

4147

DOLNAGE CAMPBELL & ASSOCIATES LTD.  
CONSULTING GEOLOGICAL & MINING ENGINEERS  
100 GUINNESS TOWER  
VANCOUVER 1, B.C.

Geochemical Report

on the

CL PROPERTY

being Mineral Claims

CL 1-32, 34766 partment of

Mines and Petroleum Resources

ASSESSMENT REPORT

NO. 4147

Claim Sheet No.

94B/13W(M) ✓

Robb Lake Area

Liard Mining Division, B. C.

56°57N; 123°49W

Owner of Claims

Buckhorn Mines Ltd. (N.P.L.)

Report by:

R. S. Adamson, P.Eng.

C. R. Saunders, P.Eng.

Work completed between September 11 and September 29, 1972

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VANCOUVER 1, B.C.

SUMMARY

The CL Claims of Buckhorn Mines Ltd. (N.P.L.), consisting of 65 contiguous mineral claims, is located in the Robb Lake district of north-eastern B. C. approximately 135 miles northwest of Fort St. John. Current access to the property can be best accomplished by helicopter. The topography on the property comprises a relatively wide, flat northwest-trending valley surrounded by towering mountains.

The geological setting consists of sedimentary rocks of lower to middle Paleozoic age. A regional west-dipping thrust fault, manifested by the valley, traverses the property. The presence of Mid-Devonian dolomitic formations, the host unit for economically-important zinc mineralization on the adjoining Barrier Reef claims has not been established. Dolomite of unknown age occurs at the valley floor, the potential prospective area of interest on the property.

A geochemical survey was carried out over the valley floor on the property. A total of 329 samples was collected, assayed for zinc content, and analyzed statistically. Anomalous values were determined to be in excess of 70 ppm.

Zinc values in the soils were only weakly anomalous and were distributed erratically. It is concluded that the chances of zinc mineralization existing at the sub-outcrop on the valley floor are remote. The writer therefore recommends that the claims be retained in good standing for one year, but that no further work be done unless positive economic developments are demonstrated on the adjoining Barrier Reef property.

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CONSULTING GEOLOGICAL & MINING ENGINEERS

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INTRODUCTION

On behalf of Buckhorn Mines Ltd. (N.P.L.), the owners of the CL property, a geochemical soil survey was executed under the supervision of R. S. Adamson, P.Eng., of Dolmage Campbell & Associates Ltd., on parts or all of 31 of the 65 claims of the property. At the same time property geological mapping was attempted but was thwarted by moderate to heavy snow-falls.

The claims were staked to cover a possible down-dip extension of the Middle Devonian carbonate sequence which lies to the east and in which (lead-) zinc mineralization has been located.

LOCATION AND ACCESS: (Figures 1 and 2)

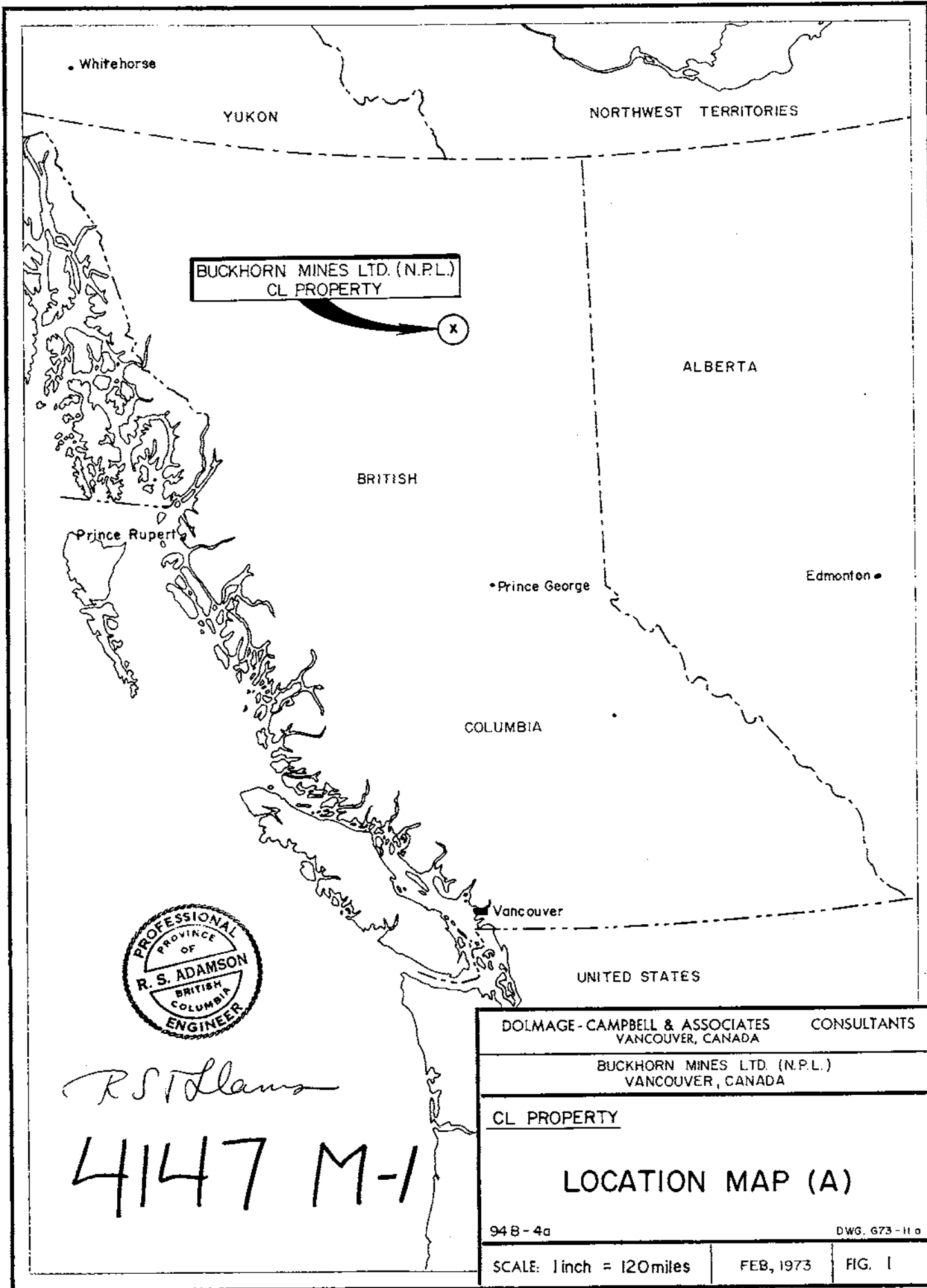
The CL property is located in the Liard Mining Division approximately 135 miles northwest of Fort St. John, B. C. and 60 miles west of the Alaska Highway. Although dirt tote roads and bulldozer trails approach to within a few miles east of the property, the only means of reasonable access is via helicopter from Fort St. John, MacKenzie, B. C., or a base camp on a nearby lake large enough to land float-equipped aircraft. The present work was conducted from a base camp some 5 miles to the south on Robb Lake.

