6076
Part 2

#6076

SHEFFIELD OPTION
NYLAND LAKE, B.C.

Geology, Geochemistry and Geophysics
PART II

Geophysics: Induced Polarization and Magnetic Surveys

REGISTERED PROFESSIONAL ENGINEER
J. A. McCANCE
PROVINCE OF ONTARIO

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
NO. 6076

J. A. McCance

PART 2

November, 1976

93-A-12, 93-B-16

SHEFFIELD OPTION

NYLAND LAKE, B.C.

IP and MAGNETIC SURVEYS, 1976

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SHEFFIELD OPTION
NYLAND LAKE, B.C.

IP and MAGNETIC SURVEYS, 1976

SUMMARY

In the summer of 1976, induced polarization and magnetometer surveys were carried out over a property located 20 air miles East of Quesnel, British Columbia. This reconnaissance survey was completed to determine if the extent and continuity of Mo mineralization exposed by previous trenching was sufficient to suggest economic potential as a porphyry body.

The scattered weakly anomalous IP responses acquired from four traverses were confined primarily to one line and appear to rule out a porphyry-type target of either economic dimensions or concentration.

The magnetic responses from six traverses indicate three magnetic zones which can be interpreted to suggest a fault controlled shear zone environment of limited extent.

This report contains a detailed interpretation of these surveys results with recommendations.

1. SURVEY PROCEDURE

1.1 Geophysical Grid

The location of the geophysical traverses with regard to the geochemical grid, claim groups, showings, roads and other topographical detail is given in the accompanying map, DWG. M-4494, at a scale of 1 : 5000. The four IP lines at nominal intervals of 200 metres were cleaned out and rechained when the original geochemical lines proved unsuitable for effective IP traverses.

In total 6.95 kilometres of survey line were cut and rechained by Rio staff.

1.2 Magnetometer Survey

A Scintrex MF-2 fluxgate-type magnetometer was used for this work. Requiring only "bull's-eye" levelling, it has a sensitivity of 20 gammas per scale division and a reading accuracy of 10 gammas on the most sensitive scale. On all other scales reading accuracy can be maintained at 1% of full scale. Five switch-selectable scales are available which allow the observer to monitor an overall range of relative vertical magnetic values of ±100,000 gammas.

The base stations were initially surveyed using ABAB type closed loops. The positions of these magnetic drift-free bases is located on map DWG. M-4494. The lines were traversed in successive hourly loops beginning and ending at one of the previously established magnetic bases. Readings were taken at 25 metre intervals along line 26N, line 24N, IP line 22N, IP line 18N, IP line 16N and IP line 14N. Hourly drift and diurnal variations were removed from each set of daily traverses, with magnetic adjustments being applied to all observed values by a strict linear distribution of the observed magnetic variation over the time between base checks. Magnetic adjustments were calculated to an accuracy of 1 gamma.

In total 376 stations were occupied over 8.70 kilometres of the grid.

1.3 Induced Polarization Survey

A Huntec MK III time domain induced polarization receiver was used for this work with a 7.5 Kw transmitter and related accessories. Transmitter timing parameters were set as follows:

Period = 2 seconds
Duty Ratio = 1 : 1
td = 240 ms
tp = 60 ms

The dipole-dipole array using three foot 'T' shaped stainless steel rods as electrodes was employed as past experience using this array and the symmetrical properties from this configuration were felt to be advantageous within this geologic environment. The power lines were laid out to avoid any coupling effects between the power and receiver potential lines. For every potential dipole location, data was obtained to calculate apparent resistivity and composite chargeability values for each of two dipole separations. Measurements were recorded at 100 metre intervals along lines IP 14N, IP 16N, IP 18N, and IP 22N. Subsequently IP line 18N was covered with additional dipole separations of n = 2 and 4 to provide increased data density in the vicinity of exposed mineralization.

Apparent chargeability data from the Huntec MK III receiver using the above timing parameters has been converted to the equivalent Newmont response parameter, Mc, by the following operation:

$$Mc = 4.05\ (M_3+2M_4)$$

Mc is the composite apparent chargeability expressed in millivolts per volt; M_3 and M_4 are Huntec digital voltmeter displays expressed as percentages of Vp; the primary voltage at time "t" = 0; which represent the integrals under the Vp decay curve from "t" = 420 ms to "t" = 660 ms and "t" = 660 ms to "t" = 1140 ms respectively.

