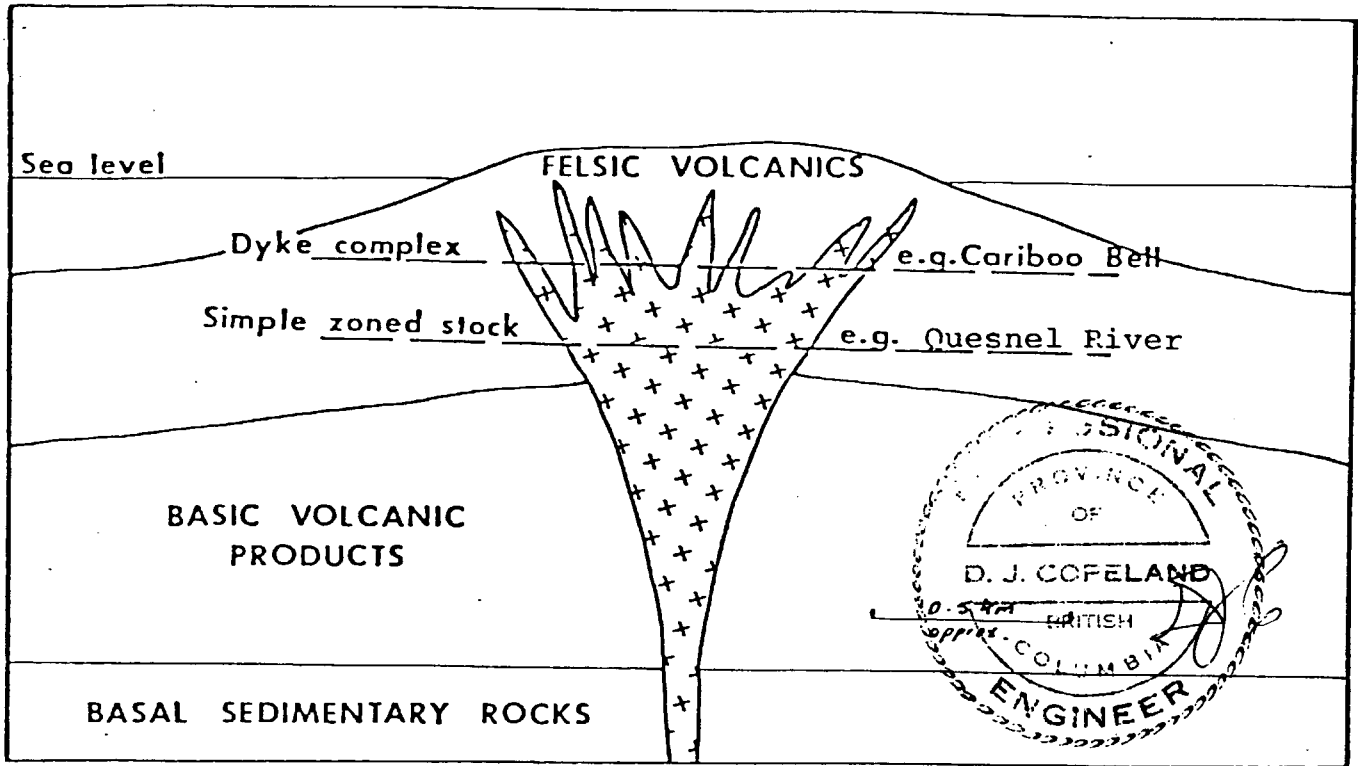


Fig. shows possible environments within the volcanic pile for ore deposition.

unaltered rocks, in the debris thrown out around the volcanic vents. Subsequently, or perhaps at the same time, this material slumped downslope, mixing with the debris from previous explosive eruptions, flows, and the normal erosion products of the edifice, to form the laterally extensive aprons of laharic deposits around the volcanic centre.

Solutions were then circulating through the rock at the same time as ore was being deposited, as indicated by the spatial relationships of ore and alteration zones, it can be concluded that the ore deposits were forming at the same time as volcanic activity in the region. Furthermore, fragments of syenite and monzonite, similar to rocks comprising the Polley Stock, occur in the breccias. Therefore, the emplacement of the stock must also have been occurring at this time. As well, ore occurs in the stock and is central to the zoned alteration pattern, and therefore the Polley Stock is the probable source of metals and heat in the ore-forming hydrothermal system.