TOPOGRAPHY:

The CL property is situated within the middle ranges of the Rocky Mountains in an area where elevations range from less than 4000 feet to over 8000 feet. The claims encompass a high (4400-5000 ft.) moderately flat valley surrounded to the east and south by very steep, rugged mountains which reach elevations of 8200 feet. Sampling was conducted only in the valley area. Forest cover is moderate to thick in the valley and consists of spruce, pine and alpine fir. Precipitation is moderate, occurring as winter snows and spring and early summer rains.

PROPERTY: (Figure 3)

The CL property of Buckhorn Mines Ltd. (N.P.L.), consists of 65 recorded mineral claims as listed below. They comprise an area of about 3200 acres.



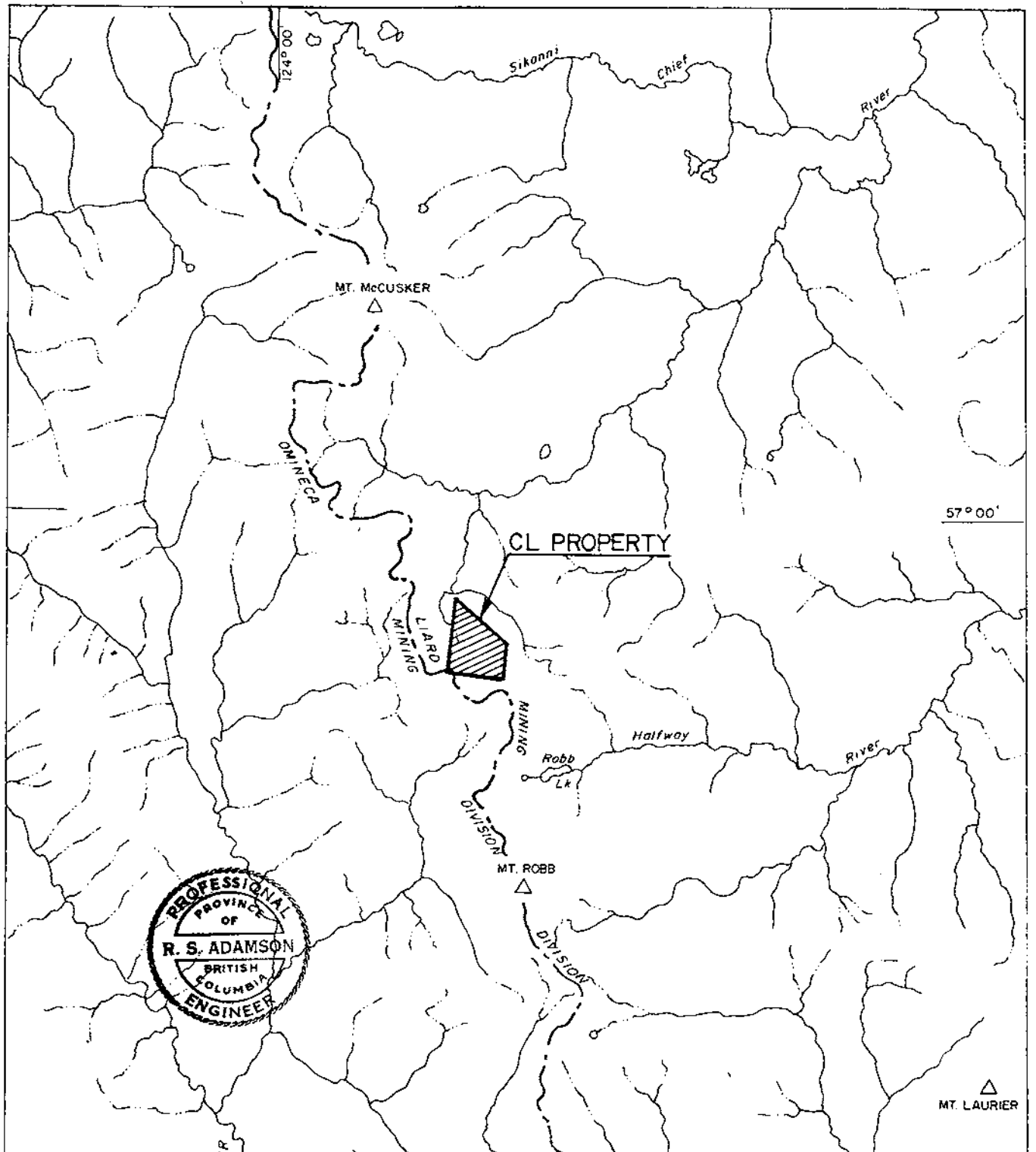
BUCKHORN MINES LTD. (N.P.L.)  
CL PROPERTY



*R S Adams*

4147 M-1

DOLMAGE-CAMPBELL & ASSOCIATES VANCOUVER, CANADA		CONSULTANTS
BUCKHORN MINES LTD. (N.P.L.) VANCOUVER, CANADA		
CL PROPERTY		
LOCATION MAP (A)		
94B-4a		DWG. 673-110
SCALE: 1 inch = 120 miles	FEB, 1973	FIG. I



