REPORT ON AN INDUCED POLARIZATION SURVEY IN THE WHITEHORSE AREA, YUKON TERRITORY FOR WHITEHORSE COPPER MINES LTD.

BY
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J.E. Wyder, Ph.D., P.Eng.

This report has been examined by the Geological Evaluation Unit and is recommended to the Commissioner to be accepted as representation work in the amount of

$11,675

D.B. Craig
Resident Geologist or
~~Resident Mining Engineer~~

Considered as representation work under Section 53 (4) Yukon Quartz Mining Act.

Commissioner of Yukon Territory

REPORT ON

AN INDUCED POLARIZATION SURVEY

IN THE

WHITEHORSE AREA, YUKON TERRITORY

FOR

WHITEHORSE COPPER MINES LTD.

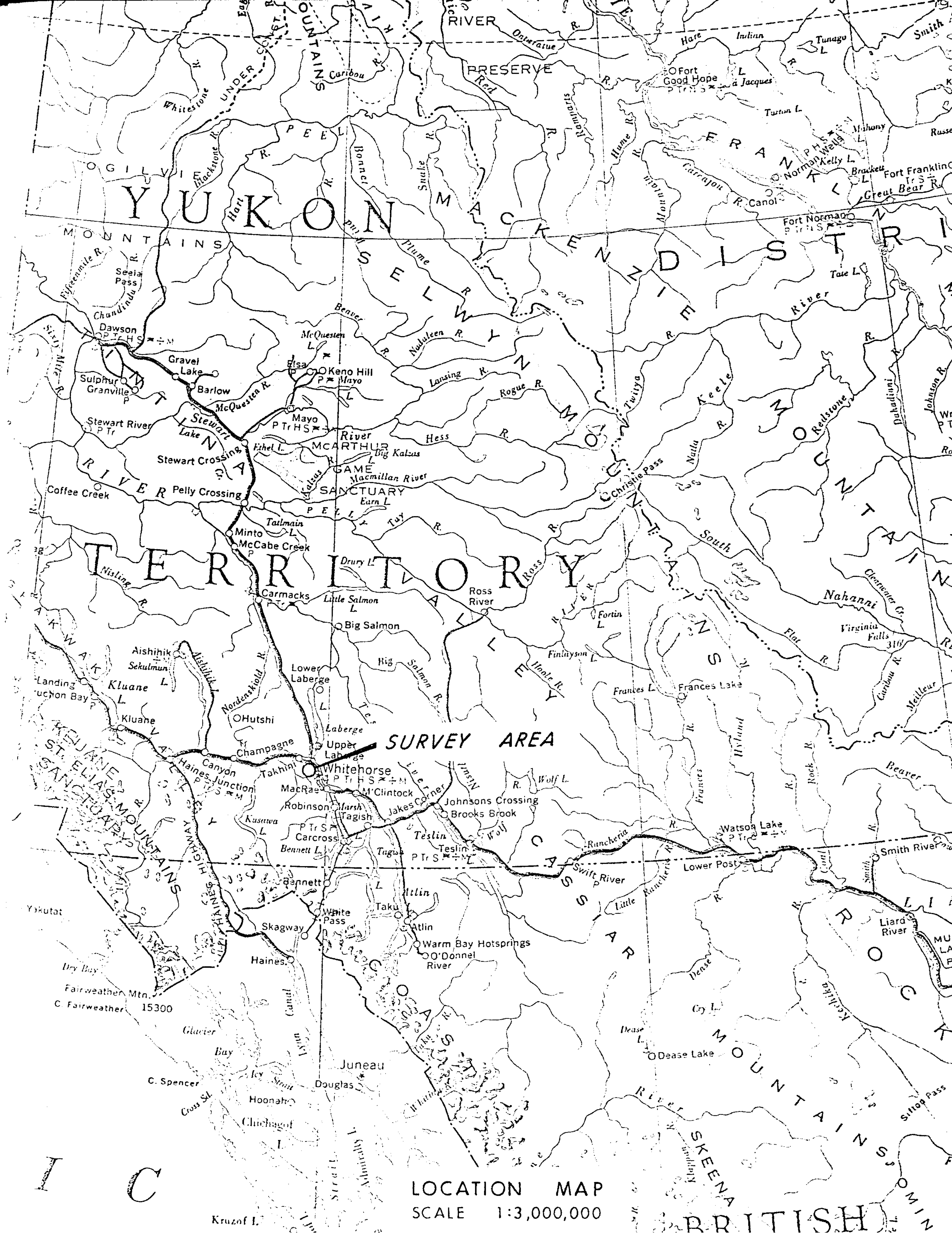
BY

KENTING EXPLORATION SERVICES LIMITED

CALGARY, ALBERTA

OCT. 1973

TABLE OF CONTENTS



LOCATION MAP
SCALE 1:3,000,000

INTRODUCTION

General

This report describes the results of an Induced Polarization (I.P.) Survey carried out by Kenting Exploration Services Limited, Whitehorse Area, Yukon Territory for Whitehorse Copper Mines Ltd.

