

631

INDUCED POLARIZATION (I. P.) SURVEY

HIGHLAND VALLEY, BRITISH COLUMBIA

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
FOR NO. 631 MAP

THE CONSOLIDATED MINING AND SMELTING COMPANY
OF CANADA LIMITED

BY

HUNTEC LIMITED
TORONTO, ONTARIO

JUNE, 1965

THE CONSOLIDATED MINING AND SMELTING COMPANY OF CANADA LIMITED
TRAIL, B.C.

ADDENDUM TO HUNTEC LTD. GEOPHYSICAL REPORT ON INDUCED POLARIZATION (I.P.) SURVEY ON VALLEY COPPER NO. 9 CLAIM GROUP,
HIGHLAND VALLEY AREA, BRITISH COLUMBIA (50° 120° N.W.)

GENERAL

The accompanying I.P. survey report by A.R. Dodds and R.K. Watson, P. Eng. of Hunttec Limited covers the technical aspects of the I.P. survey only and does not indicate the application of work for assessment credit.

This addendum indicates the desired application of expenditures related to the I.P. survey for assessment credit on the Valley Copper No. 9 claim group. A statement of total expenditures incurred in the survey and a Statutory Declaration relating to the same is included here.

Expenditures indicated in the accompanying Hunttec I.P. survey report include only the Hunttec contract charges based on a monthly rate of \$6,950. The Consolidated Mining and Smelting Company personnel carried out the surveying and linecutting required for the I.P. survey. Linecutting was done on a contract basis by two men at a price of \$90 per line mile. G.R. Rosseau, a Cominco geologist and geophysicist, supervised the linecutting and carried out the necessary surveying and chaining.

The I.P. survey covered in this report is a direct southerly extension of the same type of survey carried out earlier in the year. The latter survey was covered in a report submitted by Cominco for assessment credit which was entitled Geophysical Report on Induced Polarization Survey, Dave Claims, Highland Valley, Kamloops M.D. by P.E. Walcott, P. Eng. dated April, 1965. The most southerly east-west line on the above survey was 60+00 south. The adjoining line to the south on the survey covered in this report is 64+00 south.

Assessment credit is requested on the 20 claims of the Valley Copper No. 9 Group. A map showing the claim grouping and I.P. coverage with respect to the claims has been added to the Hunttec maps. The claims on which assessment credit is requested and the distribution of credits is as follows:

Valley Copper Group No. 9

<u>Claim</u>	<u>Distribution</u>	<u>Credit</u>
Cow 1-8	2 yrs. each claim	16 yrs.
Cow 9-12	" " "	8 "
BX 1-4	" " "	8 "
BX 13-16	" " "	8 "
	Total:	<u>40 yrs.</u>

The total requested assessment credit for the I.P. survey and related work on the above claim group is \$4,000. Total expenditures were \$4,175.

A Statement of Expenditures and a Statutory Declaration relating to the same is appended. Affidavits on Application for Certificates of Work have been filed with the Mining Recorded in Kamloops.

D. W. Heddle

D.W. Heddle
Professional Engineer

DWH:gmc
Trail Exploration Office, Western District
June 11, 1965

CANADA) STATUTORY DECLARATION RELATING TO EX-
) PENDITURES ON A GEOPHYSICAL SURVEY OF
PROVINCE OF BRITISH COLUMBIA) CERTAIN MINERAL CLAIMS THE PROPERTY OF
) VALLEY COPPER MINES LIMITED
TO WIT:)

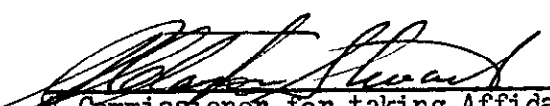
I, DUNCAN W. HEDDLE, a Professional Engineer, of the City of Trail, in the Province of British Columbia, DO SOLEMNLY DECLARE:

1. That I am employed as a geological engineer by The Consolidated Mining and Smelting Company of Canada Limited.
2. That to my knowledge The Consolidated Mining and Smelting Company of Canada Limited did, on behalf of Valley Copper Mines Limited, cause Hunttec Limited, a firm engaged in performing geophysical surveys, to conduct an induced potential geophysical survey on certain mineral claims, the property of Valley Copper Mines Limited situated in the Kamloops Mining Division, the cost of which was paid by The Consolidated Mining and Smelting Company of Canada Limited, on behalf of Valley Copper Mines Limited.
3. That in support of the said induced potential geophysical survey, The Consolidated Mining and Smelting Company of Canada Limited did hire men and incur expenses in addition to those incurred by Hunttec Limited.
4. That a report was prepared by Hunttec Limited as a result of the said surveys, and that copies of this report are being filed with the Mining Recorder in Kamloops.
5. That attached hereto and marked with the letter "A", upon which I have signed my name at the time of declaring hereof, is a statement of expenditures incurred by The Consolidated Mining and Smelting Company of Canada Limited on behalf of Valley Copper Mines Limited in connection with the said geophysical survey of the said mineral claims, and showing in addition the dates during which those making the said survey performed their work.

AND I MAKE this solemn declaration conscientiously believing it to be true and knowing that it is of the same force and effect as if made under oath and by virtue of the Canada Evidence Act.

DECLARED before me at the
Municipality of Tadanac, in
the Province of British Columbia)
this 18th day of)
June, A.D. 1965.)

D. W. Heddle


A Commissioner for taking Affidavits for British Columbia

STATEMENT OF EXPENDITURES

INDUCED POLARIZATION SURVEY VALLEY COPPER
NO. 9 CLAIM GROUP - KAMLOOPS M.D.

LINECUTTING - (April 5 - April 16, 1965)

9-1/8 line miles @\$90/mile = \$ 822

SUPERVISION, LINE SURVEYING - (April 5-16, 1965)

G.R. Rosseau 5 days @\$30/day = 150

JEEP RENTAL

200 miles @25¢/mi. = 50

HUNTEC LIMITED CHARGES - (April 12-27, 1965)

For data on personnel employed by Hunttec,
see page i (Appendix to Hunttec Report) = 3,153

TOTAL \$ 4,175

D.W. Heddle
D.W. Heddle
Professional Engineer

Endorsed by:

G. Hanson
Branch Accountant

This is Exhibit "A" to the Statutory Declaration of D.W. Heddle declared before me the 18th day of June, A.D. 1965.

Robert Stewart
A Commissioner for taking Affidavits
for British Columbia

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CHARGEABILITY AND RESISTIVITY PROFILES - PLATE I	Scale 1" = 200'
PLAN OF I.P. SURVEY AREA WITH RESPECT TO CLAIMS	Scale 1" = 500'

INTRODUCTION

Between April 12 and April 27, 1965, Hunttec Limited carried out an Induced Polarization (I. P.) survey for The Consolidated Mining and Smelting Company of Canada Limited over a group of mineral claims in Highland Valley, British Columbia. The area adjoins that surveyed by I. P. between November, 1964 and March, 1965 (report dated April, 1965), and the same co-ordinate system is used.

The field party was managed by Mr. F. Smith and included an instrument operator, Mr. B. Howes, and two assistants, Mr. F. Armstrong and Mr. R. Stewart, all provided by Hunttec Limited. Mr. A. R. Dodds of Hunttec Limited provided geophysical supervision in the field and carried out a preliminary interpretation. Final reporting and drafting was done at the Toronto office of Hunttec Limited.

The survey specifications are the same as described in the April report.

PROPERTY AND LOCATION

The property is located about 26 miles southeast of Ashcroft, B. C. , in the Kamloops Mining District.

The following mineral claims were surveyed in whole or in part:

Cow 1 to 8 inclusive

BX 2

Lodge 1, 3 and 4

"B" Fraction

Outrider 16

Bay 2 Fraction and 31

Dave 14, 15, 58 and 60

These claims lie in the northwest quadrant of the one degree quadrilateral whose southeast corner is 50°, 120°. Access is by bush road from the Bethlehem Mine main entrance road.