4147 M-2

DOLMAGE-CAMPBELL & ASSOCIATES		CONSULTANTS
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BUCKHORN MINES LTD. (N.P.L.)		
VANCOUVER, CANADA		
<u>CL PROPERTY</u>		
LOCATION MAP (B)		
DWG. 673-120		
SCALE:	1 : 250,000	FEB., 1973
		FIG. 2

<u>Claim Name</u>	<u>Record Number</u>
CL 1-32	58176 - 58207
CL 34-66	58208 - 58240

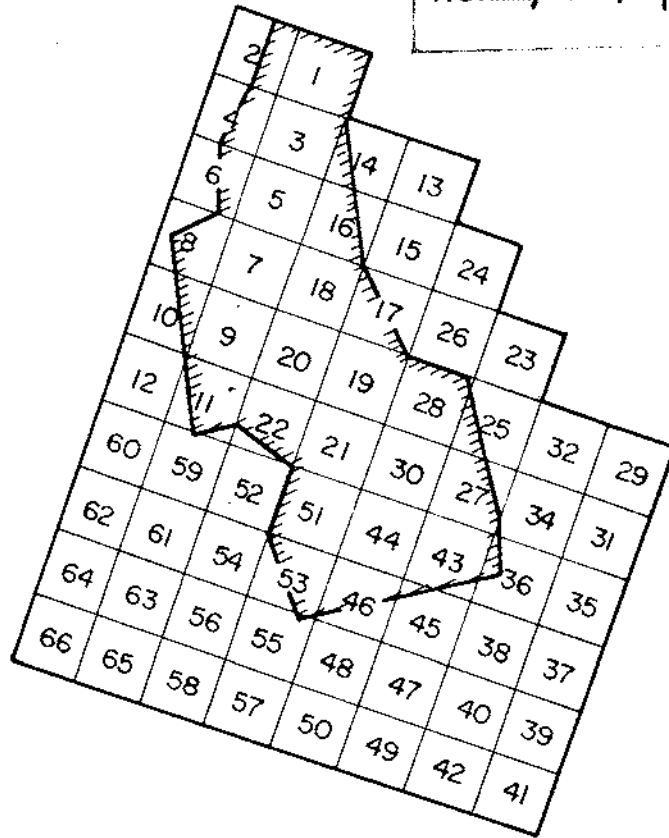
HISTORY:

Extensive zinc deposits were discovered and staked near Robb Lake by the Barrier Reef Group in the fall of 1971, which prompted intensive staking in the area in early 1972. The CL property was acquired during this period of staking. No history of previous work or staking on the ground encompassed by the CL property is known.




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ASSESSMENT REPORT

NO. **4147** MAP **#3**



*R. S. Adamson*

 OUTLINE OF GEOCHEMICAL SURVEY

DOLMAGE-CAMPBELL & ASSOCIATES		CONSULTANTS
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BUCKHORN MINES LTD. (N.P.L.)		
VANCOUVER, CANADA		
CL PROPERTY		
<b>CLAIM MAP</b>		
DWG. 673-13a		
SCALE	1: 50,000	FEB., 1973
		FIG. 3