Apparent resistivity data was calculated from the following expression: Rho = K Vp/I

Rho is the apparent resistivity in ohmmetres; Vp is the observed potential difference at the receiver in volts; I is the transmitter output current in amperes and K is a composite constant combining a geometrical factor for the electrode configuration and a conversion factor to derive ohmmetres from a metric-chained grid.

Over a total line distance of 5.5 kilometres 141 stations were occupied and the following chargeability and resistivity coverage was obtained with an 'x' of 100 metres.

Approximate Depth Penetration	No. of Stations	Traverse Length
100 metres	59	5.5 Km
150 metres	14	1.3 Km
200 metres	55	5.1 Km
250 metres	13	1.2 Km

2. PRESENTATION OF RESULTS

2.1 Magnetometer Survey

The magnetic data, corrected for hourly drift and diurnal variation are presented in plan form at a horizontal scale of 1 : 5000. This contoured data and the grid system for the survey area together with prominent geographic features are presented with this report as drawing M-4494.

Magnetic values between 0 gammas and 700 gammas are contoured at intervals of 100 gammas. Negative values or values in excess of 700 gammas are not contoured.

The magnetic data at a vertical scale of 200 gammas/cm are also presented as profiles against a horizontal scale of 1 : 5000 on all IP pseudosection plots.

2.2 Induced Polarization Survey

Chargeability and resistivity values are presented on four accompanying drawings, DWG. IP 2745-1 to IP 2745-4, all at a scale of 1 : 5000. The data are presented as pseudo-sections with no vertical exaggeration. Chargeability values, given in millivolt per volt units (termed "mils"), are contoured linearly at 2 mil intervals. Resistivity values are plotted directly in ohmmetres. The basic contour interval for all resistivity data is 50 ohmmetres. The data plotting points are illustrated in the legend on each drawing with the data being plotted beneath a point midway between dipoles at a depth equal to half the electrode separation. The resistivity and IP pseudosections are plotted as mirror images of one another, the upper section being inverted. This inversion technique of data presentation has been found convenient for interpretation purposes.

The magnetic data have also been indicated in profile form directly above the inverted resistivity pseudosection. This information is provided for comparison purposes so as to facilitate identification of 'rock signatures.'

Recognizable IP anomalies have been indicated on the profile section at the top of each IP drawing. The solid and dashed bars represent the surface projection of the definite and less definite anomalies respectively, as interpreted.

3. DISCUSSION OF GEOPHYSICAL RESULTS

3.1 Magnetometer Survey

The survey results indicate that magnetic relief does not exceed 825 gammas; consequently, this area is considered to be poorly magnetic. However, three magnetic zones may be recognized. Designated the 'low' zone, 'high' zone and 'transition' zone; these areas may be segregated magnetically as to values which are usually less than 200 gammas; values which usually exceed 300 gammas and an area where values either vary between 200 gammas and 300 gammas generally or have large amplitude variations over short distances. The most characteristic responses, typical of these zones is observed on IP line 14N where the high amplitude (300 - 450+ gammas), generally higher frequency data are separated from lower amplitude (50 - 200 gammas), lower frequency data by a relatively flat, gradient-like transition response located between 100E and 225E. IP line 22N shows a similar response although the 'low' zone on this line appears to have a high frequency component relative to the line 14N response.

The transition zone on IP line 22N is situated between 25W and 250W.

The magnetic 'pattern' on IP line 16N and IP line 18N appears more complex. On these lines the transition zone has been interpreted between 0 and 450E and between 25W and 500E respectively. Similarly on line 24N and line 26N the transition zone is broad extending from 100W to 275E and from 150W to 300E respectively.

Geologic correlation with these magnetic zones is not practical as outcrops are sparse and except where uncovered by stripping, occur almost entirely in creek beds. However, a possible highly speculative geologic interpretation of these magnetic patterns would suggest that a generally north-south fault controlled contact zone exists between more magnetic possibly dioritic rocks to the west and volcanic or granitic rocks being less magnetic towards the east. Quartz and aplite in-fillings along these general fracture trends may from the host of the observed molybdenum mineralization.

3.2 Induced Polarization Survey

Generall low apparent chargeabilities prevail over most of this property with observed responses ranging from 1.8 mils to 11.0 mils. Background readings of 5 mils appear fairly uniform over the area based on the results from this limited coverage survey.

Resistivity data is similarly quite low ranging from 53 ohmmetres to 518 ohmmetres with most of the data between approximately 80 ohmmetres and 300 ohmmetres. A north-south resistivity gradient between lines suggests that the southern sections of the property are more conductive.

The following are descriptions of the salient features of each zone as observed line by line. Because of the reconnaissance nature of this survey comments concerning source geometries must be considered speculative.

