

COMINCO LTD.

EXPLORATION DIVISION

WESTERN DISTRICT

GEOLOGICAL REPORT

VINE PROPERTY 1978

N.T.S. 82G/5

Fort Steele Mining Division

Work Performed by:

E.W. BATCHELOR  
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G.L. WEBBER

Cominco Ltd.  
Kootenay Exploration  
2450 Cranbrook St.  
Cranbrook, B. C.

Under the Supervision of:

C. HARDEN  
Manager,  
Exploration, Western District

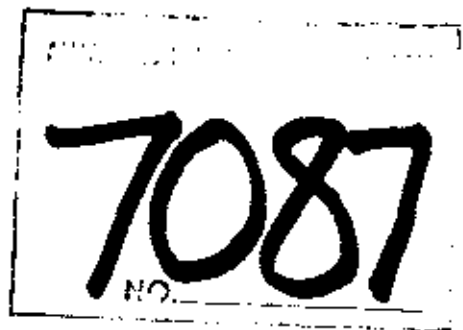


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COMINCO LTD.

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WESTERN DISTRICT

GEOLOGICAL REPORT

VINE PROPERTY 1978

Fort Steele Mining Division

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GENERAL STATEMENT

This report deals with the history of the Vine property and the results of geological mapping on that portion of the Vine claims consisting of 327 units. Work was performed during the period October 26, 1977 to October 15, 1978.

Expenditures incurred in carrying out the field work and map preparation amounted to \$28,348.00.

Affidavits on Application to Record Work was submitted in connection with this report.

INTRODUCTION

General

Geological mapping was undertaken to evaluate the economic potential of the Vine property and to determine the geological setting of Pb-Zn mineralization in Precambrian clastics of the Aldridge Formation.

Work was performed by geologists E.A.U. Parviainen, E.W. Batchelor, R.J. Kelly and supervised by G. Harden, Manager, Exploration Western District.

Mapping results were plotted on a cronaflex 1:20,000 (contour interval 10 m) orthophoto base map, prepared for Cominco by McElhanney Engineering Ltd. of Vancouver, B.C. Outcrops and attitudes were plotted directly on the base map.

Location and Access

Longitude: 49° 30'  
Latitude: 115° 50'

N.T.S. 82G/5  
M.D. Fort Steele

The centre of the claim block is approximately 12 km SSW of Cranbrook. Access to all parts of the property is excellent via secondary gravel roads leading from Highway 3/95. The C.P. Rail line and B.C. Hydro high voltage transmission line also crosses the property. Elevation of the property ranges from 935 to 2140 m.

Vegetation varies from open grassland through immature, dense, second-growth pine to mature stands of fir, pine and larch.

Ownership and Status

The Vine claim group contains 527 units, is 100% Cominco-owned, and was 95% acquired by contract staking during the fall of 1976. There is no Vine No. 4 claim and approximately 30% of Vine #5 and #7 was over-staked on the Bert and/or E.L. claims of Rimrock Mining N.P.L.

The current status of the claims with respect to assessment work is as follows as of October 1, 1978.

<u>Claim</u>	<u>Units</u>	<u>Date Recorded</u>	<u>Record No.</u>	<u>Yrs. Assess.</u>	<u>Work Due</u>
VINE 1	20	Sept. 3, 1976	65	1	1978
2	20	Oct. 20, 1976	85	1	1978
3	16	Oct. 26, 1976	103	2	1979
5	20	"	104	1	1978
6	15	"	105	1	1978
7	20	"	106	1	1978
8	29	"	107	1	1978
9	16	"	108	1	1978
10	20	"	109	1	1978
11	20	"	110	1	1978
12	20	"	111	2	1979
13	20	"	112	1	1978
14	4	"	113	1	1978
15	20	"	114	1	1978
16	20	"	115	2	1979
17	20	"	116	2	1979
18	10	"	117	3	1980
19	4	"	118	2	1979
20	20	"	119	1	1978
21	16	"	120	2	1979
22	8	"	121	3	1980
23	20	"	122	1	1978
24	16	"	123	1	1978
25	12	"	124	4	1981
26	20	"	125	1	1978
27	6	"	126	3	1980
28	20	"	127	3	1980
29	12	"	128	2	1979
30	15	"	129	3	1980
31	15	"	130	3	1980
32	12	"	131	2	1979
33	6	"	132	2	1979
34	20	"	133	3	1980
35	4	June, 1977	203	1	1978

## PREVIOUS EXPLORATION - History

### Regional

The Vine property area has been extensively prospected at various times in the past, particularly following the discovery of Pb-Zn-Ag mineralization in 1893 at St. Eugene on Moyie Lake. Numerous small pits, trenches and adits probably date to this period.

