ARIS SUMMARY SHEET

istrict Geologist, Smithers   Off Confidential: 89.04.14

ASSESSMENT REPORT 17304   MINING DIVISION: Omineca

ROPERTY: GWP
LOCATION: LAT 57 21 30   LONG 127 10 49
UTM 09 6358527 609476
NTS 094E06E
CLAIM(S): GWP 454,GWP 357
OPERATOR(S): Cyprus Metals Can.
UTHOR(S): Tompson, W.D.
EPORT YEAR: 1988, 86 Pages
COMMODITIES
SEARCHED FOR: Gold,Silver
GEOLOGICAL
SUMMARY: The claims are covered by unconsolidated glacial deposits but bedrock is believed to be flows of the Middle Jurassic Toodoggone Volcanics.
WORK
DONE: Geochemical,Geophysical,Physical
IPOL 1.8 km
Map(s) - 5; Scale(s) - 1:2500,1:1000
LINE 1.8 km
SOIL 159 sample(s) ;AU,AG
Map(s) - 3; Scale(s) - 1:10 000,1:5000
RELATED
REPORTS: 15632

CYPRUS METALS CANADA

TOODOGGONE PROJECT

Exploration of Cassidy Claim Groups 3 and 4
and
Mineral Claims G.W.P. Nos. 454 and 357

Toodoggone Gold-Silver District
Omineca Mining Division, British Columbia

N.T.S. 94 E/6

Lat. 57° 22' N., Long. 127° 10' W.

Willard D. Tompson

January 4, 1988

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SUMMARY OF CONCLUSIONS
AND RECOMMENDATIONS

Eight zones of anomalous resistivity were discovered on a reconnaissance induced polarization survey of claims in Cassidy group 3 and mineral claims G.W.P. Nos. 454 and 357.

Geochemical soil surveys in parts of Cassidy groups 3 and 4 disclosed several areas with anomalous gold and/or silver values. Swampy conditions interfered with soil sampling through much of the survey area.

Detailed geochemical soil surveys and forest humus geochemical surveys may be employed to determine whether the anomalies are continuous along strike. Additional induced polarization surveys are recommended in areas of resistivity anomalies.

Diamond drilling is recommended where continuity is demonstrated by induced polarization surveys. Estimated cost of the exploration work is $120,998.

Exploration of Cassidy Claim Groups 3 and 4
and Mineral Claims G.W.P. Nos. 454 and 357
Toodoggone Gold-Silver Mining District
Omineca Mining Division, British Columbia

PROPERTY AND LOCATION

Cassidy Groups 3 and 4 lie near the center of the Toodoggone gold-silver mining district in the northern interior of British Columbia (Figures 1 and 2). The Toodoggone area achieved prominence when the Baker gold-silver mine commenced production in 1980.

Toodoggone River is the most prominent landmark in the immediate vicinity of the claims, although the surrounding country contains many prominent landmarks, including the beautiful, broad, flat-topped Edozadelly Mountain which lies 16 kilometers westerly from Cassidy Group 3. Toodoggone River rises 12 kilometers west of Cassidy Groups and flows easterly. The claims occupy a broad area on both sides of the river, through 6 kilometers of its length.

Near the center of Cassidy Groups 3 and 4, latitude is 57°22' N. and longitude is 127°10' W. Magnetic declination is N.26°30' E.

Cassidy Groups 3 and 4 lie at elevations of 1150 meters in Toodoggone River valley, to 1900 meters in the southeast corner of claim, G.W.P. No. 130. Relief is moderate to precipitous.

Toodoggone district lies 300 kilometers north of Smithers, B.C. Access is by fixed wing aircraft to Sturdee airstrip (Figure 3) and thence by helicopter to the Company's base camp at Moosehorn Creek, 23 kilometers northerly from Sturdee.

Figure I.

CYPRUS METALS CANADA

Toodoggone Project

Map of British Columbia showing Location of Toodoggone Area

WILLARD D. TOMPSON   November 20, 1986

Km 0 100 200 400 600 Km

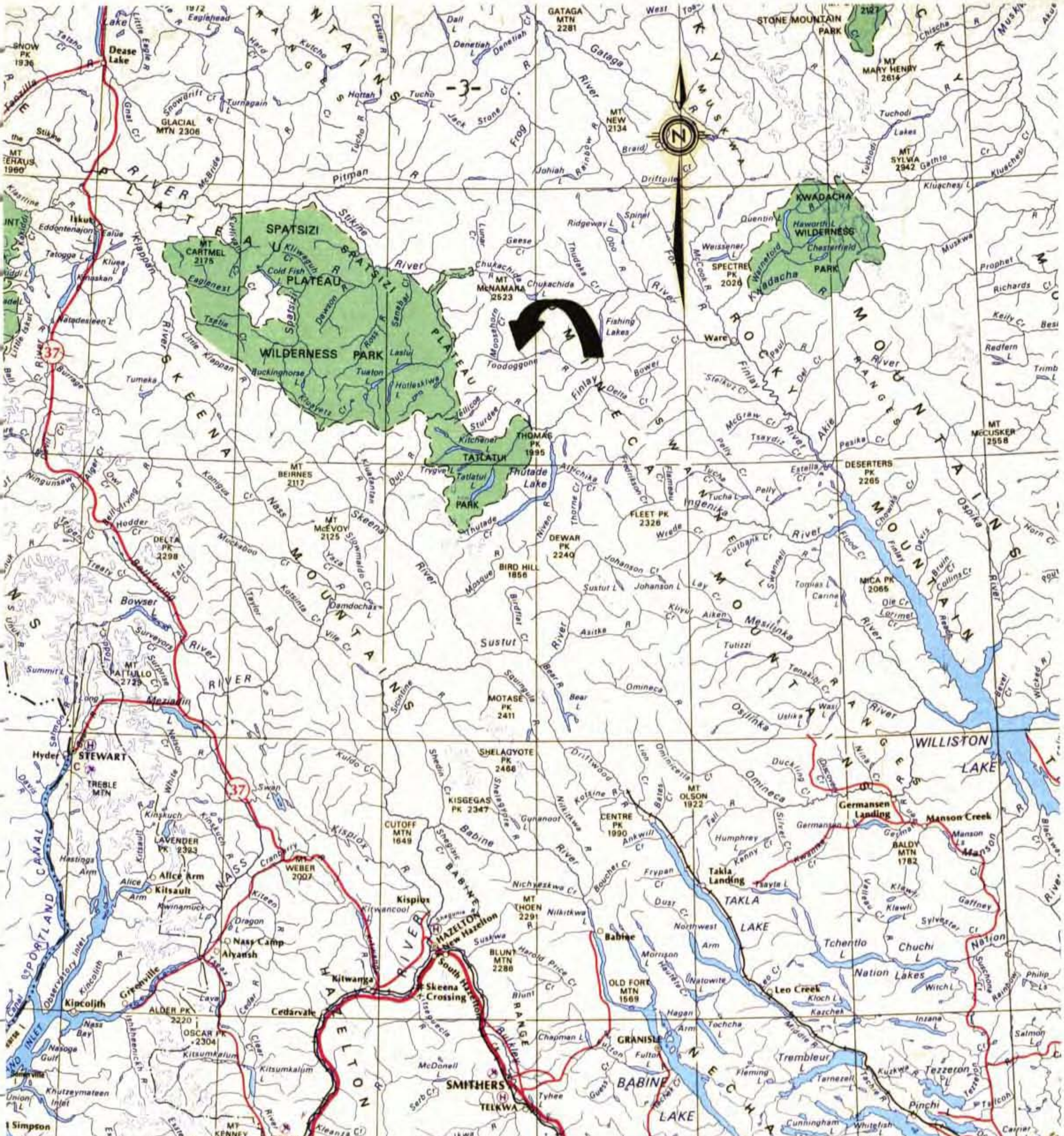

Figure 2 - Map of a portion of northern British Columbia showing Toodoggone district.

SCALE – 1: 2 000 000

Kilometres 20 0 20 40 60 80 100 120 140 160 180 200 Kilometres

Figure 3. - Map showing Cassidy groups 1 to 6 and claim, G.W.P. 430.

Scale 1:250 000 Échelle

Miles 5 0 5 10 15 20 Milles

Kilometres 5 0 5 10 15 20 25 30 Kilomètres

CLAIMS

Cassidy Group No. 3 is made up of 4 claims containing 72 units. Cassidy Group No. 4 has 61 units in 5 claims (Figure 4).

The legal corner post of mineral claims, G.W.P. numbers 250 and 260 was surveyed during the summer of 1987 by McWilliam, Whyte, Goble and Associates (Plate 1). Trig stations and photo points were incorporated into the survey which was plotted on a topographic map at scale, 1:10,000 (Plate 1).

Cassidy Group No. 3

Claim Name	Record Number	Units
G.W.P. No. 220	7567	16
G.W.P. No. 240	7569	20
G.W.P. No. 250	7570	18
G.W.P. No. 260	7571	18

Cassidy Group No. 4

Claim Name	Record Number	Units
G.W.P. No. 130	7558	6
G.W.P. No. 150	7560	12
G.W.P. No. 170	7562	12
G.W.P. No. 210	7566	15
G.W.P. No. 230	7568	16

Other Company holdings in the Toodoggone district include Cassidy Groups 1, 2, 5 and 6 and mineral claims G.W.P. Nos. 430, 454, 357, Round Mountain and R. M. Fraction.

Cassidy Group No. 1

Claim Name	Record Number	Units
G.W.P. No. 27	3514	18
G.W.P. No. 28	3515	12
G.W.P. No. 30	3517	20
G.W.P. No. 40	3519	8
G.W.P. No. 42	3898	12
Bear	3899	1
Doug's	3897	1

Cassidy Group No. 2

Claim Name	Record Number	Units
G.W.P. No. 29	3516	20
G.W.P. No. 34	3518	15

Cassidy Group No. 5

Claim Name	Record Number	Units
G.W.P. No. 110	7556	3
G.W.P. No. 120	7557	6
G.W.P. No. 140	7559	12
G.W.P. No. 160	7561	16
G.W.P. No. 180	7563	16
G.W.P. No. 190	7564	15
G.W.P. No. 2000	7565	20

Cassidy Group No. 6

Claim Name	Record Number	Units
G.W.P. No. 1	2870	20
G.W.P. No. 41	3520	18
G.W.P. No. 200	4731	8

Claims not included in claim groups are:

Claim Name	Record Number	Units
G.W.P. No. 430	7302	20
Round Mountain	8499	12
R. M. Fraction	8622	1
G.W.P. No. 454	8550	5
G.W.P. No. 357	8560	12

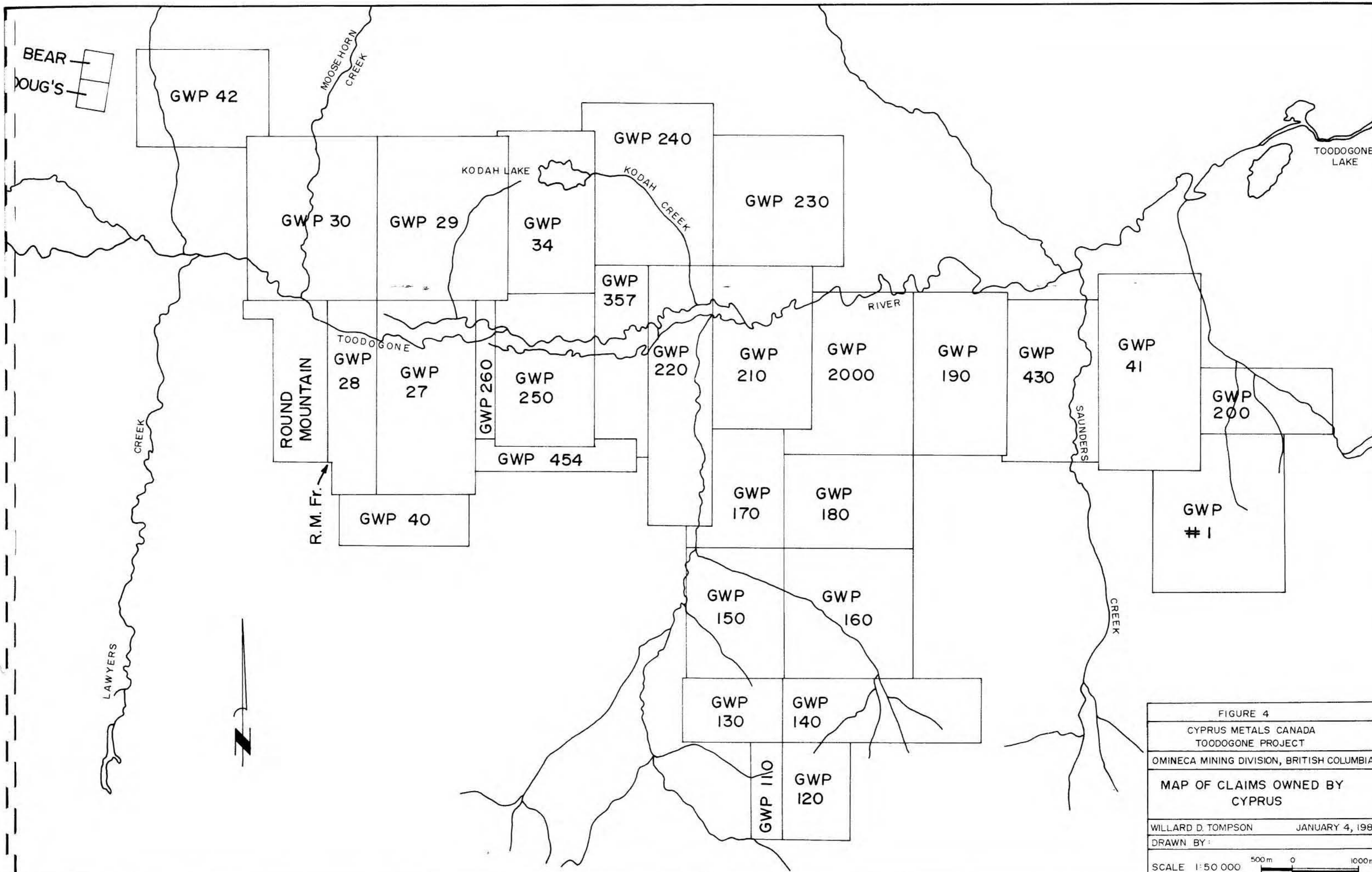

FIGURE 4

CYPRUS METALS CANADA
TOODOGONE PROJECT

OMINECA MINING DIVISION, BRITISH COLUMBIA

MAP OF CLAIMS OWNED BY CYPRUS

WILLARD D. TOMPSON — JANUARY 4, 1988

SCALE 1:50 000

HISTORY

The claims of Cassidy groups 3 and 4 were staked during the spring of 1986 by Douglas B. Carroll. The claims were staked after an earlier group of claims having a similar configuration.

Earliest work on the ground now covered by Cassidy groups 3 and 4 was by Great Western Petroleum Ltd. in 1981. Reconnaissance geological mapping and reconnaissance geochemical surveys were under the direction of N. C. Carter in 1981.

The Cassidy claim groups were optioned by Cyprus Metals Canada in 1986 and Cyprus conducted work on the claims during 1986.

First recorded work in the Toodoggone area was for placer gold along the lower portions of Belle Creek near its confluence with Toodoggone River. During the 1930's, a large camp was established near the mouth of Belle Creek and some placer mining was done in the shallow canyon of Belle Creek about 4 or 5 kilometers upstream from the camp.

In 1968, Kennco Explorations (Canada) Ltd. conducted a geochemical survey on the Chapelle property, 15 kilometers southwesterly from Toodoggone Lake. In 1970 they conducted a geochemical survey on their Lawyers property, which lies 12 kilometers west-southwesterly from Toodoggone Lake.

The Chapelle property was optioned to Conwest Exploration Company, Ltd. in 1973 and Conwest drove a 530 foot (161.1 m) adit to the vein. In 1975 the Chapelle property was optioned to DuPont of Canada Exploration Ltd. and they diamond drilled and conducted geophysical surveys (Barr, 1978). The Baker Mine (renamed from Chapelle) went into production in 1980 with reserves of 100,000 tons of ore containing 0.92 ounces of gold and 18.7 ounces of silver per ton. That ore was mined during the ensuing 3 years.

Kennco optioned the Lawyers property to Serem, Ltd., in 1979. From 1979-1985 Serem conducted extensive underground work on the Amethyst Gold Breccia zone and trenched and drilled the Cliff Creek and Dukes Ridge zones. Cheni Gold Mines Ltd. was organized to operate the Lawyers project and during 1987 conducted extensive diamond drilling as well as pre-production clearing and construction. The extension of the Omineca Mining Road reached the camp in October, 1987. Mineable ore reserves are reported to be:

Zone	Tons	Ag(oz/T)	Au(oz/T)
AGB	498,900	7.69	0.243
Cliff Creek	463,300	7.61	0.170
Duke's Ridge	75,400	6.59	0.230

Other major exploration projects in the Toodoggone district during 1987 were conducted by; Canasil Resources, Ltd., Energex Minerals, Ltd., Esso Minerals Canada, Multinational Resources, Inc., St. Joe Canada, Inc. and Western Horizon Resources, Ltd.

GENERAL GEOLOGY OF THE TOODOGGONE AREA

This description of the general geology of the Toodoggone mining area is summarized from the works of those who have mapped the geology of the Toodoggone volcanic rocks and the surrounding area.

The volcanic sequence was named by Carter (1971, p. 63). Carter described the rocks as follows:

> "A sequence of volcanic rocks, Jurassic or younger in age, and here informally called the Toodoggone volcanic rocks, unconformably overlie Takla Group in the western part of the area. The Toodoggone rocks, which may be several hundred feet thick, include red to green or grey dacite and latite porphyry flows and pyroclastic rocks."

He showed the age to be 186 $\pm$ 6 million years.

Gabrielse, Dodds and Mansy (1975) mapped the Toodoggone River quadrangle (N.T.S. 94E) which includes the area underlain by the Toodoggone volcanic rocks. They show a northwesterly-striking band of volcanic rocks, which is up to 17 kilometers wide and 90 kilometers long, extending from Kemess Creek on the south to Chukachida River on the north. The Toodoggone volcanic rocks are bounded on the east by coeval hornblende-quartz diorite plutons, which are known as the "Omineca Intrusions" and on the west by the Upper Cretaceous Sustut group.

Schroeter (1981, pp. 124-131) described the regional geology, structure and mineral prospects of the area. He identified four principal subdivisions of Toodoggone volcanic rocks:

1. Lower volcanic division - purple agglomerates, and grey to purple dacite tuffs.
2. Middle volcanic division - rhyolites, dacites, "orange" crystal to lithic tuffs and quartz-feldspar porphyries.
3. Upper volcanic-intrusive division - grey to green to maroon crystal tuffs and quartz-eye feldspar porphyries.
4. Upper volcanic-sedimentary division - lacustrine sedimentary rocks, stream bed deposits and possible fanglomerate and interbedded tuffs.

In 1981, Schroeter (1982) conducted some preliminary geochemical studies. He observed:

1. Three main classes of rocks are: varicolored andesitic and dacitic pyroclastic tuffs which are overlain by trachytic pyroclastic tuffs.

2. The ratio K_2O/Na_2O increases toward mineralization.

3. Sulfur values are very low.

4. Trace elements are not enhanced toward mineralization.

5. The overall Ag:Au ration is 20:1.

Panteleyev (1982) commenced systematic geologic mapping of the Toodoggone rocks in 1981. He started his mapping south of Finlay River in 1981 and in 1982 he mapped an area north of Finlay River between Sturdee River and Toodoggone River (Panteleyev, 1983).

Diakow (1983) examined the stratigraphy, structure and hydrothermal alteration of two types of precious metal occurrences in the Toodoggone; (1) quartz stockworks and veins which are discordant and transect bedding at high angles and (2) pervasive siliceous zones which are strataform and stratabound.

In 1985, Diakow, Panteleyev and Schroeter produced a geological map of the Toodoggone River area. Figure 5 (p. 12) is a geological map at scale 1:250,000 which is generalized and reduced from Diakow, Panteleyev and Schroeter (1985).

Permian Asitka Group

The oldest rocks in the map area are Permian crystalline limestones of the Asitka group. Barr (1978) shows that Asitka rocks were thrust upon Triassic Takla rocks during Jurassic time.

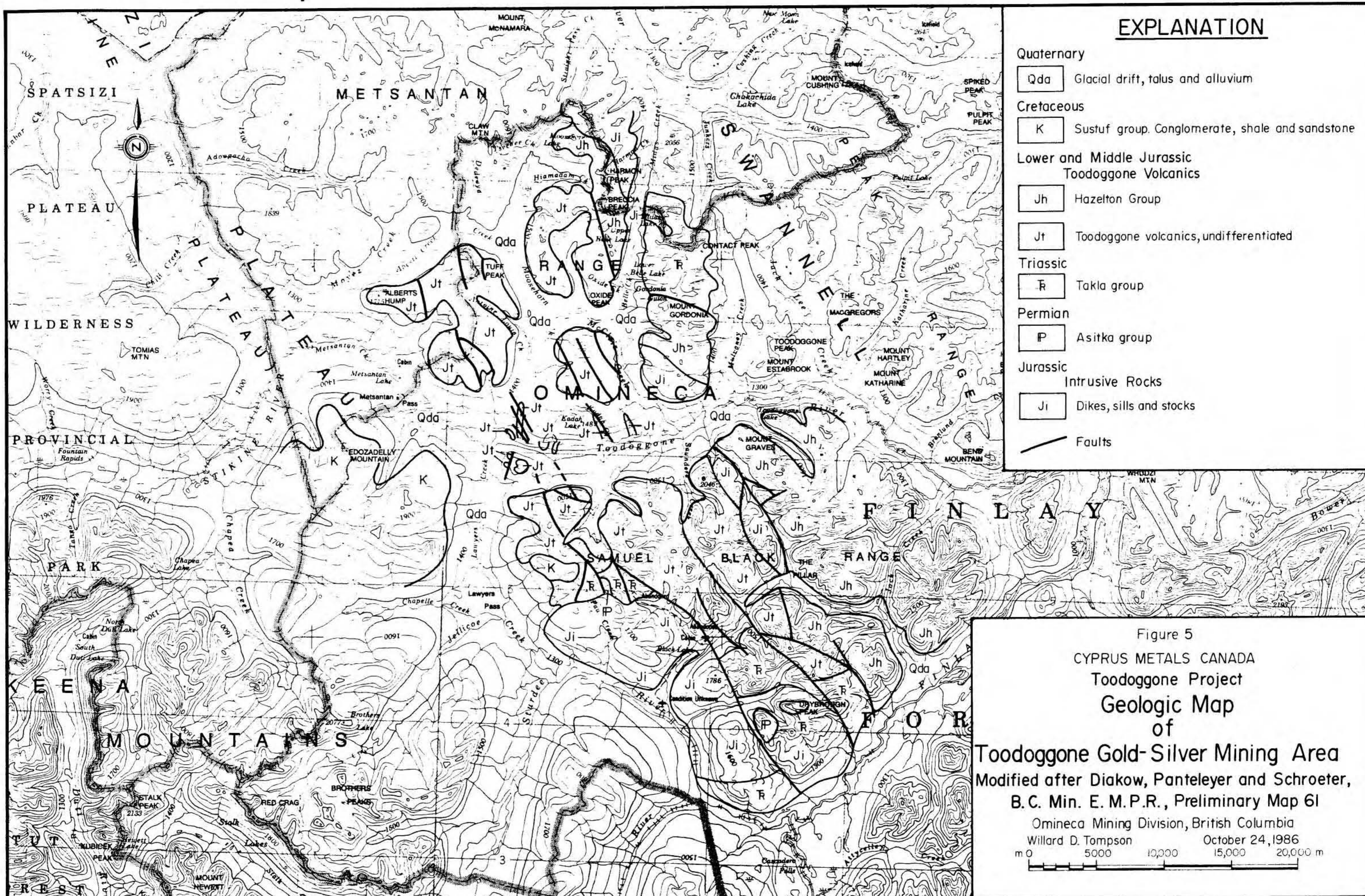

Figure 5

CYPRUS METALS CANADA

Toodoggone Project

Geologic Map of Toodoggone Gold-Silver Mining Area

Modified after Diakow, Panteleyer and Schroeter, B.C. Min. E.M.P.R., Preliminary Map 61

Omineca Mining Division, British Columbia

Willard D. Tompson October 24, 1986

m 0 5000 10,000 15,000 20,000 m

Barr (1978) in his work at the Chapelle gold-silver deposit (Baker mine) shows that the Takla group is made up of four principal units:

1. Tremolite andesite prophyry. Typically contains large euhedral phenocrysts of tremolite in a dark grey aphanitic matrix. This is the oldest unit of Takla rocks.
2. Fine grained andesite. Massive light green to greenish-grey.
3. Dark grey porphyritic feldspar andesite.
4. Pyroclastic breccia composed of lapilli-sized multi-colored clasts of fine grained andesite in a fine-grained beige to grey-green matrix.

