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VANCOUVER, B.C.

	LOG NO:	NOV 1 0 1993	RD.	
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A GEOPHYSICAL REPO	RILE NO:			

<u>ON</u>

INDUCED POLARIZATION SURVEYING

CVS Property, Highland Valley Area, B.C. 50° 22'N, 120° 52'W
N.T.S. 92 I/7w



<u>Claims surveyed:</u> CVS 2,4 - 11, 13-15

CS 7,8

Survey Dates:

May 25th - July 7th, Aug. 5th - 9th, 1993

Owner Operator:

HUDSON BAY EXPLORATION AND

DEVELOPMENT COMPANY LIMITED

Vancouver, B.C.

GEOLOGICAL BRANCH ASSESSMENT REPORT

PETER E. WALCOTT & ASSOCIATES LIMITED

Vancouver, British Columbia

SEPTEMBER 1993

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INTRODUCTION.

Between May 25th and July 7th, and August 5th and 9th, 1993, Peter E. Walcott & Associates Limited undertook a grid establishment and induced polarization (I.P.) surveying programme on the CVS property, located in the Highland Valley of British Columbia, for Hudson Bay Exploration and Development Company Limited.

Brushed out east-west trending "compass and flag" lines were established at 200 and/or 400 metre intervals along a cut north-south base line by the geophysical crew and chained with 50 metre stations.

Measurements (first to fourth separation) of apparent chargeability (the I.P. response parameter) and resistivity were then made every 150 metres along most of the lines using the pole-dipole method of surveying with a 150 metre dipole.

The I.P. data are presented in contour form on individual pseudo-sections bound in this report. In addition the first and third separation chargeability and resistivity data are presented in contour form at 1:10,000 on Maps W-505-1, 2, 5 & 6 that accompany this report.

PROPERTY, LOCATION & ACCESS

The property is located in the Kamloops Mining Division of British Columbia and consists of the following units:

Claim Name	<u>Units</u>	Record No.	Anniversary
CVS-1	20	219885	May 10
CVS-2	20	219886	May 11
CVS-3	20	219887	May 10
CVS-4	20	219888	May 11
CVS-5	20	219889	May 12
CVS-6	20	219890	May 12
CVS-7	20	308682	April 18
CVS-8	20	308683	April 19
CVS-9	18	314627	November 10
CVS-10	15	314628	November 10
CVS-11	10	314629	November 10
CVS-12	8	314630	November 11
CVS-13	20	314631	November 9
CVS-14	20	314632	November 10
CVS-15	20	318562	June 21
CS-7	1	308684	April 19
CS-8	1	308685	April 19
CS-9	1	314633	November 7
CS-10	1	314634	November 7
CS-11	1	314635	November 7

The claims are situated in the Highland Valley of British Columbia around Chataway Lake and some seven kilometres south of the Highmont Copper Mine.

Access was obtained from the town of Merritt via Highway 8, the Pimanus-Tyner fire access road and the spur road to Chataway Lodge fishing camp.

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GEOLOGY.

The reader is referred to the formentioned reports and to a report by A.G. Troup, P.Eng., of Archean Engineering dated May 1992.

Basically the property is underlain by rock of the Guichon Batholith complex, a somewhat concentric phased intrusive with increase in age, mafic content and decrease in grain size from the inner core to the outer margin.

Although mostly covered by glacial till the Chataway granodiorite, a member of the Highland Valley Phase, appears to be the dominant underlying rock type, in contact with younger Bethlehem and Bethsaida Phase rocks near the western boundary.

Mineralization on the property exists in a number of showings where malachite, bornite, chalcopyrite and chalcocite are observed in shears and/or altered rocks.

- 5 -

PURPOSE.

The purpose of the survey was to relocate and better define the many weakly anomalous I.P. zones located in the late sixties through the early eighties on various grids by different contractors using a variety of instruments for further investigation by diamond drilling.

A large dipole was to be employed to look for subtle anomalies based on the premise of looking for sulphur poor sulphide assemblages with considerable bedrock oxidation and deep overburden cover.

SURVEY SPECIFICATIONS.

The induced polarization (I.P.) survey was conducted using a pulse type system, the principal components of which are manufactured by Huntec Limited of Metropolitan Toronto, Ontario, and BRGM Instruments of Orleans, France.

The system consists basically of three units, a receiver (BRGM), a transmitter and a motor generator (Huntec). The transmitter, which provided a maximum of 2.5kw d.c. to the ground, obtains its power from a 2.5 kw 400 c.p.s. three phase alternator driven by a gasoline engine. The cycling rate of the transmitter is 2 seconds "current-on" and 2 seconds "current-off" with the pulses reversing continuously in polarity. The data recorded in the field consists of careful measurements of the current (I) in amperes flowing through the current electrodes C_1 and C_2 , the primary voltages (V) appearing between any two potential electrodes, P_1 through P_7 , during the "current-on" part of the cycle, and the apparent chargeability, (Ma) presented as a direct readout in millivolts per volt using a 100 millisecond delay and a 1000 millisecond sample window by the receiver, a digital receiver controlled by a micro-processor - the sample window is actually the total of ten individual windows of 100 millisecond widths.

The apparent resistivity (fa) in ohm metres 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 chargeability and resistivity are called apparent as they are values which that portion of the earth sampled would have if it were homogeneous. As the earth sampled is usually inhomogeneous the calculated apparent chargeability and resistivity are functions of the actual chargeability and resistivity of the rocks.

