

R E P O R T

ON

PERCUSSION DRILLING PROGRAM

1976 - 1977

ON

SHEBA COPPER MINES LTD.

BY

WESTERN MINES LTD.

R.H. Seraphim, Ph.D., P.Eng.

February 14, 1977

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FIGURE

4800 - 1

Pocket

## SUMMARY AND CONCLUSIONS

Western Mines percussion drilling on selected parts of the Sheba Copper Mines property has comprised a total of 61 holes totalling 11,725 feet. These holes tested two north-south trending depressions called the West Swale (W series of holes) and East Swale (E series of holes). Several intercepts were obtained that approached ore grade, but follow-up drilling in the vicinity did not disclose continuity to the mineralization. Consequently, the program was terminated and the control of the property was returned to the vendors.

The drilling was completed in two stages. The first stage was the subject of a report dated November 1, 1976. The second stage was begun because two holes W-21 and E-5 showed marginal mineralization, and because the depth of 'casing' in these holes was less than 100 feet. Subsequent conversation with other drillers disclosed that our drillers did not always case to bedrock. Hence the material in some of the uppermost intercepts of some of the holes logged and reported on herein may be boulder or gravel. In fact, some of the logs do show an abrupt change in grade near the top of the recovered intercept.

However, all holes were drilled with the object of recovering and assaying at least 150 feet of bedrock, and

2.

this object was obtained in almost all attempts. Thus the test of the pertinent ground is, in the opinion of the author, successful though it did not produce favorable results.

### COSTS

The costs of the first stage were shown to be \$51,181 applicable directly to the property. The second stage was completed in conjunction with some drilling on neighboring claims held by Bethlehem. Costs were pro-rated; those applicable to Sheba claims total \$8,032. This total is preliminary and subject to audit.

### RECOMMENDATION


Sheba's claims do contain widespread but low grade copper mineralization. One showing, known as the J 101, probably contains a small tonnage of milling grade. The claims should be maintained in the hope that other small copper deposits might be found, and also for their 'real estate' value in this important mining camp.

### DRILL HOLE LOGS

The following drill hole logs include those from two holes W-27 and E-36, drilled on Bethlehem claims. The assays should be accepted with the reservation that the results from the uppermost parts of some of the holes may be obtained from material which was not bedrock.

The map included shows the location of all the holes drilled under the supervision of Western Mines. The following summary includes only the holes drilled in Stage Two.

Bethlehem Holes	-	W-27	=	270'	
	-	E-36	=	<u>180'</u>	(170'?)
				450'	450'
Western Holes	-	W-22	=	230'	
		W-23	=	200'	
		W-24	=	230'	
		W-25	=	240'	
		W-26	=	190'	
		E-35	=	<u>200'</u>	
				1290'	<u>1290'</u>
					Total: <u>1740'</u>

  
R.H. Seraphim, Ph.D., P.Eng.

Date: February 15, 1977.

Rec'd by MAM Nov. 12/76

## SUMMARY AND CONCLUSIONS

Western Mines 1976 percussion drilling program on selected parts of the Sheba Copper Mines property has included 34 holes totalling 6685 feet in the East (PHI) Swale and 21 holes totalling 3750 feet in the West (JAY) Swale. Total footage drilled is 10,435 feet.

The northmost holes in each swale, close to the boundary with Bethlehem, provided intercepts as follows:

<u>Area</u>	<u>Hole</u>	<u>Intercept (ft.)</u>	<u>% Cu.</u>
East Swale (south of the east end of the J.A. deposit)	E-5	50 - 100	0.35
		or 20 - 170	0.21
West Swale (south of the west end of the J.A. deposit)	W-18	40 - 190	0.07
		or 100 - 190	0.11
	W-21	80 - 150 or 80 - 220	0.36 0.25

The data from the above listed holes is important to Bethlehem as well as to the current project. The shallowness of the overburden found in these holes facilitates further drilling with inexpensive percussion equipment.

## RECOMMENDATIONS

A second stage of percussion drilling on a minimum of 400 foot centers is strongly recommended in the vicinity of holes W-21, W-18 and E-5. The intercepts obtained in these holes, when on ore trends like the southerly trend through Bethlehem and the southeasterly trend through Valley Copper and the J.A. (see sketch on following page) are worthy of extensive and detailed follow-up drilling.

A minimum of twelve percussion holes is recommended, laid out as shown on the accompanying 400 ft. to the inch map. Cost of this stage would be \$25,000 but provision should be made for follow-up diamond drilling.