During 1966 H. Fors of Kimberley discovered float boulders containing appreciable Pb-Zn mineralization. After the prospect was optioned by Cominco, company prospectors intensively worked the area that is now the southwest sector of the Vine property.

Cominco prospectors located a 1.2 x 13.7 m lens of Pb-Zn mineralization which assayed 5% combined Pb-Zn and 4 oz. Ag.

Subsequent work included prospecting, mapping, trenching, soil and stream geochemistry, E.M. surveys and diamond drilling (7 holes totalling 944 m). No economic mineralization was encountered by this drilling.

Following a discovery of Pb-Zn float boulders near Peavine Creek in August 1976 Cominco staked 527 units, which are now called the Vine property. Since the discovery the following reports were submitted for assessment work and are in Government records. These reports describe the procedure and results obtained for each method used.

Report D-71. Geophysical Report. Vine Mineral Claims. N.T.S. 82G/5W  
January 7, 1977.

Geochemical Survey Report on the South Vine Grid. N.T.S. 82G/5,  
December 20, 1977.

Geochemical Survey Grid "A", N.T.S. 82G/5, September 28, 1977.

Geochemical Survey Grid "B", N.T.S. 82G/5, October 14, 1977.

Geochemical Survey Grid "C", N.T.S. 82G/5, September 28, 1977.

Geochemical Survey Vine 3 Claim, 82G/5, October 14, 1977.

Diamond Drill Report, Vine #1 Claim, N.T.S. 82G/5, DDH V-77-1-2-3-4,  
September 5, 1978.

Diamond Drill Report, Vine #1 Claim, N.T.S. 82G/5, DDH V-78-1-2,  
September 5, 1978.

Diamond Drill Report, Vine #29 Claim, N.T.S. 82G/5, V-78-1-2,  
October 1978.

EXHIBIT "A"

Statement of Expenditures

VINE CLAIMS (327 units)

Fort Steele Mining Division

VINE GEOLOGY - Mapping on a scale of 1:20,000

Geology Salaries: (field)

E.W. Batchelor (Geologist) 59 days @ \$117. . . . .	\$ 6,903.00
R.J. Kelly (Geologist) 98 days @ \$68 . . . . .	6,664.00
J.K. Glover (Geologist) 20 days @ \$78 . . . . .	1,560.00

Assistant to Geologists:

J.L. Livingstone 7 days @ \$56. . . . .	392.00
R.J. Eyre 24 days @ \$45. . . . .	1,080.00
P.M. Levasseur 44 days @ \$45 . . . . .	1,980.00

Supervision:

E.A.U. Parviainen (Geologist) 21 days @ \$130 . . . . .	2,730.00
G.L. Webber (Geologist) Report and map preparation - 6 days @ \$120. . . . .	720.00

Base Map 1:20,000 (McElhanney Surveying) . . . . .	596.00
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Domicile:

Temporary staff assistance 154 days @ \$10/day. . . . .	1,540.00
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Transportation:

Ford 4x4 1/2 ton (3 crews) Total 7 months @ \$500 . . . . .	3,500.00
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Equipment and supplies . . . . .	683.00
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\$28,348.00

This is Exhibit "A" to the Statutory Declaration of G.L. Webber declared before me this 3 day of NOVEMBER, 1978.

A Commissioner for taking Affidavits for the Province of British Columbia.

J. M. LEASAK

A Commissioner for taking Affidavits for British Columbia.