The survey was carried out using the "pole-dipole" method of surveying. In this method the current electrode, C_1 , and the potential electrodes, P_1 through P_7 , are moved in unison along the survey lines at a spacing of "a" (the dipole) apart, while the second current electrode, C_2 , is kept constant at "infinity". The distance, "na" between C_1 and the nearest potential electrode generally controls the depth to be explored by the particular separation, "n", traverse.

A 150 metre dipole was employed on this survey, and first to fourth separation measurements made at 150 metre intervals along the survey lines. In all some 123.4 kilometres of line were established, and some 88.7 kilometres of surveying completed using the above procedure.

-7-

DISCUSSION OF RESULTS.

The I.P. results show the property to exhibit a low chargeability background - circa 5 mv/v over the Chataway rocks in the middle and eastern parts of the grid, and slightly lower circa 4 mv/v over the younger Bethsaida and associated phase rocks on the west - above which a number of weak chargeability zones are clearly discernible, as can be seen on Maps W-505-1 & 5, the contoured plans of the first and third separation chargeabilities. It should be mentioned here that due to the asymmetric nature of the pole-dipole response the third separation plot should be shifted 150 metres westwards for comparison with that of the first separation.

The four strongest of these zones, as outlined by the 7.5 mv/v contour on the third separation chargeability plan - Map W-505-5 - lie to the northwest, north, northeast and southeast of Chataway Lake and will be hereafter referenced as the Roscoe, Billy Lake, Superior North and Superior South zones respectively. They are or appear to be better definitions of previously located anomalous zones from earlier surveys.

As the zones cover considerable areas they should be given consideration for further exploration.

They exhibit an increase in chargeability with larger separation suggesting a greater percentage sulphide content at depth as can be seen on the individual pseudosections.

They also generally exhibit higher resistivities suggesting a causative source as above with silicification or one due to a phase change within the rock type.

The largest of these zones - the Roscoe - encompasses the Roscoe showing on Line 4600N - sporadic malachite in Chataway rocks - and Art's showing near Line 5800N where mineralization occurs as malachite - bornite fracture at/near the contact between Roscoe and Chataway rocks.

The Billy Lake zone lies south and apparently extends to previous trenching where minor sericite - malachite veinlets are observed in mainly unaltered Chataway rocks.

No mineralization was noted in outcrop within the Superior North and South zones respectively but the former was apparently the subject of investigation by two previous drill holes.

Weaker but slightly anomalous chargeability values - 6's - were



DISCUSSION OF RESULTS cont'd

obtained over an area of strong alteration on Lines 7800N and 8200N in the extreme northwest portion of the grid south of Mystery Lake.

No anomalous responses were obtained over the eastern half of Lines 450N and 1150N where a previously conducted - late sixties - survey by Seigel & Associates showed a strong high frequency series of narrow chargeability highs presumably noise related.

No anomalous chargeability responses were obtained over the western extension of Line 4600N surveyed to cover any possible southerly extension of the Yubet showing to the north where mineralized material of up to 2.25% copper content was reported in the literature with no significant I.P. signature.

Aside from the highs mentioned previously the resistivity survey showed the area west of 3200E to exhibit generally lower resistivities apparently mapping younger phases of the batholith.

The more intense resistivity lows seen on the west ends of Lines 2600N through 3800N and extending into Chataway Lake as suggested by the results of Line 4200N are due to a considerable thickness of overburden in and around Chataway Creek - a previous drill hole in the creek failed to intersect bedrock at 180 metres depth - and suggests a major fault to underlie the same.

SUMMARY, CONCLUSIONS & RECOMMENDATIONS.

Between May 25th and July 7th, and August 5th and 9th, 1993, Peter E. Walcott & Associates Limited carried out a large I.P. survey programme on a property located in the Highland Valley of British Columbia, for Hudson Bay Exploration and Development Company Limited.

Twenty two widely spaced east-west traverses were undertaken with the pole-dipole method of surveying employing a 150 metre dipole in an effort to detect possible sulphide mineralization at depth.

Four zones of considerable aereal expanse and of weak chargeability response with accompanying higher resistivities were defined by the survey, two of which encompassed areas where weak copper mineralization was observed. In addition weaker responses were observed in an area of strong hydrothermal alteration.

As a result the writer recommends that these features be investigated by borehole techniques to determine their causative sources. To this end he suggest the following holes be drilled:

	Collar	Direction	Angle	Length	Horizontal Travel
1	L 3000N, 3975E	2700	-700	250m	85m
2	L 3800N, 4600E	2700	-550	250m	143m
3	L 4200N, 4850E	2700	-550	250m	143m
4	L 5400N, 4950E	2700	-600	200m	100m
5	L 5400N, 5075E	2700	-600	200m	100m
6	L 5000N, 3175E	900	-600	300m	150m
7	L 5000N, 3500E	2700	-600	300m	150m
8	L 5000N, 3700E	2700	-600	300m	150m
9	L 5800N, 3550E	2700	-600	300m	150m
10	L 6600N, 5450E	2700	-600	300m	150m
11	L 7000N, 4550E	2700	-600	300m	150m

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SUMMARY, CONCLUSIONS & RECOMMENDATIONS cont'd

or	L 6600N, 4550 E	2700	-600	300m	150m
12	L 8200N, 1025E	900	-600	300m	150m

He further recommends that prior to drilling inverse and forward modelling of the geophysical responses should be undertaken, and the location of the above suggested holes be subject to change based on the results of this modelling, further geological evaluation and accessibility.

