

REPORT

on the

CM, KAM, MER, JAC, RAF AND CLEVE FR.'s CLAIM GROUP

of

CLEVELAND MINING & SMELTING CO. LTD.

HIGHLAND VALLEY, BRITISH COLUMBIA

(50°30'N, 127°7'W)

for

KALCO VALLEY MINES LIMITED (N.P.L.)

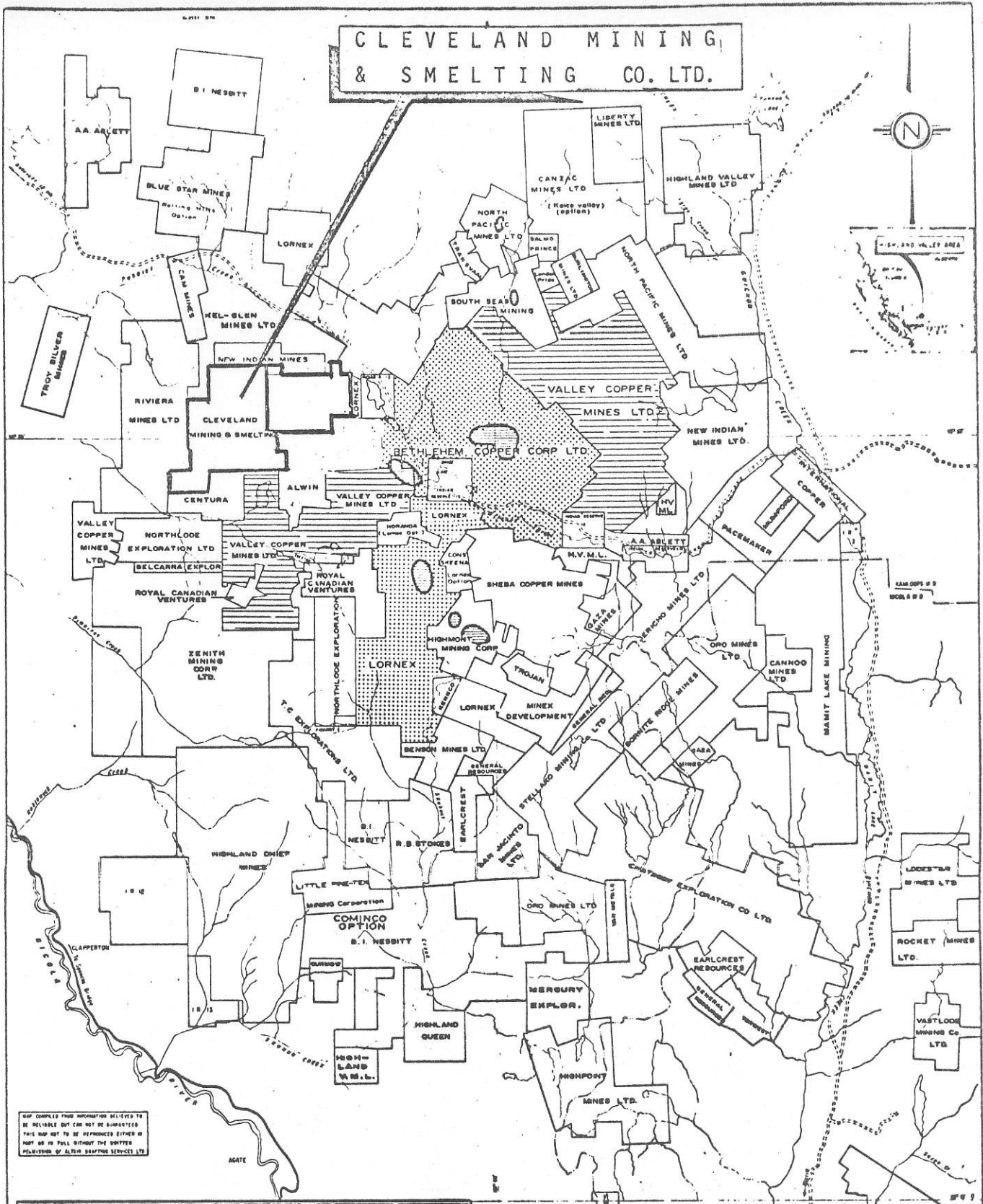
by

Edward O. Chisholm, P.Eng.
Consulting Geologist

Vancouver, B. C.

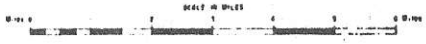
September 30, 1971

CLEVELAND MINING & SMELTING CO. LTD.



MAP COMPILED FROM INFORMATION BELIEVED TO BE RELIABLE BUT CAN NOT BE GUARANTEED. THIS MAP NOT TO BE REPRODUCED EITHER IN WHOLE OR IN PART WITHOUT THE WRITTEN PERMISSION OF ALTAIR DRAFTING SERVICES LTD.

PROPERTY MAP
OF
THE HIGHLAND VALLEY
NICOLA & KAMLOOPS MINING DIVISIONS
BRITISH COLUMBIA



PREPARED BY
ALTAIR drafting services Ltd.,
Srs. 8-921 W. PENDER ST., VANCOUVER, B.C.
Phone: 688-4134.

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MAPS

Location Map	Front
Drill Hole Location Map	Pocket
Property Map	Pocket

S U M M A R Y

The property consists of 88 contiguous unpatented mining claims lying 3 to 4 miles west of the Bethlehem Copper mine. It is underlain mainly by granitic phases of the Guichon Batholith that are locally altered and mineralized with disseminated chalcocite, chalcopyrite and molybdenite. The group has been extensively explored by geological, geophysical and geochemical surveys, trenching and drilling. A mineralized area on the MER 6 mineral claim outlined by percussion drilling indicates a block 240 ft. by 400 ft. by 80 ft. deep containing some 640,000 tons of mineralized granodiorite averaging 0.327% copper. A diamond drill hole showed disseminated bornite associated with biotite alteration throughout the mineralized zone.

It is concluded that the zone may be extended in size by additional detailed work and that overburden conditions on the claim group are sufficiently extensive to mask economic deposits that may exist. A work program on the property totalling expenditures of \$50,000 is recommended.

I N T R O D U C T I O N

On September 11th, 1971, the writer visited the above captioned claim grous in the presence of Mr. Lennart Bourgh and Mr. L. Woodman of Merritt, B. C. and reviewed part of the work completed to date.

Little original work was possible in the brief time allotted to the examination and the bulk of the material forming this report is taken from voluminous reports listed in Appendix I. The work undertaken to date in my estimation has been carefully carried out and well directed and the reports on file at the Company's office are well documented.

This report briefly summarizes the work and the writer makes conclusions and recommendations based on his examination of the property and the reports of previous work.

C L A I M S

The property consists of 88 located contiguous claims as follows:

<u>Claim Name</u>	<u>Record Numbers</u>
CM 1-10	51858-51867
KAM 13-20	51850-51857
MER 1-40	49798-49837
JAC 1 & 3	51420&51422
JAC 5-7	51424-51426
JAC 9-22	51428-51441
RAF 11-17	47735-47741
CLEVE FRACTIONS 1,2 & 3	54905, 54906, 74123

OWNERSHIP AND LEGAL ASPECTS

Cleveland Mining & Smelting Co. Ltd. of 615-850 West Hastings Street, Vancouver, B.C. furnished the writer with the data on the above list of claims and represented the claims shown within the heavy black outline on the Location Map as being owned by the Company. The writer examined several sets of tags during a one-day examination of a portion of the claim group and found them to be staked according to the British Columbia Mining Act.

Evaluation of the legal status of the claims is beyond the scope of this report.

LOCATION AND ACCESS

Latitude: 50°30'N

Longitude: 127° 7'W

Elevation: 4,600 Ft.

The Cleveland properties lie in the Highland Valley 3 to 4 miles west of the Bethlehem Copper mine and approximately 30 miles southeast of Ashcroft, B.C. The group is served by good, 4 w.d. vehicle logging roads from the main Highland Valley highways. It can be reached from Ashcroft via the Highland Valley Road southeasterly to the Highland Valley Lodge road, a distance of 28 miles, thence south on the O.K. Mine road for 2 miles from the highway. At that point a road branches off to the north passing through the northerly part of the property and to the south leading to the main workings

on the MER Claims. Ashcroft, the nearest supply centre, is situated near the Trans Canada Highway some 220 miles northeast of Vancouver, B. C.

RELIEF, ELEVATION AND CLIMATE

The Cleveland property is in the dry belt of the Interior Plateau region. The topography is rolling to mildly rugged, varying from 2,500 to 5,000 feet in elevation.

The principal timber growth is park-like jackpine forest with light underbrush. Outcrop is plentiful but appears to occupy less than 5 percent of the area. Overburden is light in general and is comprised of boulder clay and sand for the most part.

Average annual precipitation for this area is 10 to 11 inches. Climate is considered moderate and varies from summer temperatures of 100⁰F. to slightly below zero in winter.

GENERAL GEOLOGY

A description of the geology of the area including and surrounding the claim group is found in the following G.S.C. publications:

- Memoir 249 - 'Geology & Mineral Deposits of the Nicola Map Area, B.C.', W.E. Cockfield, 1961
- Memoir 243 - 'Geology of the Mineral Deposits of the Princeton Map Area,' B.C. by H.M.A. Rice, 1960.
- Geological Map of the Highland Valley Area by Carr & Lee, B.C. Department of Mines, Preliminary Map, May 1966.
- Preliminary Map No. 7, Department of Mines, Victoria, B.C. 92 I/6h, W.J. MacMillan, P.M. McAndless, D. Branchflower, 1970.

According to mapping carried out by R.H.D. Philp, P.Eng. in 1970, the property is largely underlain by four phases of the Guichon Batholith. Kamloops Group volcanics occupy a very small area in the north-central part of the claims.

Bethlehem granodiorite is the most abundant rock type, bounded to the north and west by Highland Valley and Wilder Brook phases. Contacts are gradational and approximate. Several minor faults and joints were mapped.

Minor copper mineralization in the granitic phases occurs at several locations throughout the property. Due to extensive overburden, detailed investigation by indirect methods is warranted.

P R E V I O U S E X P L O R A T I O N

The property has been extensively explored by many I.P. geophysical surveys, some geochemical survey, a geological survey, many miles of roads and a few trenches. Some 2,000 ft. of percussion drilling and about 500 ft. of diamond drilling were also completed. Due to the widespread overburden cover and small extent of individual outcrops, there are still large areas, of sufficient size to mask an economic sized deposit, that warrant additional detailed work.

D E P O S I T S

Despite the widely separated occurrences of copper mineralization indicated on the attached map, the most important occurrence was partially continued by percussion drilling on Claims MER 5 and 6. The attached sketch shows the percussion hole locations.

Values obtained in this drilling are tabulated below:

Copy of Assays for Cleveland Mining & Smelting
Company Ltd., received from J.R. Williams & Son

	<u>Footage</u>	<u>Cu%</u>		<u>Footage</u>	<u>Cu%</u>
Drill Hole #1	10-20	0.20	Drill Hole #4	2-10	0.20
" " "	20-30	0.70	" " "	10-20	0.18
" " "	30-40	0.40	" " "	20-30	0.25
" " "	40-50	0.32	" " "	30-40	0.23
" " "	50-60	0.15	" " "	40-50	0.12
" " "	60-70	0.15	" " "	50-60	0.05
" " "	70-80	0.13	" " "	60-70	0.02
" " "	80-90	0.15	" " "	70-80	0.10
" " "	90-100	0.10	" " "	80-90	0.10
" " "	100-110	0.14	" " "	90-100	0.08
" " "	110-120	0.05	" " "	100-110	0.03
" " "	120-130	0.15	" " "	110-120	Trace
" " "	130-140	0.02	" " "	120-130	Trace
" " "	140-150	Trace	" " "	130-140	Trace
			" " "	140-150	Trace
Drill Hole #2	5-20	0.10	Drill Hole #5	5-20	0.02
" " "	20-30	Trace	" " "	20-30	0.05
" " "	30-40	0.10	" " "	30-40	0.02
" " "	40-50	0.03	" " "	40-50	0.04
" " "	50-60	0.15	" " "	50-60	0.01
" " "	60-70	0.10	" " "	60-70	Trace
" " "	70-80	0.12	" " "	70-80	0.06
" " "	80-90	0.05	" " "	80-90	0.02
" " "	90-100	0.15	" " "	90-100	0.40
" " "	100-110	0.53	" " "	100-110	0.05
" " "	110-120	0.18	" " "	110-120	0.05
" " "	120-130	0.10	" " "	120-130	0.10
" " "	130-140	Trace			
" " "	140-150	0.10	Drill Hole #6	5-20	0.01
Drill Hole #3	2-10	0.10	" " "	20-30	0.09
" " "	10-20	0.13	" " "	30-40	0.05
" " "	20-30	0.15	" " "	40-50	0.04
" " "	30-40	0.10	" " "	50-60	0.07
" " "	40-50	0.07	" " "	60-70	0.07
" " "	50-60	0.30	" " "	70-80	0.09
" " "	60-70	0.70	" " "	80-90	0.20
" " "	70-80	0.80	" " "	90-100	0.10
" " "	80-90	0.58	" " "	100-110	0.01
" " "	90-100	0.50	" " "	110-120	0.02
" " "	100-110	0.70	" " "	120-130	0.04
" " "	110-120	0.47	" " "	130-140	0.07
" " "	120-130	0.35	" " "	140-150	0.02
" " "	130-140	0.35	" " "	150-160	0.05
" " "	140-150	0.50			

	<u>Footage</u>	<u>Cu%</u>		<u>Footage</u>	<u>Cu%</u>
Drill Hole #7	5-20	0.02	Drill Hole #11	10-20	0.02
" " "	20-30	0.05	" " "	20-30	0.05
" " "	30-40	0.01	" " "	30-40	Trace
" " "	40-50	0.02	" " "	40-50	0.01
" " "	50-60	0.03	" " "	50-60	0.01
" " "	60-70	0.01	" " "	60-70	Trace
" " "	70-80	Trace	" " "	70-80	Trace
" " "	80-90	0.02	" " "	80-90	Trace
" " "	90-100	0.02	" " "	90-100	0.04
" " "	100-110	0.04			
" " "	110-120	0.01	Drill Hole #12	15-30	0.22
			" " "	30-40	0.04
Drill Hole #8	10-20	0.02	" " "	40-50	0.05
" " "	20-30	0.07	" " "	50-60	0.01
" " "	30-40	0.05	" " "	60-70	0.04
" " "	40-50	0.05	" " "	70-80	0.05
" " "	50-60	0.04	" " "	80-90	0.04
" " "	60-70	0.02	" " "	100-110	0.02
" " "	70-80	0.02			
" " "	80-90	0.19	Drill Hole #13	10-20	Trace
" " "	90-100	0.04	" " "	20-30	0.05
" " "	100-110	0.01	" " "	30-40	0.08
			" " "	40-50	0.01
Drill Hole #9	10-20	0.04	" " "	50-60	0.04
" " "	20-30	0.05	" " "	60-70	0.03
" " "	30-40	0.01	" " "	70-80	0.05
" " "	40-50	0.01	" " "	80-90	0.02
" " "	50-60	0.06	" " "	90-100	0.05
" " "	60-70	0.04	" " "	100-110	Trace
" " "	70-80	0.02	" " "	110-120	Trace
" " "	80-90	Trace	" " "	120-130	0.05
" " "	90-100	Trace			
" " "	100-110	0.07	Drill Hole #14	10-20	0.05
			" " "	20-30	0.04
Drill Hole #10	5-20	0.07	" " "	30-40	0.06
" " "	20-30	0.05	" " "	40-50	0.02
" " "	30-40	0.04	" " "	50-60	0.02
" " "	40-50	0.01	" " "	60-70	0.02
" " "	50-60	0.03	" " "	70-80	Trace
" " "	60-70	0.01	" " "	80-90	Trace
" " "	70-80	Trace	" " "	90-100	0.10
" " "	80-90	Trace	" " "	100-110	0.01
			" " "	110-120	0.02