GEOLOGICAL ENVIRONMENT

The area is covered by Pleistocene and recent deposits, such as glacial outwash, sand and gravel, and characterized by irregular hummocky and kettled topography. These are underlain by the intrusive rocks of the Guichon Creek Batholith, consisting for the most of granite, granodiorite, quartz diorite and diorite.

The plutonic rocks of the Guichon Creek Batholith are host to the copper minerals in this area. These occur as veins and in shattered zones associated in many places with molybdenite, and the wall rocks are often highly sericitized.

The Induced Polarization method of prospecting is well suited for use in this area since it responds to disseminated or scattered veins of mineralization as well as massive deposits.

SURVEY SPECIFICATIONS

The Huntec pulse-type I. P. instrument is similar in design and operation to that described by R. W. Baldwin in "A Decade of Development in Cvervoltage Surveying", A. I. M. E. Transactions, Vol. 214, 1959. Power is obtained from a gasoline motor, coupled to a 2.5 kw, 400 cycle, three-phase generator, providing a maximum of 2.5 kw d. c. to the ground. The cycling rate is 1.5 seconds "current on" and 0.5 seconds "current off", the pulses reversing continuously in polarity. The data recorded in the field consist of careful measurements of the current (I) in amperes flowing through electrodes C_1 and C_2 , the primary voltage (V_p) appearing between P_1 and P_2 during the "current on" part of the cycle, and a secondary voltage (V_s) appearing between P_1 and P_2 during the "current off" part of the cycle. The apparent chargeability (M_a) in milliseconds is calculated by dividing the secondary voltage by the primary voltage and multiplying by 400, which is the sampling time in milliseconds of the receiver unit. The apparent resistivity in ohmmeters is proportional to the ratio of the primary voltage and the measured current, the proportionality factor depending on the geometry of the array used. The resistivity and chargeability obtained are called "apparent" as they are values which that portion of the earth sampled by the array would have if it were homogeneous. As the earth sampled is usually inhomogeneous,

the calculated apparent resistivity and apparent chargeability are functions of the actual resistivity and chargeability of the rocks sampled and of the geometry of the rocks.

The survey was carried out using the "three-electrode array" system. In this system, the current electrode (C_1) and two potential electrodes P_1 and P_2 are moved in unison along the survey lines. The spacing between these three electrodes is kept constant for each traverse, at the figure roughly equal to the depth to be explored by that traverse. The second electrode (C_2) is kept fixed at "infinity".

Thus, on a three-electrode traverse with a spacing of 200 feet, a body lying at a depth of 100 feet will produce a strong response, whereas one at a depth of 200 feet will only just be detected. By running subsequent traverses at different electrode spacings, more precise estimates can be made of depth to the top of causative bodies, as well as more detailed information on the geometry and extent of the bodies.

INTERPRETATION PROCEDURES

I. P. interpretation procedures have been most completely developed in situations of horizontal layering and for bodies such as porphyry coppers of large lateral extent. The complex problem of resolving the combined effects of depth, width, dip and true chargeability of steeply dipping bodies together with the physical characteristics of overburden and country rocks has not been solved theoretically. The interpreter must use empirical solutions plus experience gained from surveys over known bodies in other areas.

The profiles submitted on the plan map with this report indicate certain anomalous zones which are believed to correspond to weak disseminated sulphide mineralization. Estimates of average percentage sulphides have been made in some cases. Where made these estimates are minimum as they are based on the value of the observed chargeabilities, not the true chargeabilities of the anomalies themselves. They are necessarily approximate inasmuch as the relationship between chargeability and percentage sulphide is affected by such things as grain size, resistivity contrast, quantity and nature of absorbed water, degree of interconnection of mineralization, and other factors. The rule-of-thumb for use in interpretation, based on past experience, is that 1% by volume of sulphide mineralization corresponds to between 5 and 15 milliseconds of true chargeability.

