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A.O. | C.G. | E.G.
84-2147
- 3 JUL 1984
DEPT. OF MINES
6659/84

GEOPEKO
A DIVISION OF PEKO-WALLSEND OPERATIONS LIMITED

PROGRESS REPORT ON MINERAL EXPLORATION in MACKINTOSH EAST - PART OF E.L. 2/70 TASMANIA

JUNE 1980 - JUNE 1982

Compiled by W. Herrmann
June, 1984
with contributions by:
P.S. Heithersay
W. Herrmann
J. Pemberton
J. Sumpton

MICROFILMED

OPEN FILE

Diagram profiles at end of computer.

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DIGHEM CHARTS IN TCR 81_1637

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1. INTRODUCTION

This report attempts to present results of mineral exploration, within the eastern portion of E.L. 2/70, conducted between June 1980 and the present.

1.1 Tenure

Exploration Licence 2/70 of 232sq km is held in two parts, designated Mackinstosh West and Mackintosh East, by Cleveland Tin N/L for Aberfoyle Limited.

The Mackintosh East portion, of approximately 58sq km, covers part of the north eastern extremity of exposure of the Mt Read Volcanic Belt and lies adjacent to the north-western boundary of the Cradle Mountain-Lake St Clair National Park.

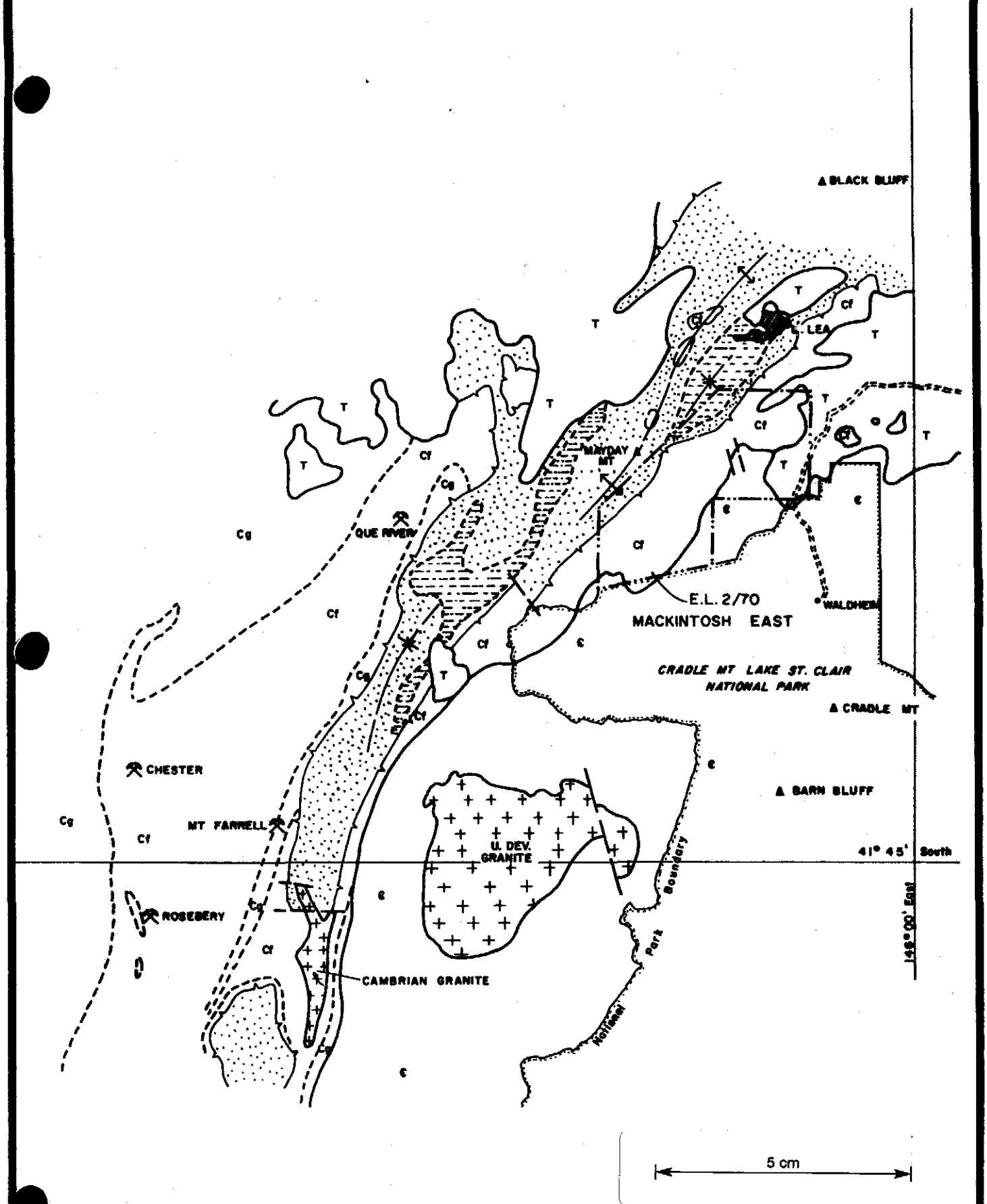
Prior to September 1979, the area was explored by the Aberfoyle Group (90%) in joint venture with Paringa Mining and Exploration Co. Ltd. (10%).

Under a joint venture agreement of 1st October 1979, Geopeko assumed management of exploration in the Mackintosh East portion and to this date has earned an equity of 40% in the project.

At the date of writing, as a consequence of a decision to withdraw from active exploration in Tasmania, Geopeko is seeking to "farm out" a part of its equity.

Under the new rules governing Exploration Licences (introduced 1/7/82) E.L. 2/70 (entire) must be reduced to no greater than 125sq km in area by 30/12/84.

...



LEGEND:

T	TERTIARY:	Basalt
	ORDOVICIAN:	Siliceous conglomerate, sandstone, siltstone/limestone
Cf Cg	CAMBRIAN:	Felsic to intermediate volcs. volcaniclastics, intrusives. /greywacke turbidite sequences.
Є	PRECAMBRIAN:	Metamorphosed quartzites, pelitic schists

DATE: JUNE'80
GEOL: W. H.
DWN: J. P. M.
CHKD:

GEOPEKO
A DIVISION OF PEKO WALLSEND OPERATIONS LTD

Scale: 1:2 500 000 | FIG. 1

E.L. 2/70 MACKINTOSH EAST

LOCALITY PLAN

with

REGIONAL GEOLOGICAL SETTING

1.2 Acknowledgements

Exploration, by Geopeko, of the Mackintosh East area has traditionally been a "winter project". As such it has struggled along in adversity of climate and suffered from numerous staff changes and resultant discontinuity of exploration logic, interpretation and reporting.

The present author merely attempts to compile the fragmental notes and other data emerging from sporadic exploration in the period mid 1980 to early 1982. Essentially no work has been carried out since the latter date.

Acknowledgements are due to the following Geopeko staff for their respective contributions.

Paul Heithersay:	Geol mapping, C-horizon geochem in Prover 1+3 areas, mid-Late 1980.
Paul Heithersay John Sumpton:	Dighem II survey and limited ground follow up of Provers 5,6 and 7; Late 1980.
Walter Herrmann:	Reconnaissance of Prover 8, magnetic anomalies. C-horizon geochem and limited mapping of Prover 1 area and planning of diamond drill hole. Late 1981.
John Pemberton:	Logging of Prover 1 DDH 1 Early 1982.

2. SUMMARY

Exploration within the Mackintosh East area since June 1980 has involved:

1. Gridding, geological mapping and C-Horizon geochemical sampling of the Prover 1 and Prover 3 drainage geochemical anomalies.

2. Drilling of one diamond drill hole at Prover 1. The hole intersected very minor Pb-Zn vein mineralization.

3. Coverage by a helicopter borne Dighem II (Electromagnetic/Magnetic) Survey with limited ground follow up of several anomalies.

In general, however, the Dighem II Survey indicated that no significant conductors occur at shallow depths within the favourable layered volcanic rocks of the area.

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409009

PROVER 3
Geochem anomaly

PROVER 7
Dighem anomalies
Magnetic anomalies

5400mE

PROVER 8
Magnetic anomaly

PROVER 6
Dighem 'X' type anomaly

PROVER 1
Geochem anomaly

PROVER 5
Dighem 'X' type anomaly

5 391 000mN

5 cm

411000mE

LEGEND:

- TERTIARY : Basalt
- ORDOVICIAN : 1. Limestone 2. Sandstone, Conglomerate
- CAMBRIAN : 1. Quartz feldspar biotite porphyry 2. Rhyolitic pyroclastics
- PRECAMBRIAN : Schists, quartzites.

GEOPEKO LIMITED

Scale: 1: 100 000

Nº FIG: 2

DATE: Nov 1980
GEOL: P.S.H.
DWN:
CHKD:

MACKINTOSH EAST E.L. 2/70

PROSPECT LOCALITY MAP

3. PROSPECT EVALUATION

3.1 PROVER 1 (1981 P.S. Heithersay)

Previous Geopeko work - designated Prover 1 due to stream sediment, rock chip data. Also best part of Cominco/Paringa geochem anomalies.

Comparison of Cominco data with Geopeko data

Line 2100

Pb data agrees fairly well except for spot high value of 1.26%.

Zn anomaly is coincident except anomaly is better formed and generally 50 - 150ppm larger.

Cu agrees fairly well except for spot high.

Fe anomaly agrees but much more character.

IP data over line 2900E - refer J.S. comments

Geology

Base of sequence of laminated and massive quartzites and psammites with pelitic and carbonaceous mica schists. Crenulation cleavage is evident indicating multiple deformation. Form part of the Tyennan nucleus.

Mt Read Volcanics

The metasedimentary basement overlain by rhyolitic fine-m.g. qtz xtal quartz and crystal vitric tuffs. Beddding is generally not discernable. They are chloritic in part with fine chlorite lenses randomly oriented in the matrix common. Conspicuous blocky fracture cleavage is conspicuous feature. At least two trends are usually seen one consistantly North (M) and the other variable.

The centre of the sequence a thin bed of massive to finely laminated vitric tuff occurs. Fine lamination and possible load casts indicate deposition in a subaqueous environment - possibly indicating an undisturbed environment or cessation of volcanism.

Sequence offset by NW strike/slip faults

Various lithologies are locally continous but contacts are difficult to ascertain. Appears that rocks dip consistently steeply to N.W. indicating that lack of continuity is due to facieing out or lensing out.

The volcanics are structually overlain by a broadly conformable massive body of coarse grained quartz-feldspar biotite porphyry. At least 2km wide in central region and has great textural and compositional homogenity.
- Regarded as a large synvolcanic intrusive.

Geochemistry

Rock Chip Geochemistry

	Cu	Pb	Zn	Ag	Fe
KR 6973	50	310	240	1	1.62
KR 6974	5	40	20	1	1.92
KR 6967	10	35	25	(1	1.72
KR 6972	55	0.16%	80	3	1.72

Jacro Geochemistry

1. Average depths range from 0.5m to 1.5m
2. 200m line spacing
3. Line 10,000N corresponded to line 2100 from Cominco data

Pb Geochemistry

1. Main trend 900 metres long - open ended
   Cannot relate to geology - possibly thin sedimentary unit most probably stratigraphic
   Rock sample KR 6972 - veins in Chl xt-iron staining 0.16%Pb
2. Minor trend corresponding to vitric tuff unit near 10250 some 300-400m long

Zn Geochemistry

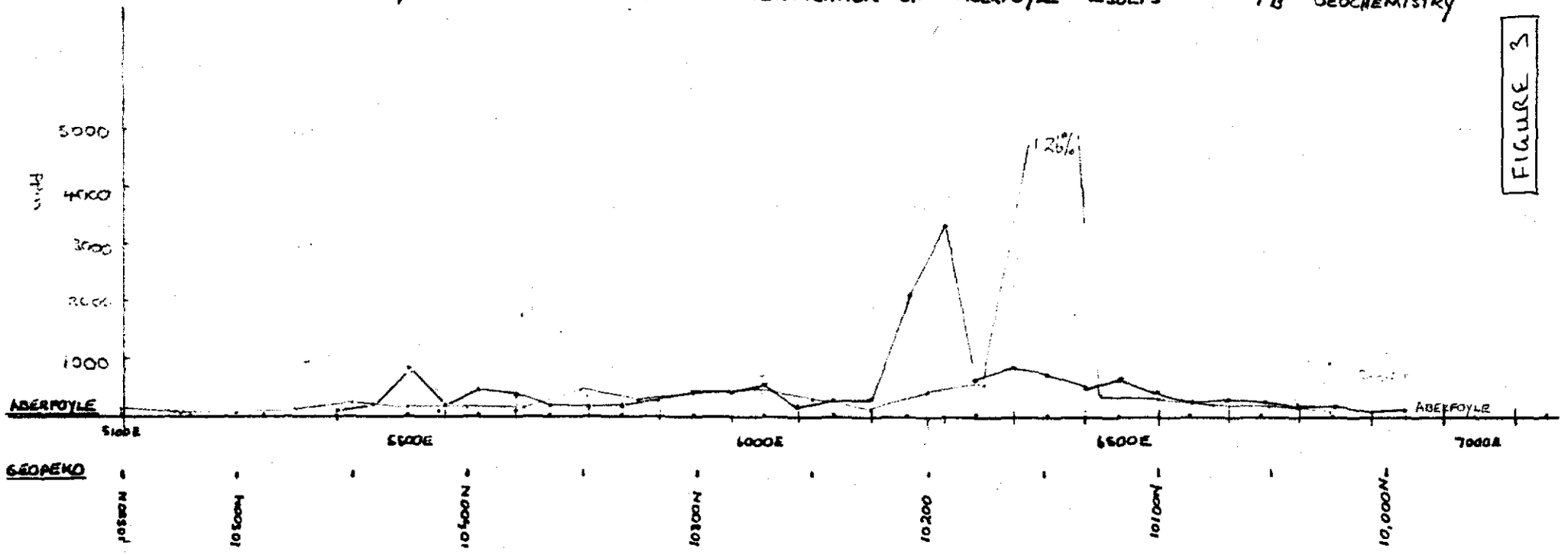
1. Main trend concident with Pb trend $>$600ppm
   More dispersed
2. Further trend concident with minor trend and vitric tuff unit.

...

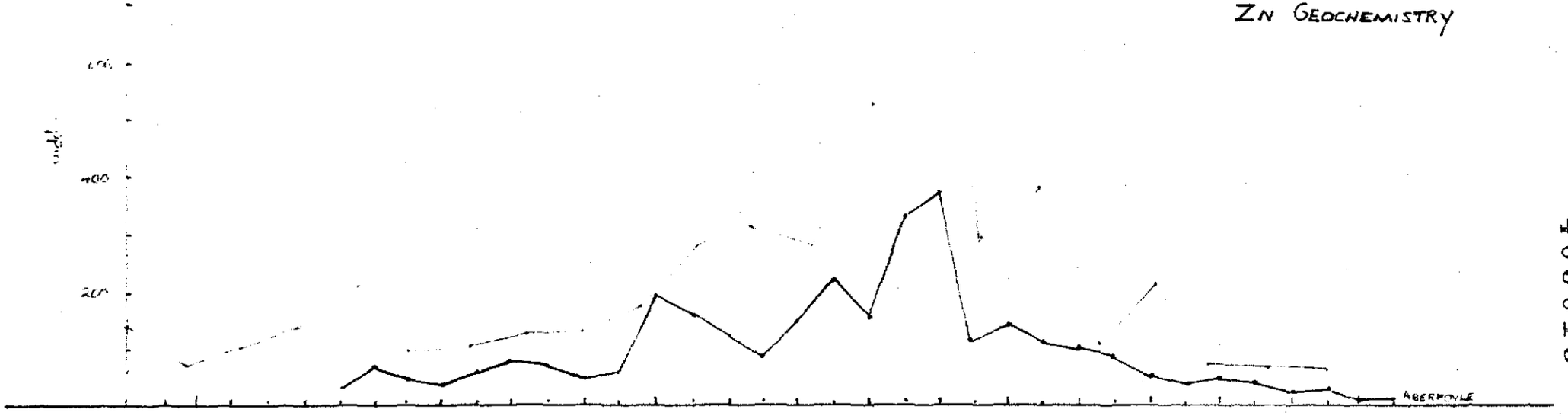
PROVER I LINE 10 000E

MACKINTOSH EAST E.L 2/70 C HORIZON SOILS VERIFICATION OF ABERFOYLE RESULTS Pb GEOCHEMISTRY

FIGURE 3



ZN GEOCHEMISTRY



Ag Anomalies)3ppm

1. Concident with main Pb/Zn trend
2. Concident with upper Pb/Zn trend
3. Good dispersion

Fe

1. Offset from main anomaly
2. Some association with Q.F.B.P.

Cu

1. Coincident with main geochem trend (> 52ppm)

Forward Programme

1. Extend grid to close off anomaly
2. Close grid up around anomalies
3. IP or Sirotem - 6 lines
4. Gravity
5. Further mapping to find stratigraphic horizon of potential
6. Drilling hole to provide geological and geophysical information
   Main area of geochem coincidence
7. IP, SP, EM (Aberfoyle's Max Min) for calibration

PROVER 1: Notes W. Herrmann, January 1982

During November 1981, C Horizon soil samples were collected per Mate auger, at 6.25m intervals, over the peak of the known (1980) Pb anomaly on lines 9400, 9600, 9800, 10000 East. These results (Analytical Report No: 83.1 08 655) have tended to destroy the previously known anomaly (based on 25m sample intervals) giving much more "spiky" profiles but of generally comparable magnitude (except for failing to reproduce the 1.26%Pb on 10000E/10150N).

Further sampling at 12.5m intervals to obtain background data more or less restored the stratiform appearance of the Pb geochem anomaly; occupying a broad band of about 100m width trending linearly between 9400E/10000N to 10200E/10200N. This zone generally contains Pb values in the range 500-2000ppm against background ranging from 60-500. (with occaisional spikes above 500).

In my opinion, the infill sampling has done little to upgrade the Prover 1 anomaly. The spiky nature of the profiles and the sometimes poor reproducibility of separate samples at similar sample stations (eg: 9600E/10012.5N) suggests there is little secondary geochemical dispersion and that primary metal distribution may be errattic. This is probably also complicated by poor C-Horizon development leading to sampling inconsistency and small scale variability in leaching etc.

If this is so, it follows that soil geochem is of limited use in precision drill targetting but is more applicable to defining broader zones of above

...

background metal values which might be mineralized. The Prover 1 experience suggests that 25m spacing is adequate for this task. Hopefully a geophysical method for drill target definition will emerge from P1 DDH 1.

Nevertheless, it will be interesting to compare metal values from the various lithologies encountered in DDH 1 with the surface geochem - indeed it is one of the primary aims of DDH 1.

An attempt has been made to map in detail the variations in acid volcanics associated with the Prover 1 geochem anomaly.
Tracks and costeans near 10000E allow the best geological exposure and a geological section has been drawn from mapping these. The rocks consist of finely laminated, fine grained tuffaceous (cherty) sediments or siltstones, interbedded with m. grained lithic (xtal) tuffs, a cse. grained lithic tuff and two more massive units of rather glassy f-m grained quartz crystal tuff or quartz phyric lava (I favour the latter).

Except for the possible quartz phyric lava, the rocks are generally quite well stratified striking between 5-20° magnetic and dipping gently 45-75° to the north west. (Grid north: 310°M)

Observed mineralization is confined to minor galena blebs and fine veinlets in the quartz phyric lava (or qxt) at the southern end of the southern costean. Disseminated and "stratiform" lenses of pyrite, sphalerite, galena were found in a floater of laminated fine sediment/ lithic tuff from the northern costean (about (9975E, 10225N) during 1979 mapping but couldn't be relocated this season.

(Ref Specimen No: KR 5560, 5561)

Minor poddy epidote (chlorite) alteration also occurs at that vicinity.

The present plan is to drill one hole of 150-200m under the peak of the Pb geochem anomaly in attempt to:

1. Relate surface geochem (soil) to primary rock geochem and determine the value of soil geochem.

2. Get a good look at volcanic sequence and hopefully mineralization therein - determine if mineralization is of massive-stratiform type or veinlet style ($\approx$ Carter's)

3. Compare mineralization and rock types to geophysical results to be obtained by a geophysical orientation - calibration survey.

I would prefer to drill the DDH on section 10000E principally because of the better exposure there, which will enable more confident correlation of surface to hole geology.

A 200m hole collared at about 10260N, inclined -50° to grid south (130°M) would provide a cross-section of all the lithotypes mappable in the costeans, test the peak of the Pb geochem anomaly as well as provide a fair bit of "background" geochem comparison, and would reach very nearly to the Pre Cambrian unconformity.

I would suggest that the core should be side ground (with individual assay samples spanning 5m intervals) to assist in relating the rock/soil geochem. ...

Analyses for total S and Ca, Na, K, Mg would be useful in the geological-geophysical modelling if significant mineralization is intersected.

Significantly mineralized sections should be split and analysed in 1m intervals.

John Sumpton has suggested a list of geophysical techniques to be applied on lines 9800, 10000, 10200E (ie 200m either side of drill hole section as well as the drill section) over about 500m centred on the geochem anomaly. (Total 1.5km)

as follows:

MST
VLF
SIROTEM (will involve additional grid cutting)
TURAM
MAGNETICS
1 LINE OF GRAVITY
SP
IP Dipole-Dipole
IP Pole- Dipole
IP Down Hole Logging

Some of these geophysical techniques will be fairly sensitive to <u>casing left in the hole</u> and especial care should be taken during the drilling to ensure that casing does not become stuck.

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409019

K513 W. Herrmann Macke Prover-1

ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.

52 Murray Road, Welshpool, W.A. 6106

Phone (09) 458 7999 Telex AA92560

ANALYTICAL REPORT No. 83.1 08 655

THIS REPORT MUST BE READ IN CONJUNCTION WITH THE ACCOMPANYING ANALYTICAL DATA

Geopeko Ltd
PO Box 598
Devonport
Tasmania 7310

ORDER No.	PROJECT
KP 2791	K513

DATE RECEIVED	RESULTS REQUIRED
30.10.81	URGENT

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
	3.11.81	3	75

STATE OF SAMPLES	SAMPLE NUMBERS	PRE-TREATMENT: DRY	CRUSH	SPLIT	PULVERISE	SIEVE	OTHER SEE REMARKS	NONE	ANALYSIS: REFER TO ANALYSIS SECTION	PREPARATION	METHOD
	TS 12901 - 75	1				2			Cu Pb Zn Ag As	A1	AAS
									Fe Mn	A1	AAS
	TS 12901 - 18								Au		LG40

RESULTS TO: As Above

RESULTS TO:

REMARKS

PROVER 1
MATE AUGER
GHORIZON SOIL.

1981 infills. (12.5, 6.25m Spacings)

STATE OF SAMPLES		ANALYSIS — PREPARATION				ANALYSIS — METHOD	
whole [illegible]	WC	perchloric acid	A1	cold acid	CA	atomic absorbtion	AAS
split core	SC	hydrochloric acid	A2	specific sulphide	SS	x-ray fluorescence	XRF
cutting	CU	nitric acid	A3	other mixed acids	Ma	spectrophotometry	SPEC
rock	Ro	aqua regia	A4	alkaline attack	AA	colorimetry	COL
soil	SO	nitric-perchloric	A5	volatilization	VO	chromatography	CHR
pulp	PU	HF mixture	A6	ignition	IG	titration	TTN
water	WA	HF under pressure	A7	pressed powder (XRF)	PP	other chemicals means	CHEM
tissue	TT	fusion	A8	glass fusion (XRF)	GF	miscellaneous	MISC
[illegible]	[illegible]					fluorescence	FLUOR
[illegible]	[illegible]					inductively coupled plasma	ICP

AUTHORISED OFFICER B. Don

019

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ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
TS	81.1 08 655	5.11.81	KP 2791	1 OF 4

		Mn	Fe	Cu	Zn	As	Ag	Au	Pb	10000 EAST
1	12901	590	1.20%	30	415	4	4.2	0.008	680	10100 NORTH
2	12902	270	7250	15	315	15	5.6	X	460	10106.25
3	12903	380	2.30%	35	560	54	3.5	X	800	10112.5
4	12904	405	1.90%	25	360	45	1.9	X	575	10118.75
5	12905	295	1.40%	8	240	55	1.2	X	385	1025
6	12906	870	1.90%	39	605	20	1.1	X	655	10131.25 N
7	12907	960	2.15%	25	510	21	3.0	X	765	10137.5 N
8	12908	475	1.80%	38	560	21	4.1	X	1170	10143.75
9	12909	285	1.20%	37	600	9	1.3	X	810	10150
10	12910	845	2.00%	30	690	6	1.5	X	970	10156.25
11	12911	835	1.85%	35	705	8	1.5	X	1000	11
12	12912	710	2.15%	25	680	33	0.9	X	570	10162.5
13	12913	1150	1.90%	15	290	5	0.8	X	300	10168.75
14	12914	1350	2.50%	25	690	24	0.8	X	720	10175
15	12915	1500	2.25%	20	720	18	0.5	X	715	101812.5
16	12916	1350	2.40%	15	540	11	0.5	X	420	10187.5
17	12917	1010	2.25%	5	370	11	0.2	X	350	10193.75
18	12918	1800	3.70%	35	1900	10	0.9	X	495	10200
19	12919	150	5400	5	110	7	0.2		270	10050N
20	12920	110	6200	15	385	7	0.3		910	10056.25
21	12921	120	6500	15	425	5	0.2		1230	10056.25
22	12922	455	1.95%	20	505	24	1.3		2900	10062.5
23	12923	485	2.15%	70	835	22	1.0		2350	10068.75
24	12924	170	2.30%	35	370	36	0.4		890	10075
25	12925	480	5900	15	155	6	0.1		480	10081.25

10000 EAST

Results quoted are specified
Limit of determination too low for reliable measure
Sample not detected at level

AUTHORISED OFFICER

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ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
TS	83.1 08 655	5.11.81	KP 2791	2 OF 4

[illegible]	[illegible]	Mn	Fe	Cu	Zn	[illegible]	Ag	Au	Pb	
1	12926	520	1.75%	20	420	7	0.2		430	10087.5N
2	12927	275	9500	10	215	8	0.4		300	10093.75
3	12928	475	1.30%	10	280	7	0.2		360	10100
4	12929	830	2.10%	10	420	13	0.2		445	10106.25
5	12930	665	2.25%	15	335	15	0.2		435	10112.5
[illegible]	12931	625	2.35%	15	335	14	0.3		430	"
7	12932	1100	2.05%	15	380	10	0.3		835	10118.75
8	12933	1450	2.80%	25	545	28	1.0		1750	10125
9	12934	2300	4.65%	15	645	22	0.5		945	10131.25
10	12935	565	1.70%	5	170	19	0.2		800	10137.5
11	12936	375	9700	5	180	11	0.2		795	10143.75
12	12937	185	3650	X	95	4	X		280	10150
13	12938	345	1.70%	20	365	38	0.3		435	10000N
14	12939	415	1.50%	10	350	22	0.2		400	10006.25
15	12940	370	1.50%	10	315	31	0.4		680	10012.5
[illegible]	12941	400	1.90%	20	340	36	0.6		1380	"
17	12942	900	3.25%	20	425	45	0.6		780	10018.75
18	12943	270	3.75%	30	415	93	0.6		1460	10025
19	12944	535	1.90%	15	500	42	1.0		755	10031.25
20	12945	615	2.55%	15	400	50	1.0		1300	10037.5
21	12946	1750	3.35%	10	440	28	0.6		720	10043.75
22	12947	475	2.25%	15	465	30	0.6		295	10050
23	12948	930	2.70%	10	615	21	0.6		415	10056.25
24	12949	935	2.40%	15	630	7	0.6		375	10062.5
25	12950	3850	4.85%	15	975	11	1.4		1500	10068.75

9800 EAST

9600 EAST

[illegible] specified
[illegible] concentration too low [illegible]
[illegible] below detection limit [illegible]

AUTHORISED OFFICER [signature]

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A division of [illegible] Pty. Ltd.

ANALYTICAL DATA

SAMPLE TYPE | REPORT DATE | CLIENT ORDER NO. | PAGE

TS | 83.1 08 655 | 5.11.81 | KP 2791 | 3 OF 4

Sample No.	Laboratory No.	Mn	Fe	Cu	Zn	As	Ag	Au	Pb	
1	12951	3600	4.35%	15	1050	10	1.2		1350	10066.75
2	12952	2050	4.25%	10	1650	7	2.0		245	10095
3	12953	1200	2.90%	15	1250	10	3.9		535	10088.25
4	12954	975	3.05%	20	1400	16	3.4		645	10087.5
5	12955	525	1.70%	15	805	6	2.3		295	10091.25
6	12956	555	3.05%	20	1100	34	0.7		260	10100
7	12957	230	1.15%	10	255	10	0.8		280	9950 N
8	12958	390	1.45%	10	440	6	0.9		240	9956.25
9	12959	900	2.00%	10	1300	11	0.6		425	9962.5
10	12960	625	2.40%	5	520	25	0.8		825	9968.75
11	12961	645	2.40%	5	545	26	0.8		935	11
12	12962	270	1.50%	15	640	24	1.1		495	9975
13	12963	240	1.20%	5	360	15	0.7		310	9981.25
14	12964	200	1.20%	5	270	34	0.3		360	9987.5
15	12965	105	1.15%	25	205	46	0.6		480	9993.75
16	12966	700	1.45%	30	430	42	0.2		415	10000
17	12967	165	1.40%	15	295	47	0.4		560	10006.25
18	12968	430	1.10%	15	435	31	0.7		510	10012.5
19	12969	300	1.60%	15	455	34	0.7		470	10018.75
20	12970	165	1.50%	40	475	34	0.5		310	10025
21	12971	160	1.50%	40	470	36	0.5		280	10025
22	12972	380	1.50%	X	620	20	3.0		240	10031.25
23	12973	350	1.60%	5	850	27	1.3		310	10037.5
24	12974	315	1.70%	10	1350	26	0.5		285	10043.75
25	12975	425	1.60%	5	645	16	2.5		175	10050

9500 EAST

9450 EAST

Specified
[illegible] ration has low to [illegible]
[illegible] detection limit of [illegible]

AUTHORISED OFFICER

409023

022

ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
TS	8[illegible].1 08 655	5.11.81	KP 2791	4 OF 4

TUBE No.	SAMPLE No.	Mn	Fe	Cu	Zn	As	Ag	Au	Pb	
1	ASS5	290	37.5[illegible]	440	110	830	0.7		325	
2	TS12901	590	1.20[illegible]	30	420	4	4.2		695	
3	TS12920	115	6450	15	400	9	0.4		925	
4	ASS5	235	33.5[illegible]	370	90	700	0.6		270	
5	TS12941	400	1.90[illegible]	20	350	36	0.6		1390	
6	TS12960	600	2.40[illegible]	5	515	26	0.6		815	
7										
8										
9										
10										
11										
12										
13										
14										
15										
[illegible]										
[illegible]										
18										
19										
20										
21										
22										
23	DETECTION	5	50	5	5	1	0.1	0.008	5	
24	DIGESTION									
25	METHOD	A1/1	A1/1	A1/1	A1/1	A1/3	A1/2	LG40	A1/1	

[illegible] specified
[illegible] concentration too low to measure
[illegible] is below detection limit
[illegible]

AUTHORISED OFFICER B. Dow[illegible]

ANALABS
A division of MacDonald Hamilton & Co. Pty. Ltd.
Phone (09) 458 7999 52 Murray Road, Welshpool, W.A. 6106

ANALYTICAL REPORT No. 81 08 704

THIS REPORT MUST BE READ IN CONJUNCTION WITH THE ACCOUNTANYING ANALYTICAL DATA

Geopeko Ltd
PO Box 598
Devonport
Tasmania 7310

ORDER No.	PROJECT
KP 2815	MACKE

DATE RECEIVED	RESULTS REQUIRED
26.11.81	

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
	3.12.81	3	151

STATE OF SAMPLES	PRE-TREATMENT								ANALYSIS		
REPORT BELOW	SAMPLE NUMBERS	DRY	CRUSH	SPLIT	PULVERISE	SIEVE	OTHER OR REMARKS	NONE	REQUIRED ANALYTICAL SYSTEM	PREPARATION	METHOD
	TS 12976-13000	1				2			Cu Pb Zn Ag Fe	A1	AAS
	TS 13901-14000								Mn	A1	AAS
	TS 15851-15886										

RESULTS TO: As Above

RESULTS TO:

REMARKS

PROVER 1
MATE AUGER
C-HORIZON SOILS.
1981 infills
12.5m. Spacing

STATE OF SAMPLES		ANALYSIS — PREPARATION				ANALYSIS — METHOD	
whole core	WC	perchloric acid	A1	cold acid	CA	atomic absorption	AAS
split core	SC	hydrochloric acid	A2	specific sulphide	SS	x-ray fluorescence	XRF
cutting	CU	nitric acid	A3	other mixed acids	Ma	spectrophotometry	SPEC
rock	Ro	aqua regia	A4	alkaline attack	AA	colorimetry	COL
soil	SO	nitric-perchloric	A5	volatilization	VO	chromatography	CHR
pulp	PU	HF mixture	A6	ignition	IG	titration	TTN
water	WA	HF under pressure	A7	pressed powder (XRF)	PP	other chemical process	CHEM
tissue	TI	fusion	A8	glass fusion (XRF)	GF	miscellaneous	MISC
stream sediment	SS					fluorescence	FLUOR
heavy mineral	HM					inductively coupled plasma	ICP

AUTHORISED OFFICER

409024

ANALABS

A division of [illegible]

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
IS	83.1 08 704	3.12.81	KP 2815	1 OF 8

No.	SAMPLE No.		Mn	Fe	Cu	Zn	Ag	Pb		
1	12976		405	1.35%	10	210	0.2	325		10500 N
2	12977		805	2.10%	10	270	0.1	495		104875
3	12978		355	1.20%	5	165	0.3	275		10475
4	12979		290	1.15%	20	165	0.2	310		10462.5
5	12980		100	5450	20	70	0.2	145		10450
6	12981		80	4950	20	55	0.3	145		"
7	12982		140	7150	15	155	0.4	175		10437.5
8	12983		275	1.50%	5	250	1.5	875		10425
9	12984		280	3.50%	5	320	1.3	385		10412.5
10	12985		260	6900	X	110	0.4	440		10400
11	12986		190	2.55%	5	155	0.8	360		10387.5
12	12988		300	9650	X	105	0.3	595		10375
13	12989		205	8350	X	130	0.3	490		10350
14	12990		340	1.30%	X	170	0.3	495		10337.5
15	12991		290	1.20%	X	145	0.3	445		10337.5
16	12992		330	8550	5	145	0.3	325		10325
17	12993		200	5350	X	150	0.7	340		10312.5
18	12994		235	7500	5	95	0.5	250		10300
19	12995		295	9350	10	205	2.3	570		10287.5
20	12996		355	2.00%	25	260	0.5	680		10275
21	12997		300	1.50%	15	225	0.8	635		10262.5
22	12998		160	8650	10	160	1.2	420		10250
23	12999		690	1.80%	10	245	1.3	345		10237.5
24	13000		350	1.65%	10	200	0.3	610		10225
25	13001		330	1.25%	5	190	0.2	630		"

10 2500 FAST

Results in ppm unless otherwise specified
T = element present; but concentration too low to measure
X = element concentration is below detection limit
— = element not determined

AUTHORISED OFFICER

409025

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
TS	83.1 08 704	3.12.83	KP 2815	2 OF 8

No.	SAMPLE No.		Mn	Fe	Cu	Zn	Ag	Pb	
1	13902		175	4350	5	70	0.5	295	10242.5
2	13903		315	1.55%	25	280	0.5	680	10200
3	13904		300	1.60%	25	295	0.7	1000	10187.5
4	13905		370	1.60%	10	335	1.1	1850	10175
5	13906		390	1.80%	50	385	4.5	1900	10162.5
6	13907		160	2.00%	25	285	0.4	1950	10150
7	13908		150	8600	15	115	0.3	500	10137.5
8	13909		130	1.10%	5	95	X	125	10125
9	13910		40	1.50%	20	15	0.5	75	10112.5
10	13911		55	1.60%	25	20	0.5	75	11
11	13912		50	5750	20	25	0.2	140	10100
12	13913		50	2.30%	40	60	0.1	95	10087.5
13	13914		15	6150	15	15	0.2	35	10075
14	13915		10	1250	X	X	0.9	45	10062.5
15	13916		10	1600	X	5	0.2	20	10050
16	13917		85	8100	50	35	0.3	15	10037.5
17	13918		75	8400	40	55	0.3	40	10012.5
18	13919		65	5050	10	65	0.6	65	10025
19	13920		140	2.25%	20	100	0.2	80	10037.5
20	13921		150	2.30%	20	110	0.2	75	11
21	13922		170	8300	10	95	1.0	155	10050
22	13923		155	7150	X	50	0.3	75	10062.5
23	13924		295	1.35%	20	280	0.4	335	10075
24	13925		270	6450	15	200	0.6	425	10087.5
25	13926		770	9950	30	370	2.4	520	10100

10250 EAST

10000 EAST

Results in ppm unless otherwise specified
T = element present; but concentration too low to measure
X = element concentration is below detection limit
--- = element not determined

AUTHORIZED OFFICER

409026

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
TS	83.1 08 704	3.12.81	KP 2815	3 OF 8

	SAMPLE No.		Mn	Fe	Cu	Zn	Hg	Pb	
1	13927		1300	1.60%	15	955	0.9	275	10200
2	13928		1850	2.30%	5	445	0.3	145	10212.5
3	13929		1600	1.90%	10	465	0.1	80	10225
4	13930		1850	2.50%	15	500	X	170	10237.5
5	13931		1900	2.35%	15	490	X	165	10250
6	13932		780	1.90%	15	340	X	410	10262.5
7	13933		730	2.60%	5	290	0.4	375	10275
8	13934		760	2.35%	5	145	X	485	10287.5
9	13935		700	2.30%	5	305	X	310	10300
10	13936		1500	2.40%	10	270	X	415	10312.5
11	13937		600	1.80%	10	220	X	475	10325
12	13938		270	9350	X	110	0.3	180	10337.5
13	13939		425	6200	X	125	0.2	330	10350
14	13940		420	7200	5	140	0.1	405	"
15	13941		395	7300	X	145	0.3	405	10362.5
16	13942		410	1.45%	10	235	0.3	435	10375
17	13943		270	9700	40	125	0.2	220	10387.5
18	13944		160	1.40%	40	115	0.2	135	10400
19	13945		120	1.40%	50	100	0.2	90	10412.5
20	13946		150	1.50%	35	100	0.2	90	10425
21	13947		125	8100	30	100	0.2	85	10437.5
22	13948		160	1.55%	35	110	0.2	90	10450
23	13949		420	2.15%	35	270	0.1	270	10462.5
24	13950		275	3.40%	25	185	X	100	"
25	13951		300	3.25%	25	190	X	90	

EAST 10000

Results in ppm unless otherwise specified
T = element present; but concentration too low to measure
X = element concentration is below detection limit
--- = element not determined

409027

ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
IS	83.1 08 704	3.12.81	KP 2815	4 OF 8

[illegible]	SAMPLE No.		Mn	Fe	Cu	Zn	Ag	Pb	
1	13952		200	2.45%	25	120	0.1	55	10475
2	13953		335	2.70%	20	130	0.2	20	10487.5
3	13954		260	2.10%	25	170	0.2	20	10500
4	13955		260	2.15%	40	85	0.2	20	10400
5	13956		470	2.30%	35	105	0.7	305	
6	13957		295	1.40%	10	65	0.2	270	10375
[illegible]	13958		110	1.25%	35	155	0.2	105	
8	13959		125	6350	5	35	0.5	175	10350
9	13960		185	8900	X	35	0.3	305	10337.5
10	13961		200	9700	5	40	0.4	335	10337.5
11	13962		1500	5.30%	5	455	0.6	780	10325
12	13963		510	1.95%	20	265	0.2	305	
[illegible]	13964		785	2.90%	10	375	0.4	320	10300
14	13965		1750	2.40%	10	685	0.9	440	
15	13966		290	9800	10	275	0.4	215	10275
16	13967		365	1.25%	X	100	0.3	205	
[illegible]	13968		1200	1.85%	5	410	1.2	495	10250
18	13969		2000	1.85%	10	765	0.9	495	
19	13970		3000	2.10%	10	865	0.8	355	10225
20	13971		3200	2.10%	10	840	0.8	355	9
21	13972		2500	2.50%	15	920	0.7	455	
22	13973		4150	3.10%	10	1300	1.4	450	10200
23	13974		1100	1.30%	10	1950	0.6	215	
24	13975		4900	1.15%	5	420	0.7	210	10175
25	13976		1000	5100	X	155	0.5	130	9

10000E

9800 EAST

Results in ppm unless otherwise specified
T = element present; but concentration too low to measure
X = element concentration is below detection limit
— = element not determined

AUTHORISED OFFICER

409028

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER	PAGE
TS	83.1 08 704	3.12.83	KP 2815	5 OF 8

	SAMPLE No.		Mn	Fe	Cu	Zn	Ag	Pb	
1	13977		240	2650	X	95	0.3	410	10150 N
2	13978		135	3000	X	65	0.4	435	10050
3	13979		145	4300	5	190	1.1	780	10037.5
4	13980		160	4750	5	140	0.4	480	10025
5	13981		160	4400	X	170	0.4	465	9600 EAST 11
6	13982		270	8350	20	345	3.6	1000	
7	13983		245	7350	15	355	0.4	545	10050
8	13984		165	6900	10	135	0.3	275	
9	13985		55	4950	10	40	0.2	75	9975
10	13986		60	1.25%	30	35	0.4	165	
11	13987		40	1.10%	10	25	0.1	50	9950
12	13988		230	7950	10	220	0.3	180	9900
13	13989		295	8150	10	230	0.4	270	
14	13990		280	9850	15	520	0.1	330	9925
15	13991		260	1.10%	15	515	0.3	355	9925
16	13992		210	8350	10	315	0.4	360	
17	13993		145	7850	10	415	0.1	260	9950
18	13994		360	1.25%	20	545	1.1	480	
19	13995		235	1.45%	10	555	0.1	265	9975
20	13996		110	4400	10	510	0.6	160	9600 EAST
21	13997		295	1.25%	15	250	0.3	605	10000
22	13998		550	2.50%	15	625	0.4	210	10100
23	13999		415	1.50%	5	405	0.4	145	10112.5
24	14000		1400	2.65%	5	820	0.3	75	10125
25	15851		1000	2.35%	5	605	0.4	75	11

Results in parts per million unless otherwise specified
T = element present, but concentration too low to determine
X = element concentration is below detection limit
- = element not determined

409029

ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
TS	83.1 08 704	3.12.81	KP 2815	6 OF 8

[illegible]	SAMPLE No.		Mn	Fe	Cu	Zn	Ag	Pb	
1	15852		630	6250	X	280	0.7	60	10137.5N
2	15853		130	1.70%	10	195	0.3	85	10150
3	15854		50	2150	X	50	0.3	160	
4	15855		120	1.75%	X	130	0.3	380	10175
5	15856		110	1.55%	X	90	0.3	545	
6	15857		390	1.80%	5	270	0.3	345	10200
7	15858		170	8050	X	210	0.4	445	
8	15859		170	5500	X	405	1.0	370	10225
9	15860		120	4300	5	90	1.0	510	10237.5
10	15861		110	5400	5	95	1.1	555	"
11	15862		370	1.70%	30	340	0.8	805	10250
12	15863		615	1.70%	35	545	1.0	445	
13	15864		330	1.60%	5	230	0.3	200	10275
14	15865		360	1.50%	10	215	0.2	200	
15	15866		355	2.05%	15	75	0.3	85	10300
16	15867		2600	1.95%	10	280	0.5	695	10150
17	15868		470	1.70%	5	330	0.5	150	
18	15869		315	8800	X	655	0.5	30	10125
19	15870		205	6450	X	155	0.4	45	10112.5
20	15871		190	6100	X	155	0.5	40	10112.5
21	15872		110	2400	X	25	0.5	20	10100
22	15873		280	9100	5	315	0.7	155	
23	15874		220	7400	5	445	0.6	175	10075
24	15875		160	4650	X	375	0.5	125	
25	15876		830	1.75%	5	535	2.1	215	10050

9600 EAST

9400 EAST

Results in ppm unless otherwise specified
T = element present; but concentration too low to measure
X = element concentration is below detection limit
— = element not determined

409030

030

409031

ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
TS	83.1 08 704	3.12.81	KP 2815	7 OF 8

TUBE No.	SAMPLE No.		Mn	Fe	Cu	Zn	Ag	Pb		
1	15877		230	8100	5	245	0.6	210	9950 N	
2	15878		130	7150	X	400	0.6	245		
3	15879		120	8650	10	520	0.2	330	9925	
4	15880		230	5900	X	185	0.5	95	9912.5	
5	15881		205	6000	X	190	0.5	90	"	
6	15882		150	1.35%	5	125	0.4	75	9900	
7	15883		140	5300	5	125	0.4	85		
8	15884		175	7750	5	240	0.4	45	9875	
9	15885		145	7750	X	115	0.5	70		
10	15886		155	8750	5	105	0.4	70	9850N	
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										

9400 EAST

[illegible] otherwise specified
[illegible] concentration too low to measure
[illegible] is below detection limit
[illegible]

AUTHORISED OFFICER B [illegible]

031

409032

ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
IS	81 08 704	3.12.81	KP 2815	8 OF 8

Row No.	Sample No.		Mn	Fe	Cu	Zn	Ag	Pb		
1	STD FS4		610	6.80%	275	7000	0.9	95	N	N
2	RPT 12976		400	1.40%	10	210	0.2	330		
3	RPT 12995		295	9400	15	210	2.4	550		
4	STD FS4		600	7.20%	285	660	0.7	95		
5	RPT 13916		10	1650	X	5	0.1	15		
6	RPT 13935		685	2.55%	5	300	X	305		
7	STD FS4		600	7.20%	285	660	0.7	95		
8	RPT 13956		475	2.40%	35	110	0.3	295		
9	RPT 13975		5200	1.10%	5	420	0.6	195		
10	STD FS4		620	6.60%	270	640	0.9	100	N	
11	RPT 13996		115	4250	5	490	0.7	160		
12	RPT 15865		355	1.40%	10	215	0.3	190		
13										
14										
15										
16										
17										
18	Sample No IS 12987 N.I Submitted									
19										
20										
21										
22										
23	DETECTION		5	50	5	5	0.1	5		
24	DIGESTION		A1	A1	A1	A1	A1	A1		
25	METHOD		A1/1	A1/1	A1/1	A1/1	A1/2	A1/1		

otherwise specified
concentration too low to measure
relative detection limit

AUTHORISED OFFICER

3.1.1 PROVER 1 DIAMOND DRILLING (J. Pemberton, 1982)

In the period November to December 1981 close spaced hand held power auger samples were collected over the known Pb anomaly on Prover 1. DDH 1 was planned to pass under the peak of the Pb anomaly to relate soil to rock geochemistry, examine the sequence and style of mineralization. If the hole proved positive it was intended to test a variety of geophysical methods as an orientation-calibration exercise. The drill log profile and geochemical comparison appear in Figure No 4,5.

SUMMARY LOG & GEOCHEMISTRY

The hole was collared in April 1982 on 10260N 10000E drilling grid south at an angle of inclination of -50°. A brief summaryof the major rock types intersected and associated geochemistry follows:-

0 - 33m	Grey to green tuffaceous siltstone. Pyrite, galena and sphalerite are visible in trace amounts along fractures. This mineralization is reflected in increased Pb and Zn values from 20m to 34m.
33m - 63m	Medium to coarse grained lithic crystal tuffs with interbedded cherts and welded tuffs. No anomalous Pb values with minor Zn from 53m to 59m.
63m - 70m	Medium to coarse grained lithic crystal tuff and welded tuff. Anomalous Zn is associated with a highly broken zone from 66m to 83m.

...

70m - 74m Cream siltstone with graded beds showing facing up the hole.

74m - 88m Chert predominates with ±15% tuff beds. A vein of sphalerite at 86m results in 0·24%Zn.

88m - 156m Medium grained siliceous quartz biotite porphyritic lava. Zones of chloritic-talcose alteration carries pyrite and sphalerite as veins and blebs. Sporadic Zn values upto 1.5% coincide with this alteration while Pb is more subdued.

A comparison of the down hole geochemistry with that of the auger samples does not show the expected correlation. From the surface to 34m the highest Pb values were recorded (up to .32%) while the projected surface expression of this zone had Pb values below 200ppm. The remainder of the hole has Pb values averaging below 100ppm while the surface is highly anomalous with values well above 500ppm. As the core was fractured in numerous places down the hole it is possible that faulting displaced the lithologies and their geochemistry.

CONCLUSION

The style of occurrence of the mineralization as veins, smears and blebs and the low assay values do not provide the encouragement to proceed with the planned geophysical orientation-calibration exercise.

034

409035

Logged By: J. Pemberton., May 1982.

SHEET 1 OF 4

GEOPEKO TASMANIA DRILL LOG

Prospect Prover 1 Hole no. 1.

DEPTH (m) from	to	GRAPHIC LOG	ANGLE TO CORE AXIS So	St	GEOLOGICAL DESCRIPTION	Alteration	MINERALISATION py	g	sp	ch	Fracturing	Sample No. KR	From (m)	To (m)	Rec (m)	ASSAYS (Lab: ANALAB - COOKE) Cu	Pb	Zn	Ag	Au	Ba	
0	1				0m - 0.1m Thin soil cover.						>20	11001	0	1	1	25	1100	590	3.0	36	450	35
1	2				0.1m - 32.9m Grey to green fine grained						>20	11002	1	2	1	25	600	380	2.0	40	430	39
2	3		54		diffaceous siltstone.						>20	11003	2	3	1	20	690	440	2.0	47	560	52
3	4										>20	11004	3	4	1	15	200	300	1.0	19	565	60
4	5		50		Orange clay parallel to So and along						17	11005	4	5	1	15	160	350	1.0	11	475	69
5	6				fractures - probable weathered sulphide		tr	tr			10	11006	5	6	1	25	270	1300	2.0	46	460	83
6	7										>20	11007	6	7	1	15	560	460	2.0	39	480	46
7	8										>20	11008	7	8	1	15	390	465	2.0	35	500	
8	9		72								>20	11201	8	9	.8	15	480	465	1.0	56	490	
9	10				Dark grey beds ± 2cm chert & sil. siltstone.						>20	11202	9	10	1	15	515	430	1.0	47	420	
10	11				10.2m ± 10cm brecciation						>20	11203	10	11	1	15	525	615	2.0	40	585	
11	12		43								>20	11204	11	12	1	10	430	535	2.0	35	520	
12	13										8	11205	12	13	1	15	530	470	1.0	41	480	47
13	14										10	11206	13	14	1	15	765	530	2.0	41	450	41
14	15		65								17	11207	14	15	1	15	915	430	2.5	36	435	32
15	16				15.1m Trace py+g on fracture		tr	tr			6	11208	15	16	1	15	1550	1250	2.5	50	520	45
16	17										>20	11209	16	17	1	10	850	690	2.0	46	530	39
17	18		70								13	11210	17	18	1	15	785	345	2.5	46	515	31
18	19				18.4m - 18.9m brecciated.						>20	11211	18	19	1	20	700	600	2.0	37	585	46
19	20										11	11212	19	20	.9	20	1200	355	2.0	23	425	23
20	21		76		20.5 - 28m py+g on fractures surfaces		tr	tr			16	11213	20	21	1	30	1350	535	2.5	16	640	28
21	22				weathered & orange clay.		tr	tr			11	11214	21	22	1	30	2100	1750	3.0	14	640	95
22	23				Orange clay // & So - no visible		tr	tr			13	11215	22	23	1	30	1750	1300	3.0	39	545	83
23	24				sulphides // & So.		tr	tr			14	11216	23	24	1	25	2150	2150	2.0	20	630	50
24	25						tr	tr			6	11217	24	25	1	20	1950	2250	3.5	25	480	54
25	26				25.6m T.S. KR 11051		tr	tr			9	11218	25	26	1	25	2100	2900	4.0	21	520	53
26	27						tr	tr			8	11219	26	27	1	30	1750	2700	4.0	16	660	66
27	28		68		py+g on vein + // & So.		tr	tr			>20	11220	27	28	1	20	1350	1800	2.5	18	650	57
28	29				Visible sp at 28.6m as irregular vein		tr	tr	tr		9	11221	28	29	1	20	965	1250	2.5	20	765	56
29	30						tr	tr	tr		12	11222	29	30	1	20	1400	1900	3.5	36	695	58
30	31						tr	tr			5	11223	30	31	1	30	235	700	2.0	95	665	71
31	32		62				tr	tr			11	11224	31	32	1	45	1400	2100	2.5	44	710	60
32	33				32.9m - welded medium to coarse grained		tr	tr			>20	11225	32	33	1	40	1650	1300	2.5	26	600	64
33	34				lithic crystal tuff with fine grained		tr	tr	tr		8	11226	33	34	1	55	2400	1600	2.0	19	765	40
34	35		61		clast beds up to 2cm thick @ 35.5m.		tr	tr	tr		>20	11227	34	35	1	40	2150	2550	2.0	4	1200	45
35	36				36.4m - vein + disseminated sp+py+g		tr	tr	tr		15	11228	35	36	1	20	420	590	1.0	3	925	
36	37				100cm. Trace of hematite + tuff.		tr	tr	tr		15	11229	36	37	1	15	50	400	1.0	2	770	
37	38				37.5. Clast predominate over tuff.			tr	tr		19	11230	37	38	1	15	20	550	X	1	725	
38	39							tr	tr		20	11231	38	39	1	15	40	710	1.0	3	665	95

0351

SHEET 2 OF 4

GEOPEKO TASMANIA DRILL LOG

409036

Prospect PROVER 1 Hole no. 1

DEPTH (m) from	DEPTH (m) to	Graphic Log	ANGLE TO CORE AXIS Sa	ANGLE TO CORE AXIS Si	GEOLOGICAL DESCRIPTION	Alteration	MINERALISATION py	MINERALISATION g	MINERALISATION sp	MINERALISATION cl	Fracturing	Sample No. KR	From (m)	To (m)	Rec (m)	ASSAYS (Lab: AMDEL - COOTE Cu	Pb	Zn	Ag	As	Sb
39	40		69		Recrystallized qz in fractures rifflely.		t	t	t		>20	111232	39	40	1	20	50	625	1.0	3	585
40	41						t	t			>20	111233	40	41	1	15	35	550	0.5	3	525
41	42				42.1m quartz pebble ; recrystal veinlet		t	t			>20	111234	41	42	1	15	50	560	x	2	585
42	43		61		tuff Blk 1/cm			t			13	111235	42	43	1	20	90	580	x	3	495
43	44										19	111236	43	44	1	20	60	625	x	3	585
44	45				Manganese staining along fractures			t	t		14	111237	44	45	1	25	30	925	x	3	510
45	46		72								>20	111238	45	46	1	20	35	720	x	4	430
46	47				Clast pervit with ext fragments (?)						13	111239	46	47	1	15	25	660	0.5	3	495
47	48										>20	111240	47	48	1	15	50	535	0.6	6	405
48	49										>20	111241	48	49	.6	20	55	610	0.5	2	630
49	50										>20	111242	49	50	.7	25	70	670	x	2	820
50	51										>20	111243	50	51	1	20	25	610	x	x	1750
51	57		60		Orange clay pervit along fractures						>20	111244	51	52	1	30	10	690	0.5	2	2200
52	53										>20	111245	52	53	1	50	10	740	0.5	2	3950
53	54										>20	111246	53	54	1	130	15	1400	2.0	15	3200
54	55										>20	111247	54	55	1	10	10	1300	1.0	6	1900
55	56										>20	111248	55	56	1	5	10	1250	0.5	2	1250
56	57				Clast rel welded tuff + recrystal						>20	111249	56	57	1	10	15	715	x	24	1350
57	58		71		crystal tuffs - calm to green with			t	t		>20	111250	57	58	1	10	15	1450	1.0	11	1350
58	59				recessive dark green Clast - Absolute						>20	111251	58	59	1	30	25	820	x	2	1700
59	60										>20	111501	59	60	1	115	60	425	0.5	3	1400
60	61				60.9 well bedded dust overlays +						>20	111502	60	61	1	20	25	600	1.0	x	1650
61	62				infills designated tuff unit suggesting						>20	111503	61	62	1	20	35	850	0.5	4	2250
62	63				facing up the bed TS KR11062						>20	111504	62	63	1	10	60	525	x	2	1650
63	64		63					t	t		>20	111505	63	64	1	15	10	585	0.5	1	950
64	65				From 63m & 70m chevron ; clast bed						>20	111506	64	65	1	15	15	630	x	2	1050
65	66										>20	111507	65	66	1	30	40	2300	1.0	15	330
66	67				Highly fracture zone from 66m & 83m						>20	111508	66	67	1	15	30	1450	x	20	500
67	68										>20	111509	67	69	.6	15	85	1250	1.0	4	745
68	69										>20				.5						
69	70				Green Alt with grading up the bed						>20	111510	69	70	1	10	105	1350	0.5	2	600
70	71				Grading defined by Clast mineral						>20	111511	70	71	.8	10	70	610	0.5	3	1150
71	72				- no magnetic fric Gravel Layer.						>20	111512	71	72	.7	15	70	445	0.5	x	970
72	73				72m KR11053 T.S.						>20	111513	72	73	.8	20	60	775	1.0	6	690
73	74										>20	111514	73	74	.6	30	20	1300	0.5	27	880
74	75				Clast bed suggested						>20	111515	74	75	.9	15	25	670	0.5	2	1000
75	76										>20	111516	75	76	1	10	40	660	x	3	510
76	77										>20	111517	76	77	1	15	150	690	1.0	3	450
77	78										>20	111518	77	78	1	15	60	360	0.6	2	540

036

GEOPEKO TASMANIA DRILL LOG

409037

SHEET 3 OF 4

Prospect Prover 1 Hole no. 1

DEPTH (m) from	DEPTH (m) to	GRAPHIC LOG	ANGLE TO CORE AXIS So	ANGLE TO CORE AXIS Si	GEOLOGICAL DESCRIPTION	Alteration	MINERALISATION py	MINERALISATION g	MINERALISATION sp	MINERALISATION ch	Fracturing	Sample No. RR	From (m)	To (m)	Rec (m)	ASSAYS (Lab: Amdaas-Cooper) Cu	Pb	Zn	Ag	As	Ba	
78	79				From 78m - 82.5m dark grey & grey chert beds predominate with light						>20	11519	78	79	.7	15	40	350	x	2	360	
79	80		56		forming ~15% of the section.						>20	11520	79	80	.8	30	85	635	1.0	16	305	
80	81										>20	11521	80	81	1	25	190	835	1.0	20	365	
81	82										>20	11522	81	82	1	15	50	580	0.5	12	525	
82	83										>20	11523	82	83	1	20	85	625	x	4	590	
83	84		81								>20	11524	83	84	.7	10	40	470	x	1	415	
84	85										>20	11525	84	85	1	10	40	715	x	7	325	
85	86										>20	11526	85	86	1	10	90	1500	x	11	415	
86	87				Sp present as vein material				Sp		16	11527	86	87	1	10	120	2400	x	11	335	95
87	88		84								18	11528	87	88	1	5	40	510	x	2	315	
88	89				82.5m - medium grained siltstone,						>20	11529	88	89	1	10	65	1700	x	7	225	
89	90				quartz biotite porphyritic lava with						>20	11530	89	90	1	5	50	1500	x	12	185	
90	91				calcite & calcareous (plagioclase)						>20	11531	90	91	1	5	35	720	x	4	155	
91	92				fabric/fracturing.						>20	11532	91	92	1	5	35	485	x	1	185	
92	93										>20	11533	92	93	1	10	35	400	0.5	5	285	
93	94				Ground + broken + cut by thin						>20	11534	93	94	1	5	30	900	x	9	180	
94	95				quartz veins.						>20	11535	94	95	1	5	55	760	x	8	225	
95	96										>20	11536	95	96	1	5	60	1375	x	7	185	
96	97				Cleavage appears to be ±35° to core axis						13	11537	96	97	1	10	50	610	0.5	7	125	
97	98										15	11538	97	98	1	10	25	650	x	5	170	
98	99										>20	11539	98	99	1	5	40	835	x	4	145	
99	100										17	11540	99	100	1	10	40	270	x	6	195	
100	101				Cemented fault of intermediate						18	11541	100	101	1	20	165	2400	x	15	230	
101	102				composition with brecciated contact						16	11542	101	102	1	15	135	1200	1.0	16	295	
102	103				Cuts oak core at 50° to core axis.						>20	11543	102	103	1	20	85	690	0.5	5	355	
103	104				Pol: S T.S. RR 11054			Sp	Sp		>20	11544	103	104	1	10	55	710	x	4	335	
104	105							Sp	Sp		19	11545	104	105	1	5	40	405	x	2	280	
105	106							Sp	Sp		>20	11546	105	106	1	10	45	600	x	2	305	
106	107				106m to 108m Core is brecciated with			Sp	Sp		>20	11547	106	107	1	20	105	2350	x	1	220	
107	108				quartz + chlorite as vein infilling			Sp	Sp		>20	11548	107	108	1	60	675	8580	1.0	4	250	
108	109				Comprising 30% g.				Sp		>20	11549	108	109	1	40	910	4900	x	29	505	34
109	110								Sp		>20	11550 / 11550R	109	110	1	65 / 10	900 / 185	1.99% / 2580	2.0 / x	1.7 / 4	320 / 1115	96 / 96
110	111								Sp		>20	11551	110	111	1	10	60	275	x	2	370	
111	112				Chloritic alteration/vein cut by late				Sp		20	11552	111	112	1	5	80	250	x	4	305	
112	113				quartz vein.						>20	11553	112	113	1	5	160	720	0.5	5	295	
113	114										18	11554	113	114	1	5	60	200	0.5	2	255	
114	115										>20	11555	114	115	1	10	35	220	x	1	200	
115	116				Cleavage appears to be ±45° as defined						17	11556	115	116	1	5	35	190	0.5	2	240	
116	117				by alteration sheets (carbonate).						16	11557	116	117	1	10	40	215	x	1	225	

037

409038

SHEET 4 OF 4

GEOPEKO TASMANIA DRILL LOG

Prospect Prover 1 Hole no. 1

DEPTH (m) from	DEPTH (m) to	GRAPHIC Log	ANGLE TO CORE AXIS So	ANGLE TO CORE AXIS Si	GEOLOGICAL DESCRIPTION	Alteration	MINERALISATION py	MINERALISATION g	MINERALISATION sp	MINERALISATION cl	Fracturing	Sample No. KR	From (m)	To (m)	Rec (m)	ASSAYS (Lab: Amdel - Cooper) Cu	Pb	Zn	Ag	As	Ba
117	118										>20	11559	117	118	1	10	50	175	X	1	265
118	119				Enclosed feldspar in a phenocryst		tr		tr	tr	>20	11560	118	119	1	30	270	1900	0.5	10	230
119	120				over 2m.		tr		tr	tr	>20	11561	119	120	1	125	95	3900	0.5	22	215
120	121				Mineralisation associated with						>20	11562	120	121	1	10	30	215	X	2	220
121	122				chlorite/talc (?) alteration.		tr		tr		>20	11563	121	122	1	10	60	290	X	2	105
122	123						tr				>20	11564	122	123	1	25	185	4000	0.5	11	115
123	124										>20	11565	123	124	1	15	100	1300	1.5	16	125
124	125				Alteration patches among py.						>20	11566	124	125	1	5	65	195	X	6	115
125	126								tr		11	11567	125	126	1	10	80	225	X	7	185
126	127										>20	11569	126	127	1	10	45	800	X	5	135
127	128										>20	11570	127	128	1	5	55	435	X	3	150
128	129										>20	11571	128	129	1	10	40	590	X	4	150
129	130						tr				18	11572	129	130	1	10	60	200	X	9	155
130	131						tr				>20	11573	130	131	1	10	110	210	X	4	125
131	132										>20	11574	131	132	1	5	55	315	X	4	175
132	133										>20	11575	132	133	1	10	80	225	X	5	200
133	136				quartz veins with barren feldspar		tr				>20	11576	133	136	1	5	55	140	X	6	205
134	135										>20	11577	134	135	1	5	35	95	X	X	195
135	136										16	11578	135	136	1	5	80	115	X	X	205
136	137										14	11579	136	137	1	5	70	290	X	1	170
137	138						tr				17	11580	137	138	1	5	70	320	X	1	195
138	139										12	11581	138	139	1	10	45	600	0.5	4	165
139	140				From 140m ground loses texture						16	11582	139	140	1	5	20	95	X	X	165
140	141				part i colour with a green alter-						6	11583	140	141	1	5	15	70	0.5	2	170
141	142				ation or coating.		tr				16	11584	141	142	1	5	10	80	X	2	170
142	143				141m T.S. 11055						13	11585	142	143	1	10	10	85	0.5	X	160
143	144										12	11586	143	144	1	10	10	90	X	1	165
144	145										9	11587	144	145	1	5	25	85	X	3	210
145	146				Angular blocks of lava & lava						17	11588	145	146	1	5	15	100	X	3	165
146	147				- phenocryst cross contact with						7	11589	146	147	1	5	10	75	X	1	220
147	148				angular alteration of groundmass						14	11590	147	148	1	5	5	90	X	2	125
148	149				& fracture control.						19	11591	148	149	1	5	25	106	X	2	200
149	150										>20	11592	149	150	1	10	40	130	0.5	2	265
150	151										11	11593	150	151	1	5	20	145	X	1	250
151	152										>20	11594	151	152	1	5	35	150	X	2	225
152	153				some of alteration + chlorite		tr				10	11595	152	153	1	5	60	135	X	7	265
153	154										11	11596	153	154	1	5	15	110	X	2	275
154	155										18	11597	154	155	1	10	20	155	X	X	260
155	156										16	11598	155	156	1	5	20	195	0.5	X	240
	EOH																				

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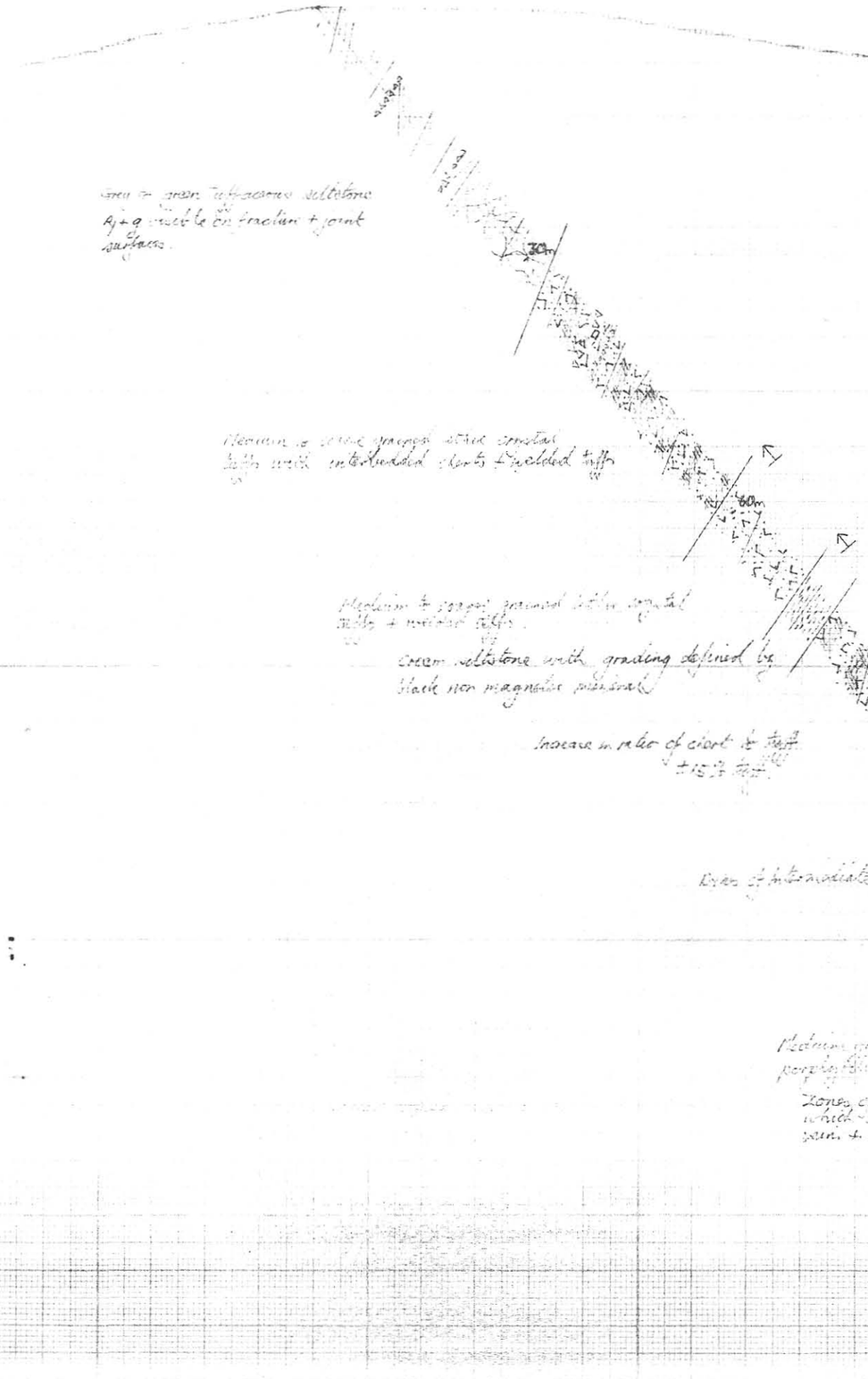
409039

N 09201 -



PROVER 1, ADH 1

Collar Co-Ordinates: 10000 E / 10260N

Collar Azimuth. : 130° Magnetic.

Collar Inclination: -50°

E.L. 2/70 PROVER 1

Geological Cross Section 10000 EAST.

Scale: 1:500

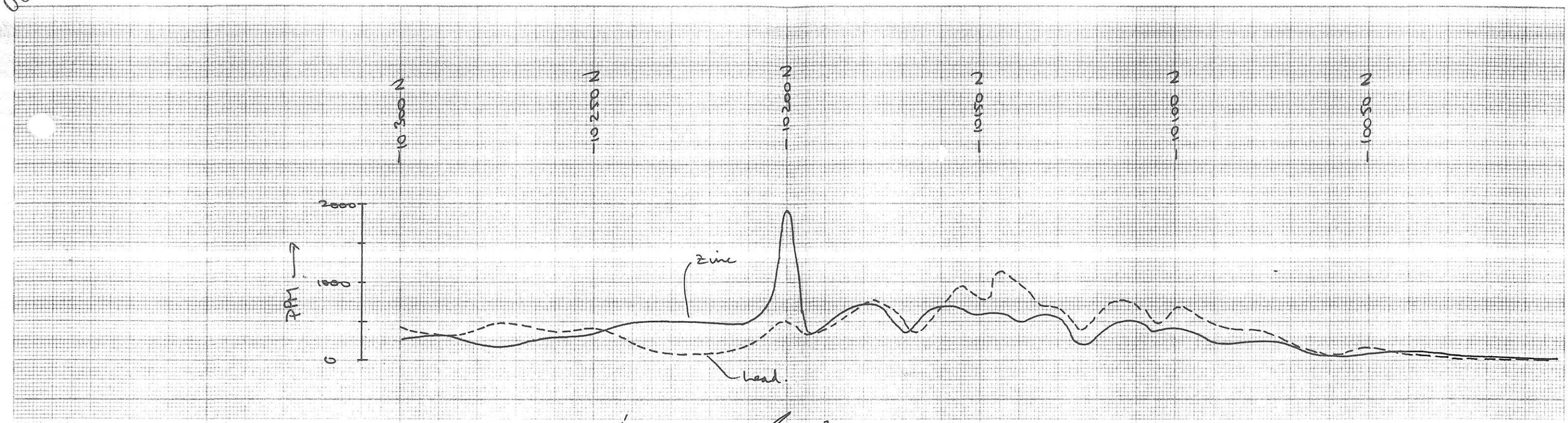
T. Pemberton: 1982.

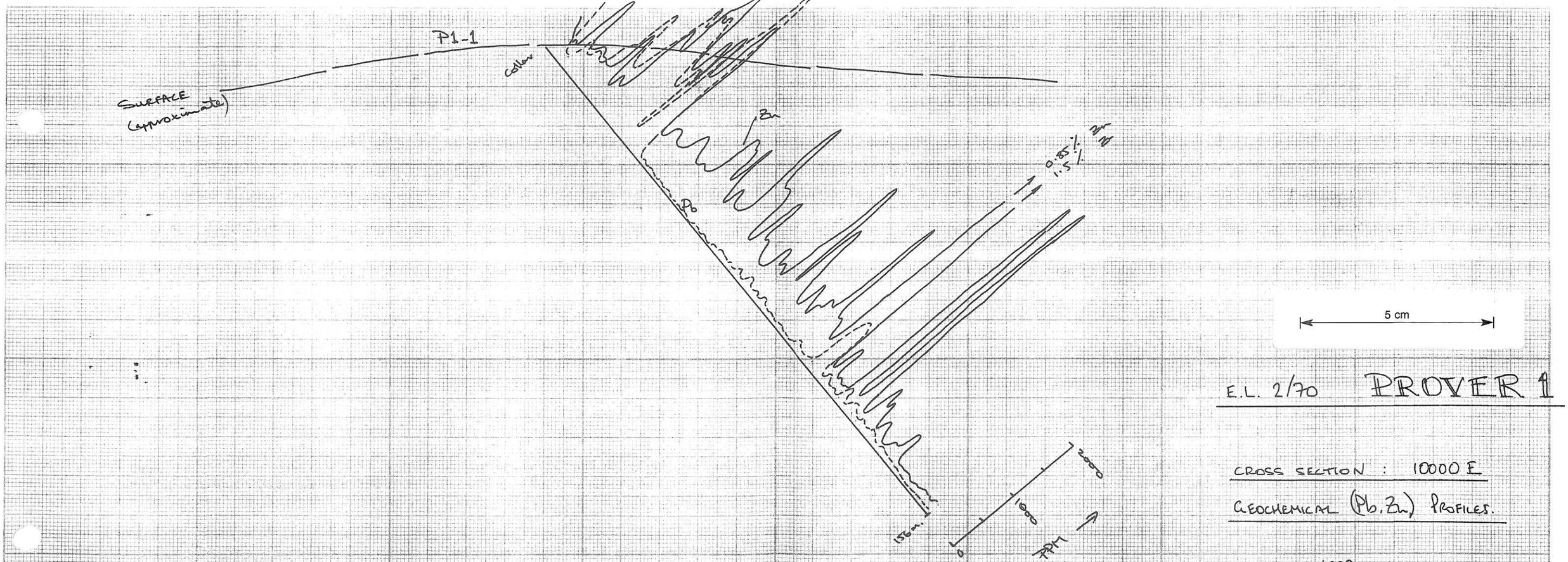
5 cm

FIG. 4

039

409040





5 cm

E.L. 2/70 PROVER 1

CROSS SECTION : 10000 E

GEOCHEMICAL (Pb, Zn) PROFILES.

SCALE 1:1000

FIG. 5

3.2 PROVER 3 (P. Heithersay)

Previous Work

Initiated after providing strongest drainage geochemistry anomaly.

Geology

1. Basement is PreCambrian quartzite.

2. Generally rhyolitic f.g. - medium grained quartz xtal tuffs lithic tuff and vitric tuff interbeds. Vitric tuff interbeds. Some haematic tuffaceous siltstones. Minor quartz veining. At base of grid have transgressive lava - non porphyritic feldsparphyric lava - flow structures - associated with lithic tuffs ??

3. Marker bed. Highly disordered polymict conglomerate angular to rounded PreCambrian and EoCambrian clasts.

4. Chloritic veining in parts. Chloritic clots in others. Disseminated pyrrhotite.

5. C.g. QFB Porphyry.

6. Tertiary Basalt.

Geochemistry

Rock Chips?

KR 6964 KR 6965
KR 6971
KR 6969
KR 6970

Jacro Geochemistry

Pb Geochemistry

Spot high ~ 0.1 - 0.3%Pb
Coincident xut tuffs minor chlorite veining with disseminated pyrite.

Zn Geochemistry
Coincident 300 - 700ppm Zn

Cu Geochem
- Illustrates basalt
- Spot highs

Ag Geochem
- Not much

FORWARD PROGRAMME

Dependant on Prover 1.

4. DIGHEM II ANOMALY FOLLOW UP

A Dighem II electromagnetic/resistivity/magnetic survey of 385 line km was flown over the area in February-March 1980.

The Dighem II Report by Fraser and Dvorak is presented in Appendix 6.1.

Discussion of the results of Sheet 2 of the survey, involving a small area south of the E.L. Boundary, has been deleted from their report.

Only two very weak (X type) conductors were identified over the favourable volcanic sequence, these were subsequently investigated as Provers 5 and 6. A third anomaly, Prover 7, occurred in the north eastern part of the licence in an area covered by Tertiary basalt.

Ground follow up of the anomalies involved establishment of small skeletal grids and coverage by Moving Source Turam, Magnetics and limited geological/ geochemical reconnaissance.

MOVING SOURCE TURAM

M.S.T. uses the two receiving coils of a conventional Turam unit; a Scintrex SE-77 5 frequency unit, with a third transmtting coil which moves along the traverse with the receiving coils. For the purposes of DIGHEM follow up a frequency of 945Hz is mostuseful as this approximates the frequency used by the DIGHEM system. The observed ratio at 945Hz is divided by the observed ratio at 105Hz to compensate for errors in coil geometry, the result is termed the normalised ratio. Such geometric problems do not affect phase difference measurements and they are plotted as read.

4.1.1 PROVER 5 M.S.T. FOLLOW UP

A weak DIGHEM anomaly appearing on the Co-axial inphase and quadrature channels, not big enough to have any real character. This anomaly is within system noise levels. Ground follow up showed no evidence that the anomaly had been located with no response being detected. Magnetic intensity was measured and showed nothing.

PROVER 5

PROVER 5

E.L. 2/70

Drakeman, Line 310

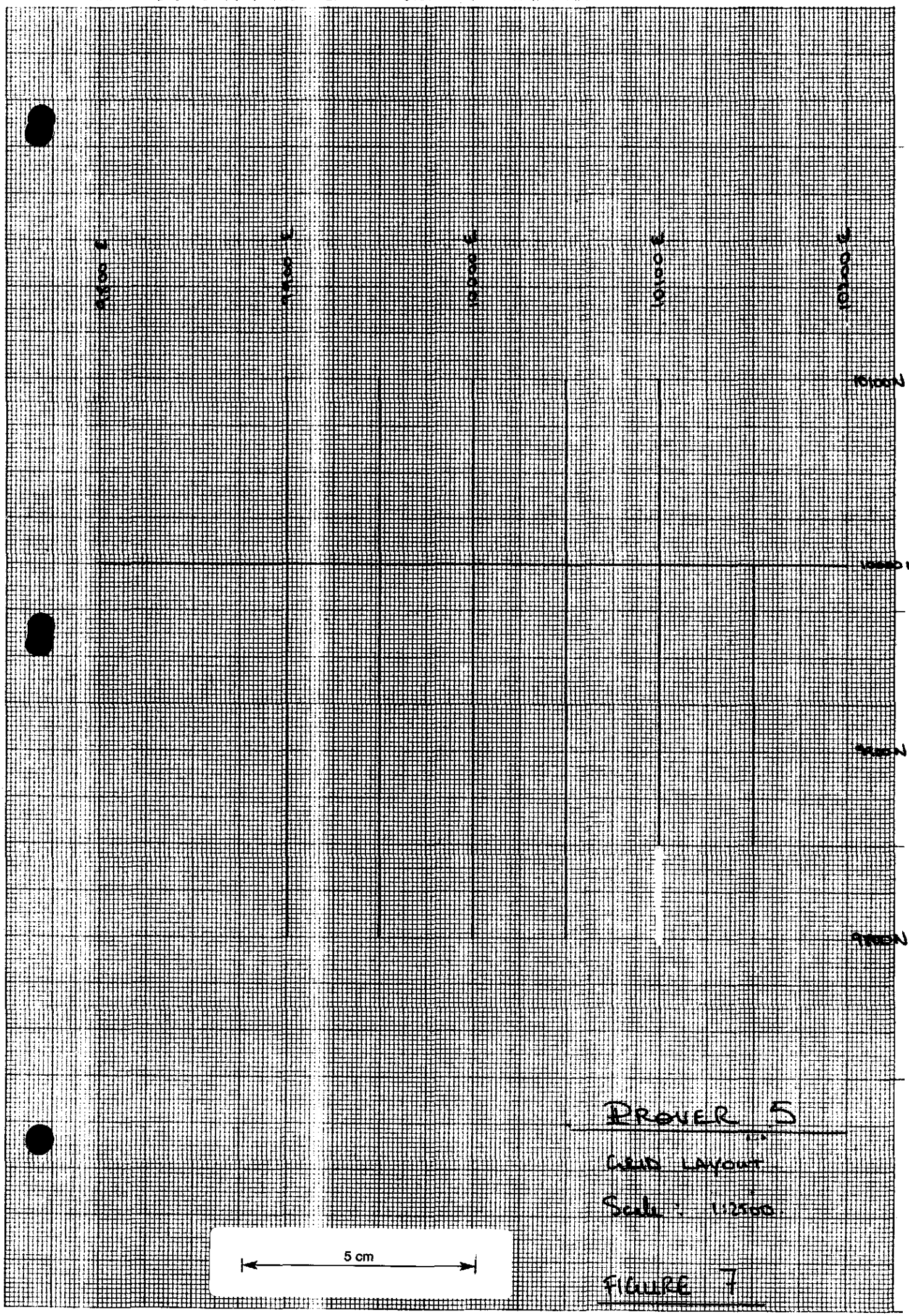
2240

2241

FIGURE 6

046

409047



PROBE 5

GRID LAYOUT

Scale 1:2500

FIGURE 7

047
409048
NORMACK GRAPH PAPERS CHRISTCHURCH N.Z. C101Y 19 cm x 28 cm in mm

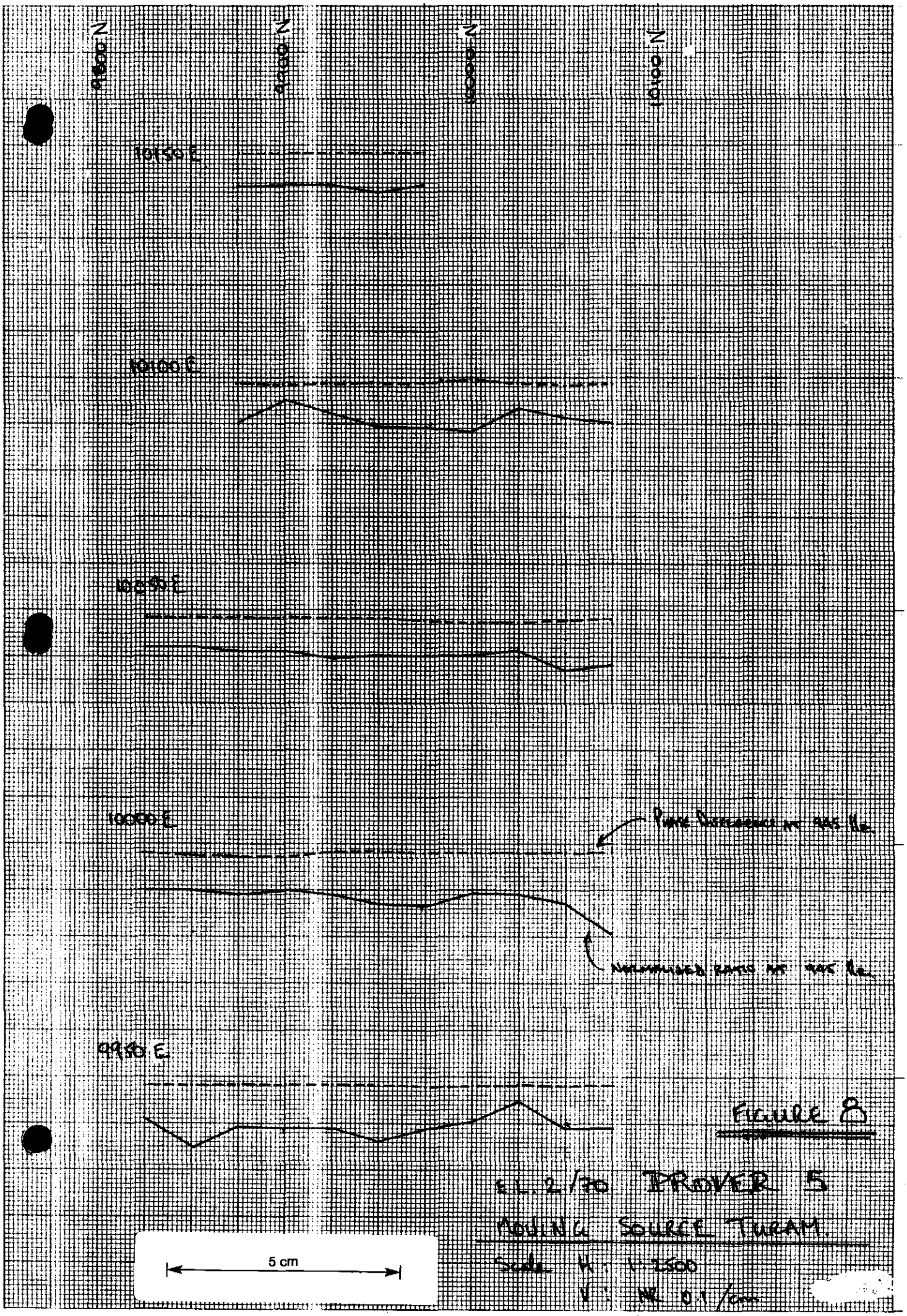


FIGURE 8

EL. 2/70 PROVER 5

MOVING SOURCE TURAM.

Scale H: 1:2500

V: NR 0.1/cm

FORMACK GRAPH PAPERS CHRISTCHURCH N.Z. C101Y 19 cm x 28 cm in mm

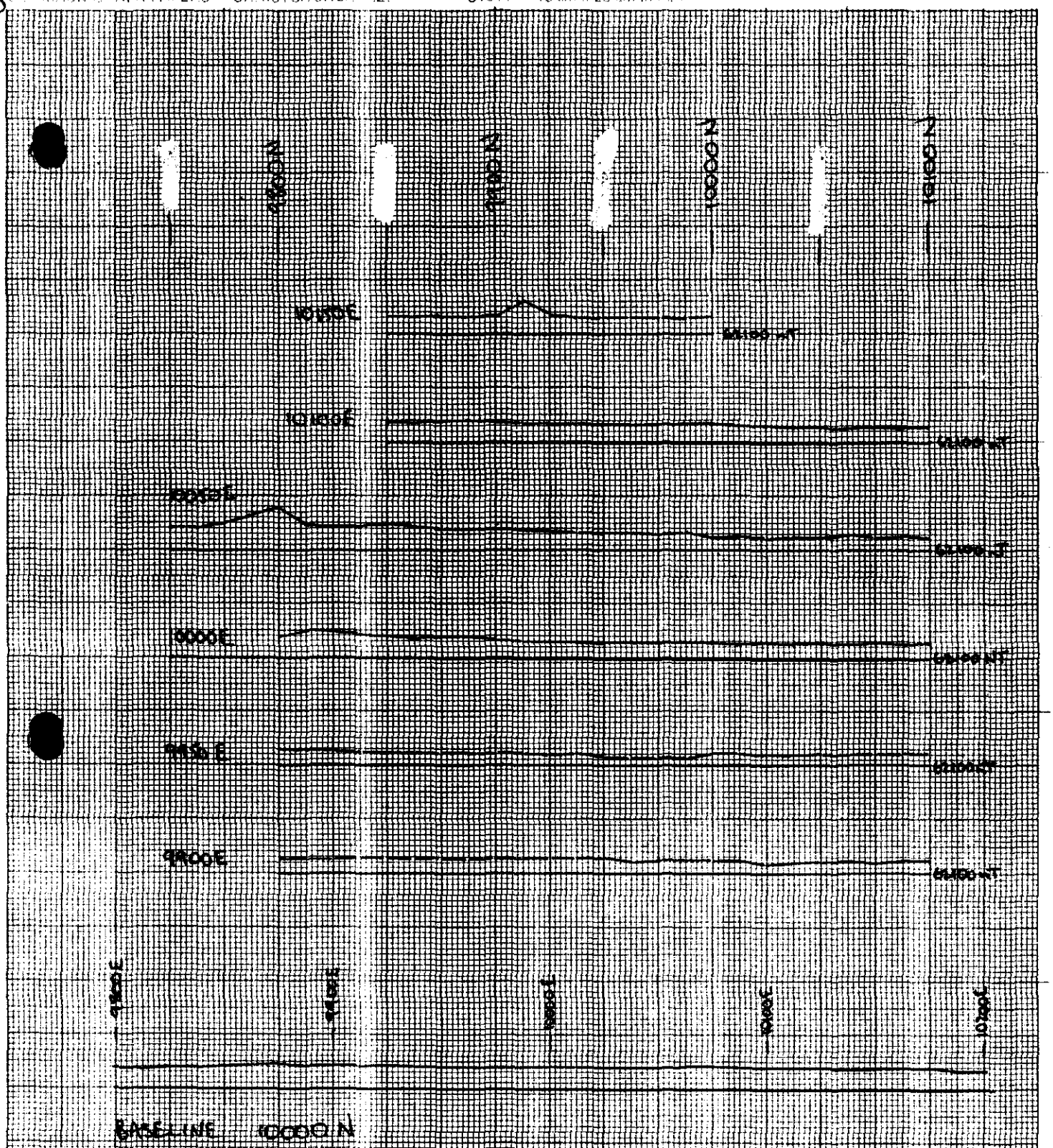


FIGURE 9

E.L. 2/70

PROVER 5

PROFILES OF TOTAL MAGNETIC INTENSITY.

Scales: H = 1:2500
V = 1cm / 100 nT

Inst. CHEMTRON G.3.
Obs. R.S. Goodwin

5 cm

4.1.2. PROVER 6

The Prover 6 grid was initiated to assess the Dighem "X" type anomaly defined in the 1979 Dighem Survey of Mackintosh East. The area was gridded, and mapped at 1:2500 scale. The area was soil-sampled using both Jacro power auger and hand auger. A moving source Turam technique was utilized in an attempt to locate the anomaly.

This area has been the target of previous investigations primarily due to the presence of shear related galena mineralization known as Carters Prospect.

Geology

The basal sequence consists of crenulated psammites, pelites and massive quartzites of Proterozoic age. These rocks are part of the Tyennan Nucleus. Carter's Prospect occurs within these rocks. Unconformably above this sequence is a group of dominantly volcaniclastics of Cambrian Age. These rocks are representative of part of the Mt Read Volcanics and as such are prospective for Que River, Hellyer style of volcanic hosted lead, zinc, gold deposits.

The lowermost unit consits of a mixed sequence of crystal vitric tuffs to fairly homogeneous vitric tuffs which commonly form fairly massive outcrops. These are quartz rich and are of overall rhyolitic composition. In hand specimen they commonly consist of quartz phenocrysts 1 to 3mm in diameter set in a cream to fawn coloured quartzofeldspathic groundmass. Lenticular chlorite is often noted, perhaps replacing pumice or rock fragments.

The middle unit is distinctive, but only noted on the western side of a strike slip fault roughly parallel to 9950E. It is chlorite rich, with the chlorite forming distinctive clots. It is not seen on the eastern side of the fault.

The uppermost sequence consists of fairly monotonous vitric tuff. Often fine lamellae can be noted in outcrop reflecting bedding. An elongate body of quartz feldspar biotite porphyry outcrops around 9850E, 9950N. It strikes subparallel to the Cambrian, PreCambrian unconformity. It is a similar texture and composition to the large porphyry which is located at Provers 1 and 3. It is interpreted as a small subvolcanic intrusive.

Mineralization

Apart from the galena at Carter's Prospect disseminated pyrite and minor galena and sphalerite is noted in outcrop in Fleece Creek (9850E 9900N).
This occurs in a vitric tuff unit which may have undergone some contact metamorphism, giving a somewhat hornfelsed appearance. Dissemianted sulphides occur through this rock type for at least 20m across strike.

Geochemistry

"C" Horizon samples (-80# fraction) were analysed for Cu, Pb, Zn, Ag and Fe. Cu, Pb, Zn and Fe are plotted on accompanying plans. Ag failed to exceed 2ppm, hence is not reproduced in plan.

Lead Geochemistry

Greater than 200ppm Pb is considered anomalous against a background of 40 to 150ppm Pb. Two linear zones are indicated. The zone around 9900N between 9850E and 9950E is open to the east and covers an area of disseminated pyrite and minor galena and sphalerite in a vitric tuff located in mapping. The second zone appears subparallel to the 10,100N line. The bulk of the anomaly lies within the unit consisting of a mixed sequence of crystal to vitric tuffs. A low order anomaly (400ppm) is indicated in the vicinity of Carter's Prospect. The lead anomalies developed are open to the east and west.

Zinc Geochemistry

Greater than 200ppm zinc is considred anomalous with background values ranging between 40 and 120ppm. Zinc exhibits similar trends to lead, albeit more highly constrained. A zone which transgresses the Cambrian, PreCambrian contact trends towards Carter's Prospect. Anomalies are open to the east and west.

Copper Geochemistry

Background values range from 5 to 15ppm Cu. Anomalous values above 20ppm are contoured. The zone which is subparallel to the 9900N line appears to be dominantly in PreCambrian rocks. The discrete anomaly centred at 9950N and 9750E appears spatially related to the small body of quarz feldspar biotite porphyry. Equally, the anomaly straddles the Cambrian PreCambrian contact. The copper geochemistry does not relate to the lead, zinc geochemistry at all.

...

Fe Geochemistry

Greater than 3.00%Fe is considered anomalous. Possible linear zones are indicated which in part correspond to chlorite rich volanics. These vague trends may indicate more chlorite rich interbeds.

M.S.T. Follow Up

Like Prover 5, also showing in the DIGHEM Co-axial coil channels, but within the system noise envelope. M.S.T. showed no significant response, the data showing only topographic effects.

Conclusion

The Prover 6 area appears to represent yet another part of the geochemically anomalous Mt Read Volcanics in Mackintosh East. The geochemical trends are similar to those encountered at Prover 1 and they fail to point out a significantly anomalous zone, which may reflect economic mineralization. The weak Dighem response could not be verified by ground EM techniques.

DIGHEM^{II} PROFILES. MACKINTOSH EAST EL. 2/10

Flt. Line 294

(PROVER 6)

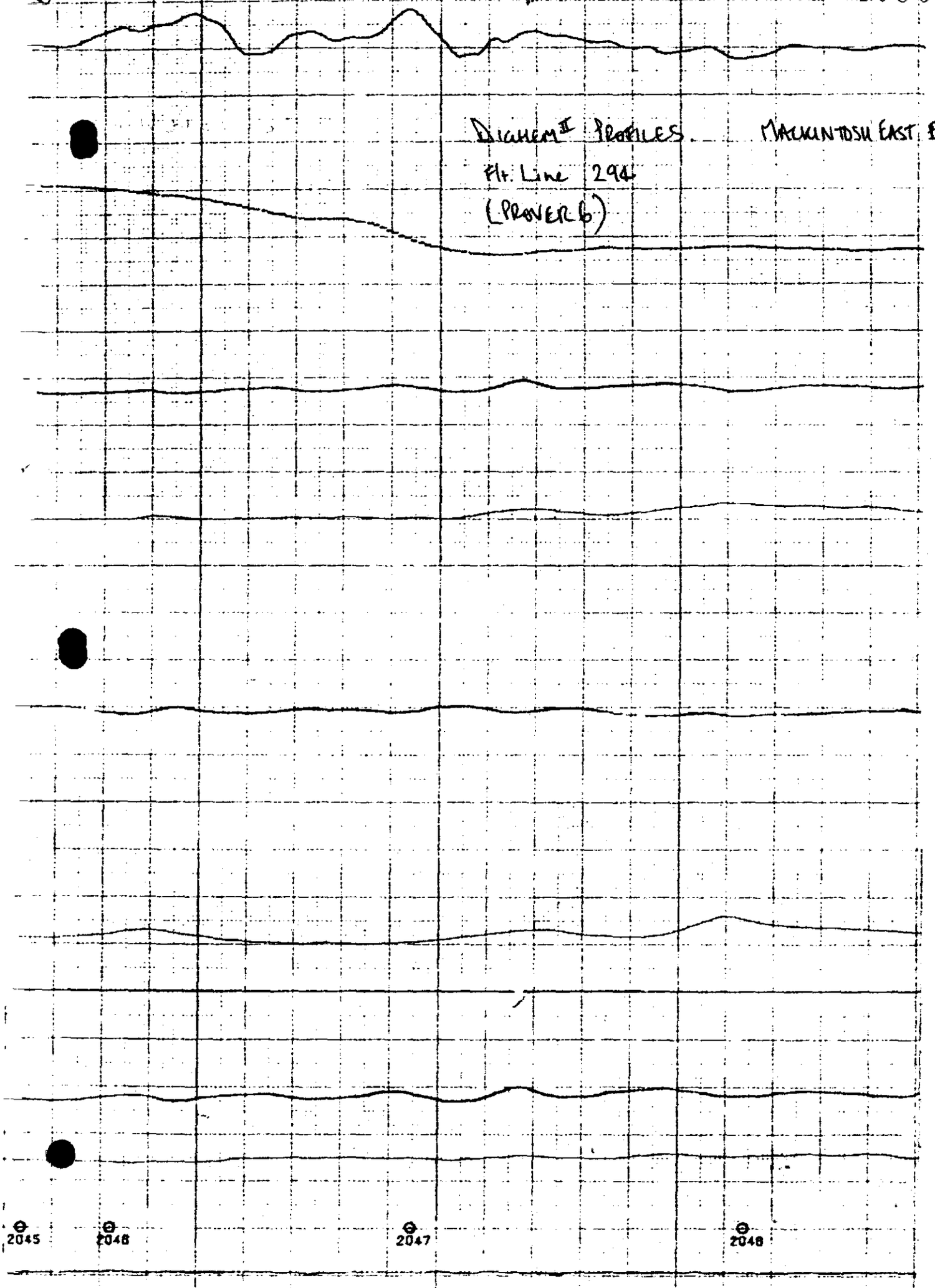


FIGURE 10

054
409055
CORMACK GRAPH PAPERS : CHRISTCHURCH N.Z. C101Y 19 cm x 28 cm in mm

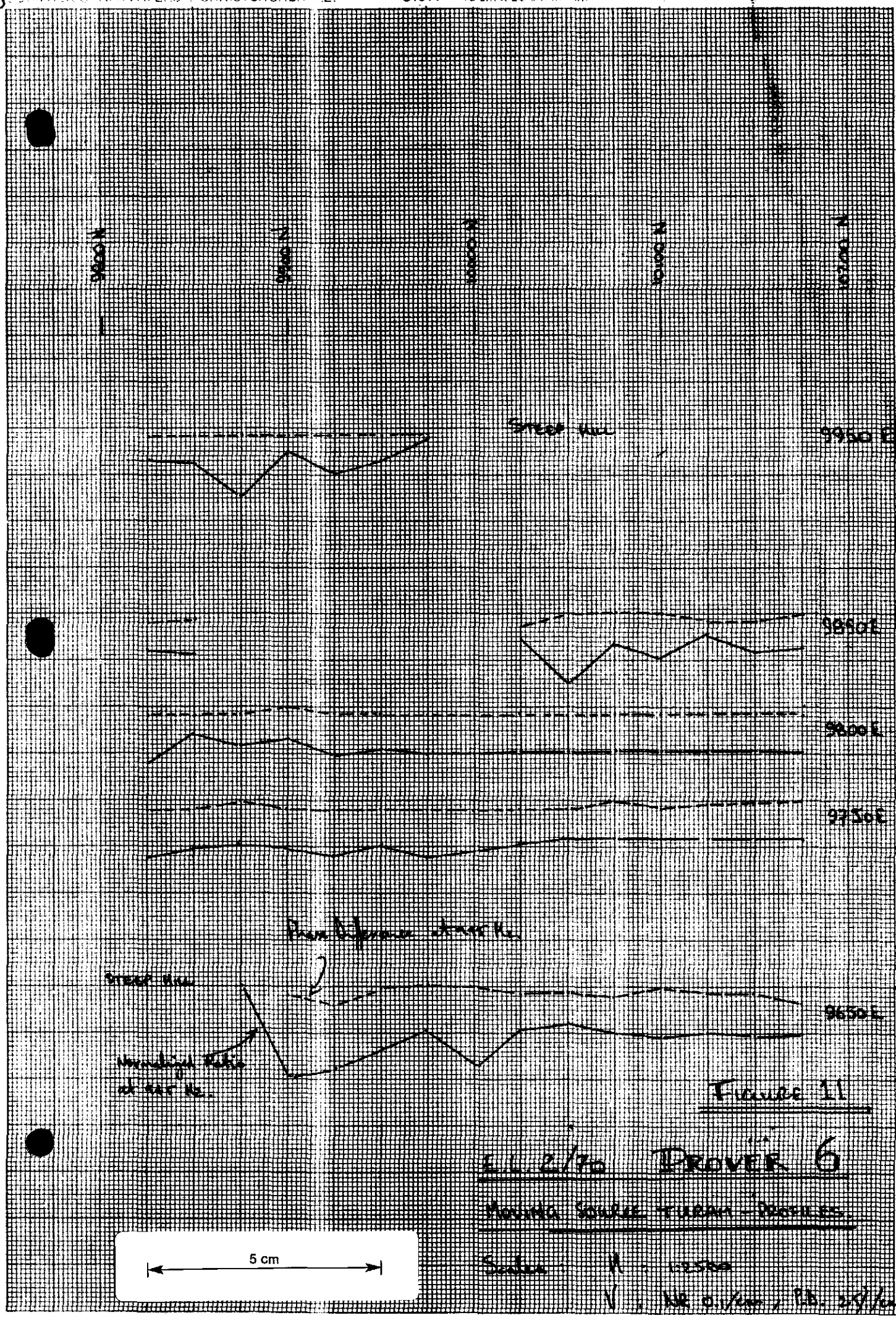


Figure 11

E.L. 2/70 PROVER 6

MOVING SOURCE TURAM - PROFILES

Scales: H : 1:2500

V : NR 0.1/cm , P.D. 2.5/cm

3050E 3100E 3150E 3200E 3250E

10200N 10100N 10000N 9900N 9800N

vt

vt + vvt
Possible lava interbeds

vvt

vt - siliceous

fg vt with vt interbeds

vvt chlorite alt

Silicified vt

vt

vt

Location of + type Dichroic anomaly

chlorite quartz rich crystal vitric tuff - Distinctive unit.

vvt

vvt

vvt

056

409057

10,200N

10,100N

10,000N

9900N

9800N

3050E	3040E	3030E	3020E	3010E
8081 • 1·0	8037 • 0·75	7931 • 1·0	8017 • 0·5	8064 • 0·5
8066 • 0·5	8036 • 0·5	7930 • 0·5	8016 • 1·0	8053 • 0·45
8065 • –	8035 • 0·5	7929 • 0·5	8015 • 1·0	8052 • 1·0
8064 • 0·5	8034 • 0·5	7928 • 1·2	8014 • 3·0	8051 • 1·0
8063 • 0·5	8033 • 0·5	7927 • 0·5	8013 • 1·0	8050 • 0·75
8062 • 0·5	8032 • 0·5	7926 • 2·5	8012 • 1·0	8049 • 0·5
8061 • 0·7	8031 • 0·5	7925 • 2·0	8011 • 0·5	8048 • 1·0
8060 • 0·3	8030 • 0·5	7924 • 0·5	8010 • 1·5	8047 • –
8059 • 0·3	8029 • 3	7923 • 0·75	8009 • 0·75	8046 • 0·25
8058 • 2·0	8028 • 2	7922 • 2·0	8008 • 1·5	8045 • 0·5
8057 • 2·0	8027 • 1·3	7921 • 2·0	8007 • 1·75	8044 • 0·5
8056 • 2·0	8026 • 1·2	7920 • 2·0	8006 • 2	8043 • 0·5
8055 • 1·5	8025 • 0·5	7919 • 2·0	8005 • 1·75	8042 • 1·0
	8024 • 0·75	7918 • 3·0	8004 • 1·75	8041 • 1·0
	8023 • 0·75	8020 • 0·5	8003 • 0·25	8040 • 0·75
	8022 • 1·0	8019 • 0·5	8002 • 1·5	8039 • 0·5
	8021 • 1·4	8018 • 2	8001 • 1	8038 • 0·5

10200 N

10100 N

10000 N

9900 N

9800 N

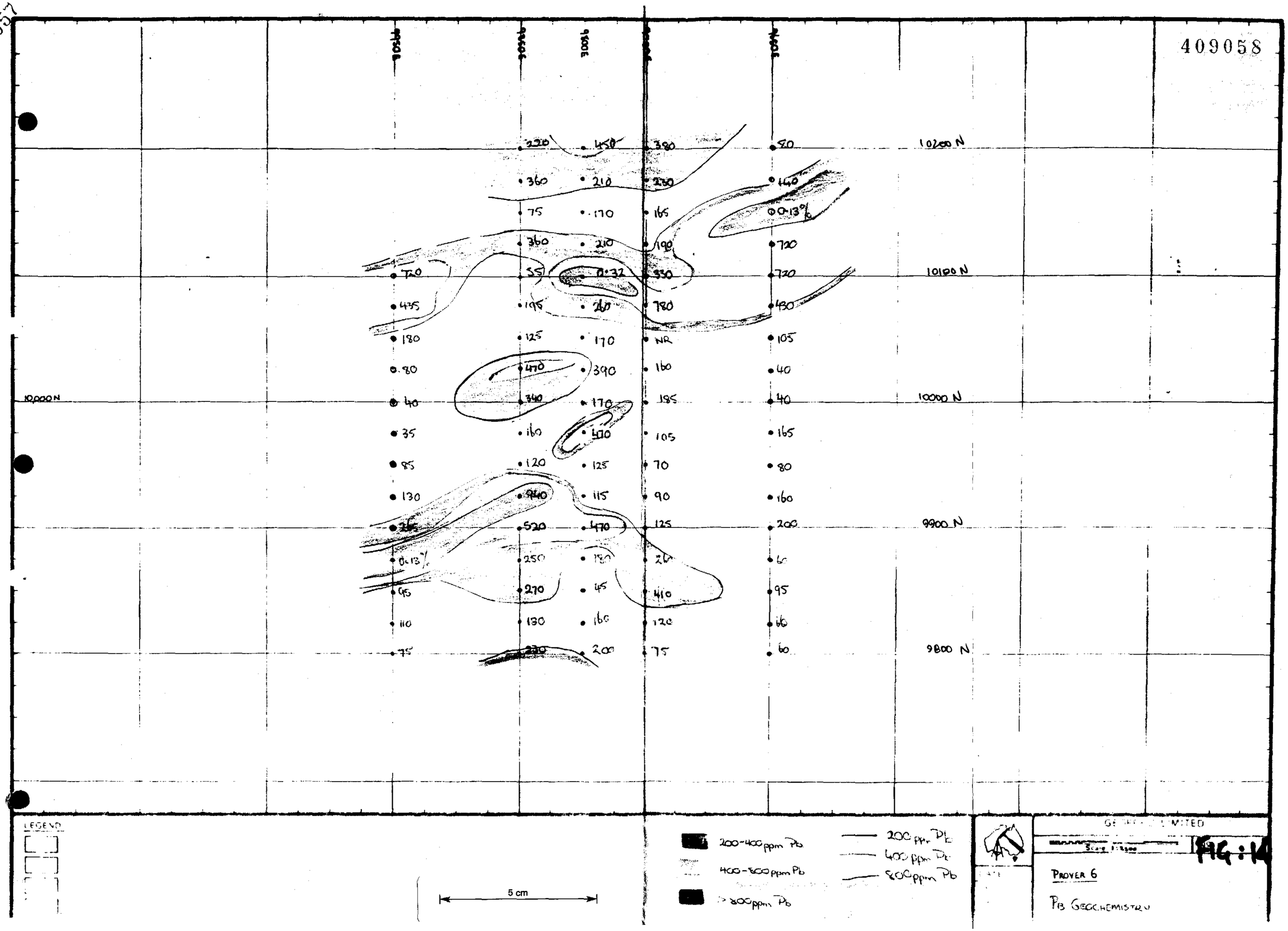
LEGEND

5 cm

VITED

FIG:13

PROVER 6
SAMPLE LOCATIONS
AUGER HOLE DEPTHS.


057
409058
10200 N
10100 N
10000 N
9900 N
9800 N
10,000 N
LEGEND
200-400 ppm Pb
400-800 ppm Pb
> 800 ppm Pb
200 ppm Pb
400 ppm Pb
800 ppm Pb
5 cm
PROVER 6
PB GEOCHEMISTRY
FIG: 14

058

409059

10200N

10100N

10000N

9900N

9800N

LEGEND

200-400ppm Zn

400-600ppm Zn

>600ppm Zn

200 ppm

400 ppm

600 ppm

5 cm

GEOPEKO LIMITED

DATE

SCALE 1:2500

PROVER 6

Zn GEOCHEMISTRY

FIG:15

059

409060

10200 N

10100 N

10000 N

9900 N

9800 N

LEGEND

5 cm

20-40 ppm Cu

40-60 ppm Cu

>60 ppm

20ppm Cu

40ppm Cu

60 ppm Cu

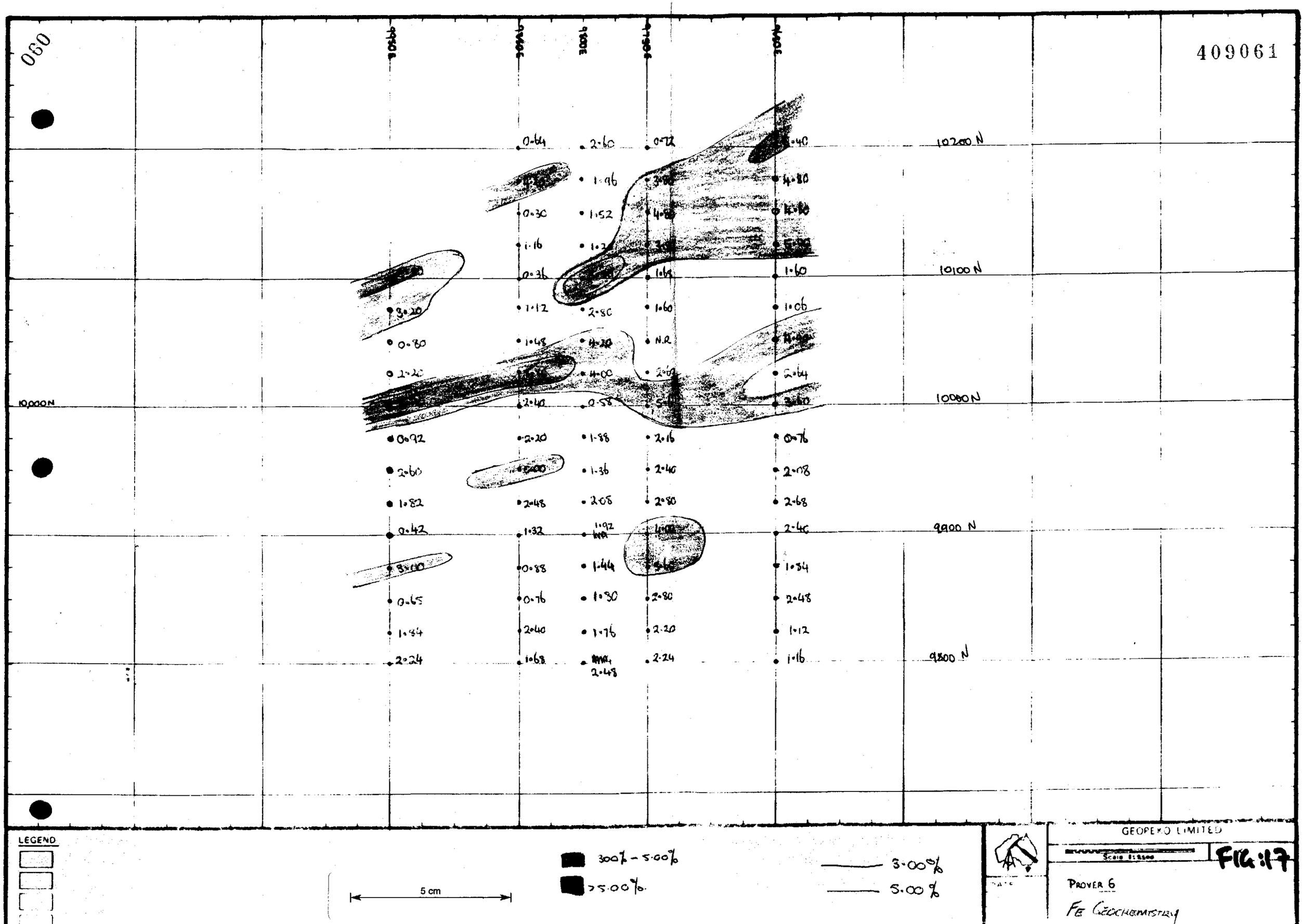
GEOPEKO LIMITED

Scale 1:2500

FIG:16

PROVER 6

COPPER GEOCHEMISTRY



090
409061
10200 N
10100 N
10000 N
9900 N
9800 N
10,000 N
0·64
2·60
0·72
4·80
0·30
1·96
1·52
1·16
0·36
1·60
1·12
2·80
1·60
1·06
3·20
0·80
1·48
N.R
2·20
4·00
2·64
2·40
0·58
0·92
2·20
1·88
2·16
0·76
2·60
1·36
2·40
2·08
1·82
2·48
2·08
2·80
2·68
0·42
1·32
1·92
2·40
3·00
0·88
1·44
1·84
0·65
0·76
1·30
2·80
2·48
1·84
2·40
1·76
2·20
1·12
2·24
1·68
2·48
2·24
1·16
LEGEND
5 cm
300% - 5·00%
>5·00%
3·00%
5·00%
GEOPEKO LIMITED
Scale 1:2500
FIG:17
PROVER 6
FE GEOCHEMISTRY

4.1.3 PROVER 7 M.S.T./MAGNETIC FOLLOW UP

A collection of large amplitude EM responses showing on all channels and with closely related magnetic anomalies. Thought to be basalt but we had to be certain didn't we. The M.S.T. profiles show considerable and constant variation consistant with traversing across weathered basalt with moderate and variable conductivity. This explains also the airborne response. The total magnetic intensity profiles also show typical responses over magnetic basalt.

409063

EL2/70
PROVER 7
Digham II Profiles.
Flt. Line 252.

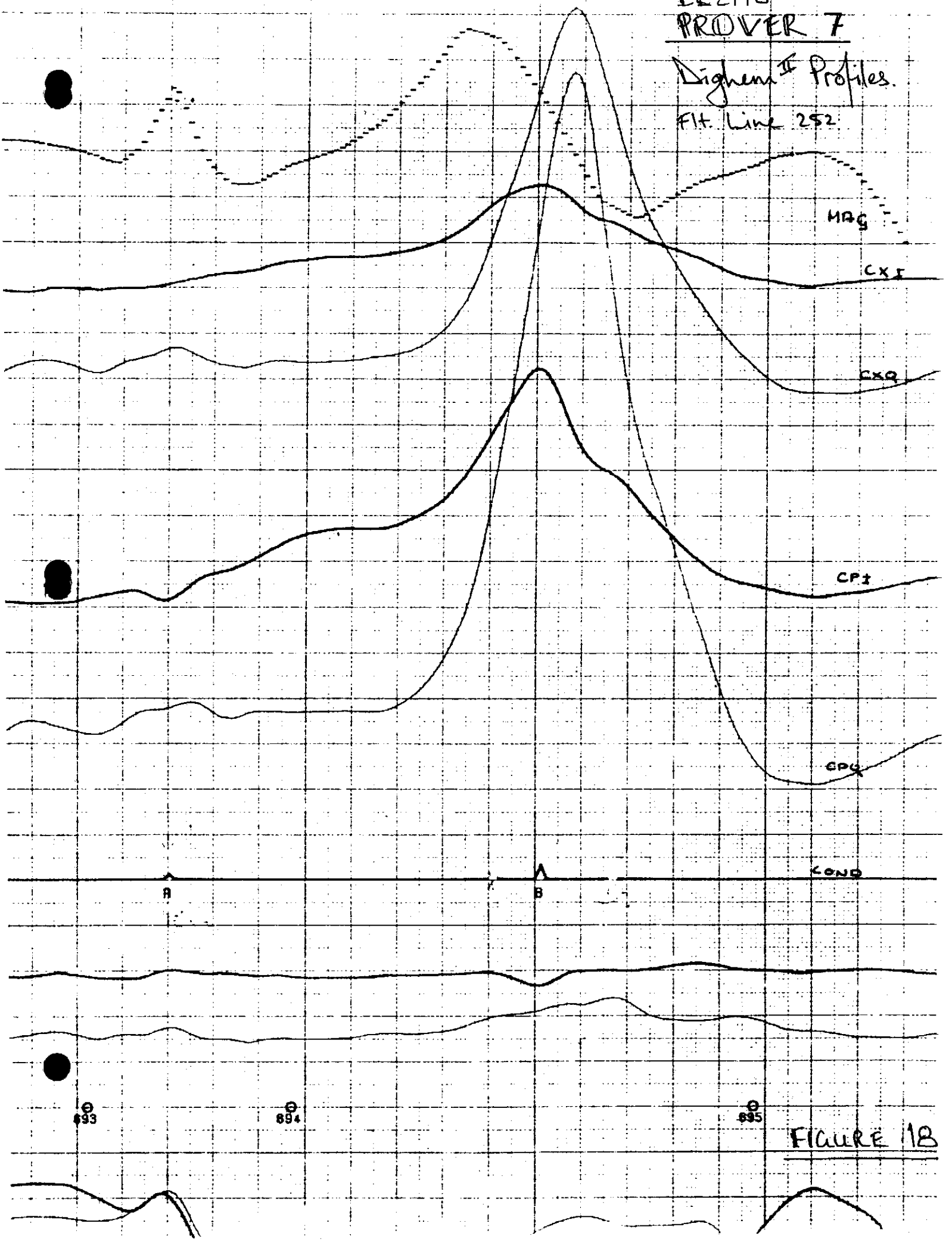
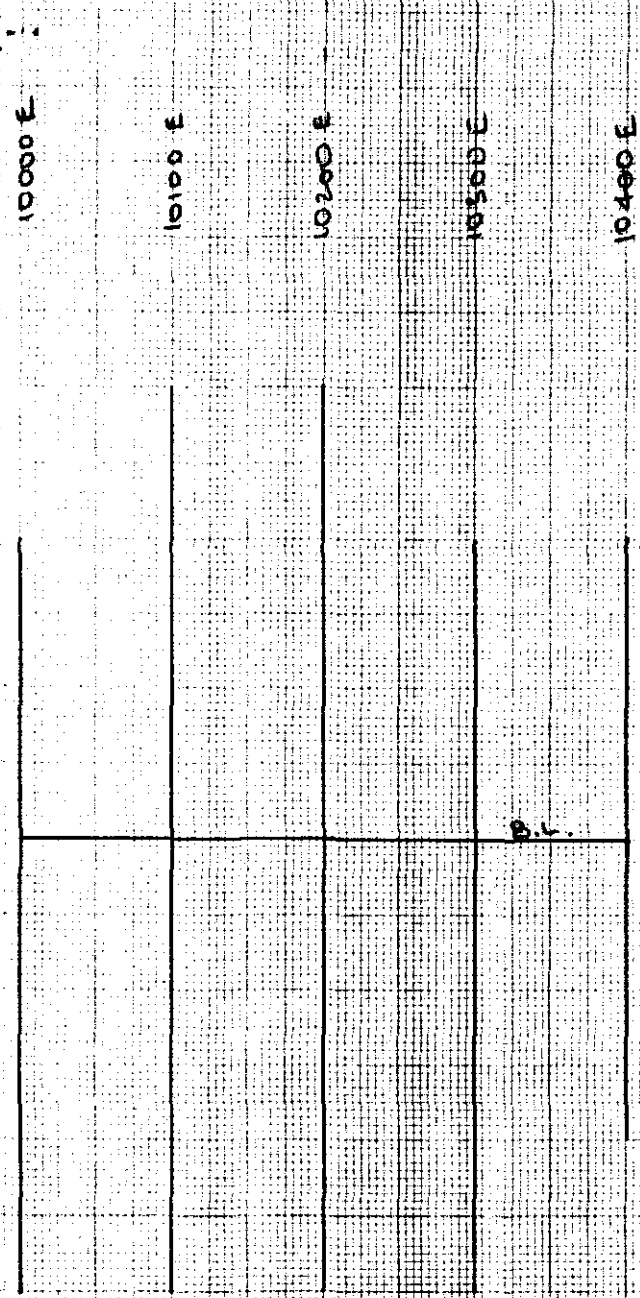


FIGURE 18



E.L. 2/70 PROVER 7

GRID LAYOUT.

Scale : 1:5000.

5 cm

FIGURE 19

9700 N
9800 N
9900 N
10000 N
10100 N
10200 N
10300 N

10400 E

10300 E

10200 E

10100 E

10000 E

Normalized Ratio

Phase Difference.

5 cm

E.L. 2/70

PROVER 7

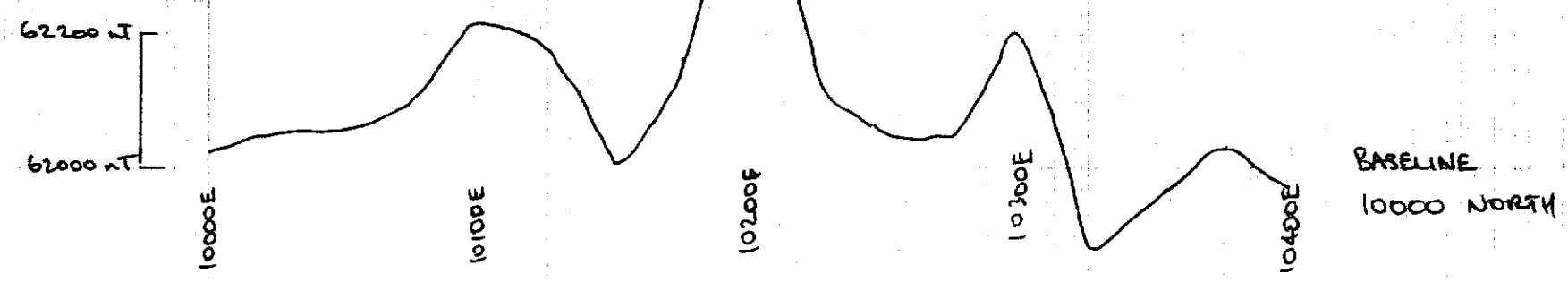
MOVING SOURCE TURAM PROFILES

SCALES: H : 1:2500

V : NR : 1cm = 0.1

Ø : 1cm = 2.5°

FIGURE 20



E.L. 2/70 PROVER 7

MAGNETIC PROFILES.

Inst. CHEMITRON G3, RTG: 13/11/80

SCALE 1:2500

V: 1cm = 100 nT

5 cm

FIGURE 21

409066

4.2 DIGHEM II MAGNETIC ANOMALIES.

4.2.1 PROVER 8

(Notes on Reconnaissance Work) (November 1981, W. Herrmann)

Prover 8 is a Dighem II detected aeromagnetic anomaly located at the southern end of the Vale of Belvoir near the north western boundary of E.L. 2/70.

A skeletal grid of 1100m x 500m was laid out and magnetically surveyed during November 1980. (P8 Figure 22). The magnetic profiles indicated a broad (200m) anomaly of about 200nT above a relatively "quiet" background. The anomaly was best developed on traverses 10100E and 10400E becoming broader and less intense on 10700E and 11000E, suggesting a similar but deeper buried source at the eastern end.
Limited geological reconnaissance had not indicated the source of the anomaly.

Futther geological reconnaissance mapping over the anomaly was carried out during late November 1981. (Magnetometer malfunction prevented more detailed magnetic traversing).

It was found that the peaks of the anomaly on 10100E, 10400E corresponded to a "window" of (previously unreported) pyroclastic rocks overlying the massive quartz-feldspar-biotite porphyry unit (ϵ) and in turn unconformably overlain by conglomeratic sandstone and sandstone forming the base of the Ordovician Owen Group.

The Ordovician clastics (and the unconformity surface) dip steeply (35-50°) to the north west and (since the southern slope of the Vale at this end is a steep dip slope of at least 30°) form a thin cover over the underlying Cambrian rocks.

North-east of 10700E the Ordovician conglomerate/ sandstones rest directly on Q-F-Bi porphyry. Mapping of porphyry/pyroclastic contact and lithological boundaries within the window suggest that the pyroclastic sequence extends to the north east under the Ordovician rocks - accounting for the broad magnetic anomaly in this area.

The lithologies within the "window" are typical acid quartz crystal tuffs and lesser lithic crystal tuffs generally with a strong purplish hematitic or brownish limonitic staining. One unit in particular is strongly chloritic and is transected by numerous limonitic veinlets and contains local patches of blebby or disseminated magnetite. This corresponds with the "noisy" segment of the magnetic profile on 10100E.

These iron rich and chloritic tuffs are not similar to the volcanics overlying the PreCambrian gneisses to the south east (Back Peak - Prover 3 areas). Rock chip samples indicate iron in the range 2.7 - 26%Fe and two samples containing magnetite/hematite veining contain 1600 and 720ppm copper. Lead and zinc (peaking at 110ppm, 305ppm respectively) do not seem to be exceptional.

Two lines of close spaced C-Horizon geochem sampling (Mate Auger) (on 10100m 10400E) showed subtle but spiky copper anomalies to 80ppm. Iron peaks at 5%Fe but is similarly rather spiky. Lead, zinc and silver do not seem to have anomalous character.

The copper "anomaly" on 10100E is "open" to the south and it is suggested that this relates to the Q-F-B: porphyry contact (at about 9600N) - the porphyry may have slightly higher than usual copper background.

The magnetic anomaly can be attributed to weakly magnetic pyroclastics, abnormally high in iron, which occupy the window occurring stratigraphically above the QFBi porphyry and unconformably below the Ordovician sediments.

The chloritic composition of some of the pyroclastics and the magnetite-hematite veining/staining may be regarded as a form of alteration.

The conglomeratic sandstones at the base of the Ordovician are commonly quite hematitic (especially at the north eastern end of P8 grid) but these have never been observed to be magnetic. It is unlikely that the iron rich alteration of the underlying pyroclastics relates to the Ordovician unconformity.

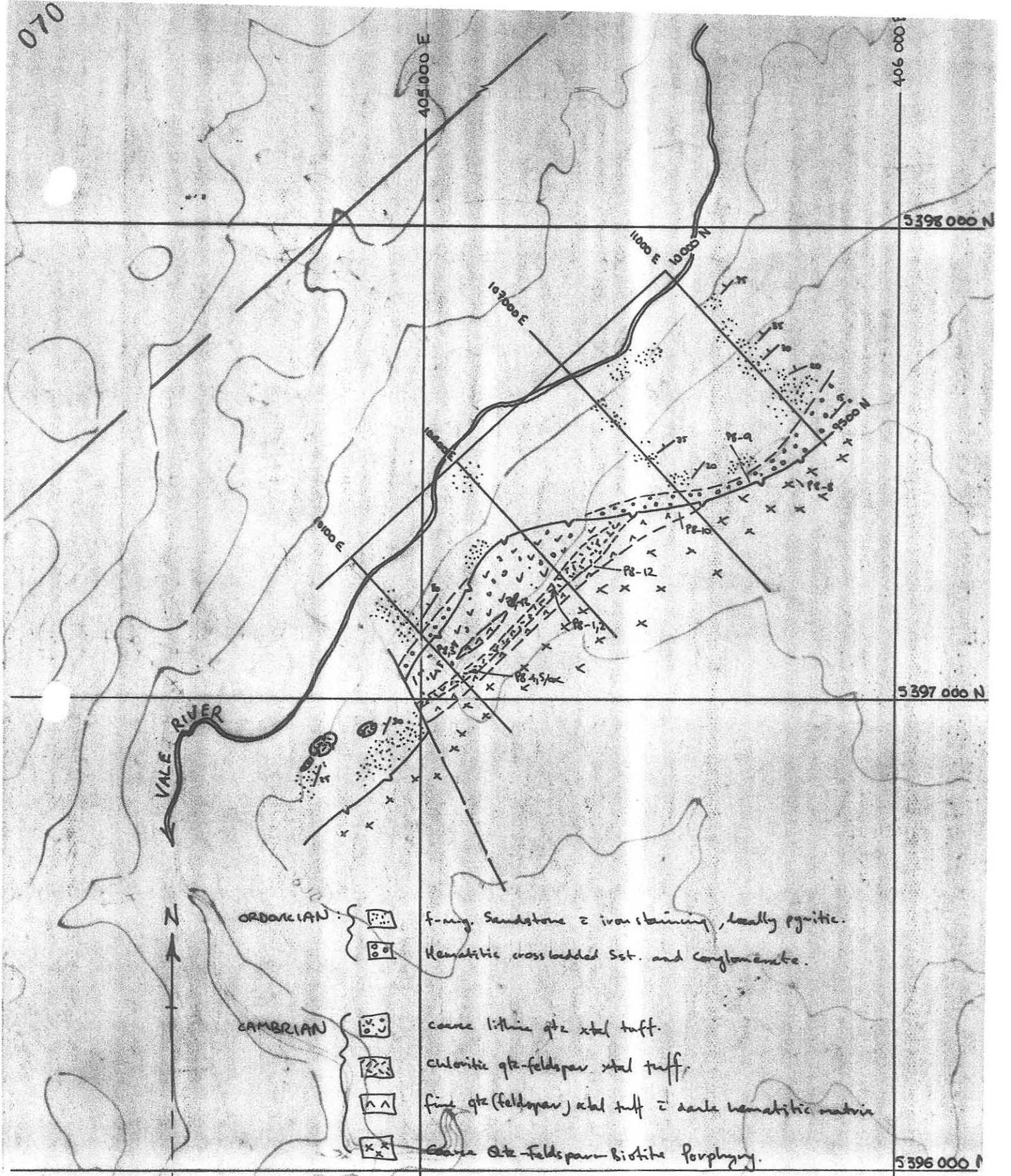
This writer favours the possibility that the iron rich alteration/veining is due to hydrothermal activity derived from crystallization of the massive Q-F-Bi porphyry. This porphyry "unit" is regarded as a synvolcanic intrusive probably of sill-like form. The altered rocks exposed in the "window" at Prover 8 would have constituted the "hanging wall" to the intrusive porphyry. It is difficult to say at this stage, without detailed petrological studies, if there is any <u>fundamental</u> difference in composition of volcanic tuffs below and above (the porphyry) due to some change in the style of vulcanism. My feeling is that there is probably not much fundamental difference and that the iron rich rocks observed in the window were formed by local alteration at the hanging wall of a large sill like porphyry body intruded into an otherwise homogenous volcanic pile.

The high copper values in outcrop samples are interesting but the situation does not readily fit into the massive sulphide-acid volcanogenic models and the prospect does not appear to have much potential. The limited exposure in the window, extensive Ordovician cover, and absence of conductive features in Dighem II data are strong negative factors.

Recommendation

No further work.

Postscript: Note isolated W values (to 35ppm) in C-Horizon soils, appears to correlate with copper > 50ppm, but no correlation to Fe.



E.L 2/70 PROVER 8

GEOLOGICAL SKETCH PLAN

SCALE : 1:10000

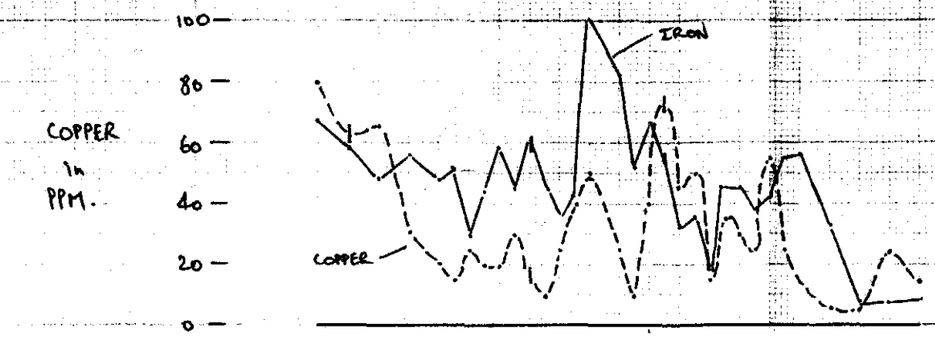
5 cm

FIGURE 22

409071

071

409072



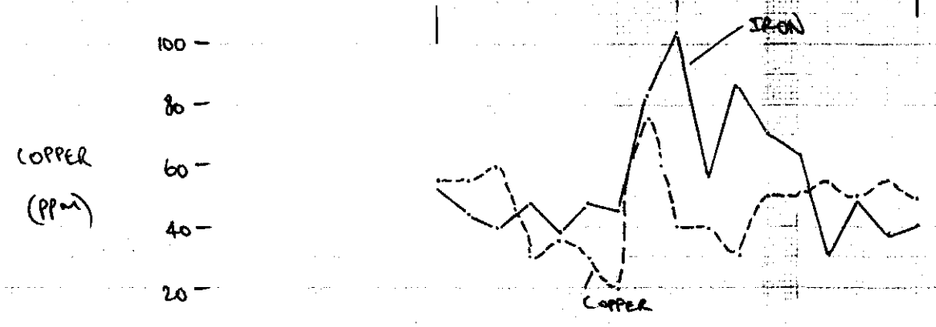
LINE 10100 EAST.

9600 E

9700 E

9800 E

9900 E



LINE 10400 EAST.

FIGURE 23

5 cm

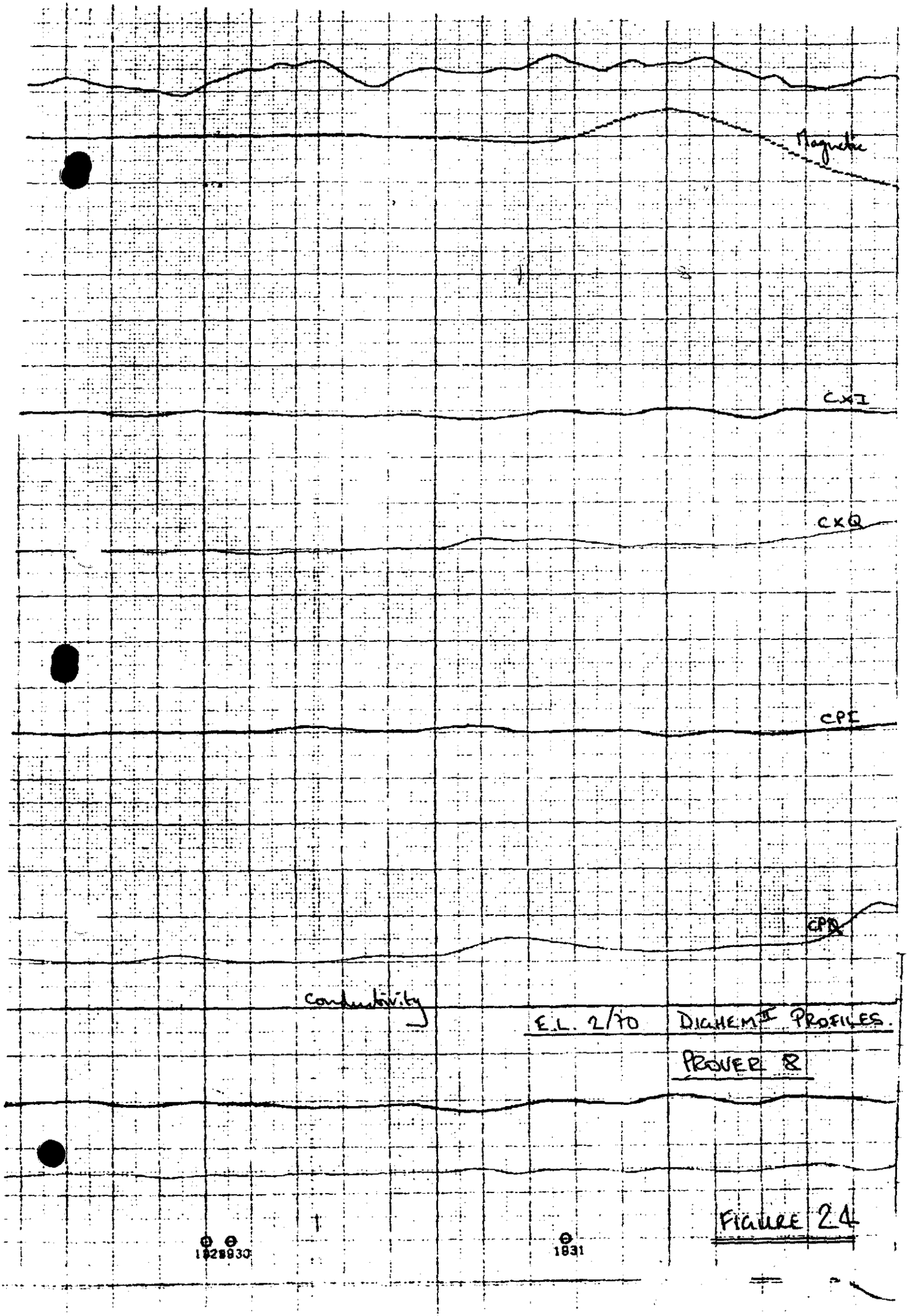
E.L. 2/70 PROVER 8

C-HORIZON SOIL GEOCHEM.

COPPER, IRON PROFILES.

SCALE = 1:2500. November 1981

Sampling by 'MATE' Auger



E.L. 2/70 DIGHEM^{I} PROFILES.

PROVER 8

FIGURE 24

073 GORMACK GRAPH PAPERS : CHRISTCHURCH N.Z. C102X 40 cm x 28 cm x 1 mm

409074

BASELINE : 10000 N

62400 nT

62600 nT

62500 nT

62400 nT

10 000 E 10 100 E 10 200 E 10 300 E 10 400 E 10 500 E 10 600 E 10 700 E 10 800 E 10 900 E 11 000

LINE 10 100 E

62 700

62 600

62 500

62 400 nT

9 500 N 9 600 N 9 700 N 9 800 N 9 900 N 10 000 N

5 cm

EL 2/70 PROVER R

MAGNETIC PROFILES

H Scale = 1:2500

V Scale : 1 cm / 100 nT.

FIGURE 25

GORMACK GRAPH PAPERS CHRISTCHURCH N.Z. C102X 40 cm x 28 cm x 1 mm

409075

MAGNETIC SURVEY 15-11-80

INSTRUMENT – CHEMTRON MODEL 63

OBS – R.J.G.

DATUM – 62,400 nT

LINE 10400E

62 600 nT

62 500 nT

62 400 nT

9400 N 9500 N 9600 N 9700 N 9800 N 9900 N 10000 N 10100 N

LINE 10700 E

62 600

62 500 nT

62 400 nT

LINE 11000 E

62 600 nT

62 500 nT

62 400 nT

5 cm

EL. 2/70 PROVER 8

MAGNETIC PROFILES.

H SCALE : 1:2500

V SCALE : 1cm/100 nT.

FIGURE 26

075

PROVER 8.
ROCK CHIPS. 409076

ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
KR	83.1 08 746	4.1.82	KP 2830	1 OF 4

TUBE No.	SAMPLE No.	Mn	Fe	Cu	Zn	Mo	Ag	Sn	W	Au
16	8566	175	4.35%	10	85	X	0.2	3	X	X
17	8567	155	5.45%	35	55	X	0.3	4	X	X
18	8568	50	2.75%	5	25	X	0.3	X	X	X
19	8569	1000	26.5%	1600	185	X	X	35	T	X
20	8570	720	16.5%	10	305	X	X	35	T	X
21	8571	790	14.5%	15	205	X	X	45	T	X
22	8572	385	9.5%	720	95	X	0.6	5	20	X
25										

Results in ppm unless otherwise specified
T = element present; but concentration too low to measure
X = element concentration is below detection limit
— = element not determined

AUTHORISED OFFICER B Dan

ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
KR	83.1 08 746	4.1.82	KP 2830	3 OF 4

TUBE No.	SAMPLE No.	Pb	Bi	Field No.
16	8566	110	4	P8-1
17	8567	85	X	P8-2
18	8568	85	X	P8-3
19	8569	70	X	P8-4
20	8570	65	X	P8-5
21	8571	55	X	P8-6
22	8572	50	X	P8-7
25				Specimens in Cristobalite, Development ROCK FILE

Results in ppm unless otherwise specified
T = element present; but concentration too low to measure
X = element concentration is below detection limit
— = element not determined

AUTHORISED OFFICER B Dan

076

409077

PROVER 8
C-HORIZON SOILS.

ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.
52 Murray Road, Welshpool, W.A. 6106
Phone [illegible] 7999
Telex AA92560

ANALYTICAL REPORT No. 83.1 08 722

THIS REPORT MUST BE READ IN CONJUNCTION WITH THE ACCOMPANYING ANALYTICAL DATA

Geopeko Ltd
PO Box 598
Devonport
Tasmania 7310

ORDER No.	PROJECT
KP 2819	MACKE

DATE RECEIVED	RESULTS REQUIRED
1.12.81	

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
	7.12.81	3	54

STATE OF SAMPLES		PRE-TREATMENT							ANALYSIS		
REFER BELOW	SAMPLE NUMBER	DRY	CRUSH	SPLIT	PULVERISE	SIEVE	OTHER SEE REMARKS	NONE	REFER TO ANALYSIS SECTION	PREPARATION	METHOD
SO	TS 13051-85	1			3	2			Cu Pb Zn Fe Mn	A1	AAS
	TS 13087-105								Ag	A1	AAS
									Sn	A11	AAS
									W	A6	COL

RESULTS TO: As Above

RESULTS TO:

REMARKS

STATE OF SAMPLES		ANALYSIS — PREPARATION				ANALYSIS — METHOD	
whole core	WC	perchloric acid	A1	cold acid	CA	atomic absorbtion	AAS
split core	SC	hydrochloric acid	A2	sparkle sulphide	SS	x-ray fluorescence	XRF
cutting	CU	nitric acid	A3	other mixed acids	Ma	spectrophotometry	SPEC
rock	Ro	aqua regia	A4	alkaline attack	AA	colorimetry	COL
soil	SO	nitric-perchloric	A5	volatilization	VO	chromatography	CHR
pulp	PU	HF mixture	A6	ignition	IG	titration	TTN
water	[illegible]	HF under pressure	A7	pressed powder (XRF)	PP	other chemicals means	CHEM
tissue	[illegible]	fusion	A8	glass fusion (XRF)	GF	miscellaneous	MISC
stream sediment	[illegible]					fluorescence	FLUOR
heavy mineral	[illegible]					inductively coupled plasma	ICP

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ANALYTICAL DATA

SAMPLE TYPE(S)	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
IS	83.1 08 722	10.12.81	KP 2819	1 OF 4

SAMPLE No.	[illegible]	Mn	Fe	Cu	Zn	Mo	Sn	W	Pb	LINE : 10400 E
1	13051	65	2.00%	50	50	X	X	2.5	5	9800 N
2	13052	60	1.90%	55	60	X	X	2.5	10	9787.5 N
3	13053	60	2.40%	50	40	X	X	5.5	10	9775 N
4	13054	105	1.55%	55	55	X	X	2.0	15	9762.5 N
5	13055	125	3.20%	50	60	X	X	3.5	10	9750 N
6	13056	100	3.55%	50	60	X	X	2.5	X	9737.5 N
7	13057	120	4.30%	30	75	X	X	3.5	X	9725 N
8	13058	85	2.80%	40	45	X	X	5.0	X	9712.5 N
9	13059	155	5.25%	40	115	X	X	3.0	15	9700 N
10	13060	230	4.15%	75	55	X	X	20.0	X	9687.5 N
11	13061	215	4.20%	75	50	X	X	25.0	5	9681.5 N
12	13062	85	2.30%	20	30	X	X	5.5	5	9675 N
13	13063	60	2.35%	30	30	X	X	4.0	X	9662.5 N
14	13064	70	1.90%	35	25	X	4	2.5	5	9650 N
15	13065	50	2.40%	30	20	0.1	1	4.5	5	9637.5 N
16	13066	310	2.00%	60	25	X	X	1.5	X	9625 N
17	13067	870	2.20%	55	50	0.1	10	2.5	10	9612.5 N
18	13068	445	2.60%	55	125	X	X	3.5	5	9600 N
19	13069	1350	3.35%	80	85	X	X	3.0	30	9550 N
20	13070	1700	2.95%	60	135	0.1	X	8.5	5	9562.5 N
21	13071	1600	2.90%	65	130	0.1	X	11.5	5	9562.5 N
22	13072	195	2.40%	65	65	0.2	X	4.0	5	9575 N
23	13073	80	2.80%	30	65	0.1	X	5.5	15	9587.5 N
24	13074	50	2.40%	20	85	0.2	2	4.0	X	9600 N
25	13075	55	2.55%	15	60	0.2	X	4.0	10	9606.25 N

LINE 10400 EAST

LINE 10000 EAST

Unless otherwise specified
Element not detected or concentration too low to measure
Elements below detection limit

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PROVERB 8
C-HORIZON SOILS.

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ANALYTICAL DATA

SAMPLE TYPE	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
[illegible]	[illegible].1 08 722	10.12.81	KP 2819	2 OF 4

TUBE No.	SAMPLE No.	Mn	Fe	Cu	Zn	Ag	Sn	W	Pb	LANE; NORTHING
1	13076	45	1.45%	25	40	X	X	4.0	5	9650 N
2	13077	50	2.20%	20	50	0.1	X	3.5	10	9618.75 N
3	13078	45	2.90%	20	55	0.1	X	4.0	5	9625 N
4	13079	45	2.25%	30	55	0.1	X	1.0	15	9631.25 N
5	13080	45	2.85%	15	40	0.1	X	5.5	X	9637.5 N
6	13081	45	3.10%	20	40	0.1	X	5.5	X	9637.5 N
7	13082	40	2.25%	10	50	X	X	4.0	5	9643.75 N
8	13083	55	1.80%	25	75	X	X	2.5	5	9675 N
9	13084	45	2.10%	40	60	X	X	2.5	X	9656.25 N
10	13085	85	5.00%	50	40	X	X	16.5	5	9662.5 N
11	13087	370	4.10%	25	30	0.1	X	9.5	5	9675 N
12	13088	110	2.55%	10	30	0.2	X	9.5	10	9681.25 N
13	13089	95	3.30%	40	65	X	X	9.0	15	9687.5 N
14	13090	90	2.80%	75	70	X	X	7.5	15	9693.75 N
15	13091	90	2.75%	70	65	X	X	9.5	20	9693.75 N
16	13092	45	1.65%	45	40	X	X	7.0	15	9700 N
17	13093	40	1.80%	50	25	0.1	X	6.0	10	9706.25 N
18	13094	35	945%	15	15	0.1	X	9.0	X	9712.5 N
19	13095	35	2.30%	35	20	0.1	X	6.5	X	9718.75 N
20	13096	325	2.25%	30	25	0.2	X	6.0	15	9725 N
21	13097	85	1.90%	25	20	0.2	X	6.0	5	9731.25 N
22	13098	45	1.10%	55	30	X	X	14.0	X	9737.5 N
23	13099	240	2.75%	25	25	X	2	6.0	10	9743.75 N
24	13100	65	2.90%	15	20	0.2	6	3.5	X	9750 N
25	13101	70	2.75%	15	25	0.2	4	3.0	X	9750 N

[illegible] unless otherwise specified
[illegible] but concentration too low to measure
[illegible] below detection limit

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ANALYTICAL DATA

REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
TS	81.1 08 722	10.12.81	KP 2819	3 OF 4

Line No.	Sample No.	Mn	Fe	Cu	Zn	Ag	Sn	W	Rb	Line Reference
1	13102	35	1.60%	5	15	0.1	6	3.0	X	9760S N
2	13103	25	3850	5	10	0.1	2	2.0	X	9775 N
3	13104	15	3800	25	85	0.1	4	2.0	X	9787.5N
4	13105	25	4650	15	10	0.1	X	1.5	5	9800 N
5										9[illegible] N
6										9[illegible] N
7										9[illegible] N
8										9[illegible] N
9										9[illegible] N
10										9[illegible] N
11										9[illegible] N
12										9[illegible] N
13										9[illegible] N
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										

specified
concentration too low to measure
below detection limit

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ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
TS	83.1 08 722	10.12.81	KP 2819	4 OF 4

[illegible]	[illegible]	Mn	Fe	Cu	Zn	Ag	Sn	W	Pb	[illegible]
1	STD FS4	560	6.85%	295	705	0.9	–	–	95	
2	RPT 13051	60	1.95%	45	50	X	–	–	10	
3	RPT 13070	1650	3.00%	60	135	0.1	–	–	5	
4	STD FS4	555	7.50%	305	700	0.6	–	–	95	
5	RPT 13092	40	1.55%	40	35	X	–	–	20	
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	5	50	5	5	0.1	1	0.5	5	
24	DIGESTION	A1	A1	A1	A1	A1	A11	A6	A1	
25	METHOD	A1/1	A1/1	A1/1	A1/1	A1/2	A11/2	A6/4	A1/1	

[illegible] otherwise specified
[illegible] but concentration too low to measure
[illegible] is below detection limit

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081

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ANALABS

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ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	81.1 08 722	7.1.82	KP 2819	1 OF 1

1	13060	35								
2	13061	35								
3	13071	10								
4	13085	30								
5	13098	20								
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	10								
24	DIGESTION									
25	METHOD	XRF								

[illegible] specified
[illegible] concentration too low to measure
[illegible] detection limit

AUTHORISED OFFICER

5. REFERENCES

Herrmann, W. 1980: Progress Report on Mackintosh East (Part of E.L. 2/70) TASMANIA. (Geopeko, Report to Tasmanian Mines Department)

APPENDIX 6.1

084

409085

REPORT NO. 312

DIGHEM^{II} SURVEY

OF

MACKINTOSH EAST AREA, TASMANIA

FOR

GEOPEKO LIMITED

BY

DIGHEM LIMITED

TORONTO, ONTARIO
AUGUST 15, 1980

D.C. FRASER
PRESIDENT

Z. DVORAK
GEOPHYSICIST

085

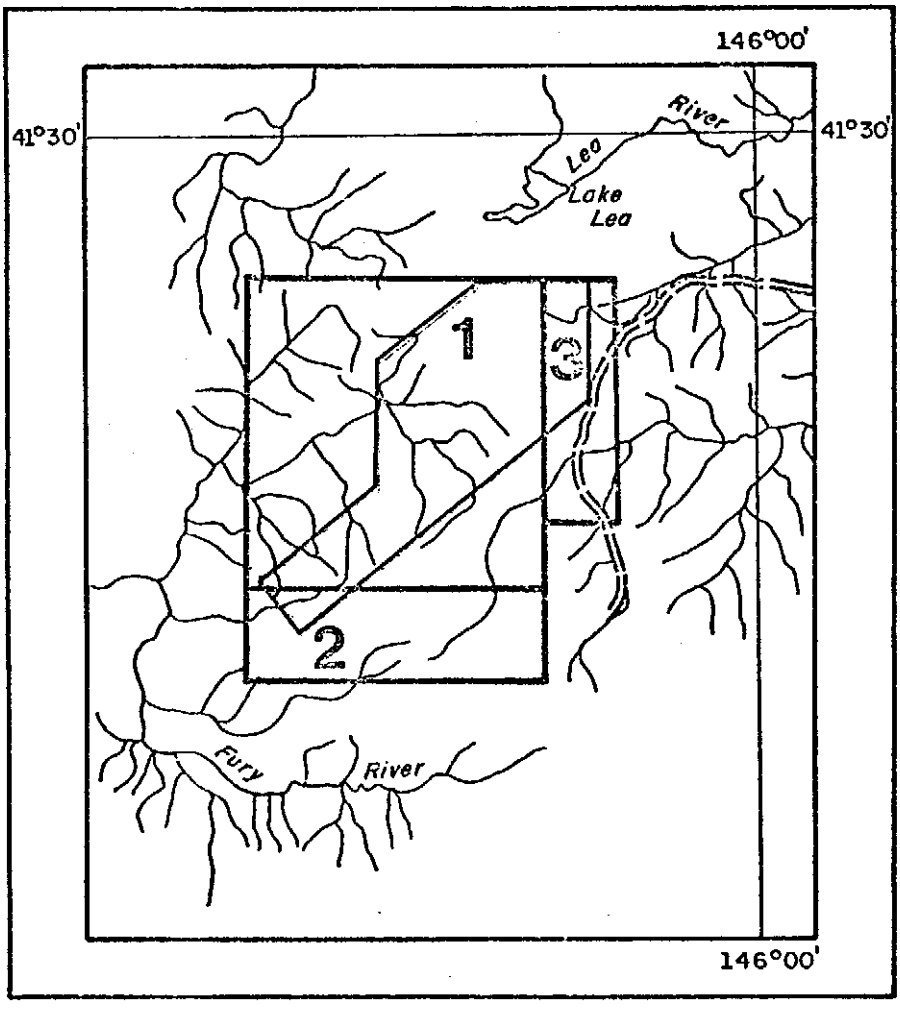
409086

SUMMARY

A DIGHEM^{II} electromagnetic/resistivity/magnetic survey of 385 line-km was flown in the Mackintosh area of Tasmania in February and March 1980, for Geopeko Limited.

The survey identified a strong conductive zone as well as a few scattered weak and moderate conductors. The conductive zone is non-magnetic and consists of a number of parallel conductors.

LOCATION MAP



Scale 1: 250,000

Figure 1. The Survey Area

5 cm

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INTRODUCTION 2

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MAGNETICS 22

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Sheet 3 27

APPENDIX A: The Flight Record and Path Recovery

APPENDIX B: EM Anomaly List

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INTRODUCTION

A DIGHEM^{II} survey of 385 line-km was flown with a 150 m line-spacing for Geopeko Limited from February 27 to March 10, 1980, in the Mackintosh East area of Tasmania (Figure 1). The Lama VH-PDU jet helicopter flew with an average airspeed of 100 km/h and EM bird height of 35 m. Ancillary equipment consisted of a Geometrics 803 magnetometer with its bird at an average height of 55 m, a Sperry radio altimeter, Geocam sequence camera, Barringer 8-channel hot pen analog recorder, and a Geometrics G-714 digital data acquisition system with a Kennedy 9700 9-track 800-bpi magnetic tape recorder. The analog equipment recorded four channels of EM data at approximately 900 Hz, two ambient EM noise channels (for the standard and whaletail receivers), and one channel each of magnetics and radio altitude. The digital equipment recorded the EM data with a sensitivity of 0.25 ppm/bit, and the magnetic field to one gamma/bit.

The Appendix provides details on the data channels, their respective noise levels, and the data reduction procedure. The quoted noise levels are generally valid for wind speeds up to 30 km/h. Higher winds may cause the system to be grounded because excessive bird swinging

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produces difficulties in flying the helicopter. The swinging results from the 5 m^2 of area which is presented by the bird to broadside gusts. The DIGHEM system nevertheless can be flown under wind conditions that seriously degrade other AEM systems.

ELECTROMAGNETICS

DIGHEM electromagnetic responses fall into two general classes, discrete and broad. The discrete class consists of sharp, well defined anomalies from discrete conductors such as sulfide lenses and steeply dipping sheets of graphite and sulfides. The broad class consists of wide anomalies from conductors having a large horizontal surface such as flatly dipping graphite or sulfide sheets, saline water-saturated sedimentary formations, conductive overburden and rock, and geothermal zones. A vertical conductive slab with a width of 100 m would straddle these two classes.

The vertical sheet (half plane) is the most common model used for the analysis of discrete conductors. All anomalies plotted on the electromagnetic map are interpreted according to this model. The following section entitled Discrete conductor analysis describes this model in detail, including the effect of using it on anomalies caused by broad conductors such as conductive overburden.

030

The conductive earth (half space) model is suitable for broad conductors. Resistivity contour maps result from the use of this model. A later section entitled Resistivity mapping describes the method further, including the effect of using it on anomalies caused by discrete conductors such as sulfide bodies.

Discrete conductor analysis

The EM anomalies appearing on the electromagnetic map are interpreted by computer to give the conductance (i.e., conductivity-thickness product) in mhos of a vertical sheet model. DIGHEM anomalies are divided into six grades of conductance, as shown in Table I. The conductance in mhos is the reciprocal of resistance in ohms.

Table I. EM Anomaly Grades

Anomaly Grade	Mho Range
6	greater than 99
5	50 - 99
4	20 - 49
3	10 - 19
2	5 - 9
1	less than 5

The mho value is a geological parameter because it is a characteristic of the conductor alone; it generally is inde-

pendent of frequency, and of flying height or depth of burial apart from the averaging over a greater portion of the conductor as height increases.[1] Small anomalies from deeply buried strong conductors are not confused with small anomalies from shallow weak conductors because the former will have larger mho values.

Conductive overburden generally produces broad EM responses which are not plotted on the EM maps. However, patchy conductive overburden in otherwise resistive areas can yield discrete-like anomalies with a conductance grade (cf. Table I) of 1, or even of 2 for conducting clays which have resistivities as low as 50 ohm-m. In areas where ground resistivities can be as low as 1 ohm-m, anomalies caused by weathering variations and similar causes can have conductance grades as high as 4. The anomaly shapes from the multiple coils often allow such surface conductors to be recognized, and these are indicated by the letter S on the map. The remaining anomalies in such areas could be bedrock conductors. The higher grades indicate increasingly higher conductances. Examples: DIGHEM's New Insco copper

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[1]This statement is an approximation. DIGHEM, with its short coil separation, tends to yield larger and more accurate mho values than airborne systems having a larger coil separation.

discovery (Noranda, Quebec, Canada) yielded a grade 4 anomaly, as did the neighbouring copper-zinc Magusi River ore body; Mattabi (copper-zinc, Sturgeon Lake, Ontario, Canada) and Whistle (nickel, Sudbury, Ontario, Canada) gave grade 5; and DIGHEM's Montcalm nickel-copper discovery (Timmins, Ontario, Canada) yielded a grade 6 anomaly. Graphite and sulfides can span all grades but, in any particular survey area, field work may show that the different grades indicate different types of conductors.

Strong conductors (i.e., grades 5 and 6) are characteristic of massive sulfides or graphite. Moderate conductors (grades 3 and 4) typically reflect sulfides of a less massive character or graphite, while weak bedrock conductors (grades 1 and 2) can signify poorly connected graphite or heavily disseminated sulfides. Grade 1 conductors may not respond to ground EM equipment using frequencies less than 2000 Hz.

The presence of sphalerite or gangue can result in ore deposits having weak to moderate conductances. As an example, the three million ton lead-zinc deposit of Restigouche Mining Corporation near Bathurst, New Brunswick, Canada, yielded a well defined grade 1 conductor. The 10 percent by volume of sphalerite occurs as a coating around

the fine grained massive pyrite, thereby inhibiting electrical conduction.

Faults, fractures and shear zones may produce anomalies which typically have low conductances (e.g., grade 1 and 2). Conductive rock formations can yield anomalies of any conductance grade. The conductive materials in such rock formations can be salt water, weathered products such as clays, original depositional clays, and carbonaceous material.

On the electromagnetic map, the actual mho value and a letter are plotted beside the EM grade symbol. The letter is the anomaly identifier. The horizontal rows of dots, beside each anomaly symbol, indicate the anomaly amplitude on the flight record. The vertical column of dots gives the estimated depth. In areas where anomalies are crowded, the identifiers, dots and mho values may be obliterated. The EM grade symbols, however, will always be discernible, and the obliterated information can be obtained from the anomaly listing appended to this report.

The purpose of indicating the anomaly amplitude by dots is to provide an estimate of the reliability of the conductance calculation. Thus, a conductance value obtained

from a large ppm anomaly (3 or 4 dots) will be accurate whereas one obtained from a small ppm anomaly (no dots) could be inaccurate. The absence of amplitude dots indicates that the anomaly from the standard (maximum-coupled coaxial) coil-pair is 5 ppm or less on both the inphase and quadrature channels. Such small anomalies could reflect a weak conductor at the surface or a stronger conductor at depth. The mho value and depth estimate will illustrate which of these possibilities fits the recorded data best.

Flight line deviations occasionally yield cases where two anomalies, having similar mho values but dramatically different depth estimates, occur close together on the same conductor. Such examples illustrate the reliability of the conductance measurement while showing that the depth estimate can be unreliable. There are a number of factors which can produce an error in the depth estimate, including the averaging of topographic variations by the altimeter, overlying conductive overburden, and the location and attitude of the conductor relative to the flight line. Conductor location and attitude can provide an erroneous depth estimate because the stronger part of the conductor may be deeper or to one side of the flight line, or because it has a shallow dip. A heavy tree cover can also produce

errors in depth estimates. This is because the depth estimate is computed as the distance of bird from conductor, minus the altimeter reading. The altimeter can lock on the top of a dense forest canopy. This situation yields an erroneously large depth estimate but does not affect the conductance estimate.

Dip symbols are used to indicate the direction of dip of conductors. These symbols are used only when the anomaly shapes are unambiguous, which usually requires a fairly resistive environment.

A further interpretation is presented on the EM map by means of the line-to-line correlation of anomalies, which is based on a comparison of anomaly shapes on adjacent lines. This provides conductor axes which may define the geological structure over portions of the survey area. The absence of conductor axes in an area implies that anomalies could not be correlated from line to line with reasonable confidence.

DIGHEM electromagnetic maps are designed to provide a correct impression of conductor quality by means of the conductance grade symbols. The symbols can stand alone with geology when planning a follow-up program. The actual mho values are plotted for those who wish quantitative data.

The anomaly ppm and depth are indicated by inconspicuous dots which should not distract from the conductor patterns, while being helpful to those who wish this information. The map provides an interpretation of conductors in terms of length, strike direction, conductance, depth, thickness (see below), and dip. The accuracy is comparable to an interpretation from a ground EM survey having the same line spacing.

An EM anomaly list attached to each survey report provides a tabulation of anomalies in ppm, and in mhos and estimated depth for the vertical sheet model. The EM anomaly list also shows the conductance in mhos and the depth for a thin horizontal sheet (whole plane) model, but only the vertical sheet parameters appear on the EM map. The horizontal sheet model is suitable for a flatly dipping thin bedrock conductor such as a sulfide sheet having a thickness less than 15 m. The list also shows the resistivity and depth for a conductive earth (half space) model, which is suitable for thicker slabs such as thick conductive overburden. In the EM anomaly list, a depth value of zero for the conductive earth model, in an area of thick cover, warns that the anomaly may be caused by conductive overburden. Since discrete bodies normally are the targets of EM surveys, local base (or zero) levels are

used to compute anomaly amplitudes rather than true zero levels. The use of local base levels may distort the horizontal sheet and conductive earth parameters. True zero levels, however, are used for resistivity mapping, discussed below.

X-type electromagnetic responses

DIGHEM^{II} maps contain x-type EM responses in addition to EM anomalies. An x-type response is below the noise threshold of 2 ppm, and reflects one of the following: a weak conductor near the surface, a strong conductor at depth (e.g., 100 to 120 m below surface) or to one side of a flight line, or aerodynamic noise. Those responses that have the appearance of valid bedrock anomalies on the flight profiles are mentioned in the report. The others should not be followed up unless their locations are of considerable geological interest.

The thickness parameter

DIGHEM^{II} can provide an indication of the thickness of a steeply dipping conductor. The ratio of the anomaly amplitude of channel 24/channel 22 generally increases as the apparent thickness increases, i.e., the thickness in the

horizontal plane. This thickness is equal to the conductor width if the conductor dips at 90 degrees and strikes at right angles to the flight line. This report refers to a conductor as thin when the thickness is likely to be less than 3m, and thick when in excess of 10 m. In base metal exploration applications, thick conductors can be high priority targets because most massive sulfide ore bodies are thick, whereas non-economic bedrock conductors are usually thin. An estimate of thickness cannot be obtained when the strike of the conductor is subparallel to the flight line, when the conductor has a shallow dip, when the anomaly amplitudes are small, or when the resistivity of the environment is below 100 ohm-m.

Resistivity mapping

Areas of widespread conductivity are commonly encountered during surveys. In such areas, anomalies can be generated by decreases of only 5 m in survey altitude as well as by increases in conductivity. The typical flight record in conductive areas is characterized by inphase and quadrature channels which are continuously active; local peaks reflect either increases in conductivity of the earth or decreases in survey altitude. For such conductive areas, apparent resistivity profiles and contour maps are necessary

for the interpretation of the airborne data. The advantage of the resistivity parameter is that anomalies caused by altitude changes are virtually eliminated, so the resistivity data reflect only those anomalies caused by conductivity changes. This helps the interpreter to differentiate between conductive trends in the bedrock and those patterns typical of conductive overburden. Discrete conductors will generally appear as narrow lows on the contour map and broad conductors will appear as wide lows.

Channel 40 (see Appendix) and the resistivity contour map present the apparent resistivity using the so-called pseudo-layer (or buried) half space model defined in Fraser (1978)[2]. This model consists of a resistive layer overlying a conductive half space. Channel 41 gives the apparent depth below surface of the conductive material. The apparent depth therefore is simply the apparent thickness of the overlying resistive layer. The apparent depth (or thickness) parameter will be positive when the upper layer is more resistive than the underlying material,

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[2]Resistivity mapping with an airborne multicoil electromagnetic system: Geophysics, v 43, p. 144-172.

in which case the apparent depth may be quite close to the true depth.

The apparent depth will be negative when the upper layer is more conductive than the underlying material, and will be zero when a homogeneous half space exists. The apparent depth parameter must be interpreted cautiously because it will contain any errors which may exist in the measured altitude of the EM bird (e.g., as caused by a dense tree cover).

The inputs to the resistivity algorithm are the inphase and quadrature components of the whaletail coil-pair. The outputs are the apparent resistivity of the conductive half space (the source) and the sensor-source distance. The flying height is not an input variable, and the output resistivity and sensor-source distance are independent of the flying height. The apparent depth, discussed above, is simply the sensor-source distance minus the measured altitude or flying height. Consequently, errors in the measured altitude will affect the apparent depth parameter but not the apparent resistivity parameter.

The apparent depth parameter is a useful indicator of simple layering in areas lacking a heavy tree cover. The

DIGHEM^{II} system has been flown for the purpose of permafrost mapping, where positive apparent depths were used as a measure of permafrost thickness. However, little quantitative use has been made of negative apparent depths because the absolute value of the negative depth is not a measure of the thickness of the conductive upper layer and, therefore, is not meaningful physically. Qualitatively, a negative apparent depth estimate usually shows that the EM anomaly is caused by conductive overburden. Consequently, the apparent depth channel 41 can be of significant help in distinguishing between overburden and bedrock conductors.

Interpretation in conductive environments

Environments having background resistivities below 30 ohm-m cause all airborne EM systems to yield very large responses from the conductive ground. This usually prohibits the recognition of bedrock conductors. The processing of DIGHEM^{II} data, however, produces four channels which contribute significantly to the recognition of bedrock conductors. These are the inphase and quadrature difference channels (number 33 and 34), and the resistivity and depth channels (40 and 41). The EM difference channels eliminate up to 99% of the response of conductive ground, leaving responses from bedrock conductors, cultural features

(e.g., telephone lines, fences, etc.) and edge effects. An edge effect arises when the conductivity of the ground suddenly changes, and this is a source of geologic noise. While edge effects yield anomalies on the EM difference channels, they do not produce resistivity anomalies. Consequently, the resistivity channel aids in eliminating anomalies due to edge effects. On the other hand, resistivity anomalies will coincide with the most highly conductive sections of conductive ground, and this is another source of geologic noise. The recognition of a bedrock conductor in a highly conductive environment therefore is based on the anomalous responses of the two difference channels (33 and 34) and the resistivity channel (40). The most favourable situation is where anomalies coincide on all 3 channels.

Channel 41, which is the apparent depth to the conductive material, also helps determine whether a conductive response arises from surficial material or from a conductive zone in the bedrock. When this profile rides above the zero level (i.e., it is negative), it implies that the EM and resistivity profiles are responding primarily to a conductive upper layer, i.e., conductive overburden. If channel 41 is below the zero level, it indicates that a resistive upper layer exists, and this usually implies the existence of a bedrock conductor.

Channels 35 and 36 are the anomaly recognition functions. They are used to trigger the conductance channel 37 which identifies discrete conductors. In highly conducting environments, channel 36 may not be generated because it is subject to some corruption by highly conductive earth signals. Some of the automatically selected anomalies (channel 37) are discarded by the human interpreter. The automatic selection algorithm is intentionally oversensitive to assure that no meaningful responses are missed. The interpreter than classifies the anomalies according to their source and eliminates those that are not substantiated by the data, such as those rising from geologic or aerodynamic noise.

The resistivity map often yields more useful information on conductivity distributions than the EM map. In comparing the EM and resistivity maps, keep in mind the following:

(a) The resistivity map portrays the absolute value of the earth's resistivity.

(b) The EM map portrays anomalies in the earth's resistivity. An anomaly by definition is a change from the norm and so the EM map displays

anomalies, (i) over narrow, conductive bodies and (ii) over the boundary zone between two wide formations of differing conductivity.

The resistivity map might be likened to a total field map and the EM map to a horizontal gradient in the direction of flight[3]. Because gradient maps are usually more sensitive than total field maps, the EM map therefore is to be preferred in resistive areas. However, in conductive areas, the absolute character of the resistivity map usually causes it to be mre useful than the EM map.

Reduction of geologic noise

Geologic noise refers to unwanted geophysical responses. For purposes of airborne EM surveying, geologic noise refers to EM responses caused by conductive overburden and magnetic polarization. It was mentioned above that the

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[3]The gradient analogy is only valid with regard to the identification of anomalous locations. The calculation of conductance is based on EM amplitudes relative to a local base level, rather than to an absolute zero level as for the resistivity calculation.

EM difference channels (i.e., channel 33 for inphase and 34 for quadrature) tend to eliminate the response of conductive overburden. This marked a unique development in airborne EM technology, as DIGHEM^{II} is the only EM system which yields channels having an exceptionally high degree of immunity to conductive overburden.

Magnetite produces a form of geological noise on the inphase channels of all EM systems. Rocks containing less than 1% magnetite can yield negative inphase anomalies caused by magnetic polarization. This is described in more detail below. When magnetite is widely distributed throughout a survey area, the inphase EM channels may continuously rise and fall reflecting variations in the magnetite percentage, flying height, and overburden thickness. This can lead to difficulties in recognizing deeply buried bedrock conductors, particularly if conductive overburden also exists. However, the response of broadly distributed magnetite generally vanishes on the inphase difference channel 33. This feature can be a significant aid in the recognition of conductors which occur in rocks containing accessory magnetite.

EM magnetite mapping

The information content of DIGHEM^{II} data consists of

a combination of conductive eddy current response and magnetic polarization response. The secondary field resulting from conductive eddy current flow is frequency-dependent and consists of both inphase and quadrature components, which are positive in sign. On the other hand, the secondary field resulting from magnetic polarization is independent of frequency and consists of only an inphase component, which is negative in sign. When magnetic polarization manifests itself by decreasing the measured amount of positive inphase, its presence may be difficult to recognize. However, when it manifests itself by yielding a negative inphase anomaly (e.g., in the absence of eddy current flow), its presence is assured. In this latter case, the negative component can be used to estimate the percent magnetite content.

A magnetite mapping technique was developed for the whaletail coil-pair of DIGHEM^{II}. The technique yields contours of apparent weight percent magnetite according to a homogeneous half space model. The method can be complementary to magnetometer mapping in certain cases. Compared to magnetometry, it is far less sensitive but is more able to resolve closely spaced magnetite zones, as well as providing an estimate of the amount of magnetite in the rock. The method is sensitive to 1/4% magnetite by weight when the EM

sensor is at a height of 30 m above a magnetitic half space. It can individually resolve steeply dipping narrow magnetite-rich bands which are separated by 60 m.

The EM magnetite mapping technique provides estimates of magnetite content which are usually correct within a factor of 2 when the magnetite is fairly uniformly distributed. EM magnetite maps can be generated when magnetic polarization is evident as indicated by negative inphase responses.

The EM magnetite algorithm is basically quite simple because a linear relationship exists between volume percent magnetite and the negative inphase response in ppm. This linear relationship is true for a fixed survey altitude when demagnetization effects are disregarded and when a fixed susceptibility-volume percent relationship is assumed. The technique in practice involves, first, correcting the actual EM response for variations in flying altitude and, second, calibrating the negative inphase ppms in terms of volume percent magnetite.

EM magnetite mapping provides another method of airborne geologic mapping. It thus joins resistivity mapping, magnetometer mapping, spectrometry, photogeology, etc., as a

possible means by which geologic information can be obtained from airborne techniques. It is not nearly as useful in the general sense as the other airborne mapping techniques, but can be of value in cases where the magnetite content gives an indication of lithology.

Like magnetometry, the EM magnetite method maps only bedrock features, provided that the overburden is characterized by a general lack of magnetite. This contrasts with resistivity mapping which portrays the combined effect of bedrock and overburden.

MAGNETICS

The existence of a magnetic correlation with an EM anomaly is indicated directly on the EM map. An EM anomaly with magnetic correlation has a greater likelihood of being produced by sulfides than one that is non-magnetic. However, sulfide ore bodies may be non-magnetic (e.g., the Kidd Creek deposit near Timmins, Ontario, Canada) as well as magnetic (e.g., the Mattabi deposit near Sturgeon Lake, Ontario).

The magnetometer data are digitally recorded in the aircraft to an accuracy of one gamma. The digital tape is

processed by computer to yield a standard total field magnetic map which is usually contoured at 25 gamma intervals. The magnetic data also are treated mathematically to enhance the magnetic response of the near-surface geology, and an enhanced magnetic map is produced with a 100 gamma contour interval. The response of the enhancement operator in the frequency domain is shown in Figure 2. The 100 gamma contour interval is equivalent to a 5 gamma interval for the passband components of the airborne data. This is because these components are amplified 20 times by the operator of Figure 2.

The enhanced map, which bears a resemblance to a downward continuation map, is produced by digital bandpass filtering the total field data. The enhancement is equivalent to continuing the field downward to a level (above the source) which is 1/20th of the actual sensor-source distance.

Because the enhanced magnetic map bears a resemblance to a ground magnetic map, it simplifies the recognition of trends in the rock strata and the interpretation of geological structure. The contour interval of 100 gammas is suitable for defining the near-surface local geology while de-emphasizing deep-seated regional features.

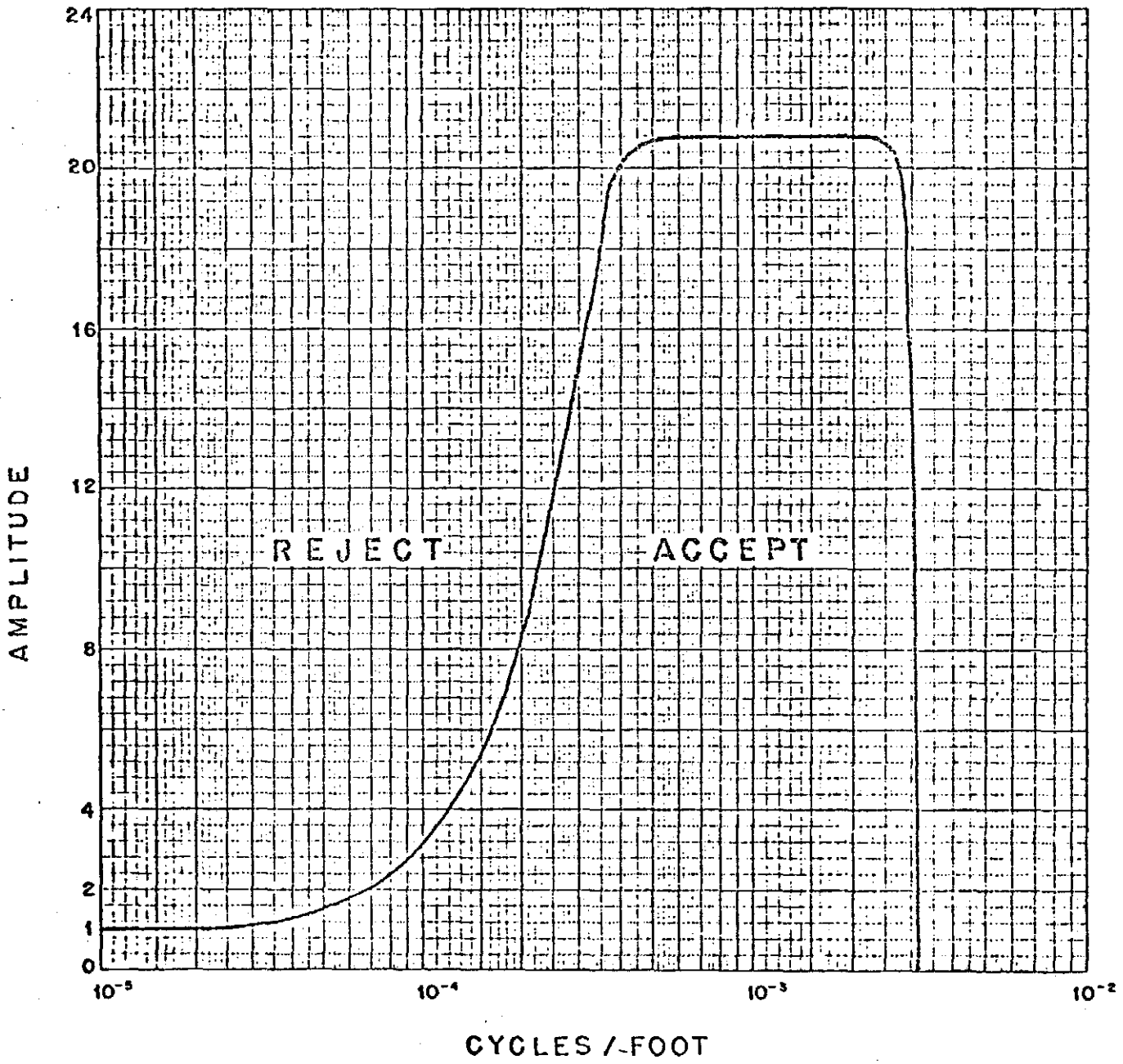

Figure 2 Frequency response of magnetic operator

CONDUCTORS IN THE SURVEY AREA

The electrogmanetic map shows the locations of conductors and their interpreted conductance (i.e., conductivity - thickness product), depth and, occasionally, dip. Their strike direction and length are also shown when anomalies can be correlated from line-to-line. When studying the maps for follow-up planning, consult the anomaly listings appended to this report to ensure that none of the conductors are overlooked.

The survey consists of a 94 line grid flown in a northwesterly direction. The data are presented on three map sheets. The EM maps indicate which anomalies are believed to be caused by cultural or surficial sources. Generally, such anomalies are not commented on below as the discussions are directed to identifying bedrock features.

Sheet 1

The resistivity in the area of sheet 1 is consistently in excess of 1000 ohm-m.

The magnetics appear to be quiet but the enhanced magnetic map indicates a change in the basement rock type

across a boundary running northeasterly approximately along the 62,200 gamma contour interval in the southeast portion of the sheet. In addition, a dike-like features striking northeast at the north end of the sheet is evident.

The EM map consists of only two x-type responses, i.e., 294xA[4] and 310xA, which possibly could reflect bedrock conductors at depth. However, these responses are unlikely to be significant. Since the host rock is highly resistive and would provide a good contrast for conductors, it is clear that there are no conductors within in the upper 100 m this survey block.

Sheet 2

Covers area to South of E/L 2/70.

Sheet 3

The ground resistivity within the area of sheet 3 varies from 1 ohm-m to in excess of 1000 ohm-m. Three large conductive zones can be readily recognized. The most anomalous one occurs in the southwestern part of the sheet. The other two conductive zones, in the northern and northeastern parts of the sheet, are quite similar in character to each other and may be caused by similar material.

these grade 1 anomalies and x-type responses. Conductor 266C-267C is magnetic.

Anomalies 278F-285A, 280E-284A

A pair of bedrock conductors is indicated by these grade 1 to 4 anomalies and associated x-type responses. Both conductors are non-magnetic and appear to have a west dip.

Anomalies 285F-290xA, 285D-291B, 286B-291A

These grade 2 to 4 anomalies reflect a series of parallel bedrock conductors. These conductors, and those listed immediately above, are part of the strong resistivity low discussed above. The magnetic correlation of 285D, 288A and

The magnetic map shows considerable activity correlating with the two moderately conductive zones in the north and northeast.

Anomaly 252A	This grade 1 conductor is directly associated with a 150 gamma magnetic anomaly. The whaletail inphase is negative which warns that the conductivity calculation for this anomaly may be underestimated.
Anomaly 262H-265xD	These grade 1 anomalies and associated x-type responses reflect a conductor which could have a bedrock source. The inphase responses are depressed due to the presence of magnetite, and so the conductances may be underestimated.
Anomaly 266C-267C, Response 268xF-269xC	A pair of weak bedrock conductors may be indicated by

289xA appears to be coincidental.

Respectfully submitted,

DIGHEM LIMITED

D. C. Fraser,
President

Z. Dvorak
Geophysicist

Twelve map sheets accompany this report.

Electromagnetic	3 map sheets
Resistivity	3 map sheets
Magnetics	3 map sheets
Enhanced magnetics	3 map sheets

APPENDIX A

THE FLIGHT RECORD AND PATH RECOVERY

Both analog and digital flight records are produced. The analog profiles are recorded on green chart paper in the aircraft during the survey. The digital profiles are generated later by computer and plotted on orange chart paper at a scale identical to the geophysical maps. The digital profiles, which may be displayed, are as follows:

Channel Number	Parameter	Scale units/mm	Noise
20	magnetometer	10 gamma	2 gamma
21	bird height	10 feet	5 feet
22	standard* coil-pair inphase	1 ppm	1-2 ppm
23	standard coil-pair quadrature	1 ppm	1-2 ppm
24	whaletail** coil-pair inphase	1 ppm	1-2 ppm
25	whaletail coil-pair quadrature	1 ppm	1-2 ppm
26	VLF-EM total field	1 %	1-2 %
27	VLF-EM vertical quadrature	1 %	1-2 %
28	ambient noise monitor (standard coil)	1 ppm	1 ppm
29	ambient noise monitor (whaletail coil)	1 ppm	1 ppm
33	difference function inphase	1 ppm	1-2 ppm
34	difference function quadrature	1 ppm	1-2 ppm
35	first anomaly recognition function	1 ppm	1-2 ppm
36	second anomaly recognition function	1 ppm	1-2 ppm
37	conductance	1 mho	
40	log resistivity at main frequency	.03 decade	
41	apparent depth at main frequency	3 m	
45	log resistivity at secondary frequency	.03 decade	
46	apparent depth at secondary frequency	3 m	
50	EM magnetite	0.5%	

* coaxial
** horizontal coplanar

The log resistivity scale of 0.03 decade/mm means that the resistivity changes by an order of magnitude in 33 mm. The resistivities at 0, 33, 67 and 100 mm up from the bottom of the chart are respectively 1, 10, 100 and 1000 ohm-m.

The fiducial marks on the flight records represent points on the ground which were recognized by the aircraft navigator. Continuous photographic coverage allowed accurate photo-path recovery locations for the fiducials, which were then plotted on the geophysical maps to provide the track of the aircraft.

The fiducial locations on both the flight records and flight path maps were examined by a computer for unusual helicopter speed changes. Such changes may denote an error in flight path recovery. The resulting flight path locations therefore reflect a more stringent checking than is provided by standard flight path recovery techniques.

The following brief description of DIGHEM^{II} illustrates the information content of the various profiles*.

*For a detailed description, see D.C. Fraser, Geophysics, v.44, p.1367-1394.

Single-frequency surveying

The DIGHEM^{II} system has two transmitter coils which are mounted at right angles to each other. Both coils transmit at approximately the same frequency. (This frequency is given in the Introduction.) Thus, the system provides two completely independent surveys at one pass. In addition, the digital flight chart profiles (generated by computer) include an inphase channel and a quadrature channel which essentially are free of the response of conductive overburden. Also, the EM channels may indicate whether the conductor is thin (e.g., less than 3 m), or has a substantial width (e.g., greater than 10 m). Further, the EM channels include channels of resistivity, apparent depth and conductance. A minimum of 11 EM channels are provided. The DIGHEM^{II} system therefore gives information in one pass which cannot be obtained by any other airborne or ground EM technique.

Figure A1 shows a DIGHEM^{II} flight profile over the massive pyrrhotite ore body in Montcalm Township, Ontario. It will serve to identify the majority of the available channels.

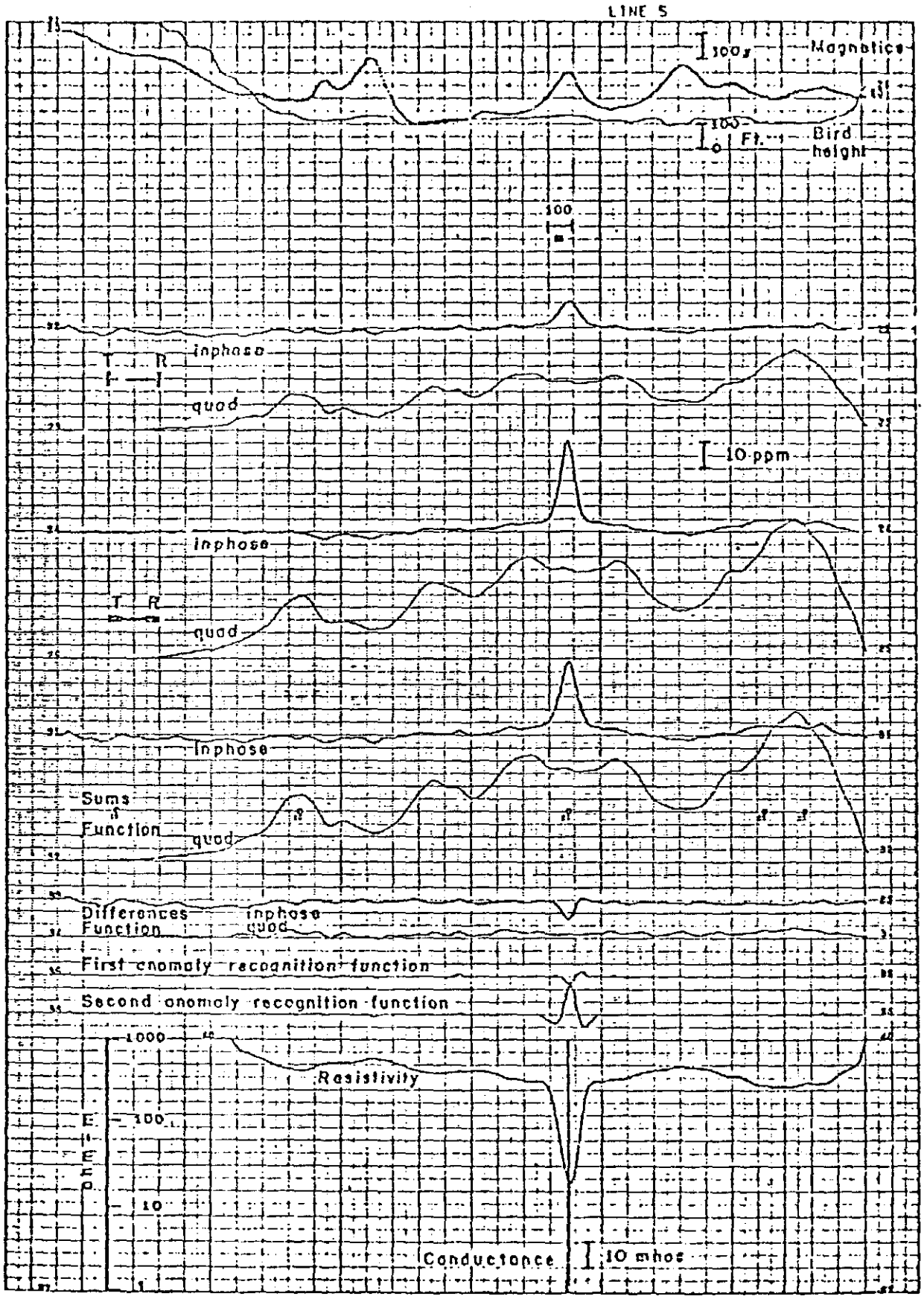

Fig. A1. Flight over Montcalm deposit, with line parallel to strike

(v)

The two upper channels (numbered 20 and 21) are respectively the magnetics and the radio altitude. Channels 22 and 23 are respectively the inphase and quadrature of the coaxial coil-pair, which is termed the standard coil-pair. This coil-pair is equivalent to the standard coil-pair of all inphase-quadrature airborne EM systems. Channels 24 and 25 are the inphase and quadrature of the additional coplanar coil-pair which is termed the whaletail coil-pair.

Channels 31 and 32 are inphase and quadrature sum functions of the standard and whaletail channels; they provide a condensed view of the four basic channels 22 to 25. The sum channels normally are not plotted.

Channels 33 and 34 are inphase and quadrature difference functions of the standard and whaletail channels. The difference channels are almost free from the response of conductive overburden. Channel 37 is the conductance. The conductance channel essentially is an automatic anomaly picker calibrated in conductance units of mhos; it is triggered by the anomaly recognition functions shown as channels 35 and 36.

Channel 40 is the resistivity, which is derived from the whaletail channels 24 and 25. The resistivity channel 40 yields data which can be contoured, and so the DIGHEM^{II} system yields a resistivity contour map in addition to an electromagnetic map, a magnetic contour map, and an enhanced magnetic contour map. The enhanced magnetic contour map is similar to the filtered magnetic map discussed by Fraser.*

Figure A2 presents the DIGHEM^{II} results for a line flown perpendicularly to the Montcalm ore body. Channel 20 shows the 175 gamma magnetic anomaly caused by the massive pyrrhotite deposit. For the EM channels, the following points are of interest:

1. On channels 22-25 and 31-34, the ore body essentially yields only an inphase response. The quadrature response is almost completely caused by conductive overburden (which also gives a small inphase response). The hachures show the EM response from the overburden. The overburden response vanishes on the

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*Cdn. Inst. Mng., Bull., April 1974.

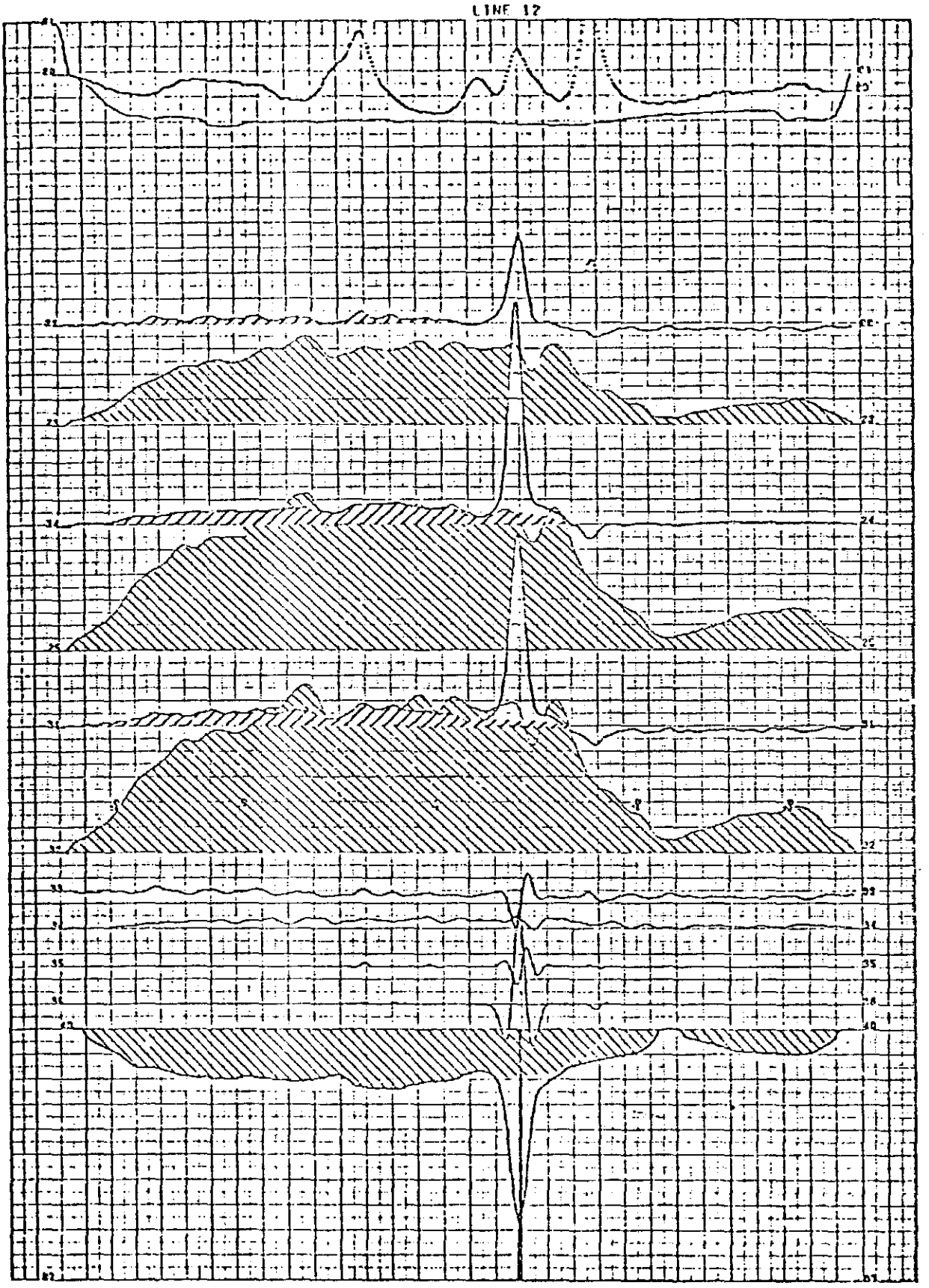

Fig. A2. Flight over Montcalm deposit, with line perpendicular to strike.

difference EM channels, as can be seen by comparing the quadrature channels 25 and 34. This is an important point to note because DIGHEM^{II} is the only EM system which provides an inphase channel and a quadrature channel which are essentially free of conductive overburden response.

2. The whaletail anomaly of channel 24 has a single peak. This shows that the conductor has a substantial width. If the width had been under 3 m, the conductor would have produced a weak m-shaped anomaly on channel 24.

3. The ore body yields a resistivity of 5 ohm-m in a background of about 200 ohm-m (cf. channel 40). A dipole-dipole ground resistivity survey with an a-spacing of 50 m showed a similar background, but the ore body gave a low of only 53 ohm-m because of the averaging effect inherent in the ground technique.

4. The ore body has a conductance of 330 mhos according to its EM response on this particular flight line. The conductance channel 37 saturates at 100 mhos, and so the deposit is indicated by a 100-mho spike.

Figure A1 illustrates the DIGHEM^{II} results for a line flown subparallel to the ore body. The ore body anomaly is small on the standard coil-pair (channel 22) but shows up strongly on the whaletail coil-pair (channel 24).

Dual-frequency surveying

For surveys flown primarily for resistivity mapping, as opposed to EM surveying, the two transmitter coils may be energized at two well-separated frequencies (e.g., 900 and 3600 Hz). Apparent resistivity and apparent depth maps can be made independently for each frequency. The interpretation procedure involves comparing the apparent resistivities and apparent depths at the two frequencies.

The use of two different coil-pair orientations (i.e., standard and whaletail) for dual-frequency resistivity mapping is an unorthodox procedure. However, as long as the current flow patterns are primarily horizontal, the different coil orientations do not influence the results, according to superposed dipole theory. Wire fences and other cultural features will produce local deviations,

because they usually respond preferentially to one or the other of the coil-pairs.

The difference channels 33 and 34 are not produced because the divergent frequencies of the two coil-pairs renders them meaningless. In addition, channels 35 to 37 also are not produced.

APPENDIX B

EM ANOMALY LIST

409129

312 GEOPEKO, TASMANIA MAY/80

LINE & ANOMALY	STANDARD COIL REAL PPM	STANDARD COIL QUAD PPM	WHALETAIL COIL REAL PPM	WHALETAIL COIL QUAD PPM	VERTICAL DIKE COND MHOS	VERTICAL DIKE DEPTH* FEET	HORIZONTAL SHEET COND MHOS	HORIZONTAL SHEET DEPTH FEET	CONDUCTIVE EARTH RESIS OHM-M	CONDUCTIVE EARTH DEPTH FEE
251B	11	24	20	44	4	0	1	145	62	44
252A	1	5	1	5	1	0	1	214	730	0
252B	11	52	27	98	3	0	1	31	85	0
253E	8	22	12	39	3	0	1	129	103	22
254C	0	9	1	19	1	0	1	68	901	0
256C	2	2	0	3	3	98	1	434	470	138
256D	3	6	5	13	3	0	1	218	137	60
258F	3	16	3	30	1	0	1	44	337	0
259G	4	21	8	41	2	0	1	69	194	0
259H	2	1	0	0	5	191	1	703	121	511
259I	2	5	13	13	5	42	1	294	75	152
260D	5	20	8	35	2	0	1	98	166	0
261D	1	26	5	40	1	0	1	12	451	0
261E	5	22	19	44	3	0	1	93	106	0
261F	2	7	1	9	1	0	1	169	466	0
262H	2	47	0	80	1	0	1	0	364	0
262J	8	39	20	82	2	0	1	39	103	0

* ESTIMATED DEPTH MAY BE UNRELIABLE BECAUSE THE STRONGER PART OF THE CONDUCTOR MAY BE DEEPER OR TO ONE SIDE OF THE FLIGHT LINE, OR BECAUSE OF A SHALLOW DIP OR OVERBURDEN EFFECTS.

409130

312 GEOPEKO, TASMANIA MAY/80

LINE & ANOMALY	STANDARD COIL REAL PPM	STANDARD COIL QUAD PPM	WHALETAIL COIL REAL PPM	WHALETAIL COIL QUAD PPM	VERTICAL DIKE COND MHOS	VERTICAL DIKE DEPTH* FEET	HORIZONTAL SHEET COND MHOS	HORIZONTAL SHEET DEPTH FEET	CONDUCTIVE EARTH RESIS OHM-M	CONDUCTIVE EARTH DEPTH FEET
263H	0	64	0	125	1	0	1	0	282	0
263I	8	41	19	87	2	0	1	73	112	0
264E	3	12	9	29	2	0	1	125	167	0
265E	2	30	4	66	1	0	1	34	449	0
265F	0	34	2	84	1	0	1	0	398	0
265H	3	23	6	40	1	0	1	68	285	0
266A	4	26	9	46	2	0	1	65	192	0
266B	2	14	7	29	2	0	1	103	230	0
266C	4	8	3	12	3	25	1	245	153	92
267A	1	5	1	5	2	56	1	270	446	67
267B	3	15	2	27	1	0	1	63	359	0
267C	5	14	9	27	3	0	1	133	134	10
271C	1	24	5	48	1	0	1	8	431	0
276C	2	5	0	6	2	50	1	281	442	76
277D	7	32	13	60	2	0	1	76	127	0
278F	19	62	26	87	4	0	1	89	63	8
279C	88	69	194	136	29	0	7	93	3	51
280D	10	25	32	60	5	0	2	122	51	27
280E	24	36	20	49	6	16	2	157	37	68
281B	8	33	19	66	3	0	1	93	97	0
281C	1	4	1	6	1	42	1	298	580	43

* ESTIMATED DEPTH MAY BE UNRELIABLE BECAUSE THE STRONGER PART OF THE CONDUCTOR MAY BE DEEPER OR TO ONE SIDE OF THE FLIGHT LINE, OR BECAUSE OF A SHALLOW DIP OR OVERBURDEN EFFECTS.

312 GEOPEKO, TASMANIA MAY/80

LINE & ANOMALY	STANDARD COIL REAL PPM	STANDARD COIL QUAD PPM	WHALETAIL COIL REAL PPM	WHALETAIL COIL QUAD PPM	VERTICAL DIKE COND MHOS	VERTICAL DIKE DEPTH* FEET	HORIZONTAL SHEET COND MHOS	HORIZONTAL SHEET DEPTH FEET	CONDUCTIVE EARTH RESIS OHM-M	CONDUCTIVE EARTH DEPTH FEET
282C	21	60	66	114	6	0	2	88	32	14
282D	13	19	19	35	6	36	2	207	42	109
283A	95	66	194	124	33	0	7	77	3	38
284A	105	94	223	204	24	0	6	87	4	47
285A	6	11	9	17	4	31	1	234	85	102
285B	3	12	1	14	1	0	1	134	308	0
285D	23	25	46	26	16	0	4	178	11	112
285F	21	34	55	82	8	0	2	111	24	32
286A	8	49	25	98	2	0	1	70	98	0
286B	119	211	456	353	22	0	6	67	4	25
286C	84	225	261	382	11	0	3	50	11	2
286D	0	0	12	13	6	138	2	465	65	322
287A	32	36	65	70	13	0	3	140	14	74
288A	45	41	123	91	21	1	5	139	6	88
288B	72	99	164	213	14	0	4	91	9	38
289A	19	44	54	85	7	0	2	98	31	18
289B	40	74	118	163	10	0	3	65	15	2
290A	11	18	26	31	7	54	2	236	35	136
290B	62	104	150	203	12	0	3	74	12	18
291A	5	3	12	5	19	137	4	468	12	381
291B	15	14	54	39	16	0	4	175	12	105

APPENDIX 6.2

132

409133

GEOPEKO
A DIVISION OF PEKO-WALLSEND OPERATIONS LTD.

INTER-OFFICE MEMO

TO: R.R. LARGE DATE: 12-1-82

FROM: W. HERRMANN COPIES TO:

SUBJECT: CARTER'S PROSPECT - FLEECE CREEK ML : 38M/78

On Tuesday 8th December 1981, in company with 'Paul' Carter, I inspected the Pb-Ag prospect in the Fleece Creek.

The prospect is located near the north western corner of mineral lease 38M/78 which is held by Carter and associates, and occupies a square block of 49 hectares at the north western corner of E.L. 46/80, Heap of Rocks.

Mr. Carter pointed out the datum (NW corner) of the lease to be a point about 100m west of the principal exposure of mineralization in the north bank of Fleece Creek. The datum is marked only by a roughly blazed sapling (eucalypt) and with crude stone cairns indicating the direction of the northern and western boundaries. This approximate position is shown on the attached sketch plan (Fig. 1) (This datum does not co-incide exactly with the sketch plan produced by Mr. Carter (Fig. 2) nor with the quoted grid reference.) If the datum marked by the tree is correct, then only about a third of a hectare of Cambrian volcanics falls within Carter's lease.

The main exposure of mineralization occurs in a shallow cut on the north bank of Fleece Creek. Mineralization consists of numerous anastomosing and irregular galena bearing quartz veinlets confined within a narrow, north westerly, striking - steeply dipping, fracture zone within (Precambrian) psammo-pelitic gneiss.

The fracture zone is apparently complementary to prominent NW-SE trending faults and mineralization is confined to a strike length of about 25m and maximum width of 2-3m.

The veinlets consist of vughy and "dogtooth" quartz with galena, some sphalerite and minor chalcopyrite and pyrite. Grade of mineralization within the fracture veinlets zone tends to be erratic but there are fairly sharp cutoffs against barren wall rocks.

According to Mr. Carter, the pile of mullock at the southern end of the exposure, immediately adjacent to the creek, covers a former shaft. It was at this point that H.J. Stacpoole assisted by the Carters, drilled a 33 foot (vertical?) diamond core hole which reputedly intersected "solid galena". The whereabouts of this core is unknown; Harry Stacpoole (pers. comm. telephone) thinks it was probably dicarded!

I attempted to obtain representative channel/chip samples across the main pod of mineralization exposed in samples. Details are listed below. These were meant to be fair samples but due to the relative hardness of the enclosing gneiss, the samples are undoubtetly biased towards the mineralization.

KR 8556	Mullock from shafts 80 m west of Marsden - Fleece Creek confluence.
8557	Chlorite-qtz veinlet in psammo-pelitic schist 100m south west along track from 8556.
8558	Qtz-galena vein mineralization from dumps of small shaft at the confluence of Marsden and Fleece Creeks.
8559	0.5m channel sample across southern end of "main" mineralized pod.
8560	1.0m channel sample through main zone 5m NW of 8559.
8561	1.0m channel sample across main zone 3m NW of 8560.
8562	1.0m channel sample across main 5m NW of 8561.
8563	Selected samples from high grade pod (0.5m long) from NW end of "main" zone.

Using samples 8559 - 8562 as representative of the "main" zone I have calculated average grades of approximately 8.8% Pb, 0.9% Zn, 28 gm/t Ag.

Calculations based on, very generous, figures of 25m strike length, 5m width and 100m depth lead to a size estimate of just under 50 000 tonnes.

Mineralization of similar type but very minor extent, occurs in a shallow shaft near the Marsden/Fleece Creek confluence and amongst some very old abandoned shafts about 80m further west. (These latter are reputedly gold prospects of an even earlier history than the Carter interests.)

Exposure in the vicinity is reasonably good and there doesn't seem to be much scope for the extension of the known occurrences.

My opinion is that this mode of occurrence, fracture controlled veinlet mineralization probably unrelated to volcanic or intrusive process, has little economic potential.

Fortunately, the lease (as pegged) covers very little of the more prospective Cambrian volcanic sequence and therefore constitutes only a minor hindrance to our future exploration in E.L. 2/70 Mackintosh East.

Mr. Carter would like "to see the prospect tested" by a drill hole or two. Unfortunately, his perception is clouded by faith and I think he would be underterred by even a dozen barren holes while the shining stuff was visible at the surface.

Regards,

W. HERRMANN.

135

409136

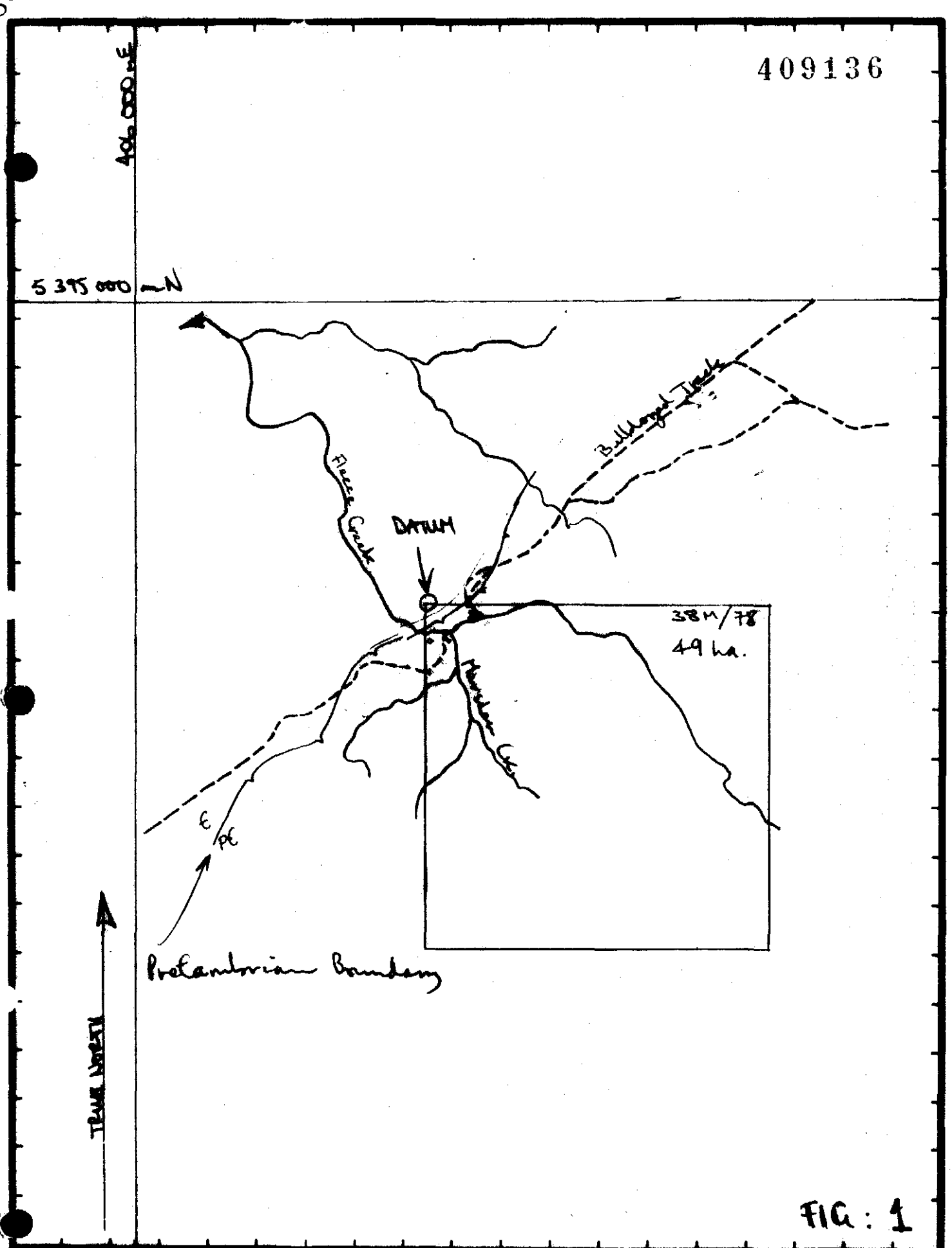

FIG: 1

LEGEND:

5 cm

GEOPEKO LIMITED
KING ISLAND

[redacted]

NR K

DATE:
GEOL:
DWN: 1

Sketch Showing Position of Carter's Lease

Commencing at the pedal notice situate at the north west corner of area applied for whose approximate grid co-ordinates are 406 700 metres E 5394 575 metres N and bounded on the north by 700 metres easterly on the east by 700 metres southerly on the south by 700 metres westerly thence on the west by 700 metres northerly to the point of commencement.

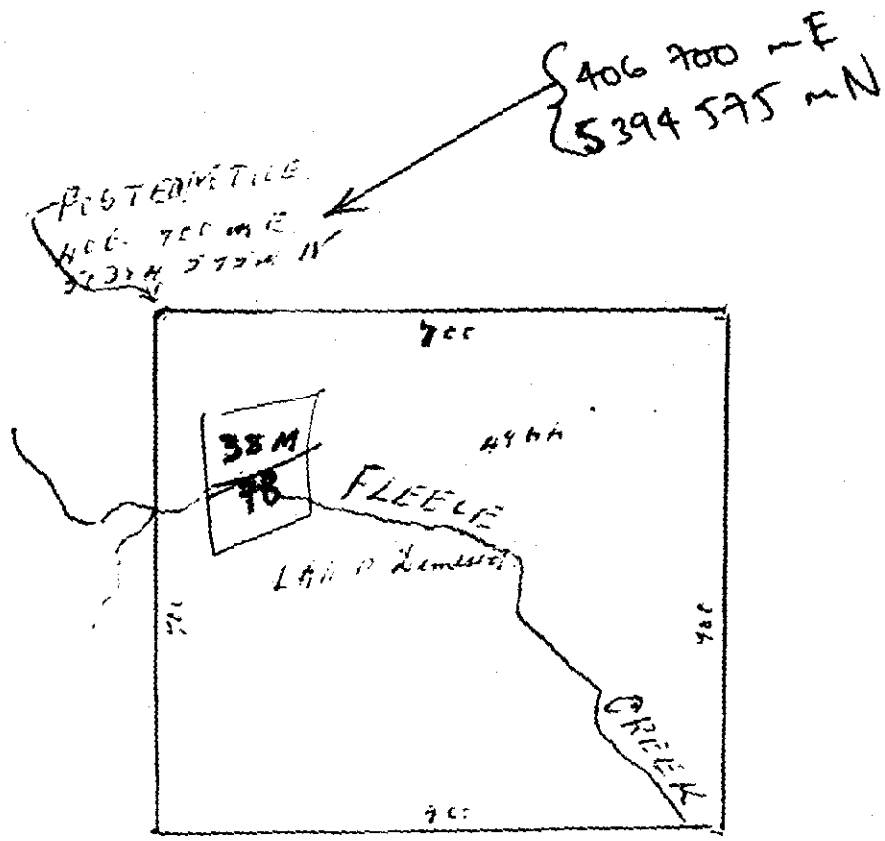

FIG: 2

137

409138

ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
KR	82.1 08 746	4.1.82	KP 2830	1 OF 4

TUBE No.	SAMPLE No.	Mn	Fe	Cu	Zn	Mo	Ag	Sn	W	Au
6	8556	190	2.3%	45	105	9.5	*8.0	5	X	X
7	8557	135	1.0%	10	40	1.0	*0.3	8	X	X
8	8558	170	1.1%	100	*2.25%	8.5	*39.0	X	X	0.016
9	8559	280	1.4%	50	625	11.0	*30.0	4	X	0.016
10	8560	150	1.35%	130	*3.4%	3.5	*31.5	5	X	0.008
11	8561	310	1.95%	75	1000	5.0	*17.5	X	X	X
12	8562	200	2.0%	40	2600	19.0	*20.0	5	X	X
13	8563	110	750	70	225	32.5	*55.0	X	X	X

ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
KR	82.1 08 746	4.1.82	KP 2830	3 OF 4

TUBE No.	SAMPLE No.	Pb	Bi							
6	8556	*3.90%	X							
7	8557	160	X							
8	8558	*4.0%	X							
9	8559	*6.0%	4							
10	8560	*2.25%	X							
11	8561	*5.3%	2							
12	8562	*4.8%	2							
13	8563	*5.5%	10							

* Denotes reanalysis by method AG/3.

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ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.

409139

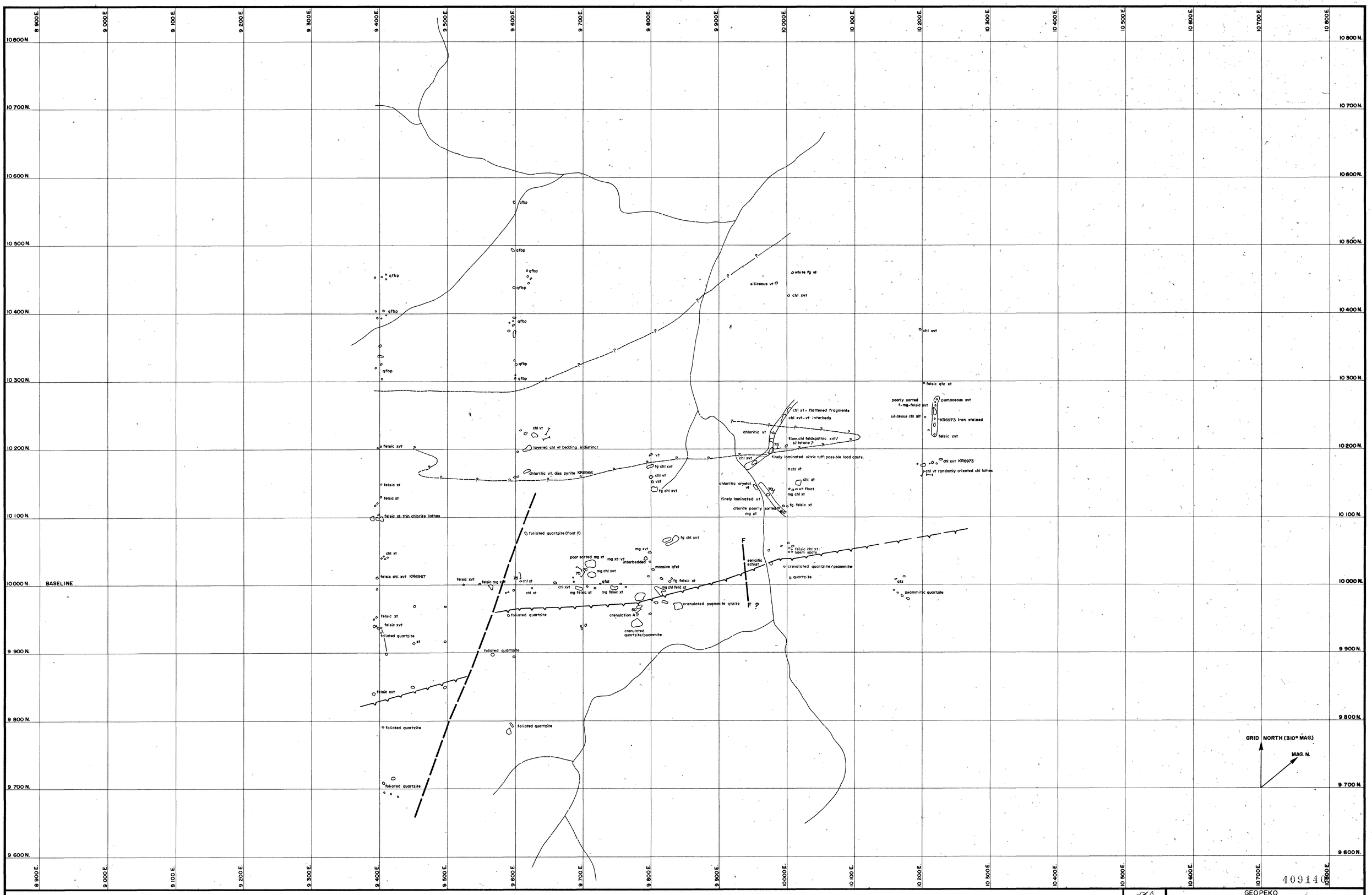
ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
K.F. [redacted]	83.1 08 746	4.1.82	KP 2830	5 OF 5

TUBE No.	SAMPLE No.	Zn	Ag	Pb	% Mo					
1	8556	- 105	11	3.72%	013					
2	8558	2.07%	44	14.8%	12					
3	8559	-625	34	11.0%	1					
4	8560	3.26%	35	9.36%	26					
5	8561	- 1000	21	6.02%	2					
6	8562	- 2600	23	8.95%	3					
7	8563	-225	52	17.5%	0.1					
8										
23	DETECTION	25	2	25						
24	DIGESTION	A6	A6	A6						
25	METHOD	A6/3	A6/3	A6/3						

Results in ppm unless otherwise specified
T = element present; but concentration too low to measure
X = element concentration is below detection limit
— = element not determined

AUTHORISED OFFICER B Dow



409140

LEGEND

Geological Boundaries

- mapped
- inferred
- unconformity
- unconformity inferred
- outcrop boundary
- float boundary

Structural Features

- Faults: mapped
- Faults: inferred
- Strike/dip of lithological layering
- Strike/dip of cleavage / schistosity
- Cleavage / schistosity: vertical
- Strike and dip of prominent joints

Miscellaneous

- KR6972 Rock sample location and number for geochemical analysis
- Track
- Creek

Geological Interpretation

- € Quartz - feldspar - biotite porphyry intrusive ?
- € Rhyolitic quartz crystal tuff and crystal vitric tuff
- € Rhyolitic fine grained massive or finely laminated vitric tuff.
- U/C Pre € Psammo - pelitic schists and quartzite

GEOPEKO
A DIVISION OF PEKO-WALLSEND OPERATIONS LTD.

SCALE 1:2500

No. TS 2/70-P1-2

E.L. 2/70 MACKINTOSH EAST, TASMANIA

PROVER I 84-2147

GEOLOGICAL PLAN 001

DATE: May 1981
GEOLOGIST P.S.H
DRAWN: T.G.D.S
CHECKED:

5 cm

massive mg qzt or porphyritic lava?

layered chl vt bedding indistinct

chloritic vt diss pyrite KR6968

coarse grained lithic tuff.

felsic xt

felsic xt mg chlorite grnes

foliated quartzite (float ?)

dark (siliceous) lithic tuff

coarse grn lithic tuff. locally chloritic

qzt matrix

fg-sil-xvt

xvt

poor sorted mg xt mg xt-vt interbedded

mg chl xvt

massive qfxt or lava

felsic xvt KR6967

felsic xvt

felsic mg xvt

chl xt

chl xvt

mg felsic xt

qfxt

fg felsic xt

mg chl feld xt or lava

crenulated psammite qtzite

foliated quartzite

crenulation AXIS

crenulated quartzite/psammite

foliated quartzite

foliated quartzite

foliated quartzite

foliated quartzite

qfbp

qfbp float

qfbp

qfbp

qfbp

qfbp

qfbp

qfbp

qfbp

qfb porphyry

massive fg cherty tuff sediment

glassy qzt float.

TRACK

qfb porphyry

white fg vt

siliceous vt

chl xvt

greenish qzt with pink sericitic alteration (kaolin)

1% disseminated pyrite

(glassy) mg xt float.

boulder: cherty/glassy vitric tuff"

float: mixture qzt and finely laminated cherty tuff sediment.

cherty tuff sed. recrystallised and inhomogenous qzt.

slightly calcareous qzt

chl xvt

PZ DDH 1

fine massive chert, tuff - siltstone

chl xt - flattened fragments

chl xvt - vt interbeds

siliceous sed components including remains of ?

silice vs chl xtl

felsic qtz xt

COSTEAN

qzt

lithic qzt

siliceous lithic qzt and characteristic dark siliceous blebbies / or fragments

KR6973 iron stained

qzt with siliceous blotches

qzt

chl xvt KR6973

chl vt randomly oriented chl lathes

fine grained lithic tuff. fg glassy/granular texture.

fg felsic xt

chl vt

chl xt

chl vt float

mg chl xt

fg felsic xt

fg stained mg massive qzt. (or porph. lava) (minor py and galena in fractures.

felsic chl xt or porphyritic lava ? haem. spots

crenulated quartzite/psammite

quartzite

qtz

psammitic quartzite

interbedded mfg qzt/fsed

sericitic schist

F

F ?

A

A'

BASELINE

N

Geological Cross Section through Line 10.000E

Massive fine grained green felsic unit(s) porphyry

Massive mg felsic qzt and fg qzt porphyry sequence

Pz 9

Pz 8

Pz 7

Pz 6

Pz 5

Pz 4

Pz 3

Pz 2

Pz 1

LEGEND

Geological Boundaries

- mapped
- inferred
- photoformin
- photoformin inferred
- outcrop boundary
- float boundary

Structural Features

- Faults mapped
- Faults inferred
- Strike and dip of foliation or bedding
- Strike and dip of cleavage (schistosity)
- Cleavage (schistosity) vertical
- Strike and dip of prominent joints

Miscellaneous

KR6972 Rock sample location and number for geochemical analysis

Track

Creek

Geological Interpretation

Refer to geological cross-section above

GRID NORTH (310° MAG)

MAG. N.

409141

GEOPEKO

A DIVISION OF PEKO-WALLSEND OPERATIONS LTD

SCALE 1:2500

No. TS 2/70-PI-2A

EL 2/70 MACKINTOSH EAST, TASMANIA

(Updated 1982) PROVER I 84-2147.

GEOLOGICAL PLAN 002

DATE May 1981

GEOLOGIST P.S.H.

DRAWN T.G.S.

CHECKED

5 cm

LEGEND:

480 / 460 — 480 ppm Cu original sample / 480 ppm Cu duplicate sample

CONTOUR INTERVALS

- 15 – 25 ppm
- 25 – 52 ppm
- > 52 ppm

- Power auger hole
- Hand auger hole
- x Rock sample

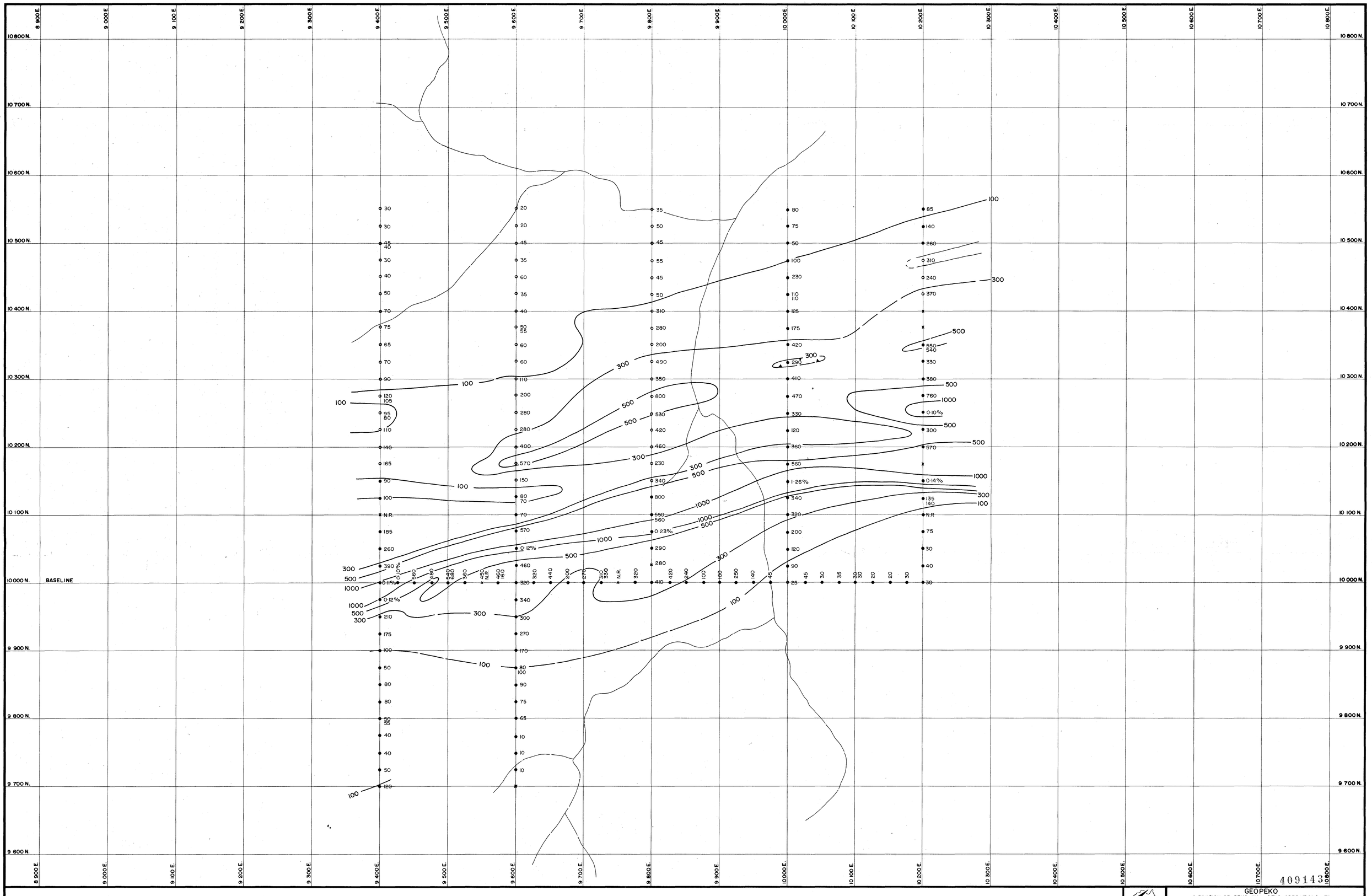
GEOPEKO
A DIVISION OF PEKO-WALLSEND OPERATIONS LTD.
SCALE 1:2000 — No. TS 2/70-PI-3

E.L. 2/70 MACKINTOSH EAST, TASMANIA
PROVER I 82-2147 003
C HORIZON GEOCHEMICAL RESULTS
COPPER CONTOURS

DATE: May 1981
GEOLOGIST: P.S.H.
DRAWN: T.G.D.S.
CHECKED:

409142

5 cm



LEGEND:

● 480 / 460 — 480 ppm Pb original sample; 480 ppm Pb duplicate sample

CONTOUR INTERVALS

- 100-300 ppm
- 300-500 ppm
- 500-1000 ppm
- >1000 ppm

● Power auger hole
o Hand auger hole
x Rock sample

409143

GEOPEKO
A DIVISION OF PEKO-WALLSEND OPERATIONS LTD.

SCALE 1:2500

No. TS 2/70-P1-4

DATE: May 1981
GEOLOGIST: P.S.H.
DRAWN: T.G.D.S.
CHECKED: P.S.H.

E.L. 2/70 MACKINTOSH EAST, TASMANIA
PROVER 1 84-2147 004
C HORIZON GEOCHEMICAL RESULTS
LEAD CONTOURS

5 cm

LEGEND:

480 / 460 — 480 ppm Zn original sample / 480 ppm Zn duplicate sample

CONTOUR INTERVALS

- 180 - 300 ppm
- 300 - 600 ppm
- > 600 ppm

- Power auger hole
- Hand auger hole
- x Rock sample

GEOPEKO
A DIVISION OF PEKO-WALLSEND OPERATIONS LTD.

SCALE 1:2500

No. TS 2/70-P1-5

E.L. 2/70 MACKINTOSH EAST, TASMANIA
PROVER I 81-2147. 005

C HORIZON GEOCHEMICAL RESULTS
ZINC CONTOURS

DATE: May 1981
GEOLOGIST: P.S.H
DRAWN: T.G.D.S
CHECKED:

409144

5 cm

LEGEND:

480 / 460 — 480 ppm Ag original sample / 480 ppm Ag duplicate sample

CONTOUR INTERVALS

2 - 3 ppm

> 3 ppm

Power auger hole

Hand auger hole

x Rock sample

409145

GEOPEKO
A DIVISION OF PEKO-WALLSEND OPERATIONS LTD.

SCALE 1:2500

No. TS 2/70-P1-6

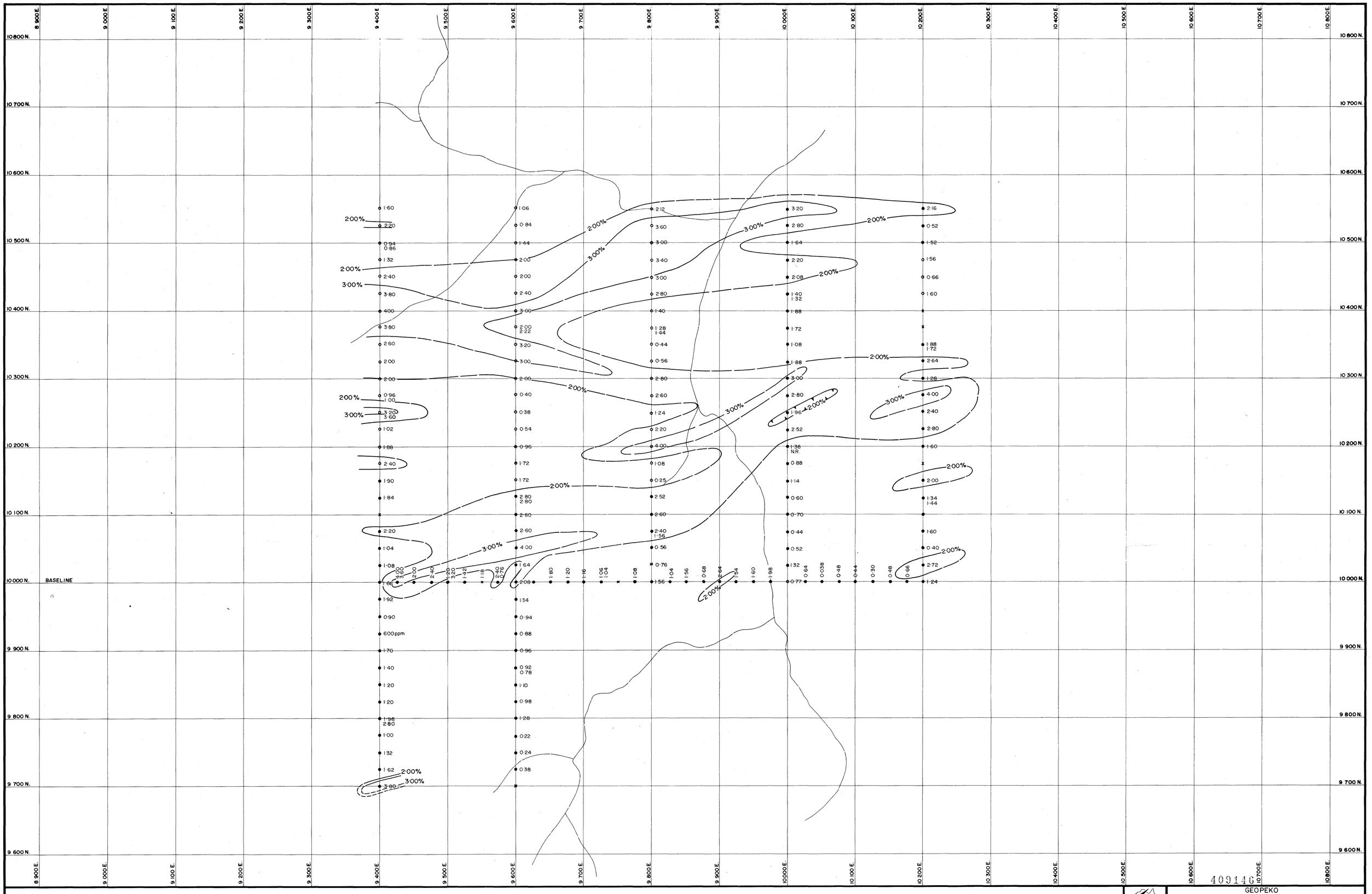
E.L. 2/70 MACKINTOSH EAST, TASMANIA

PROVER I 84-2147.006

C HORIZON GEOCHEMICAL RESULTS
SILVER CONTOURS

DATE: May 1981
GEOLOGIST: P.S.H
DRAWN: T.G.D.S.
CHECKED:

5 cm



LEGEND:

480 / 460 — 480 ppm Fe original sample / 480 ppm Fe duplicate sample

CONTOUR INTERVALS

- 2%-3%
- >3%

- Power auger hole
- Hand auger hole
- Rock sample

GEOPEKO
A DIVISION OF PEKO-WALLSEND OPERATIONS LTD
SCALE 1:2500 — No. TS 2/70-PI- 7

E.L. 2/70 MACKINTOSH EAST, TASMANIA
PROVER I 81-214.
C HORIZON GEOCHEMICAL RESULTS
IRON CONTOURS 007

DATE May 1981
GEOLOGIST P.S.H.
DRAWN T.G.D.S.
CHECKED

409116

5 cm

8 900 E. 9 000 E. 9 100 E. 9 200 E. 9 300 E. 9 400 E. 9 500 E. 9 600 E. 9 700 E. 9 800 E. 9 900 E. 10 000 E. 10 100 E. 10 200 E. 10 300 E. 10 400 E. 10 500 E. 10 600 E. 10 700 E. 10 800 E.

10 800 N. / 10 700 N. / 10 600 N. / 10 500 N. / 10 400 N. / 10 300 N. / 10 200 N. / 10 100 N. / 10 000 N. / 9 900 N. / 9 800 N. / 9 700 N. / 9 600 N.

BASELINE

5983 ◇ 0·4
5982 ◇ 0·7
5980 ◇ 0·9
5981
5979 ◇ 0·4
5978 ◇ 0·3
5977 ◇ 1·0
5976 ◇ 0·3
5975 ◇ 0·5
5974 ◇ 0·2
5973 ◇ 0·2
5972 ◇ 0·5
5970 ◇ 0·4
5971
7330 ◇ 1·3
7331
7329 ◇ 1·0
7328 ◆ 0·7
7327 ◇ 0·8
7326 ◆ 0·6
7325 ◆ 0·7
5969 ×
7324 ◆ 0·8
7323 ◆ 0·6
7322 ◆ 0·8
7302 ◆ 1·5
7330 ◆ 1·2
7450 ◆ 1·2
7449 ◆ 1·0
7448 ◆ 0·9
7447 ◆ 0·9
7429 ◆ 2·0
7446 ◆ 1·0
7445 ◆ 1·4
7428 ×
7303 ◆ 0·8
7304 ◆ 0·6
7305 ◆ 0·6
7306 ◆ 0·9
7307 ◆ 1·7
7308 ◆ 0·8
7309 ◆ 1·1
7310 ◆ 0·8
7311
7312 ◆ 1·1
7313 ◆ 0·9
7314 ◆ 0·8
7315 ◆ 0·8

5968 ◇ 0·5
5967 ◇ 0·5
5966 ◇ 0·33
5965 ◇ 0·5
5964 ◇ 0·5
5963 ◇ 0·4
5962 ◇ 1·0
5960 ◇ 1·0
5961
5959 ◇ 0·4
5958 ◇ 0·5
5957 ◇ 0·6
5956 ◇ 0·4
5955 ◇ 0·5
5954 ◇ 0·4
5953 ◇ 0·5
7552 ◇ 0·5
5951 ◇ 0·5
7320 ◆ 0·8
7321
7319 ◆ 1·9
7318 ◆ 1·1
7317 ◆ 2·0
7316 ◆ 0·1
7435 ◆ 1·0
7427 ×
7436 ◆ 1·2
7425 ◆ 1·9
7424 ◆ 1·9
7423 ◆ 1·1
7422 ◆ 1·5
7420/21 ◆ 0·5
7419 ×
7418 ◆ 1·2
7417 ◆ 1·6
7416 ◆ 1·5
7415 ◆ 1·3
7414 ◆ 0·75
7413 ◆ 1·0
7412 ◆ 1·0
7411 ◆ 1·2
7437 ◆ 1·9
7438 ◆ 2·1
7439 ◆ 1·0
7440 ◆ 1·8
7441
7442 ◆ 1·9
7443 ◆ 1·5
7444 ◆ 0·5
5984 ◇ 0·3
5985 ◇ 0·4
5986 ◇ 0·5
5987 ×

5918 ◇ 0·25
5917 ◇ 1·00
5916 ◇ 0·75
5915 ◇ 1·0
5914 ◇ 0·5
5913 ◇ 0·25
5912 ◇ 0·10
5910 ◇ 1·25
5911
5909 ◇ 0·25
5908 ◇ 1·00
5907 ◇ 0·75
5906 ◇ 1·0
5905 ◇ 0·75
5904 ◇ 1·5
5903 ◇ 0·5
5902 ◇ 0·5
5901 ◇ 0·5
7434 ◆ 3·0
7433 ◆ 3·2
7432 ◆ 1·0
7430 ◆ 0·9
7431 ×
7410 ◆ 0·6
7352 ◆ 0·5
7377 ◆ 1·0
7378 ◆ 1·5
7379 ◆ 1·6
7380/81 ◆ 1·0
7382 ◆ 0·8
7383 ◆ 1·4
7384 ◆ 1·2
7385 ◆ 1·2

7376 ◆ 0·7
7375 ◆ 0·5
7374 ◆ 0·6
7373 ◆ 0·8
7372 ◆ 1·2
7370 ◆ 0·8
7371
7369 ◆ 1·4
7368 ◆ 0·9
7367 ◆ 0·5
7366 ◆ 0·5
7365 ◆ 1·0
7364 ◆ 0·6
7363 ◆ 0·6
7362 ◆ 0·7
7360 ◆ 1·0
7361
7359 ◆ 0·7
7358 ◆ 1·1
7357 ◆ 0·6
7356 ◆ 0·7
7355 ◆ 0·5
7354 ◆ 0·4
7353 ◆ 0·5

7402 ◆ 0·5
7403 ◆ 0·5
7404 ◆ 1·8
7405 ◇ 1·0
7406 ◇ 1·0
7407 ◇ 0·7
7408 ×
7409 ×
7400 ◆ 0·5
7401
7399 ◆ 1·2
7398 ◆ 0·9
7397 ◆ 1·0
7396 ◆ 0·4
7395 ◆ 0·5
7394 ◆ 0·6
7393 ×
7392 ◆ 0·5
7390 ◆ 0·6
7391
7389 ◆ 0·8
7388 ◆ 1·4
7387 ◆ 0·7
7386 ◆ 0·6

409147

LEGEND:

7315 ◆ 0·8

Soil Sample number — Auger hole depth : metres

● Power auger hole
○ Hand auger hole
× Rock sample

GEOPEKO
A DIVISION OF PEKO-WALLSEND OPERATIONS LTD.

SCALE 1:2500 (25 0 50 100 125)

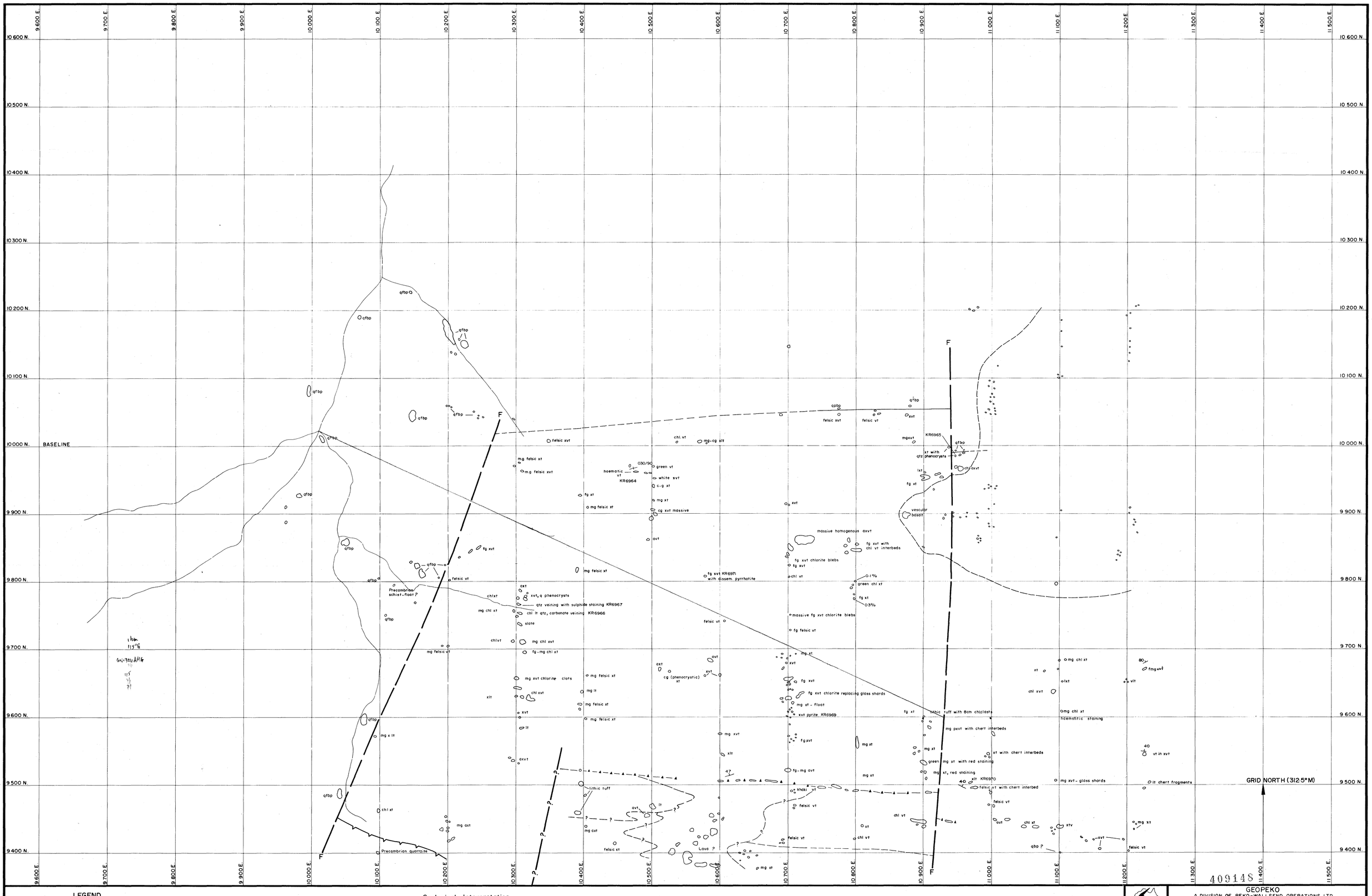
No. TS 2/70-P1-8

E.L. 2/70 MACKINTOSH EAST, TASMANIA
PROVER I 84-2147
C HORIZON SAMPLE LOCATION / AUGER HOLE DEPTHS

008

DATE: May 1981
GEOLOGIST: P.S.H.
DRAWN: T.G.D.S.
CHECKED:

5 cm



LEGEND

Geological Boundaries

- mapped
- inferred
- unconformity
- outcrop boundary

Structural Features

- Faults: mapped
- Faults: inferred
- 60 Strike/dip of lithological layering/bedding
- 60 Strike/dip of cleavage

Miscellaneous

KR6970 Rock sample location and number for geochemical analysis.

Geological Interpretation

- Tertiary : Vesicular basalt.
- Cambrian : Quartz, feldspar biotite porphyry-intrusive ?
- Cambrian : Rhyolitic fine grained to medium grained crystal tuffs and crystal vitric tuffs. Lithic tuff and crystal lithic tuff interbeds. Thin felsic vitric tuff interbeds.
- Cambrian : Marker bed: polymict disordered conglomerate: angular to rounded clasts.
- Cambrian : Lithic tuff.
- Cambrian : Khaki brown non-porphyritic rhyolitic fine grained lava.
- Cambrian : Felsic chlorite vitric tuff.
- Precambrian : Psammo-pelitic schist and quartzite.

5 cm

409148

GEOPEKO
A DIVISION OF PEKO-WALLSEND OPERATIONS LTD.

SCALE 1:2500

No. TS2170 P3-3

DATE: May 1981
GEOLOGIST: P.S.H.
DRAWN: T.G.D.S.
CHECKED:

E.L. 2/70 MACKINTOSH EAST, TASMANIA
PROVER III 84-2147

GEOLOGICAL PLAN 009

9 600 E. 9 700 E. 9 800 E. 9 900 E. 10 000 E. 10 100 E. 10 200 E. 10 300 E. 10 400 E. 10 500 E. 10 600 E. 10 700 E. 10 800 E. 10 900 E. 11 000 E. 11 100 E. 11 200 E. 11 300 E. 11 400 E. 11 500 E.

10 600 N. 10 500 N. 10 400 N. 10 300 N. 10 200 N. 10 100 N. 10 000 N. 9 900 N. 9 800 N. 9 700 N. 9 600 N. 9 500 N. 9 400 N.

BASELINE

409149

LEGEND:

480 / 460 — 480 ppm Cu original sample / 480 ppm Cu duplicate sample

CONTOUR INTERVAL

- 23 - 37 ppm
- 37 - 52 ppm
- 52 - 110 ppm
- >110 ppm

- Power auger hole
- Hand auger hole
- x Rock sample

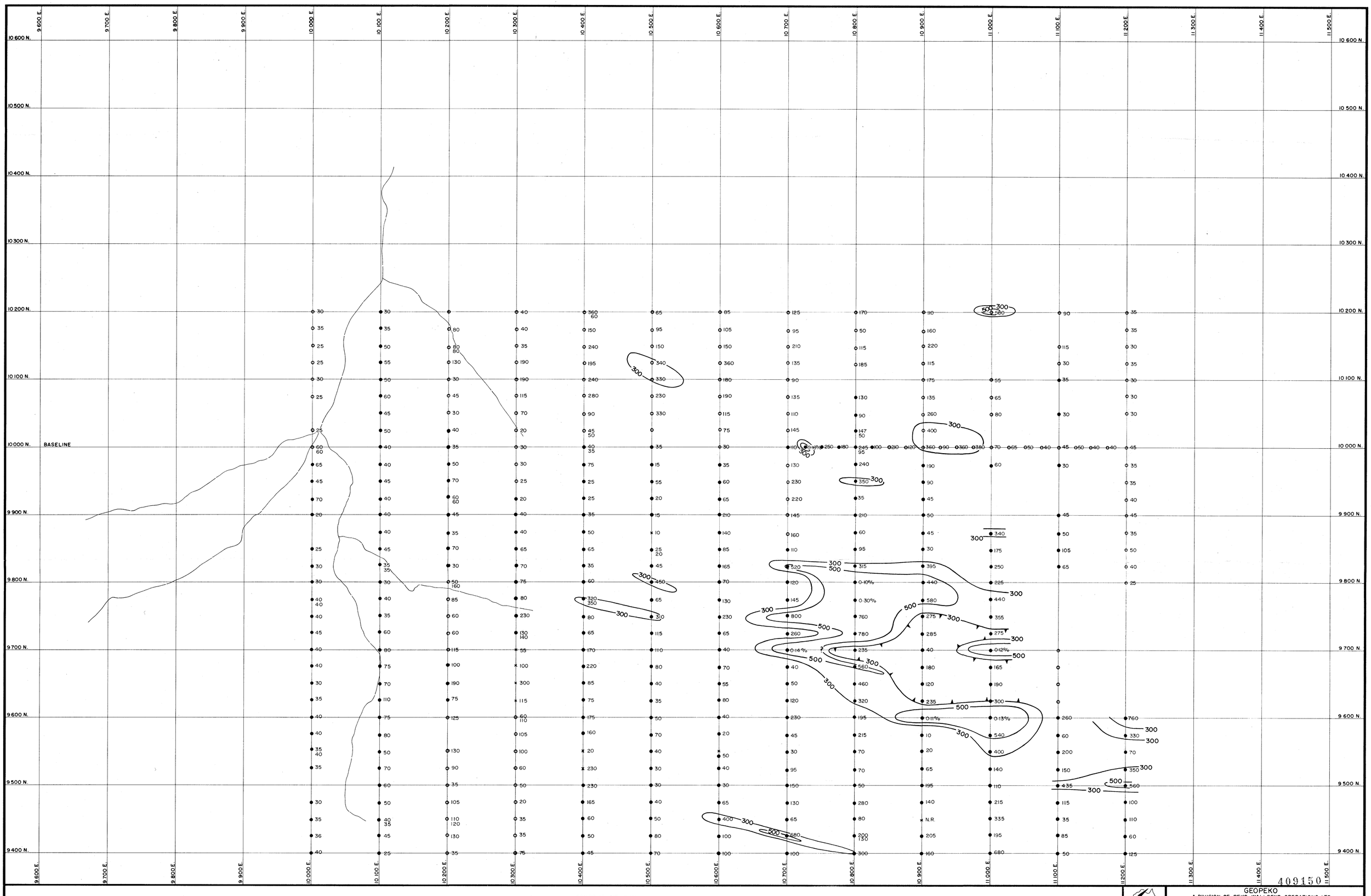
DATE: May 1981
GEOLOGIST: P.S.H
DRAWN: T.G.D.S.
CHECKED:

GEOPEKO
A DIVISION OF PEKO-WALLSEND OPERATIONS LTD.
25 0 50 100 125 SCALE 1:2500
No. TS 2/70 P3-4

E.L. 2/70 MACKINTOSH EAST, TASMANIA
PROVER III 84-2-147 010

COPPER GEOCHEMISTRY

5 cm



LEGEND:

480 / 460 — 480 ppm Pb original sample; 480 ppm Pb duplicate sample

CONTOUR INTERVAL

300 - 500ppm

≥500ppm

Power auger hole

Hand auger hole

Rock sample

409150

GEOPEKO
A DIVISION OF PEKO-WALLSEND OPERATIONS LTD.

SCALE 1:2500 (25 0 50 100 125)

No. TS 2/70 P3-5

E.L. 2/70 MACKINTOSH EAST, TASMANIA

PROVER III 84-2147

LEAD GEOCHEMISTRY 011

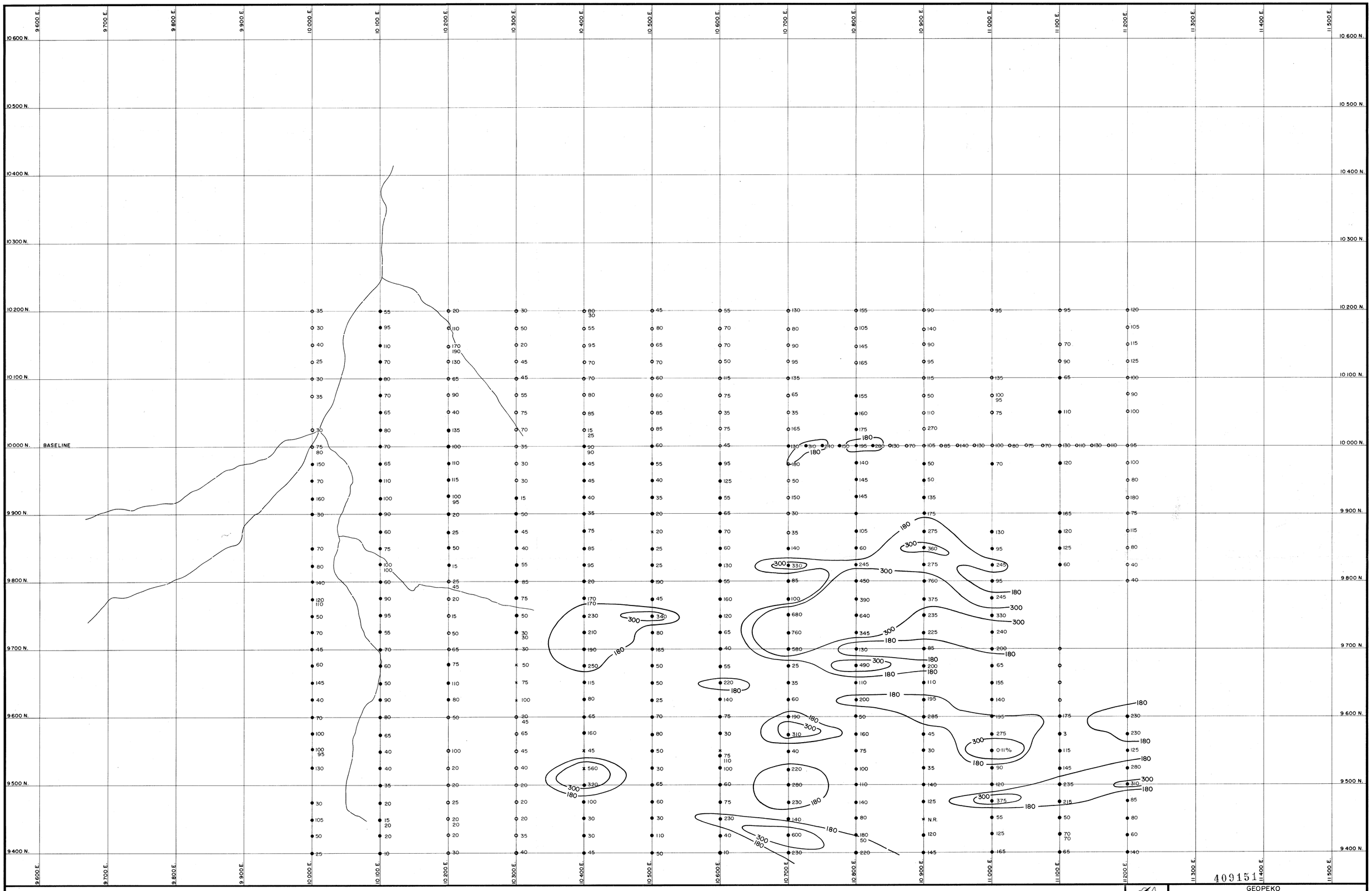
DATE: May 1981

GEOLOGIST: P.S.H.

DRAWN: T.G.D.S.

CHECKED:

5 cm



LEGEND:

480 / 460 — 480 ppm Zn original sample / 480 ppm Zn duplicate sample

CONTOUR INTERVALS

180 - 300ppm

≥300 ppm

Power auger hole

Hand auger hole

Rock sample

409151

GEOPEKO
A DIVISION OF PEKO-WALLSEND OPERATIONS LTD.

SCALE 1:2500

No. TS 2/70 83-6

E.L. 2/70 MACKINTOSH EAST, TASMANIA

PROVER III 84-2147

ZINC GEOCHEMISTRY 012

DATE: May 1981

GEOLOGIST: P.S.H.

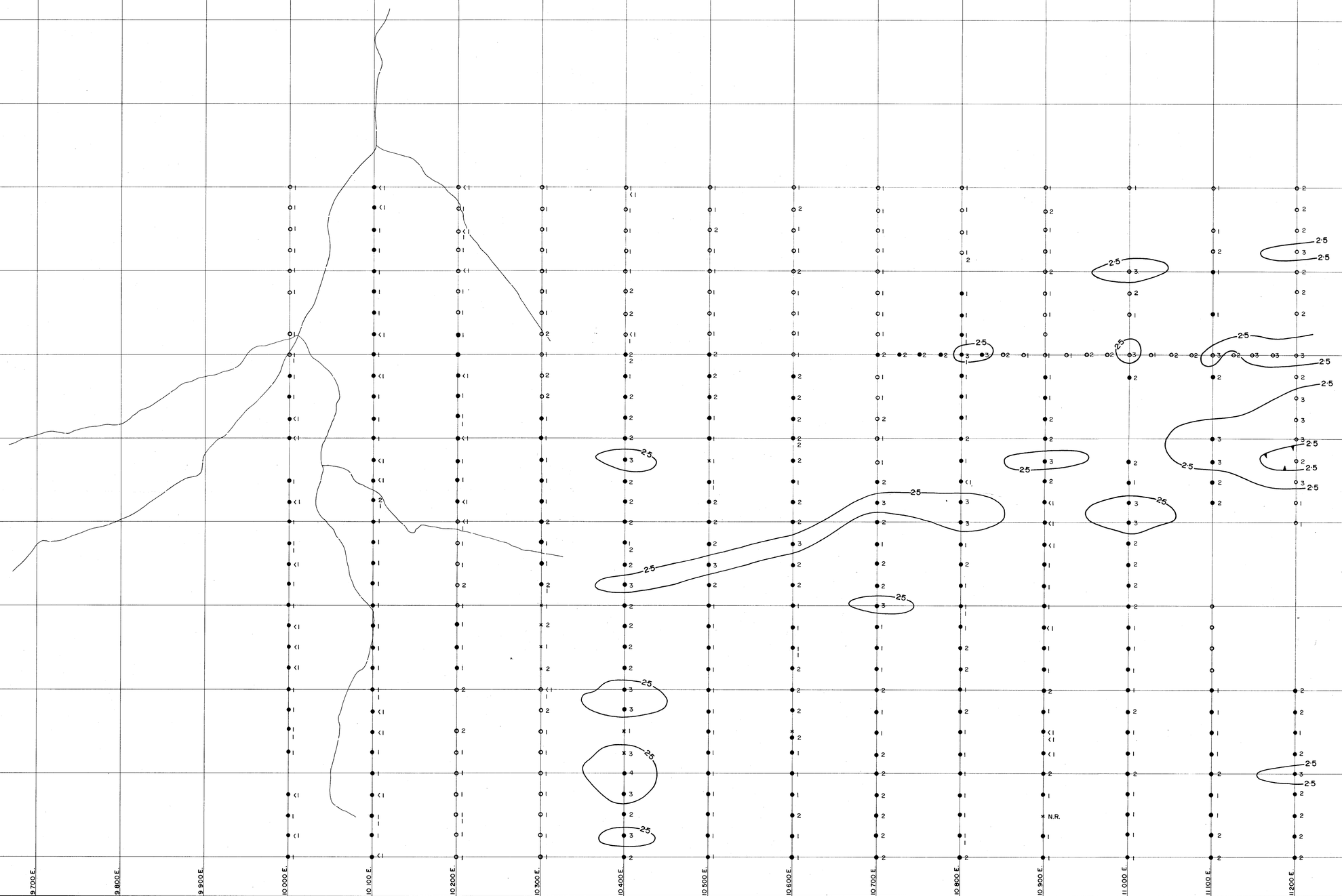
DRAWN: T.G.D.S.

CHECKED:

5 cm

9 600 E. 9 700 E. 9 800 E. 9 900 E. 10 000 E. 10 100 E. 10 200 E. 10 300 E. 10 400 E. 10 500 E. 10 600 E. 10 700 E. 10 800 E. 10 900 E. 11 000 E. 11 100 E. 11 200 E. 11 300 E. 11 400 E. 11 500 E.

10 600 N.
10 500 N.
10 400 N.
10 300 N.
10 200 N.
10 100 N.
10 000 N. BASELINE
9 900 N.
9 800 N.
9 700 N.
9 600 N.
9 500 N.
9 400 N.



LEGEND:

480 / 460 — 480 ppm Ag original sample; 480 ppm Ag duplicate sample

CONTOUR INTERVAL

≥ 2·5 ppm

● ..... Power auger hole
○ ..... Hand auger hole
× ..... Rock sample

GEOPEKO
A DIVISION OF PEKO-WALLSEND OPERATIONS LTD.

25 0 50 100 125
SCALE 1:2500

No. TS 2/70 P3-7

E.L. 2/70 MACKINTOSH EAST, TASMANIA
PROVER III 84-2147

SILVER GEOCHEMISTRY

DATE: May 1981
GEOLOGIST: P.S.H.
DRAWN: T.G.D.S.
CHECKED:

409152

013

5 cm

9 600 E. | 9 700 E. | 9 800 E. | 9 900 E. | 10 000 E. | 10 100 E. | 10 200 E. | 10 300 E. | 10 400 E. | 10 500 E. | 10 600 E. | 10 700 E. | 10 800 E. | 10 900 E. | 11 000 E. | 11 100 E. | 11 200 E. | 11 300 E. | 11 400 E. | 11 500 E.

10 600 N.

10 500 N.

10 400 N.

10 300 N.

10 200 N.

10 100 N.

10 000 N.

9 900 N.

9 800 N.

9 700 N.

9 600 N.

9 500 N.

9 400 N.

BASELINE

7250 ○ 0·5
7249 ○ 0·4
7248 ○ 0·4
7247 ○ 0·4
7246 ○ 0·3
7245 ○ 0·3
7244 ○ 0·4
7260 ○ 0·9 (7261)
7262 ● 0·5
7263 ● 0·8
7264 ● 1·0
7265 ● 0·4
7266 N.S.
7267 ● 0·9
7268 ● 1·1
7269 ● 1·4
7270/71 ● 2·0
7272 ● 1·6
7273 ● 1·1
7274 ● 1·4
7275 ● 1·7
7276 ● 2·0
7277 ● 1·6
7278 ● 0·8
7279 ● 1·3
7280/81 ● 1·8
7282 ● 0·6
7283 N.S.
7284 ● 0·6
7285 ● 0·8
7286 ● 0·9
7287 ● 0·7

7259 ● 0·7
7258 ● 0·6
7257 ● 1·4
7256 ● 1·6
7255 ● 1·1
7254 ● 1·2
7253 ● 1·0
7252 ● 1·5
6983 ● 1·0
6984 ● 1·1
6985 ● 1·1
6986 ● 1·6
6987 ● 1·1
6988 ● 0·6
6989 ● 1·0
6990/91 ● 0·8
6992 ● 0·6
6993 ● 0·6
6994 ● 1·3
6995 ● 1·0
6996 ● 1·6
6997 ● 1·8
6998 ● 1·5
6999 ● 1·0
7000-7251 ● 1·3
7296 ● 2·0
7295 ● 2·0
7294 ● 2·0
7293 ● 1·2
7292 ● 0·4
7290/91 ● 0·6
7289 ● 1·5
7288 ● 1·1

7219 ○ 0·5
6982 ○ 1·2
6980/81 ○ 1·6
6979 ○ 1·1
6978 ○ 0·7
6977 ○ 0·5
6976 ○ 0·4
6975 ● 0·5
6966 ● 1·4
6967 ● 1·3
6968 ● 1·5
6969/70 ● 1·2
6971 ● 0·9
6972 ● 0·7
6973 ● 1·0
6974 ● 0·5
7230/31 ○ 0·4
7232 ○ 0·6
7233 ○ 0·4
7234 ○ 0·4
7297 ● 1·5
7298 ● 1·6
7299 ● 0·6
7300 ● 1·1
7233 ○ 1·0
7236 ○ 1·0
7237 ○ 1·0
7238 ○ 0·7
7239 ○ 0·4
7240/41 ○ 0·4
7242 ○ 0·2
7243 ○ 0·5

7218 ○ 0·5
7217 ○ 0·4
7216 ○ 0·6
7215 ○ 0·6
7214 ● 1·0
7213 ○ 0·5
7212 ○ 0·4
6947 ○
6948 ○
6949 ○
6950 ○
6952 ● 0·8
6953 ● 1·2
6954 ● 1·2
6955 ● 0·8
6956 ● 1·2
6957 ● 0·8
6958 ● 0·4
6959 ● 0·3
6961/60 ● 0·4
6962 × Rock sample
6963 × Rock sample
6964 × Rock sample
6965 × Rock sample
7220/21 ○ 0·2
7222 ○ 0·3
7223 ○ 0·4
7224 ○ 0·3
7225 ○ 0·6
7226 ○ 0·4
7227 ○ 0·4
7228 ○ 0·5
7229 ○ 0·2

7210/11 ○ 0·5
7209 ○ 0·05
7208 ○ 0·5
7207 ○ 0·4
7206 ○ 0·4
7205 ○ 0·5
7204 ○ 0·5
7202/3 ○ 0·4
6920/21 ● 1·0
6922 ● 1·3
6923 ● 1·3
6924 ● 0·8
6925 ● 1·0
6926 ● 0·9
6927 ● 0·9
6928 ● 0·5
6929 ● 0·8
6930/31 ● 1·2
6932 ● 1·2
6933 ● 1·2
6934 ● 1·5
6935 ● 1·2
6936 ● 0·4
6937 ● 0·8
6938 ● 0·4
6939 ● 0·7
6940 × Rock sample
6941 × Rock sample
6942 ● 0·3
6943 ● 0·4
6944 ● 0·4
6945 ● 0·8
6946 ● 1·2

7201 ○ 0·5
7200 ○ 0·7
7199 ○ 0·5
7198 ○ 0·6
7197 ○ 0·5
7196 ○ 0·6
7195 ○ 0·1
6859 ● 0·4
6919 ● 1·2
6918 ● 1·0
6917 ● 1·0
6916 ● 0·5
6915 ● 0·5
6914 × Rock sample
6912/13 ● 0·6
6911 ● 0·5
6910 ● 0·6
6909 ● 0·5
6908 ● 1·5
6907 ● 1·2
7194 ● 1·0
7193 ● 1·7
7192 ● 1·7
7190/91 ● 1·0
7189 ● 1·5
7188 ● 1·6
7187 ● 1·0
7186 ● 1·2
7185 ● 1·5
7184 ● 0·9
7183 ● 0·7
7182 ● 1·5
7180/81 ● 1·0

6850/51 ○ 0·5
6852 ○ 0·3
6853 ○ 0·3
6854 ○ 0·3
6855 ● 0·4
6856 ○ 0·6
6857 ○ 1·0
6858 ● 0·6
6786 ○
6787 ●
6788 ●
6789 ●
6790/91 ●
6792 ●
6793 ●
6794 ●
6795 ●
6796 ●
6797 ●
6798 ●
6799 ●
6800 (6901) ●
6902 ● 1·0
6903 ● 2·0
6904 ● 1·2
6905 ● 0·3
6906, 7179 × Rock sample ● 0·5
7178 ● 0·8
7177 ● 0·3
7176 ● 0·5
7175 ● 0·7
7174 ● 1·0
7173 ● 0·6

6849 ○ 0·3
6848 ○ 0·4
6847 ○ 0·6
6846 ○ 1·0
6845 ○ 1·0
6844 ○ 1·0
6843 ○ 0·6
6842 ○ 0·6
6897 ● 0·8 ● 1·2 ● 1·0
6896 ○ 2·0
6895 ○ 2·0
6894 ○ 0·75
6893 ○ 0·3
6892 ○ 0·5
6890/91 ● 2·0
6889 ● 0·9
6888 ● 1·8
6887 ● 1·7
6886 ● 1·5
6885 ● 1·7
6884 ● 0·5
6883 ● 0·5
6882 ● 0·6
6880 ● 0·15
6879 ● 0·5
6878 ● 0·5
6877 ● 0·5
6876 ● 0·9
6875 ● 2·0
6874 ● 0·6
6872 ● 0·5
6873 ● 0·6
6870/71 ● 1·3

7054 ○ 1·0
7053 ○ 1·5
7052 ○ 1·0
7050/51 ○ 1·0
7049 ●
7048 ●
7004-13, ● 7047
7001-4 ● 7170/71 ● 20
7045 ● 2·0
7044 ●
7043 ●
7014-20 ●
7042 ●
7041 ●
7040 ●
7039 ●
7038 ●
7037 ●
7036 ●
7034/35 ●
7033 ●
7032 ●
7031 ●
7030 ●
7029 ●
7028 ●
7027 ●
7026 ●
7025 ●
7024 ●
7022/23 ●
7021 ●

7172 2·2
7164 0·4
7163 0·5
7162 0·6
7161 0·4
7160 0·15
7159 0·4
7158 0·2
7157 0·3
7156 0·32
7155 0·45
7154 0·45
7153 0·45
7152 0·4
7151 0·25

6807 ○ 0·3
6806 ○ 0·6
6805 ○ 0·6
6804 ○ 0·3
6803 ○ 0·35
6802 ○ 0·3
6801 ○ 0·5
7165 ○ 0·4
6756 ● 0·6
6755 ● 0·7
6754 ● 0·6
6753 ● 2·7
6752 ● 1·5
6751 ● 4·8
7073 ● 1·5
7072 ● 1·7
7071 ● 4·0
7070 ● 1·5
7069 ● 2·4
7068 ● 3·0
7067 ● 4·7
7066 ● 2·0
7065 ● 1·8
7064 ● 0·5
7063 ● 0·3
7061/62 ● 1·0
7060 ● 0·3
7059 ● 0·4
7058 ● 1·8
7057 × Rockchips
7056 ● 0·7
7055 ● 0·8

6808 ○ 0·3
6809 ○ 0·3
6810/11 ○ 0·45
6812 ○ 0·45
6813 ● 4·5
6778 ● 0·6
6777 ● 0·5
6776 ● 4·0
6775 ● 1·7
6774 ● 2·0
6773 ● 1·2
6772 ● 2·3
6770/71 ● 3·4
6769 ● 0·6
6768 ● 2·0
6767 ● 0·5
6766 ● 0·4
6765 ● 1·0
6764 ● 1·9
6763 ● 1·9
6762 ● 1·5
6760/61 ● 1·8
6759 ● 0·6
6758 ● 0·7
6757 ● 0·6

6824 ○ 0·6
6823 ○ 1·1
6822 ○ 0·3
6820/21 ● 1·2
6819 ● 0·3
6818 ● 0·33
6817 ● 0·45
6816 ● 0·5
6815 ● 0·9
6814 ● 0·75
7080 ○
7079 ○
7078 ○
7077 ○
7076 ● 1·3
7075 ● 0·8
7074 ● 2·0
6785 ● 1·50
6784 ● 2·50
6783 ● 2·0
6782 ● 0·5
6780/81 ● 0·80
6779 ● 0·4

6825 ○ 0·6
6826 ○ 0·3
6827 ○ 0·6
6828 ○ 0·3
6829 ○ 0·45
6830/31 ○ 0·3
6832 ○ 0·3
6833 ○ 0·30
6834 ○ 0·30
6835 ○ 0·70
6836 ○ 0·45
6837 ○ 0·45
6838 ○ 0·45
6839 ○ 0·6
6840/41 ○ 0·3
6869 ● 2·0
6868 ● 1·0
6867 ● 1·0
6866 ● 1·4
6865 ● 1·9
6864 ● 1·4
6863 ● 0·5
6861/62 ● 0·5
6860 ● 0·9

409153

LEGEND:

7315 ● 0·8

Soil Sample number — Auger hole depth : metres

● ..... Power auger hole
○ ..... Hand auger hole
× ..... Rock sample

GEOPEKO
A DIVISION OF PEKO-WALLSEND OPERATIONS LTD

SCALE 1:2500

No. TS 2/70-P3-8

DATE May 1981
GEOLOGIST: P.S.H.
DRAWN: T.G.D.S.
CHECKED:

E.L. 2/70 MACKINTOSH EAST, TASMANIA
PROVER III SL-2147

AUGER SAMPLE LOCATIONS AND DEPTHS

5 cm

014

PROVER 8

MT MAYDAY
Trig 460
3747

F.L. 2.7 BOUNDARY

DIGHEM^{II} SURVEY

MAGNETICS

FOR

GEOPEKO LIMITED

LOCATION MAP



Scale 1 250,000

REGISTERED PROFESSIONAL ENGINEER
D. C. FRASER
PROVINCE OF ONTARIO

SCALE 1:10,000

1/2 0 1/2 1 Kilometres

1/4 0 1/4 1/2 Miles

Flight line

2265 Fiducials and numbers 2565

ISOMAGNETIC LINES
(total field)

1000 ..... 1000 gammas
200 ..... 200 gammas
..... 50 gammas
..... 25 gammas
..... magnetic depression

Magnetic Inclination within the survey area: 72°

409154

GEOPEKO
DEVONPORT BASE, TASMANIA 84-2147

TS 2/70 D1-6

015

MACKINTOSH EAST, SHEET 1

5 cm

Plan No. 5577 S/B

MT MAYDAY
Trig 460
3747

LOCATION MAP



Scale 1 : 250,000

REGISTERED PROFESSIONAL ENGINEER
D. C. FRASER
PROVINCE OF ONTARIO

DIGHEM[II] SURVEY

ENHANCED MAGNETICS

FOR

GEOPEKO LIMITED

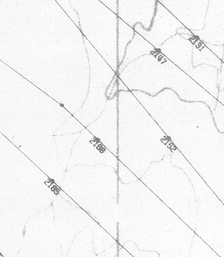
Flight line

Fiducials and numbers

ISOMAGNETIC LINES

(enhanced field)

5000 gammas
1000 gammas
200 gammas
100 gammas
magnetic depression



Frequency response of magnetic operator

SCALE 1 : 10,000

1/2 0 1/2 1 Kilometres

1/4 0 1/4 1/2 Miles

409155

GEOPEKO
DEVONPORT BASE, TASMANIA

84-2147

TS 2/70 D1-7

MACKINTOSH EAST, SHEET 1

016

5 cm

Plan No. 5578 S/B

DIGHEM II SURVEY

ELECTROMAGNETICS

FOR

GEOPEKO LIMITED

LOCATION MAP



Scale 1 250,000

REGISTERED PROFESSIONAL ENGINEER
D. C. FRASER
PROVINCE OF ONTARIO

SCALE 1:10,000

1/2 0 1/2 1 Kilometres

1/4 0 1/4 1/2 Miles

Flight line

Fiducials and numbers

ANOMALY GRADE	EM GRADE SYMBOL	MHO RANGE
6	●	≥ 100
5	✱	50 — 99
4	●	20 — 49
3	◎	10 — 19
2	○	5 — 9
1	○	≤ 4
	×	Possible conductor

DIGHEM anomalies are divided into six grades of conductivity – thickness product. This product in mhos is the reciprocal of resistance in ohms. The mho is a measure of conductance, and is a geologic parameter. Most swamps yield Grade 1 anomalies but highly conducting clays can give Grade 2 anomalies. The multi-coil anomaly shapes often allow surface conductors to be recognized, and these are indicated by the letter S on this map. The remaining Grade 1 and 2 anomalies could be weak bedrock conductors. The higher grades indicate increasingly higher conductances. Examples: The ore bodies of the Magusi River camp yield Grade 4 anomalies, while Mattabi and Whistle give Grade 5. Graphite and sulphides can span all grades but, in this survey area, field work may show that the different grades indicate different types of conductors.

identifier → C 38 ← mho value

Depth is greater than
- 50 feet
- 100 feet
- 150 feet
- 200 feet

Inphase and Quadrature of Standard coil is greater than
- 5 ppm
- 10 ppm
- 15 ppm
- 20 ppm

Refer to list of anomalies in survey report for the actual ppm values for all coils, and for conductor depths.

The actual mho value is plotted beside the EM grade symbol. The letter is the anomaly identifier. The horizontal rows of dots indicate anomaly amplitude on the flight record, and the vertical column gives the estimated depth. This depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or conductive overburden effects.

	Conductor axis
S	Probable surface response
S?	Possible surface response
L	Probable line (power, telephone, pipe, or fence)
L?	Possible line
?	Questionable anomaly
C	Apparent thickness > 10 m
>	Dip
100¢	Direct magnetic correlation of 100 gammas

DIGHEM maps are designed to provide a correct impression of conductor quality by means of the conductance grade symbols. The symbols can stand alone with geology when planning a followup program. The actual mho values are plotted for those who wish quantitative data. The anomaly ppm and depth are indicated by inconspicuous dots which should not distract from the conductor patterns, while being helpful to those who wish this information. The map provides an interpretation of all conductors in terms of length, strike direction, conductance and depth. The accuracy is comparable to an interpretation from a ground EM survey having the same line spacing.

GEOPEKO
DEVONPORT BASE, TASMANIA 84-2147

SCALE 1:10,000 — No. TS 2/70 D1-8

409156

MACKINTOSH EAST, SHEET 1 017

5 cm

DATE
GEOLOGIST
DRAWN
INSPECTED

Plan No. 5576 S/B

MT MAYDAY
Trig 4.60
3747

E.L. 2/70 BOUNDARY

LOOP 1

LOOP 2

LOOP 3

LOOP 4

LOOP 5

LOOP 6

LOOP 7

LOOP 8

LOOP 9

LOOP 10

LOOP 11

LOOP 12

LOOP 13

LOOP 14

LOOP 15

LOOP 16

LOOP 17

LOOP 18

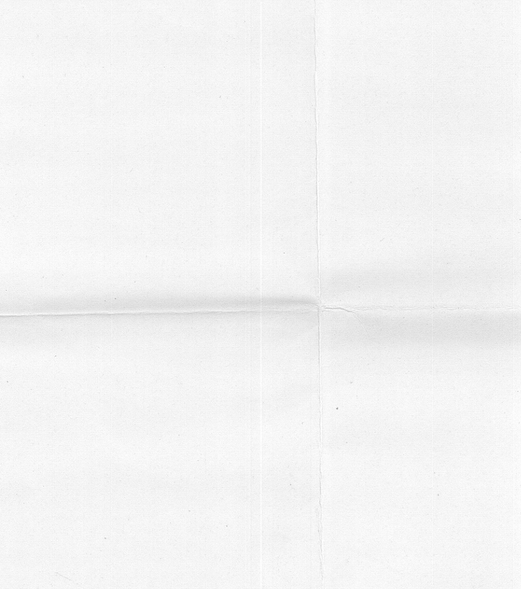
LOOP 19

LOOP 20

LOOP

E L. 2170 BOUNDARY

LOCATION MAP



Scale 1 : 250,000

Plan No. 5585 S/B

REGISTERED PROFESSIONAL ENGINEER
D. C. FRASER
PROVINCE OF ONTARIO

DIGHEM^{II} SURVEY

MACKINTOSH EAST, TASMANIA

MAGNETICS

FOR

GEOPEKO LIMITED

SCALE 1 : 10,000

1/2 0 1/2 1 Kilometres

1/4 0 1/4 1/2 Miles

SHEET 3

Flight line

Fiducials and numbers

ISOMAGNETIC LINES

(total field)

1000 ..... 1000 gammas

200 ..... 200 gammas

..... 50 gammas

..... 25 gammas

..... magnetic depression

409158

Magnetic Inclination within the survey area : 72°

5 cm

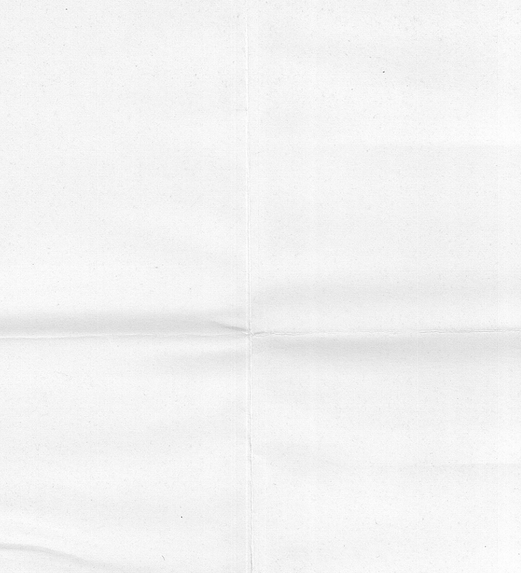
019

84-2147

TS 2/70 D3-10

EL. 2170 BOUNDARY

LOCATION MAP



Scale 1 : 250,000

Plan No. 5586 S/B

REGISTERED PROFESSIONAL ENGINEER
D. C. FRASER
PROVINCE OF ONTARIO

DIGHEM^{II} SURVEY

MACKINTOSH EAST, TASMANIA

ENHANCED MAGNETICS

FOR

GEOPEKO LIMITED

SCALE 1 : 10,000

1/2 0 1/2 1 Kilometres

1/4 0 1/4 1/2 Miles

SHEET 3

Flight line

Fiducials and numbers

ISOMAGNETIC LINES (enhanced field)

409159

5000 ..... 5000 gammas

1000 ..... 1000 gammas

200 ..... 200 gammas

100 ..... 100 gammas

..... magnetic depression

5 cm



Frequency response of magnetic operator

020

84-2147

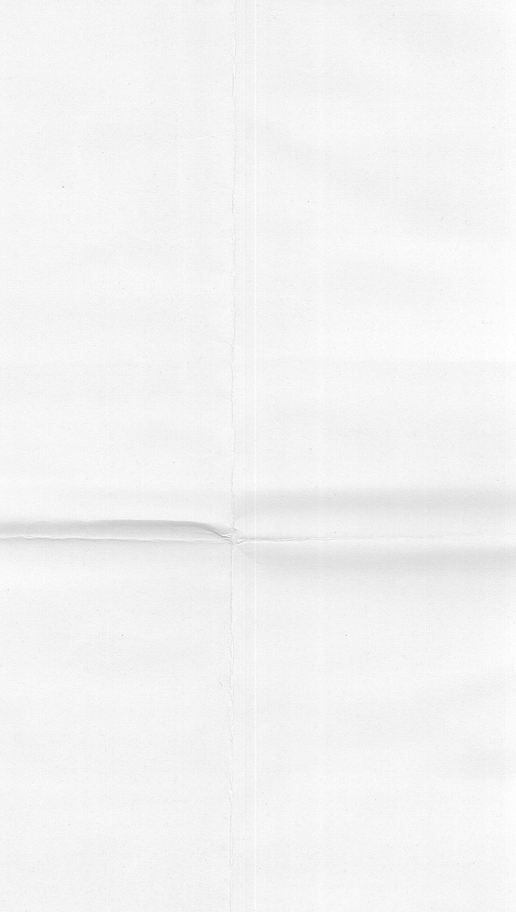
TS 2/70 D3-11

PROVER 7

EL. 2/70 BOUNDARY

409160

LOCATION MAP



Scale 1 : 250,000

Plan No. 5584 S/B

REGISTERED PROFESSIONAL ENGINEER
D. C. FRASER
PROVINCE OF ONTARIO

DIGHEM^{II} SURVEY

MACKINTOSH EAST, TASMANIA

ELECTROMAGNETICS

FOR

GEOPEKO LIMITED

SCALE 1 : 10,000

1/2 0 1/2 1 Kilometres

1/4 0 1/4 1/2 Miles

SHEET 3

5 cm

Flight line

Fiducials and numbers

ANOMALY GRADE	EM GRADE SYMBOL	MHO RANGE
6	●	⩾ 100
5	✸	50 — 99
4	●	20 — 49
3	◉	10 — 19
2	○	5 — 9
1	○	⩽ 4
	×	Possible conductor

DIGHEM anomalies are divided into six grades of conductivity – thickness product. This product in mhos is the reciprocal of resistance in ohms. The mho is a measure of conductance, and is a geologic parameter. Most swamps yield Grade 1 anomalies but highly conducting clays can give Grade 2 anomalies. The multi-coil anomaly shapes often allow surface conductors to be recognized, and these are indicated by the letter S on this map. The remaining Grade 1 and 2 anomalies could be weak bedrock conductors. The higher grades indicate increasingly higher conductances. Examples: The ore bodies of the Magusi River camp yield Grade 4 anomalies, while Matagami and Whistle give Grade 5. Graphite and sulphides can span all grades but, in this survey area, field work may show that the different grades indicate different types of conductors.

identifier → C 38 ← mho value

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50 feet
100 feet
150 feet
200 feet

Inphase and Quadrature of Standard coil is greater than
5 ppm
10 ppm
15 ppm
20 ppm

Refer to list of anomalies in survey report for the actual ppm values for all coils, and for conductor depths.

The actual mho value is plotted beside the EM grade symbol. The letter is the anomaly identifier. The horizontal rows of dots indicate anomaly amplitude on the flight record, and the vertical column gives the estimated depth. This depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or conductive overburden effects.

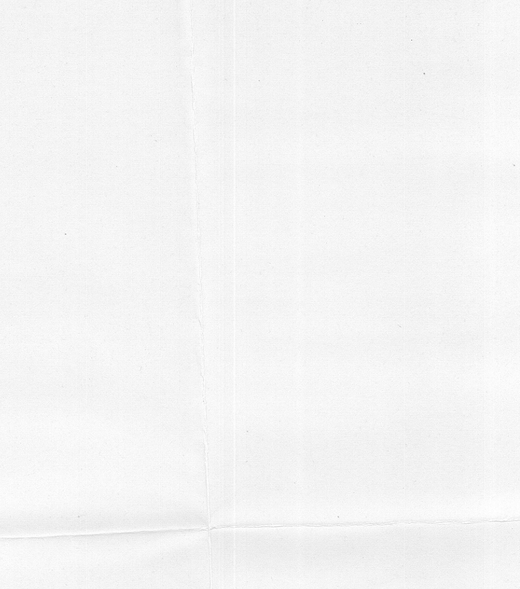
	Conductor axis
S	Probable surface response
S?	Possible surface response
L	Probable line (power, telephone, pipe, or fence)
L?	Possible line
?	Questionable anomaly
<	Apparent thickness > 10 m
>	Dip
100γ	Direct magnetic correlation of 100 gammas

DIGHEM maps are designed to provide a correct impression of conductor quality by means of the conductance grade symbols. The symbols can stand alone with geology when planning a followup program. The actual mho values are plotted for those who wish quantitative data. The anomaly ppm and depth are indicated by inconspicuous dots which should not distract from the conductor patterns, while being helpful to those who wish this information. The map provides an interpretation of all conductors in terms of length, strike direction, conductance and depth. The accuracy is comparable to an interpretation from a ground EM survey having the same line spacing.

021 84-2147 TS 2/30 D3-12

E.L. 2/70 BOUNDARY

LOCATION MAP



Scale 1: 250,000

Plan No. 5587 S/B

REGISTERED PROFESSIONAL ENGINEER
D. C. FRASER
PROVINCE OF ONTARIO

DIGHEM^{II} SURVEY

MACKINTOSH EAST, TASMANIA

RESISTIVITY

FOR

GEOPEKO LIMITED

SCALE 1:10,000

1/2 0 1/2 1 Kilometres

1/4 0 1/4 1/2 Miles

SHEET 3

Flight line

Fiducials and numbers

LEGEND

Contours in ohm - m at eight intervals per decade

100
75
56
42
31
23
17
13
10

Note

The numbers face in the direction of increasing value.

409161

5 cm

022

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