IP Line 18 North

Three zones of weakly anomalous chargeability responses are indicated, none of which originate from sources considered close to surface.

Zone 1 centered at 300W (n = 4 value) has a maximum response of 10 mils with an associated 8 mil "anomalous" section extending from 200W to 400W (n = 3 and 4 values). This anomaly correlates with a relatively sharp resistivity gradient and positive magnetic relief of about 100 gammas.

Zone 2 is virtually a single station response on n = 4 data located at 100E. Maximum response at this station is 9.4 mils. It is overlain by a narrow low-resistivity feature which probably correlates with a fracture zone. Mineralization is exposed at surface on both sides of the line between 25E and 50E but apparently is not present in quantities sufficient to show a chargeable response over a surface area of 100 metres. A magnetic low in excess of 200 gammas correlates with this feature.

Zone 3 is another spatially restricted chargeability response on n = 3 data between 400E and 500E. Maximum chargeability is 11.0 mils. This anomaly occurs on the flank of a possibly deep seated relatively high resistivity feature with about 100 gammas of positive magnetic relief. Consequently Zone 3 appears quite similar to the Zone 1 response. Implications of a genetic relationship, possibly at greater depth cannot be disputed.

IP Line 22 North

This line is observed as uniformly poorly chargeable throughout. A section from 450W to 550W appears to have marginally higher than background responses on n = 3 data which correlate with low resistivities but it can hardly be described as anomalous. Similar marginally higher responses occur uniformly on both spacings from 300W to 200E. These responses, however, correlate with a higher resistivity zone with values exceeding 300 ohmmetres. Scattered single or double station responses of similar magnitude occur farther East but are not considered significant. Resistivities are generally higher than observed on line 18N.

IP Line 16 North

Chargeability features have virtually disappeared with only three isolated readings at 150W, 350W and 550E of the n = 3 data showing other than background responses.

The first two features correlate with appreciate resistivity gradients to the East and West respectively of a relative resistivity high. These features may onsequently represent the continuation of Zone 1 described on IP line 18N. A positive magnetic feature of approximately 100 gammas relative relief is situated nearby between 175E and 250E.

Generally the resistivities on this line are much lower than observed on line 18N with most values observed less than 200 ohmmetres.

<u>IP Line 14 North</u>

A slightly above background chargeability response is situated between 0 and 100W. This feature flanks a relatively high resistivity zone (values in excess of 200 ohmmetres) between 50W and 150W. A possible anomaly indicated by weakly elevated chargeabilities East of 500E correlate with lower resistivities and uniformly low amplitude magnetics.

4. CONCLUSIONS

Generally low apparent chargeabilities prevail over most of this property. Resistivity values are likewise very low.

Results from IP line 18N, being marginal at best do not appear to show any relationship suggesting the presence of a porphyry-type target of either economic dimensions or concentration. It is recognized that the three zones identified on line 18N might speculatively be presumed to represent "shoots" from a deeper source but the prospect of developing an economically viable deposit assuming these very restricted geophysical responses are direct indicators of a mineralized environment appears remote. IP responses from all other lines reinforce the idea of a spatially restricted host for the observed low grade mineralization.

The amplitudes of the magnetic results although by no means diagnostic have been used to establish three recognizable magnetic zones. Geological correlation is not possible but speculation would suggest a fault controlled shear zone type of environment in which Quartz and Aplite dikes host the observed molybdenum mineralization.

5. RECOMMENDATIONS

Since significant unexplainable magnetic or induced polarization responses were not detected further conventional ground geophysical surveys cannot be recommended.

C E R T I F I C A T E

I, John A. McCance of the City of Toronto, Province of Ontario do hereby certify:

1. That I am a geophysicist and reside at 113 Hendon Avenue, Willowdale, Ontario.

2. That I graduated from Queen's University at Kingston in 1970 with the degree of Bachelor of Applied Science and have completed post-graduate courses at the University of Western Ontario, London.

