DIAMOND DRILLING REPORT

on the

LOG 54, 63 and 64 Mineral Claims

MISSEZULA LAKE AREA

NICOLA MINING DIVISION

LATITUDE 49° 47' N LONGITUDE 120° 33.5' W

N.T.S. SHEET No. 92H/15E

BETHLEHEM COPPER CORPORATION
Suite 2100 - Guinness Tower
1055 West Hastings Street
Vancouver, B.C.
V6E 2H8

SEPTEMBER 8, 1975

R. E. Anderson, P.Eng.

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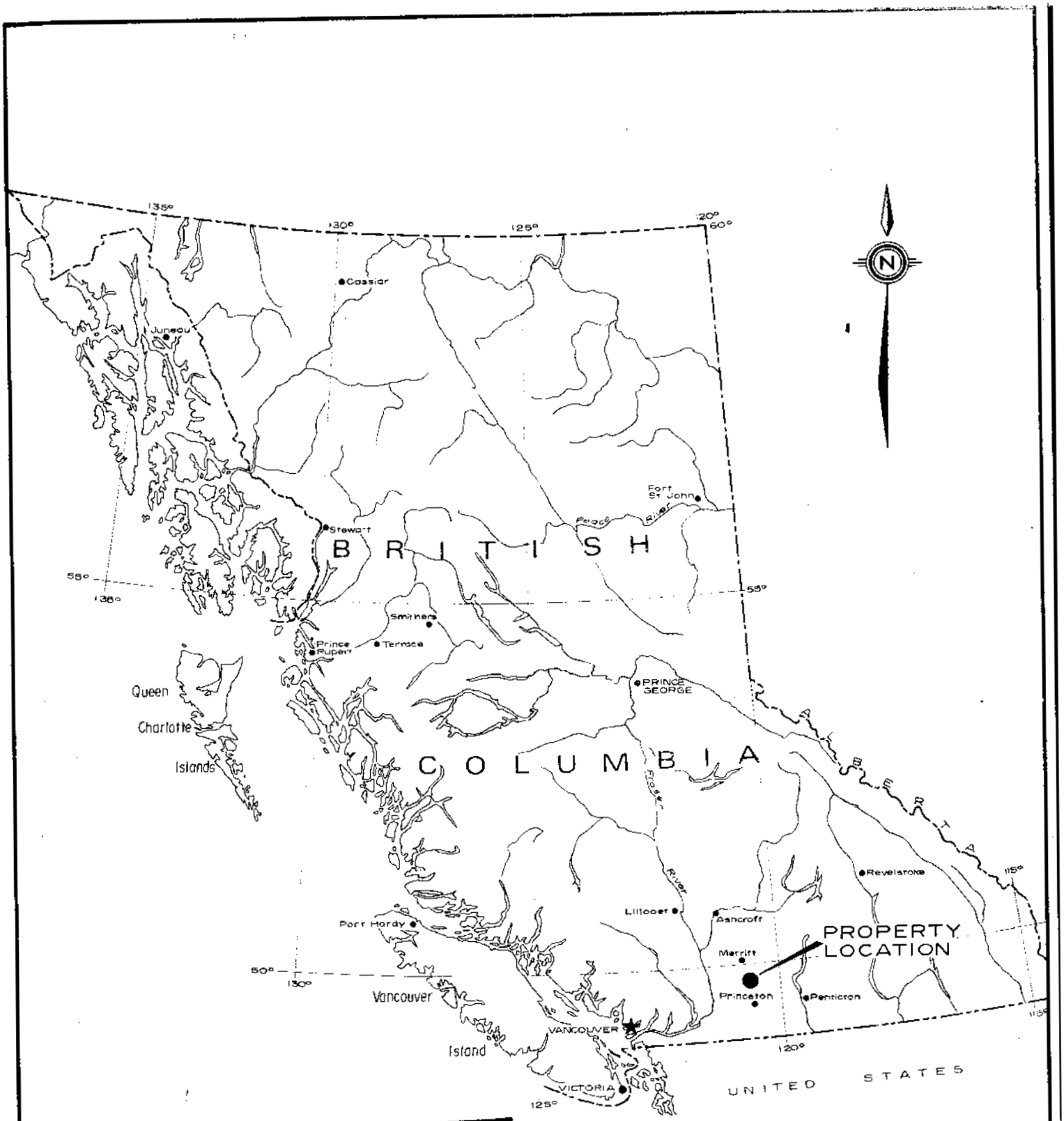

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 5601 MAP 1

COPPER BELT PROJECT
(MISSEZULA LAKE)
"LOG" GROUP
LOCATION PLAN

ALTAIR drafting services ltd.

SECTION A - SUMMARY OF WORK

Introduction -

The "LOG" Group of mineral claims was acquired by staking during December 1973 and its acquisition resulted from a large scale regional exploration program that was carried out in the Merritt-Princeton area during 1970, 1971 and 1972. Work carried out on the property during October to December 1974 consisted of geological mapping, sampling and the drilling of ten percussion holes totalling 900 metres (2955'). This program was detailed in the "Percussion Drilling Report on the LOG Claims" by R. J. Nethery, P.Eng. which was submitted as an assessment report in January 1975. Some of the percussion holes yielded results that were considered to be anomalous and it was, therefore, decided to conduct a limited diamond drilling program to further test the area.

Location and Access

The LOG claim group is situated over a low north-south trending valley some 3 Km. west of Missezula Lake at geographic co-ordinates 49° 47' latitude and 120° 33.5' longitude. The nearest centres of population are 36 Km. to the south at Princeton and 38 Km. to the NNW at Merritt. Access to the property is obtained by a 9.5 Km. gravel road which runs southeasterly from a point on Highway #5 some 43 Km. south of Merritt. (See Drawing No. 75-1)

Topography and Physical Environment

The area is characterized by generally moderate topography with altitude ranges from 1250 metres to 1370 metres A.S.L. The central portion of the claim block is in the bottom of a low wide north-south trending valley with the eastern and western limits of

the property situated on higher ridges. A major portion of the valley floor is clear of any timber cover due to recent logging operations and a forest fire. The remaining area is covered by moderate stands of lodgepole pine and to a lesser extent groves of aspen.

Two small lakes and numerous small sloughs are situated in the area. The two lakes do not have any official designation although the one located to the immediate south and west of the drill area has been referred to as Duke Lake.

History

The first recorded work in this area was done by Plateau Metals, who staked the Strike-Lorna group of claims in 1962 to cover a showing of disseminated copper which was found near the site of a former logging operation. Line cutting, detailed prospecting, magnetometer surveying, bulldozing and diamond drilling were then conducted and indicated several areas of low-grade mineralization. Little work was done until 1966 when the property was optioned by Adera Mining Limited who conducted geological and geophysical surveys. The magnetics indicate a strong NW trend with several anomalous highs while an IP survey revealed two large anomalies, the Strike and the Duke. Fourteen trenches were dug and seven diamond holes, totalling 513.5 metres (1685'), were drilled to test these anomalies. The Strike anomaly was found to be caused by sulphides, mainly pyrite but including some chalcopyrite, whereas bedrock at the Duke anomaly consists of a slightly pyritic and graphitic argillite. In 1971 Adera conducted a geochemical survey over the property after which the claims were allowed to expire.

Bethlehem then staked the LOG #1-72 mineral claims and these were recorded on December 18, 1973. A program of geological mapping, sampling and percussion drilling was carried out between October 28, 1974 and December 20, 1974 and this work was summarized in an assessment report

filed in January 1975. The claim block was reduced to sixty-four claims at this time with a long single row of eight claims on the western perimeter being allowed to expire. Following the drilling program outlined in this report, the sixty-four claims were abandoned and relocated under the provisions of the new modified-grid system. Drawing No. 75-2 details the location of the mineral claims.

Geology

The property is mainly underlain by Upper Triassic Nicola volcanic rocks and their associated intrusions. It lies within an area which is at present undergoing a detailed geological mapping program by the B.C. Department of Mines.

Rocks on the claim block belong to the Central Belt of the Nicola Group which is bounded on the west by the Allison Lake pluton and on the east by a major fault system called the Summers Creek Fault. Faults on the property tend to follow a northerly regional trend and share the steep dips of both this fault zone and the Allison Fault to the west. Dips on the property are generally to the east since it lies on the west limb of a major syncline; the axis of this syncline strikes northerly and lies on the east side of Missezula Lake.

The detailed mapping of this area, recently completed by the B.C. Department of Mines (Preliminary Map No. 17), shows that the new claim block boundaries almost entirely surround an intrusive body which is roughly triangular in shape. This body, which varies in composition from a medium-grained syenodiorite to monzonite, is truncated on the east by a NW trending fault. It intrudes a largely subaqueous assemblage of green flows, flow breccia, tuffs and minor sedimentary units and, being similar in composition to the volcanics, it is thought to be about the same age. It contains several occurrences of chalcopyrite mineralization.

A Geological Plan (Drawing No. 75-3) was prepared by enlarging a portion of the recently published Preliminary Map No. 17 up to the scale of 1:10,000 thus making it compatible with the Mineral Claim Plan (Drawing No. 75-2).

A copy of the "Notes to Accompany Preliminary Map No. 17" are appended in Section E.

Diamond Drilling

Shepherd Enterprises Ltd. of Vancouver and Kamloops were retained to carry out the diamond drilling program. They utilized an E.J. Longyear Model 44 diamond drilling unit employing the wireline core recovery method with an NQ size core barrel. Although the overall core recovery in bedrock was good, its faulted nature caused drilling difficulties with two of the holes being abandoned prior to reaching their planned depth. The other two holes also encountered problems and had to be abandoned.

Drilling on Hole No. L-75-1 began on June 17, 1975 and continued until June 23, 1975. The location was sited on an old I.P. anomaly that had been delineated by previous holders of the ground. The hole was initially planned to be drilled to the 200 to 250 metre range but excessive faulting was encountered at the 100.5 metre (330') depth and the hole was abandoned at 107.9 metres (354').

The second hole (L-75-2) was sited in the area 650 metres northwest of L-75-1. Its depth was also scheduled for the 200 to 250 metre range, but at 16.76 metres (55') a broken tricone bit and jammed drilling rods forced abandonment of this hole. Drilling took place on June 24 and 25, 1975.

Hole No. L-75-2A was spotted a few feet from L-75-2 and commenced on June 26. Overburden was encountered down to 21.6 metres (71'). Tertiary volcanics were then penetrated to the 63.4 metre (208') level. A fossil overburden carried on from 63.4 to 104.5 metres (343')

where a soft bedrock was encountered. Triconing continued to 107.3 metres (352') and at this point the hole was lost during an attempt to change from the tricone bit to the coring equipment. The work on this hole ceased on July 7, 1975.