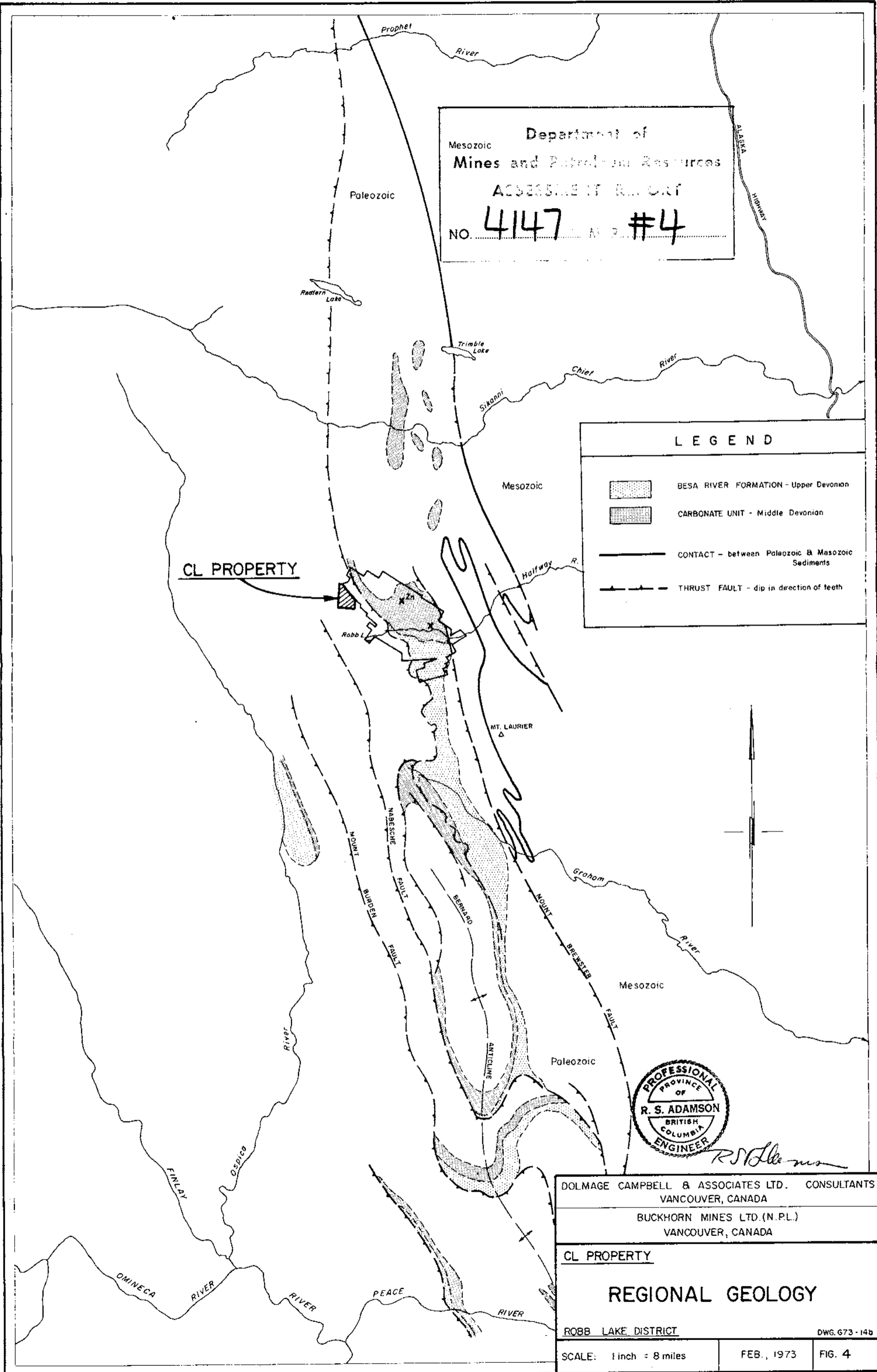
## GEOLOGICAL SETTING

### REGIONAL GEOLOGY:

The Robb Lake region is underlain by Paleozoic strata ranging in age from Ordovician in the west to Permian in the east; Mesozoic sediments unconformably overlie the most easterly Paleozoic units. (Figure 2) The Paleozoic rocks are composed of marine and non-marine sedimentary strata with a total thickness of over 10,000 feet. The strata have been deformed by folding along axes having a general trend of N30°W and by thrust faults that tend to parallel the axes of the folds. As a result, the rock formations are generally exposed as long, relatively narrow, north-west-trending bands. The thrust faulting is considered to be more important than folding and the initial type of structural deformation. Most of the thrust faults are west dipping and some are folded.





The rock units in the region appear to be transitional lithologically between those of the same age in the more southern and more northern parts of the Rocky Mountains. Facies changes both from east to west and from north to south are not uncommon within the area. The following table of formations shows the approximate age and succession of the units within and about the Robb Lake district.

Period or Epoch	Formation and Group	Lithology	Thickness (feet)
Permian	Fantasque Formation	Chert (marine)	0 -
Permian Pennsylvanian Mississippian	Stoddart Group	Kiskatinaw and Taylor Flat	1000
		Golata Formation	200 - 400
Mississippian	Prophet Formation	Limestone, chert, dolomite (marine)	1000 - 1500
Upper Devonian and Low Mississippian	Besa River Formation	Shale, minor limestone (marine)	1500 - 2000
Middle Devonian		Limestone, dolomite	800 -
		sandstone (marine)	1500
Silurian		Dolomite, Limestone sandstone (marine)	3000
Ordovician and Upper Cambrian?		Limestone, dolomite	2000 -
		shale, siltstone sandstone (marine)	3000



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 NO. 4147 #4

**LEGEND**

-  BESA RIVER FORMATION - Upper Devonian
-  CARBONATE UNIT - Middle Devonian
-  CONTACT - between Paleozoic & Mesozoic Sediments
-  THRUST FAULT - dip in direction of teeth



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 VANCOUVER, CANADA

CL PROPERTY

**REGIONAL GEOLOGY**

ROBB LAKE DISTRICT DWG. 673-14b

SCALE: 1 inch = 8 miles FEB., 1973 FIG. 4

Middle Devonian Unit: The most important rock unit in the Robb Lake district with respect to (lead-) zinc sulphide mineralization is the predominantly carbonate Middle Devonian unit.

Within the Mid-Devonian Unit there appears to be a change of lithology from predominant limestone and argillaceous limestone in the south, to predominate dolomite in the northern part of the district. In some areas the underlying Silurian strata is similar to the Mid-Devonian rocks and consequently it is not always possible to easily determine the lower boundary of the Mid-Devonian succession.

Dolomite is the most common rock type comprising the Middle Devonian carbonate succession within the Robb Lake district. Dolomitization together with silification has produced much of the present texture of these rocks. The various rock types are dolomite, dolomitic shale, dolomitic sandstone, dolomitic siltstone, sandy or silty dolomite, argillaceous dolomite and calcareous dolomite. They include dense, microcrystalline to medium crystalline textural varieties, and their colours are light grey, grey and light brown. The rocks form blocky or shaly debris of grey, buff and brown colours.

Quartz grains of silt and fine sand size are a conspicuous component of many beds. Where there is much silt or sand a very rough weathered surface is produced. Many sandy or silty beds grade into dolomitic sandstone or dolomitic siltstone. In some beds the sand grains are concentrated as lenses or irregular patches, and where this occurs a bumpy weathered surface is formed.