3. That I am a member of the Association of Professional Engineer's of the Province of Ontario (Mining Branch).

4. That I have been practising my profession for a period of five years.

5. That I am employed by Rio Tinto Canadian Exploration Limited.

6. That I supervised this survey program.

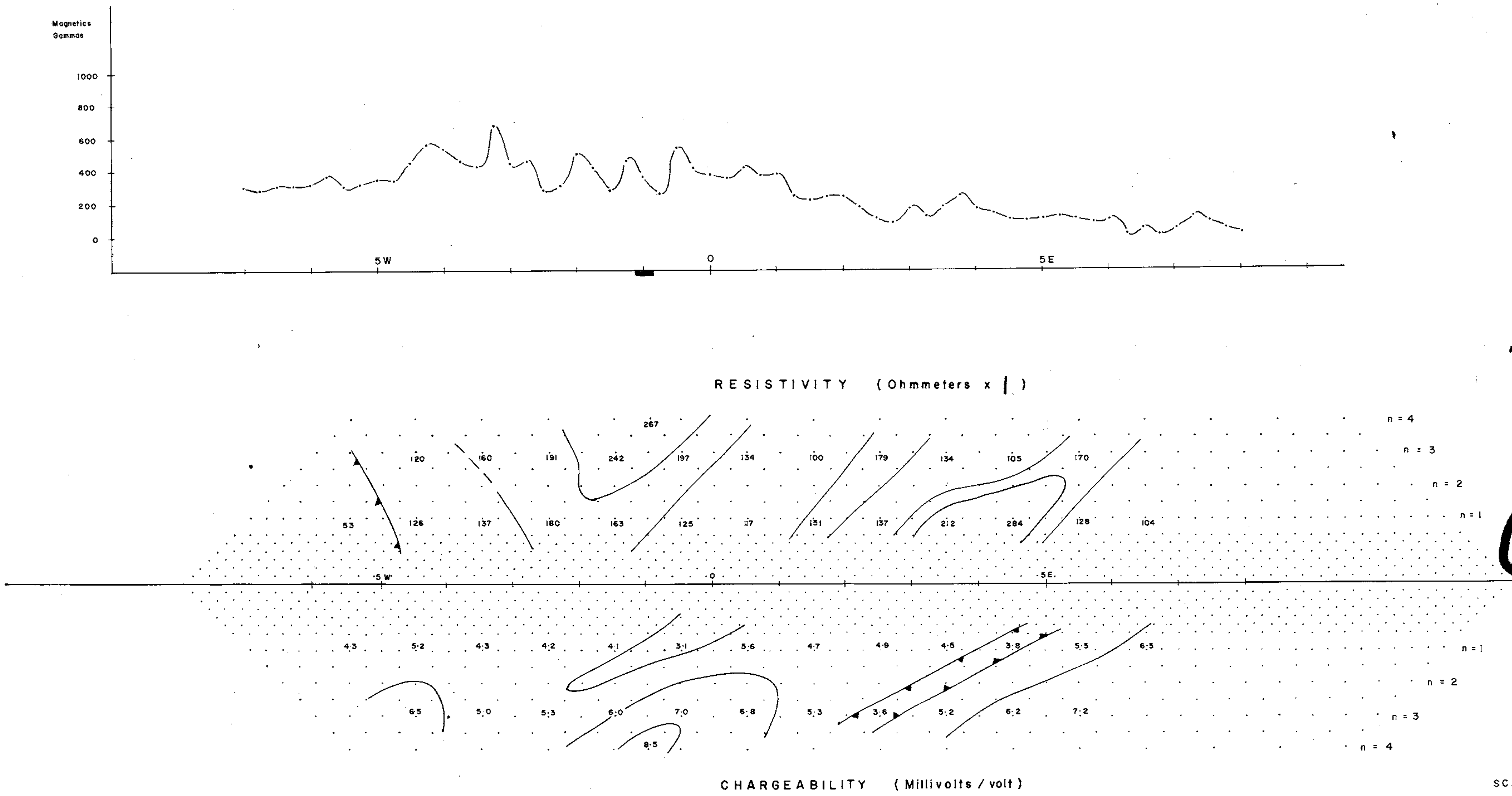
November 1976 J. A. McCance, P.Eng.

REGISTERED PROFESSIONAL ENGINEER
J. A. McCANCE
PROVINCE OF ONTARIO

APPENDIX I

LIST OF PERSONNEL EMPLOYED

Name	Position	Sign-on Point	Employment Period
D. Sexsmith	Party Chief	Permanent staff	July 29/76 to August 15/76
J. Lindsey	Junior geophysicist	Toronto	July 29/76 to August 15/76
K. Gossen	Geophysical Assistant	Vancouver	July 29/76 to August 15/76
A. Loo	Geophysical Assistant	Vancouver	July 29/76 to August 15/76
S. Lowe	Geophysical Assistant	Victoria	July 29/76 to August 15/76
H. Ngo	Geophysical Assistant	Kamloops	July 29/76 to August 15/76
A. Aeichele	Cook	Grand Forks	July 29/76 to August 15/76