It was then decided to drill another hole in the proximity of L-75-1 and a point 60.7 metres (200') east was chosen for L-75-3 where drilling began on July 9 and continued until July 15 when the same problems which previously impeded L-75-1, namely badly faulted ground, forced the cessation of the hole. Final depth was 119.2 metres (391').

The following table summarizes the drilling that was carried out:-

Hole No.	Dip	Overburden	Rock	Total Depth
L-75-1	90°	7.01 m.(23')	100.89 m.(331')	107.90 m.(354')
L-75-2	90°	16.76 m.(55')	-	16.76 m.(55')
L-75-2A	90°	21.64 m.(71')	85.65 m.(281')	107.29 m.(352')
L-75-3	90°	5.49 m.(18')	113.69 m.(373')	119.18 m.(391')
		50.90 m.(167')	300.23 m.(985')	351.13 m.(1152')

The locations of the drill holes are shown on Drawing Nos. 75-2, 75-3 and 75-4 which are appended in Section F.

The NQ core was transported to Bethlehem's core storage facilities which are located at its Highland Valley Operations. Here the core was split and logged with half the core going for assay and the other half being retained. Detailed geological logs were prepared by D. C. Miller, P.Eng. and S.H.M. Marr, both of whom are employed by the Exploration Dept. of Bethlehem Copper Corporation. Copies of these logs are to be found in Section D.

Summary of Costs

The expenditures incurred during the aforementioned drilling program totalled $27,318.61 and are detailed in Section B. Copies of all contractors' invoices are also included. Expenditures for the services of contractors totalled $22,498.61 and represent 82.36% of the gross outlay while costs incurred with the Bethlehem organization came to $4,820.00 or 17.64%. The overall average drilling cost that resulted was $77.80/metre or $23.71/foot. This cost is, of course, considerably higher than normal but reflects the difficult drilling conditions that were encountered.

Respectfully submitted,

R. E. Anderson, P.Eng.
Exploration Manager

SECTION B - STATEMENT OF EXPENDITURES

CONTRACTORS (see accompanying invoices)

1. Tri-Valley Construction Ltd. - bulldozer used for site preparation and moving drill unit

Total	$ 1,147.00	
Cost Distribution per hole:-		
L-75-1 - $407.00		(LOG 63 M.C.)
L-75-2 - $192.00		(LOG 54 M.C.)
L-75-2A - $192.00		(LOG 54 M.C.)
L-75-3 - $356.00		(LOG 64 M.C.)

2. Shepherd Enterprises Ltd. - diamond drilling

June 16-30, 1975	$ 6,338.80
July 1-15, 1975	$ 6,132.00
July 1-15, 1975	$ 5,418.79
July 16-19, 1975	$ 3,462.02
Total	$21,351.61

Cost Distribution per hole:-

L-75-1 -	Footage	$ 3,717.00
	Mobilization	$ 175.45
		$ 3,892.45
L-75-2 -	Footage	$ 282.33
	Mobilization	$ 175.45
	Mud and Materials	$ 285.80
		$ 743.58
L-75-2A -	Footage	$ 3,347.17
	Mobilization	$ 175.45
	Mud and Materials	$ 3,054.43
		$ 6,577.05
L-75-3 -	Footage	$ 4,063.50
	Mobilization	$ 175.45
	Mud and Materials	$ 5,899.58
		$10,138.53

TOTAL CONTRACTORS' EXPENDITURES $22,498.61

BETHLEHEM EXPENDITURES

1. Personnel

R. E. Anderson, P.Eng. - Exploration Manager - a total of 5 days during the period from June 16 to July 19, 1975 5 days @ $140.00/day	=	$ 700.00
E. Andersen - Property Agent - 10 days during the period from June 16 to July 19, 1975 10 days @ $75.00/day	=	$ 750.00
D. C. Miller, P.Eng. - Senior Geologist - 3 days June 23-25, 1975 3 days @ $120.00/day	=	$ 360.00
S.H.M. Marr - Geologist - 4 days during the period from June 16 - July 19, 1975 4 days @ $60.00/day	=	$ 240.00
J. G. Collins - Field Supervisor - 24 days during the period from June 16 - July 19, 1975 24 days @ $65.00/day	=	$1,560.00
P. Wannop - Field Assistant - 10 days during the period from June 16-27, 1975 10 days @ $45.00/day	=	$ 450.00
N. Shaw - Secretary - 5 days during the period from June 16 to July 19, 1975 5 days @ $35.00/day	=	$ 175.00
TOTAL		$4,235.00

2. Transportation

D. C. Miller - 1 Ford F-100 4 x 4 Pickup		
3 days @ $15.00/day		$ 45.00
S.H.M. Marr - 1 Ford F-100 4 x 4 Pickup		
4 days @ $15.00/day		$ 60.00
J. G. Collins - 1 Ford F-250 4 x 4 Pickup		
24 days @ $20.00/day		$ 480.00
Total		$ 585.00

Total Bethlehem Expenditures $4,820.00

Cost distribution per hole:-

L-75-1	(7 days)	$1,405.83
L-75-2	(2 days)	$ 401.67
L-75-2A	(8 days)	$1,606.67
L-75-3	(7 days)	$1,405.83

TOTAL EXPENDITURES $27,318.61

Cost per hole:

L-75-1	$ 5,705.28
L-75-2	$ 1,337.25
L-75-2A	$ 8,375.72
L-75-3	$11,900.36

AUG 8 1975

EA
REA
HGE

PHONES:
T. G. Stout
295-3944
W. Wilkinson
295-6186
L. Mckenzie
295-6270

Tri Valley Construction Ltd.

PRINCETON, B. C.
Bulldozing & Craning
P. O. BOX 808

July 29, 1975.

Bethlehem Copper Ltd.,
c/o John Collins,
Ashcroft,
B. C.

STATEMENT

Re. Drill site at Aspen Grove.

June 17	D-5 Cat.	6 hrs.		
" 24	"	8 "		
July 7	"	8 "		
		22 hrs.	@ $ 30.50	-- $ 671.00
June 16	Lowbed	4 hrs.		
" 17	"	4 "		
" 24	"	5 "		
July 7	"	4 "		
		17 hrs.	@ $ 28.00	-- 476.00

TOTAL ..... $ 1,147.00

INVOICE

JUL - 7 1975 REA

SHEPHERD ENTERPRISES LTD.

804 - 470 Granville Street, Vancouver, B.C. V6C 1V5
Box 21 - 24, Station A, Kamloops, B.C. V2B 7K6

Bethlehem Copper Corporation

2100 - 1055 West Hastings Street

VANCOUVER, B. C.

Invoice No. 0033

Date June 30, 1975

Period June 16 - 30

Property Aspen Grove

FOOTAGE:

Hole #	From	To	Footage	Price/Ft	Total	
75-1	0	354	354	10.50	3,717.00	
75-2	Overburden		55	Field Cost	-	
75-2A	Overburden		65	Field Cost	-	$4662.00
75-2A	0	155	155	10.50	-1,627.50 / 945.00	5,344.50

MUD:

8 bags - Hole 75-2
12 bags - Hole 75-2A
20 bags mud @ $6.10 each - 122.00 — 122.00

MOBILIZATION TO JOB SITE:

48 man hours @ $9.75 per hour	468.00	
Plus 10%	46.80	514.80
Hi-boy Rental to jobsite	170.00	
Plus 10%	17.00	187.00

MATERIAL LOST IN HOLE 75-2:

1 - 3-7/8 tricone @ $65.00 ea less 20% for wear	-	52.00
1 - NQ sub to tricone @ $40.00 less 50% for wear	-	20.00
6 - NQ rods @ $55.00 ea less 50% for wear	-	165.00
		237.00

OPERATING FIELD COST:

40 man hours @ 9.75 per hour	390.00	
20 Longyear 44 hours @ 8.50 per hr	170.00	
	560.00	
Plus 10%	56.00	616.00

PER: G. Schultz, Field Super. Gary Schultz

TOTAL INVOICE: $ 7,021.30

Less Cr. 682.50

$ 6338.80

Engineering Approval _____ Date _____

Ck for Payment.
003-938
CET

INVOICE

JUL 18 1975 KEA

SHEPHERD ENTERPRISES LTD.

804 - 470 Granville Street, Vancouver, B.C. V6C 1V5
Box 21 - 24, Station A, Kamloops, B.C. V2B 7K6

Bethlehem Copper Corporation Ltd.,
Suite 2100 - 1055 West Hastings Street,
VANCOUVER, B. C.

Invoice No. 0041
Date July 17, 1975

Period Aspen Grove
Property July 1 - 15

FOOTAGE:

Hole No.	From	To	Footage	Price/Ft	Total
75-2 A	155	352	197	$10.50	2,068.50
75-3	0	387	387	$10.50	4,063.50

TOTAL DRILLING COST: $ 6,132.00

Extra charges for lost and unrecoverable equipment will follow.

Thank you.

PER: E. Tessmer

E. Tessmer, Gen. Mgr.

ok for Payment.
003-938
RCH.

Engineering Approval Date

INVOICE

JUL 2 3 1975 KEA ✓

SHEPHERD ENTERPRISES LTD.

804 - 470 Granville Street, Vancouver, B.C. V6C 1V5
Box 21 - 24, Station A, Kamloops, B.C. V2B 7K6

Bethlehem Copper Corporation Ltd.,
Suite 2100 - 1055 West Hastings Street,
VANCOUVER, B. C.

Invoice No. 0043

Date July 22, 1975

Period July 1 - 15, 1975

Property Aspen Grove

Hole 75-2A

Mud:	47 bags at $6.10 each			286.70
Man Hours:	July 6 - 16 hrs @ $9.75 per hr		156.00	
	July 7 - 24 hrs @ $9.75 per hr		234.00	
Machine Hrs:	- 16 hrs @ $8.50 per hr		136.00	
			526.00	
		Plus 10%	52.60	578.60
Materials:	4 NW Casing Shoes @ $186.75 ea		747.00	
	1 NQ Reaming Shell		253.73	
	4 NW Casing @ $18.75 ea		75.00	
	2 1-3-7/8 Tricones @ $85.00 ea		170.00	
	2 NQ Bits N5LY 4310, N5LY 4309 @ $392.60 ea		785.20	
	1 NW Sub		85.00	2,115.93

Hole 75-3

Mud:	32 bags at $6.10 each			195.20
Man Hours:	July 14 - 42 hrs @ $9.75 per hr		409.50	
	July 15 - 40 hrs @ $9.75 per hr		390.00	
Machine Hrs:	- 41 hrs @ $8.50 per hr		348.50	
			1148.00	
		Plus 10%	114.80	1,262.80
Materials:	2 NQ Shells #3473-3621 @ $253.73		507.46	
	1 NQ Bit N5LY 306		392.60	
	1 2-7/8 Tricone		79.50	979.56

TOTAL INVOICE: $ 5,418.79 ✓

PER: J.M. Healy J.M. Healy, Adm. Assist.