Dolomite breccias (of possible economic significance) are found from north to south throughout the map-area, but are more common toward the north. Some brecciated beds are composed of one rock type only; others appear to comprise fragments of several different rock types that are cemented with secondary, coarsely crystalline, white dolomite.

Limestone rock types, particularly in the southern half of the map area, range from dense to medium crystalline. There are also all gradations between argillaceous limestone and calcareous shale. Colours exhibited by these strata include grey, grey-brown, and black; on weathered surfaces they are dull grey to brown. The crystalline types weather to blocky fragments, but platy to shaly debris results from the weathering of the more argillaceous beds.

Upper Devonian Units:

The Upper Devonian unit has been named the Besa River Formation. It overlies the Mid-Devonian unit. The strata consist entirely of dark grey to black, fissile to thin-bedded or splintery shales. These are normally non-calcareous, but zones of calcareous shale, sometimes with thin, argillaceous limestone beds, are present. The formation has a distribution similar to the underlying carbonate strata. It varies in thickness from 1500 to 2000 feet but weathers readily because of its relative softness; consequently, it tends to be largely tree covered in the valleys and to form gentle slopes within the mountains. Complete exposures of the formation are quite rare because of its incompetency relative to the underlying and overlying strata.

ROBB LAKE ZINC DEPOSITS:

The Robb Lake zinc deposits located on the Barrier Reef Group property occur on well-exposed cliffs in breccia zones within the Mid-Devonian carbonate unit. The unit has been broadly folded along northwesterly axes so that dips are flat to gentle. Several steep north-trending fractures or faults intersect the mineralized area. Mineralization, manifested as several, extensive relatively-weak gossans, extends laterally within, presumably reef, breccia zones that lie several hundred feet below the top of the Mid-Devonian unit. At least one zone reportedly occurs at considerably lower elevation in the unit near the valley bottom and thus is probably lower in the stratigraphic sequence.

The mineralization as seen in hand specimen and under the microscope consists primarily of sphalerite with minor pyrite and possibly tetrahedrite contained in a coarsely-crystalline white dolomite which cements fragments of very finely-crystalline grey dolomite. Mineralization appears restricted to the white matrix-dolomite. The sphalerite is generally light tan to moderately brown in colour suggesting a relatively low content of iron. The lack of pyrite in some specimens, and as noted in one zone, may preclude the formation of even a weak gossan and hence, inhibit both visual and geophysical prospecting.

### PROPERTY GEOLOGY:(Figure 5)

The CL property was staked on the premise that because of folding and thrust faulting the prospective Mid-Devonian carbonate unit could lie beneath the overburden that covers the flat northwest-trending valley bisecting the property. The valley at the 4500 to 5000 foot elevation reflects a thrust fault of regional magnitude. The thrust divorces twin anticlinal structures whose axes' crest lie at the 8000 foot elevation.

The prospective area of interest on the property lies at the valley level and it is on the valley floor that the geochemical survey was carried out. Mapping in the valley has revealed two areas of thinly-bedded, medium grey dolomitic rocks shown on figure 5. The age of the dolomite formations is unknown. Dolomite formation occur in the Cambrian, Ordovician, Silurian, and the Mid-Devonian.

### SAMPLING AND ASSAYING TECHNIQUES

Control for the geochemical survey was obtained by establishing a single base line along the valley, 12,000 feet in length. The sample lines were run at right-angles to the base line at 800 foot intervals, and sampling stations marked at 200 foot intervals. Soil samples were collected at each sample station and silt samples taken wherever streams were encountered along the sample lines and base line.

Soil samples were taken by first digging a hole with a mattock; a small handful of soil was then taken and packaged in a standard high wet-strength brown kraft paper sample bag. Wherever possible, samples were taken from the "B" soil horizon. If the "B" horizon could not be reached the samples were taken from the "A" horizon and noted as such. The samples were sent to Chemex Labs Ltd. in North Vancouver for analysis.

At the assay laboratory the samples were dried at 110°F and then sieved to -80 mesh consistency through a nylon and stainless steel sieve. One-half gram of the dry pulp was weighed into a calibrated test tube and 3 mls. of perchloric and 1 ml. of nitric acid added. The samples were digested initially at low heat and then at a temperature of 203°C. Digestion time was two to three hours. The digested samples were cooled, made up to 25 ml. volume with distilled water and the solutions thoroughly mixed. Analyses for zinc were then done by Atomic Absorption procedures.