IN THE MATTER OF THE  
B.C. MINERAL ACT  
AND  
IN THE MATTER OF A GEOLOGICAL PROGRAM  
CARRIED OUT ON THE VINE MINERAL CLAIMS  
SOUTHWEST OF CRANBROOK

in the Fort Steele Mining Division  
of the Province of British Columbia.

More Particularly N.T.S. 82G/5W

A F F I D A V I T

I, G.L. WEBBER, of the City of Kimberley, in the Province of British Columbia, make Oath and say:

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 Exhibit "A" to this my Affidavit is a true copy of expenditures incurred on a geological mapping programme, on the Vine Mineral Claims.
3. That the said expenditures were incurred between the 26th day of October, 1977 and the 15th day of October, 1978, for the purpose of mineral exploration on the above noted claim.

Sworn Before Me at CRANBROOK )  
in the Province of British Columbia, )  
this 3 day of NOVEMBER, 1978. )

G.L. Webber  
G.L. WEBBER

J. M. Leasak )  
A Commissioner for taking Affidavits )  
in the Province of British Columbia. )

J. M. LEASAK  
A Commissioner for taking Affidavits  
for British Columbia

## GEOLOGICAL MAPPING

### Previous Mapping

Much of the previous mapping in the area, by Cominco consisted of regional ridge traverses to locate and correlate Aldridge Formation lithology and structure. The most recent government mapping in the area was conducted by G.B. Leech of the G.S.C. This work has been published at 1" to 2 mi. as Preliminary Map #11-1960 (Fernie West Half) with marginal notes.

### Current Mapping (Cominco)

A topographic base map and orthophoto on a scale of 1:10,000 with a 10 m contour interval was purchased for the Vine property. Areas of outcrop can be easily identified on the orthophoto and it provides an excellent base for plotting in the field. This 1:10,000 base map was reduced to 1:20,000 for the purpose of this report.

The majority of the work in 1978 was done in the northwest section of the Vine Property (Plate V-78-1).

## GEOLOGY

### Regional Setting

All clastic rocks on Plate V-78-1 are Proterozoic sediments of the Aldridge Formation of the Purcell Supergroup. These rocks have undergone lower greenschist facies regional metamorphism. It is believed that the area covered by Plate V-78-1 is underlain by subcropping Middle Aldridge Formation and Moyie Intrusives.

### Aldridge Formation

The Aldridge Formation has the characteristics of a flysch sequence. It is composed of a sequence of alternating beds of very fine-grained quartz wacke, subwacke and lesser amounts of very fine- to coarse-grained quartz arenite.

The Aldridge Formation has been divided into three map units. The Lower Aldridge, Middle Aldridge, and Upper Aldridge. This division was first published by G.B. Leech (1957) to Aldridge rocks exposed in the Purcell mountains. All the clastic rocks in the area in question are those of the Middle Aldridge.



Description and composition

Turbidites are essentially 'monotonous' in that variations across small distances approximate variations across large distances; one outcrop may contain the range of lithologies found in the entire formation. They are commonly composed of quartz arenites and quartzitic wacke at the base, which progressively grade upwards into wacke, subwacke and argillites. Not all of these various rock types are present in each turbidite unit.

The arenaceous base (A<sub>1</sub> & A<sub>2</sub>, Fig. 1b) of a turbidite is often sculptured. Sculpturing includes grooves and tool marks, longitudinal ridges, striations and loadcasts. The lower portion is generally ungraded, poorly sorted quartz arenite or quartzitic wacke and may contain rip-up clasts reaching 1m in length and 3 cm in thickness. Occasionally this interval contains calcareous concretions of varied external morphology. Within the upper portion of the basal subdivision, vague coarse crossbedding is sometimes displayed. This interval is rapidly transitional to any of the B, C, D subdivisions shown in Figure 1.

Within the B,C,D subdivisions there occur parallel current laminations, small scale ripples, crossbedding, climbing ripples, cut-and-fill structures and convolute laminae. The overlying interturbidite subdivisions (E in Fig. 1) is composed of thinly laminated subwacke or argillite. Table 1 presents whole rock chemical analyses of quartzitic wacke and argillite from the Middle Aldridge.