RESULTS AND INTERPRETATION

The I. P. results are shown as chargeability and resistivity profiles on Plate I in the pocket of this report. The map is to scale at 200 feet to the inch and the vertical scales for chargeability and resistivity are respectively 4 milliseconds per inch and one logarithmic cycle per two inches.

Two zones of interest are interpreted from this extension survey and are shown on Plate I. Anomaly A is an extension of Anomaly A in the previous survey and coincides with a resistivity low. The most striking correlation, however, is that of the magnetics, surveyed in March 1965 by Cominco, and the chargeability anomaly. The strongest part of Anomaly A occurs on Lines 76+00S and 80+00S and these two anomalies coincide directly with two of the most pronounced magnetic lows in the area. There are two possible interpretations of these phenomena:

1. The entire Anomaly A represents a long zone of bedrock alteration which has a high chargeability due to either sulphide mineralization or some disseminated clay minerals resulting from kaolinization of the feldspars during the alteration process. The low resistivity could be caused by the alteration, especially if any wet shears were present and this is supported by the fact

that magnetic lows are often observed over altered or shattered zones.

2. The other interpretation is that the magnetic lows represent small pockets of basic volcanics polarized in a reverse direction. It is not uncommon to find reverse polarization in volcanics of Tertiary age and, in fact, negative magnetic Tertiary volcanics have been seen in the nearby Trojan property. If this is the case, the chargeability response could be caused by the magnetite in the volcanics as well as any sulphide mineralization.

In any case, it is believed that the anomaly is of sufficient interest to warrant further investigation. Detailing was done on Line 76+00S and indicates that the causative body is rather deeper here than in the original survey area. If sulphide mineralization is the cause, then weak dissemination or higher-grade narrow veins might be expected between depths of 100 and 200 feet. It is recommended that this area be investigated by a hole collared at 84+00E and plunging 45° easterly along the line which should intersect the causative body within 400 feet.

A second zone marked "B" on Plate I is a continuation of Zone B in the previous survey. It is much weaker but does correspond

generally with weak magnetic lows. Its cause may be similar to that of Anomaly A but no action should be taken regarding further investigation until the cause of Anomaly A is known.

SUMMARY AND RECOMMENDATIONS

The I. P. survey over this extension area indicated two zones of interest which extend to the south of the main zones outlined in the report of April, 1965.

It is recommended that the anomalies of the earlier survey be investigated first since the causative body is shallower and can probably be identified at less cost. However, it is also felt that the anomaly found on this extension survey is of sufficient merit to be investigated even if no economic sulphides are found to the north. A drill hole collared at 84+00E on Line 76+00S and plunging 45° east should intersect the causative body within 400 feet.

HUNTEC LIMITED

R. K. Watson

for A. R. Dodds,
Geophysicist.

R. K. Watson

R. K. Watson, B. A. Sc., P. Eng.,
Geophysicist.

Toronto, Ontario

June, 1965

APPENDIX

(i)

ASSESSMENT DATA

This survey comprised 7.84 line miles of I. P. reconnaissance plus 0.57 line miles of detail profiling, making a total of 8.41 line miles.

The total number of man days required to complete this work are as follows:

	<u>Man Days</u>
Operating I. P. instrument	40
Calculations and Interpretation	7
Report writing	5
Drafting	3
Office typing and supervision	<u>1</u>
Total	<u>56</u>

PERSONNEL EMPLOYED ON SURVEY

<u>Name</u>	<u>Occupation</u>	<u>Address</u>	<u>Dates 1965</u>
F. Smith	Instrument Operator	1450 O'Connor Dr., Toronto 16, Ont.	April 12 - 27 inclusive
B. Howes	"	"	"
F. Armstrong	Field Helper	"	"
R. Stewart	"	"	"
A. R. Dodds	Geophysicist	"	Various times between April 12 and May 15
R. K. Watson	Supervising Geophysicist	"	May 26 - June 7
Miss P. Curtis	Drafting	"	June 3 - 7
Mrs. L. Brunton	Typing	"	June 3 - 7