The field work was carried out in the period October 3rd - October 29th, 1973 by T.R.B. Dundas, Senior Geophysicist with a crew provided by Whitehorse Copper Mines Ltd.

The area is located approximately 5 miles to the Northwest of Whitehorse Townsite and on the west side of the Alaska Highway (Figure 1).

The property forms part of the general Whitehorse Copper Belt and the purpose of the survey was to continue previous Induced Polarization work northwards in an attempt to locate copper deposits similar to those of the copper Belt to the south of the survey grid.

SURVEY SPECIFICATIONS

Instrumentation

The equipment used for the Induced Polarization survey consisted of a pulse-type system using a Huntec 2.5 kilowatt transmitting system combined with a Newmont Type Receiver.

The following specifications apply:-

Current - D.C.	-	2.0 seconds "current on" 2.0 seconds "current off" Alternate pulses have reversed polarity
Transmitter Power Available	-	2.5 k Watt
Integrating Time	-	650 Milliseconds
Delay Time From "current off" to start of integration	-	450 Milliseconds

Calculations

The apparent resistivity is calculated by dividing the primary voltage, Vp, by the current, Ig, flowing between the current electrodes, C_1 and C_2, and multiplying by a geometrical factor appropriate to the electrode array being used. The apparent resistivity is expressed in ohm-meters.

Electrode Arrays

The electrode array used was the pole dipole array.

In this system one current electrode, C_1, is put a large distance from the stations surveyed so that the other electrode, C_2, can be considered as a single electrical pole unaffected by the potential from the C_1 electrode. The potential electrodes (P_1 - P_2) are maintained at a fixed distance from the moving current electrode C_2.

Electrode Arrays (continued)

Distances of 200 feet and 400 feet were used for $C_2 - P_1$, combined with a $P_1 - P_2$ distance of 200 feet.

Detail work on the two anomalies was carried out using a gradient arrangement in which the two current electrodes, $C_1 - C_2$, are maintained a large distance apart compared to the potential electrodes $P_1 - P_2$ which are moved along the line between the current electrodes.

RESULTS

The results are presented in the form of contoured plan maps of both apparent resistivity and chargeability at a scale of 1 inch = 400 feet for both electrode separations (Figures 4 - 7).

The detail work over two of the anomalies is presented as profiles (Figures 2 - 3).

GEOLOGY

The property is located at the northern end of the "Whitehorse Copper Belt" which is approximately 17 miles long and varying from 1 mile to 3 miles in width. The Copper Belt strikes approximately north - south, and lies dircetly west of Whitehorse.

The general geology of the area consists of a series of sedimentary rocks of Upper Triassic age - grey wacke, arkose, limestone, quartzite, argillite and slates, which have been intruded and metamorphosed by an acid intrusive, varying in compostion from a granite - granodiorite, forming part of the main Coast Range Intrusives.

The copper deposits are mainly classed as contact metamorphic skarn type with the limestone/intrusive contact being the favoured location for the formation of this type of ore.

INTERPRETATION

An interpetation of the results is presented in Figure 8 but certain qualifications as described later should be considered in conjunction with this map.

A number of factors have made it very difficult to be definite regarding the distribution of the various rock types, establishing the background values locally and thus the amplitude and extent of "anomalous" areas. Normally a particular rock type would be expected to give a characteristic resistivity and chargeability response making it possible, provided there is enough contrast between adjoining rock units, to make the contact with reasonable accuracy. It is apparent from the geophysical results and what geology is known of the survey area that a particular rock type shows considerable variation in both resistivity and chargeability response. The changes in resistivity response are probably due to a combination of variation in the degree of metamorphism and local faulting. Changes in chargeability response are probably caused by local metamorphism combined with the introduction of secondary minerals in some local areas.

The only rock unit in the survey area which could be recognized with any degree of certainty is the quartzite which has an apparent east-west strike and located near the north end of the grid. An interpretation of the resistivity results which are high over the quartzite suggests that the quartzite strike is in fact west north west - east south east with the apparent east - west strike due to a number of cross faults normal to the strike. Other quartzites are known to occur within the survey area but do not show a similar high resistivity response and cannot be distinguished from the sediments. The extent of the quartzite suggests that it is cut off by the major faults both at the east and west ends with no direction or amount of displacement obvious from the results.