Two of the percussion holes laid out are on Bethlehem claims, and several are on the Bethlehem boundary. Thus information should be traded with Bethlehem, and negotiation concerning acquisition of some controls on neighboring Bethlehem ground should be completed prior to commencement of drilling.

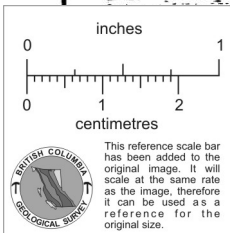
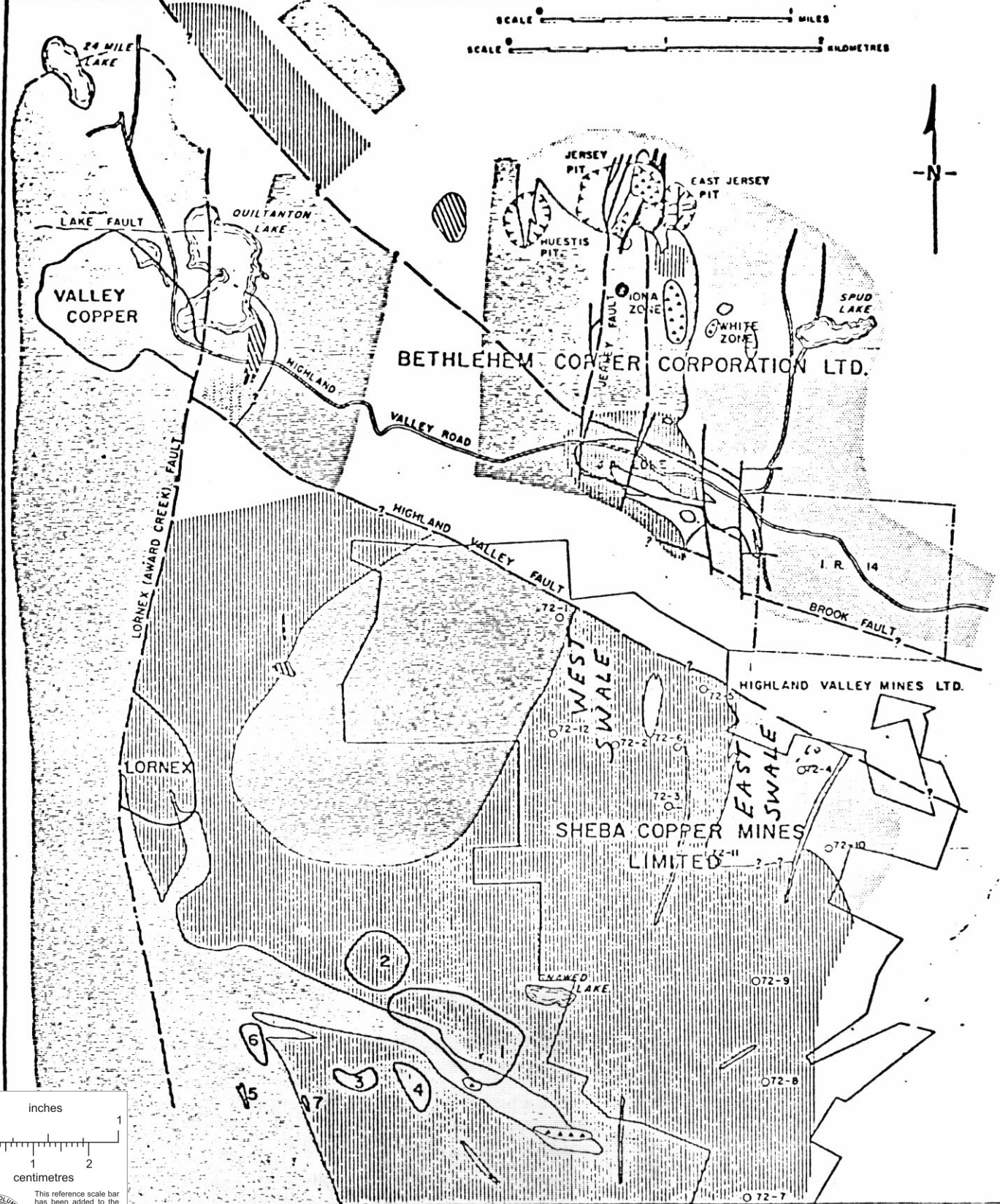


Figure 12  
GENERALIZED GEOLOGY  
OF  
HIGHLAND VALLEY

B.C. MIN. OF MINES  
1972 P.163

TERTIARY

- VOLCANIC FLOW ROCKS
- CLASTIC SEDIMENTARY ROCKS
- GUICHON CREEK BATHOLITH
  - BETHSAIDA PHASE AND OFFSHOOT DYKES AND BODIES
  - SKEENA VARIETY
  - BETHLEHEM PHASE WITH QUARTZ EYES

LEGEND

- BETHLEHEM PHASE
- GUICHON VARIETY
- PORPHYRY DYKES
- BRECCIA BODIES
- OUTLINE OF OREBODY
- FAULT-PROVEN, INFERRED



## INTRODUCTION

Western Mines Ltd. decided to drill two areas, known as the East and West Swales, after data concerning these areas was presented and reported on by R.H. Seraphim, February 6, 1976. Seraphim reconnoitred the areas initially on May 25 and again on July 7 and 8 with A. Soregaroli, B. Spencer and P. Mason. W. McMillan of the B.C. Department of Mines kindly provided guidance and a better appreciation of lithology on July 7.

Detailed mapping of rock alteration and mineralization in outcrop and examination of percussion drill cuttings were completed July 26 to 31, and September 28 and October 3. Memoranda dated May 27, 1976, August 31, 1976 and a short preliminary report dated October 5, 1976 add to the data in the report of February 6, 1976.

Peter Mason gave excellent field management to the drill program. The drilling itself was begun by L. & L. (Larry Reaugh) on July 21 and completed on September 22. The layout of the percussion drill holes E1 to E34 (east grid in PHI swale) and W1 to W21 (west grid in Jay swale) as well as holes previously drilled in the two swales, are shown on an accompanying plan at a scale of 4800 : 1 (400 ft. = 1 in.) Assay logs and brief descriptions of the nature of the cuttings are appended hereto.

## GEOLOGY AND ASSAY RESULTS

### East (PHI) Swale

The PHI or East Swale is approximately on the contact of an embayment of rocks mapped as Bethlehem phase with Skeena phase to the west and Chataway phase to the east. (Map by L.W. Saleken & Associates 1971). One or more Bethsaida (leucocratic) dykes trends northerly through the east part of the swale. Rock similar to Bethsaida was found in all of holes E23 to 28.

Aerial photographs indicate that a series of north to north 20° east trending lineaments cut through the swale and may continue northerly through the east part of Bethlehem's J.A. deposit and then through Soup and Copper Lakes on Bethlehem ground. The lineaments conform to the easternmost part of the belt of porphyry dykes mapped by J.M. Carr in 1956. All of the important mineral deposits known in Highland Valley lie west of this limiting structural zone.

Alteration is moderate to strong in many of the holes, and is predominantly chloritic, with some sericite locally. Copper mineralization is widespread but low grade. Most of the holes through the central part of this East (PHI) Swale, such as E2, E3, E5, E8, E9, E10, SPD 1, E8, E14, E15, E16, E18, and E31 average 0.1% copper. One near the south end, E14, contained 40 ft. of 1.08% Cu. and 0.11% MoS<sub>2</sub> but the 5 neighboring holes, within 400 ft. of E14, did not intercept as high a grade.

Further drilling is recommended near hole E5, the north-most hole in the East Swale, which contains 50 ft. of 0.35% Cu. or 150 ft. of 0.21% Cu. This hole is within 200 ft. of the boundary with Bethlehem Copper Corp.

#### West (JAY) Swale

The West Swale does contain the best mineralized exposure on the property, the J 101 zone. The drilling disclosed mineralization on trend of this zone, but several thousand feet to the northeast, near the postulated Highland Valley south fault. The rocks in the swale are mapped as Skeena except for one Bethsaida dyke or series of dykes striking north to north 20° east. The swale itself is aligned at north 20° east. Alteration is present in some holes, and includes "pink" alteration, probably from potash feldspar or cloudy hematization as well as chlorite. Oxidation extends to greater depths than in the East Swale.

Two holes near the north end of the drilled area provided intercepts of 90 ft. - 0.11% Cu. (in W-18) and 70 ft. - 0.36% or 140 ft. of 0.25% Cu. (in W-21). Hole W-21 is within a few tens of feet of the Bethlehem boundary. Further drilling is recommended in the vicinity of these two holes as there remains adequate room for an ore body, and overburden is sufficiently shallow to facilitate further percussion drilling.

Olade and Flether have concluded that copper and sulfur anomalies are the most useful guides to ore in Highland Valley (Ec. Geol. Vol. 71, 1976, p. 733-748). This writer suggests that their conclusion is self-evident. All drill intercepts approaching ore grade in Highland Valley should be followed by drilling on at least 400 ft. centers.



R.H. Seraphim

November 1, 1976.

Hole No.	Grid	Co-ordinates		Start	Finish	Over-burden	End of hole
E-1	East	18+50E	33+75N	21/7	21/7	50	200
E-2	"	15+60E	38+50N	21/7	22/7	50	200
E-3	"	8+90E	34+10N	22/7	22/7	50	230
E-4	"	1+00E	34+00N	22/7	23/7	20	170
E-5	"	8+00E	40+00N	23/7	23/7	20	170
E-6	"	0+70E	39+90N	24/7	24/7	15	160
E-7	"	0+65E	27+00N	25/7	25/7	26	180
E-8	"	2+00E	22+00N	26/7	27/7	36	290
E-9	"	6+30E	27+80N	28/7	28/7		120
E-10	"	9+25E	24+50N	29/7	29/7	35	180
E-11	"	15+90E	24+00N	29/7	30/7	20	170
E-12	"	16+00E	20+00N	2/8	2/8	30	180
E-13	"	12+20E	17+75N	3/8	3/8	20	170
E-14	"	9+00E	6+30N	3/8	3/8	20	230
E-15	"	2+50E	6+90N	4/8	4/8	30	250
E-16	"	8+00E	12+00N	5/8	6/8	30	180
E-17	"	12+00N	2+40E	6/8	6/8	30	160
E-18	"	5+00E	17+30N	6/8	7/8	70	220
E-19	"	2+90W	17+80N	9/8	9/8	20	170
E-20	"	3+80W	12+00N	10/8	10/8	20	250
E-21	"	14+80E	12+00N	10/8	11/8	20	170
E-22	"	19+75E	4+30N	11/8	11/8	20	230
E-23	"	16+90E	8+00S	12/8	12/8	10	290
E-24	"	11+00E	8+00S	12/8	13/8	10	170
E-25	"	16+40E	15+60S	13/8	16/8	10	170
E-26	"	8+60E	16+00S	17/8	18/8	20	160
E-27	"	18+10E	20+15S	18/8	19/8	20	170
E-28	"	19+40E	26+20S	19/8	19/8	10	160
E-29	"	23+70E	42+35S	20/8	20/8	30	270
E-30	"	5+80E	5+15N	2/9	3/9	20	250
E-31	"	5+80E	9+20N	3/9	7/9	20	195
E-32	"	9+80E	9+20N	7/9	7/9	20	170
E-33	"	14+20E	7+00N	8/9	8/9	10	200
E-34	"	9+00E	2+70N	9/9	9/9	10	200

Hole No.	Grid	Co-ordinates	Start	Finish	Over-burden	End of hole
W-1	West	43+20W 28+00N	21/8	21/8	20	170
W-2	"	44+80W 32+00N	22/8	22/8	10	160
W-3	"	61+70W 2+45N	22/8	22/8	10	160
W-4	"	60+70W 9+70N	23/8	23/8	80?	100
W-5	"	58+60W 15+15N	24/8	24/8	100	250
W-6	"	48+70W 24+90N	25/8	25/8	30	200
W-7	"	36+30W 55+50N	26/8	26/8	40	190
W-8	"	43+90W 48+80N	27/8	27/8	25	80
W-9	"	55+25W 23+70N	28/8	28/8	120	170
W-10	"	44+35W 43+00N	30/8	30/8	30	170
W-11	"	35+30W 44+50N	31/8	2/9	60	210
W-12	"	48+60W 37+00N	10/9	10/9	20	170
W-13	"	50+20W 42+80N	10/9	13/9	40	250
W-14	"	56+20W 42+25N	13/9	14/9	45	200
W-15	"	50+00W 47+25N	14/9	14/9	20	170
W-16	"	39+30W 47+60N	14/9	15/9	20	170
W-17	"	31+00W 47+85N	16/9	16/9	20	170
W-18	"	45+80W 69+50N	16/9	17/9	40	190
W-19	"	45+00W 61+80N	17/9	17/9	20	180
W-20	"	50+00W 56+85N	18/9	19.9	20	170
W-21	"	34+50W 61_00N	19/9	22/9	70	220

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