TABLE 1. Whole Rock Analyses		Quartzwacke		Argillite	
	$\bar{x}$	$\hat{\sigma}$	$\bar{x}$	$\hat{\sigma}$	
SiO <sub>2</sub>	78.893	5.738	64.162	3.219	
Al <sub>2</sub> O <sub>3</sub>	9.415	2.826	16.055	2.762	
CaO	1.359	1.080	1.962	1.817	
MgO	0.778	0.458	2.460	1.093	
FeO	2.435	1.073	4.606	1.198	
K <sub>2</sub> O	1.476	0.667	4.136	1.166	
Na <sub>2</sub> O	2.439	0.997	1.723	0.673	
TiO <sub>2</sub>	0.409	0.136	0.681	0.168	

Number of samples: Quartzitic wacke = 46     $\bar{x}$  mean  
 Argillite = 47     $\hat{\sigma}$  standard deviation

THE ENVIRONMENT OF THE MIDDLE ALDRIDGE FORMATION

The unusual placidity implied by inter-turbidity subwacke suggests that the Purcell Basin of Middle Aldridge time was closed or barred. It is interpreted that water depth in the Purcell Mountain region during Middle Aldridge time increased rapidly due to transgression and the deposition of clastic material by turbidity currents commenced.

### Middle Aldridge

The Middle Aldridge is characterized by turbidite units. They contain most of the internal and external features for turbidite sequences elsewhere in the world. Figure 1 is a comparison of the turbidite model after Bouma (1963), with the turbidites of the Middle Aldridge.

FIGURE 1. A comparison of the Turbidite Model after BOUMA with that of the Middle Aldridge. (Bouma, 1962).