The response of the diorite intrusive and the sediments in the area are very similar

and the proposed intrusive/sediment contacts as shown on the map is questionable in some places.

A major "contact" trend in a northwest - southeast direction (from Line 176N, 25E) is obvious from the chargeability response and is different from the strike of the sediments just to the north. This could be the location of the intrusive/sediments contact making a large area of proposed sediments, centered at the baseline - Lines 164-180, a pendant or faulted inlier within the main mass of the intrusive. This change in response could also be a feature within the sedimentary rocks, possibly caused by faulting or could indicate limits of a metamorphosed zone.

A number of anomalous areas have been indicated in the map and are believed to be caused by the introduction of secondary rocks. High values occur in other parts of the area but are considered to be caused by different lithological units within the sedimentary series. All of the anomalous areas occur within the sedimentary rocks but close to the intrusive contact with the exception of the area near Line 188 at 31W which apparently extends into the main mass of the intrusive rock.

It would not be prudent to give a relative degree of importance to the various anomalous area based on the present results and if required this may be accomplished on the basis of other work e.g. geochemistry.

Detail work on two of the anomalies (Figures 2 and 3) show that the anomalous areas have considerable depth extent and width from a chargeable source in contrast to the resistivity which shows considerable variation.

CONCLUSIONS AND RECOMMENDATIONS

The results show considerable variation in the chargeability response throughout the survey. The response of many of the rock units in the area is quite similar making it difficult to define geological contacts with any accuracy.

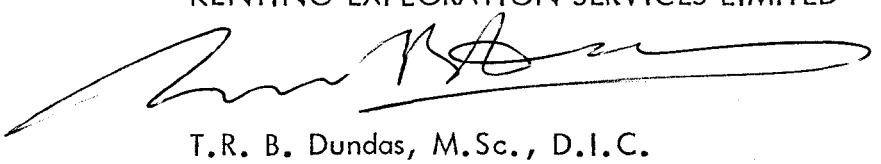
There is strong evidence for a number of faults striking in a north north east - south south west direction.

A number of anomalous areas have been defined and it is recommended that each of these be drilled to check the source of the anomaly in each case. The anomalies have considerable width and vertical drill holes at the peak response should be sufficient to indicate the materials producing the anomalies.

On the basis of the geological information obtained from a drilling programme, a re-interpretation of the present survey might prove valuable.