Upper Triassic Takla Group

The Takla group of volcanic rocks is the earliest of the Mesozoic extrusions in the area and reflects the beginnings of a period of volcanism which persisted through Lower Jurassic time when the Toodoggone volcanic rocks were deposited.

Lower and Middle Jurassic Toodoggone Volcanic Rocks

Carter (1971) and Panteleyev (1983) show that the Toodoggone volcanic rocks were deposited over a period of 20 million years from 200 to 180 Ma. Panteleyev (1983, p. 143) identified six map units of Toodoggone volcanic rocks between Sturdee River and Toodoggone River.

Diakow, Panteleyev and Schroeter (1985) in their preliminary map of the Toodoggone area, recognize nine map units with several mappable subdivisions of Toodoggone volcanic rocks:

1. Addogatcho Creek formation
2. Moyez Creek volcaniclastics
3. Lawyers-Metsantan quartzose andesite
4. Mafic flow and tuff unit
5. McClair Creek formation
6. Tuff Peak formation
7. Toodoggone crystal ash tuff and flows
8. Grey dacite
9. Hazelton group.

Upper Cretaceous Sustut Formation

The Triassic Takla rocks and the Jurassic Toodoggone rocks are overlain on the west by sandstones and conglomerates of the Upper Cretaceous Sustut formation. Sustut rocks are part of the Bowser assemblage and here, lie near the eastern margin of the Bowser Basin.

Physiography of the Toodoggone Area

Physiography of the Toodoggone area was sculptured by the movement of ice during Recent glaciation. Valleys were undoubtedly full of ice at the climax of the "little ice age", about 450 years ago (Holland, 1964, p. 105). Remnants of glaciers still exist in a few cirques. Valleys are "U" shaped and glacial moraines, kames and eskers are widespread. Glacial erratics occur throughout the area. A common rock-type which occurs as erratics is a chert-quartz pebble conglomerate. Similar chert-quartz pebble conglomerate beds occur along the Skeena River 100 kilometers to the southwest.

Toodoggone River occupies a broad "U" shaped valley (Figures 6 and 7) with gravel terraces up to 1100 meters wide. Toodoggone River was first formed by a valley glacier and then became a major drainage channel as it carried meltwater eastward from the waning glaciers.

GEOLOGY OF CASSIDY GROUPS 3 AND 4
AND MINERAL CLAIMS G.W.P. NOS. 454 AND 357

It was shown by Tompson in 1986 that, except for the alpine areas of G.W.P. Nos. 130, 150 and 170, Cassidy groups 3 and 4 and G.W.P. Nos. 454 and 357 are mostly covered by unconsolidated deposits; river gravels, glacial deposits and talus, and these sustain dense growths of spruce, balsam and pine trees and broad expanses of willows.

Cassidy group 3 has outcrops in the banks of two small creeks in claim, G.W.P. No. 260. Cassidy group 4 has abundant outcrop in the precipitous walls of Attorney Creek and Kodah Creek and on the small mountain south of Kodah Lake.

Description of Rocks

With the exception of the outcrops of quartz dacite porphyry in the alpine areas, bedrock is covered by unconsolidated materials in about 98 percent of the claim area.

Five bedrock map units are recognized on Cassidy groups 3 and 4 (Tompson, 1986). They are:

1. Grey to brown, medium grained to very fine grained epiclastic tuffs and greywacke. A few thin beds of dark grey to black shale. Some greywacke beds contain minor amounts of chloritized mafic minerals.
2. Light green lapilli tuff containing trachyandesite clasts. Matrix is fine grained.
3. Porphyritic andesite with hornblende, pyroxene and plagioclase phenocrysts. Matrix is fine grained and greenish. Contains a few quartz phenocrysts.
4. Coarse grained, grey lithic tuff.
5. Grey to dark grey porphyritic quartz dacite. Up to 1 or 2 percent orthoclase phenocrysts with minor quartz phenocrysts in fine grained, dark grey matrix.

Topographic Relations

The southeastern extremities of Cassidy group 4 are underlain by porphyritic quartz dacite flows which are relatively unaltered and resistant to erosion. These areas are characterized by alpine to sub-alpine terrain above 1600 meters elevation where there are abundant outcrops.

Attorney Creek and Kodah Creek each have bedrock exposures in steep canyons. Attorney Creek canyon is up to 60 meters deep with a precipitous area which is about 900 meters long. Kodah Creek canyon is up to 30 meters deep and has a precipitous portion which is about 800 meters long.

Kodah Creek

Kodah Lake occupies a slight debris-filled depression 2 1/2 kilometers north of Toodoggone River. The terrain slopes moderately toward Toodoggone River at an average grade of about 10 percent. The entire area is covered by glacial drift, although bedrock exposures occur in the canyons of streams which drain Kodah Lake and on a small, but prominent hill south of Kodah Lake.

Attorney Creek

Attorney Creek flows northerly for a distance of about 9 kilometers from near the area of Baker mine. As the creek traverses the Cassidy claim groups, it flows in a debris-filled valley. However, the northernmost 900 meters of the creek occupy a steep canyon in a resistant, but strongly faulted, grey lapilli tuff.

EXPLORATION OF CASSIDY GROUPS 3 AND 4 AND MINERAL CLAIMS G.W.P. NOS. 454 AND 357

Geochemical Surveys

Two grid soil surveys were conducted in areas of aeromagnetic anomalies in Cassidy groups 3 and 4 and mineral claims G.W.P. Nos. 454 and 357. Control for the survey grids was from baseline number 2 and baseline 250 (Plate 1).

"B" horizons sampled at 15-31 cm depth.

Soil Survey on Baseline 250

The geochemical soil survey on parts of Cassidy group 3 and mineral claims G.W.P. 454 and 357 is shown on Plate 2.

The area is swampy with very low relief and an undetermined thickness of glacial till.

Of a possible 618 sample sites, 319 soil samples were collected. The remaining sites could not be sampled due to swampy conditions. The distribution of gold and silver analyses from the samples is as follows:

Gold		Silver	
> 200 ppb,	3 samples	> 4 ppm,	nil
101 - 200 ppb,	2 samples	2 - 4 ppm,	9 samples
50 - 100 ppb,	8 samples	1 - 2 ppm,	50 samples
< 50 ppb,	306 samples	< 1 ppm,	260 samples
TOTAL	319 samples		319 samples

All analytical work was done by Min-En Laboratories Ltd., 705 West 15th Street, North Vancouver, B.C.

All samples were analyzed for gold and silver:

Element	Method
Gold	Wet A.A.
Silver	Multi acid A.A.

Areas in which anomalous values occur should be checked by resampling on a detailed grid:

Coordinates of Areas to Resample

L.10+00N.- 1+50W.
L.10+00N.- 8+50W.
L. 6+00N.- 4+00E.
L. 2+00S.-11+25W.
L. 8+00S.- 2+00E.

Soil Survey on Baseline No. 2

The geochemical soil survey on claim, G.W.P. 170, Cassidy group 4 is shown on Plate 3. Terrain is mostly moderate, but is steep on line 69+00S.

From a possible 346 sample sites, 317 samples were taken. Distribution of gold and silver analyses is as follows:

Gold		Silver	
> 200 ppb,	4 samples	> 4 ppm,	1 sample
101 - 200 ppb,	1 sample	2 - 4 ppm,	2 samples
50 - 100 ppb,	3 samples	1 - 2 ppm,	67 samples
< 50 ppb,	309 samples	< 1 ppm,	247 samples
TOTAL	317 samples		317 samples

Sample sites of the very high gold and silver anomalies should be resampled on a detailed sample grid. Coordinates of those samples are:

Coordinates of Areas to Resample

L.57+00S.- 3+50E.
Baseline at 60+50S.
L.65+00S.- 1+50W.
L.67+00S.- 7+00E.
L.67+00S.- 4+00E.

Induced Polarization Surveys

A reconnaissance line of induced polarization was run on line 44+00S. from Baseline number one (Plate 1). Line 44+00S. strikes N.62E. from the baseline for a distance of 4000 meters and to the S.62W. for a distance of 500 meters. Thus the reconnaissance survey on L.44+00S. is 4500 meters (2.8 miles) long.

The induced polarization survey was conducted by White Geophysical Inc. of Richmond, B.C. The final report for the survey was prepared by Markus Seywerd, geophysicist for White Geophysical Inc. For this survey, a = 25. The following description of the geophysical technique was prepared by Seywerd (1987):

MULTIPOLE INDUCED POLARIZATION SURVEY

"The multipole induced polarization method is a technique which exploits the rapid signal acquisition and processing capabilities available with current micro computer technology. With this technique the potential field information is obtained through a multiconductor cable having 36 takeouts at 25 metre intervals. The cable is presently configured as up to six end and position interchangeable cables of 150 metre length. The takeouts are addressed by the 40 channel multiplexer assembly in a specially configured HP-3497A data acquisition system as 25 metre to 275 metre dipoles. The data acquisition system is driven by a HP-85 computer, allowing the data to be stacked in the computer for a number of cycles at full precision until a criteria is reached. Ten windows on the secondary voltage are compiled, as well as the primary voltage information. Time zero is sensed by direct reference to the transmitter timing circuitry. The cable is scanned simultaneously in groups of five dipoles and the decay curves presented graphically for acceptance and logging or rejection and rescan by the operator. The data is logged on digital tape cartridges and is readily accessed in the field in order to produce pseudo-sections. These tapes are read by a HP-9845 computer for further processing and production of final report ready sections.

The primary field power is provided by a Huntec MK IV 2.5 kw transmitter operated in time domain mode which is driven by a 400 Hz, 120 volt three phase motor generator. The transmitted signal is an alternate cycle reversing current pulse of two second on and two second off time. The current is introduced into the ground through two current electrodes for each scan of the potential cable. By scanning the cable for each of several current stake positions both along the cable and off the ends of the cable a strong measure of redundancy of coverage of a given depth point is assured. The stacking of this multiple scan information in the computer results in an improved determination of the geoelectric section.

The apparent resistivity is obtained from the ratio of the primary voltage measured on the potential dipole during the current on part of the cycle to the current flowing through the current electrodes. A geometric factor is computed from the electrode locations to arrive at the apparent resistivity, measured in ohm-metres.

The apparent chargeability is calculated from the ten secondary voltage windows as the area under the secondary decay curve and is measured in milliseconds. The integration time is 1100ms with a delay of 200ms."

It may be noted by reference to Plate 1 that the induced polarization reconnaissance line transects four claims: G.W.P. numbers 454, 250, 357 and 220.

That portion of the survey lying west of station 5+00E. occurs on claims of Cassidy group 1 and is recorded elsewhere.

Seywerd (1987, p. 3 and 4) identified anomalies from "Zone I" to "Zone P" in mineral claims G.W.P. numbers 454, 250, 357 and 220. He described zone "P" as: "a very pronounced anomaly typical of the Toodoggone silicified zones".

Claim Name	Intersection of Line 44+00S. on Claim	Anomalous Zones
G.W.P. No. 454	5+00E. to 13+50E.	Zones I & J
G.W.P. No. 250	13+50E. to 23+50E.	Zones K, L & M
G.W.P. No. 357	23+50E. to 32+70E.	Zones N, O & P
G.W.P. No. 220	32+70E. to 40+00E.	None

The locations of the anomalous zones are shown on Plate 2.

CONCLUSIONS

Geochemical Surveys

At least 10 geochemical soil anomalies were discovered on the two grids which were sampled on Cassidy claim groups 3 and 4 and mineral claims, G.W.P. 454 and 357. Continuity of the anomalies is difficult to demonstrate because of the extensive distribution of glacial till and swampy conditions in the sample areas.

Detailed soil grids and geochemical forest humus sampling in specific localities may aid in the resolution of the anomalies.

Induced Polarization Surveys

Seyward (1987, p. 4) identified 8 "possible silicified zones" from the reconnaissance induced polarization survey of line 44+00S. from 5+00E. on the line to 40+00E. (areas lying to the west of coordinate, 5+00E. are on Cassidy group 1). Seyward (op. cit.) identified anomalous zones from zone "I" to zone "P".

Zone	Location on line 44+00 South
I	6+50E. and 7+50E.
J	13+40E.
K	16+00E.
L	21+30E.
M	23+50E.
N	25+75E.
O	28+50E.
P	31+30E.

Seywerd notes that zone "P" is, "a very pronounced anomaly typical of the Toodoggone silicified zones".

All of the induced polarization zones warrant additional investigation and evaluation.

It should be noted that geochemical soil sampling of the same line on which the induced polarization survey was run, e.g. line 44+00S., had 76 possible sample sites. However, only 21 samples were collected, the balance of the sample sites being in a swamp. Furthermore, the soil sample grid area did not encompass the sites of induced polarization anomalous zones, "O" and "P". Therefore there are no geochemical data with which to corroborate the geophysical anomaly.

RECOMMENDATIONS

Geochemical Surveys

It is proposed that each of the ten principal geochemical soil anomalies be tested by a detailed soil sampling grid with a sample array of 10 x 25 meters.

Ten detailed grid soil surveys with a 10 x 25 meter sample array will have 1890 sample sites. However, some samples (estimate 10 percent) may be missed due to adverse ground conditions. Thus the surveys will produce about 1700 samples. Cost of the surveys are expected to be:

Sampling and grid line preparation, $3.50 per sample	$ 5,950
Assays, $11.00 per sample	18,700
Support costs; supervision, board and room, plotting, $4.80 per sample	8,160
Transportation, $4.00 per sample	6,800
Total for detailed grid soil surveys:	$39,610

Some of the areas in which the induced polarization anomalies, "I" to "P" occur may be satisfactorily tested using forest humus (mull) samples. Curtin and others (1968) found that lode gold deposits which are concealed beneath colluvial and glacial cover are delineated by gold anomalies in the forest humus.

About 200 samples may be taken in the areas of the geophysical anomalies. Estimated cost is as follows:

Sampling and grid line preparation, $3.50 per sample	$ 700
Assays, $13.00 per sample	2,600
Support costs; supervision, board and room, plotting, $4.80 per sample	960
Transportation, $4.00 per sample	800
Total for humus survey:	$ 5,060
TOTAL COSTS FOR GEOCHEMICAL SURVEYS:	$44,670

Induced Polarization Surveys

It is recommended that each of the induced polarization anomalies be further evaluated with additional induced polarization surveys. Four additional lines, each 300 meters in length, may further refine information gained from the 1987 survey of line 44+00S. These surveys will provide a total of 7200 meters of additional induced polarization data for the 8 anomalies. Estimated costs of those surveys are as follows:

Wages for crew, 6 days @ $855 per day	$ 5,130
Room and board for crew 6 days @ $200 per day	1,200
Instrumentation, 6 days @ $200 per day	1,200
Computer plots, drafting, interpretation, reproductions and report	1,000
Transportation, including mobilization, demobilization and travel during tenure of survey	1,500
TOTAL COST FOR INDUCED POLARIZATION SURVEY:	$10,030

Diamond Drilling

It is recommended that about 1500 feet of diamond drilling be allocated to testing induced polarization anomalies and that the drilling be done late in the field season after the induced polarization surveys are completed. Cost of this drilling is expected to be as follows:

Drill contract 1500 feet @ $21.00	$31,500
Contractors field costs @ $11.00 per foot	16,500
Support costs; supervision, planning, plotting, core logging, drafting	3,375
Assays, 150 @ $11.15	1,673
Core boxes, core racks, sampling supplies	1,000
Helicopter for drill and crew moves	8,500
Fixed-wing aircraft	1,500
Board and room	2,250
TOTAL FIELD AND LABORATORY COSTS FOR 1500 FEET OF DRILLING:	$66,298

Cost of the 1988 exploration program for Cassidy groups 3 and 4 may be summarized as follows:

Geochemical surveys	
Forest humus surveys	$ 5,060
Detailed grid surveys	39,610
Induced polarization surveys	10,030
Diamond drilling	66,298
ESTIMATE OF TOTAL COSTS FOR THE PROPOSED 1988 EXPLORATION PROGRAM, CASSIDY GROUPS 3 AND 4:	$120,998

Respectfully submitted,

Willard D. Tompson

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CERTIFICATE

I, Willard D. Tompson, of Smithers, British Columbia, do hereby certify:

1. THAT I am a consulting geologist residing at Van Gaalen Road, Smithers, British Columbia;

2. THAT I hold a Master of Science Degree (Geology) from Montana State University;

3. THAT I am a Fellow of the Geological Association of Canada;

4. THAT I have practiced my profession for more than 29 years;

5. THAT I managed the field exploration program which is described in this report and that I planned the work described herein in consultation with Company management personnel and that I supervised the work in the field;

6. THAT I have not received, directly or indirectly, nor do I expect to receive any interest, direct or indirect, in the property of the Company nor any affiliate of the Company, nor do I beneficially own, directly or indirectly any securities of the Company or any affiliate of the Company;

7. THAT this report may be used for any corporate purpose the Company deems necessary.

Dated at Smithers, British Columbia this 9th day of January, 1988.

Willard D. Tompson,
Consulting Geologist

APPENDIX I

Cost Analysis of Exploration Project for Cassidy Groups 3 and 4 and Mineral Claims G.W.P. Nos. 454 and 357

OOSEHORN PROJECT

YEAR ENDED DECEMBER 31, 1987

ata as at : 31/12/1987 Report produced on 4 January 1980 at 02:42:23

Cost centre range : C - C CASSIDY #3

TRIAL BALANCE

G/L		DEBIT	CREDIT
20	BOARD AND ROOM	140.82	
40	CONTRACT - OTHER	25.84	
160	FIXED WING A/C	220.51	
170	HELICOPTERS	600.00	
30	SUPPLY EXPENSE	152.46	
260	TRENCHES ETC.	33.92	
270	WAGES AND FEES	55.76	
83	ED RUSSELL	70.00	
87	JEANNIE FLEMMING	375.00	
585	REPORT PREPARATION	300.00	
05	PHOTOS AND MAPS	91.20	
10	ASSAY	3,509.00	
720	BOARD AND ROOM	255.60	
730	CONTRACT - OTHER	354.46	
40	DE-MOBILIZATION	139.23	
750	FIXED WING A/C	294.02	
760	HELICOPTERS	3,060.00	
70	MOBILIZATION	1,780.25	
75	REPORT PREPARATION	300.00	
790	SUPPLY EXPENSE	203.28	
00	TRAVEL EXPENSE	77.80	
10	WAGES AND FEES	74.36	
811	WILL TOMPSON	600.00	
813	JACK HEMELSPECK	150.00	
15	JIM SPENCER	275.00	
818	NORMA AIKINS	250.00	
819	GAIL TOMPSON	420.00	
20	DONALD TROTTER	240.00	
22	GEFF GRANT	700.00	
823	ED RUSSELL	350.00	
27	JEANNIE FLEMMING	250.00	
05	ASSAYS	1,440.00	
910	BOARD AND ROOM	187.76	
915	CONTRACT - OTHER	34.46	
25	FIXED WING A/C	291.02	
30	HELICOPTERS	360.00	
938	REPORT PREPARATION	300.00	
45	SUPPLY EXPENSE	203.28	
70	WAGES & FEES	74.36	
978	NORMA AIKINS	31.00	
		18,268.39	0.00

MOOSEHORN PROJECT

YEAR ENDED DECEMBER 31, 1987

Data as at : 31/12/1987 Report produced on 4 January 1980 at 02:43:45

Cost centre range : D - D CASSIDY #4

TRIAL BALANCE

G/L	DEBIT	CREDIT
20 BOARD AND ROOM	15.77	
40 CONTRACT - OTHER	2.90	
160 FIXED WING A/C	24.70	
170 HELICOPTERS	600.00	
30 SUPPLY EXPENSE	17.08	
260 TRENCHES ETC.	3.80	
270 WAGES AND FEES	6.25	
85 REPORT PREPARATION	33.60	
05 PHOTOS AND MAPS	10.22	
710 ASSAY	3,487.00	
720 BOARD AND ROOM	28.63	
730 CONTRACT - OTHER	3.86	
740 DE-MOBILIZATION	122.15	
750 FIXED WING A/C	32.93	
760 HELICOPTERS	3,060.00	
770 MOBILIZATION	1,697.95	
775 REPORT PREPARATION	33.60	
790 SUPPLY EXPENSE	22.77	
800 TRAVEL EXPENSE	8.72	
810 WAGES AND FEES	8.32	
815 JIM SPENCER	90.00	
818 NORMA AIKINS	125.00	
819 GAIL TOMPSON	80.00	
820 DONALD TROTTER	80.00	
823 ED RUSSELL	70.00	
910 BOARD AND ROOM	21.03	
915 CONTRACT - OTHER	3.86	
925 FIXED WING A/C	32.93	
930 HELICOPTERS	360.00	
938 REPORT PREPARATION	33.60	
945 SUPPLY EXPENSE	22.77	
970 WAGES & FEES	8.32	
	10,147.76	0.00

MOOSEHORN PROJECT
YEAR ENDED DECEMBER 31, 1987
Data as at : 31/12/1987 Report produced on 4 January 1980 at 02:49:43

Cost centre range : I - I G.W.P. 454

TRIAL BALANCE

G/L		DEBIT	CREDIT
120	BOARD AND ROOM	43.56	
140	CONTRACT - OTHER	7.99	
160	FIXED WING A/C	68.21	
230	SUPPLY EXPENSE	47.15	
260	TRENCHES ETC.	10.49	
270	WAGES AND FEES	17.25	
585	REPORT PREPARATION	92.80	
705	PHOTOS AND MAPS	28.21	
710	ASSAY	803.00	
720	BOARD AND ROOM	79.06	
730	CONTRACT - OTHER	10.66	
740	DE-MOBILIZATION	365.95	
750	FIXED WING A/C	90.95	
760	HELICOPTERS	1,920.00	
770	MOBILIZATION	649.58	
775	REPORT PREPARATION	92.80	
790	SUPPLY EXPENSE	62.88	
800	TRAVEL EXPENSE	24.07	
810	WAGES AND FEES	23.00	
813	JACK HEMELSPECK	300.00	
815	JIM SPENCER	180.00	
818	NORMA AIKINS	250.00	
820	DONALD TROTTER	160.00	
821	RICHARD NEWTON	80.00	
822	GEFF GRANT	140.00	
823	ED RUSSELL	140.00	
905	ASSAYS	1,620.00	
910	BOARD AND ROOM	58.08	
915	CONTRACT - OTHER	10.66	
925	FIXED WING A/C	90.95	
930	HELICOPTERS	120.00	
938	REPORT PREPARATION	92.80	
945	SUPPLY EXPENSE	62.88	
970	WAGES & FEES	23.00	
		7,765.98	0.00

MOOSEHORN PROJECT
YEAR ENDED DECEMBER 31, 1987
Data as at : 31/12/1987 Report produced on 4 January 1980 at 02:48:45

Cost centre range : H - H G.W.P 357

TRIAL BALANCE

G/L	DEBIT	CREDIT
:20 BOARD AND ROOM	36.43	
.40 CONTRACT - OTHER	6.68	
160 FIXED WING A/C	57.04	
230 SUPPLY EXPENSE	39.44	
:60 TRENCHES ETC.	8.77	
270 WAGES AND FEES	14.42	
585 REPORT PREPARATION	77.60	
;21 WILL TOMPSON	300.00	
705 PHOTOS AND MAPS	23.59	
710 ASSAY	660.00	
720 BOARD AND ROOM	66.12	
730 CONTRACT - OTHER	8.92	
740 DE-MOBILIZATION	184.97	
750 FIXED WING A/C	76.05	
760 HELICOPTERS	1,800.00	
770 MOBILIZATION	701.45	
775 REPORT PREPARATION	77.60	
790 SUPPLY EXPENSE	52.58	
800 TRAVEL EXPENSE	20.13	
810 WAGES AND FEES	19.24	
813 JACK HEMELSPECK	150.00	
815 JIM SPENCER	90.00	
818 NORMA AIKINS	125.00	
819 GAIL TOMPSON	80.00	
820 DONALD TROTTER	80.00	
821 RICHARD NEWTON	80.00	
822 GEFF GRANT	70.00	
823 ED RUSSELL	70.00	
905 ASSAYS	1,260.00	
910 BOARD AND ROOM	48.57	
915 CONTRACT - OTHER	8.92	
925 FIXED WING A/C	76.05	
938 REPORT PREPARATION	77.60	
945 SUPPLY EXPENSE	52.58	
970 WAGES & FEES	19.24	
	6,518.99	0.00

APPENDIX II

Geochemical Laboratory Reports

MIN-EN LABORATORIES LTD.