Respectfully submitted,

PETER E. WALCOTT & ASSOCIATES LIMITED

Peter E. Walcott, P. Eng. Geophysicist

Vancouver, British Columbia

September 1993

APPENDIX

- i -

COST OF SURVEY.

Peter E. Walcott & Associates Limited undertook the survey on a contract basis including mobilization and reporting. The total cost of services provided of \$119,471.00 was derived as follows:

1. Line establishment - 126 man days - 123.6 kms at \$345.00 per km

\$42,745.50

2. I.P. surveying - 155 man days - 88.7 kms at \$865.00 per km

\$76,725.50

\$119,471.00

- ii -

PERSONNEL EMPLOYED ON SURVEY

Name	Occupation	Address	Dates
Peter E. Walcott	Geophysicist	Peter E. Walcott & Assoc. 605 Rutland Court, Coquitlam, B.C. V3J 3T8	May 25, June 8- 10 13-15, June 23-Jul 7, Aug. 5-9th, 20th-30th 1993
G. MacMillan	Geophysical Operator	11	May 25th - June 17th, Aug. 5th - 9th, 1993
A. Walcott	11	11	May 25th - June 2nd, July 4th - July 6th,
P. Charlie	77	11	May 26th - July 7th, Aug. 5th - 9th, 93
G. Karacunte	11	11	May 26th - July 7th, Aug. 5th - 9th, 93
J. Luthi	Geophysical Helper	11	May 26th - June 16th, June 21st - July 7th
K. O'Hara	17	11	May 26th - June 18th
D. Groves	† †	**	June 13th - June 17th Aug. 5th - 9th
R. Rothwell	₹ ₹	· • • • • • • • • • • • • • • • • • • •	June 23rd - July 7th Aug. 6th - 8th
K. Walcott	11	11	June 29th - July 7th
M. Epneris	Ħ	IT .	June 4th - June 10th,
W. Daenens	11	11	June 10th - July 7th,
J. Walcott	Typing	п	Aug. 31st, 1993

PETER E. WALCOTT & ASSOCIATES LTD

CERTIFICATION.

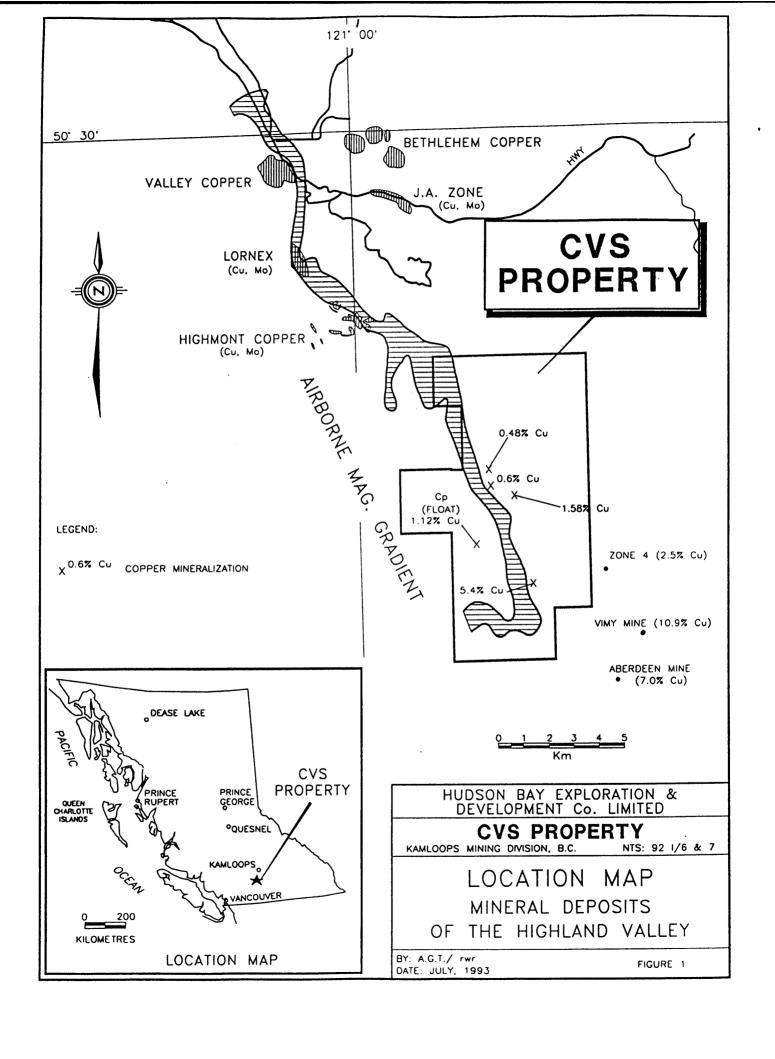
I, Peter E. Walcott, of the Municipality of Coquitlam, British Columbia, hereby certify that:

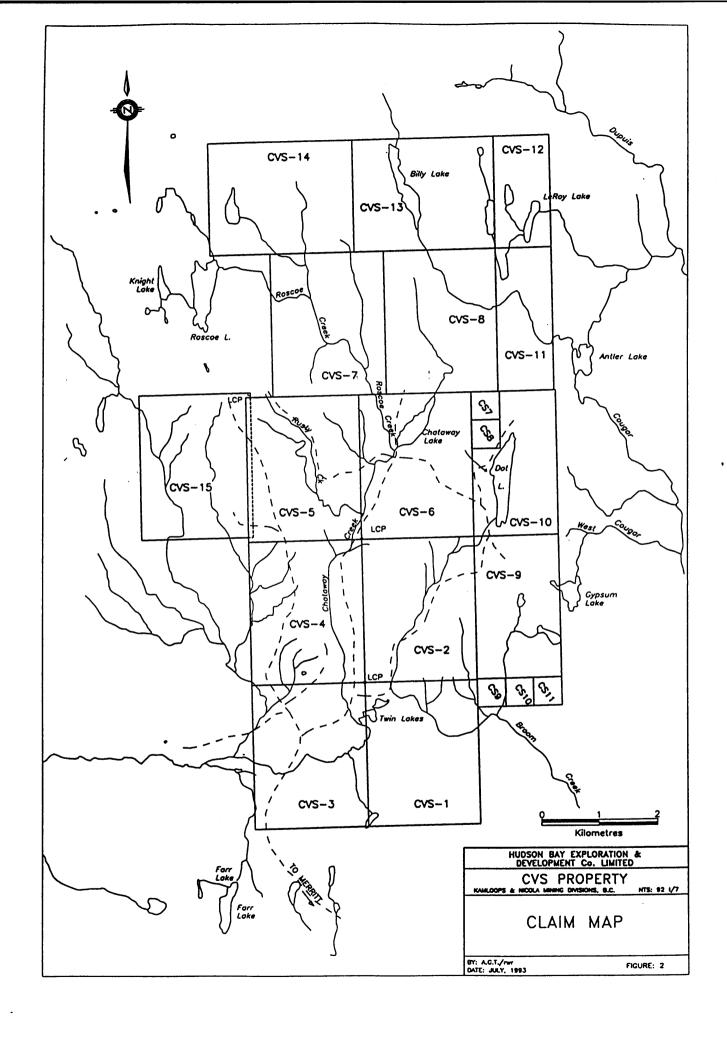
- 1. I am a graduate of the University of Toronto in 1962 with a B.A.Sc. in Engineering Physics, Geophysics Option.
- 2. I have been practising my profession for the last thirty one years.
- 3. I am a member of the Association of Professional Engineers of British Columbia and Ontario.

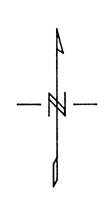
Peter E. Walcott, P.Eng.

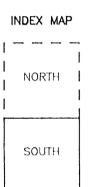
Vancouver, B.C.

September 1993









GEOLOG CAL BRANCH ASSES TO PORT

23, 0

100 0 100 200 300 400 500 600 700 (meters)