DAVE-DOUG CLAIMS

MIDDLE

DEVONIAN

CARBONATE

DOLOMITE

55

30

CL CLAIM GROUP

ORDOVICIAN



*R. S. Adamson*

Department of  
Mines and Petroleum Resources  
ASSESSMENT REPORT

NO. **4147** AND **#5**

DOLMAGE-CAMPBELL & ASSOCIATES CONSULTANTS  
VANCOUVER, CANADA

BUCKHORN MINES LTD.(N.P.L.)  
VANCOUVER, CANADA

CL PROPERTY

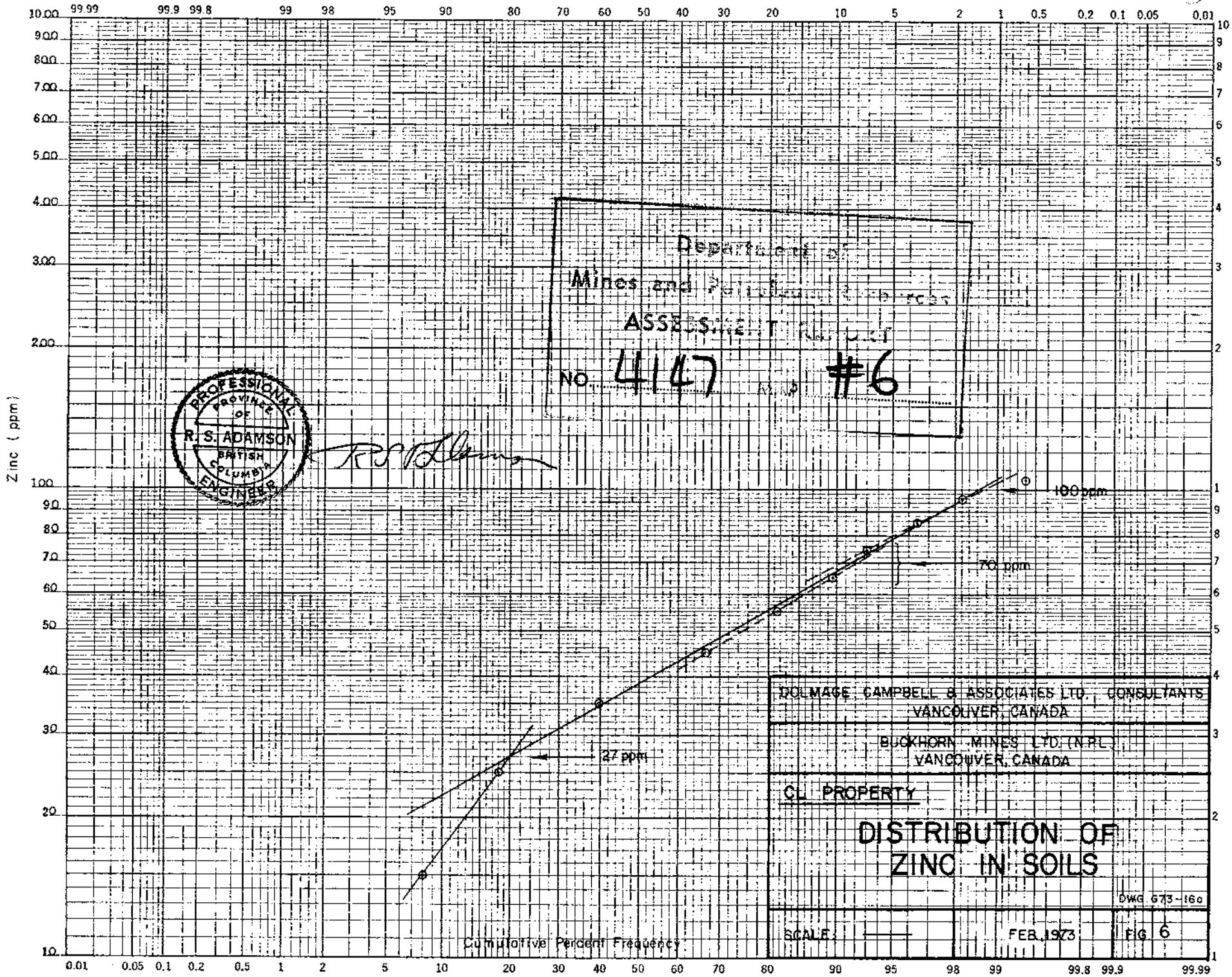
PROPERTY GEOLOGY

DWG. G73-15a

SCALE 1 : 50,000

FEB., 1973

FIG 5





The results for the zinc soils were interpreted by means of statistical analysis and then plotted and outlined according to the values determined. The silt assays were employed primarily as some confirmation for the soil results.

### INTERPRETATION OF GEOCHEMICAL RESULTS

The distribution of zinc values was determined by plotting the cumulative percent frequency of the values on a two-cycle log-probability graphy, (Figure 6). The graph indicates three somewhat indistinct population ranges: 0-27 ppm zinc, 27-70 ppm, and greater than 70 ppm. The zinc values are plotted on figure 7; the anomalous values are outlined above 70 ppm.

### CONCLUSIONS

On the CL claim group zinc values in the soils are only weakly anomalous and these values tend to be very irregularly distributed. Therefore it can only be concluded that from a geochemical standpoint the chances for zinc mineralization existing at the sub-outcrop on the valley floor are remote.

### RECOMMENDATIONS:

No further geochemical work or follow-up geophysical work is recommended for the CL Claim Group. The claims should be retained in good standings for one year in order to gain time to assess the ore-making possibilities on the adjoining Barrier Reef Group claims. If the adjoining property does demonstrate economic viability then detailed geological assessment of the valley-floor dolomite with a view to determining by stratigraphic correlation and fossil identification whether the key Mid-Devonian unit exists beneath the overburden should be undertaken.

Respectfully submitted by,  
DOLMAGE CAMPBELL & ASSOCIATES LTD.



*R S Adamson*  
R. S. Adamson, P.Eng.

*C R Saunders*  
per C. R. Saunders, P.Eng.

DOMINION OF CANADA:  
PROVINCE OF BRITISH COLUMBIA.