Specialists in Mineral Environments
705 West 15th Street North Vancouver, B.C. Canada V7M 1T2

HONE: (604)980-5814 OR (604)988-4524 TELEX: VIA USA 7601067 UC

Certificate of GEOCHEM

Company: CYPRUS MINERALS
Project:
Attention: A.JACKSON/W.TOMPSON

File: 7-939/P1
Date: AUGUST 5/87
Type: SOIL GEOCHEM

We hereby certify the following results for samples submitted.

Sample Number	AG PPM	AU-WET PPB	
BL 250-0+50S	0.4	5	40MESH
BL 250-3+00S	1.0	15	40MESH
BL 250-3+25S	0.6	5	40MESH
BL 250-3+50S	0.4	10	
BL 250-3+75S	0.3	10	
BL 250-4+00S	0.6	5	
BL 250-4+25S	0.4	5	
BL 250-4+50S	0.5	5	
BL 250-4+75S	0.2	5	
BL 250-5+00S	0.2	10	
BL 250-5+25S	0.2	5	
BL 250-5+50S	0.2	20	
BL 250-5+75S	0.3	5	
BL 250-6+25S	1.8	5	40MESH
BL 250-6+50S	0.8	10	
BL 250-6+75S	0.2	5	40MESH
BL 250-7+50S	0.2	5	
BL 250-7+75S	0.4	10	
BL 250-8+00S	0.2	5	
BL 250-2+00N	1.6	5	20MESH
BL 250-2+75N	0.2	5	
BL 250-3+50N	0.2	5	40MESH
BL 250-3+75N	0.4	5	
BL 250-4+00N	0.4	5	
BL 250-4+25N	0.3	10	
BL 250-4+50N	0.4	5	
BL 250-4+75N	0.4	5	
BL 250-5+00N	0.4	5	
BL 250-5+25N	0.4	15	40MESH
BL 250-5+50N	0.6	5	20MESH

Certified by ______

MIN-EN LABORATORIES LTD.

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Specialists in Mineral Environments

705 West 15th Street North Vancouver, B.C. Canada V7M 1T2

PHONE: (604)980-5814 OR (604)988-4524 TELEX:VIA USA 7601067 UC

Certificate of GEOCHEM

Company:CYPRUS MINERALS
Project:
Attention:A.JACKSON.W.TOMPSON

File:7-939/P2
Date:AUGUST 5/87
Type:SOIL GEOCHEM

We hereby certify the following results for samples submitted.

Sample Number	AG PPM	AU-WET PPB	
BL 250-8+00N	0.4	15	
BL 250-8+25N	0.3	5	
BL 250-8+50N	0.4	5	
BL 250-8+75N	0.2	5	
BL 250-9+00N	0.5	5	
BL 250-9+25N	0.3	10	
BL 250-9+50N	0.4	5	
BL 250-9+75N	0.2	5	
BL 250-10+00N	0.3	5	
BL 250-LON-3+75E	0.6	10	
BL 250-LON-4+00E	1.4	5	20MESH
BL 250-LON-4+50E	0.3	5	
BL 250-LON-4+75E	0.2	5	
BL 250-LON-5+00E	0.2	5	
BL 250-LON-5+25E	0.2	5	40MESH
BL 250-LON-5+50E	0.4	10	20MESH
BL 250-LON-5+75E	0.4	5	
BL 250-LON-6+00E	0.2	5	
BL 250-LON-6+25E	0.2	5	40MESH
BL 250-L2N-0+50E	0.3	10	
BL 250-L2N-0+75E	0.2	5	
BL 250-L2N-1+00E	0.3	5	20MESH
BL 250-L2N-1+50E	0.3	5	20MESH
BL 250-L2N-2+00E	0.2	10	
BL 250-L2N-2+25E	0.2	5	
BL 250-L2N-2+50E	0.2	5	
BL 250-L2N-2+75E	0.4	5	20MESH
BL 250-L2N-3+50E	0.4	5	20MESH
BL 250-L2N-3+75E	0.3	10	
BL 250-L2N-4+00E	0.3	5	

Certified by ____________________

MIN-EN LABORATORIES LTD.

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705 West 15th Street North Vancouver, B.C. Canada V7M 1T2

PHONE: (604)980-5814 OR (604)988-4524 TELEX: VIA USA 7601067 UC

Certificate of GEOCHEM

Company: CYPRUS MINERALS
Project:
Attention: A.JACKSON/W.TOMPSON

File: 7-939/P3
Date: AUGUST 5/87
Type: SOIL GEOCHEM

We hereby certify the following results for samples submitted.

Sample Number	AG PPM	AU-WET PPB	
BL 250-L2N-4+25E	0.7	10	
BL 250-L2N-4+50E	0.4	5	
BL 250-L2N-4+75E	0.7	5	
BL 250-L2N-5+00E	0.8	10	20MESH
BL 250-L2N-5+25E	0.6	5	
BL 250-L2N-5+50E	0.2	5	
BL 250-L2N-5+75E	0.4	5	
BL 250-L2N-6+00E	0.4	5	
BL 250-L2N-6+25E	0.4	10	
BL 250-L2N-6+50E	0.6	5	40MESH
BL 250-L2N-7+00E	0.4	5	
BL 250-L2N-0+75W	0.5	10	20MESH
BL 250-L2N-2+00W	0.2	5	
BL 250-L2N-9+00W	0.6	5	40MESH
BL 250-L2N-10+25W	0.6	5	40MESH
BL 250-L2N-10+50W	0.3	5	40MESH
BL 250-L2N-11+50W	0.3	10	40MESH
BL 250-L2N-11+75W	0.4	5	20MESH
BL 250-L2N-12+00W	0.6	5	40MESH
BL 250-L2S-0+50E	0.2	10	40MESH
BL 250-L2S-1+00E	0.2	20	
BL 250-L2S-1+50E	0.7	5	20MESH
BL 250-L2S-1+75E	0.5	5	20MESH
BL 250-L2S-2+00E	0.6	5	20MESH
BL 250-L2S-2+25E	0.5	15	20MESH
BL 250-L2S-2+75E	0.3	10	
BL 250-L2S-3+00E	0.4	5	
BL 250-L2S-3+25E	0.2	5	
BL 250-L2S-3+50E	0.4	5	
BL 250-L2S-3+75E	0.2	5	

Certified by ______________

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705 West 15th Street North Vancouver, B.C. Canada V7M 1T2

PHONE: (604)980-5814 OR (604)988-4524 TELEX:VIA USA 7601067 UC

Certificate of GEOCHEM

Company: CYPRUS MINERALS
Project:
Attention: A. JACKSON/W. TOMPSON

File: 7-939/P4
Date: AUGUST 5/87
Type: SOIL GEOCHEM

We hereby certify the following results for samples submitted.

Sample Number	AG PPM	AU-WET PPB	
BL 250-L2S-4+00E	0.7	5	
BL 250-L2S-4+25E	0.2	5	
BL 250-L2S-5+50E	0.4	5	
BL 250-L2S-5+75E	0.6	10	
BL 250-L2S-6+00E	0.4	5	
BL 250-L4S-0+25W	0.5	5	
BL 250-L4S-0+50W	0.2	5	
BL 250-L4S-0+75W	0.6	5	
BL 250-L4S-1+00W	0.7	5	20 MESH
BL 250-L4S-1+50W	0.4	5	
BL 250-L4S-1+75W	0.4	10	40 MESH
BL 250-L4S-2+00W	0.5	5	
BL 250-L4S-2+25W	0.4	5	
BL 250-L4S-2+50W	0.6	10	
BL 250-L4S-3+25W	0.4	5	40 MESH
BL 250-L4S-3+50W	0.2	10	20 MESH
BL 250-L4S-3+75W	0.2	5	
BL 250-L4S-6+00W	0.4	5	
BL 250-L4S-6+25W	0.8	5	20 MESH
BL 250-L4S-6+50W	0.2	5	
BL 250-L4S-6+75W	0.2	25	
BL 250-L4S-7+00W	0.2	15	
BL 250-L4S-7+25W	1.0	50	20 MESH
BL 250-L4S-7+50W	0.2	5	
BL 250-L4S-7+75W	0.2	10	
BL 250-L4S-8+00W	0.6	5	
BL 250-L4S-8+25W	0.2	5	
BL 250-L4S-8+50W	0.2	5	
BL 250-L4S-8+75W	0.3	5	
BL 250-L4S-9+00W	0.4	10	

Certified by ____________

MIN-EN LABORATORIES LTD.

MIN-EN LABORATORIES LTD.

Specialists in Mineral Environments

705 West 15th Street North Vancouver, B.C. Canada V7M 1T2

PHONE: (604)980-5814 OR (604)988-4524 TELEX: VIA USA 7601067 UC

Certificate of GEOCHEM

Company: CYPRUS MINERALS
Project:
Attention: A. JACKSON/W. TOMPSON

File: 7-939/P5
Date: AUGUST 5/87
Type: SOIL GEOCHEM

We hereby certify the following results for samples submitted.

Sample Number	AG PPM	AU-WET PPB	
BL 250-L4S-9+25W	0.4	10	
BL 250-L4S-9+50W	0.3	5	40 MESH
BL 250-L4S-9+75W	0.2	5	
BL 250-L4S-10+00W	0.5	5	
BL 250-L4S-10+25W	0.4	10	40 MESH
BL 250-L4S-10+50W	0.3	35	
BL 250-L4S-10+75W	0.7	5	
BL 250-L4S-11+50W	1.8	10	20 MESH
BL 250-L4S-12+00W	1.4	5	20 MESH
BL 250-L4S-0+25E	0.6	5	
BL 250-L4S-0+50E	0.4	5	
BL 250-L4S-0+75E	0.4	5	
BL 250-L4S-1+00E	0.3	5	
BL 250-L4S-1+25E	0.2	5	
BL 250-L4S-1+50E	0.6	10	20 MESH
BL 250-L4S-1+75E	0.3	40	
BL 250-L4S-2+00E	0.2	5	
BL 250-L4S-2+25E	0.3	5	
BL 250-L4S-2+50E	0.4	5	20 MESH
BL 250-L4S-2+75E	0.2	5	20 MESH
BL 250-L4S-3+00E	0.3	5	
BL 250-L4S-3+25E	0.2	5	20 MESH
BL 250-L4S-3+50E	0.2	5	40 MESH
BL 250-L4S-3+75E	0.2	10	20 MESH
BL 250-L4S-4+50E	0.2	5	20 MESH
BL 250-L4S-5+00E	0.4	5	
BL 250-L4N-0+25W	0.2	5	
BL 250-L4N-0+50W	0.3	5	
BL 250-L4N-0+75W	0.2	5	
BL 250-L4N-1+00W	0.4	5	20 MESH

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Specialists in Mineral Environments
705 West 15th Street North Vancouver, B.C. Canada V7M 1T2

PHONE:(604)980-5814 OR (604)988-4524 TELEX:VIA USA 7601067 UC

Certificate of GEOCHEM

Company:CYPRUS MINERALS
Project:
Attention:A.JACKSON/W.TOMPSON

File:7-939/P6
Date:AUGUST 7/87
Type:SOIL GEOCHEM

We hereby certify the following results for samples submitted.

Sample Number	AG PPM	AU-WET PPB	
BL 250-L4N-1+25W	1.2	5	20MESH
BL 250-L4N-8+50W	0.8	10	20MESH
BL 250-L4N-9+25W	0.6	5	
BL 250-L4N-9+75W	0.2	5	
BL 250-L4N-10+00W	0.4	5	
BL 250-L4N-10+25W	0.3	80	
BL 250-L4N-10+75W	0.4	5	40MESH
BL 250-L4N-11+00W	0.4	5	40MESH
BL 250-L4N-12+00W	0.2	40	
BL 250-L4N-0+25E	0.4	5	
BL 250-L4N-0+50E	0.3	5	
BL 250-L4N-0+75E	0.4	5	
BL 250-L4N-1+00E	0.2	5	
BL 250-L4N-1+25E	0.5	5	
BL 250-L4N-1+50E	0.3	5	
BL 250-L4N-2+00E	0.9	10	40MESH
BL 250-L4N-2+50E	0.6	5	20MESH
BL 250-L4N-2+75E	0.6	5	40MESH
BL 250-L4N-3+00E	0.4	5	
BL 250-L4N-3+25E	0.4	5	40MESH
BL 250-L4N-3+50E	0.2	5	
BL 250-L4N-3+75E	0.6	10	40MESH
BL 250-L4N-4+00E	0.2	5	
BL 250-L4N-4+50E	0.2	5	
BL 250-L4N-4+75E	0.2	5	
BL 250-L4N-5+00E	0.4	10	
BL 250-L4N-5+25E	0.2	5	
BL 250-L4N-5+50E	0.3	5	40MESH
BL 250-L4N-5+75E	0.2	5	
BL 250-L4N-6+00E	0.2	90	

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705 West 15th Street North Vancouver, B.C. Canada V7M 1T2

PHONE: (604)980-5814 OR (604)988-4524 TELEX:VIA USA 7601067 UC

Certificate of GEOCHEM

Company: CYPRUS MINERALS
Project:
Attention: A.JACKSON/W.TOMPSON

File: 7-939/P7
Date: AUGUST 7/87
Type: SOIL GEOCHEM

We hereby certify the following results for samples submitted.

Sample Number	AG PPM	AU-WET PPB	
BL 250-L4N-6+25E	2.6	5	
BL 250-L4N-6+50E	1.2	90	
BL 250-L4N-6+75E	1.4	50	
BL 250-L4N-7+00E	2.0	10	
BL 250-L4N-7+25E	0.6	10	
BL 250-L4N-7+50E	0.7	5	
BL 250-L4N-7+75E	0.8	130	
BL 250-L4N-8+00E	0.8	5	
BL 250-L6S-0+25E	0.3	5	
BL 250-L6S-0+50E	0.4	5	
BL 250-L6S-0+75E	0.6	5	
BL 250-L6S-1+00E	0.8	10	
BL 250-L6S-1+25E	0.4	5	
BL 250-L6S-1+50E	0.7	5	
BL 250-L6S-1+75E	0.7	5	
BL 250-L6S-2+00E	0.5	5	
BL 250-L6S-2+25E	0.4	5	
BL 250-L6S-2+50E	0.6	5	
BL 250-L6S-2+75E	0.9	10	
BL 250-L6S-3+00E	0.4	5	
BL 250-L6S-3+25E	0.3	5	40MESH
BL 250-L6S-3+75E	0.5	5	40MESH
BL 250-L6S-4+00E	0.4	5	
BL 250-L6S-0+25W	1.0	5	40MESH
BL 250-L6S-0+50W	0.8	5	
BL 250-L6S-0+75W	0.9	80	
BL 250-L6S-1+00W	0.7	5	
BL 250-L6S-1+50W	0.7	5	20MESH
BL 250-L6S-3+50W	0.4	5	40MESH
BL 250-L6S-3+75W	0.6	5	40MESH

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Certificate of GEOCHEM

Company: CYPRUS MINERALS
Project:
Attention: A.JACKSON/W.TOMPSON

File: 7-939/P8
Date: AUGUST 6/87
Type: SOIL GEOCHEM

We hereby certify the following results for samples submitted.

Sample Number	AG PPM	AU-WET PPB	
BL 250-L6S-4+00W	0.8	50	
BL 250-L6N-0+50E	1.6	5	20MESH
BL 250-L6N-0+75E	1.5	5	20MESH
BL 250-L6N-1+00E	1.1	10	
BL 250-L6N-1+25E	1.4	5	
BL 250-L6N-1+50E	0.5	5	
BL 250-L6N-1+75E	0.6	5	
BL 250-L6N-2+00E	0.8	5	40MESH
BL 250-L6N-2+25E	1.4	5	40MESH
BL 250-L6N-2+50E	0.7	5	
BL 250-L6N-2+75E	1.6	5	40MESH
BL 250-L6N-3+00E	0.6	10	
BL 250-L6N-3+25E	0.9	30	
BL 250-L6N-3+50E	0.9	5	
BL 250-L6N-3+75E	2.3	5	20MESH
BL 250-L6N-4+00E	2.5	5	40MESH
BL 250-L6N-4+25E	0.9	10	
BL 250-L6N-4+50E	0.4	5	
BL 250-L6N-5+25E	1.5	5	20MESH
BL 250-L6N-5+50E	0.3	5	
BL 250-L6N-5+75E	0.5	5	
BL 250-L6N-6+00E	0.7	5	
BL 250-L6N-0+25W	1.6	15	20MESH
BL 250-L6N-0+50W	1.0	10	
BL 250-L6N-0+75W	0.5	5	
BL 250-L6N-1+00W	0.6	5	
BL 250-L6N-1+25W	1.4	5	20MESH
BL 250-L6N-7+00W	0.9	5	
BL 250-L6N-9+75W	1.4	5	20MESH
BL 250-L6N-10+00W	2.8	5	20MESH

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705 West 15th Street North Vancouver, B.C. Canada V7M 1T2

PHONE: (604)980-5814 OR (604)988-4524 TELEX:VIA USA 7601067 UC

Certificate of GEOCHEM

Company: CYPRUS MINERALS
Project:
Attention: A.JACKSON/W.TOMPSON

File: 7-939/P9
Date: AUGUST 6/87
Type: SOIL GEOCHEM

We hereby certify the following results for samples submitted.

Sample Number	AG PPM	AU-WET PPB	
BL 250-L6N-10+25W	NO SAMPLE		
BL 250-L8S-0+25E	0.8	5	
BL 250-L8S-0+50E	0.5	5	
BL 250-L8S-0+75E	0.2	10	
BL 250-L8S-1+25E	2.3	5	20MESH
BL 250-L8S-1+75E	0.6	5	
BL 250-L8S-2+00E	2.2	5	
BL 250-L8S-2+25E	1.8	10	40MESH
BL 250-L8S-2+50E	2.1	5	20MESH
BL 250-L8S-2+75E	1.0	5	
BL 250-L8S-3+00E	0.3	5	
BL 250-L8S-0+25W	0.4	5	
BL 250-L8S-0+50W	0.3	20	
BL 250-L8S-1+00W	1.4	5	40MESH
BL 250-L8S-1+25W	0.9	5	40MESH
BL 250-L8S-1+50W	0.8	10	40MESH
BL 250-L8S-1+75W	0.5	50	
BL 250-L8S-2+00W	0.9	5	
BL 250-L8N-0+25E	0.6	5	
BL 250-L8N-0+50E	0.7	5	
BL 250-L8N-0+75E	0.7	5	
BL 250-L8N-1+00E	0.3	5	
BL 250-L8N-1+25E	0.6	5	
BL 250-L8N-1+50E	0.5	5	
BL 250-L8N-1+75E	2.0	5	
BL 250-L8N-0+25W	0.4	5	
BL 250-L8N-0+50W	1.1	5	
BL 250-L8N-0+75W	1.2	5	
BL 250-L8N-1+00W	0.7	10	
BL 250-L8N-1+25W	0.9	5	

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Certificate of GEOCHEM

Company:CYPRUS MINERALS
Project:
Attention:A.JACKSON/W.TOMPSON

File:7-939/P10
Date:AUGUST 7/87
Type:SOIL GEOCHEM

We hereby certify the following results for samples submitted.

Sample Number	AG PPM	AU-WET PPB	
BL 250-L8N-1+50W	0.7	5	
BL 250-L8N-3+75W	0.3	10	
BL 250-L8N-4+00W	0.4	5	
BL 250-L8N-4+25W	1.1	5	40MESH
BL 250-L8N-5+25W	0.8	5	40MESH
BL 250-L8N-5+75W	0.3	5	
BL 250-L8N-6+25W	0.6	5	
BL 250-L8N-6+50W	0.7	5	
BL 250-L8N-7+00W	1.0	5	
BL 250-L8N-7+75W	1.7	10	
BL 250-L8N-8+25W	1.3	10	
BL 250-L8N-8+75W	0.8	5	
BL 250-L8N-9+00W	1.0	5	
BL 250-L8N-9+25W	0.7	5	
BL 250-L8N-9+50W	1.1	5	
BL 250-L8N-9+75W	1.0	5	
BL 250-L8N-10+00W	0.6	5	
BL 250-L8N-10+25W	0.6	10	
BL 250-L10N-0+25W	0.9	20	
BL 250-L10N-0+50W	0.8	5	
BL 250-L10N-0+75W	0.4	5	
BL 250-L10N-1+00W	0.6	25	
BL 250-L10N-1+25W	1.0	10	
BL 250-L10N-1+50W	0.7	260	
BL 250-L10N-1+75W	0.8	5	
BL 250-L10N-2+00W	1.0	5	
BL 250-L10N-2+25W	0.6	5	
BL 250-L10N-2+50W	0.9	5	
BL 250-L10N-2+75W	0.5	5	
BL 250-L10N-3+25W	0.8	130	

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705 West 15th Street North Vancouver, B.C. Canada V7M 1T2

PHONE: (604)980-5814 OR (604)988-4524 TELEX:VIA USA 7601067 UC

Certificate of GEOCHEM

Company:CYPRUS MINERALS
Project:
Attention:A.JACKSON/W.TOMPSON

File:7-939/P11
Date:AUGUST 7/87
Type:SOIL GEOCHEM

We hereby certify the following results for samples submitted.