Engineering Approval _____ Date _____

JUL 31 1975

INVOICE

HGE ✓
ACP ✓

SHEPHERD ENTERPRISES LTD.

804 - 470 Granville Street, Vancouver, B.C. V6C 1V5
Box 21 - 24, Station A, Kamloops, B.C. V2B 7K6

Bethlehem Copper Corporation Ltd.,
Suite 2100 - 1055 West Hastings Street,
VANCOUVER, B. C.

Invoice No. 0047
Date July 30, 1975

Period July 16 - 19

Property Aspen Grove

Refer to Invoice 0044 - Invoice Replaced:

Hole 75-3

Man Hours:	July 16 - 20 hrs @ $9.75 per hr -	195.00	
	July 17 - 30 hrs @ $9.75 per hr -	292.50	
	July 18 - 50 hrs @ $9.75 per hr -	487.50	
Machine Hrs:	- 30 hrs @ $8.50 per hr -	255.00	
		1,230.00	
	Plus 10%	123.00	1,353.00
Materials:	1 BQ Core Barrel - complete	516.00 *	
	1 Stabilizer	16.65 *	
	1 Overshot - complete	241.00 *	
	1 BQ Reaming Shell	198.10	
	2 BQ 100 Series Bits @ 308.25 ea	616.50	
	2 NW Casing Shoes @ 186.75 ea	373.50	
	3 10' NQ Rods @ 48.00 ea new less 50% = 24.00 ea	72.00	
		2,033.75	
	Less 20% on * items	154.73	1,879.02
Broadway Bulldozing Charges	As per attached Invoice		230.00
		TOTAL INVOICE:	$ 3,462.02

PER: _____ E. Tessmer, Gen. Mgr.

Engineering Approval _____ Date _____

SECTION C - STATEMENT OF EMPLOYEE QUALIFICATIONS

DAVID CHARLES MILLER, P.ENG. - Mr. D. C. Miller,

geologist, obtained the degree in Geological Engineering from the University of British Columbia in 1959. Following graduation he was employed by Eldorado Mining and Refining Ltd. and Cominco Ltd. before joining the exploration staff of Bethlehem Copper Corporation in the fall of 1967. His positions with Bethlehem have been as Chief Geologist at the company's Highland Valley operations and Maggie exploration project (1967-73), Senior Exploration Geologist on numerous property examinations and exploration ventures in Canada and the United States (1973 to the present).

SANDRA H.M. MARR - Mrs. Sandra Marr

graduated in 1968 from the University of St. Andrews, Scotland with a B.Sc.(Hons.) degree in Geology. She was employed from Nov. 1969 to March 1970 as a Research Assistant to Professor A. C. Turnock at the University of Manitoba; from April 1970 to Nov. 1971 as a Geological Technician for Anaconda American Brass in Noranda, Quebec and from June 1972 to April 1973 as a Geological Technician with Dundee-Palliser Resources in Calgary, Alberta. Mrs. Marr joined the exploration staff of Bethlehem Copper Corporation in May 1973 and has been primarily responsible for conducting research into geological projects in both the metal and coal industries as well as maintaining the company's geological library. She has also assisted on some of Bethlehem's drilling projects.

Both these employees have carried out their assignments in a competent and professional manner.

R. E. Anderson, P.Eng.
Exploration Manager

SECTION D - DRILL HOLE LOGS

Hole No. L-75-1

Hole No. L-75-2

Hole No. L-75-2A

Hole No. L-75-3

DRILL HOLE LOG

BETHLEHEM COPPER CORPORATION LTD.

SHEET No.1

Property	MISSEZULA LAKE	Hole No.	L-75-1	Bearing	-	Elevation	~ 4250'
District	Nicola Mining Division	Length	354'	Dip	-90°	Overburden	23'
Commenced	June 17, 1975	Latitude	120' N and 100' W of	Hor. Comp.	-	Recovery	
Completed	June 23, 1975	Departure	#1 POST OF LOG 63, 64	Vert. Comp.	354'	Purpose	EXPLORE I.P. AND SOIL ANOMALY AT DEPTH

Logged by D. C. Miller

Date June 23, 1975

D Carlb.

DESCRIPTION	SULPHIDES			ALTERATION				STRUCTURE		OTHERS		From	To	Sample No.	%Cu	%Mo				% Recovery
	Py: Cp	Bn: Cp	% Py	Ser.	Chl.	Ep	K-spar	Faults	Fractures	Qtz. Veining	Aplitic Veins									
(23 - 66) Breccia																				
Medium greys, pinks; fine grained granular texture; strong fine grained pyrite mineralization around subrounded fragments, in fine discontinuous veins and	>10:1		8		Mod.	Mod			Weak	5% Calcite		23	30	1167M						90
disseminated throughout the rock; some magnetite as fine grains and also small veinlets;	"		"		"	"			"	"		30	40	1168M						95
occasional grain of chalcopyrite; medium to strong epidote, chlorite and calcite alteration; rock is a fine-grained aggregate of grey	"		"		"	"			"	"		40	50	1169M						95
and pink feldspar; some quartz and chloritized mafics; epidote is present in discontinuous	"		"		"	"		(52-56)	"	"		50	60	1170M						80
veinlets and small masses <5% overall; feldspars are relatively unaltered; fracturing is weak	"		5		"	"			"	"		60	70	1171M						95
and stronger fractures trend at 40-70°; (52-56), fault zone, broken, ground core	1:1		<1		"	"			"	"		70	80	1172M						95
	"		<1		"	"			"	"		80	90	1173M						95
(66 - 94) Fine Grained Intrusive	"		<1		"	"			"	"	Minor hematite	90	100	1174M						95
Brick red - grey; fine grained granular texture; aggregate of red and grey feldspar with some quartz and mafics	>10:1		5		"	"			"	"	"	100	110	1175M						95
altering to chlorite; some epidote; sparse sulphides with chalcopyrite ≈ pyrite < ½%	"		5		"	"			"	"	"	110	120	1176M						95

DRILL HOLE LOG

BETHLEHEM COPPER CORPORATION LTD.

Property MISSEZULA LAKE Hole No. L-75-1 Logged by D. C. Miller Date June 23, 1975

DESCRIPTION	SULPHIDES			ALTERATION				STRUCTURE		OTHERS		From	To	Sample No.	%Cu	%Mo				% Recovery
	Py: Cp	Bn: Cp	% Py	Ser.	Chl.	Ep	K-spar	Faults	Fractures	Qtz. Veining	Aplitic Veins									
(94 - 100) Breccia, as 0-66	>10:1		2	Clay	Mod.	Mod.			Weak	5-15% Calcite	Minor hematite	120	130	1177M						95
(100 - 114) Fine Grained Intrusive	>10:1		5	"	"	Str.			"	"	"	130	140	1178M						95
Reddish to grey; strong disseminated fine grain pyrite; traces of	>10:1		3	"	"	"			"	"	"	140	150	1179M						95
chalcopyrite; strong epidote	10:1		1	"	"	"			"	"	"	150	160	1180M						98
(114 - 354) Fine Grained Intrusive	10:1		1	"	"	"			"	"	"	160	170	1181M						95
Grey; fine grained; 1-5% pyrite mainly in fine veinlets; strong epidote in	10:1		1	"	"	"			"	"	"	170	180	1182M						95
discontinuous veins and blebs; strong magnetite; some feldspar and hornblende	10:1		1	"	"	"			"	"	"	180	190	1183M						95
crystals aligned at 70° to core axis.	10:1		2	"	"	"			"	"	-	190	200	1184M						95
(114 - 209) Mainly dark grey	10:1		2	Mod	"	"			"	"	-	200	210	1185M						95
(209 - 354) Dark grey with 50-75% altered light grey sections with calcite epidote and pale feldspar; local medium grained texture.	10:1		2	"	"	"			"	"	-	210	220	1186M						95
	10:1		2	"	"	"			"	"	-	220	230	1187M						90
	10:1		2	"	"	"			"	"	-	230	240	1188M						95
	10:1		2	"	"	"			"	"	-	240	250	1189M						95

DRILL HOLE LOG

BETHLEHEM COPPER CORPORATION LTD.

Property MISSEZULA LAKE Hole No. L-75-1 Logged by D. C. Miller Date June 23, 1975

DESCRIPTION (114 - 354)	SULPHIDES			ALTERATION				STRUCTURE		OTHERS		From	To	Sample No.	%Cu	%Mo				% Recovery
	Py: Cp	Bn: Cp	% Py	Ser.	Chl.	Ep	K-spar	Faults	Fractures	~~Qtz. Veining~~	~~Aplitic Veins~~									
Fine Grained Intrusive (cont'd)	10:1		2	CLAY Mod.	Mod.	Str.			Weak	5-15% Calcite Veining		250	260	1190M						95
	10:1		2	"	"	"			"	"		260	270	1191M						95
(343 - 354) Fault zone; broken crushed with some gouge; strong chlorite alteration; some very fine grained chalcopyrite, mainly disseminated.	10:1		4	Wk	"	"			"	"		270	280	1192M						95
	10:1		4	Mod	"	"			"	"		280	290	1193M						95
END OF HOLE - DRILL COULD NOT PENETRATE FAULT ZONE	10:1		3	"	"	Mod.			"	"		290	300	1194M						95
	10:1		2	"	"	"			"	"		300	310	1195M						95
	10:1		2	"	"	"			"	"		310	320	1196M						95
	10:1		4	"	"	"			"	"		320	330	1197M						95
	4:1		5	"	Str.	"		343	Mod.	"		330	340	1198M						80
	4:1		2	"	"	"		to 354	Strong	"		340	350	1199M						40
	4:1		2	"	"	"		Fault Zone	Strong	"		350	354	1200M						40

DRILL HOLE LOG

BETHLEHEM COPPER CORPORATION LTD.

SHEET No. 1

Property MISSEZULA LAKE	Hole No. L-75-2	Bearing -	Elevation 4150'	Logged by No log completed	
District Nicola Mining Division	Length 55'	Dip 90°	Overburden 55'	Date as bedrock was	
Commenced June 24, 1975	Latitude 450' N and 1350' E of	Hor.Comp. -	Recovery	not encountered.	
Completed June 25, 1975	Departure #1 POST of LOG 53, 54	Vert.Comp. 55'	Purpose		

DESCRIPTION	SULPHIDES			ALTERATION				STRUCTURE		OTHERS		From	To	Sample No.	%Cu	%Mo				% Recovery
	Py: Cp	Bn: Cp	% Py	Ser.	Chl.	Ep	K-spar	Faults	Fractures	Qtz. Veining	Aplitic Veins									
0-55 Overburden																				
Hole lost at 55'																				

DRILL HOLE LOG

BETHLEHEM COPPER CORPORATION LTD.