(iii)

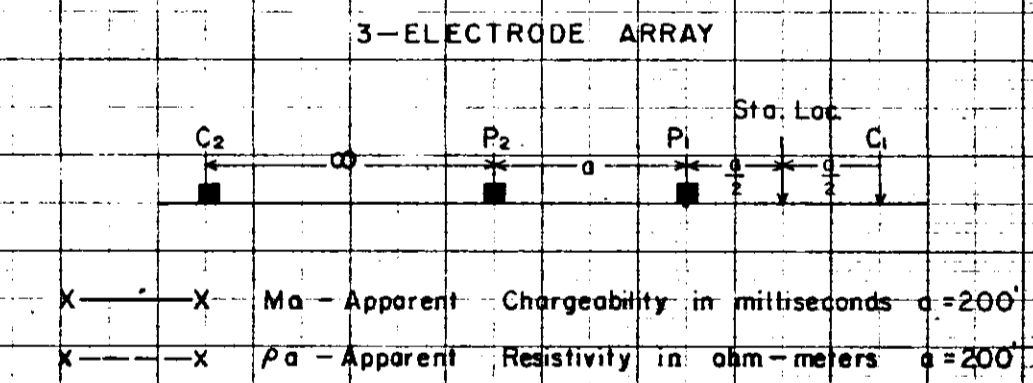
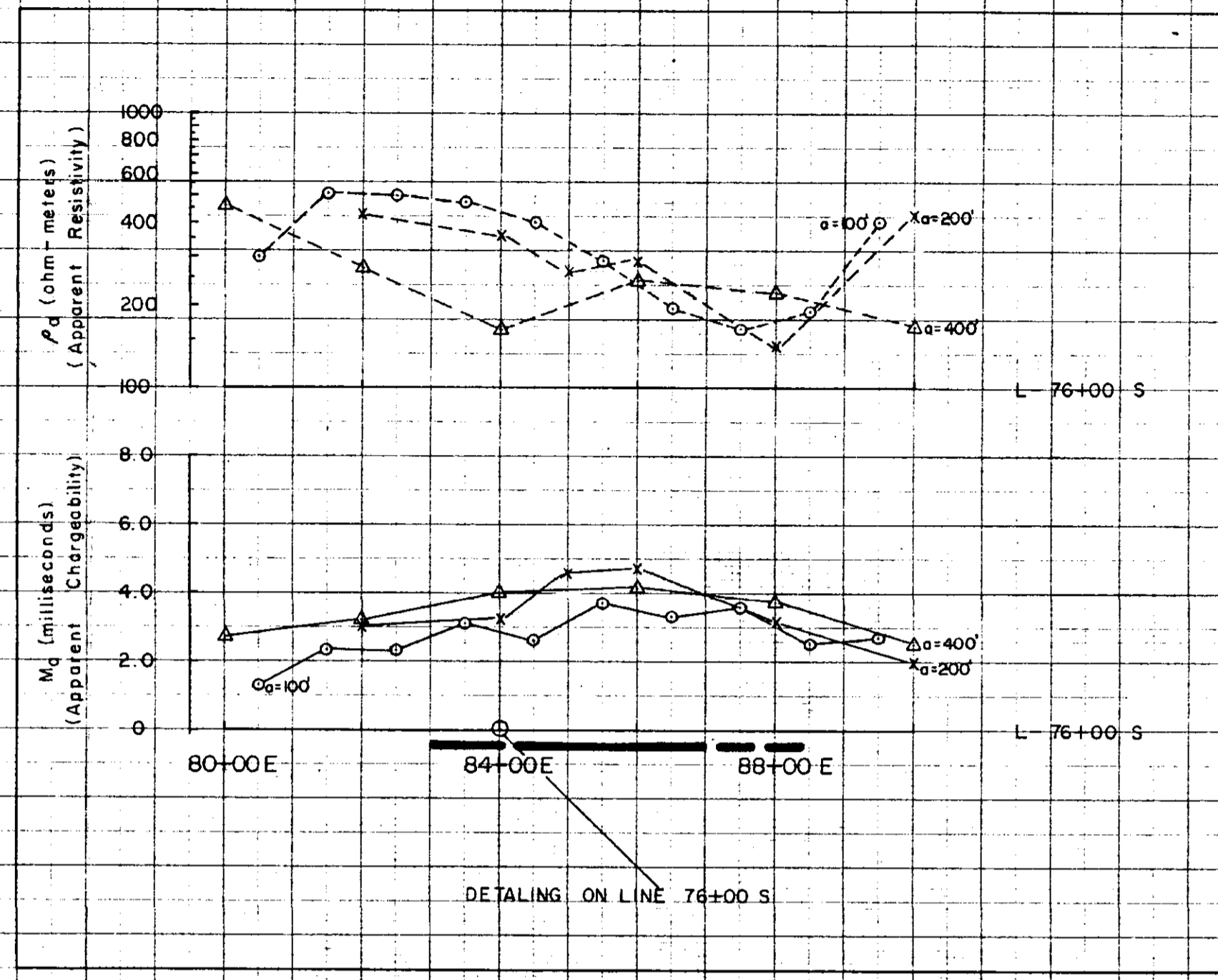
COST OF SURVEY