To Wit:

In the Matter of

Buckhorn Mines Ltd. - CL property

I, R. S. Adamson  
#1000 - 1055 West Hastings Street,  
Vancouver 1, B. C.

of

in the Province of British Columbia, do solemnly declare that

Expenditures for work performed on the CL property between September 11 and September 29, 1972 are as follows:

Wages: 43 man-days	\$ 1929.50
Maintenance: food and lodging @ \$13.50 per man day	\$ 580.50
Assaying and Freight: (329 samples)	\$ 399.78
Transportation: Helicopter, 6.016 hrs. @ \$183.91 per hour	\$ 1106.40
Typing, Secretarial, Draughting:	\$ 150.00
Supervision and Report:	\$ 1000.00
	<hr/>
TOTAL	\$ 5166.18
	<hr/>

APPENDIX NO. 2DETAILED ACCOUNT OF EXPENDITURES1. WAGES:

S. Williams - c/o A. Harman, Box 4509, Whitehorse, Y.T. 18 days @ \$45.00 per day (Sept. 11 to 23 incl. & 25th to 29th incl.)	\$ 810.00
J. Etzel - c/o A. Harman, Box 4509, Whitehorse, Y.T. 13 days @ \$37.00 per day (Sept. 11 to 23rd incl.)	\$ 481.00
D. Stephens - c/o A. Harman, Box 4509, Whitehorse, Y.T. 4 days @ \$37.00 per day (Sept. 26 to 29 incl.)	\$ 148.00
R. McCandless - 1000 - 1055 West Hastings Street, Van. 1, B.C. 5 days @ \$75.00 per day (Sept. 11 to 15 incl.)	\$ 375.00
J. Kenderdine - 1000 - 1055 West Hastings Street, Van. 1, B.C. 3 days @ \$38.50 per day (Sept. 11 to 13 incl.)	\$ 115.50
TOTAL	<u>\$ 1929.50</u>

2. ASSAYING:

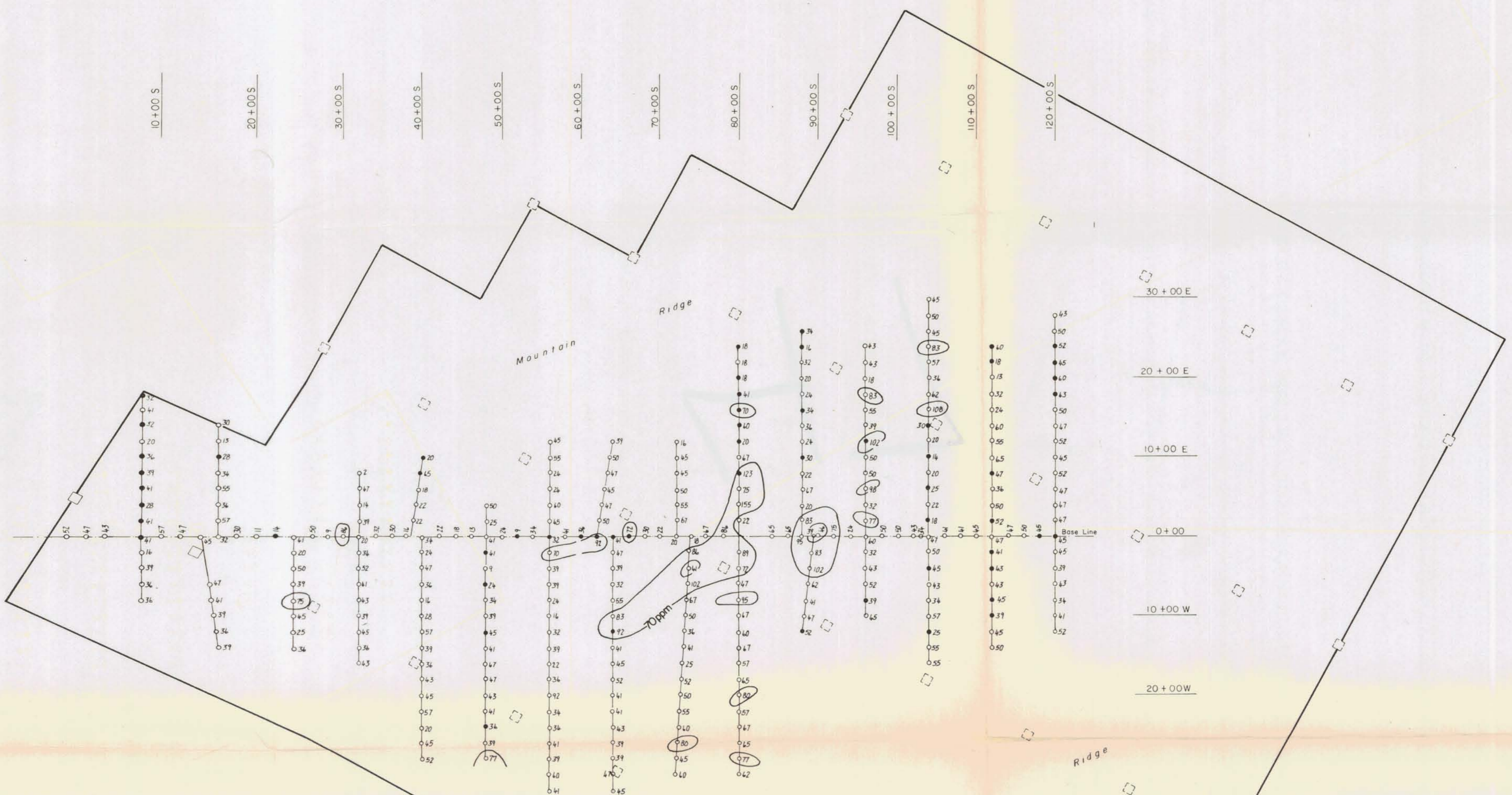
Preparation for 329 samples @ \$0.20 per sample	\$ 65.80
Freight on 329 samples	\$ 4.98
Assaying of 329 samples for zinc @ \$1.00 per sample	\$ 329.00
TOTAL	<u>\$ 399.78</u>

Declared before me at the City  
of Chamberlain in the  
Province of British Columbia on 20th  
day of February 1973.

R. S. Tolson

SUB-MINING RECORDER

H. P. Phillips  
in the Province of British Columbia or  
in the City of British Columbia.

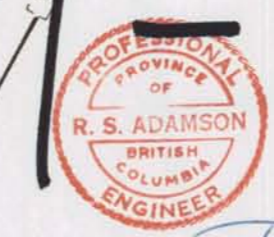


**LEGEND**

- 47 Soil Sample Location (Zn ppm)
- 45 (organic)
- Claim Posts:
- Location definite
- Location approximate
- Property Boundary

Department of  
 Mines and Petroleum Resources  
 ASSESSMENT REPORT  
 NO. 4147 MAP #7

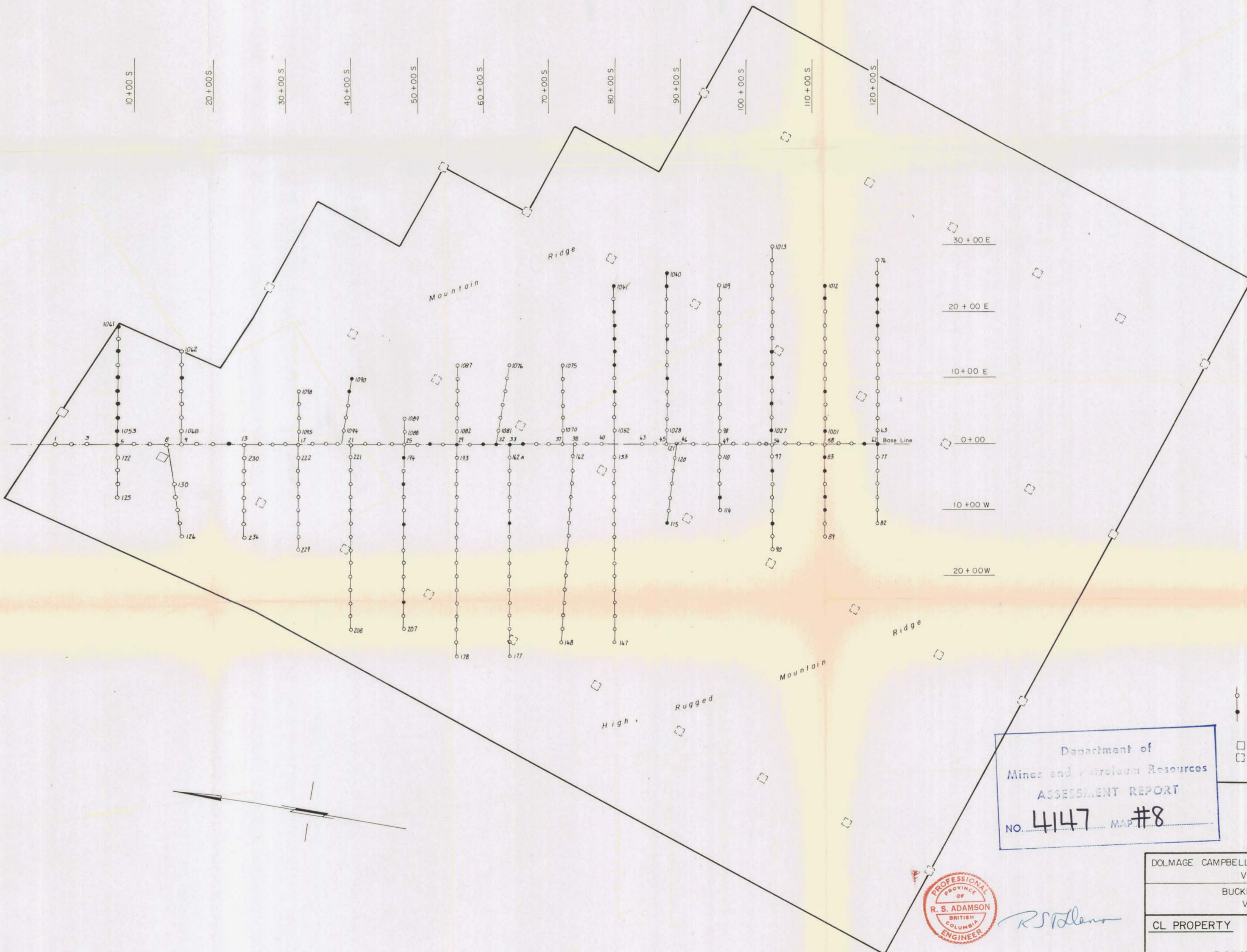
4147M7



To accompany Geochemical Report by  
 R. S. Adamson, P.Eng., on the CL Property  
 in the Robb Lake Area - Liard Mining  
 Division, dated Feb 16, 1973.

DOLMAGE CAMPBELL & ASSOCIATES LTD. CONSULTANTS VANCOUVER, CANADA	
BUCKHORN MINES LTD (N.P.L.) VANCOUVER, CANADA	
CL PROPERTY	
<b>SOIL GEOCHEMISTRY ZINC</b>	
SCALE: 1" = 1000'	FEB., 1973
	FIG. 7

DWG. 073-17



**LEGEND**

- Soil Sample Location (organic)
- Claim Posts
- Location definite
- Location approximate
- Property Boundary
- C Series

Department of  
Mines and Petroleum Resources  
**ASSESSMENT REPORT**  
NO. **4147** MAP # **8**



*R.S. Adamson*

To accompany Geochemical Report by  
R.S. Adamson, P.Eng., on the CL Property  
in the Robb Lake Area - Liard Mining  
Division, dated Feb 16, 1973.

DOLMAGE CAMPBELL & ASSOCIATES LTD. CONSULTANTS VANCOUVER, CANADA	
BUCKHORN MINES LTD (N.P.L.) VANCOUVER, CANADA	
CL PROPERTY	
<b>SAMPLE NUMBERS SOILS</b>	
SCALE: 1" = 1000'	FEB., 1973
FIG 8	

DWG G73-18