Respectfully submitted,

KENTING EXPLORATION SERVICES LIMITED



T.R. B. Dundas, M.Sc., D.I.C.
Sr. Geophysicist

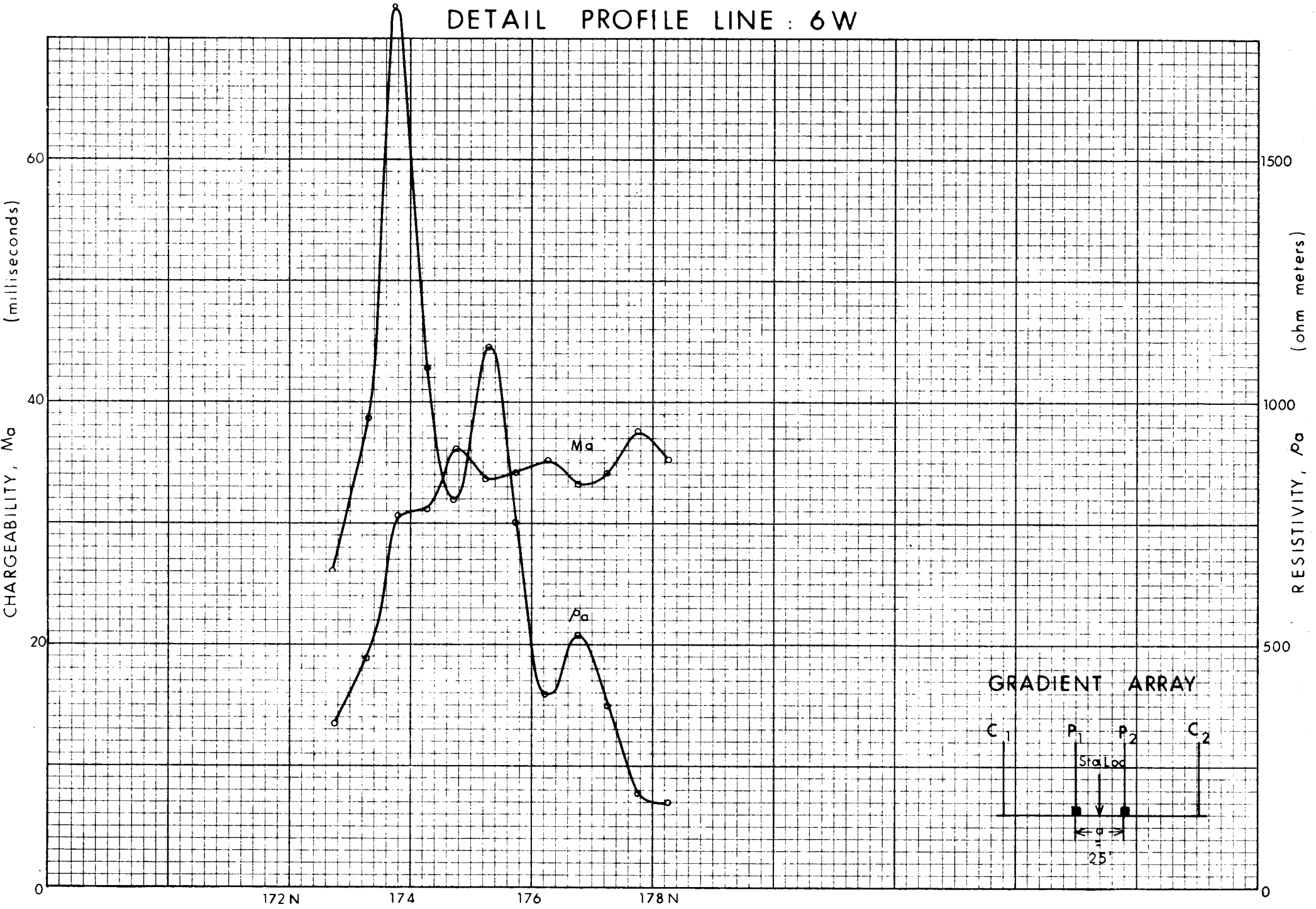

DETAIL PROFILE LINE : 6W
CHARGEABILITY, Ma (milliseconds)
RESISTIVITY, ρa (ohm meters)
60
40
20
0
1500
1000
500
0
Ma
ρa
172 N
174
176
178 N
GRADIENT ARRAY
C1
P1
P2
C2
Sta.Loc
a
25'