SHEET No. 1

Property MISSEZULA LAKE | Hole No. L-75-2A | Bearing - | Elevation 4150' | Logged by S. Marr

District Nicola Mining Division | Length 352' | Dip -90° | Overburden 71' | Date July 15, 1975

Commenced June 26, 1975 | Latitude 450' N and 1350' E of | Hor.Comp. - | Recovery Poor

Completed July 7, 1975 | Departure #1 POST of LOG 53, 54 | Vert.Comp. 352' | Purpose S. Marr

DESCRIPTION	SULPHIDES			ALTERATION				STRUCTURE		OTHERS		From	To	Sample No.	%Cu	%Mo				% Recovery
	Py:Cp	Bn:Cp	% Py	Ser.	Chl.	Ep	K-spar	Faults	Fractures	Qtz. Veining	Aplitic Veins									
71-146' Tertiary volcanics, predominantly andesitic, which are amygdaloidal and/or spherulitic in parts and vary in colour from light grey to pinkish grey to dark grey. From 141-146 the rock becomes progressively darker in colour and is also brick red stained.									W to EOH			71	80							100
												80	90							100
												90	100							100
												110	120							100
												120	130							100
146-208 Brick-red volcanic ash which becomes more grey in colour towards 208' (recovery poor).												130	140							100
												140	150							90
146-165 - Brick red, becoming less competent, contains tiny pebbles.												150	160							5
165-198 - Orange fine sand (very fine 180-190)												160	170							10
198-208 - Grey coarser sand												170	180							10
												180	190							2
												190	200							12
												200	210							15

DRILL HOLE LOG

BETHLEHEM COPPER CORPORATION LTD.

Property MISSEZULA LAKE Hole No. L-75-2A Logged by S. Marr Date July 15, 1975

DESCRIPTION	SULPHIDES			ALTERATION				STRUCTURE		OTHERS		From	To	Sample No.	%Cu	%Mo				% Recovery
	Py: Cp	Bn: Cp	% Py	Ser.	Chl.	Ep.	K-spar	Faults	Fractures	Qtz. Veining	Aplitic Veins									
208-343 - Rubble - probably a fossil overburden; appears to be a fairly unconsolidated section of boulders of varying composition.												210	220							15
												220	230							35
												230	240							3
												240	250							3
												250	260							3
												260	270							3
												270	280							3
												280	290							3
												290	300							3
												300	310							3
343-352 (E.O.H.) Soft intrusive bedrock with strong pyrite. Recovery very poor.												310	320							3
												320	330							3
												330	340							3
												340 (343	352 352)							1

DRILL HOLE LOG

BETHLEHEM COPPER CORPORATION LTD.

SHEET No. 1

Property	Missezula Lake	Hole No.	L-75-3	Bearing	-
District	Nicola Mining Division	Length	391'	Dip	-90°
Commenced	July 9, 1975	Latitude	120' N and 100' E of	Hor.Comp.	-
Completed	July 15, 1975	Departure	#1 POST of LOG 63, 64	Vert.Comp.	391'

Elevation	4260'	Logged by	S. Marr		
Overburden	18'	Date	July 16, 1975		
Recovery	Generally good				
Purpose	To test I.P. Anomaly at depth.				S. Marr

DESCRIPTION	SULPHIDES			ALTERATION				STRUCTURE		OTHERS		From	To	Sample No.	% Cu	% Mo	% Recovery
	Py: Cp	Bn: Cp	% Py	Ser	Chl.	Ep	K-spar	Faults	Fractures	Qtz. Veining	Aplitic Veins						
18-49 Greenish-grey to grey f. gr. intrusive? with moderate magnetite content. Pyrite occurs as disseminations, stringers, clusters and on a few fracture faces. Bleaching is often present along the main fractures which lie at about 50° to C.A. Epidote often occurs as a fracture filling and K-spar? may be seen near some of the larger fractures. Calcite veins may also be present, e.g. @21', 70-80' and 100-120'.			5		W-M	W-S			W	cc vn		18	30				80
			3		W-M	W-M			W			30	40				95
			<1		W-M	M-S			W			40	50				100
			<1		W-M	Strong in patches			W			50	60				100
			<1		W-M	W-M			W			60	70				100
Brecciated zones are present at 35-35.5', 38-40' and 47-49'. The angular fragments consist of rocks which are pink or light grey in colour and these occur in a matrix high in epidote and magetite.			<1		W-M	M-S			W-M	cc vns		70	80				100
			3		W-M	W-M			W			80	90				90
			1		W-M	W-M			W			90	100				100
49-80 - a more uniform f-m grained rock with needles of hornblende - flow or dyke? as crystals aligned to some extent. Epidote plus a little K-spar? occur in patches.			2		W-M	W-S			W-M	A few cc vns		100	110				100
			3		M	M-S		Fault Zone	S	A few cc vns		110	120				70
80-131 Rock again has some strongly fragmental zones with associated py. and mte. e.g. at 81-88' and 94-113'. Pyroclastic?			3		M	W-M		~~113~~ ↓	S			120	130				45
113-131 Fault zone - the rubble appears to be a	138.5 - cpy. with py and epi.		2.		W-M	W-M		131	S			130	140				90

DRILL HOLE LOG

BETHLEHEM COPPER CORPORATION LTD.

SHEET No. 2

Property MISSEZULA LAKE Hole No. L-75-3 Logged by S. Marr Date July 16, 1975

DESCRIPTION	SULPHIDES			ALTERATION				STRUCTURE		OTHERS		From	To	Sample No.	%Cu	%Mo				% Recovery
	Py: Cp	Bn: Cp	% Py	Ser.	Chl.	Ep.	K-spar	Faults	Fractures	Qtz. Veining	Aplitic Veins									
continuation of the pyroclastic? unit.		Some cpy.	2		W-M	W-M			M-S			140	150							95
131-7 Rock still fragmental in appearance; weakly epidotized; light greenish-grey; fragments harder to differentiate; varies from med.→f.gr.;		Occas. cpy.	3		W-M	W-M			M-S			150	160							100
hematite or epidote or pyrite may be present on fracture faces.		Specks and Occas. Stringer cpy.	5		W-M	M		Chl. often on fract. faces	S V.S. bet. 165-6			160	170							100
137-137.5 - brecciated zone with mte., epidote and some K-spar?		"																		
137.5-140 as 131-7 Pyrite generally in stringers or on fracture faces		"	5		W-M	M			S			170	180							100
138.5 Chalcopyrite along small shatter zone 140-367 Matrix becomes darker grey with lighter epidotized patches. Probably pyroclastic as rock		Specks cpy.	1		M	M			S	A few cc vns		180	190							100
becomes strongly fragmental at 142-3 (larger fragments sub-rounded) and continues to be		"	3		W-M	W-M			S			190	200							100
fragmental, though % fragments and their size vary. The fragments often consist of rock with		"	3		W-M	W-M			M			200	210							100
pink ground mass.		"	2		W-M	W-M			M-S			210	220							95
201-4 and 211-8 Rock bleached																				
211-20 Pervasive epidotization																				
220-30 Finer fragments, sometimes bleached																				
227' Heavy mte.		"	1		W-M	W-M		228.5-229	S V.S. @ 228' & 227.5-30			220	230							100
228.5 Small fault																				
230-40 Pervasive alteration, often high in mte.		Some cpy on shear face	1		W-M	M-S		234-240	V.S.			230	240							55
240-70 Fractures in various directions; several parallel to C.A.		Some cpy on shear face and in blebs	4		W-M	S			S			240	250							95
270-6 Gen. darker ground mass; heavily pyritized;																				

DRILL HOLE LOG

BETHLEHEM COPPER CORPORATION LTD.

SHEET No. 3

Property MISSEZULA LAKE Hole No. L-75-3 Logged by S. Marr Date July 16, 1975

DESCRIPTION	SULPHIDES			ALTERATION				STRUCTURE		OTHERS		From	To	Sample No.	%Cu	%Mo				% Recovery
	Py. Cp	Bn. Cp	% Py	Ser.	Chl.	Ep.	K-spar	Faults	Fractures	~~Qtz.~~ Veining	Aplitic Veins									
large number of pinkish fragments.	Specks cpy.		4		M	M-S			M-S	cc vns		250	260							95
276-80 and 294-8 - Large fragment or small dyke of pinkish rock, with less pyrite. Blebs hematite. Pink fragments continue to 304'.	Specks cpy		3		M	M			S	cc vns		260	270							95
280-300 Rock more bleached and altered especially near fault at 295'.			3		M	M			S			270	280							95
Shatter zones present at 317.5-18; 330.5-31.5; 335-51.	Dissem. cpy		2		S	W-M			V.S.			280	290							100
325-30 - Large number of bleached fragments. 351-2 - Fault; rock bleached and strongly altered and also at 359-63'.	Dissem. cpy		2		S	W-M		Minor fault @ 295'	V.S.			290	300							100
	Dissem. cpy		3		S	W-M			S			300	310							100
363-67 - Strongly altered with some stringers, blebs and disseminations of cpy.	Dissem. cpy		3		W-M	W-M			S-V.S. in parts			310	320							95
367-91 - Dark pinkish grey porphyritic flow unit; phenocrysts mainly chloritized mafics with a few of plagioclase; show good alignment. Variable numbers of epidote and calcite veins; main veins at 60° to C.A. Hematite or chlorite or sericite may also be present on fracture faces.	Dissem. cpy. Small chalcocite vn at 315'		1		W-M	W-M			S			320	330							95
	330- cpy stringer		1		M	M-S			S			330	340							100
	Dissem. cpy. and a few stringers		1		M	W-M			V.S.			340	350							90
			1		M	W-M		351-2' Fault	V.S.			350	360							90
373 - Stronger epidotization and chloritization Pyrite rare.		Cpy	2		M-S	M-S		367' fault	S-V.S.	Epidote and cc vns		360	370							90
Alteration much stronger in fault zones;			<1		W-M	W-M		Fault zones @378-8' 379-85' 387-91'	V.S.			370	380							75

DRILL HOLE LOG

BETHLEHEM COPPER CORPORATION LTD.

SHEET No. 4

Property MISSEZULA LAKE Hole No. L-75-3 Logged by S. Marr Date July 16, 1975

DESCRIPTION	SULPHIDES			ALTERATION				STRUCTURE		OTHERS		From	To	Sample No.	%Cu	%Mo				% Recovery
	Py: Cp	Bn: Cp	% Py	Ser.	Chl.	Ep.	K-spar	Faults	Fractures	~~Qtz.~~ Veining	Aplitic Veins									
occasional K-spar? Recovery poor.			<1		W-M	W-M			V.S.			380	391							40
391' E.O.H.																				

SECTION E - GEOLOGICAL DATA

B.C. DEPARTMENT OF MINES and PETROLEUM RESOURCES -

Notes to Accompany Preliminary
Map No. 17 by V. A. Preto

BRITISH COLUMBIA
DEPARTMENT OF MINES AND PETROLEUM RESOURCES

NOTES TO ACCOMPANY PRELIMINARY MAP NO. 17

GEOLOGY OF THE ALLISON LAKE – MISSEZULA LAKE AREA

By V. A. Preto

LOCATION AND ACCESS

During the 1974 field season mapping was continued southward from the area covered in 1973 (Preto, 1974) and an additional 55 square miles was completed. This area covers parts of map sheets 92H/15E and 92H/10E and is bound by latitudes 49 degrees 40 minutes north and 49 degrees 48 minutes 45 seconds north and by longitudes 120 degrees 30 minutes west and 120 degrees 37 minutes 30 seconds west. Highway 5 traverses the western part of the map-area and ready access to the whole area is provided by numerous secondary roads.

GEOLOGY

GENERAL REMARKS

Like the area to the north, this map-area is mainly underlain by Upper Triassic Nicola volcanic rocks and associated intrusions. Of the three belts that had previously been described as forming the Nicola assemblage (Preto, 1974) only the Central and Eastern belts are recognized in the present map-area, and these differ considerably from their northern counterparts in the lithologies involved. Rocks of the Eastern belt which to the north consist of a generally well-bedded, probably marine, assemblage of greenish volcaniclastic sedimentary rocks and which lack intrusive rocks, change abruptly near the northeast corner of the present map-area into a predominantly subaerial assemblage dominated by pyroclastic and laharic deposits and dotted by several intrusions. Conversely, rocks of the Central belt which in the north-central part of the present map-area and in areas to the north consist of a largely subaerial assemblage of flows, breccia, and laharic deposits, change abruptly into a largely subaqueous southern assemblage of green flows, flow breccia, tuffs, and minor sedimentary members.

NICOLA GROUP

CENTRAL BELT

The Central belt is bound to the east by Summers Creek fault and to the west by Allison Lake pluton. It consists of the volcanic rocks of map units 1 and 2 and of all the occurrences of map unit 4.

Exposures of map unit 1 are plentiful in the vicinity of Missezula Mountain, but extensive moss and lichen cover makes the tracing of individual flows a difficult task. The flow rocks of unit 1 are typically massive, commonly amygdaloidal, dark green pyroxene and/or plagioclase porphyries. Indices of refraction of glass beads indicate that the bulk of these flows are of andesitic to basaltic composition. In thin section these rocks commonly show a good deal of saussuritic and propylitic alteration with widespread development of epidote, carbonate, chlorite, actinolite, and sericite. Vesicles are commonly filled with chlorite, epidote, and calcite. The predominant mafic constituent is an augitic clinopyroxene which is usually variably replaced by hornblende, chlorite, or epidote. No olivine was noted. Plagioclase phenocrysts are commonly badly altered, but the few thin sections of weakly altered rocks that have been examined indicate that the original plagioclase phenocrysts of these flows were zoned, intermediate to calcic labradorite.

The flows grade laterally into and are interbedded with massive flow breccia units of similar composition. These rocks are beautifully exposed along the road to and near the Missezula Microwave Station where they are interpreted as flow breccias on the basis of the monolithologic and reaction rimmed nature, angularity, and poor sorting of the clasts which are of the same composition as the crystalline matrix.

Volcaniclastic and bedded pyroclastic deposits of units 1c, 1d, and 1f are found mostly in the south-central part of the map-area, where they help in indicating the attitude of the massive flows with which they are interlayered, and in a belt that stretches along the west side of Summers Creek and northward to the west side of Missezula Lake. Of these, unit 1f is characterized by an abundance of fragments of grey and light grey, aphanitic rhyolite or dacite, an equivalent of which is not found in the nearby flow units. Lenses of reefoid limestone are occasionally interlayered with these strata. Poorly preserved shell fragments were collected from limestone at three localities, but no dating could be obtained from them.

Flow, breccia, and laharic deposits of unit 2 are found only in the north-central part of the map-area and are southern extensions of map units 5c, 4a, and 4b of Preliminary Map No. 15 (Preto, 1974), to which the reader is referred for description. A few discontinuous layers of dark grey, pyritic tuff of unit 2d are found interlayered with the red and green breccias along and west of the powerline.

EASTERN BELT

Rocks of the Eastern belt occur east of the Summers Creek fault and are dominated by laharic deposits. In the area northeast of Missezula Lake a fairly complex assemblage of thinly bedded, grey-weathering volcaniclastic rocks (unit 3a), laharic deposits (unit 3b), crystal and lapilli tuff (unit 3c), and a few analcite-bearing augite-plagioclase trachyandesite and trachybasalt flows (unit 3d) surround an elongated body of micromonzonite porphyry and breccia that is believed to represent a shallowly eroded volcanic

dome. There is a similarity in composition between intrusive and extrusive rocks in this area, and rock fragments in all the clastic units around this dome are clearly derived from the dome. The rapid facies change that was noted in the Eastern belt a short distance north of the northeast corner of the map-area (Preto, 1974, p. 3) is believed to represent the northern limit of influence of this volcanic centre, at least with respect to flow rocks and pyroclastic rocks consisting of fragments of lapilli and larger size. This distance is in the order of 2 miles; a similar distance to the south of the dome, the rather complex assemblage of tuffs, flows, and volcaniclastic and laharic deposits changes into a thick succession of laharic deposits with minor lenses of conglomerate, grit, and occasionally limestone. These deposits are usually massive to crudely bedded, reddish to grey in colour, and contain abundant clasts of pink and red microsyenite and micromonzonite porphyry and of purple trachyandesite. Three other stocks of fine-grained monzonite cut these strata but none is surrounded by the assemblage of flows, tuffs, and volcaniclastic deposits that surround the stock northeast of Missezula Lake. This probably means that if the three southern stocks ever broke to the surface as volcanic vents, they did so at a higher level, and their extrusive products were lost to erosion.

INTRUSIVE ROCKS

UNIT 4

Several poor exposures of a leucocratic, pyritic, highly sheared quartz porphyry occur along a northerly trending shear zone in the southeastern corner of the map-area. Though highly sheared, the porphyry appears to be intrusive into flow rocks of unit 1a. It clearly predates the shear zone which appears to be truncated to the north by diorite of unit 6. Though the age of the diorite is not known, it is believed to be related to the volcanic rocks (*see* later), and the age of the quartz porphyry is thus assumed to be also Upper Triassic.

UNIT 5

Four stocks of reddish and pink micromonzonite and some microsyenite porphyry occur in the Eastern belt, and two similar, though smaller, plutons occur in the Central belt associated with rocks of unit 2. The northernmost of the Eastern belt stocks is strongly elongated in a northerly direction and consists of a central, and probably lower, part of massive porphyry and of a peripheral, and higher, zone of porphyry breccia. The distribution and nature of the surrounding volcanic and volcaniclastic rocks suggest that this intrusion represents a shallowly eroded volcanic dome from which the surrounding volcanic rocks were produced. As indicated by these strata, volcanism was for the most part subaerial, but a shallow basin must also have surrounded the vent area for some time so as to allow the formation of the lenses of impure limestone which fringe the stock.

The other three stocks are of similar porphyry but intrude a simpler assemblage of laharic deposits that contain a predominance of porphyry clasts similar to the stocks. It is probable that these stocks, like the one northeast of Missezula Lake, are the eroded remains of volcanic centres, since they represent high level intrusions and the surrounding strata are rich in clasts of similar lithology, but it would also appear that they have been more deeply eroded since they are not surrounded by their more immediate extrusive products such as flows or tuffs, which were probably removed by erosion.

UNIT 6

Medium-grained, grey syenodiorite and monzonite of unit 6 are found only in the Central belt in six stocks of variable size. The northernmost of these bodies, which is also the largest, occurs in the north-central part of the map-area west of Missezula Lake, and contains several occurrences of chalcopyrite mineralization. The stock is elongated in a northwesterly direction and is in part truncated by a northwesterly trending fault. The eastern part of the stock is mostly medium grained, grey pyroxene syenodiorite and diorite breccia locally invaded by small, irregular bodies of syenitic breccia and flooded by pink K-feldspar. The western part of the stock has a very irregular outline and consists of long dyke-like bodies of fine-grained green hornblende-pyroxene porphyry. Other stocks of similar diorite are found further south and are all elongated parallel to or cut by northerly trending faults. Copper mineralization is widespread in one of these stocks located immediately southeast of the Missezula Microwave Station.

No information on the age of these intrusions is available at this time, but their composition appears to be very similar to that of the surrounding volcanic rocks. It is suggested that these intrusives, like similar bodies in the Copper Mountain and Kamloops areas, though cutting the volcanic rocks, are roughly of the same age.

ALLISON LAKE PLUTON (UNIT 7)

This post-Nicola pluton occupies the western part of the map-area and has been previously described as consisting of red granodiorite (Rice, 1947, p. 39). Most of the pluton was found to consist of reddish and grey, locally miarolitic biotite-hornblende granite and quartz monzonite (unit 7a). Grey hornblende granodiorite (unit 7b) and grey to dark grey, locally migmatitic hornblende diorite and quartz diorite (unit 7c) also form part of this pluton. Large inclusions, or roof pendants of altered volcanic rocks, probably Nicola (unit 7d), occur at several places, suggesting that the present level of erosion is close to the former roof of the intrusion. North of Allison Lake, granitic rocks are cut by a large number of northeasterly trending, dark-coloured basic dykes, indicating a zone of tension within the pluton. The granitic rocks clearly cut Nicola volcanic rocks, which along the contact are sheared, silicified, and pyritized. Rice (1947, p. 39) indicates that to the southwest of Allison Lake the pluton is unconformably overlain by Lower Cretaceous Kingsvale rocks. It would therefore appear that the Allison Lake pluton is of Lower to Middle Jurassic age.

KINGSVALE GROUP (UNIT 8)

A few isolated exposures of plagioclase and augite-plagioclase andesite porphyry occur north of Loosemore Lake, a short distance north of exposures of granite of unit 7a. The volcanic rocks are only slightly altered and resemble somewhat in appearance volcanic rocks west of Aspen Grove that have been mapped as part of the Kingsvale Grup.

VALLEY BASALT (UNIT 9)

A few isolated exposures of Pleistocene and Recent basalt are found in the northwestern corner of the map-area. This unit is part of widespread flows of valley basalt that occur at several localities north of the map-area (Preto, 1975).

STRUCTURE

The structure in the map-area is characterized by an apparent lack of folding and is dominated by Allison fault to the west and by Summers Creek fault and its subsidiaries to the east. These high-angle structures constitute a major northerly trending fracture system which not only divides the Nicola Group into mappable belts but also controls the distribution of intrusive rocks. It is evident that such a fracture system was a dominating structural feature in Upper Triassic time in this area and should be regarded as an ancient rift system. Intermittent block movement along these faults appears to have occurred over a long period of time, and was certainly prominent in Middle Eocene time, when successor basins such as Princeton Basin south of the map-area was formed.

The Summers Creek fault marks the boundary between largely subaerial assemblages of the Eastern belt and mostly submarine sequences of the central belt, and also sharply controls the distribution of intrusive rocks of unit 5 to the east and units 4 and 6 to the west. With the exception of the area northeast of Missezula Lake, where structures in the stratified rocks are dominated and controlled by the syenite pluton, rocks of the Eastern belt dip moderately to steeply to the west.

Within most of the Central belt, layered rocks exhibit moderate to steep east and northeast or vertical dips, but in the vicinity of Missezula Mountain several westerly dips occur, indicating the presence of either a northerly trending syncline or of some severely tilted fault panels. Lack of clearly recognizable stratigraphic markers and of suitable minor structures preclude the positive identification of a fold structure in this area. Another major structural feature is a large northerly trending zone of intense shearing and faulting which marks the western boundary of Summers Creek fault system. This shear zone has been mapped from Missezula Lake to the southern boundary of the map-area, and continues to the south. It ranges in width from a few feet to more than 1,000 feet and over most of its length all rocks within it are reduced to highly fissile greenschist and sericite schist with a strong foliation that for the most part dips steeply to the west.

MINERAL DEPOSITS

Most of the mineralized occurrences in the map-area are in the Central belt, and consist of disseminations and minor replacements of pyrite, chalcopyrite, and occasionally some chalcocite in intrusive rocks of unit 6 or in volcanic rocks along faults of the Summers Creek system such as at the KR prospect northeast of Missezula Microwave Station. A few occurrences of chalcocite and chalcopyrite are found in the north-central part of the map-area along faults in rocks of unit 2. In the Eastern belt copper occurrences are best exemplified by the showings at the Shamrock prospect south of Missezula Lake, where disseminations and minor replacements of chalcocite, some native copper, and hematite occur in volcanic conglomerate and laharic deposits.

Minor chalcopyrite disseminations occur in granodiorite and granite of the Allison Lake pluton at the Pine prospect, a short distance east of Allison Lake. A short distance north of Prosser Lake a northerly trending vein a few inches wide cuts granitic rocks of the Allison pluton and is mineralized with argentite, tetrahedrite, galena, malachite, and azurite in a quartz-carbonate gangue. A selected sample from this vein, collected by P. A. Christopher, yielded: gold, 0.02 ounce per ton; silver, 275.2 ounces per ton; copper, 3.46 per cent; lead, 2.69 per cent; and zinc, 1.21 per cent.

REFERENCES

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..... (1975): Geology of the Central Part of the Nicola Belt, *B.C. Dept. of Mines & Pet. Res.*, Preliminary Map No. 18.

Rice, H.M.A. (1947): Geology and Mineral Deposits of the Princeton Map-area, British Columbia, *Geol. Surv., Canada,* Mem. 243.

Geological Division,
Mineral Resources Branch,
Department of Mines and Petroleum Resources,