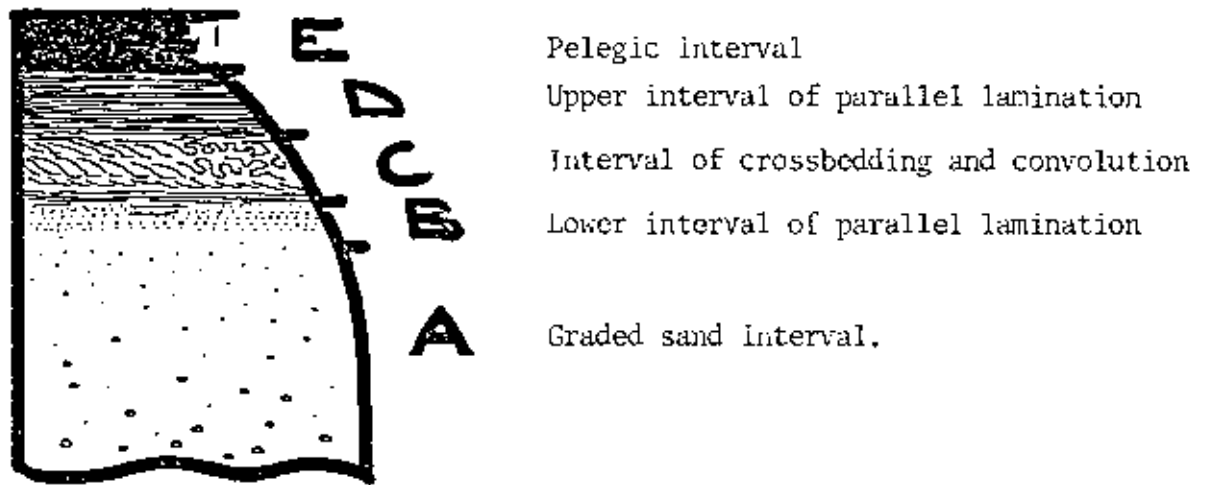


Fig. 1a BOUMA MODEL

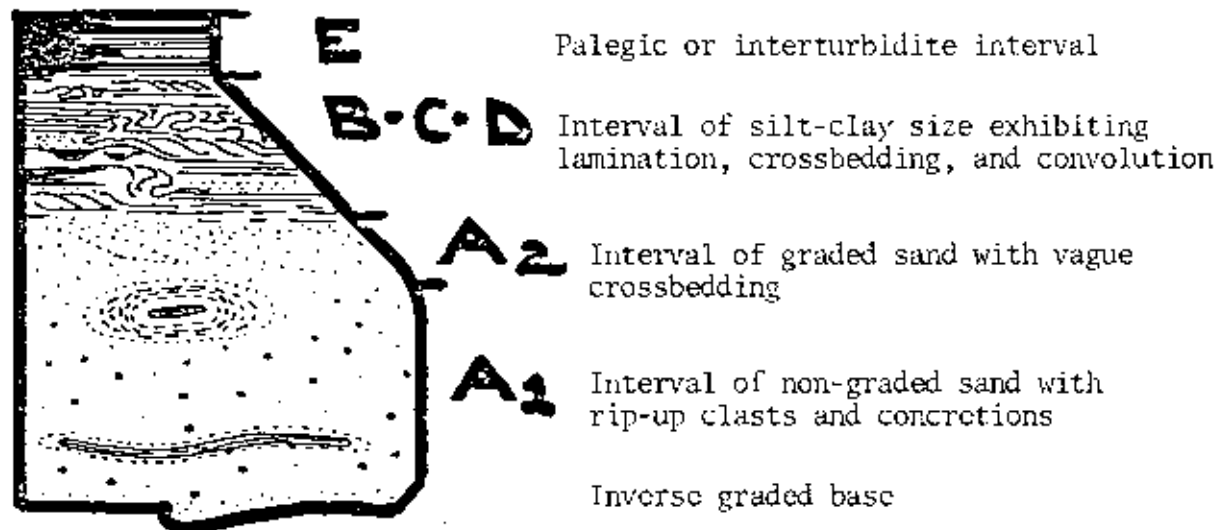


Fig. 1b GENERALIZED MIDDLE ALDRIDGE TURBIDITE

It is likely that the transgression was rapid and shortlived, and that the basin quickly achieved a stable condition before passing onto the regressive phase. The apparently cyclic, upward-dwindling of turbidites throughout the Middle Aldridge Formation is interpreted as the penetration of the source terrain by erosion. During the same period the Purcell Basin filled.

In the Purcell Mountains the turbidites cease at the top of the Middle Aldridge Formation; regressive conditions are inferred from the successional lithologies of the overlying Upper Aldridge, Creston and Kitchener Formations.

#### Moyie Intrusives (Purcell Sills in USA)

The Moyie Intrusives are sheet-like bodies intruded in the lower Purcell Supergroup. Dykes are quite rare. The sills range in thickness from 1 m to 700 m and petrographically uniform sills can be traced over areas of several hundred square kilometers. The largest sill on the Vine Group is approximately 150 m thick.

The principle primary minerals of the sills are amphiboles of the hastingsite group, plagioclase, quartz and ilmenite. Additional minerals formed subsequent metamorphic events include actinolite, clinozoisite, biotite and chlorite.

The great majority of the sills are gabbros but quartz dioritic and diabasic phases are known.

#### Structure

The Vine claim group is the northern part of a western limb of an anticlinal structure which have been faulted off by the Moyie fault from Moyie anticlinorium to south and east.

Due to poor exposure the amount of collected structural data is too sparse for meaningful interpretation. Additional regional structural data remains to be acquired.

#### REFERENCES

- Bouma, A.H., 1962; Sedimentology of some flysch Deposits; Elsevier, Amsterdam, 168 p.

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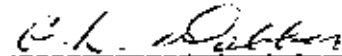
WESTERN DISTRICT

GEOLOGICAL REPORT

VINE CLAIMS

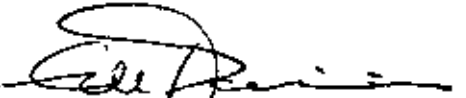
Fort Steele Mining Division

SUBMITTED BY:



G.L. WEBBER  
Geologist

ENDORSED BY:



E.A.U. PARVAINEN  
Geologist

APPROVED FOR  
RELEASE BY:



G. HARBEN  
Manager, Exploration,  
Western District

October 1978

COMINCO LTD.