HUDSON BAY EXPLORATION & DEVELOPMENT COMPANY LIMITED

POLE DIPOLE

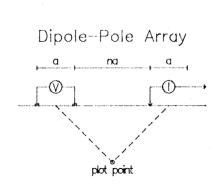
INDUCED POLARIZATION SURVEY CONTOURS OF APPARENT RESISTIVITY

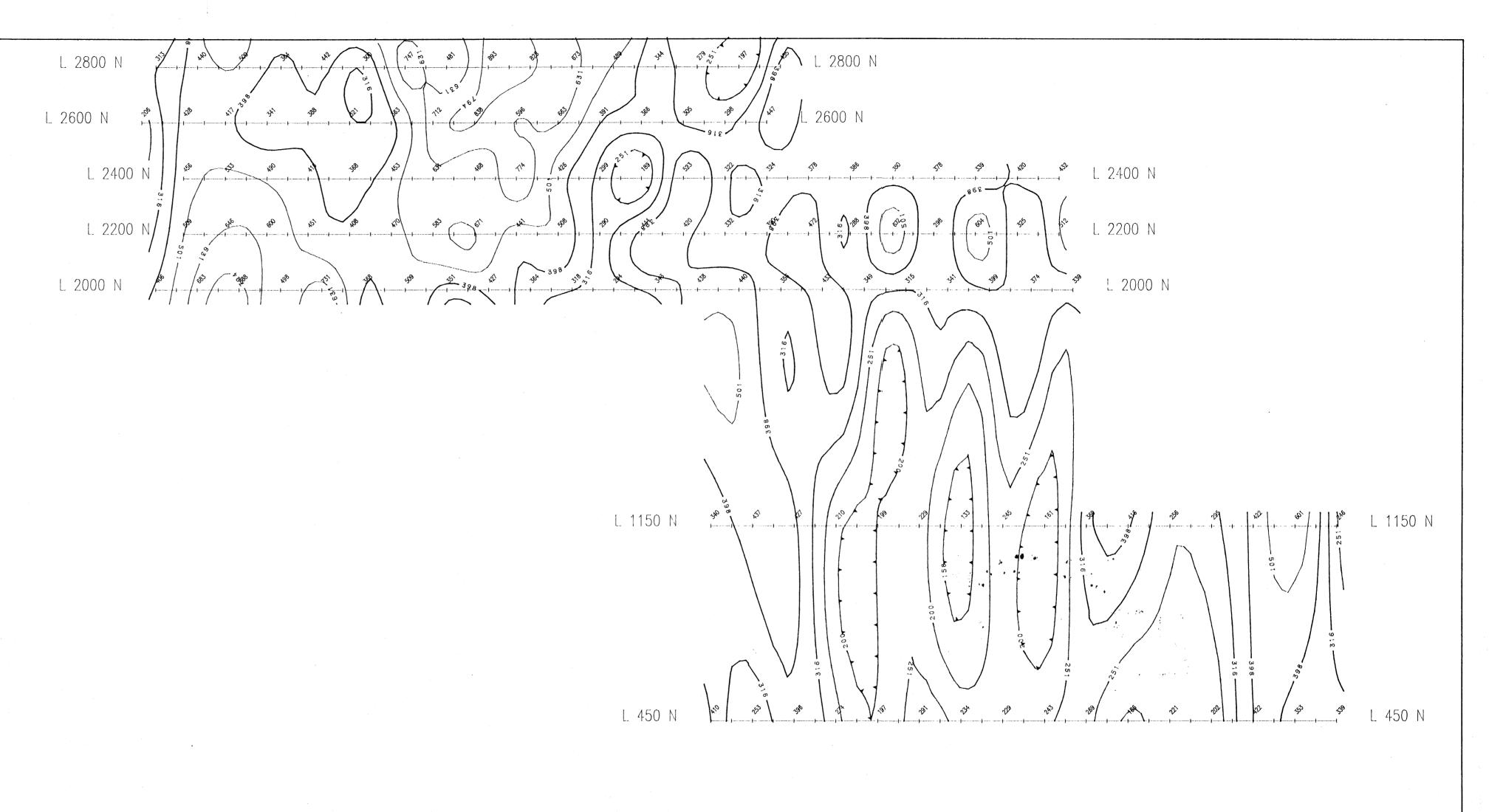
CVS CLAIMS
KAMLOOPS MIN. DIV., BRITISH COLUMBIA

Map No. W-505-2 N.T.S. 92 1/6 & 7
PETER E. WALCOTT & ASSOC. LTD.