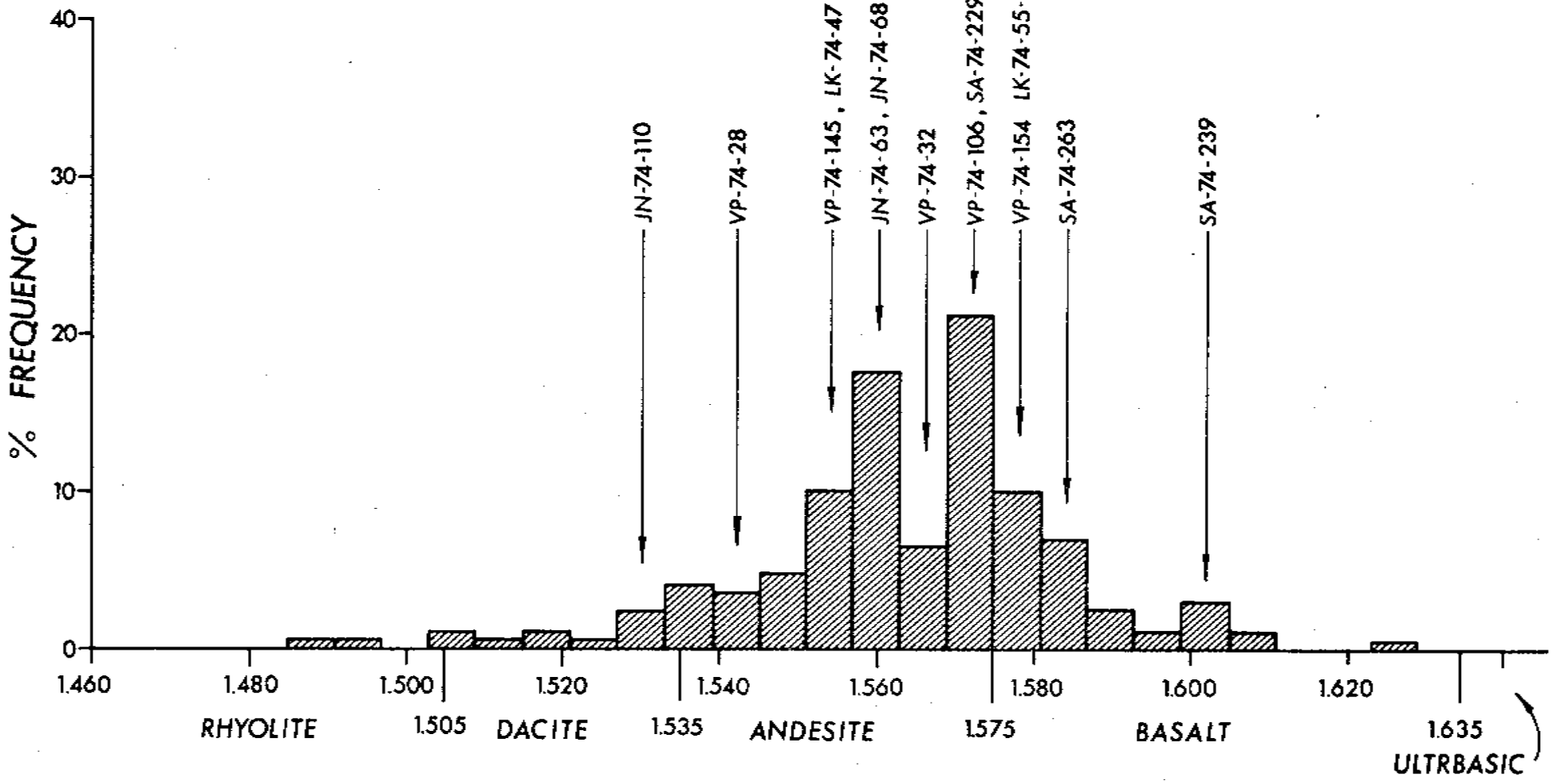
July, 1975

CHEMICAL ANALYSIS OF NICOLA VOLCANIC ROCKS

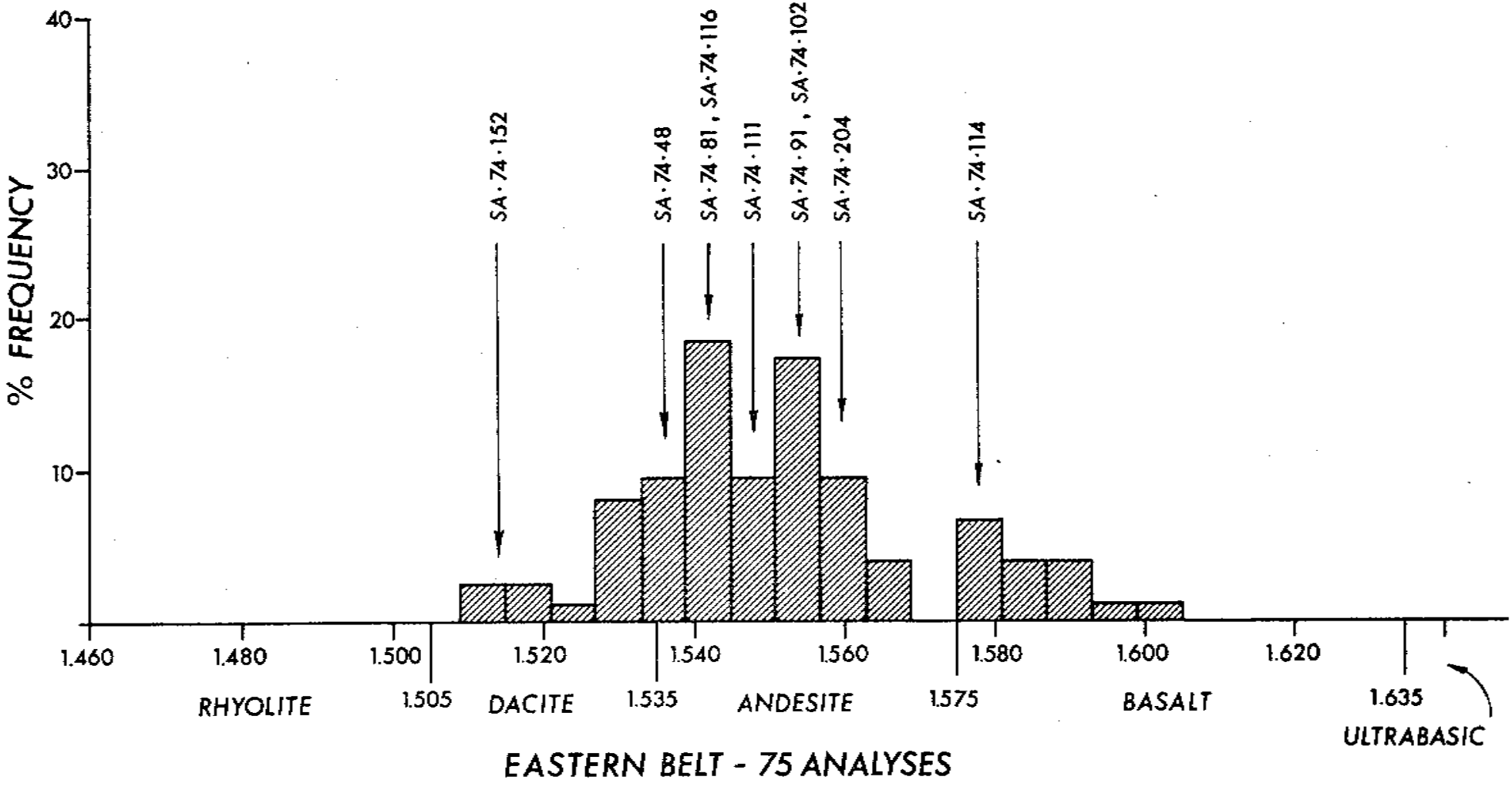
Field No.	SiO_2	Al_2O_3	MgO	CaO	Na_2O	K_2O	TiO_2	MnO	FeO	Fe_2O_3	H_2O+	H_2O-	CO_2	P_2O_5	S	Total	R.I.
Central Belt																	
VP-74- 28 (flow)	56.50	17.71	3.14	2.78	5.41	2.83	0.85	0.25	3.93	3.42	2.33	0.26	1.27	0.24	0.01	100.93	1.542
VP-74- 32 (flow)	52.45	16.77	5.06	6.35	3.84	2.50	0.91	0.26	4.72	5.18	2.39	0.32	0.34	0.39	0.18	101.66	1.566
VP-74-106 (tuff)	57.22	15.99	3.84	7.96	1.51	1.07	0.94	0.21	6.20	3.96	1.72	0.16	0.14	.2	0.04	100.98	1.570
VP-74-145 (tuff)	59.67	14.90	3.48	5.41	1.68	2.65	0.98	0.16	6.94	1.55	3.09	0.33	0.89	.2	0.11	101.86	1.556
VP-74-154 (tuff)	51.36	12.87	2.80	2.30	1.74	1.86	0.84	0.25	6.58	0.92	2.67	0.26	5.20	0.24	0.03	99.92	1.576
SA-74-229 (flow)	52.60	16.37	5.95	6.80	4.15	0.17	1.47	0.17	6.92	2.12	3.09	0.33	1.49	0.46	0.01	102.10	1.570
SA-74-239 (flow)	46.10	17.18	3.00	9.74	3.40	0.68	1.98	0.20	7.79	3.99	3.25	0.32	2.85	0.48	0.02	100.98	1.600
SA-74-263 (flow)	55.95	12.17	3.62	6.96	3.37	0.57	2.07	0.21	9.11	2.97	2.65	0.32	0.07	0.60	0.03	100.67	1.562
N-73-252 (flow)	47.70	16.10	5.51	7.83	3.88	3.95	0.74	0.24	1.94	7.75	2.78	0.29	0.82	0.69	0.03	100.25	1.576
LK-74-47 (flow)	53.13	16.72	4.91	5.48	4.47	0.74	1.19	0.15	6.20	2.92	2.89	0.28	0.35	0.48	0.02	99.92	1.552
LK-74-55B (flow)	50.29	16.99	4.11	9.01	4.23	0.62	1.21	0.21	6.08	3.00	2.54	0.34	0.41	0.33	0.03	99.40	1.578
JN-74- 63 (flow)	53.34	16.78	3.61	5.91	4.02	4.15	0.94	0.18	1.81	7.38	1.45	0.17	0.41	0.39	0.02	105.56	1.560
JN-74- 68 (flow)	53.23	16.05	4.68	7.12	3.45	3.15	0.94	0.21	4.32	4.63	1.88	0.19	0.14	0.42	0.04	100.45	1.562
JN-74-110 (flow)	63.95	15.31	2.18	4.87	3.12	2.41	0.77	0.12	3.45	2.72	1.50	0.14	0.14	0.35	0.05	101.08	1.532
Eastern Belt																	
SA-74- 81 (tuff)	56.00	17.64	2.63	6.36	6.14	2.28	0.50	0.23	1.90	3.59	1.81	0.37	2.17	0.21	0.01	101.84	1.542
SA-74- 91 (flow)	53.87	17.65	4.00	6.39	4.14	4.06	0.66	0.23	3.34	4.37	2.23	0.30	0.54	0.39	0.01	102.16	1.554
SA-74-111 (tuff)	55.80	17.83	3.65	6.73	3.34	1.93	0.67	0.13	2.85	3.13	3.35	0.81	0.41	0.33	0.01	100.97	1.550
SA-74-114 (An. flow)	49.10	15.36	6.19	8.93	3.06	4.02	0.67	0.22	3.84	5.84	3.17	0.33	0.41	0.46	0.01	101.61	1.578
SA-74-116 (flow)	54.48	17.55	3.24	5.00	7.17	0.82	0.85	0.18	3.05	3.76	2.37	0.22	0.91	0.41	0.02	100.03	1.544
SA-74-152 (flow)	65.34	16.72	4.33	1.38	1.65	6.08	3.05	0.82	1.74	2.40	1.31	0.32	0.20	0.32	0.03	105.69	1.514
SA-74-154 (An. flow)	48.78	14.22	6.44	8.81	2.13	4.77	0.66	0.26	4.53	5.24	2.56	0.23	0.83	0.50	0.02	99.98	1.578
SA-74-204 (lahar)	51.28	18.09	3.59	6.42	5.03	2.62	0.75	0.22	3.98	4.00	2.26	0.31	1.36	0.37	0.01	100.29	1.560

CHEMICAL ANALYSIS OF NICOLA INTRUSIVE ROCKS

Field No.	SiO_2	Al_2O_3	MgO	CaO	Na_2O	K_2O	TiO_2	MnO	FeO	Fe_2O_3	H_2O+	H_2O-	CO_2	P_2O_5	S	Total
Central Belt: micromonzonite - microsyenite																
N-73-242	55.41	18.09	2.16	5.57	4.75	4.38	0.56	0.17	1.36	4.86	1.79	0.22	0.10	0.34	0.01	99.77
N-73-247	53.04	16.97	3.64	5.30	2.86	6.42	0.77	0.18	1.05	7.27	1.38	0.23	0.30	0.57	0.01	99.99
N-73-270	50.93	17.33	3.38	8.25	4.98	1.99	0.83	0.21	0.71	8.30	2.16	0.23	1.00	0.66	0.02	100.99
TK-73-178	55.57	17.95	2.18	5.10	4.93	4.45	0.56	0.19	1.12	4.81	1.72	0.19	0.68	0.36	0.02	99.83
Central Belt: microdiorite																
LK-74- 1	52.94	17.98	3.51	6.75	3.76	2.88	0.77	0.12	4.48	2.48	1.67	0.18	2.70	0.37	0.02	100.61
VP-74- 75	54.76	18.32	3.02	4.42	4.26	4.70	0.64	0.09	3.38	3.12	1.63	0.17	1.20	0.24	0.02	99.97
VP-74- 81	55.76	17.64	3.23	5.57	3.82	3.90	0.65	0.13	3.23	3.41	1.40	0.11	1.30	0.30	0.04	100.49
VP-74-128	44.87	17.21	8.79	10.31	2.15	0.72	0.88	0.18	6.55	2.87	3.67	0.24	0.70	0.34	0.03	99.51
Eastern Belt: microsyenite																
SA-74- 28	58.56	19.24	1.26	3.11	7.23	2.80	0.61	0.09	0.86	4.62	1.50	0.40	0.68	0.23	0.04	101.23
SA-74- 31	54.85	17.62	2.73	5.65	6.13	1.81	0.56	0.17	1.66	5.93	2.06	0.43	0.82	0.55	0.01	100.98
SA-74- 48	56.62	17.96	2.23	6.33	4.88	1.75	0.58	0.12	3.21	1.94	2.30	0.42	1.54	0.32	0.02	100.22
SA-74-102	52.55	18.61	2.67	5.18	4.56	3.62	0.68	0.21	1.36	7.64	2.45	0.48	0.88	0.38	0.02	101.29
SA-74-210	62.68	18.23	1.53	4.09	5.81	2.68	0.42	0.16	1.53	3.02	1.62	0.25	0.41	0.30	0.01	102.74
VP-74- 17	63.02	17.85	1.95	5.85	3.74	2.17	0.56	0.11	1.27	4.96	1.05	0.69	0.10	0.28	0.02	103.62
VP-74- 18	65.77	16.98	1.21	3.38	3.55	2.96	0.46	0.07	0.63	3.69	1.02	0.57	0.27	0.30	0.02	100.88
VP-74-105	61.11	17.06	2.37	3.23	4.40	2.77	0.51	0.11	0.22	5.68	1.11	0.88	0.30	0.32	0.01	100.08



CENTRAL BELT - COMPOSITE 170 ANALYSES



EASTERN BELT - 75 ANALYSES

SECTION F - ILLUSTRATIONS

Description	Drawing No.
General Location Plan - Scale 1:50,000	75-1
Mineral Claim Plan with Drill Hole Locations - Scale 1:10,000	75-2
Geological Plan with Drill Hole Locations - Scale 1:10,000	75-3
Drill Hole Plan - Scale 1:1250	75-4

A B C D E F G H

1 2 3 4 5 6

NICOLA PULP HARVESTING FOREST

FOREST

92H/15

92H/16

92H/10

92H/9

FLGL

OKANAGA

LOG MINERAL CLAIMS

← SEE PLAN 75-2 & 75-3

49° 45'

Department of Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 5601 MAP 2

Drawing No. 75-1 to accompany "DIAMOND DRILLING REPORT on the LOG 54, 63 and 64 Mineral Claims" by R. D. Rushton, P.Eng. dated September 8, 1975.

SCALE: 1:50,000

Miles 0 1 2 3 Miles
Kilometres 1 1/2 0 1 2 3 4 Kilometres

DATE REVISED	BY	
SEPT. 3 / 1975	m.k.	

DEPT. — EXPLORATION
DRAWN BY — Altair / m.k.
CHECKED — E. A.
APPROVED —
DATE — DEC. 1974
SCALE — 1" 50,000

Bethlehem Copper
VANCOUVER BRITISH COLUMBIA

TITLE — MISSEZULA LAKE PROJECT
GENERAL LOCATION PLAN

FILE NUMBER — N.T.S. 92H 9, 10, 15, 16

DRAWING NUMBER — 75-1

BCIL 3749E-BC

5601 Map 2

L 1765

120°37'30"
49°48'45"

L 2365

3800

120°34'

L 2368

3500

Creek

Conglin Ck

120°30'00"
49°48'45"

3600

L 4417

Conglin

Missezula

Lake

3900

3800

L 2366

L 2375

L 2377

4400

L 2370

L 2369

L 2373

49°47'

120°33'30"
49°47'

L 912

L 2374

L 4573

4000

L 2372

4500

Missezula Lake

Dam

4522

L 1909

Ck

L 1910

Summers

3700

L 2376

Loosemore L

4300

L 4524

Ketchan Ck

4800

4000

Hornet L

49°45'00"

Hornet

L 4523

120°34'

49°45'00"

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 5601 MAP 3

Drawing No. 75-2 to accompany "DIAMOND DRILLING REPORT on the LOG 54, 63 and 64 Mineral Claims" by R.C. Anderson, P.Eng. dated September 8, 1975.