EXPLORATION DIVISION


WESTERN DISTRICT

STATEMENT OF QUALIFICATIONS

E.W. BATCHELOR graduated from U.B.C. during 1966 with a B.A.Sc degree in Geological Engineering.

Since that time he has been employed in various phases of base metal exploration.

He is registered as a Professional Engineer in British Columbia (Reg. No. 11335).

  
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G. HADDEN  
Manager, Exploration,  
Western District

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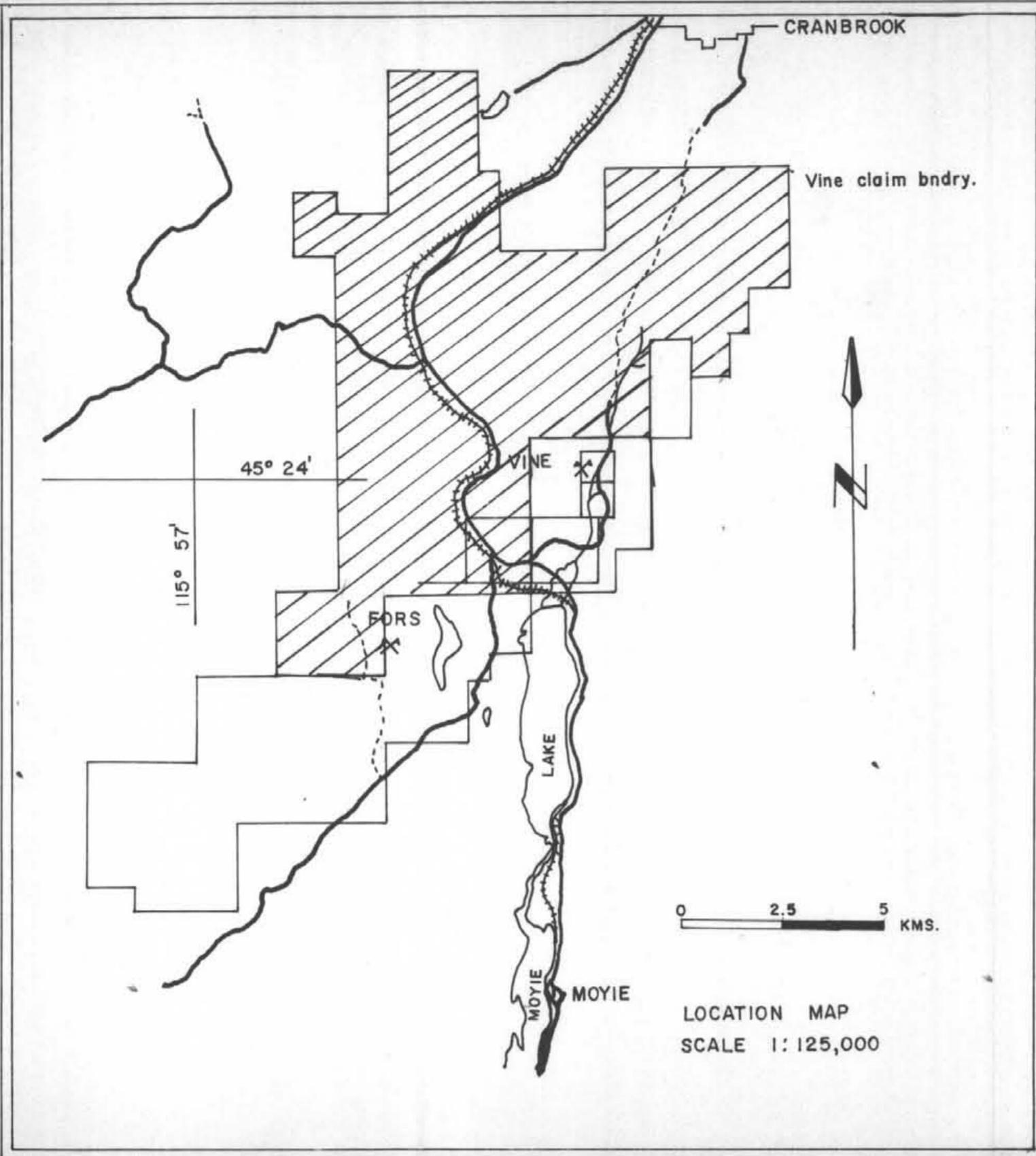
WESTERN DISTRICT