MINERAL RESOURCES BRANCH
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NO. 6076- PART 2
MAP NO. #2

6076

ELECTRODE CONFIGURATION

PLOTTING POINT
x = 100 m
n = 1, 3

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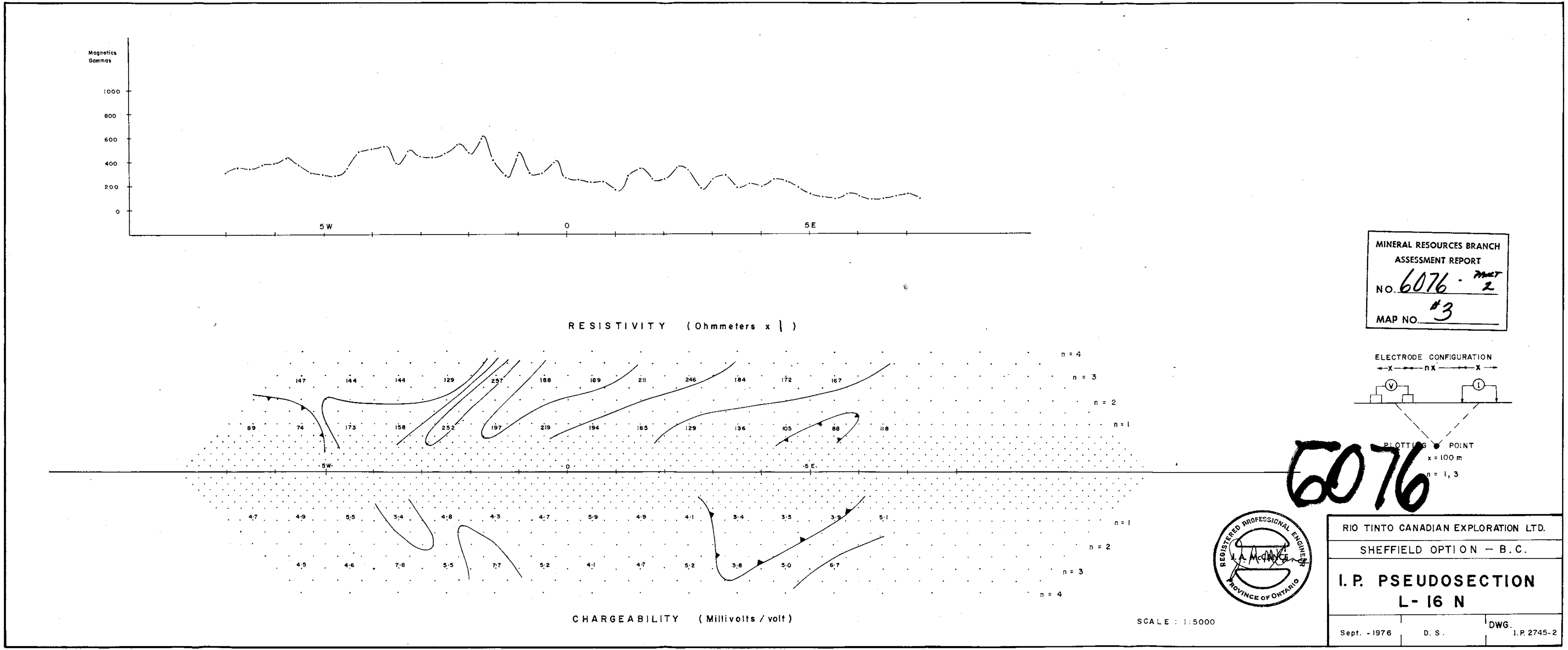
SHEFFIELD OPTION – B.C.