SCALE IN METERS
200 0 200 400 600 800 1000

DATE REVISED	BY

DEPT. — EXPLORATION
DRAWN BY — Altair / m.k.
CHECKED — E.A.
APPROVED —
DATE — SEPT. / 1975
SCALE — 1: 10,000

Bethlehem Copper
CORPORATION LTD.
VANCOUVER BRITISH COLUMBIA

TITLE — COPPER BELT-SOUTH
MISSEZULA LAKE PROJECT
MINERAL CLAIM PLAN

FILE NUMBER —

DRAWING NUMBER — 75-2

BCEL 3749E-BC

5601 Map 3

120°37'30" 49°48'45" 120°34' 120°30'00" 49°48'45" 49°47' 49°45'00"

MISSEZULA LAKE

L-75-2 & 2A L-75-1 L-75-3

PLEISTOCENE AND RECENT

7 RED AND GREY, VESICULAR OLIVINE VALLEY BASALT

LOWER CRETACEOUS
KINGSVALE GROUP

6 PLAGIOCLASE AND AUGITE-PLAGIOCLASE ANDESITE PORPHYRY

LOWER TO MIDDLE JURASSIC

7 ALLISON LAKE PLUTON
- 7a – REDDISH GREY TO RED, LOCALLY MIAROLITIC BIOTITE-HORNBLENDE GRANODIORITE AND GRANITE
- 7b – GREY HORNBLENDE GRANODIORITE
- 7c – GREY TO DARK GREY, LOCALLY MIGMATITIC HORNBLENDE DIORITE AND QUARTZ DIORITE
- 7d – HORNFELSED, MIGMATIZED, AND SILICIFIED VOLCANIC ROCKS WITHIN OR NEAR THE PLUTON

UPPER TRIASSIC

QUARTZ AND MONZONITE

6 – 6a – GREY, MEDIUM-GRAINED PYROXENE DIORITE AND MONZONITE
- 6b – GREEN HORNBLENDE PORPHYRY

5 PINK AND GREY, MEDIUM-GRAINED PORPHYRITIC MONZONITE AND SYENITE
- 5a – MONZONITE DIN BRECCIA

4 LEUCOCRATIC, PYRITIC QUARTZ PORPHYRY, LOCALLY HIGHLY SILICIFIED AND BYLOVITIZED

NICOLA GROUP
EASTERN BELT

3 LAVAS, DEPOSITS AND ASSOCIATED VOLCANIC CONGLOMERATE, SANDSTONE, SILTSTONE, AND TUFF; MINOR INTERLAYERED FLOW ROCKS
- 3a – THINLY LAMINATED, GREY-WEATHERING VOLCANIC SANDSTONE, SILTSTONE, AND SHALE, TYPICALLY GRADED AND/OR CROSSBEDDED
- 3b – MASSIVE TO CRUDELY LAYERED LAHAR DEPOSITS WITH ANGULAR TO SUBROUNDED CLASTS OF PORPHYRITIC TRACHYTE, SUBORDINATE LENSES OF VOLCANIC CONGLOMERATE AND GRIT, AND OCCASIONAL LENSES OF REDDISH, TUFFACEOUS SILTSTONE
- 3c – MASSIVE TO GREENISH GREY CRYSTAL LITHIC AND CRYSTAL TUFF AND VOLCANIC SANDSTONE, LOCALLY WITH LENSES OF IMPURE LIMESTONE
- 3d – PURPLE AND GREY LOCALLY AMYGDULE-BEARING AUGITE-PLAGIOCLASE TRACHYANDESITE AND TRACHYBASALT PORPHYRIES, LOCALLY WITH BLOCKS OF FOSSILIFEROUS LIMESTONE

CENTRAL BELT

2 ANDESITIC FLOWS, VOLCANIC BRECCIA AND LAHAR DEPOSITS, VOLCANIC SILTSTONE
- 2a – MASSIVE GREENISH GREY TO GREY AUGITE-PLAGIOCLASE ANDESITE PORPHYRY, EXTENSIVELY AUTOBRECCIATED
- 2b – MASSIVE, GREEN VOLCANIC BRECCIA AND LAHAR DEPOSITS
- 2c – MASSIVE, RED VOLCANIC BRECCIA AND LAHAR DEPOSITS
- 2d – DARK GREY, THINLY LAMINATED, PYRITIC TUFF

1 MASSIVE FLOWS, BRECCIA, AND LITHIC TUFF
- 1a – MASSIVE DARK GREEN SUBAQUEOUS BASALTIC TO ANDESITIC FLOWS WITH PLAGIOCLASE AND/OR PYROXENE PHENOCRYSTS
- 1b – INTERBEDDED EQUIVALENTS OF 1a AND FLOW BRECCIA FROM 1a FLOWS
- 1c – GREEN, CALCAREOUS AGGLOMERATIC BRECCIA AND POSSIBLY PILLOW BRECCIA OF COMPOSITION SIMILAR TO 1a
- 1d – MASSIVE TO BEDDED TUFF AND LITHIC TUFF, LOCALLY WITH INTERBEDDED LENSES, MINOR SILTSTONE, SANDSTONE, AND CONGLOMERATE
- 1e – IMPURE LIMESTONE AND LIMESTONE BRECCIA
- 1f – GREEN, MASSIVE TO CRUDELY BEDDED BASALTIC LITHIC TUFF WITH LIGHT GREY RHYOLITIC FRAGMENTS

py – PYRITE
mal – MALACHITE
cp – CHALCOPYRITE
cc – CHALCOCITE
mt – MAGNETITE
bn – BORNITE
cu – NATIVE COPPER
az – AZURITE
cv – COVELLITE
arg – ARGENTITE
tet – TETRAHEDRITE
ga – GALENA
ls – LIMESTONE

SYMBOLS

- AREA OF PREDOMINANT OUTCROP
- FAULT
- AREA OF INTENSE SHEARING
- PRECALLIST FRACTURE DIRECTION: INCLINED, VERTICAL
- SECONDARY FOLIATION: INCLINED, VERTICAL
- BEDDING: VERTICAL, INCLINED, RIGHT SIDE UP
- PROSPECT: TRENCH, PIT
- GEOLOGICAL CONTACT: DEFINED, ASSUMED
- POWER TRANSMISSION LINE
- NATURAL GAS PIPELINE
- FOSSIL LOCALITY
- MICROSCOPIC PORPHYRY CLASTS IN FRAGMENTAL VOLCANIC ROCKS

Drawing No. 75-3 to accompany "DIAMOND DRILLING REPORT on the LOG 54, 63 and 64 Mineral Claims"
by R.D. Anderson, P.Eng.
dated September 8, 1975.

Note:
This map represents an enlargement of, Preliminary Map No. 17, July, 1975
Geology of the Allison Lake - Missezula Lake Area, British Columbia.
Geology by: V.A. Preto, S.J. Atkinson, and J. Nebocat, 1974
British Columbia Department of Mines and Petroleum Resources

SCALE IN METERS
200 0 200 400 600 800 1000

DATE REVISED	BY

DEPT. — EXPLORATION
DRAWN BY — Altgir / m.k.
CHECKED — E.A.
APPROVED —
DATE — SEPT. / 1975
SCALE — 1: 10,000

Bethlehem Copper
VANCOUVER BRITISH COLUMBIA

TITLE — COPPER BELT-SOUTH
MISSEZULA LAKE PROJECT
GEOLOGICAL PLAN

FILE NUMBER —
DRAWING NUMBER — 75-3

5601 Map 4

BCIL 3749E • BC

L 1765
L 2365
L 2368
L 2366
L 2375
L 2377
L 2369
L 2370
L 2373
L 912
L 2374
L 4573
L 2372
L 4417
L 2376
L 4524
L 4523
L 4522
L 1909
L 1910
L 3345
3800
3500
3600
3900
4400
4000
4500
4300
4800
3700
Missezula Lake
Conglin Creek
Conglin Ck
Katchen Ck
Loosemore L
Hornet L
Hornet
Missezula Lake Dam
Gate
LOG 1
LOG 2
LOG 3
LOG 4
LEGAL CORNER POST
DUKE LAKE
B.C. HYDRO R/W PLAN NO. EP3225
120°37' 30"
49° 48' 45"
120°34'
49°47'
49°45' 00"
120°33' 30"
120° 33' 00"

LEGEND
75-4 ▲ Diamond Drill Hole
PC 74-4 ● Percussion Drill Hole

SCALE IN METERS
200 0 200 400 600 800 1000

DATE REVISED	BY

DEPT. — EXPLORATION
DRAWN BY — Altair/m.k
CHECKED — E.A.
APPROVED —
DATE — SEPT. / 1975
SCALE — 1: 10,000

Bethlehem Copper CORPORATION LTD. VANCOUVER BRITISH COLUMBIA

TITLE — COPPER BELT-SOUTH MISSEZULA LAKE PROJECT, MINERAL CLAIM PLAN

FILE NUMBER —

DRAWING NUMBER — 75-2A

BCIL 3749E-BC

5601 Map 6

A B C D E F G H

1 2 3 4 5 6

LOG 54

LOG 65

LOG 66

L-75-2 82A

120°33' 30"

49° 47'

LOG 52

LOG 63

LOG 64

L-75-1

L-75-3

DUKE LAKE

LOG 50

LOG 61

LOG 62

Department of Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 5601 MAP 5

Drawing No. 75-4 to accompany "DIAMOND DRILLING REPORT on the LOG 54, 63 and 64 Mineral Claims" by A.E. Anderson, P.Eng. dated September 8, 1975.

SCALE IN METRES
50 0 50 100

DATE REVISED	BY	
		DEPT. — EXPLORATION
		DRAWN BY — Altair/mk
		CHECKED — E.A.
		APPROVED —
		DATE — SEPT. / 1975
		SCALE — 1:1250

Bethlehem Copper CORPORATION LTD. VANCOUVER BRITISH COLUMBIA

TITLE — COPPER BELT-SOUTH MISSEZULA LAKE PROJECT DRILL HOLE PLAN

FILE NUMBER —

DRAWING NUMBER — 75-4

TITLE

FILE No.

DRAWING No.

5601 Map 5

BCIL 3749E-BC