In summary then, the evidence indicates that magmatism, ore formation, wall rock alteration, breccia formation, and slumping of breccias to form laharic flow deposits, were essentially synchronous and causally related processes. In other words, there appears not to have been any significant pause between the three events - volcanism, emplacement of the stock and ore deposition.

IX. PROPERTY GEOLOGY

At this time, the geology and mineralogy of the Kangaroo Group of claims has not been well defined, but their location in the Quesnel Trough, and the presence of polymictic volcanics suggests that the claims warrant further investigation. Also, the claims have the same regional geology as the Cariboo-Bell deposit, 20 kilometers south and as the Quesnel River deposit of Dome Mines which is only 8 kilometers to the west.

Two traverses were carried out over the property, one along the east-west base line between Tag 1, Tango 4 and Tag 2, Tango 3, and the other traverse was along Kangaroo Creek.



The traverse along the base line encountered a predominance of volcanics and one area of intrusive material.

The volcanics have a light grey ground-mass, contain an abundance of potassium feldspar, augite, and numerous rock fragments. At two locations, fractures continued upwards of 8% pyrite. Other outcrops were heavily oxidized with hematite and limonite. These volcanics can be considered part of the Triassic basaltic tuffs and breccias.

Two large blocks of float and one small outcrop were found that are monzonitic in composition.

The transverse along Kangaroo Creek encountered a series of argillites, green tuffs and altered basalts. These assemblages certainly could be part of a rising marine volcanic vent or indicate an area on a volcanic flank.

X. RECOMMENDATIONS

The geology of the claims show that they lie within the Quesnel Trough and that they are underlain by altered polymictic volcanics and contain some fragments of a stock or laccolith.

Based on this data, the claims fit the exploration model and detailed surveys consisting of geochemistry, geophysics and geology are recommended for the Kangaroo Group.

An additional phase II program is warranted contingent upon the success of the phase I program.

The phase I program should have the geochemistry survey done on a grid of 100 metres by 100 metres and the initial magnetometer work can be run on the same grid, but with readings taken at 50 meter intervals.

The geologic mapping should be tied to the established grid and this work must precisely locate and determine the different geological rock types.

XI. COST ESTIMATE

Phase I

Geologist - 1 month	\$	4,000
Geochemist - sampler - 1½ month		4,000
Room & board - 80 man days @ \$40/day		3,200
Geochemistry & assaying		4,000
Truck, fuel and transportation		5,000
Field equipment and supplies		1,000
Magnetometer survey		5,000
Consulting - 4 days		1,600
Contingencies @ 10%		2,780
TOTAL	\$	<u>30,580</u>

Phase II

Geologist - 2 months	\$	8,000
Geochemist - sampler - 2 months		6,000
Geophysicist - EM-16 survey - 1 month		3,000
Room & board - 150 man days @ \$40/day		6,000
Geochemistry & assaying		6,000
Truck, fuel and transportation		6,000
Cat trail construction		5,000
Trenching - cat & hoe rental		5,000
Field equipment		1,000
Consulting & reporting		2,400
Contingencies @ 10%		4,840
TOTAL	\$	<u>53,240</u>

Total Phase I	\$	30,580
Total Phase II	\$	<u>53,240</u>
TOTAL PROGRAM	\$	<u>83,820</u>

BIBLIOGRAPHY

- Campbell, R.P. (1961) Quesnel Lake Sheet (West Half), G.S.C. Map 3-1961.
- Various B.C. Minister of Mines and Petroleum Resources Reports; 1926 - 1978.
- Lang, A.H. (1948) Regional Structure of Barkerville District in C.I.M. Jubilee Volume "Structural Geology of Canadian Ore Deposits", pages 141 - 149.
- Sutherland Brown, A. (1957) Geology of the Antler Creek Area, Cariboo District, British Columbia, B.C. Ministry of Energy, Mines & Petroleum Resources, Bull. 38.
- Sutherland Brown, A. (1963) Geology of the Cariboo River, British Columbia, B.C. Ministry of Energy, Mines and Petroleum Resources, Bull. 47.

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