Sample Number	AG PPM	AU-WET PPB	
BL 250-L10N-3+50W	1.1	5	
BL 250-L10N-3+75W	0.7	10	
BL 250-L10N-4+00W	0.9	5	
BL 250-L10N-4+25W	0.5	10	
BL 250-L10N-4+50W	0.7	5	
BL 250-L10N-5+50W	0.8	5	
BL 250-L10N-5+75W	1.0	5	
BL 250-L10N-6+00W	1.2	5	
BL 250-L10N-6+25W	0.6	5	
BL 250-L10N-6+75W	0.7	5	
BL 250-L10N-7+00W	0.9	5	
BL 250-L10N-7+50W	0.5	5	
BL 250-L10N-8+50W	0.6	250	
BL 250-L10N-8+75W	0.3	5	
BL 250-L10N-9+00W	0.4	5	
BL 250-L10N-9+25W	0.3	5	
BL 250-L10N-10+75W	1.5	5	
BL 250-L10N-11+25W	0.9	10	
BL 250-L10N-11+50W	1.1	10	
BL 250-L2S-1+50W	1.8	5	20MESH
BL 250-L2S-1+75W	0.4	5	
BL 250-L2S-2+00W	0.7	5	
BL 250-L2S-2+25W	0.8	10	
BL 250-L2S-3+25W	1.5	10	20MESH
BL 250-L2S-5+25W	1.4	5	
BL 250-L2S-6+25W	1.2	5	
BL 250-L2S-8+00W	1.1	10	
BL 250-L2S-8+25W	1.3	5	40MESH
BL 250-L2S-9+50W	1.5	5	
BL 250-L2S-9+75W	0.6	15	

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705 West 15th Street North Vancouver, B.C. Canada V7M 1T2

PHONE:(604)980-5814 OR (604)988-4524 TELEX:VIA USA 7601067 UC

Certificate of GEOCHEM

Company:CYPRUS MINERALS
Project:
Attention:W.D.TOMPSON

File:7-985/P1
Date:AUGUST 20/87
Type:SOIL GEOCHEM

We hereby certify the following results for samples submitted.

Sample Number		AG PPM	AU-WET PPB
BL2 59+25S		0.4	5
BL2 59+50S		0.9	10
BL2 59+75S		0.7	5
BL2 60+00S		0.6	15
BL2 60+25S		0.9	5
BL2 60+50S		0.4	460
BL2 60+75S	MISSING		
BL2 61+00S	MISSING		
BL2 61+25S		0.8	10
BL2 61+50S		0.3	5
BL2 61+75S		0.5	5
BL2 62+00S		1.1	15
BL2 62+25S		0.6	5
BL2 62+50S		0.8	5
BL2 62+75S		1.7	10
BL2 63+00S		0.5	5
BL2 L57S 0+50W		1.1	5
BL2 L57S 0+75W		1.0	5
BL2 L57S 1+00W		0.7	20
BL2 L57S 1+25W		0.6	5
BL2 L57S 1+50W		0.9	5
BL2 L57S 1+75W		1.1	10
BL2 L57S 2+00W		0.8	5
BL2 L57S 2+25W		0.9	90
BL2 L57S 2+50W		0.9	10
BL2 L57S 2+75W		0.7	5
BL2 L57S 3+00W		0.5	30
BL2 L57S 3+25W	MISSING		
BL2 L57S 3+50W		0.7	5
BL2 L57S 0+25E		0.3	5

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705 West 15th Street North Vancouver, B.C. Canada V7M 1T2

HONE:(604)980-5814 OR (604)988-4524 TELEX:VIA USA 7601067 UC

Certificate of GEOCHEM

Company:CYPRUS MINERALS
Project:
Attention:W.D.TOMPSON

File:7-985/P2
Date:AUGUST 20/87
Type:SOIL GEOCHEM

We hereby certify the following results for samples submitted.

Sample Number	AG PPM	AU-WET PPB
BL2 L57S 0+50E	0.7	5
BL2 L57S 0+75E	0.5	10
BL2 L57S 1+00E	0.7	5
BL2 L57S 1+25E	0.8	5
BL2 L57S 1+50E	0.9	5
BL2 L57S 1+75E	0.4	10
BL2 L57S 2+00E	0.7	5
BL2 L57S 2+25E	0.3	5
BL2 L57S 2+50E	0.4	5
BL2 L57S 2+75E	0.3	5
BL2 L57S 3+00E	0.6	10
BL2 L57S 3+25E	0.5	5
BL2 L57S 3+50E	0.4	390
BL2 L57S 3+75E	1.4	5
BL2 L57S 4+00E	0.3	5
BL2 L57S 4+25E	0.5	5
BL2 L57S 4+50E	0.5	5
BL2 L57S 4+75E	0.4	5
BL2 L57S 5+00E MISSING		
BL2 L57S 5+25E	0.6	10
BL2 L57S 5+50E	0.6	5
BL2 L57S 5+75E	0.4	5
BL2 L57S 6+00E	0.3	5
BL2 L57S 6+25E	0.8	5
BL2 L57S 6+50E	0.6	5
BL2 L57S 6+75E	1.1	190
BL2 L57S 7+00E	0.7	5
BL2 L59S 0+25E	0.9	5
BL2 L59S 0+50E	0.7	5
BL2 L59S 0+75E	1.5	30

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705 West 15th Street North Vancouver, B.C. Canada V7M 1T2

PHONE:(604)980-5814 OR (604)988-4524 TELEX:VIA USA 7601067 UC

Certificate of GEOCHEM

Company:CYPRUS MINERALS
Project:
Attention:A.JACKSON/W.D.TOMPSON

File:7-985/P3
Date:AUGUST 19/87
Type:SOIL GEOCHEM

We hereby certify the following results for samples submitted.

Sample Number	AG PPM	AU-WET PPB	
BL2 L59S 1+00E	0.6	5	
BL2 L59S 1+25E	0.5	5	
BL2 L59S 1+75E	0.7	30	
BL2 L59S 2+00E	1.0	5	40MESH
BL2 L59S 2+25E	0.7	10	
BL2 L59S 2+50E	0.3	5	
BL2 L59S 2+75E	0.6	5	
BL2 L59S 3+00E	0.8	5	
BL2 L59S 3+25E	0.6	10	
BL2 L59S 3+50E	0.7	5	
BL2 L59S 3+75E	0.6	15	
BL2 L59S 4+25E	1.0	5	
BL2 L59S 4+50E	0.6	10	
BL2 L59S 4+75E	0.9	5	
BL2 L59S 5+00E	0.7	5	
BL2 L59S 5+25E	0.5	5	
BL2 L59S 5+75E	0.3	10	
BL2 L59S 6+00E	0.4	5	
BL2 L59S 6+25E	0.3	25	
BL2 L59S 6+50E	0.6	5	
BL2 L59S 6+75E	0.8	5	
BL2 L59S 7+00E	0.6	5	
BL2 L61S 0+25W	0.5	10	
BL2 L61S 0+50W	0.8	5	
BL2 L61S 0+75W	0.4	5	
BL2 L61S 1+00W	0.4	50	
BL2 L61S 1+25W	0.3	5	
BL2 L61S 1+50W	1.2	10	
BL2 L61S 2+00W	0.9	5	40MESH
BL2 L61S 2+25W	0.5	5	

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705 West 15th Street North Vancouver, B.C. Canada V7M 1T2

PHONE:(604)980-5814 OR (604)988-4524 TELEX:VIA USA 7601067 UC

Certificate of GEOCHEM

Company:CYPRUS MINERALS
Project:
Attention:A.JACKSON/W.D.TOMPSON

File:7-985/P4
Date:AUGUST 19/87
Type:SOIL GEOCHEM

We hereby certify the following results for samples submitted.

Sample Number	AG PPM	AU-WET PPB	
BL2 L61S 2+50W	0.7	5	
BL2 L61S 2+75W	0.6	10	40MESH
BL2 L61S 3+00W	0.6	10	
BL2 L61S 3+25W	0.7	5	40MESH
BL2 L61S 3+50W	0.4	5	
BL2 L61S 3+75W	0.3	5	
BL2 L61S 4+00W	0.7	5	
BL2 L61S 4+25W	0.3	5	
BL2 L61S 4+50W	0.6	10	
BL2 L61S 4+75W	1.0	5	
BL2 L61S 5+00W	0.6	5	
BL2 L61S 5+25W	0.4	5	40MESH
BL2 L61S 5+50W	1.3	5	40MESH
BL2 L61S 5+75W	0.7	10	
BL2 L61S 0+50E	0.9	5	
BL2 L61S 0+75E	0.6	5	40MESH
BL2 L61S 1+00E	1.8	5	40MESH
BL2 L61S 1+25E	0.7	10	
BL2 L61S 1+50E	0.6	5	
BL2 L61S 1+75E	0.4	10	
BL2 L61S 2+00E	0.5	5	
BL2 L61S 2+25E	0.5	5	
BL2 L61S 2+50E	1.1	5	
BL2 L61S 2+75E	0.8	10	
BL2 L61S 3+00E	1.2	10	
BL2 L61S 3+50E	1.0	5	
BL2 L61S 3+75E	0.7	5	
BL2 L61S 4+00E	0.6	5	
BL2 L61S 4+25E	1.0	5	
BL2 L61S 4+50E	0.9	10	

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705 West 15th Street North Vancouver, B.C. Canada V7M 1T2

PHONE:(604)980-5814 OR (604)988-4524 TELEX:VIA USA 7601067 UC

Certificate of GEOCHEM

Company:CYPRUS MINERALS
Project:
Attention:W.D.TOMPSON

File:7-985/P5
Date:AUGUST 20/87
Type:SOIL GEOCHEM

We hereby certify the following results for samples submitted.

Sample Number	AG PPM	AU-WET PPB	
BL2 L61S 4+75E	0.6	5	
BL2 L61S 5+00E	0.6	5	
BL2 L61S 5+25E	0.4	15	
BL2 L61S 5+50E	0.7	10	
BL2 L61S 5+75E	0.5	5	
BL2 L61S 6+00E	0.7	5	
BL2 L61S 6+25E	0.8	10	
BL2 L61S 6+50E	0.7	5	
BL2 L61S 6+75E	0.6	5	
BL2 L61S 7+00E	0.6	5	
BL2 L63S 0+25W	0.4	10	
BL2 L63S 0+50W	0.8	10	
BL2 L63S 0+75W	1.0	5	
BL2 L63S 1+00W	0.8	5	
BL2 L63S 1+25W	1.1	5	
BL2 L63S 1+50W	0.4	5	
BL2 L63S 1+75W	0.3	5	
BL2 L63S 2+00W	0.9	10	
BL2 L63S 2+25W	0.7	5	40MESH
BL2 L63S 2+50W	1.0	5	
BL2 L63S 2+75W	0.9	10	
BL2 L63S 3+00W	0.8	5	
BL2 L63S 3+25W	0.6	5	
BL2 L63S 3+50W	0.8	5	
BL2 L63S 3+75W	0.7	10	
BL2 L63S 4+00W	0.9	5	
BL2 L63S 4+25W	1.0	5	
BL2 L63S 4+50W	1.1	5	
BL2 L63S 4+75W	1.6	10	40MESH
BL2 L63S 5+00W	0.4	5	

Certified by ______

MIN-EN LABORATORIES LTD.

MIN-EN LABORATORIES LTD.
Specialists in Mineral Environments
705 West 15th Street North Vancouver, B.C. Canada V7M 1T2

PHONE:(604)980-5814 OR (604)988-4524 TELEX:VIA USA 7601067 UC

Certificate of GEOCHEM

Company:CYPRUS MINERALS
Project:
Attention:W.D.TOMPSON

File:7-985/P6
Date:AUGUST 20/87
Type:SOIL GEOCHEM

We hereby certify the following results for samples submitted.

Sample Number	AG PPM	AU-WET PPB
BL2 L63S 5+25W	0.5	10
BL2 L63S 5+50W	0.7	5
BL2 L63S 5+75W	1.0	10
BL2 L63S 6+00W	0.3	5
BL2 L63S 6+25W	0.8	5
BL2 L63S 6+50W	0.9	5
BL2 L63S 6+75W	0.7	10
BL2 L63S 7+00W	0.7	5
BL2 L63S 0+25E	1.1	5
BL2 L63S 0+50E	0.6	5
BL2 L63S 0+75E	0.6	10
BL2 L63S 1+00E	0.6	5
BL2 L63S 1+25E	0.9	5
BL2 L63S 1+50E	0.8	5
BL2 L63S 1+75E	0.7	5
BL2 L63S 2+00E	1.4	5
BL2 L63S 2+25E	0.7	10
BL2 L63S 2+50E	0.8	5
BL2 L63S 2+75E	1.0	5
BL2 L63S 3+00E	0.6	5
BL2 L63S 3+25E	0.8	10
BL2 L63S 3+50E	1.1	5
BL2 L63S 3+75E	1.0	5
BL2 L63S 4+00E	0.7	5
BL2 L63S 4+25E	0.7	5
BL2 L63S 4+50E	0.4	5
BL2 L63S 4+75E	0.5	10
BL2 L63S 5+00E	0.3	5
BL2 L63S 5+25E	0.6	5
BL2 L63S 5+50E	0.8	5

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Specialists in Mineral Environments
705 West 15th Street North Vancouver, B.C. Canada V7M 1T2

PHONE: (604)980-5814 OR (604)988-4524 TELEX: VIA USA 7601067 UC

Certificate of GEOCHEM

Company: CYPRUS MINERALS
Project:
Attention: W.D.TOMPSON

File: 7-985/P7
Date: AUGUST 20/87
Type: SOIL GEOCHEM

We hereby certify the following results for samples submitted.

Sample Number	AG PPM	AU-WET PPB	
BL2 L63S 5+75E	0.6	5	
BL2 L63S 6+50E	0.7	15	
BL2 L63S 6+75E	1.0	5	40MESH
BL2 L63S 7+00E	0.9	5	
BL2 L65S 0+25E	0.6	5	
BL2 L65S 0+50E	0.5	5	
BL2 L65S 0+75E	0.8	10	
BL2 L65S 1+00E	0.7	5	
BL2 L65S 1+25E	0.5	5	
BL2 L65S 1+50E	0.8	330	
BL2 L65S 1+75E	1.3	5	
BL2 L65S 2+00E	1.1	10	
BL2 L65S 2+25E	0.8	5	
BL2 L65S 2+50E	1.9	5	
BL2 L65S 2+75E	1.4	5	
BL2 L65S 3+00E	0.9	10	
BL2 L65S 3+25E	1.1	5	
BL2 L65S 3+50E	0.7	5	
BL2 L65S 3+75E	1.0	5	
BL2 L65S 4+00E	0.9	10	
BL2 L65S 4+25E	0.6	5	
BL2 L65S 4+50E	1.0	5	
BL2 L65S 4+75E	1.2	5	
BL2 L65S 5+00E	0.9	10	
BL2 L65S 5+25E	1.0	5	
BL2 L65S 5+50E	1.3	5	
BL2 L65S 5+75E	0.7	5	
BL2 L65S 6+00E	1.1	10	
BL2 L65S 6+25E	0.8	5	
BL2 L65S 6+50E	1.8	5	

Certified by ________________

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Specialists in Mineral Environments

705 West 15th Street North Vancouver, B.C. Canada V7M 1T2

PHONE: (604)980-5814 OR (604)988-4524 TELEX:VIA USA 7601067 UC

Certificate of GEOCHEM

Company: CYPRUS MINERALS
Project:
Attention: W.D.TOMPSON

File: 7-985/P8
Date: AUGUST 20/87
Type: SOIL GEOCHEM

We hereby certify the following results for samples submitted.

Sample Number	AG PPM	AU-WET PPB
BL2 L65S 6+75W	1.0	5
BL2 L65S 7+00W	0.4	15
BL2 L65S 7+25W	0.5	5
BL2 L65S 7+50W	1.6	10
BL2 L65S 7+75W	0.5	5
BL2 L65S 8+00W	1.0	5
BL2 L65S 0+25W East	0.7	5
BL2 L65S 0+50W ←	0.3	5
BL2 L65S 0+75W ←	0.3	20
BL2 L65S 1+00W ←	0.4	5
BL2 L65S 1+25W a/c	0.5	5
BL2 L65S 1+50W ↓	0.3	10
BL2 L65S 1+75W	0.7	5
BL2 L65S 2+00W	0.6	5
BL2 L65S 2+25W	0.4	5
BL2 L65S 2+50W	0.4	5
BL2 L65S 2+75W	0.3	10
BL2 L65S 3+00W	0.6	35
BL2 L65S 3+25W	1.6	5
BL2 L65S 3+50W	0.4	5
BL2 L65S 3+75W	0.5	10
BL2 L65S 4+00W	0.3	5
BL2 L65S 4+25W	0.6	5
BL2 L65S 4+50W	0.2	5
BL2 L65S 4+75W	0.7	5
BL2 L65S 5+00W	0.9	5
BL2 L65S 5+25W	0.8	10
BL2 L65S 5+50W	1.0	5
BL2 L65S 5+75W	0.5	25
BL2 L65S 6+00W	0.6	5

Certified by ______________________

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705 West 15th Street North Vancouver, B.C. Canada V7M 1T2

PHONE:(604)980-5814 OR (604)988-4524 TELEX:VIA USA 7601067 UC

Certificate of GEOCHEM

Company:CYPRUS MINERALS
Project:
Attention:W.D.TOMPSON

File:7-985/P9
Date:AUGUST 20/87
Type:SOIL GEOCHEM

We hereby certify the following results for samples submitted.

Sample Number	AG PPM	AU-WET PPB	
BL2 L65S 6+25W	0.6	5	
BL2 L65S 6+50W	1.2	100	
BL2 L67S 0+25W	0.8	5	
BL2 L67S 0+50W	0.7	5	
BL2 L67S 0+75W	0.6	5	
BL2 L67S 1+00W	0.3	5	
BL2 L67S 1+25W	0.9	5	
BL2 L67S 1+50W	1.0	5	40MESH
BL2 L67S 1+75W	1.4	5	
BL2 L67S 2+00W	0.8	5	
BL2 L67S 2+25W	0.9	5	40MESH
BL2 L67S 2+50W	1.1	10	
BL2 L67S 2+75W	1.1	5	
BL2 L67S 3+00W	1.5	5	
BL2 L67S 0+25E	0.5	5	
BL2 L67S 0+50E	0.3	5	
BL2 L67S 0+75E	1.6	5	
BL2 L67S 1+00E	0.3	5	
BL2 L67S 1+25E	1.8	5	
BL2 L67S 1+50E	2.2	10	
BL2 L67S 1+75E	1.2	5	
BL2 L67S 2+25E	0.6	5	
BL2 L67S 2+50E	0.9	5	
BL2 L67S 2+75E	0.6	5	
BL2 L67S 3+00E	0.5	5	
BL2 L67S 3+25E	0.5	5	40MESH
BL2 L67S 3+50E	0.4	10	
BL2 L67S 3+75E	0.6	5	
BL2 L67S 4+00E	1.2	850	
BL2 L67S 4+25E	0.3	5	

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705 West 15th Street North Vancouver, B.C. Canada V7M 1T2

PHONE:(604)980-5814 OR (604)988-4524 TELEX:VIA USA 7601067 UC

Certificate of GEOCHEM

Company:CYPRUS MINERALS
Project:
Attention:W.D.TOMPSON

File:7-985/P10
Date:AUGUST 20/87
Type:SOIL GEOCHEM

We hereby certify the following results for samples submitted.

Sample Number	AG PPM	AU-WET PPB	
BL2 L67S 4+50E	0.4	5	
BL2 L67S 4+75E	1.9	5	
BL2 L67S 5+00E	3.0	5	
BL2 L67S 5+25E	0.7	5	
BL2 L67S 5+50E	0.3	5	
BL2 L67S 5+75E	0.7	10	
BL2 L67S 6+00E	1.0	5	
BL2 L67S 6+25E	0.5	5	
BL2 L67S 6+50E	1.4	5	
BL2 L67S 6+75E	1.1	5	
BL2 L67S 7+00E	5.9	5	40MESH
BL2 L69S 0+25W	0.6	5	
BL2 L69S 0+50W	1.1	10	
BL2 L69S 0+75W	0.6	5	
BL2 L69S 1+00W	0.3	5	40MESH
BL2 L69S 1+25W	0.3	5	
BL2 L69S 1+50W	0.2	5	
BL2 L69S 1+75W	0.5	10	
BL2 L69S 2+00W	0.6	5	
BL2 L69S 2+25W	0.6	5	
BL2 L69S 2+50W	0.7	5	
BL2 L69S 2+75W	0.6	5	
BL2 L69S 3+00W	0.3	5	
BL2 L69S 0+25E	0.5	5	
BL2 L69S 0+50E	0.6	5	
BL2 L69S 0+75E	1.1	5	40MESH
BL2 L69S 1+00E	0.6	5	
BL2 L69S 1+25E	0.7	10	
BL2 L69S 1+50E	0.9	5	
BL2 L69S 1+75E	0.8	5	

Certified by [signature]

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705 West 15th Street North Vancouver, B.C. Canada V7M 1T2

PHONE: (604)980-5814 OR (604)988-4524 TELEX:VIA USA 7601067 UC

Certificate of GEOCHEM

Company:CYPRUS MINERALS
Project:
Attention:W.D.TOMPSON

File:7-985/P11
Date:AUGUST 20/87
Type:SOIL GEOCHEM

We hereby certify the following results for samples submitted.

Sample Number	AG PPM	AU-WET PPB	
BL2 L69S 2+00E	0.7	5	
BL2 L69S 2+25E	0.6	5	
BL2 L69S 2+50E	0.3	5	
BL2 L69S 2+75E	0.6	10	
BL2 L69S 3+00E	0.8	5	
BL2 L69S 3+25E	0.7	5	
BL2 L69S 3+50E	0.7	5	
BL2 L69S 3+75E	1.1	5	
BL2 L69S 4+00E	0.5	5	
BL2 L69S 4+25E	0.7	5	
BL2 L69S 4+50E	0.9	5	
BL2 L69S 4+75E	0.9	5	40MESH
BL2 L69S 5+00E	0.6	10	
BL2 L69S 5+25E	1.2	5	
BL2 L69S 5+50E	0.9	5	
BL2 L69S 5+75E	1.0	5	
BL2 L69S 6+00E	0.6	5	
BL2 L69S 6+25E	1.4	5	40MESH
BL2 L69S 6+50E	0.7	5	
BL2 L69S 6+75E	1.0	10	
BL2 L69S 7+00E	0.8	5	
BL3 L5+00S 7+50E	1.2	5	
BL3 L5+00S 7+60E	1.3	5	
BL3 L5+00S 7+70E	0.6	10	
BL3 L5+00S 7+80E	0.7	5	
BL3 L5+00S 7+90E	0.7	5	
BL3 L5+00S 8+00E	0.9	10	
BL3 L5+00S 8+10E	0.9	5	
BL3 L5+00S 8+20E	1.2	10	
BL3 L5+00S 8+30E	0.4	5	

Certified by ____________

MIN-EN LABORATORIES LTD.

CYPRUS METALS CANADA
GEOPHYSICAL REPORT ON AN
INDUCED POLARIZATION SURVEY
TOODOGGONE PROJECT
OMINECA MINING DIVISION
LATITUDE: 57°35'N LONGITUDE: 127°15'W
NTS 94E/11

AUTHOR: Markus Seywerd, B.Sc.,
Geophysicist

DATE OF WORK: Aug.30 - Sept.5,1987
DATE OF REPORT: December 9,1987

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Markus Seywerd, B.Sc., ...	6
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ILLUSTRATIONS

FIGURE 1 - Plan Map. Line 1200N-1400N apparent resistivity

FIGURE 2 - Plan Map. Line 1200N-1400N apparent chargeability

FIGURE 3-16 - Multipole Induced Polarization gradient resolution sections.

INTRODUCTION:

During the month of August 1987 White Geophysical Inc. was contracted by **Cyprus Metals Canada** to conduct a Multipole - gradient Induced Polarization survey on their **Toodoggone project**. In part, this survey was conducted over known gold bearing silicious zones in order to test the response of this system, and in part, a reconnaissance survey was conducted. Approximately 10 kilometres of line were surveyed with a=25 and 1 kilometre of line was surveyed at a=12.5.