I.P. PSEUDOSECTION L-14 N

Sept. – 1976	D.S.	DWG. I.P. 2745-1



Magnetics Gammas
1000
800
600
400
200
0
5W
0
5E
RESISTIVITY (Ohmmeters x 1)
n = 4
n = 3
n = 2
n = 1
147 144 144 129 257 188 189 211 246 184 172 167
89 74 173 158 252 197 219 194 165 129 136 105 88 118
5W
0
5E
4.7 4.9 5.5 3.4 4.8 4.3 4.7 5.9 4.9 4.1 3.4 3.5 3.9 5.1
4.5 4.6 7.8 5.5 7.7 5.2 4.1 4.7 5.2 3.8 5.0 6.7
n = 1
n = 2
n = 3
n = 4
CHARGEABILITY (Millivolts / volt)
SCALE : 1:5000
MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
NO. 6076 - PART 2
MAP NO. #3
ELECTRODE CONFIGURATION
x nx x
V
I
PLOTTING POINT
x = 100 m
n = 1, 3
6076
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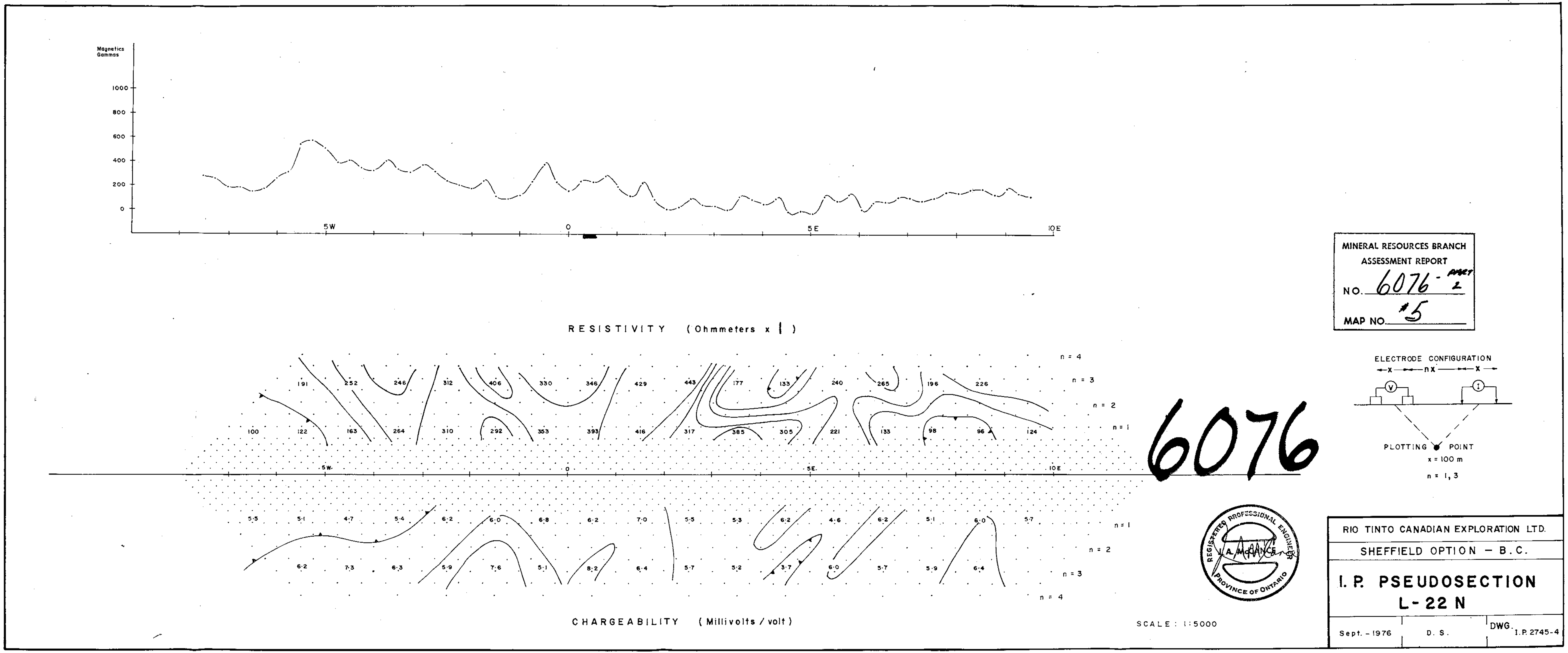
SHEFFIELD OPTION – B.C.
I. P. PSEUDOSECTION
L- 16 N
Sept. - 1976
D. S.
DWG.
I. P. 2745-2