FIG. 2

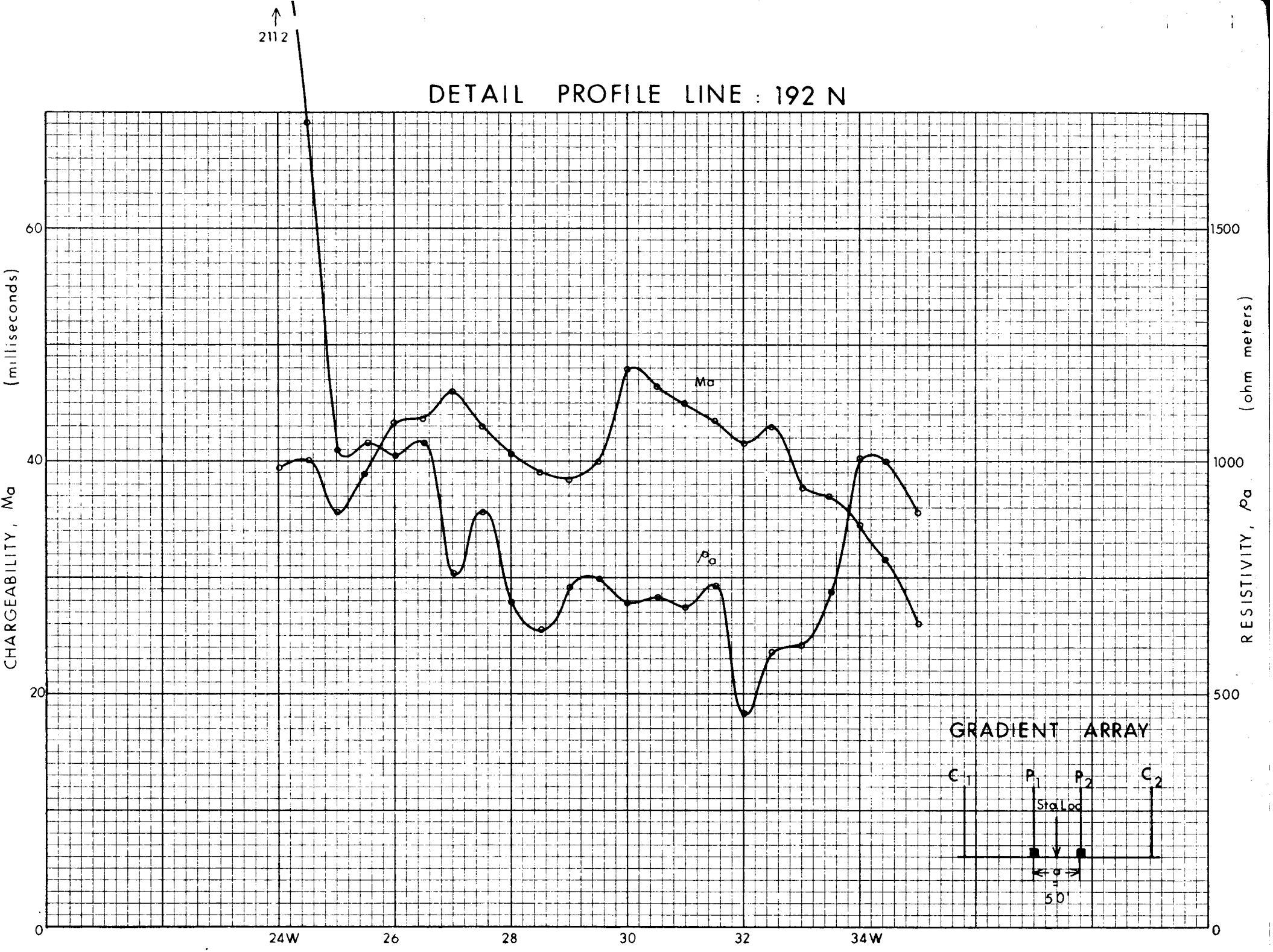

2112
DETAIL PROFILE LINE : 192 N
60
40
20
0
CHARGEABILITY, Ma
(milliseconds)
1500
1000
500
0
RESISTIVITY, ρa
(ohm meters)
Ma
ρa
24W
26
28
30
32
34W
GRADIENT ARRAY
C1
P1
P2
C2
Sta Loc
a = 50'

FIG 3

C_1 TO THE WEST

C_1 TO THE EAST

N

MILE 922

ALASKA HWY.

MCKENZIE TRAILER COURT

WE 33 Y66024

WE 32 Y66070

WE 30 Y66069

WE 28 Y66068

WE 34 Y66031

WE 31 Y66075

WE 29 Y66074

WE 27 Y66073

WE 26 Y66067

WE 24 Y66066

WE 22 Y66065

WE 20 Y66025

WE 25 Y66072

WE 23 Y66071

WE 21 Y66019

WE 19 Y66018

WE 14 Y59282

ANNE 2 Y18627

ANNE 1 Y18626

WHITEHORSE TRAVERSE

WE 36FR Y75450

WE 36FR Y75452

WE 37FR

Lot 503

WE 37FR Y75451

WE 35FR Y75449

JEAN 17 85408

JEAN 21 85412

JEAN 22 85413

WAR EAGLE B/L 0+00

ROX 2 8348

PIT 13 85832

BORNITE 3 85829

219 216 212 208 204 200 196 192 188 184 180 176 172 168 164 160

60+00W 56+00W 52+00W 48+00W 44+00W 40+00W 36+00W 32+00W 28+00W 24+00W 20+00W 16+00W 12+00W 8+00W 4+00W 4+00E 8+00E 12+00E 16+00E 20+00E 24+00E 28+00E 32+00E

POLE - DIPOLE ARRAY
M 1 a = 200'

C_2 ∞ P_2 a P_1 Na/2 Sta. Loc Na/2 C_1

1" = ½ MI.

WHITEHORSE COPPER MINES LTD.		
INDUCED POLARIZATION SURVEY		
a = 200' CHARGEABILITY CONTOUR MAP		
WAR EAGLE GRID, WHITEHORSE, YUKON TERRITORIES		
KENTING EXPLORATION SERVICES LIMITED — CALGARY, ALBERTA		
To accompany report by: T.R.B. DUNDAS M Sc DIC	Scale: 1" = 400 feet	Date: November 1973
	Job No. 2005	Fig. No. 4
	C.I. 5 milliseconds	Drn. MC