MULTIPOLE INDUCED POLARIZATION SURVEY

The multipole induced polarization method is a technique which exploits the rapid signal acquisition and processing capabilities available with current micro computer technology. With this technique the potential field information is obtained through a multiconductor cable having 36 takeouts at 25 metre intervals. The cable is presently configured as up to six end and position interchangeable cables of 150 metre length. The takeouts are addressed by the 40 channel multiplexer assembly in a specially configured HP-3497A data acquisition system as 25 metre to 275 metre dipoles. The data acquisition system is driven by a HP-85 computer, allowing the data to be stacked in the computer for a number of cycles at full precision until a criteria is reached. Ten windows on the secondary voltage are compiled, as well as the primary voltage information. Time zero is sensed by direct reference to the transmitter timing circuitry. The cable is scanned simultaneously in groups of five dipoles and the decay curves presented graphically for acceptance and logging or rejection and rescan by the operator. The data is logged on digital tape cartridges and is readily accessed in the field in order to produce pseudo-sections. These tapes are read by a HP-9845 computer for further processing and production of final report ready sections.

The primary field power is provided by a Huntec MK IV 2.5 kw transmitter operated in time domain mode which is driven by a 400 Hz, 120 volt three phase motor generator. The transmitted signal is an alternate cycle reversing current pulse of two second on and two second off time. The current is introduced into the ground through two current electrodes for each scan of the potential cable. By scanning the cable for each of several current stake positions both along the cable and off the ends of the cable a strong measure of redundancy of coverage of a given depth point is assured. The stacking of this multiple scan information in the computer results in an improved determination of the geoelectric section.

The apparent resistivity is obtained from the ratio of the primary voltage measured on the potential dipole during the current on part of the cycle to the current flowing through the current electrodes. A geometric factor is computed from the electrode locations to arrive at the apparent resistivity, measured in ohm-metres.

The apparent chargeability is calculated from the ten secondary voltage windows as the area under the secondary decay curve and is measured in milliseconds. The integration time is 1100ms with a delay of 200ms.

DISCUSSION OF RESULTS:

The data is presented in resolution section form in Figures 3-17 and a representative sample of the three detailed lines is plotted in plan map form in Figures 1 and 2. As with most of the previous data we have collected in the Toodoggone, the chargeability response is of little help in delineating the silicified zones due to low sulphide content. There appear to be chargeability highs on the flanks of some of the high resistivity zones. Experience in the Toodoggone has lead us to believe these highs are sourced in the conductive clay mineralization found in the alteraton halo of the silicified zones.

The detailed survey on lines 1200N, 1300N and 1400N delineated two high resistivity zones. Zone A has a strike length of 200 metres and is centred at 200W on line 1300N. Zone B has a strike length of 100 metres and is intercepted at 130W on line 1300N and 60W on line 1200N. Zone B may be a splay of Zone A and may amalgamate with zone A somewhere between lines 1300N and 1400N. This behavior of zones is common in the Toodoggone area of British Columbia and may be the source of the very strong character of Zone A on line 1400N.

Two Zones present themselves on lines 1400S and 1200S. Zone C, a narrow well defined zone centred at 650E on line 1400S, becomes wider and less well defined on line 1200S. Zone D is a broader zone on line 1400S and becomes narrow and well defined on line 1200S. It is centred at 170W on line 1200S. The signatures of both of these zones are typical of the silicified zones encountered in the Toodoggone.

Three zones were intersected on line 1800S. Zone E is a strong zone at 60W, Zones F and G are separate by a distinct low resisitivity zone typical of clay alteration. Zone F is centred at 650E and Zone G at 750E.

Line 4400S is a 5 kilometre long reconnaissance line which was run in an attempt to locate new silicified zones. Nine possible silicified zones were encountered labelled from west to east H-P.

Zone H, centred at 0E, is associated with a noisy environment compared with the typical Toodoggone background response. Along with abrupt changes in the apparent resistivity there is a sizeable chargeability high centred at 50E flanking zone H. Zone H is most likely sourced in a silicified zone with highly altered flanks. Zone I is a broad zone with a low apparent resistivity zone in its center. It may actually be two narrow subzones centred at 650E and 760E with clay alteration inbetween.

Zone J is a distinct narrow zone centred at 1340E. On the same scan we see Zone K which has more noise associated with it. Zone K is centred at approximately 1600E.

To the east of Zone K is zone L which appears to be of a similar nature to Zone J. This zone is centred at approximately 2130E. The eastern portion of this scan is noisy compared to the majority of the data but in it we are able to pick out Zones M and N. Zone N centred at 2530E is the stronger of the two.

In Figure 13 two zones are apparent. Zone O and Zone P. Zone O centred at 2850E is a zone of moderate strength but Zone P centred at 3130E is a very pronounced anomaly typical of the Toodoggone silicified zones.

No anomalous zones are apparent in the last scan, shown in Figure 14. A strong gradient is, however, present. This gradient is sourced in the geometry of the eastern current electrode location. With the current stake being next to a cliff, no current flows toward the east into free space. This results in a perturbed current flow, which invalidates the geometric factors used to calculate the apparent resistivity, and induces a resistivity gradient into the data not sourced in any real change of rock type.

CONCLUSIONS AND RECOMMENDATIONS:

The Multipole Induced polarization survey was very successful in delineating several zones of high apparent resistivity. All of these zones warrant further investigation. These zones should all be trenched with a backhoe to determine in what they are sourced. Experience in the Toodoggone has shown that the silicious zones vary greatly in gold content along strike making it prudent to sample along the entire strike length. If this trenching proves successful in locating the silicified zones a follow-up IP survey can be run to guide trenching and delineate further trenching/drilling targets along strike.

Respectfully Submitted,

Markus Seywerd, B.Sc.,
Geophysicist

STATEMENT OF QUALIFICATIONS

NAME: SEYWERD, Markus B., B.Sc.

PROFESSION: Geophysicist

EDUCATION: University of British Columbia - B.Sc., Mathematics

EXPERIENCE: Three years of summer field work with Noranda Exploration Company Ltd. in British Columbia, Northwest Territories and Yukon Territories.

Two year Geophysicist with White Geophysical Inc. with work in British Columbia, Saskatchewan and Yukon Territories.

COST BREAKDOWN

Personnel	Dates	Wages/Diam.	Total
B.Acheson	Aug.30-Sept.7/87	325	$2,275.00
M.Niedzwiecki	Aug.30-Sept.7/87	275	1,925.00
P.Judson	Aug.30-Sept.7/87	250	1,750.00
L.Morgan	Aug.30-Sept.7/87	250	1,750.00

Instrumentation 7 days @ $200/day	1,400.00
Mob. and demob.	1,400.00
Computer plots and drafting, reproduction	1,000.00
Interpretation and report	1,000.00
Total	$12,500.00

HP-85A Specifications

OPERATING SYSTEM

ROM .... 32K bytes

USER READ/WRITE MEMORY

Standard .... 16K bytes
Expansion memory module .... 16K bytes

DYNAMIC RANGE

Real precision: -9.99999999999E499 to -1E-499, 0 and 1E-499 to 9.99999999999E499

Short precision: -9.9999E99 to -1E-99, 0, 1E-99 to 9.9999E99

Integer precision: -99999 to 99999

BUILT-IN FUNCTIONS

Mathematical and trignometric functions are included in the following table with average execution times in msec.

Absolute (ABS)	0.83
Fractional part (FP)	1.01
Integer part (IP)	2.56
Maximum (MAX)	6.42
Minimum (MIN)	6.19
Modules (MOD)	2.21
ln (LOG)	32.11
log (LGT)	26.63
e^x (EXP)	24.54
Raise to power (Y↑X)	43.92
Random number (RND)	3.54
Sign (SGN)	0.90
Square root (SQR)	8.74
Sine (SIN)	45.62
Cosine (COS)	45.69
Tangent (TAN)	27.27
Arcsine (ASN)	43.23
Arccosine (ACS)	43.98
Arctangent (ATN)	22.76
Cosecant (CSC)	51.68
Secant (SEC)	51.72
Cotangent (COT)	27.29
+	1.08
−	1.12
÷	5.92
*	2.85
Ceiling (CEIL)	2.91
Floor (FLOOR)	3.33

Built-in Operators
Logic: AND, OR, NOT, EXOR
Relational: =, >, <, <=, >=, <> (or #)

CRT DISPLAY

Size .... 127 mm (5 in.) diagonal
Capacity:
Alphanumeric ...... 16 lines × 32 characters
Graphics .... 192 × 256 dots
Scrolling capacity ..... 64 lines
Character set .... 256 characters; set of 128 + same set underscored
Character font .... 5 × 7-dot matrix
Intensity .... adjustable to 32 ft-lamberts
Cursor .... underline

CLOCK AND TIMERS

Time is maintained as seconds since midnight, along with year and day in year. Three timers can be programmed to generate individual interrupts periodically, at intervals from 0.5 msec to 99,999,999 msec (1.16 days).

BEEPER

The beeper is programmable with parameters for duration and tone. The frequency range is approximately 0 to 4,575 Hz.

OPERATING REQUIREMENTS

Source .... 115 Vac nominal (90-127 Vac)
230 Vac nominal (200-254 Vac)
Line frequency .... 50-60 Hz
Consumption ..... 40 watts nominal
HP-85A operating temperature .... 5° to 40°C (40° to 105°F)
HP-85A storage temperature .... -40° to 65°C (-40° to 150°F)
HP-83A operating temperature .... 0° to 55°C (32° to 131°F)
HP-83A storage temperature .... -40° to 75°C (-40° to 167°F)
Ambient humidity .... 5% to 80% at 40°C

SIZE AND WEIGHT

Height .... 15.9 cm (6.3 in.)
Width .... 41.9 cm (16.5 in.)
Depth .... 45.2 cm (17.8 in.)
HP-85A Weight:
net .... 9.1 kg (20 lbs)
shipping .... 16.8 kg (37 lbs)
HP-83A Weight:
net .... 7.3 kg (16 lbs)
shipping .... 15.0 kg (33 lbs)

BASIC FUNCTIONS AND STATEMENTS

System Functions

ABS—Absolute value of the numeric expression.
ACS—Principal value (1st or 2nd quadrant) of the arccosine of the numeric expression in the current angular units.
ASN—Principal value (1st or 4th quadrant) of the arcsine of the numeric expression in the current angular units.
ATN—Principal value (1st or 4th quadrant) of the arctangent of the numeric expression in the current angular units.
ATN2—Arctangent of Y/X in proper quadrant.
CEIL—Smallest integer greater than or equal to the numeric expression.
COS—Cosine.
COT—Cotangent.
CSC—Cosecant.
DATE—Julian date in the format YYDDD, assuming system timer was set.
DTR—Converts the value of the numeric expression from degrees to radians.
EPS—A constant equal to the smallest positive real precision number, 1E-499.
ERRL—Line number of latest error.
ERRN—Error number of latest error.
EXP—Value of Napierian e raised to the power of the computed expression.
FLOOR—Largest integer less than or equal to the evaluated expression.
FP—Fractional part of the evaluated expression.
INF—A constant equal to the largest real number possible, 9.99999999999E499.
INT—Largest integer less than or equal to the evaluated expression (equivalent to FLOOR).
IP—Integer part of the numeric expression.
LGT—Common logarithm (base 10) of a positive numeric expression.
LOG—Natural logarithm (base e) of a positive numeric expression.
MAX—Larger of two values.
MIN—Smaller of two values.
PI—Numerical value of pi.
RMD—Remainder resulting from a division operation according to X-(Y*IP(X/Y)).
RND—Generates a number that is greater than or equal to zero and less than one, using a predetermined, pseudo-random sequence.
RTD—Converts the value of the numeric expression from radians to degrees.
SEC—Secant.
SGN—Returns a 1 if the expression is positive, -1 if negative, and 0 if exactly 0.
SIN—Sine.
SQR—Square root of a positive numeric expression.
TAN—Tangent.
TIME—Returns the time in seconds since midnight if the timer is set, or since machine turn-on otherwise, resetting automatically after 24 hours.

String Functions

CHR$—Converts a numeric value between 0 and 255 into a character corresponding to that value.
LEN—Returns the number of characters in a string.
NUM—Returns the decimal value corresponding to the first character of the string expression.
POS—Returns the position of the first character of a substring within another string or 0 if the substring is not found.
UPC$—Converts all lowercase letters in a string to uppercase letters.
VAL—Returns as a numeric value, including exponent, a string of digits so that the value may be used in calculations.
VAL$—Returns the value of a numeric expression as a string of digits.

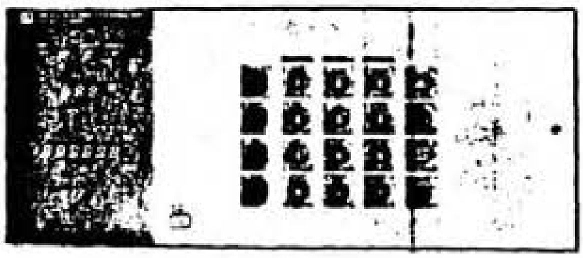
General Statements and Programmable Commands

BEEP—Outputs a tone of specified frequency for a specified duration.
CLEAR—Clears the CRT.
COM—Dimensions and reserves memory so chained programs can access the same data.
CRT IS—Allows the definition of either a printer or the actual CRT as the current CRT.
DATA—Provides constants and text characters for use with READ statements.
DEFAULT ON—Makes numeric overflows, underflows, and the use of uninitialized variables non-fatal by substituting an appropriate approximate value.
DEFAULT OFF—Makes numeric overflows, underflows, and the use of uninitialized variables fatal.
DEF FN—Defines a single- or multiple-line function.
DEG—Sets degree mode for evaluation and output of the arguments and results of trigonometric functions.
DIM—Declares the size and dimensions of array and string variables.
DISP—Outputs the values or text on the current CRT.
DISP USING—Displays values and text according to format specified by IMAGE statement or literal IMAGE.
END—Terminates program execution (same as STOP).
FLIP—Changes the keyboard from BASIC mode to typewriter mode or vice versa.
FN END—Terminates a multiple-line function.
FOR/NEXT—Defines a program loop and the number of iterations.
GOSUB—Transfers program control to a subroutine and allows subsequent return of control.
GOTO—Transfers program execution to the specified line.
GRAD—Sets grad mode for evaluation and output of the arguments and results of trigonometric functions.
IF...THEN...ELSE—Allows statements to be either executed or bypassed depending on the outcome of a logical expression.
IMAGE—Specifies the format used with PRINT USING or DISP USING statements.
INPUT—Allows entry of values or text from the keyboard during program execution.
INTEGER—Declares variables as integers as well as the size and dimensions of integer arrays.
KEY LABEL—Displays in the lower portion of the CRT, an eight-character prompt for each Special Function Key defined by an ON KEY statement. Also returns cursor to upper left corner of the CRT.
LET—Assigns a value to a variable or array element.
LIST—Lists the program on the CRT IS device. Also outputs bytes remaining at the end of a program.
NORMAL—Cancels the effect of the PRINT ALL, AUTO, or TRACE statements.
ON ERROR—Sets up a branch to the specified line or subroutine anytime an error occurs.
OFF ERROR—Cancels any ON ERROR statement previously executed.
ON KEY #—Sets up a branch to the specified line or subroutine each time the Special Function Key is pressed.

SPECIFICATIONS TABLES

SYSTEM ACCURACY SPECIFICATIONS

These system specifications combine individual accuracy specifications to result in a total measurement accuracy specification. For example, the resistance specifications combine the DVM, current source and acquisition assembly error terms.



Voltage Measured Through Acquisition Assembly

3497A Configuration:
DVM: 5½ digit, auto zero on
Relays Switches: Tree Switched

Accuracy: ±(% of reading + number of counts)

90 Days 23°C ± 5°C

Voltmeter Range	Digits Displayed 5½ digits	4½ digits	3½ digits
0.1V	0.007 + 5	0.01 + 2	0.1 + 1
1.0V	0.006 + 1	0.01 + 1	0.1 + 1
10.0V	0.006 + 1	0.01 + 1	0.1 + 1
100.0V	0.006 + 1	0.01 + 1	0.1 + 1

Resistance Measured Through an Acquisition Assembly

3497A Configuration:
DVM: 5½ digit, auto zero on
Current Source: As indicated
Relay Switches: Configured for a 4-terminal resistance measurement

Characteristics

Effective Resistance Range	Effective Resistance Resolution	Current Source Range	Range
100 Ω	1 mΩ	1 mA	.100000
1 kΩ	10 mΩ	100 µA	1.00000
10 kΩ	100 mΩ	100 µA	10.0000
100 kΩ	1 Ω	10 µA	10.0000

Accuracy: ±(% of reading + number of counts)

90 Days 23°C ± 5°C

Range Relays (Opt. 010)	Digits Displayed 5½ digits	4½ digits	3½ digits
100 Ω	.032 + 5	.035 + 2	0.125 + 1
1 kΩ	.032 + 5	.035 + 2	0.125 + 1
10 kΩ	.032 + 5	.035 + 2	0.125 + 1
100 kΩ	.031 + 2	.035 + 2	0.125 + 1

System Noise Rejection

Normal Mode Rejection (NMR): (50 or 60 Hz + .09%)

DVM Digits Displayed	Rejection
5½	60 dB
4½	0 dB
3½	0 dB

NMR is a function of the 3497A DVM configuration only and is not affected by the number of channels in the system.

Effective Common Mode Rejection (ECMR): The ECMR of a 3497A based system is a combination of the ECMR of the 3497A DVM and the effects of adding multiplexer assemblies and 3498A extenders.

ECMR: 1(kΩ imbalance in low lead, using tree switching, ac at 50 or 60 Hz, 25°C, <85% R.H.)

Voltmeter Configuration

Number of Acquisition Channels (Options 10,20)		5½ digits	4½ digits	3½ digits
0	AC	150 dB	90 dB	90 dB
	DC	120 dB	120 dB	120 dB
<100	AC	150 dB	90 dB	90 dB
	DC	104 dB	104 dB	104 dB
<400	AC	140 dB	80 dB	80 dB
	DC	92 dB	92 dB	92 dB
<1000	AC	130 dB	70 dB	70 dB
	DC	85 dB	85 dB	85 dB

Measurement Speeds

For the 3497A DVM and the relay multiplexer. Speeds are given for measurements on random channels (using software channel selection) and sequential channels (using external hardware increment). Speeds include I/O times to the indicated computers.

	Number of Digits Selected	85	Computer 9826*	1000L	1000E,F
Sequential Channels using external increment	5½ digits	39(33)**	39	39(25)	30(25)
	4½ digits	97(88)	103	108(79)	88(79)
	3½ digits	112(107)	123	127(99)	107(99)
Random Channels using software	5½ digits	13(15)	27	21(16)	22(16)
	4½ digits	14(21)	51	31(28)	35(30)
	3½ digits	14(23)	55	33(29)	35(32)

*9826 speeds for BASIC operating system
**50 Hz speeds in ( )

TIMER/REAL TIME CLOCK

Clock Format

Month:Day:Hours:Minutes:Seconds (Option 230)
Day:Month:Hours:Minutes:Seconds (Option 231)

	Maximum Time	Resolution	Accuracy	Output
Real Time Mode	1 year	1 second	±(.005% of time + .1s)	Display and HP-IB
Elapsed Time Mode	10^6 seconds	1 second	±(.005% of time + .1s)	Display and HP-IB
Time Alarm Mode	24 hours	1 second	±(.005% of time + .1s)	HP-IB SRQ
Time Interval Mode	24 hours	1 second	±(.005% of time + .1s)	50 μS TTL Pulse + HP-IB SRQ
Time Output Mode	1 second	100 μS	±(.02% of time)	16 μS TTL Pulse
Power Failure Protection: Battery back-up for >24 hours for time and elapsed time only				

3497A MAINFRAME AUXILIARY INPUTS/OUTPUTS

Ext Trig. Input: TTL Compatible
Minimum pulse width: 50 n seconds

Ext Incr. Input: TTL Compatible
Minimum pulse width: 50 μ seconds

BBM Sync: TTL Compatible
This terminal serves as a break before make synchronizing signal to the 3497A and other equipment. The terminal is both an-input and output with a low level indicating a channel is closed. The 3497A will not close any additional channels until the line is sensed high and the line will float high when all channels are open.

VM Complete Output: TTL Compatible
Pulse width = 500 n seconds

Channel Closed Output: TTL Compatible
Pulse width = 500 n seconds

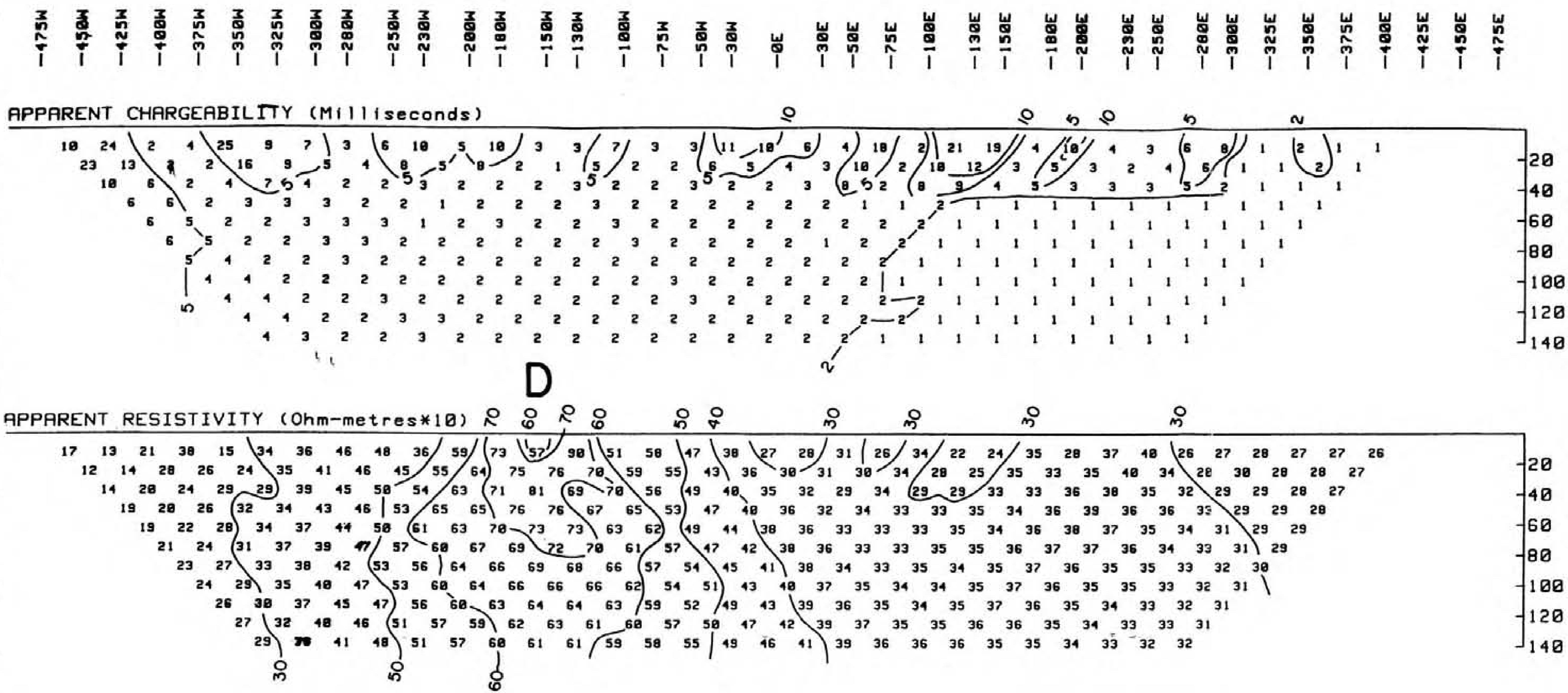
Timer Interval Output: TTL Compatible
Output port for the time interval and time output functions.

Physical Parameters

Size (3497A or 3498A): 190.5 mm (7½ in.) high
428.6 mm (16 7/8 in.) wide
520.7 mm (20½ in.) deep
An additional two inches in depth should be allowed for wiring.

Net Weight:

	3497A	3498A
Maximum (with assemblies in all slots)	20.4 kg (45 lbs.)	20.4 kg (45 lbs.)



INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.

METRES
0 25 50 75 100

CYPRUS METALS CANADA

TOODOGGONE PROJECT

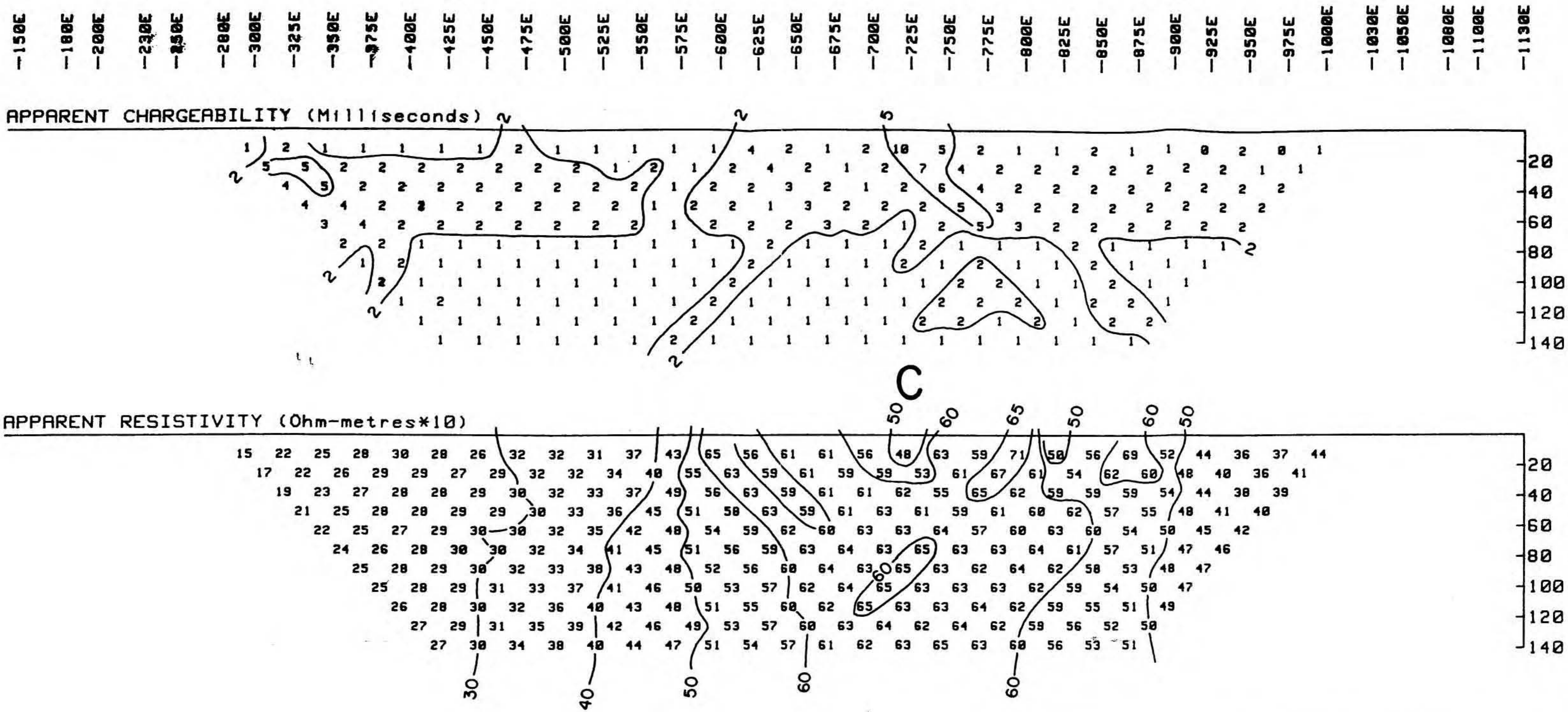
MULTIPOLE INDUCED POLARIZATION SURVEY

LINE 1200S

DATE: AUG/87

FIG.: 3

WHITE GEOPHYSICAL INC.



INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.

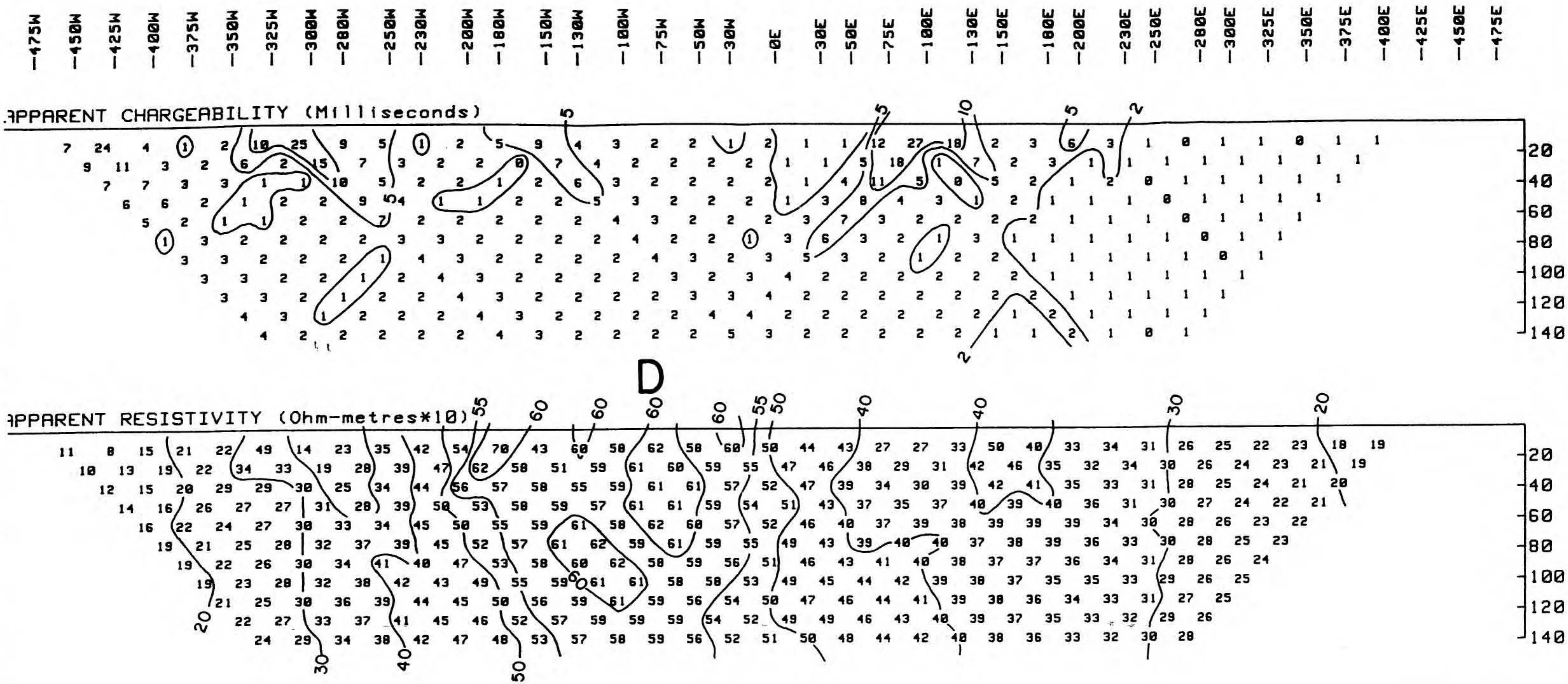
METRES
0 25 50 75 100

CYPRUS METALS CANADA
TOODOGGONE PROJECT
MULTIPOLE INDUCED POLARIZATION SURVEY
LINE 1200S

WHITE GEOPHYSICAL INC.

DATE: AUG/87

FIG.: 4



INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.

METRES
0 25 50 75 100

CYPRUS METALS CANADA

TOODOGGONE PROJECT

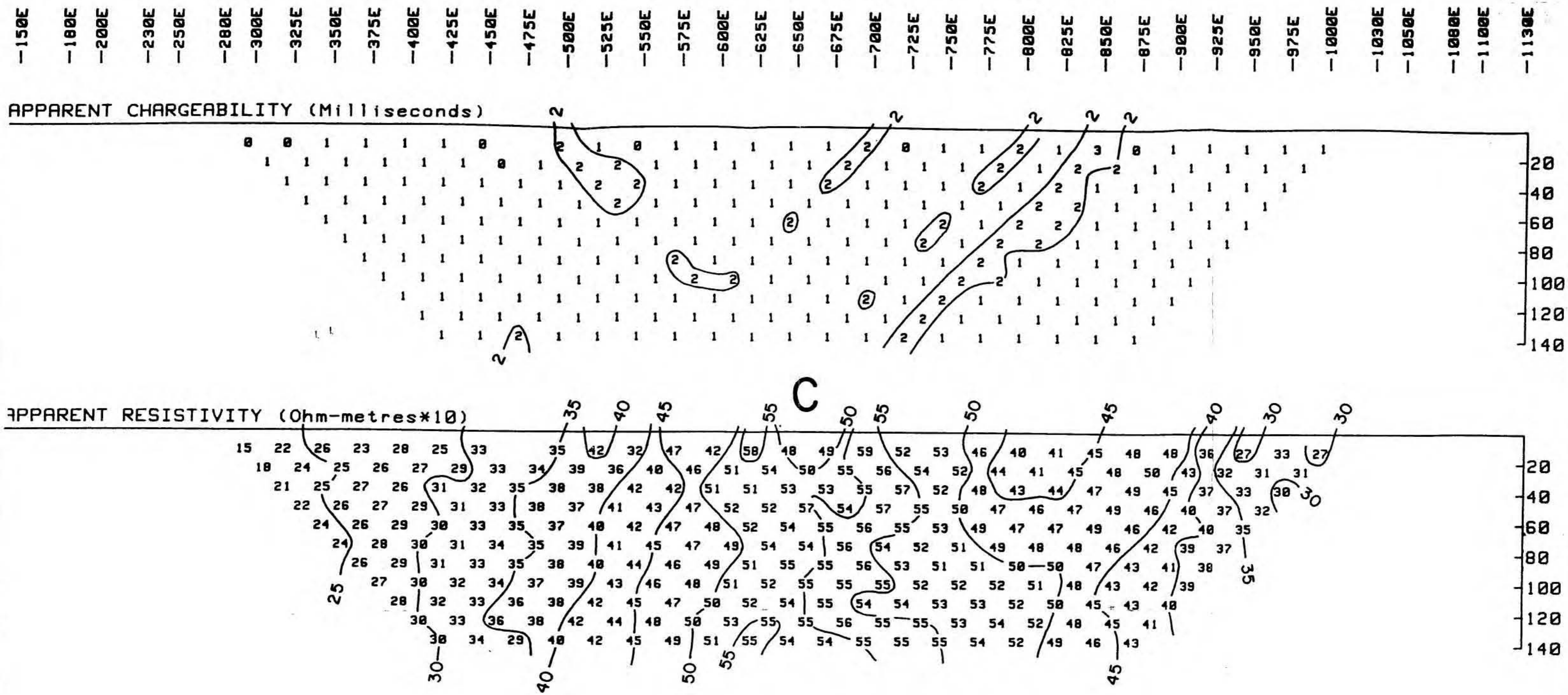
MULTIPOLE INDUCED POLARIZATION SURVEY

LINE 1400S

WHITE GEOPHYSICAL INC.

DATE: AUG/87

FIG.: 5



INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.

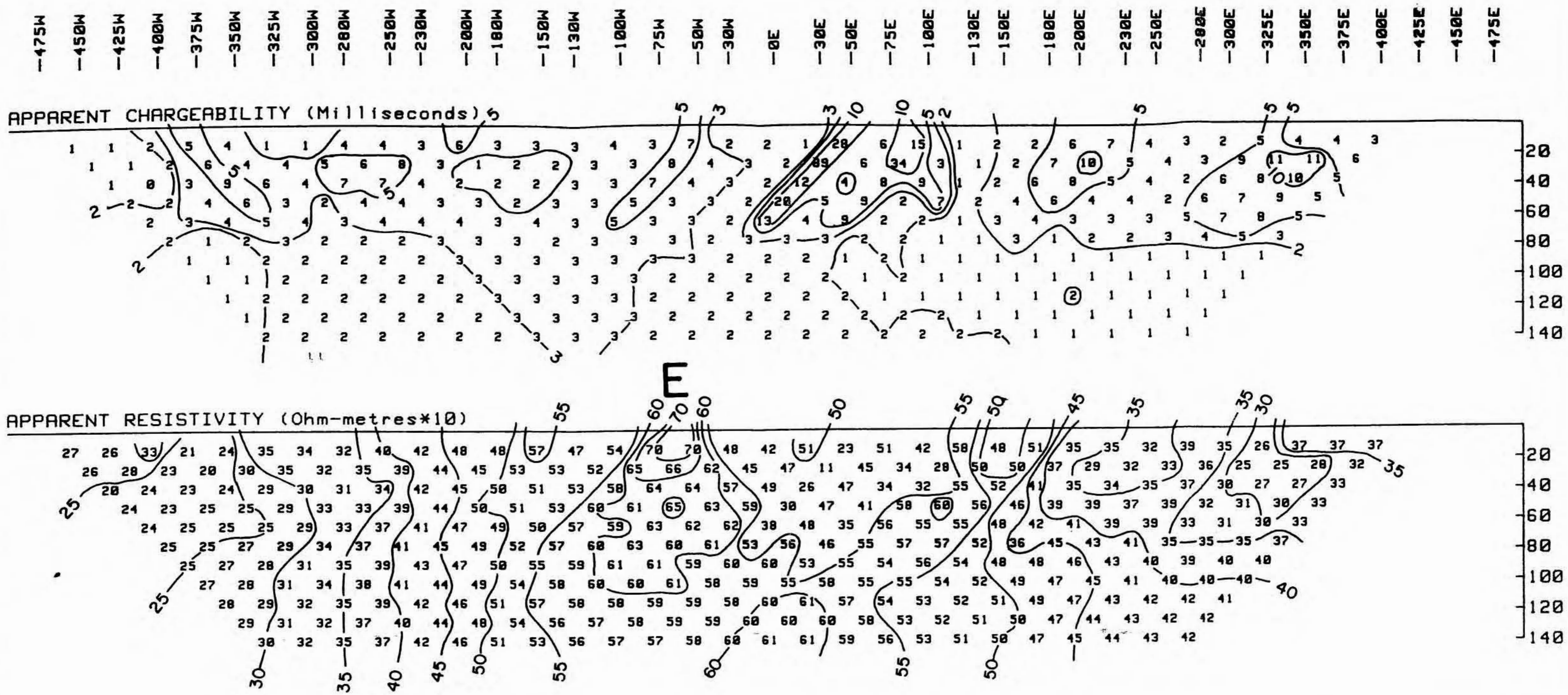
METRES
0 25 50 75 100

WHITE GEOPHYSICAL INC.

CYPRUS METALS CANADA
TOODOGGONE PROJECT
MULTIPOLE INDUCED POLARIZATION SURVEY
LINE 1400S

DATE: AUG/87

FIG.: 6



INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.

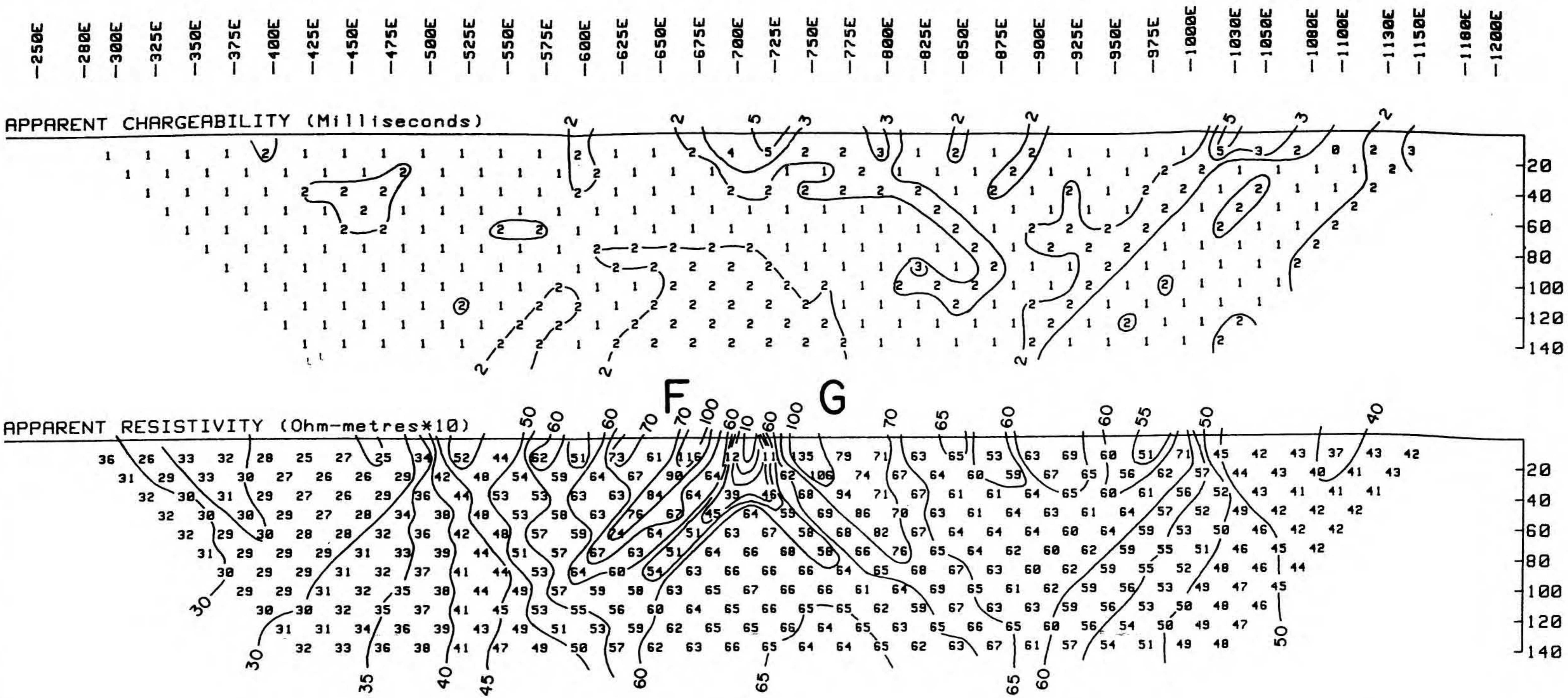
METRES
0 25 50 75 100

CYPRUS METALS CANADA
TOODOGGONE PROJECT
MULTIPOLE INDUCED POLARIZATION SURVEY
LINE 1800S

DATE: AUG/87

FIG.: 7

WHITE GEOPHYSICAL INC.



INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.

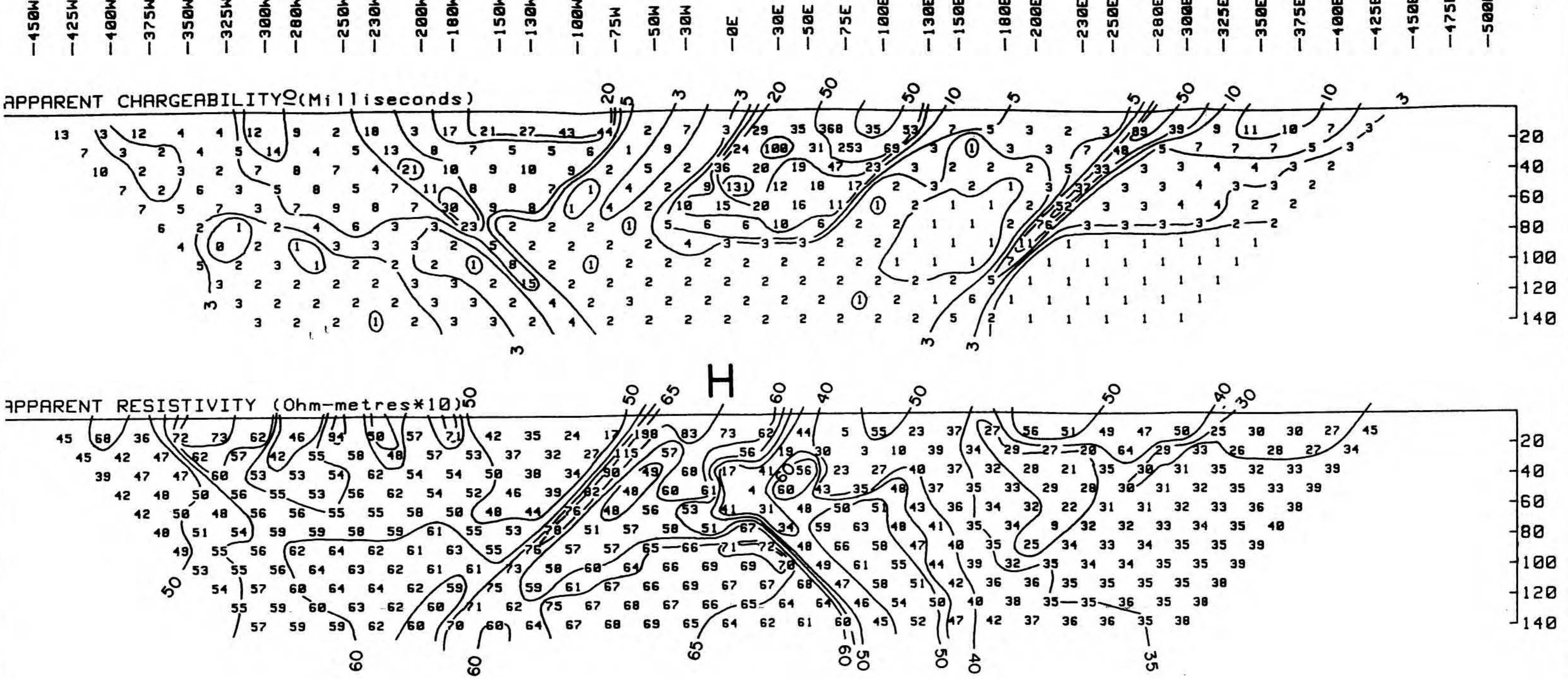
METRES
0 25 50 75 100

WHITE GEOPHYSICAL INC.

CYPRUS METALS CANADA
TOODOGGONE PROJECT
MULTIPOLE INDUCED POLARIZATION SURVEY
LINE 1800S

DATE: AUG/87

FIG.: 8



INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.

METRES
0 25 50 75 100

CYPRUS METALS CANADA

TOODOGGONE PROJECT

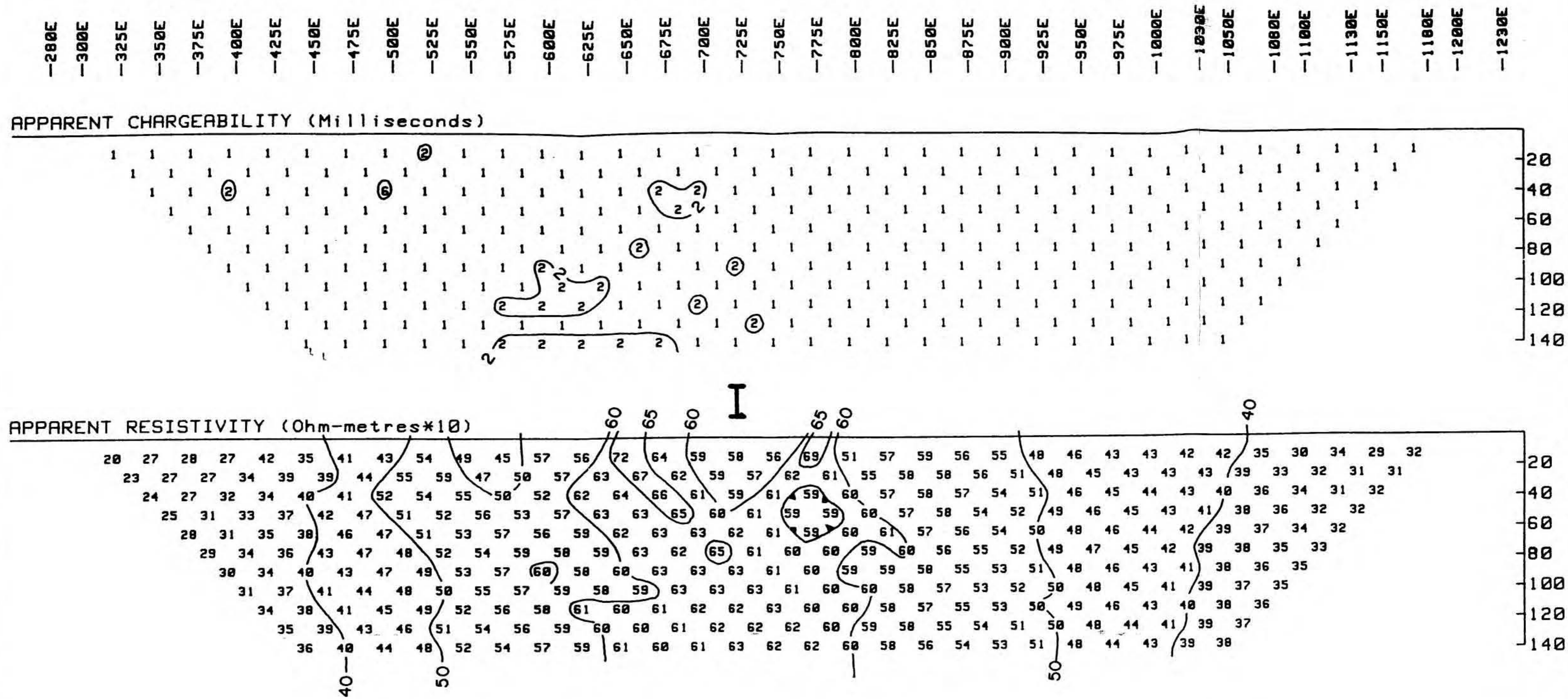
MULTIPOLE INDUCED POLARIZATION SURVEY

LINE 4400S

WHITE GEOPHYSICAL INC.

DATE: AUG/87

FIG.: 9



INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.

METRES
0 25 50 75 100

CYPRUS METALS CANADA

TOODOGGONE PROJECT

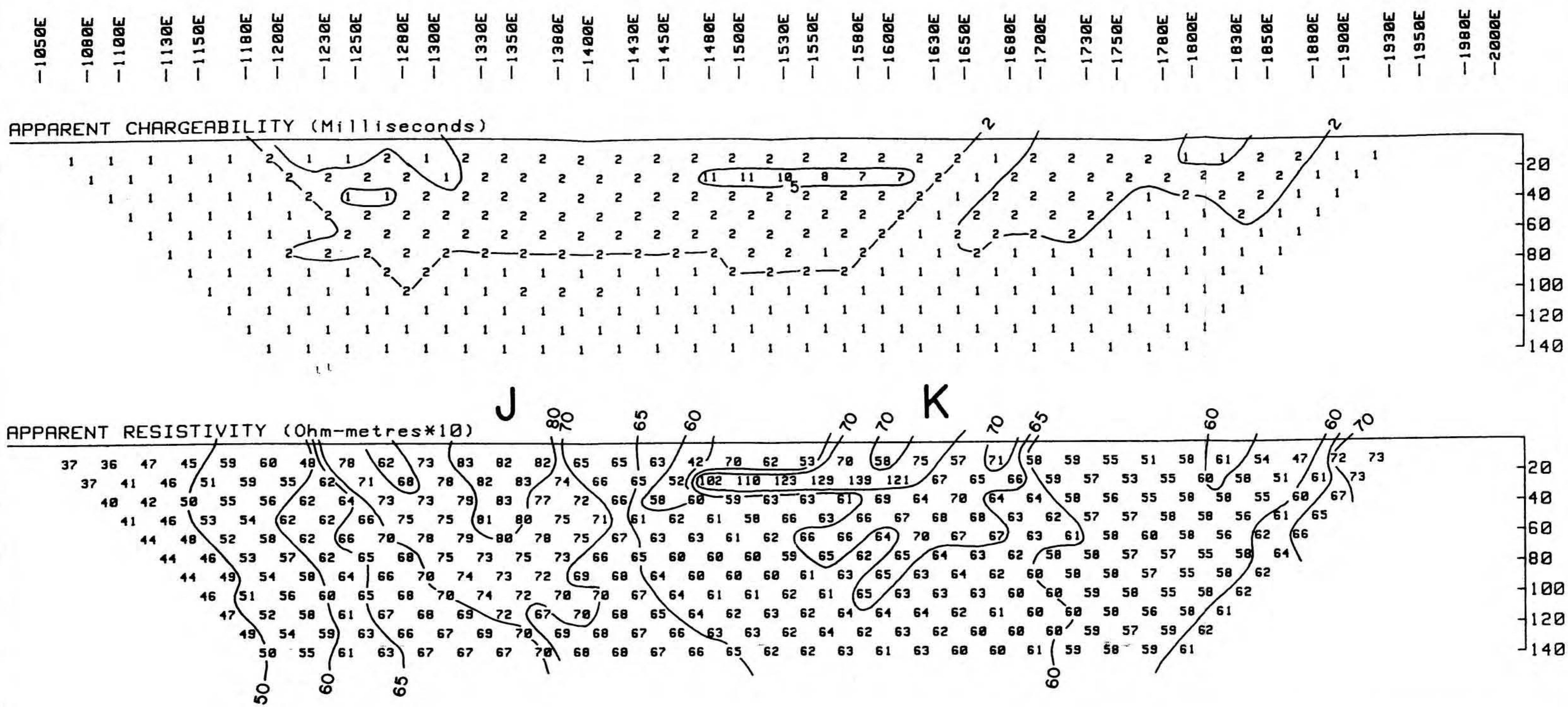
MULTIPOLE INDUCED POLARIZATION SURVEY

LINE 4400S

WHITE GEOPHYSICAL INC.

DATE: AUG/87

FIG.: 10



INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.

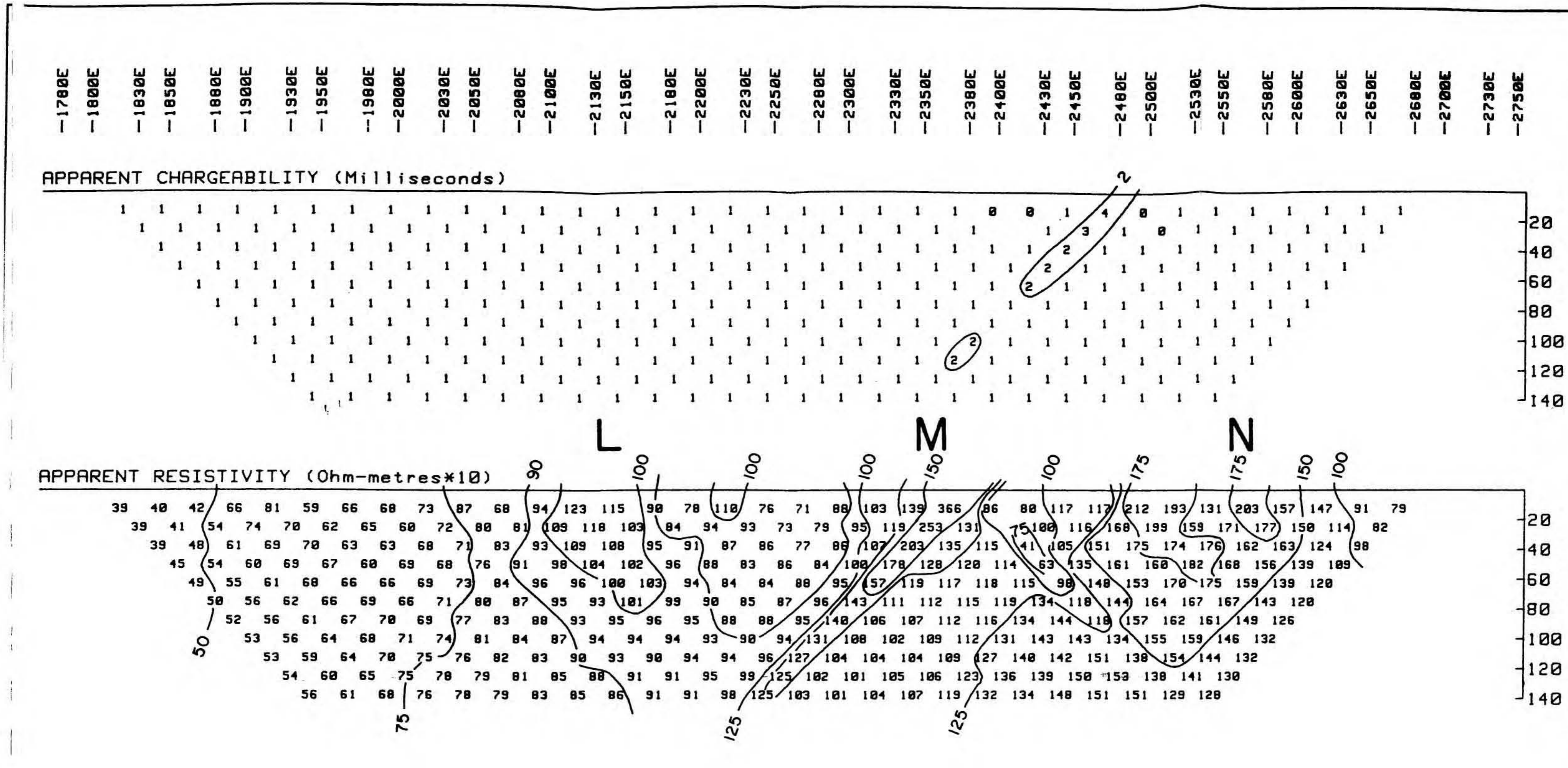
METRES
0 25 50 75 100

CYPRUS METALS CANADA
TOODOGGONE PROJECT
MULTIPOLE INDUCED POLARIZATION SURVEY
LINE 4400S

WHITE GEOPHYSICAL INC.

DATE: AUG/87

FIG.: 11



INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.

METRES
0 25 50 75 100

CYPRUS METALS CANADA

TOODOGGONE PROJECT

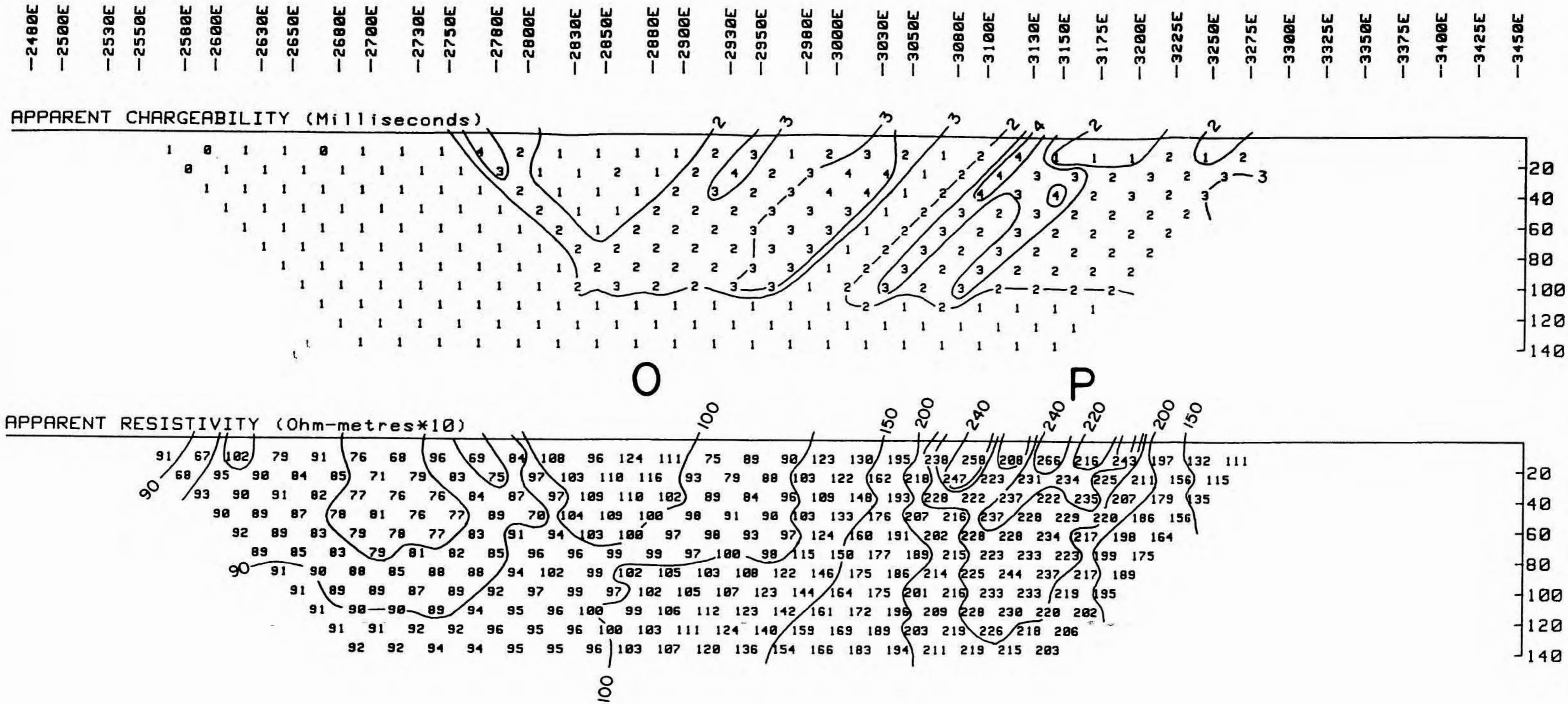
MULTIPOLE INDUCED POLARIZATION SURVEY

LINE 4400S

DATE: AUG/87

FIG.: 12

WHITE GEOPHYSICAL INC.



INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.

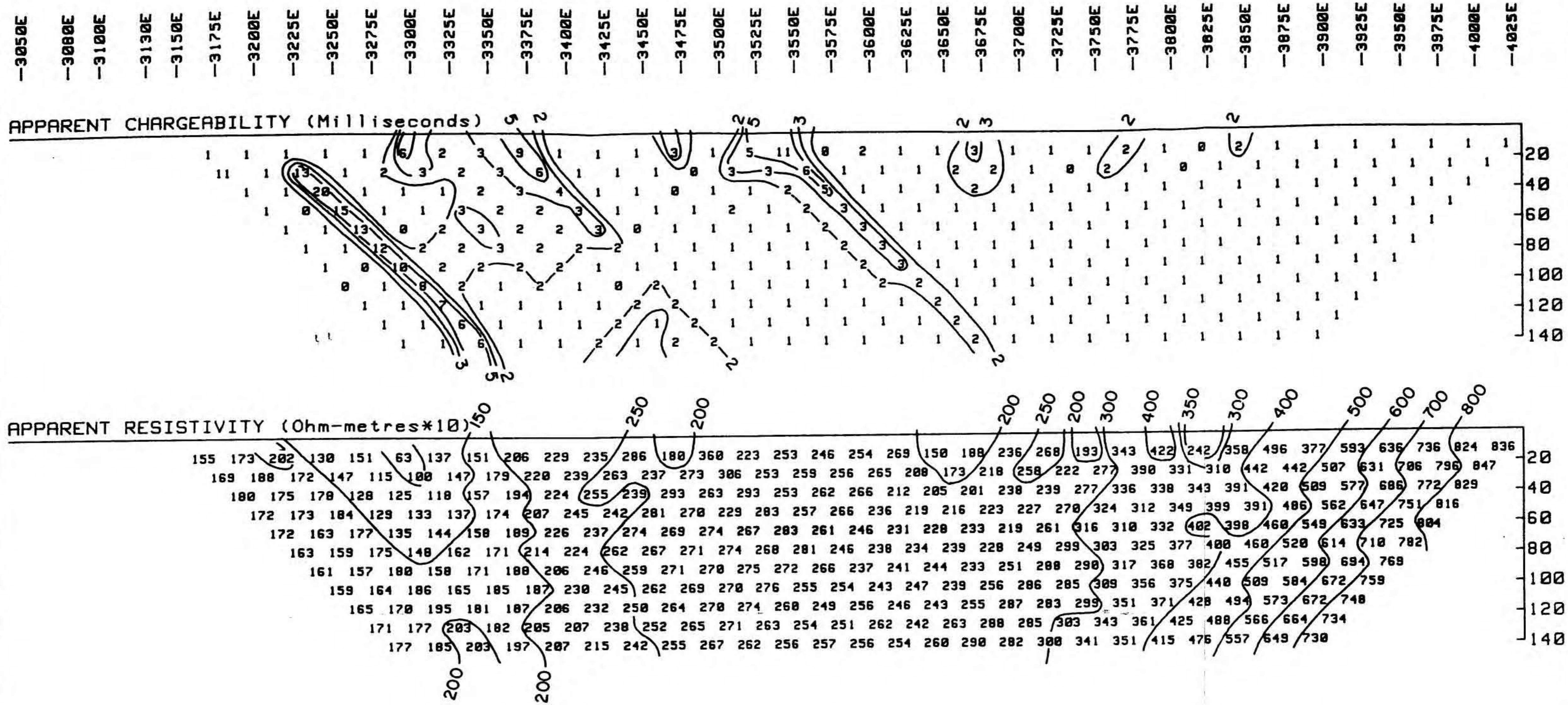
METRES
0 25 50 75 100

CYPRUS METALS CANADA
TOODOGGONE PROJECT
MULTIPOLE INDUCED POLARIZATION SURVEY
LINE 4400S

DATE: AUG/87

FIG.: 13

WHITE GEOPHYSICAL INC.



INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.

METRES

0 25 50 75 100

CYPRUS METALS CANADA

TOODOGGONE PROJECT

MULTIPOLE INDUCED POLARIZATION SURVEY

LINE 4400S

WHITE GEOPHYSICAL INC.

DATE: AUG/87

FIG.: 14

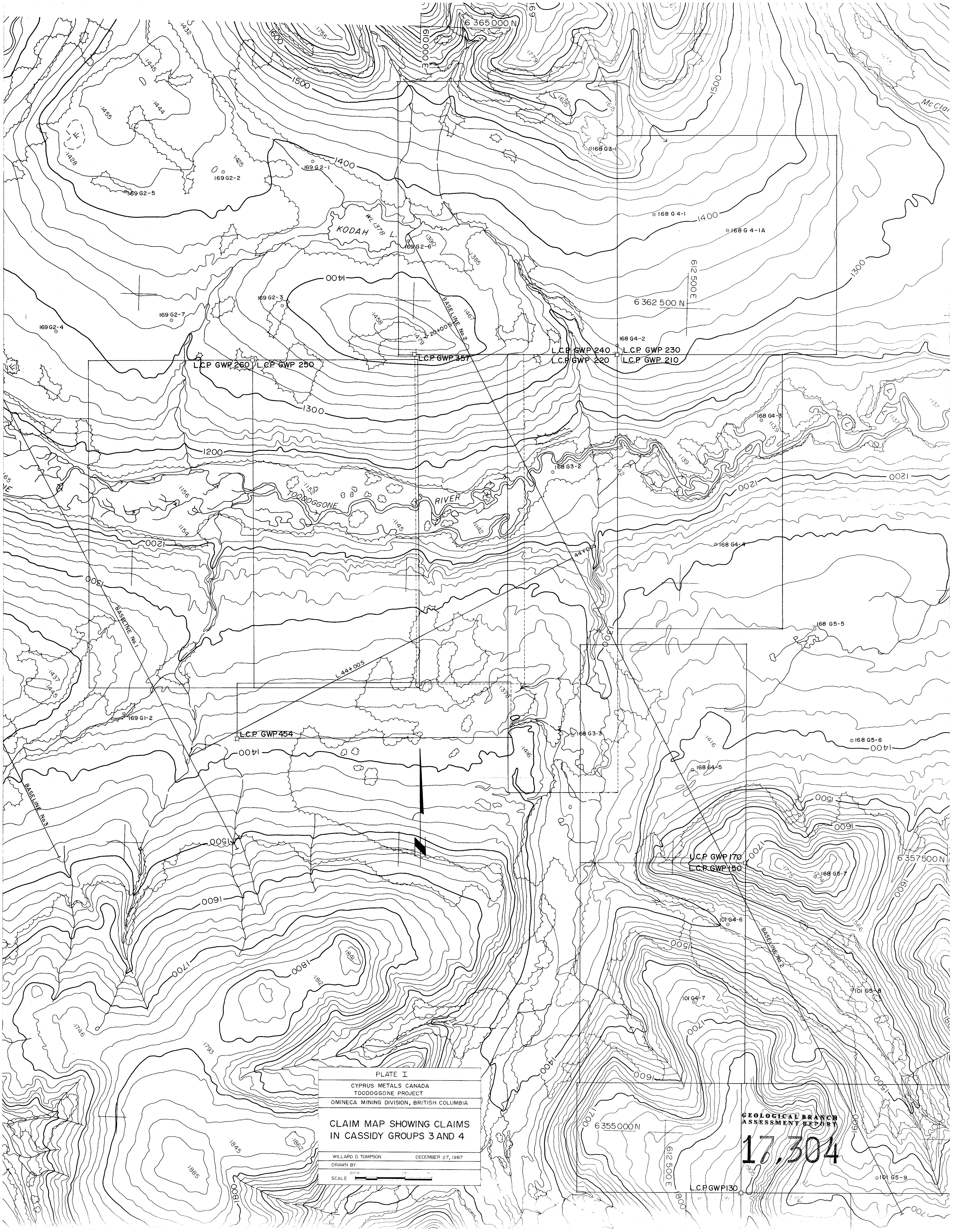
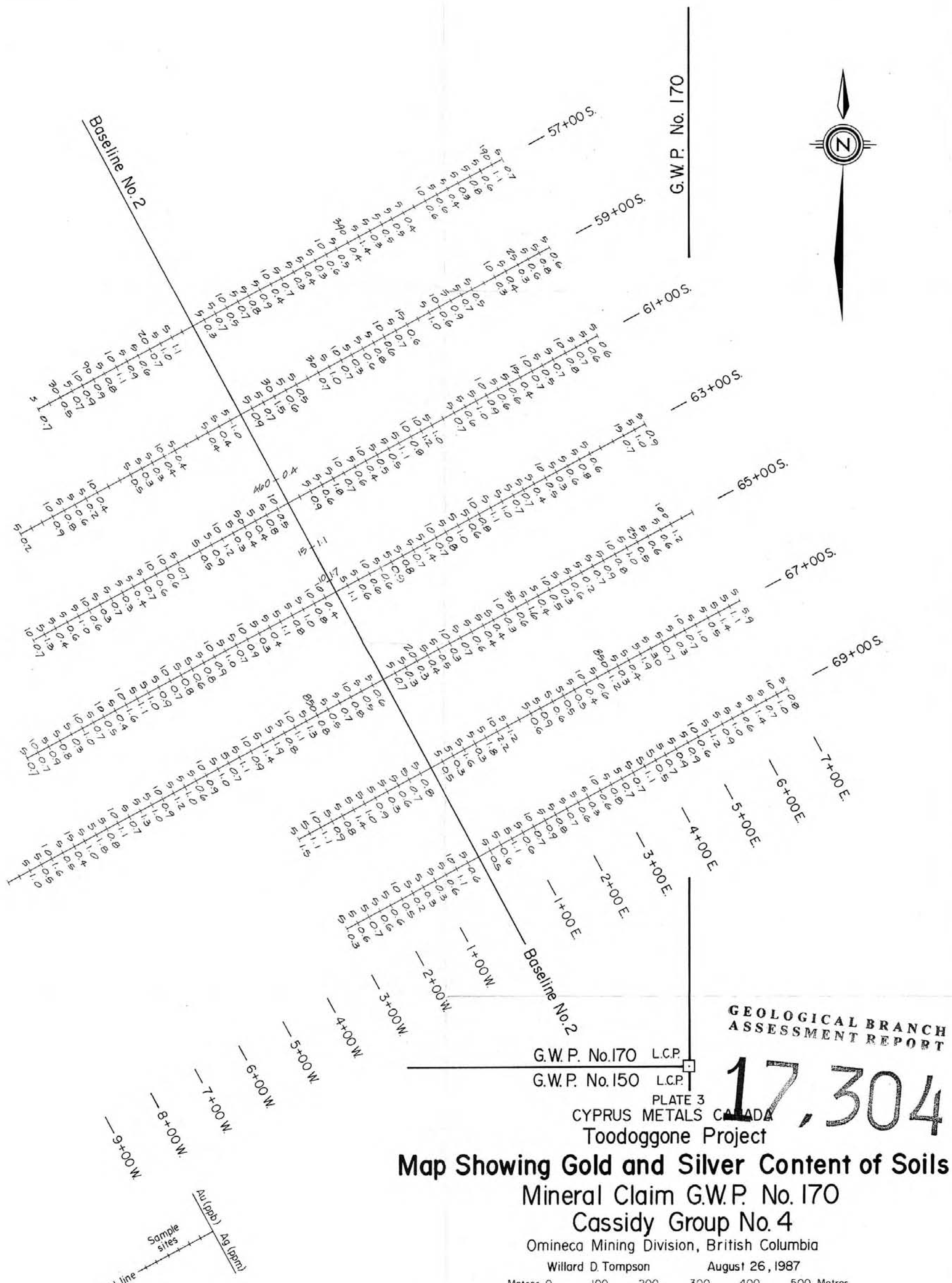