Magnetics Gammas
1000
800
600
400
200
0
5W
0
5E
10E
RESISTIVITY (Ohmmeters x 1)
191
252
246
312
406
330
346
429
443
177
133
240
265
196
226
100
122
163
264
310
292
353
393
416
317
385
305
221
133
98
96
124
n = 4
n = 3
n = 2
n = 1
5W
0
5E
10E
5·5
5·1
4·7
5·4
6·2
6·0
6·8
6·2
7·0
5·5
5·3
6·2
4·6
6·2
5·1
6·0
5·7
6·2
7·3
6·3
5·9
7·6
5·1
8·2
6·4
5·7
5·2
3·7
6·0
5·7
5·9
6·4
n = 1
n = 2
n = 3
n = 4
CHARGEABILITY (Millivolts / volt)
SCALE : 1:5000
6076
MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
NO. 6076 - PART 2
MAP NO. #5
ELECTRODE CONFIGURATION
x
nx
x
V
I
PLOTTING POINT
x = 100 m
n = 1, 3
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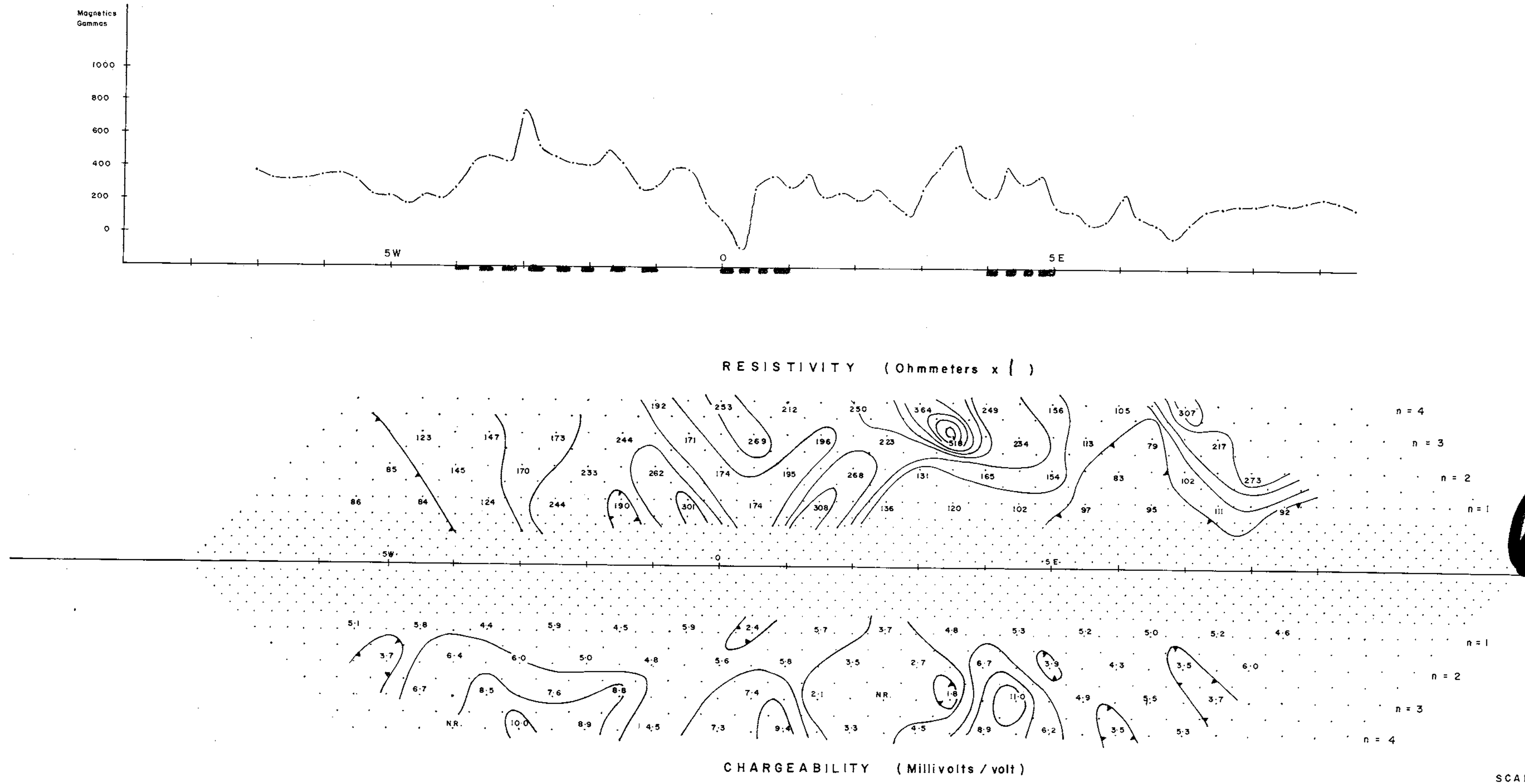
SHEFFIELD OPTION — B.C.
I. P. PSEUDOSECTION
L-22 N
Sept. - 1976
D. S.
DWG. I. P. 2745-4



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MINERAL RESOURCES BRANCH
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MAP NO. # 4