C_1 TO THE WEST

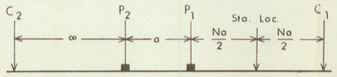
C_1 TO THE EAST

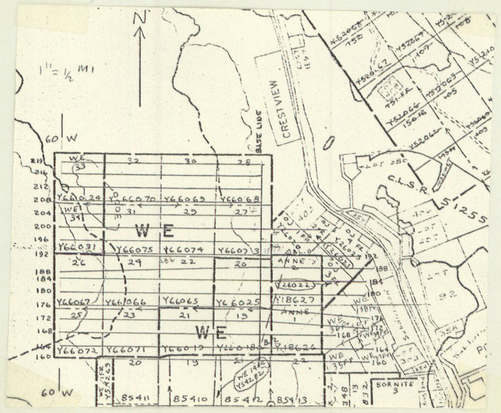
N

219
216
212
208
204
200
196
192
188
184
180
176
172
168
164
160

60+00 W
56+00 W
52+00 W
48+00 W
44+00 W
40+00 W
36+00 W
32+00 W
28+00 W
24+00 W
20+00 W
16+00 W
12+00 W
8+00 W
4+00 W
WAR EAGLE B/L 0+00
4+00 E
8+00 E
12+00 E
16+00 E
20+00 E
24+00 E
28+00 E
32+00 E

POLE - DIPOLE ARRAY
M1 a = 200'





WHITEHORSE COPPER MINES LTD.		
INDUCED POLARIZATION SURVEY		
a=200' RESISTIVITY CONTOUR MAP		
WAR EAGLE GRID, WHITEHORSE, YUKON TERRITORIES		
KENTING EXPLORATION SERVICES LIMITED — CALGARY, ALBERTA		
To accompany report by: T.R.B. DUNDAS M Sc DIC	Scale: 1" = 400 feet	Date: November 1973
	Job No. 2005	Fig. No. 5
	C.I. 1000 ohm meters	Drn. M.C

C_1 TO THE WEST

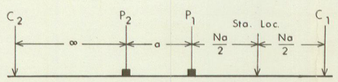
C_1 TO THE EAST

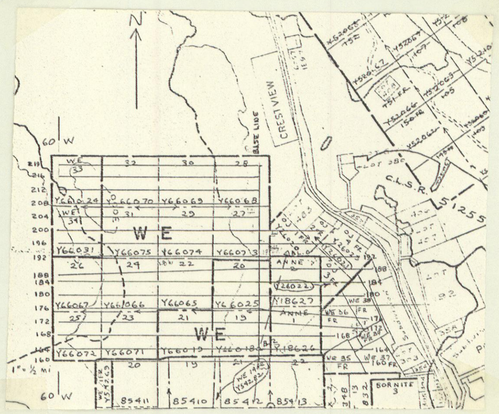
N

219 216 212 208 204 200 196 192 188 184 180 176 172 168 164 160

60+00 W 56+00 W 52+00 W 48+00 W 44+00 W 40+00 W 36+00W 32+00 W 28+00 W 24+00 W 20+00W 16+00 W 12+00W 8+00 W 4+00 W WAR EAGLE B/L 0+00 4+00 E 8+00E 12+00E 16+00E 20+00E 24+00E 28+00E 32+00E

POLE-DIPOLE ARRAY
M1 a = 400'





WHITEHORSE COPPER MINES LTD.

INDUCED POLARIZATION SURVEY

a = 400' CHARGEABILITY CONTOUR MAP

WAR EAGLE GRID, WHITEHORSE, YUKON TERRITORIES

KENTING EXPLORATION SERVICES LIMITED — CALGARY, ALBERTA

To accompany report by: T.R.B. DUNDAS M Sc DIC	Scale: 1" = 400 feet	Date: November 1973
	Job No. 2005	Fig. No. 6
	C.I. 5 milliseconds	Drn. MC

C_1 TO THE WEST

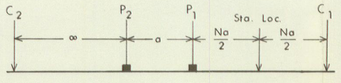
C_1 TO THE EAST

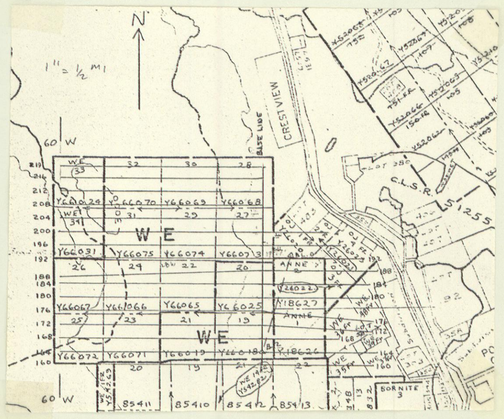
N

219
216
212
208
204
200
196
192
188
184
180
176
172
168
164
160

60+00 W
56+00 W
52+00 W
48+00 W
44+00 W
40+00 W
36+00 W
32+00 W
28+00 W
24+00 W
20+00 W
16+00 W
12+00 W
8+00 W
4+00 W
WAR EAGLE B/L 0+00
4+00 E
8+00 E
12+00 E
16+00 E
20+00 E
24+00 E
28+00 E
32+00 E

POLE - DIPOLE ARRAY
M1 a = 400'





WHITEHORSE COPPER MINES LTD.		
INDUCED POLARIZATION SURVEY		
a=400' RESISTIVITY CONTOUR MAP		
WAR EAGLE GRID, WHITEHORSE, YUKON TERRITORIES		
KENTING EXPLORATION SERVICES LIMITED	CALGARY, ALBERTA	
To accompany report by: T.R.B. DUNDAS M Sc D I C	Scale: 1" = 400 feet	Date: November 1973
	Job No. 2005	Fig. No. 7
	C.I. 1000 ohm meters	Drn. MC

C_1 TO THE WEST

C_1 TO THE EAST

N

LIMESTONES ?