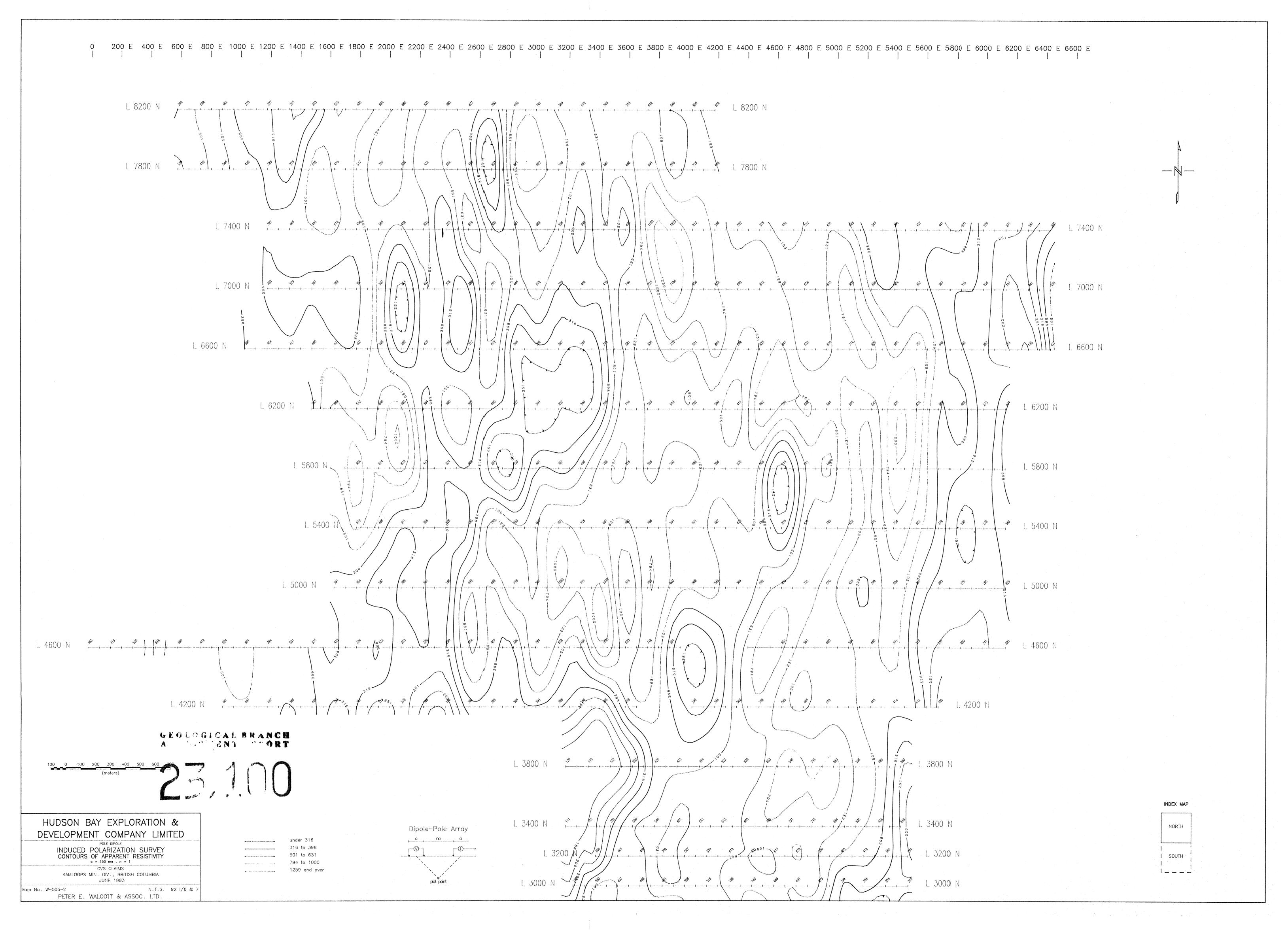
JUNE 1993

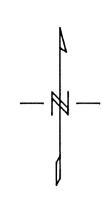
under 316
316 to 398
501 to 631
794 to 1000
1259 and over





3000 E 3200 E 3400 E 3600 E 3800 E 4000 E 4200 E 4400 E 4600 E 4800 E 5000 E 5200 E 5400 E 5600 E 5800 E 6000 E 6200 E 6400 E 6600 E 6800 E 7000 E 7200 E 7400 E





GEOLOGICAL BRANCH ASSESSMENT REPORT

23,100

100 0 100 200 300 400 500 600 700 (meters)

HUDSON BAY EXPLORATION &

DEVELOPMENT COMPANY LIMITED

POLE DIPOLE

INDUCED POLARIZATION SURVEY
CONTOURS OF APPARENT CHARGEABILITY

Q = 150 ms., n = 3

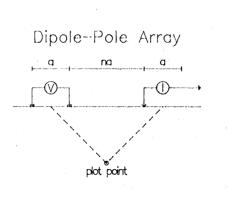
CVS CLAIMS

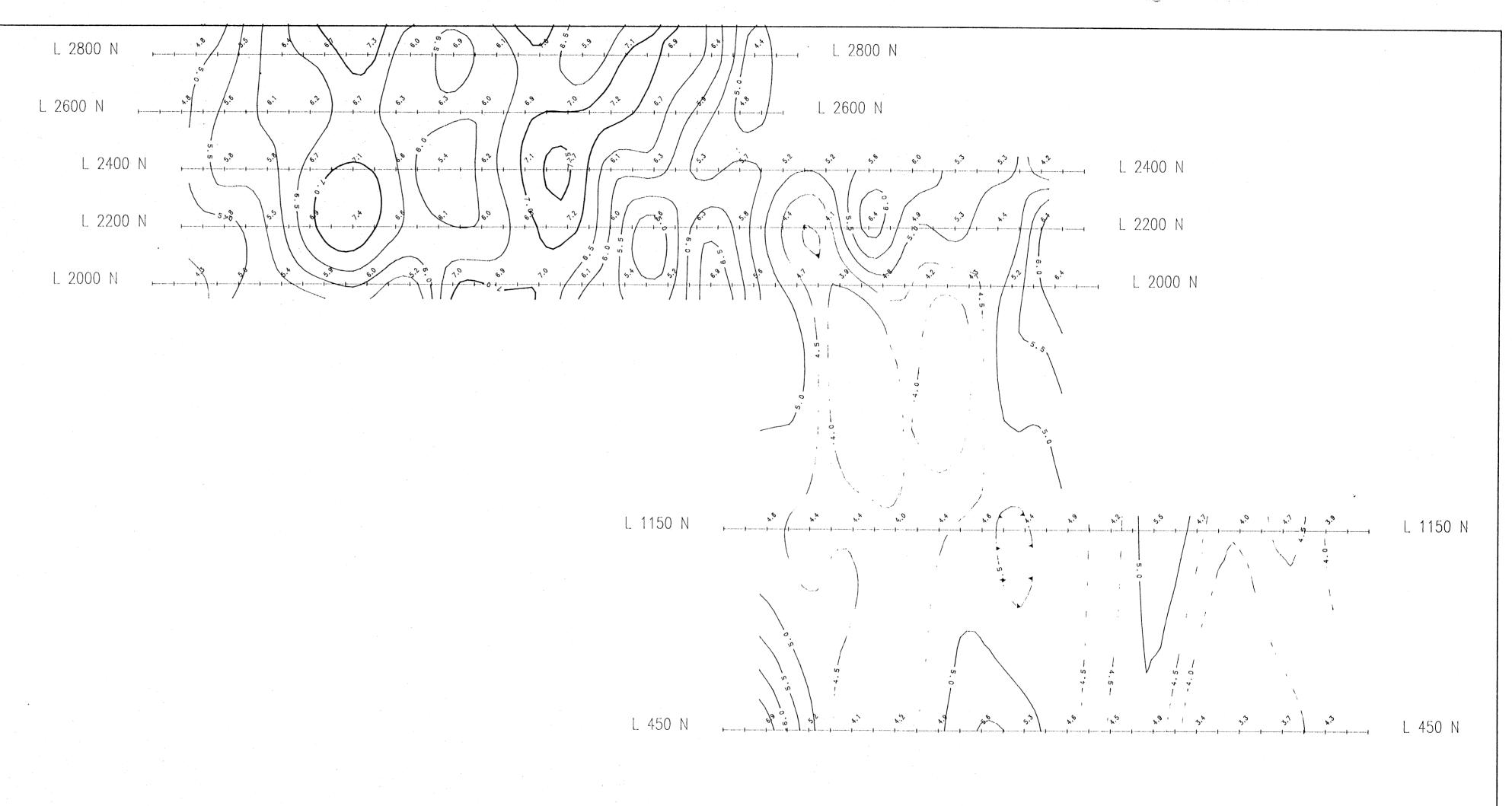
KAMLOOPS MIN. DIV., BRITISH COLUMBIA
JUNE 1993

Map No. W-505-5

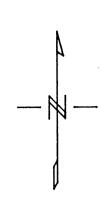
PETER E. WALCOTT & ASSOC. LTD.