ELECTRODE CONFIGURATION

—x— —nx— —x—

PLOTTING POINT

x = 100 m

n = 1, 2, 3 & 4

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SCALE : 1:5000

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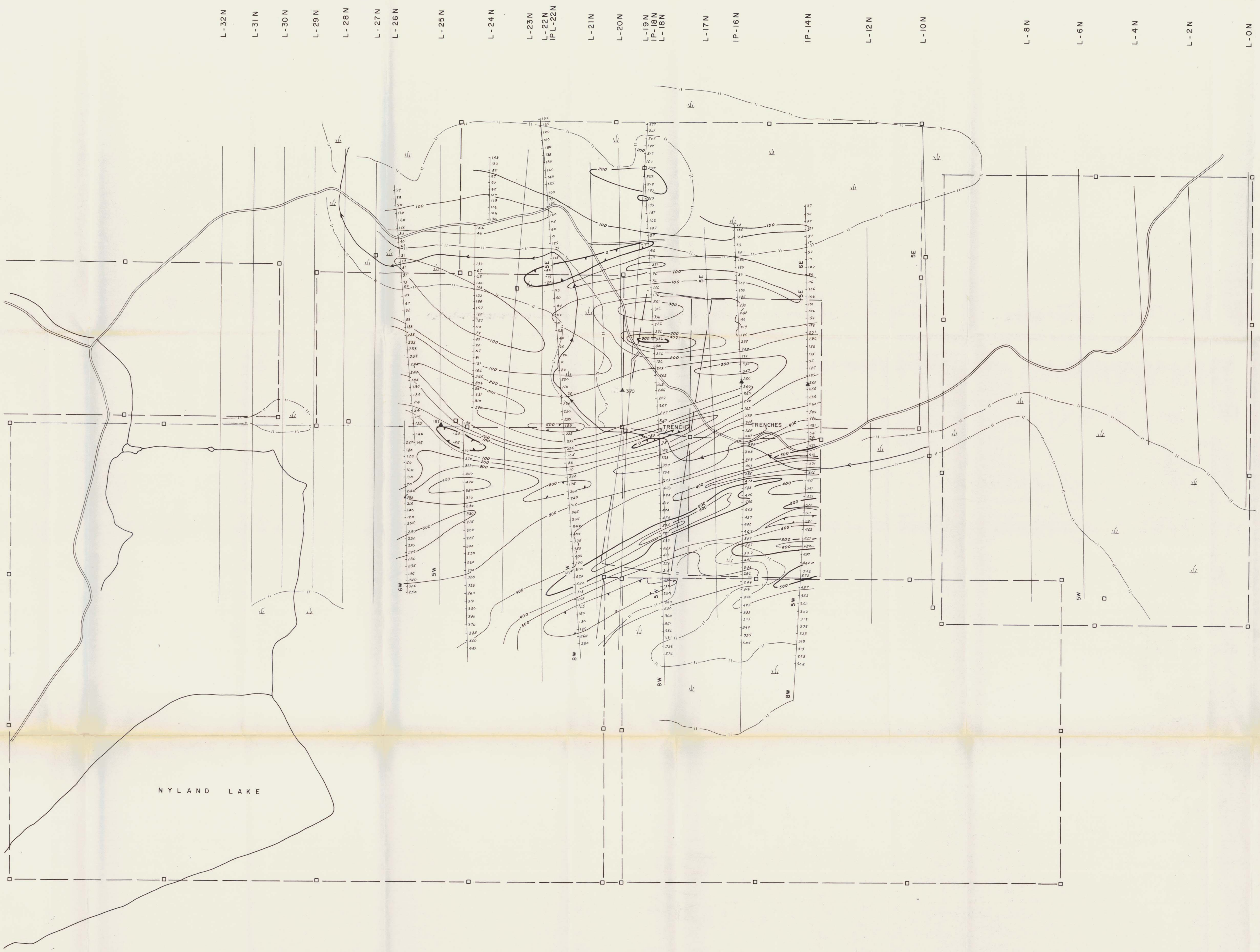
SHEFFIELD OPTION – B.C.

I. P. PSEUDOSECTION L - 18 N

Sept. – 1976	D.S.	DWG. I.P. 2745 - 3



▲ Magnetic base station

LEGEND

Values in gammas

Contour intervals

0 — gammas

100 — gammas

200 — gammas

300 — gammas

400 — gammas

500 — gammas

600 — gammas

Magnetic low

N.T.S
93-A-12

SCALE 1:5000

100 0 100 200 300 400 Meters

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ASSESSMENT REPORT
NO. 6076 - PART 2
MAP NO. #1

6076

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NYLAND LAKE

MAGNETOMETER SURVEY

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