SEDIMENTS

SEDIMENTS ? ? ? ?

QUARTZITES ?

SEDIMENTS ?

DIORITE

SEDIMENTS

AND / OR

VOLCANICS? AND SEDIMENTS?

DIORITE

SEDIMENTS ?

SEDIMENTS ?

SEDIMENTS

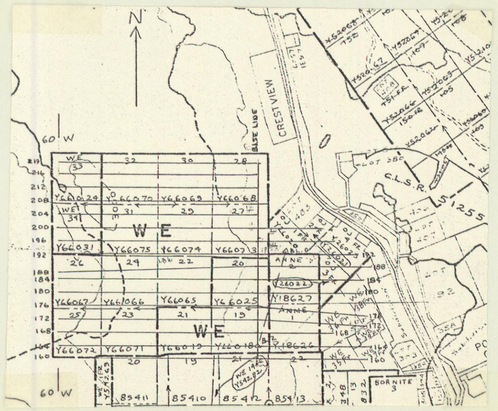
INTRUSIVES

219 216 212 208 204 200 196 192 188 184 180 176 172 168 164 160

60+00 W 56+00 W 52+00 W 48+00 W 44+00 W 40+00 W 36+00W 32+00 W 28+00 W 24+00 W 20+00W 16+00 W 12+00W 8+00 W 4+00 W WAR EAGLE B/L 0+00 4+00 E 8+00 E 12+00 E 16+00 E 20+00 E 24+00 E 28+00 E 32+00 E

LEGEND

- CONTACT
- ? MAJOR FAULT ?
- ? MINOR FAULT ?
- GENERAL STRIKE DIRECTION
- ANOMALOUS AREAS



WHITEHORSE COPPER MINES LTD.

INDUCED POLARIZATION SURVEY

INTERPRETATION MAP

WAR EAGLE GRID, WHITEHORSE, YUKON TERRITORIES

KENTING EXPLORATION SERVICES LIMITED — CALGARY, ALBERTA

To accompany report by: T.R.B. DUNDAS M Sc DIC	Scale: 1" = 400 feet	Date: November 1973
	Job No. 2005	Fig. No. 8
		Drn. MC

NEW IMPERIAL MINES LIMITED

MINING DIVISION - WHITEHORSE

YUKON TERRITORY

PROPERTY War Eagle North	Claim No. WE	Strike 305°	Lat. 191+ OON
Date April 10 19 73	Section No. 191N	Dip -55	Dep. 28+42W
Logged By A. Hureau	Plan No.	Level Surface	Elev.

Hole No. HS3

Total Depth 433'

Page No. 1

FOOTAGE From	FOOTAGE To		ROCK CLASSIFICATION Epid Diop Garn Serp Qtz Sil Actino Tremo Chlo Crystalline Shearing Veins Fracturing Foliation Grain Size Texture	MINERALIZATION TYPE	%	ASSAY DATA Sample No	Width	Recov	%Cu	%Fe	Moly	Au/Ag	Insol
0	31	Ob											
31	153.8	4g/5	Dark grey black calcareous argillite py dissem and coating joints 3 to 5 %, bnding 60° to 45° core very broken from 119'										
153.8	157.2	9a	Pale grey dyke, carbonated py on joints & dissem cts 30°										
157.2	166	9ab	grey green micro porphyritic dyke broken at lower ct tr vfg py										
166	186	4qg/5	Dark - lt grey argillaceous calcareous quartzite, py mainly on joints good bnding 45° - 60° good coring	py	2								
186	194.2	4q/5	Pale grey calcareous quartzite bnding vague, py mainly on joints	py	2								
194.2	323	4gq/5	dark - lt grey calcareous arenaceous argillite bnding 45 - 60° becomes 30° from 297', py dissem along bedding planes, and on fracture surfaces	py	3.5								
323	433	4qg/5	lt - dk gy generaly well bnded 30° - 20°, to 375' py dissem and along bedding planes bnding 45° - 60° from 375' good coring										