PLATE I
CYPRUS METALS CANADA
TOODOGGONE PROJECT
OMINECA MINING DIVISION, BRITISH COLUMBIA
CLAIM MAP SHOWING CLAIMS
IN CASSIDY GROUPS 3 AND 4
WILLARD D. TOMPSON
DECEMBER 27, 1987
DRAWN BY:
SCALE
GEOLOGICAL BRANCH
ASSESSMENT REPORT
17,304
6 365 000 N
610 000 E
6 362 500 N
612 500 E
6 357 500 N
6 355 000 N
KODAH L.
W.L. 1378
TOODOGGONE
RIVER
McClai
BASELINE No. 1
BASELINE No. 2
BASELINE No. 3
L.C.P. GWP 260
L.C.P. GWP 250
L.C.P. GWP 357
L.C.P. GWP 240
L.C.P. GWP 220
L.C.P. GWP 230
L.C.P. GWP 210
L.C.P. GWP 454
L.C.P. GWP 170
L.C.P. GWP 150
L.C.P. GWP 130
L 44+00 S
44+00 S
20+00 S
169 G2-1
169 G2-2
169 G2-3
169 G2-4
169 G2-5
169 G2-6
169 G2-7
169 G1-2
168 G3-1
168 G3-2
168 G3-3
168 G4-1
168 G4-1A
168 G4-2
168 G4-3
168 G4-4
168 G4-5
168 G5-5
168 G5-6
168 G5-7
101 G4-6
101 G4-7
101 G5-8
101 G5-9

N
G.W.P. No. 260
G.W.P. No. 250
G.W.P. No. 250
G.W.P. No. 357
L.10+00N.
L.8+00N.
L.6+00N.
L.4+00N.
L.2+00N.
L.0+00
L.2+00S.
L.4+00S.
L.6+00S.
L.8+00S.
L.40+00S.
L.42+00S.
L.44+00S.
L.46+00S.
Baseline No. 2
Baseline No. 1
Baseline 250
Line 44+00 South continues 4000 metres easterly from Baseline No.1 to Baseline No. 2
I.P. ANOMALY ZONE "P"
I.P. ANOMALIES ZONE "O"
ZONE "N"
I.P. ZONE "L"
I.P. ANOMALY ZONE "K"
I.P. ZONE "J"
I.P. ANOMALY ZONE I
L.C.P. G.W.P. 454
Breeze claim
Cheni Gold Mines
12+00W.
10+00W.
8+00W.
6+00W.
4+00W.
2+00W.
2+00E.
4+00E.
6+00E.
8+00E.
EXPLANATION
Au (ppb)
Ag (ppm)
Sample sites
Grid line
Swamp
GEOLOGICAL BRANCH
ASSESSMENT REPORT
17,304
PLATE 2
CYPRUS METALS CANADA
Toodoggone Project
Map Showing
Gold and Silver Content of Soils
Mineral Claim G.W.P. No. 250,
Cassidy Group 3 and G.W.P. No.454
Omineca Mining Division, British Columbia
Willard D. Tompson
August 1, 1987
Metres 0 100 200 300 400 500 1000 Metres
JW



GEOLOGICAL BRANCH
ASSESSMENT REPORT

17,304

PLATE 3

CYPRUS METALS CANADA

Toodoggone Project

Map Showing Gold and Silver Content of Soils

Mineral Claim G.W.P. No. 170

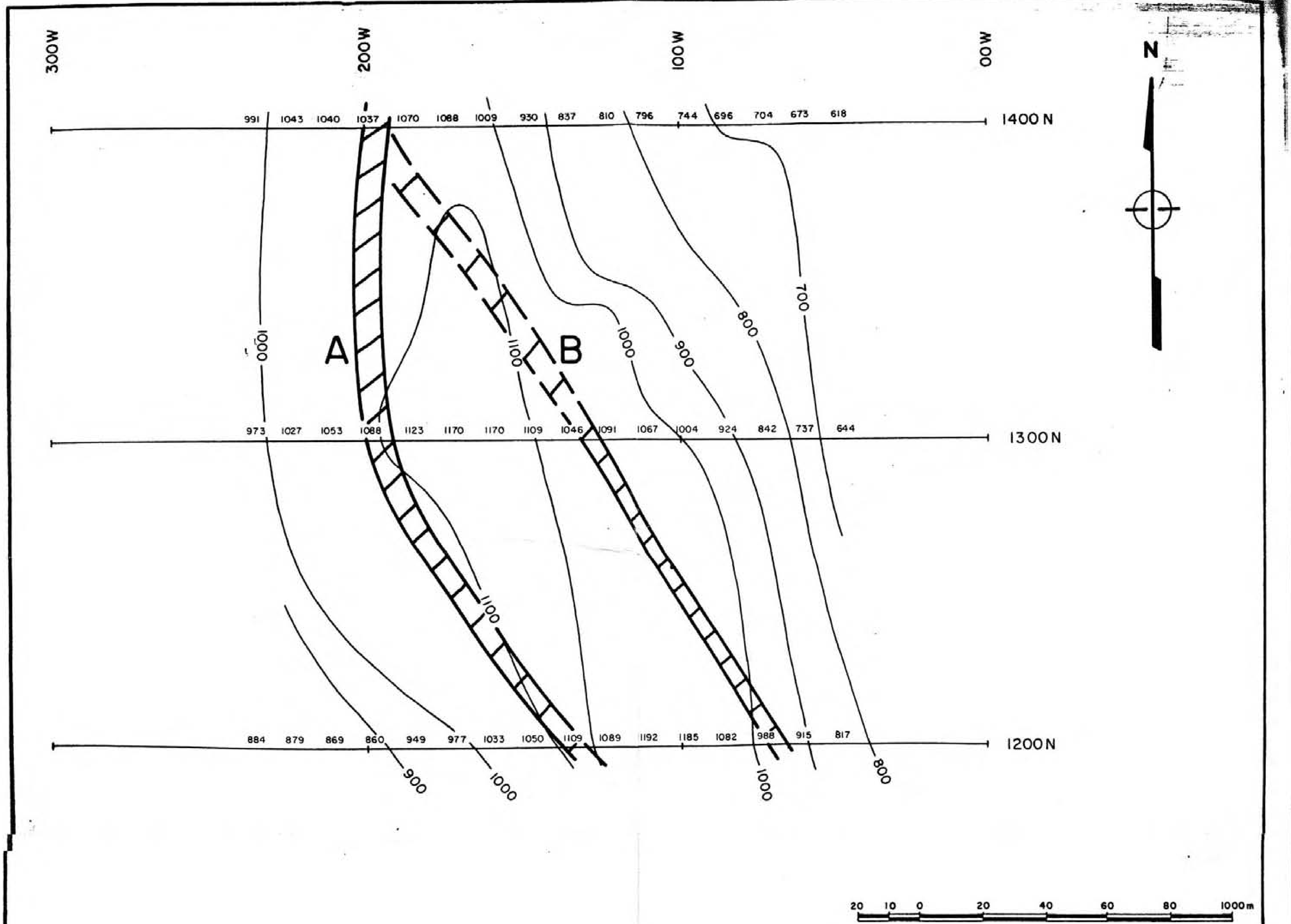
Cassidy Group No. 4

Omineca Mining Division, British Columbia

Willard D. Tompson August 26, 1987

Metres 0 100 200 300 400 500 Metres

J.W.



CYPRUS METALS CANADA
TOODOGGONE PROJECT

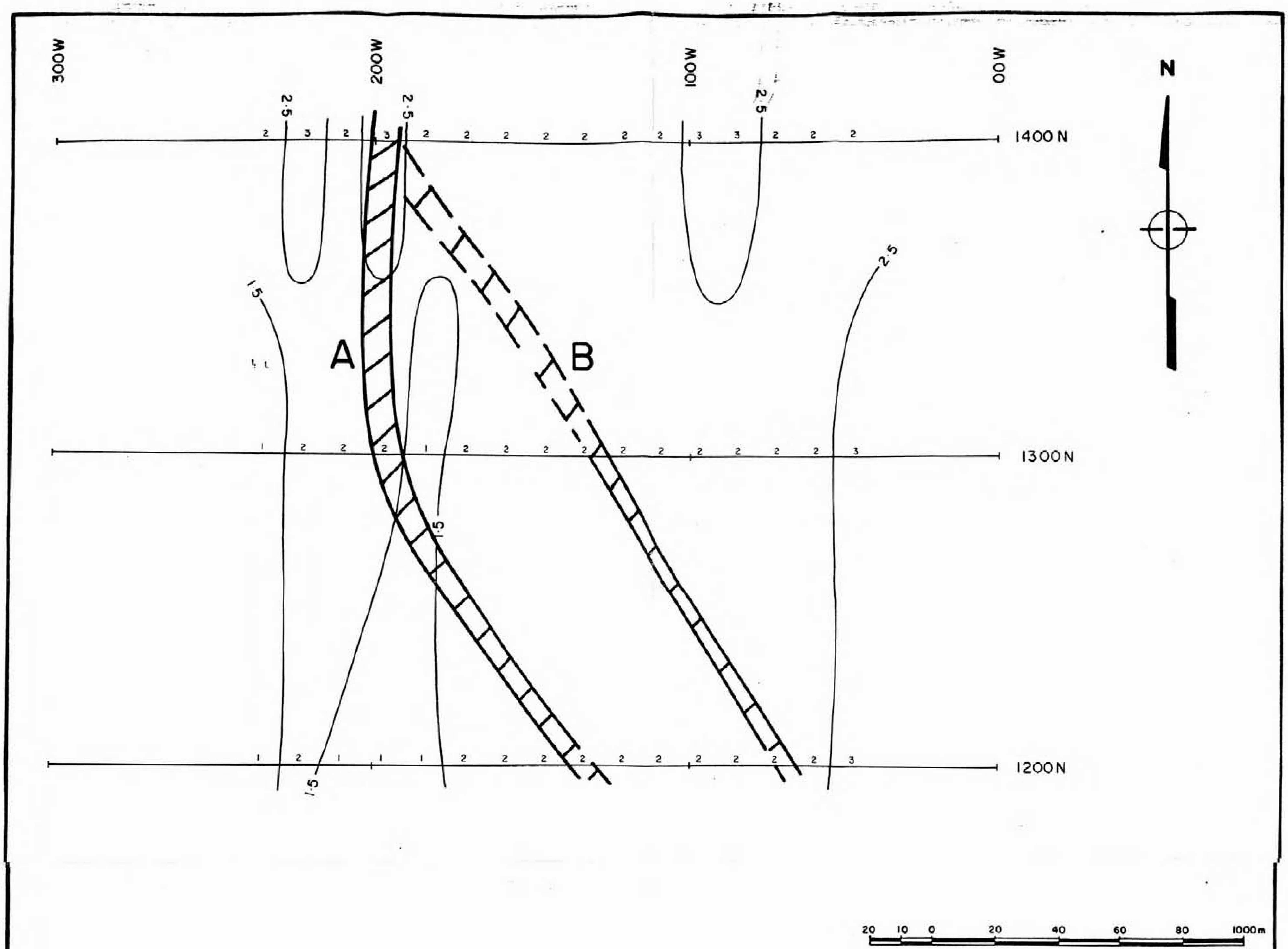
MULTIPOLE INDUCED POLARIZATION SURVEY

APPARENT RESISTIVITY

DATE : AUG., 1987 | FIG. 1

WHITE GEOPHYSICAL INC.

17,304



CYPRUS METALS CANADA
TOODOGGONE PROJECT

MULTIPOLE INDUCED POLARIZATION SURVEY

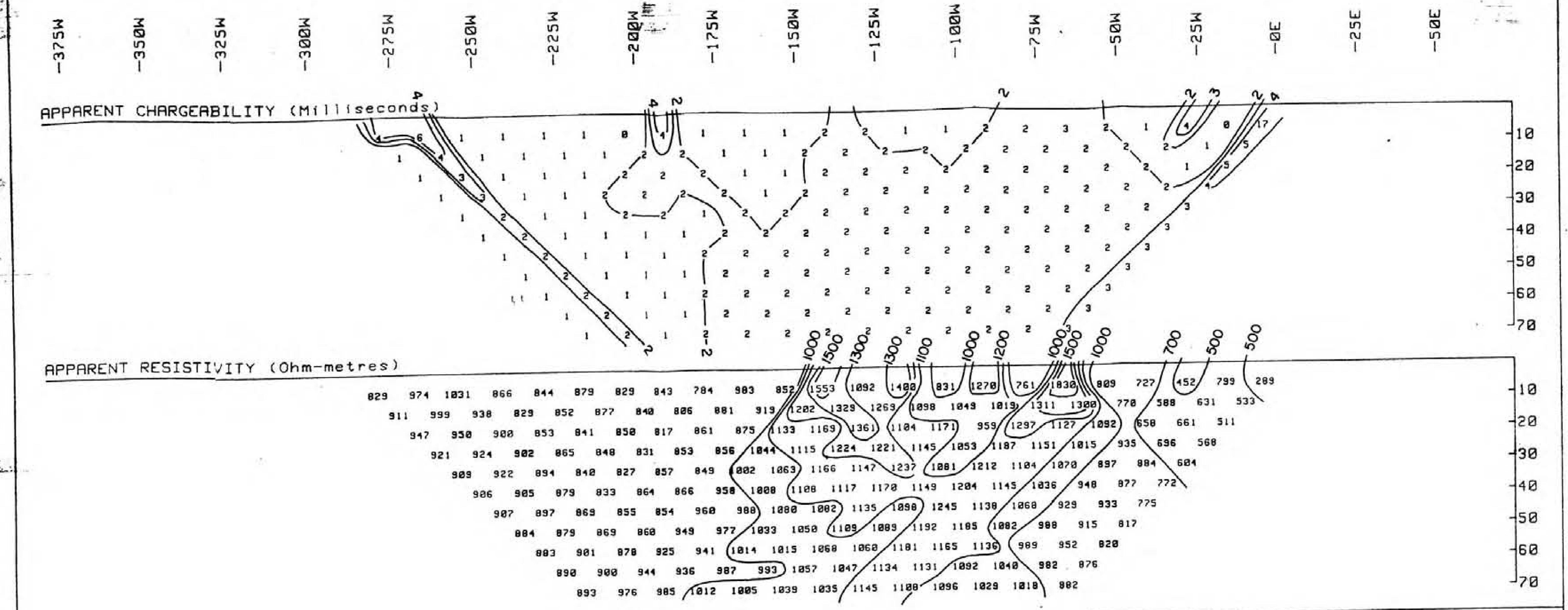
APPARENT CHARGEABILITY

DATE : AUG., 1987

FIG. 2

WHITE GEOPHYSICAL INC.

17,304



INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.

METRES
0 10 20 30 40

CYPRUS METALS CANADA

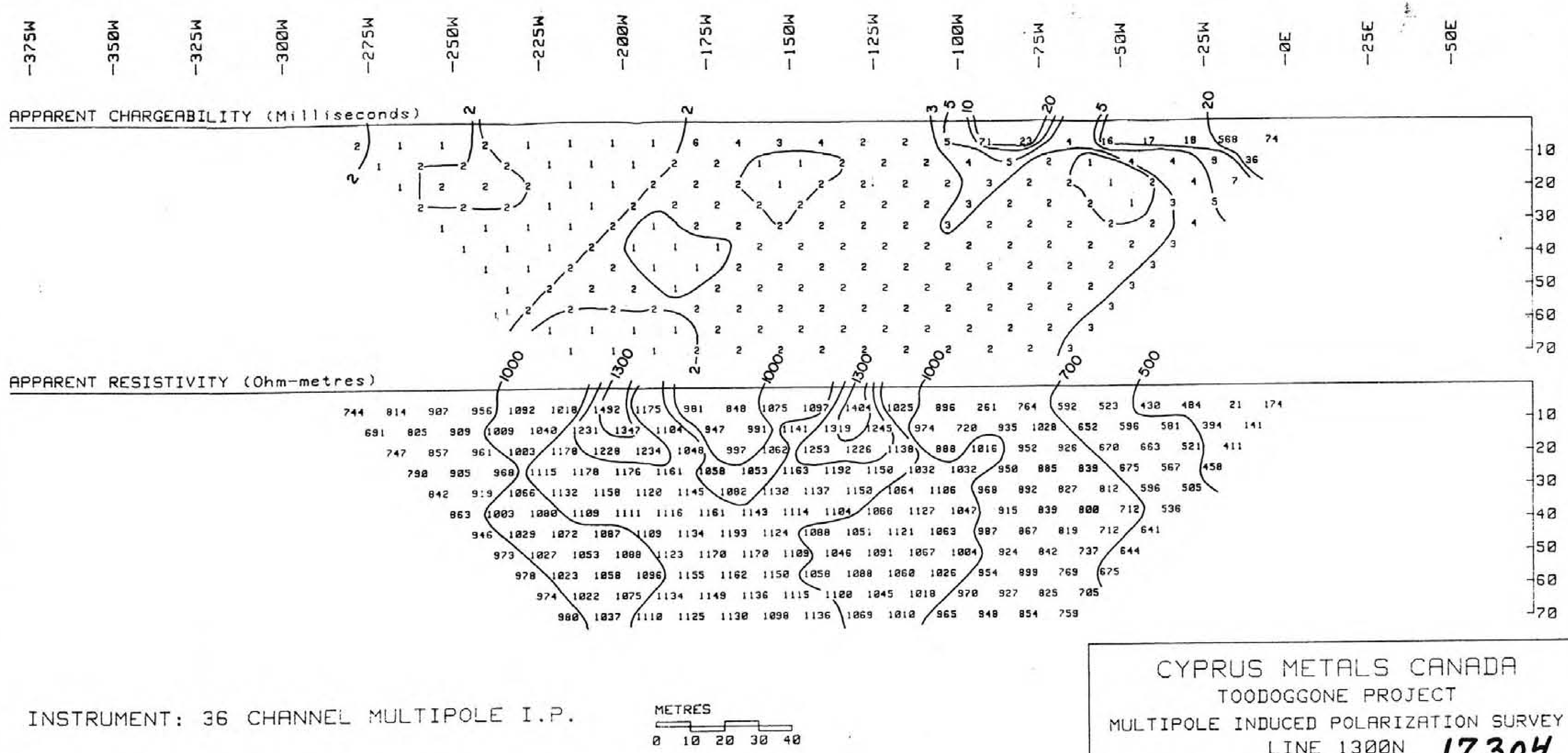
TOODOGGONE PROJECT

MULTIPOLE INDUCED POLARIZATION SURVEY

LINE 1200N 17,304

DATE: AUG/87 | FIG.: 15

WHITE GEOPHYSICAL INC.



CYPRUS METALS CANADA

TOODOGGONE PROJECT

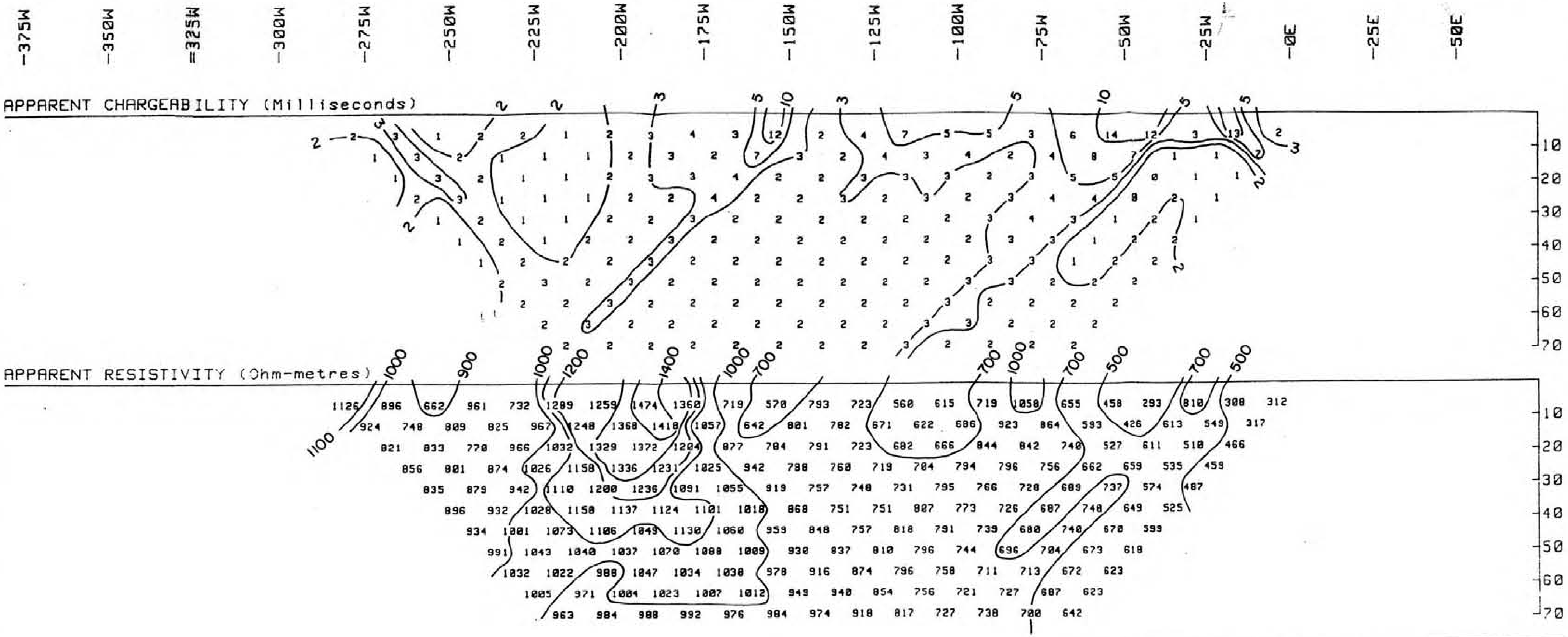
MULTIPOLE INDUCED POLARIZATION SURVEY

LINE 1300N 17,304

DATE: AUG/87

FIG.: 16

WHITE GEOPHYSICAL INC.



INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.

METRES
0 10 20 30 40

CYPRUS METALS CANADA
TOODOGGONE PROJECT
MULTIPOLE INDUCED POLARIZATION SURVEY
LINE 1400N 17,304

WHITE GEOPHYSICAL INC.

DATE: AUG/87

FIG.: 17