			<u>Footage</u>	<u>Cu%</u>				<u>Footage</u>	<u>Cu%</u>
Drill Hole #15			5-20	0.01	Drill Hole #16		10-20	0.10	
"	"	"	20-30	0.07	"	"	20-30	0.12	
"	"	"	30-40	0.02	"	"	30-40	0.47	
"	"	"	40-50	0.05	"	"	40-50	0.52	
"	"	"	50-60	0.21	"	"	50-60	0.42	
"	"	"	60-70	0.57	"	"	60-70	0.47	
"	"	"	70-80	1.00	"	"	70-80	0.40	
"	"	"	80-90	0.35	"	"	80-90	0.65	
"	"	"	90-100	0.25	"	"	90-100	0.61	
"	"	"	100-110	0.30	"	"	100-110	0.25	

Sixteen test holes totalling 2,000 feet of percussion drilling were bored to depths varying from 90 feet to 160 feet on claims MER 5 and 6. Samples of the drill rock dust were taken of 10 foot sections from each hole. Assays were run for copper by J.R. Williams & Son on 185 samples and ranged from trace to 1.0% copper. Drill holes 1, 2, 3, 4, 15 and 16 showed interesting results and indicate a copper bearing zone trending northeast and measuring 240 ft. wide by 400 ft. long and 80 ft. deep, containing 640,000 tons averaging 0.327% copper.

The best individual footages averaged as follows:

Hole No. 1 from 20-50 ft. (30 ft) averaged 0.47% Copper,

Hole No. 3 from 30-150 ft. (100 ft) averaged 0.53% Copper,

Hole No.15 from 60-110 ft. (50 ft) averaged 0.50% Copper,

Hole No.16 from 30-100 ft. (70 ft) averaged 0.51% Copper.

A composite sample in Hole 3 assayed 0.05 oz/ton Silver and 0.074% Molybdenite.

A diamond drill hole located between No. 1 and No. 15 percussion holes was recently sampled and gave the following results:

<u>Footage</u>	<u>Width</u>	<u>% Cu</u>
30-40	10 ft.	0.44
40-50	10	0.44
50-60	10	0.22
60-70	10	0.23
70-80	10	0.25
80-90	10	0.18
90-100	10	0.26
100-110	10	0.29

Remainder of hole to 500 feet averaged less than 0.05% Cu.

The copper mineralization in the higher grade zones confirms the results of the percussion drilling. Eighty feet from 30 to 110 feet averaged 0.3% copper. The copper occurs as coarse to fine blebs of chalcocite associated with biotite flakes in a Bethlehem phase granodiorite intrusive host rock. Pink coloured K'spar alteration is sparingly present throughout the mineralized section.

The mineralized zone appears to be open to the north and west and may be extended by additional test drilling in these directions.

General comments on Induced Polarization Surveys carried out over the property:

The results of Induced Polarization Surveys carried out over the Cleveland property in general showed a low level response. The correlation with the known mineralized zone on claims MER 5 and 6 was poor and since the zone was drilled prior to the survey, the indicated anomaly appears to be

fortuitous. In zones of low mineral content contained in granitic environment and with varying depth of overburden such as obtained on the Cleveland property, the method is not diagnostic and reliance on I.P. results can be misleading.

Comments on Geochemical Survey:

The results of geochemical work carried out over parts of the property were not available. Several anomalous zones are indicated on the attached map but their basis is not known. Dense clay overburden typical of glacial lake bottom conditions covers most of the claim area and would make normal surface geochemical survey difficult to interpret. Additional work of this nature should be preceded by a geochemical orientation study.

C O N C L U S I O N S

The property of Cleveland Mining & Smelting Co. Ltd. in the Highland Valley warrants additional exploration for the following reasons:

1. Similar geological environment to nearby producers or near-producers such as Bethlehem Copper Corporation, Lornex Mining Corporation, Alwin Mining Co. Ltd. and Valley Copper Mines Ltd.
2. The presence of a drill indicated mineralized zone of 640,000 tons grading 0.364% Copper with good potential of additional tonnage.
3. The presence of significant faulting and fracturing of the favourable granitic host rock.
4. Large unexplored areas covered by dense clay overburden that could mask the presence of large economic low grade Highland Valley-type copper/molybdenum deposits.

R E C O M M E N D A T I O N S

It is proposed that the sum of \$50,000 be expended on further exploration of the 88 claim group captioned above, as follows:

PHASE I

Test Hole Percussion Drilling to extend known deposit - 4,000 ft. @ \$5.00/ft	<u>\$ 20,000.00</u>
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PHASE II

Geochemical orientation study and detailed survey of 50 claims	\$ 7,000.00
Magnetometer Survey of 50 Claims	7,000.00
Photogeological study of structural patterns	1,000.00
Bulldozer Trenching	2,000.00
Contingencies	<u>3,000.00</u>
TOTAL PHASE II	<u>\$ 20,000.00</u>

PHASE III

Diamond Drilling arising out of Phase I Program: 1,000 ft. @ \$10/ft. overall	<u>\$ 10,000.00</u>
GRAND TOTAL	<u><u>\$ 50,000.00</u></u>



Edward O. Chisholm, P.Eng.

APPENDIX NO. I

Reports on Cleveland Mining & Smelting Co. Ltd. Highland Valley property
from which data in this report was taken:

1. F.J. Hemsworth, M.E., 616-850 West Hastings St., Vancouver, B.C.
Progress Reports dated as follows:
Sept. 27, 1965, Dec. 13, 1965, Feb. 1st, 1966,
Feb. 23, 1966, Aug. 12, 1966, Sept. 23, 1966,
May 2nd, 1968, Aug. 23, 1968, Oct. 11, 1968,
July 30, 1970, Nov. 30, 1970.
2. A.D. Tidsbury, P.Eng., 3408 Button Road, Calgary, Alberta.
Examination Report, CM, MER, RAE, TAM, JAC & KAM Groups, April 15, 1966.
3. Harvey H. Cohen, P.Eng., 1264 West Pender St., Vancouver, B.C.
Examination Reports on RAE & TAM Groups - June 10, 1965,
" " MER Group - Sept. 5, 1965
4. R.H.D. Philp, P.Eng., Agilis Exploration Services Ltd., 201-714 West
Hastings Street, Vancouver, B.C. Geological Report and Map on Con-
solidated Gem Explorations Ltd. (Cleveland Mining & Smelting Option)
Jan. 13, 1970.
5. Seigel Associates, Geophysical Contractors, 744 West Hastings St.,
Vancouver, B. C. Report on Induced Polarization Survey on some
Joe Claims, Highland Valley, Sept. 9, 1968 and on KAM, CM & MER Claims,
Consolidated Gem Exploration Ltd., March 5, 1969.
6. Huntec Ltd., Toronto, Canada. Report on Induced Polarization Survey,
Highland Valley, B.C. for Cleveland Mining & Smelting -
Jac, Mer, Raf & Cleve Claim Group, May 2, 1966.

C E R T I F I C A T E

I, Edward O. Chisholm of the City of Vancouver in the Province of British Columbia, hereby certify that:

1. I am a geologist with offices at 821-602 West Hastings Street, Vancouver, B.C.
2. I am a graduate of the University of Toronto, Ontario, Master of Arts, 1945.
3. I am a member of the Professional Engineers of Ontario and British Columbia.
4. I have no direct interest or indirect interest in either the property or securities of Kalco Valley Mines Ltd. or Cleveland Mining & Smelting Co. Ltd. or their affiliates nor do I expect to receive any such interest.
5. This report is based on a personal examination of the claim group on September 11th, 1971, government reports and maps and on data provided by Cleveland Mining and Smelting Co. Ltd.

DATED AT VANCOUVER, BRITISH COLUMBIA

September 30th, 1971



Edward O. Chisholm, P.Eng.

PERCUSSION DRILL HOLES
CLEVELAND MINING & SMELTING
CO. LTD. (N.P.L.)
HIGHLAND VALLEY, B.C.

SCALE: 1 INCH \approx 100 FEET.