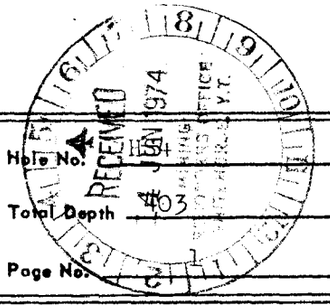
NEW IMPERIAL MINES LIMITED
MINING DIVISION - WHITEHORSE
YUKON TERRITORY

Hole No. IIS3 Page No. 2

FOOTAGE From	FOOTAGE To	ROCK CLASSIFICATION EPID. DIOP. GARN. SERP. QTZ/SIL. ACTINO. TREMO. CHLO. CRYSTALLINE. SHEARING. VEINS. FRACTURING. FOLIATION. GRAIN SIZE, TEXTURE	MINERALIZATION TYPE	MINERALIZATION %	ASSAY DATA SAMPLE NO.	WIDTH	RECOV.	%CU	%FE	MOLY	AU/AG	INSOL
		Hole ends 433'										
		Samples 25 - 30'			54519	5	5	.02	.01	.01		
		225 - 230			20	5	5	.02	.01	.01		
		425 - 430			21	5	5	.02	Tr	.02		
		Caron Diamond Drilling										
		BQ Core										

Commercial Printers, Whitehorse

NEW IMPERIAL MINES LIMITED
MINING DIVISION - WHITEHORSE
YUKON TERRITORY



PROPERTY War Eagle North | Claim No. WE20 | Strike | Lat. 17760N | Hole No. HSI
Date 19 | Section No. | Dip -90 | Dep. 550W | Total Depth 403
Logged By A. Hureau | Plan No. | Level Surface (2538') | Elev. | Page No. 1

FOOTAGE From	To		ROCK CLASSIFICATION Epid Diop Garn Serp Qtz Sil Actino Tremo Chlo Crystalline Shearing Veins Fracturing Foliation Grain Size Texture	MINERALIZATION TYPE	%	ASSAY DATA Sample No	Width	Recov	%Cu	%Fe	Moly	Au/Ag	Insol
0	20	Ob											
20	127	4q	Lt to dark fg qte well banded 45° - 60° py dissem and in										
			stringers conformable to bedding, ¼" py strs at 70', 77',										
			81.5' ¼ - ½" carb filled shear along core 35 - 37' core	py	2								
			broken 58 - 60' sections of core weakly magnetic occ bnd	po?									
			(to ½") massive 3g. conformable										
127	151	4q	Box spilled dk gy - lt gy well bnded qte (45°) py fg dissem										
			& in strks good coring										
151	220	4qg	lt - dk gy argillaceous quartzite dark bands very fine										
			grained and contour to 5% py sections thinly banded										
			generally 60°, carbonated	py	3								
220	228	4gq	blk - gy very fine grained, broken, py dissem, & on joints	py	3								
228	261	4q	lt - dk gy bnding gen 60° py dissem & in streaks good										
			coring										
261	285.5	4q/39	lt - dk gy bnded qte bnding 60°, bnds replaced by	py	3								
			garnet dissem py 3% good coring tr cp	cp	tr								
			sample 363-370			54619	7	7					

NEW IMPERIAL MINES LIMITED

MINING DIVISION - WHITEHORSE
YUKON TERRITORY

Hole No. NIS-1 Page No. 2

FOOTAGE From	FOOTAGE To		ROCK CLASSIFICATION EPID. DIOP. GARN. SERP. QTZ/SIL. ACTINO TREMO. CHLO. CRYSTALLINE. SHEARING. VEINS. FRACTURING. FOLIATION. GRAIN SIZE, TEXTURE	MINERALIZATION TYPE	%	ASSAY DATA SAMPLE NO.	WIDTH	RECOV.	MOLY	AU/AG	INSOL
285.5	313.5	4q	lt - dk gy minor g, well bnded 60° py mainly on joints	py	L2						
313.5	322.5	3g/4q	minor d, gy, brn skarnified qte, bnding neerly destroyed 60° where visible, py dissem & on slips fg	py	1						
322.5	326	4q/3	dk gy - blk qte, bnds replaced by garnet bnding 45° - 60°								
326	343	4q	lt-dk gy thinly bnded qte 60°, py vfg dissem & on joints good coring								
343	391	3g/4q	minor d, skarnified qte bnding in remnant qte sections 60° py dissem & on joints, good coring								
391	404	4q/3gd	lt - dk gy brn bnding 60°, tr py core broken 398 - 399 402 - 403 7" Rec 403 - 404		Caron Diamond Drilling BQ Core Stored						
	404		Hole stopped								

Commercial Printers, Whitehorse