STATEMENT OF QUALIFICATIONS

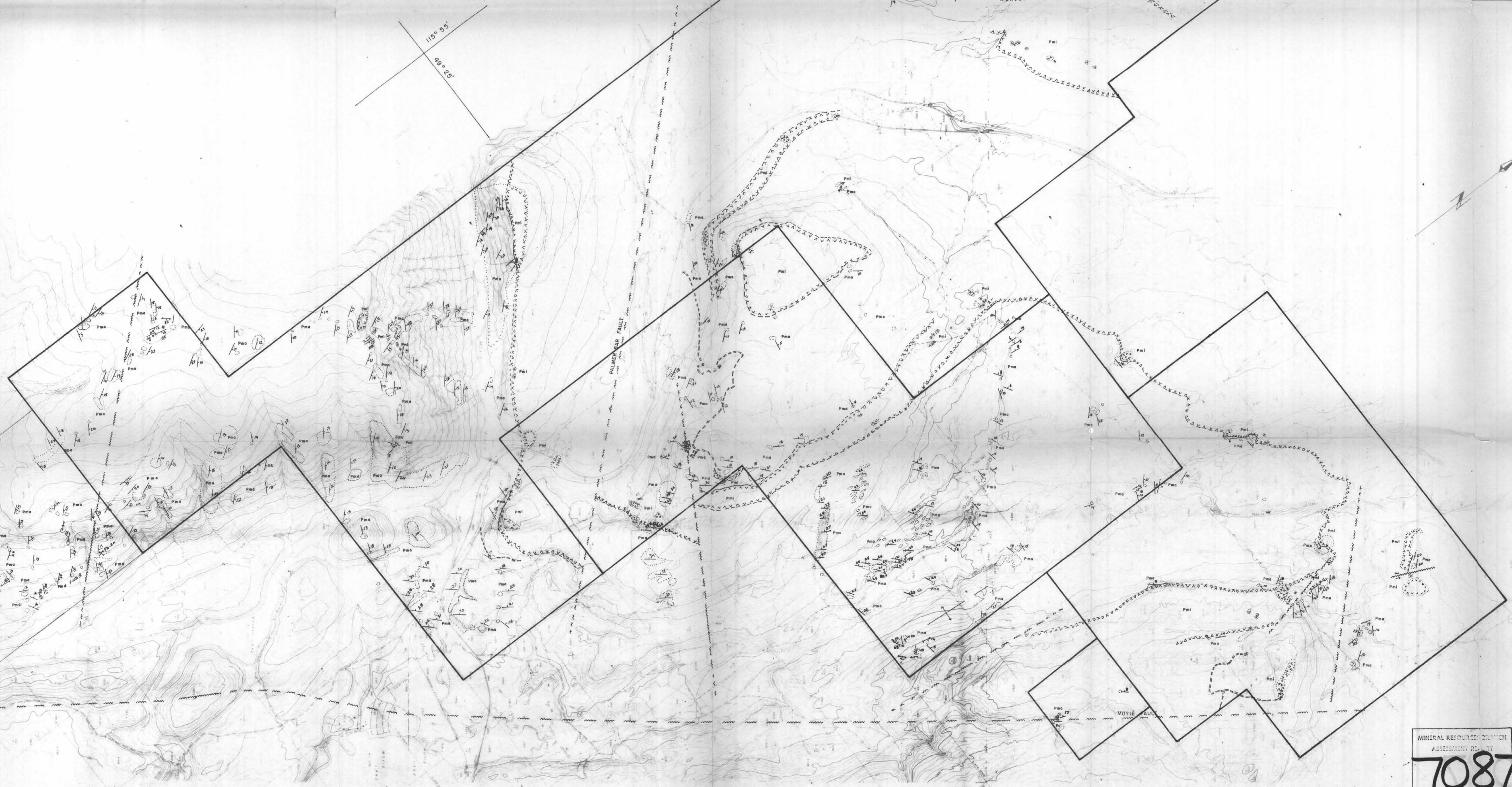
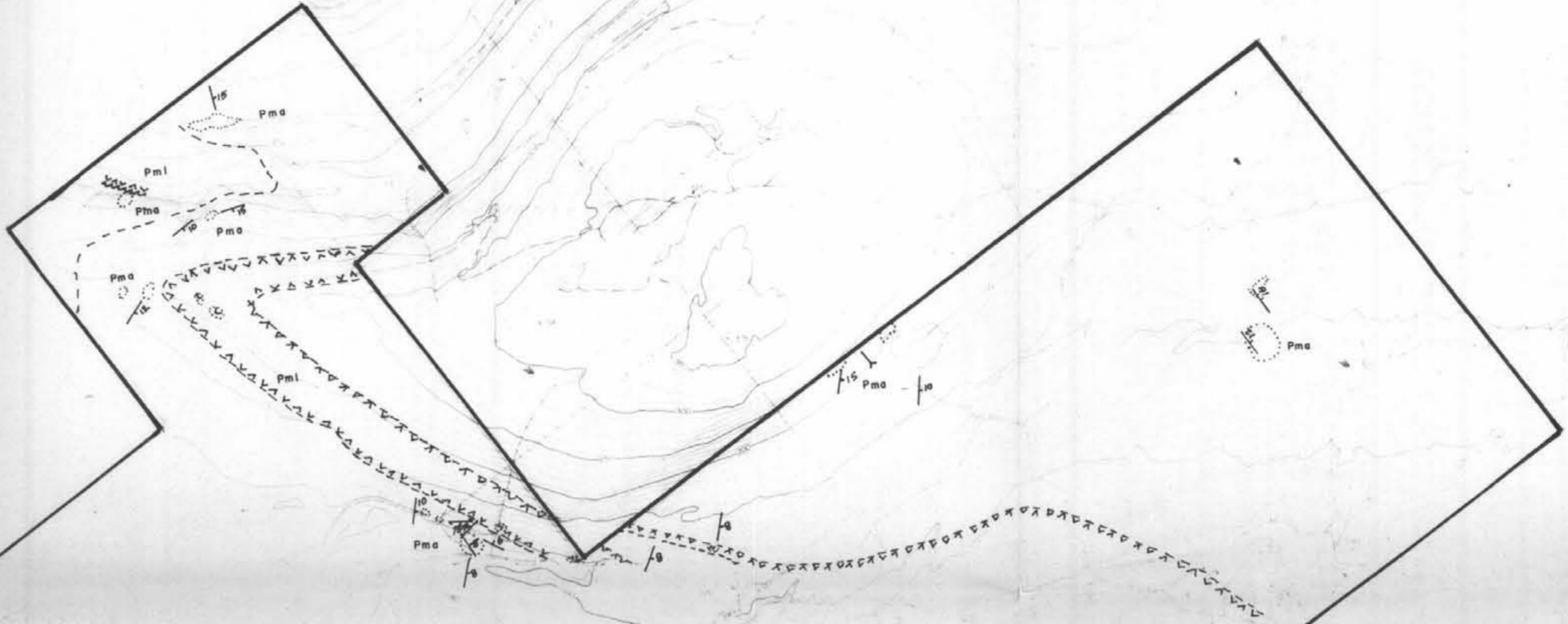
G.I. WEBBER has personally conducted many types of mineral exploration work for Cominco Ltd. over the last twenty-five years.

I consider him well qualified to prepare this report.

  
G. HARDEN  
Manager, Exploration,  
Western District



- LEGEND**
- PRECAMBRIAN
- MOYIE INTRUSIVES
  - CRESTON FM.
  - M. ALDRIDGE FM.
  - M. ALDRIDGE CONGLOMERATE
- Outcrop pattern
- Bedding (inclined)
- Cleavage (inclined, vertical)
- Fault (defined, approximate, assumed)
- Anticline (defined, approximate)
- Drag fold
- Axis of fold (inclined)
- Roads
- Contours (interval 10 meters) 2000
- Mineral prospect



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