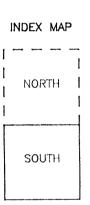
under 5
5 to 5.5
6 to 6.5
7 to 7.5
8 and over





L. 7800 N GEOLOGICAL BRANCH ASSESSMENT REPORT INDEX MAP HUDSON BAY EXPLORATION & L 3400 N NORTH Dipole-Pole Array DEVELOPMENT COMPANY LIMITED INDUCED POLARIZATION SURVEY L 3200 N CONTOURS OF APPARENT CHARGEABILITY I SOUTH a = 150 ms., n = 3 CVS CLAIMS KAMLOOPS MIN. DIV., BRITISH COLUMBIA 15.5'5" L 3000 N Map No. W-505-5 N.T.S. 92 1/6 & 7 PETER E. WALCOTT & ASSOC. LTD.





SUBSEMENT REPORT

100 0 100 200 300 400 500 600 700 (meters)

HUDSON BAY EXPLORATION & DEVELOPMENT COMPANY LIMITED

POLE DIPOLE
INDUCED POLARIZATION SURVEY
CONTOURS OF APPARENT RESISTIVITY

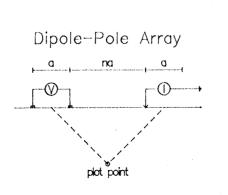
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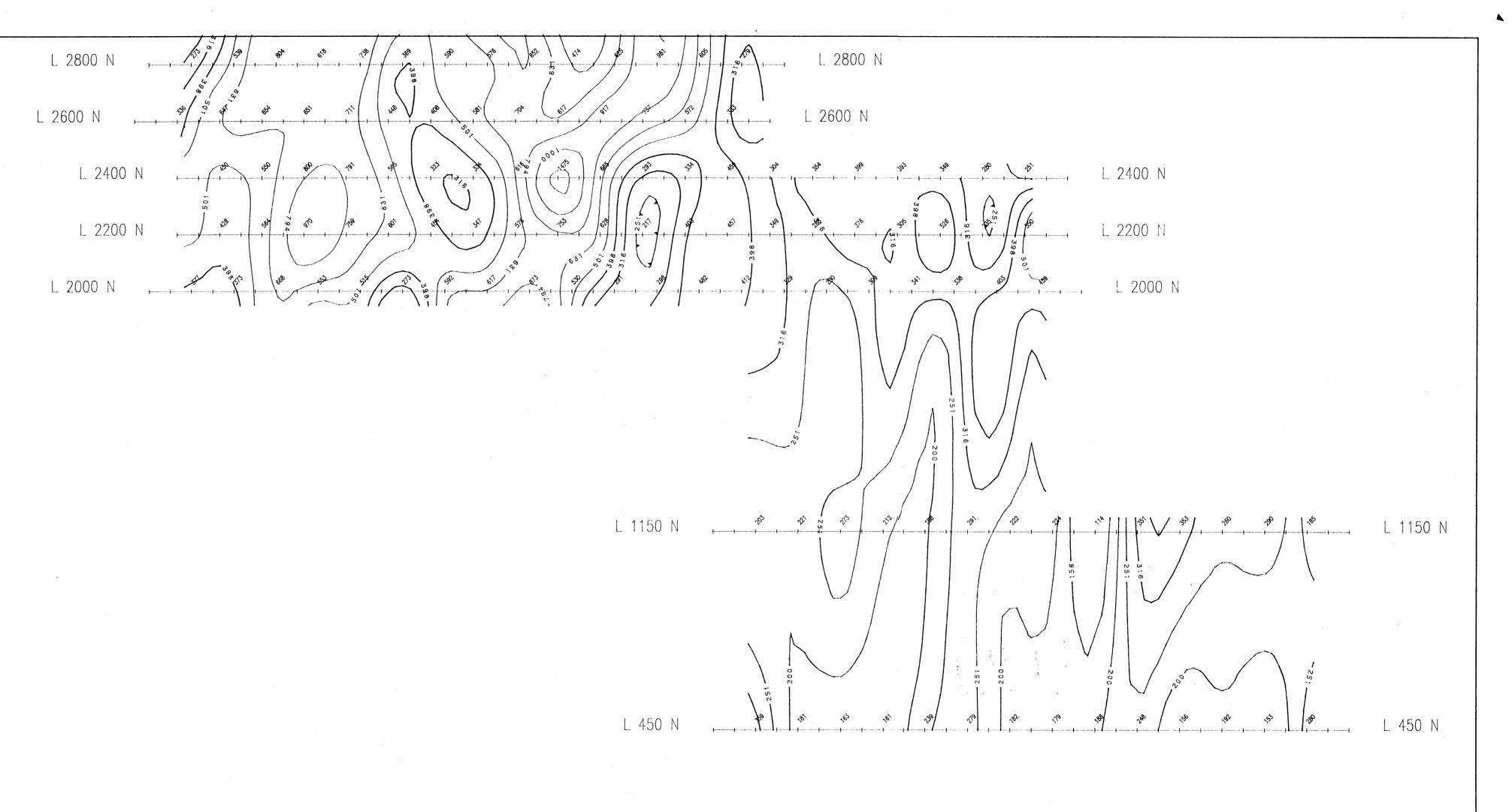
KAMLOOPS MIN. DIV., BRITISH COLUMBIA

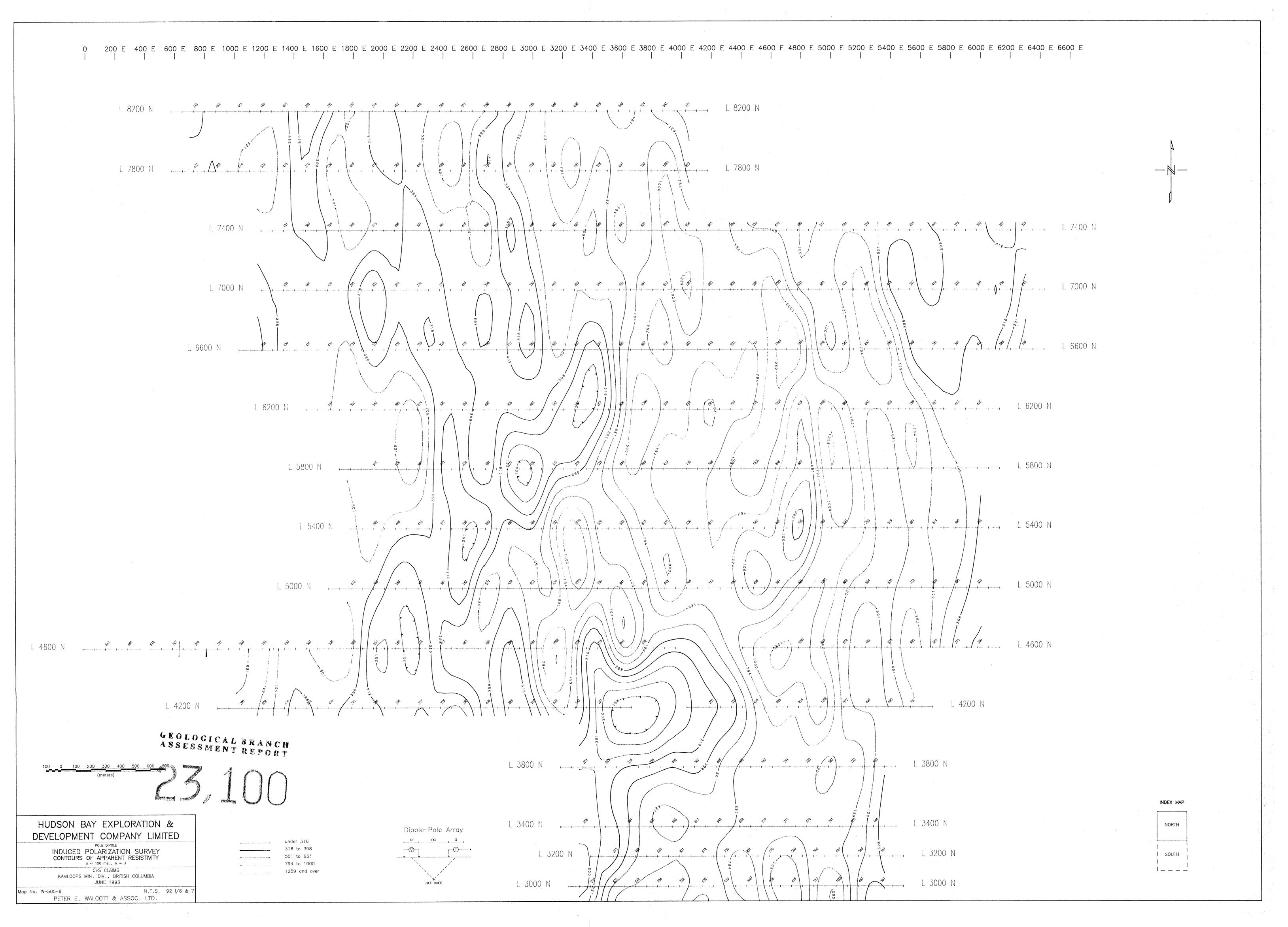
Map No. W-505-6 N.T.S. 92 1/6 & 7

PETER E. WALCOTT & ASSOC. LTD.

under 316
316 to 398
501 to 631
794 to 1000
1259 and over







INDEX MAP

GEOLOGICAL BRANCH ASSESSMENT REPORT

0 100 200 300 400 500 600 700

HUDSON BAY EXPLORATION & DEVELOPMENT COMPANY LIMITED

POLE DIPOLE
INDUCED POLARIZATION SURVEY
CONTOURS OF APPARENT CHARGEABILITY

CVS CLAIMS

KAMLOOPS MIN. DIV., BRITISH COLUMBIA

JUNE 1993

No. W-505-1 N.T.S. 92 I/6 & 7 PETER E. WALCOTT & ASSOC, LTD. under 5
5 to 5.5
6 to 6.5
7 to 7.5
8 and ove