Induced Polarization Crew.

9 1/2 working days \$2,641.00

Board and accommodation - April 12 to 27
for four men 512.00

Total Cost \$3,153.00



LEGEND

———— Anomalous zone
 - - - - Weak anomalous zone
 O.D.H. Proposed drill hole

CONSOLIDATED MINING AND SMELTING COMPANY
 OF CANADA LIMITED
 INDUCED POLARIZATION SURVEY
 HIGHLAND VALLEY, B. C.
 PLATE I
 PROFILES OF CHARGEABILITY AND RESISTIVITY
 WITH INTERPRETATION
 EXTENSION SURVEY

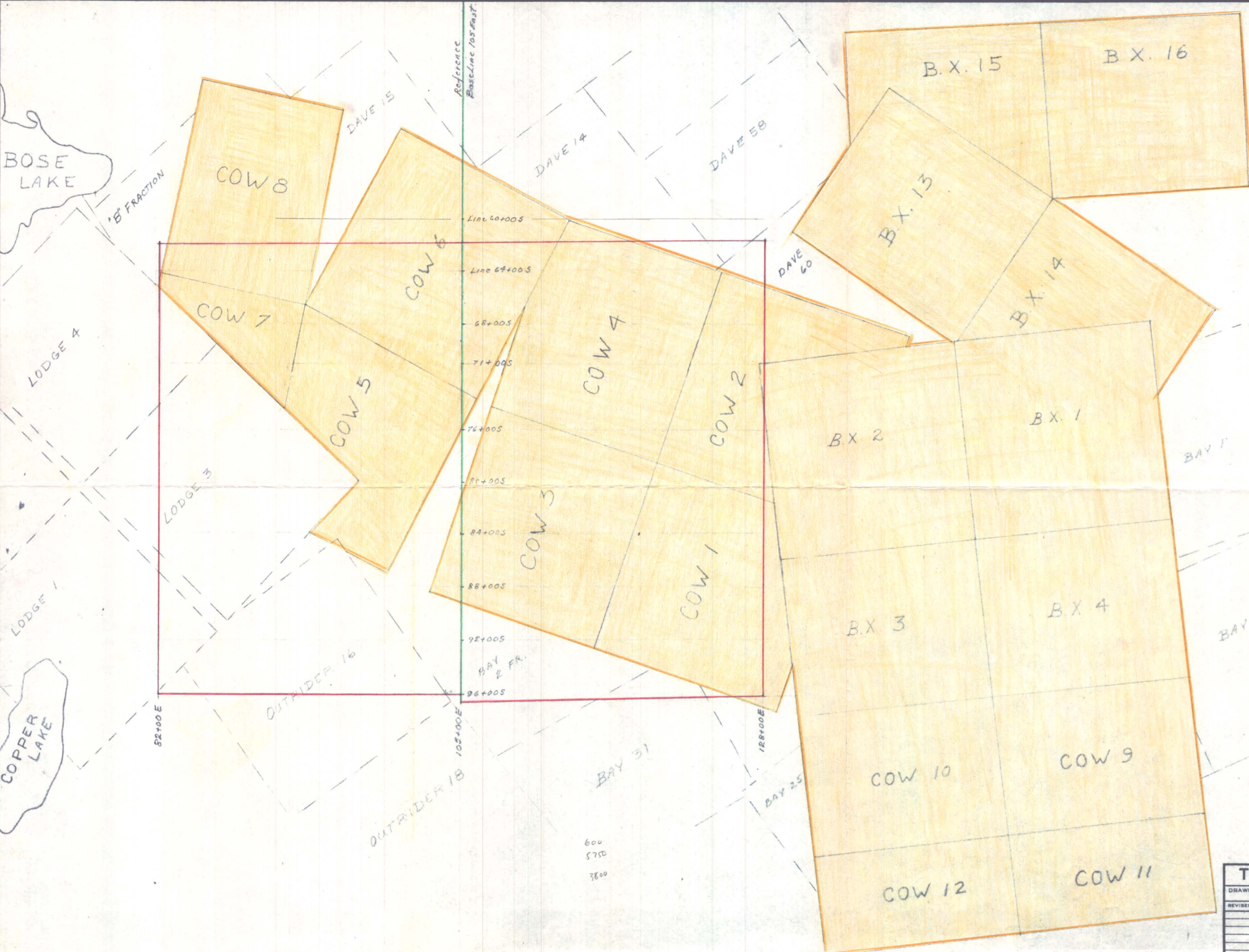
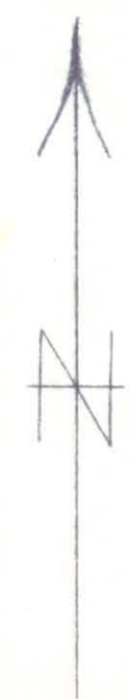
Scale: 1 inch = 200 feet
 Apparent Chargeability: 1 inch = 4.0 msec.
 Apparent Resistivity: 2 inches = 1 cycle (logarithmic)

HUNTEC LIMITED, Toronto, Canada - June, 1965
 R. K. Watson, B. A. Sc., P. Eng., Geophysicist

Department of
 Mines and Petroleum Resources
 ASSESSMENT REPORT
 NO. 631 MAP 1

To accompany Geophysical Report,
 on Induced Polarization Survey
 Highland Valley, Kamloops A.D.
 by A. R. Deeds and R. K. Watson, P. Eng.
 dated June, 1965.

631



LEGEND

- Valley Copper No 9 Claim Group
- Boundary of area covered by I.P. Survey

**Department of
 Mines and Petroleum Resources
 ASSESSMENT REPORT**
 NO. **631** MAP **2**

To accompany Geophysical Report
 on Induced Polarization Survey,
 Valley Copper No 9 Claim Group,
 Highland Valley, Kamloops M.D.
 by A.R. Dodds and R.K. Watson, P.Eng.
 Dated June, 1965.

D.W. Heddle, P.Eng.

631

The Consolidated Mining and Smelting Company of Canada Limited			
DRAWN BY: D.W.H.	TRACED BY:		
REVISED BY:	DATE:	REVISED BY:	DATE:
VALLEY COPPER No 9 GROUP		Kamloops M.D.	
PLAN OF I.P. SURVEY AREA WITH RESPECT TO CLAIM GROUP			
SCALE: 1" = 500'		DATE: May, 1965	PLATE: