000 80-1500. Vol 1 of 3.

026001

TRANSPARENCIES HELD Duplicates

TAPES HELD

PROJECT NAME: COMSTAFF PROPRIETARY LIMITED

TITLE: REPORT ACCOMPANYING LICENCE RENEWAL APPLICATION FOR EXPLORATION LICENCE 1/68

TASMANIA

MICROFILMED

AREA NAME/S, STATE 1:250,000 SHEET NO/S & COORDINATES: Burnie K55-03

COMMODITY/IES: Sn, W, Cu, Pb, Zn, Ag, Ni, Au

TEXT PAGES NO: 2

PLAN NOS: TAS 2-2309, TAS 2-2310

TABLE NOS: -

APPENDICES: Dighem Survey of Mt Cleveland Area, Tasmania for Comstaff Proprietary Limited

AUTHOR/S: G F Pigott

DATE: 24th November 1980

OPEN FILE

AUSTRALIAN ANGLO AMERICAN LIMITED

Incorporated in the State of Victoria

001

026002

EXPLORATION LICENCE 1/68

We hereby apply for renewal of Exploration Licence 1/68 over the existing area of 175 square kilometres for a further period of six months ending 30th June 1981. In support of our application for renewal we set out below a report on the work undertaken and currently in progress in the six months ending 31st December 1980. Also herein is our proposed work programme for the first six months of 1981 with expenditure and budget figures. Summary plans and a copy of the Dighem report are appended. The map sheets to accompany the Dighem Report are being copied and will follow under separate cover.

Work Completed (Plan TAS 2-2309)

The results of the helicopter born Dighem survey were processed. The electromagnetic/resistivity/magnetic survey was flown over 1001 line kilometres in the Heazlewood area. Bad weather prevented the survey from being completed and 50 line kilometres remain to be flown. The contractors report on this work with maps and profiles is presented herewith as an appendix: "Dighem Survey of Mt Cleveland Area, Tasmania for Comstaff Pty Ltd". Initial anomaly selection has been completed : full interpretation of the data is still in progress.

The anomalies of interest so far identified are shown on the attached plan (TAS 2-2309). These are described below:

Anomaly No.	Access	Dip	Width *	Depth	Strike	Magnetic Expression
5A	Poor	NW	W	26	open to SW	none
19A	Poor	SE	W	10	100m	none
18C	Fair	-	T	0	600m	300 to 1000
19K	Fair	NW	T	10	Single line	negative 300
21G	Poor	-	?	10?	500m?	none
31E	Poor	Vert	T	0	?	1500
29A	Poor	SE	T	12	300m+ open to S	none
37B	V Poor	?	T	53	single line	none
59B	V Poor	NW	T	8	500m	gentle incl to SE
63A	V Poor	SE	W	6	single line	gentle incl to SE
57A	Fair	SE?	T	0	single line	gentle incl to NW
			Second Grade Anomalies			
19C	Poor	?	T	6	400m	gentle incl to NW
44A	Poor	NW	T	0	single line	increase to SE
25A	Poor	SE	T	44	300m open to S	small amplitude broad negative

*W - wide T - thin

Planning is currently underway to follow up the more readily accessible Dighem anomalies during the summer field season.

...2.

Expenditure

Expenditure on the tenement during the period 1.7.80 to 31.10.80 has been $2,302. However, the account has been credited with $5,525, representing an over accrual of the costs of the Dighem contract during the first half of 1980. Estimated expenditure during November and December is $1,467, thus bringing the six monthly total to an estimated $1,756 credit and the annual total to an estimated $76,083.

Proposed Programme (Plan TAS 2-2310)

Target Sn (Cu Pb Zn)

1. Commence the establishment of access tracks into the more remote Dighem anomalies.

2. Follow up and investigate the source of Dighem anomaly 57A. This will involve the establishment of a grid and will include geological mapping, geochemical sampling and geophysical surveying.

3. Follow up and investigate the source of Dighem anomaly 44A. This will involve the establishment of a grid and will include geological mapping, geochemical sampling and geophysical surveying.

4. Follow up and investigate the source of Dighem anomalies 21G and 18C. If the sources are found to be within EL 1/68 follow up grids will be established. A programme of geological mapping, geochemical sampling and geophysical surveying will then be carried out. In any event regional geological mapping will be carried out in the area.

5. Follow up and investigate the source of Dighem anomaly 5A. This will involve the establishment of a grid and will include geological mapping, geochemical sampling and geophysical surveying.

Proposed Budget January-June 1981

EL 1/68 Heazlewood $90,721

Approved by

for R J Kernick
Exploration Manager

Compiled by G F Pigott
Senior Geologist Tasmania
24.11.80

003

List of Attached Plans

TAS 2-2309 Heazlewood	: Plan showing work completed 1.7.80 to 31.12.80	1:50 000
TAS 2-2310 Heazlewood	: Plan showing work proposed 1.1.81 to 30.6.81	1:50 000

004

026005

List of Appended Reports

Dighem Survey of Mt Cleveland Area, Tasmania for Comstaff Proprietary Limited.

005

EL 1/68

EL 5/63 AREA I

AREA CEDED TO METALS EXPLORATION P/L

WARATAH

LUINA

37B
63A
29A
25A
19A
44A
19C
21G
18C
57A
5A

5 420 000 mE

5 410 000 mN

380 000 mE

370 000 mE

LEGEND

- Access road construction
- Grid lines cut
- Grid lines surveyed
- Grid lines sampled
- Stream sediment samples taken
- Geophysical survey
- Costeaning
- Geological mapping
- Drilling
- 'DIGHEM' anomaly

5 cm

COMSTAFF PROPRIETARY LIMITED

EL 1/68
HEAZLEWOOD
PLAN SHOWING WORK COMPLETED
1/7/80 — 31/12/80

DRAWN	COMPILED	SCALE	
GEODRAFT	G.F.P. 21/11/80	1 : 50 000	TAS/2/2309

026006

900

EL 1768

EL 1563 AREA I

AREA CEDED TO METALS EXPLORATION P/L

WARATAH

LUINA

5 420 000 mE

5 410 000 mN

380 000 mE

360 000 mE

370 000 mE

LEGEND

- Access road construction
- Grid lines cut
- Grid lines surveyed
- Grid lines sampled
- Stream sediment samples taken
- Geophysical survey
- Costeaning
- Geological mapping
- Drilling

5 cm

COMSTAFF PROPRIETARY LIMITED

EL 1/68 HEAZLEWOOD PLAN SHOWING WORK PROPOSED 1/1/81 — 30/6/81

026007

DRAWN	COMPILED	SCALE	
GEODRAFT	G.F.P. 21/11/80	1 : 50 000	TAS/2/2310

026008

007

DIGHEM^{II} SURVEY

OF

MT. CLEVELAND AREA, TASMANIA

FOR

COMSTAFF PROPRIETARY LIMITED

BY

DIGHEM LIMITED

TORONTO, ONTARIO
SEPTEMBER 26, 1980

D.C. FRASER
PRESIDENT

Z. DVORAK
GEOPHYSICIST

008

026009

SUMMARY

A DIGHEM^{II} airborne electromagnetic/resistivity/magnetic survey totalling 1,001 line-km was flown in the Mt. Cleveland area of Tasmania for Comstaff Proprietary Limited from March to May, 1980.

The environment in the survey area varied from highly resistive to quite conductive. EM and resistivity anomalies occurred due to culture, and to locally conductive bedrock and overburden features.

Several targets were located which appear to warrant ground follow-up work. Most of these are, however, poorly conductive.

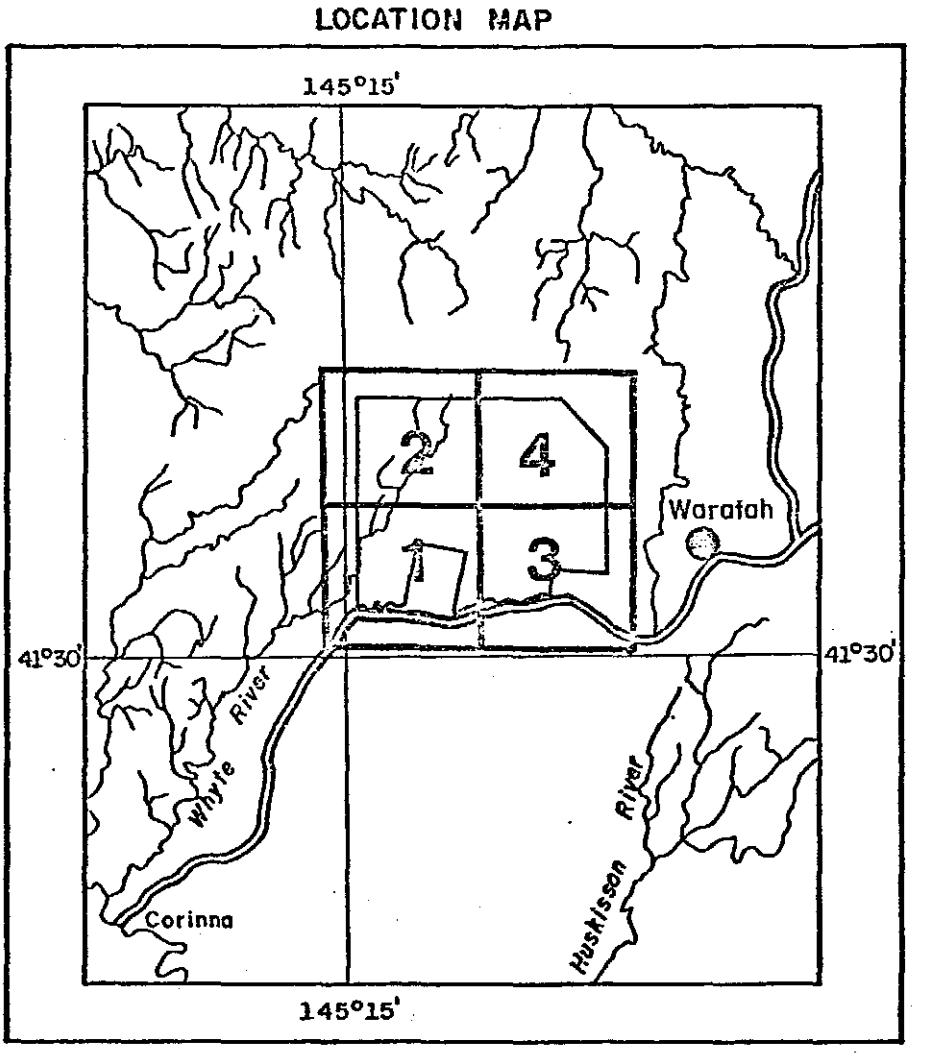

Figure 1. The Survey Area

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CONTENTS

INTRODUCTION..... 1

ELECTROMAGNETICS..... 2

Discrete conductor analysis..... 3

X-type electromagnetic responses..... 10

The thickness parameter..... 11

Resistivity mapping..... 12

Interpretation in conductive environments.... 15

Reduction of geologic noise..... 18

MAGNETICS..... 19

CONDUCTORS IN THE SURVEY AREA..... 22

Sheet 1..... 23

Sheet 2..... 25

Sheet 3..... 27

Sheet 4..... 28

APPENDIX A: The Flight Record and Path Recovery

APPENDIX B: EM Anomaly List

INTRODUCTION

A DIGHEM^{II} survey of 1,001 line-km was flown with a 200 m line-spacing for Comstaff Proprietary Limited from March 12 to May 5, 1980, in the Mt. Cleveland area of Tasmania (Figure 1).

The Lama VH-PDU jet helicopter flew with an average airspeed of 112 km/h and EM bird height of 44 m. Ancillary equipment consisted of a Geometrics 803 magnetometer with its bird at an average height of 64 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 35 km/h. Higher winds may cause the system to be grounded because excessive bird swinging 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.

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 independent 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

[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.

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 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, 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

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

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 more 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 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.

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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.

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.

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.

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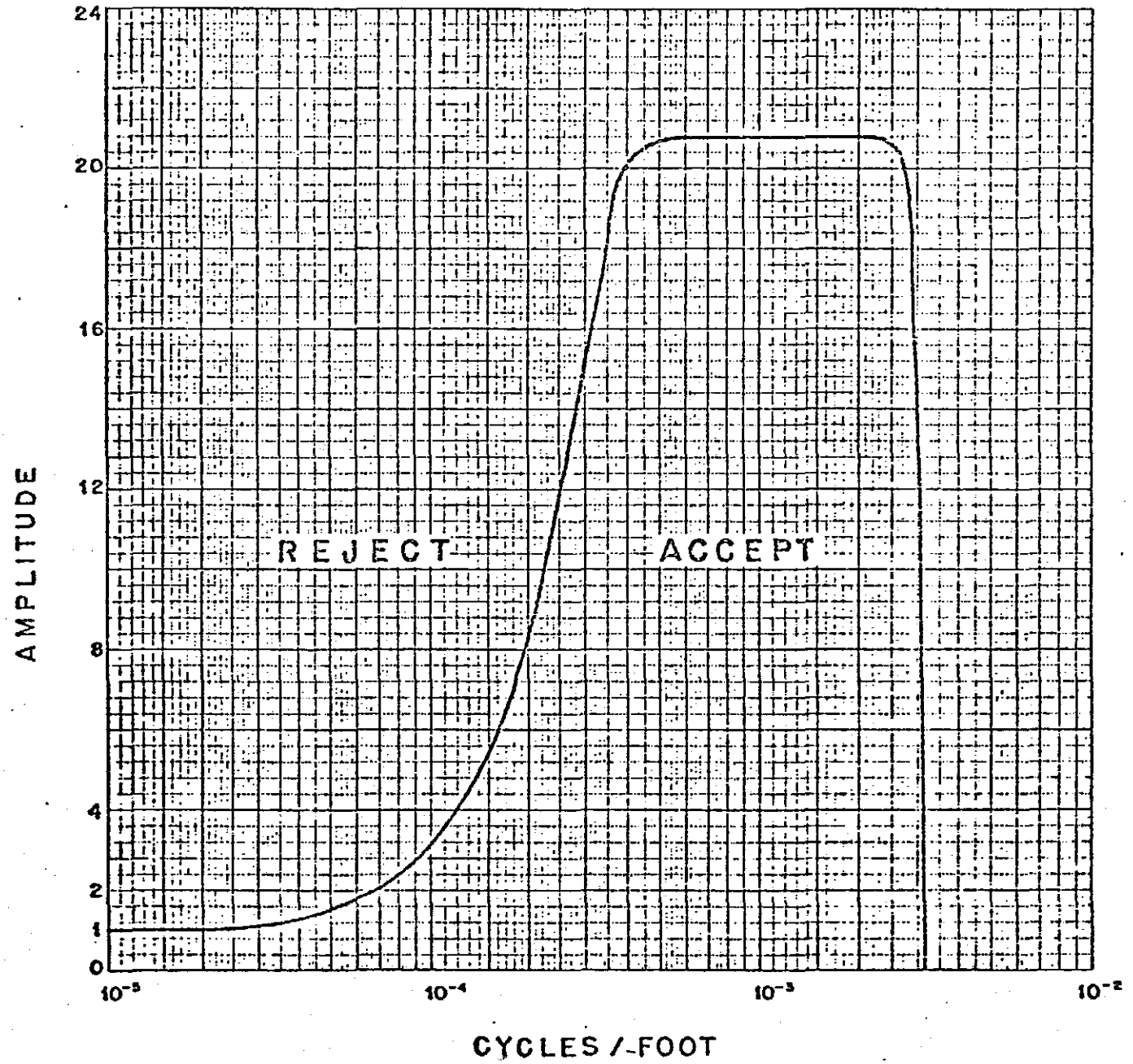

Figure 2 Frequency response of mognetic operator

5 cm

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.

CONDUCTORS IN THE SURVEY AREA

The electromagnetic maps show 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 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.

The ground resistivities in the survey area range from 30 ohm-m to in excess of 1000 ohm-m. Northeasterly trends can be readily recognized. The magnetic data show similar northeastern trends which are best portrayed by the enhanced magnetics.

Sheet 1

Anomalies 4A-7xD, 6A-7A, 11A	These grade 1 and 2 anomalies reflect non-magnetic bedrock conductors. Conductor 11A may extend toward 10xA, 9xA, and 13xB.
Group 1	The grade 1 to 5 anomalies and associated x-type responses of this grouping reflect a set of generally non-magnetic bedrock conductors. The EM anomalies 21E to 21H appear to indicate a conductive zone in the bedrock which occurs parallel to the flight line. The resistivity and

magnetic maps support this interpretation.

Anomalies 17A-20A, 18xA-19B

These grade 1 and 2 anomalies reflect a pair of non-magnetic bedrock conductors.

Anomaly 18C-20D

A strongly magnetic bedrock conductor is indicated by these grade 2 and 3 anomalies.

Anomaly 19K

This grade 2 anomaly reflects a bedrock conductor which may extend beyond the survey boundary.

Group 2
Anomaly 27A

A set of bedrock conductors of variable strike is indicated by these grade 1 to 6 anomalies and associated x-type responses. The high conductance of 34F is illusionary because overlying conductive material has caused a phase rotation.

Anomaly 44A

This single-line grade 1 anomaly is associated with an elongated low resistivity zone. The conductive (or low resistivity) zone generally did not generate EM anomalies because it lacks locally conductive inhomogeneities. The apparent depth parameter (channel 41) indicates that the conductive material of this zone occurs beneath the daylight surface, i.e., in the bedrock (e.g., at 36 m of depth as shown on the orange profile of line 41). It is of interest to note the associated magnetic high which occurs along the northern edge of the conductive zone.

Sheet 2

Anomaly 28A-30xA

A thin bedrock conductor is indicated by these grade 1 anomalies. It occurs on the

boundary of a localised resistivity low and follows a narrow enhanced magnetic trend.

Anomaly 26xA-28xA

This grade 1 anomaly and associated x-type responses reflect a weak non-magnetic bedrock conductor.

Group 3

Bedrock conductors of this grouping, which are indicated by the grade 1 to 3 anomalies, appear to occur along two parallel northeastern trends which are best portrayed by the resistivity map. Except for 34B and 41A, these conductors are non-magnetic.

Group 4

These grade 1 and 2 anomalies reflect a set of bedrock conductors. They appear to be separated into two smaller groups along line 61. This interpreta-

tion is supported by the resistivity map which indicates a low resistivity zone extending in a northeastern direction to sheet 4.

Sheet 3

Anomalies 57A, 58A, 84A

These grade 1 and 2 anomalies are associated with a prominent low resistivity zone with a northeastern strike. The apparent depth channel indicates that this low resistivity zone reflects a conductive material which occurs in the bedrock. Many x-type responses are associated with this zone, e.g., 59xB, 60xA, 61xA, 64xB, 72xB, 74xB, 76xB, 78xC. They all reflect conductive bedrock material.

Sheet 4

The area of sheet 4 is fairly featureless. Several grade 1 anomalies (e.g., 75A, 76A, 83A, 84A, 84B) appear to reflect localised variations in the surficial conductivity. A few x-type responses may be indicative of bedrock conductors. These are 65xA, 66xA, 66xB, and 82xA. The only other feature of interest is a semi-elliptical low resistivity zone which occurs on lines 87 to 89. The apparent depth parameter indicates that this zone reflects conductive material at depth. The zone may extend beyond the survey boundary.

Respectfully submitted,
DIGHEM LIMITED,

D.C. Fraser,
President.

Z. Dvorak
Geophysicist.

Sixteen map sheets accompany this report:

Electromagnetics	4 map sheets
Resistivity	4 map sheets
Magnetics	4 map sheets
Enhanced magnetics	4 map sheets

040

026041

A P P E N D I X 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.

026044

043

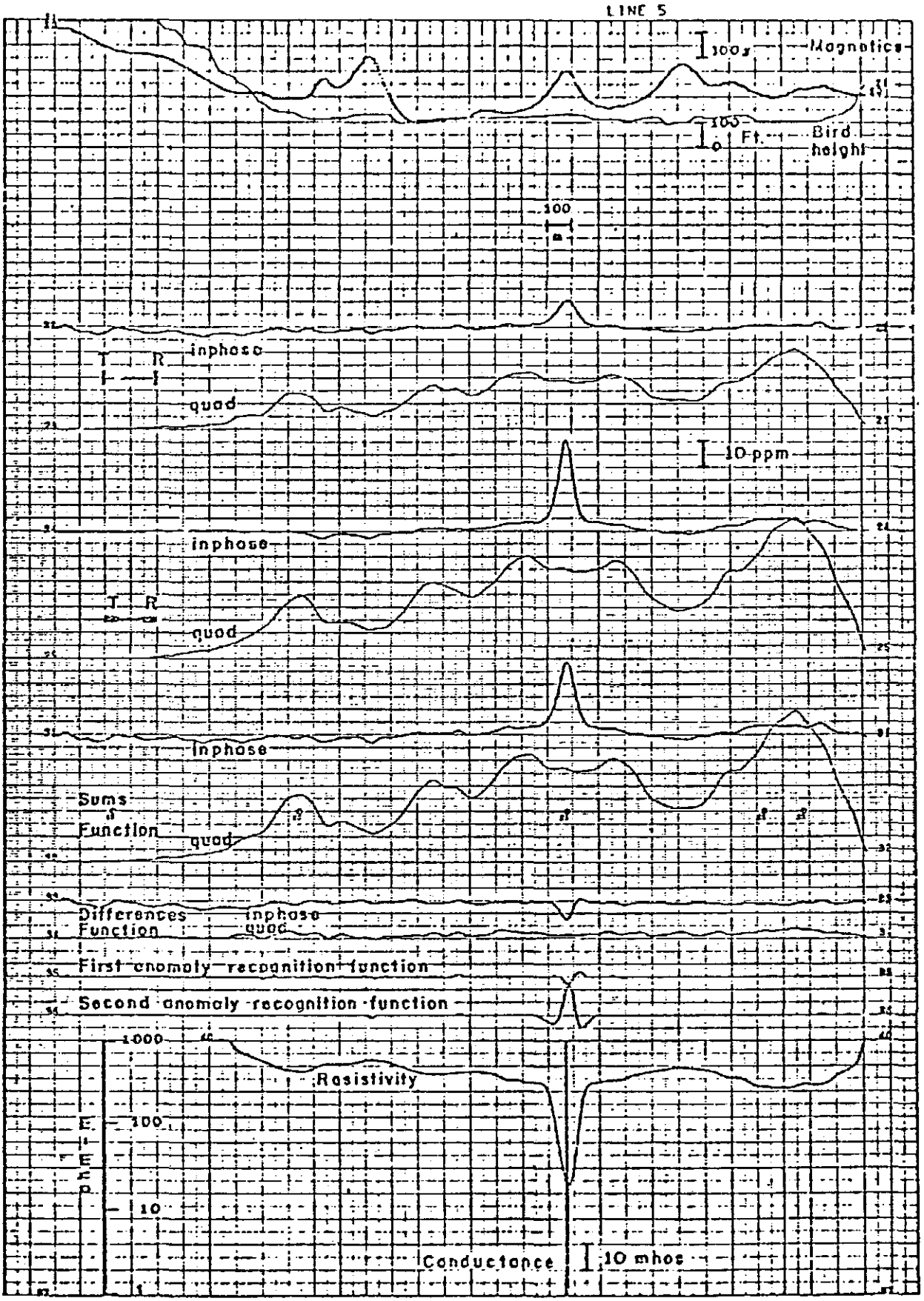

Fig. A1. Flight over Montcalm deposit, with line parallel to strike

5 cm

044

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.

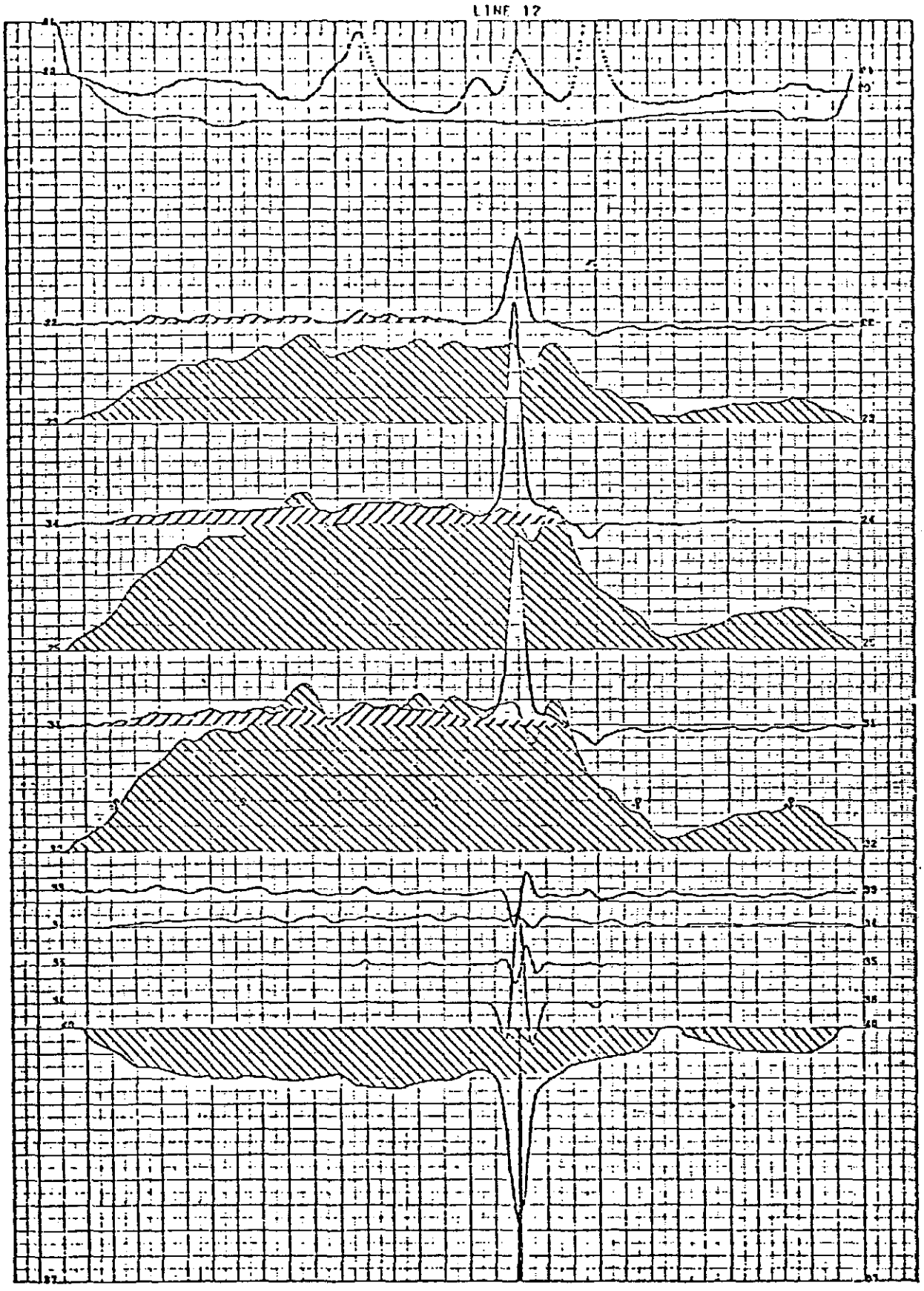


Fig. A2. Flight over Montcalm deposit, with line perpendicular to strike.

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.

050

026051

APPENDIX B

EM ANOMALY LIST

051

309-SH.1 COMSTAFF, MT.CLEVELAND APR/80

026052

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
3C	2	6	0	2	4	56	1	288	342	92
4A	3	7	10	14	4	9	1	241	92	97
4B	2	6	0	10	1	0	1	155	583	0
5A	4	3	1	3	6	92	2	467	70	321
5B	2	9	7	18	2	0	1	154	217	7
6A	5	6	4	8	5	21	1	299	75	152
6B	4	8	10	16	4	33	1	254	93	113
6C	0	10	0	13	1	0	1	92	993	0
7A	6	5	2	4	7	88	2	414	54	286
7D	1	2	0	1	5	Powerline 208	1	649	787	174
8B	0	6	0	9	1	21	1	213	1034	0
8E	4	7	0	0	4	0	1	263	149	83
9A	3	7	0	1	4	45	1	304	208	116
10A	2	3	1	3	3	59	1	396	180	190

* 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.

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
11A	2	3	3	3	4	90	1	330	100	180
11B	2	4	4	6	3	0	1	282	138	100
11D	5	9	0	0	7	0	1	191	141	23
12A	2	4	7	8	4	0	1	262	111	95
12C	0	4	0	6	2	77	1	308	1034	0
13B	1	8	0	1	1	0	1	88	884	0
14A	2	4	3	12	2	6	1	244	241	73
15A	4	7	9	12	4	0	1	208	88	63
15C	0	3	0	3	3	113	1	424	1034	0
16A	4	8	14	14	6	0	2	222	54	97
17A	2	2	1	1	5	141	1	572	108	389
17C	4	7	11	14	5	0	1	236	65	103
17F	0	10	0	16	1	0	1	54	1029	0
17G	0	16	0	31	1	0	1	18	711	0
18A	8	8	5	9	6	16	2	269	56	140
18B	3	4	7	7	5	0	1	304	74	154
18C	4	4	10	7	10	0	2	303	29	190

* 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.

026054

053

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
19A	7	6	7	8	9	28	2	316	37	206
19B	1	7	3	9	1	0	1	188	433	10
19C	3	4	8	4	10	20	2	366	33	245
19E	2	5	7	8	4	15	1	278	114	116
19F	0	12	0	23	1	0	1	55	861	0
19K	2	3	5	6	5	32	1	358	93	192
20A	17	16	14	16	10	13	3	223	24	137
20C	4	27	15	56	2	0	1	30	149	0
20D	6	10	15	19	6	0	2	206	51	87
21A	5	3	10	4	16	28	3	369	16	273
21E	5	0	10	0	83	110	12	462	2	413
21F	4	5	2	1	6	81	2	452	66	309
21G	9	15	11	16	5	0	2	194	58	74
21H	5	7	15	16	7	7	2	251	44	135
21K	4	8	8	15	3	0	1	186	113	42
24A	3	2	2	2	8	42	2	455	52	307
24B	4	4	0	2	4	92	1	418	131	232
27A	3	5	7	8	5	34	1	308	85	156
30D	2	8	0	18	2	0	1	39	554	0
30F	4	2	13	5	24	0	5	331	9	242
30H	4	5	0	1	6	0	1	225	111	47
30I	1	4	0	0	5	0	1	172	675	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.

309-SH.1 COMSTAFF, MT.CLEVELAND APR/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
31B	2	3	9	8	6	0	2	284	64	144
31D	3	1	7	6	11	0	2	376	28	254
31E	4	10	13	23	4	0	1	108	97	0
31F	16	43	0	1	6	0	1	40	92	0
31G	37	11	0	0	17	0	11	101	2	52
32A	5	5	13	7	11	0	3	284	24	178
32B	2	2	0	0	3	0	1	323	502	0
33D	3	3	10	7	10	5	2	334	34	216
33E	3	2	11	9	10	29	2	348	33	232
33I	1	4	0	1	4	23	1	346	1034	0
33J	0	0	0	0	7	0	1	428	1034	0
34D	5	5	7	10	5	23	1	293	68	152
34F	7	0	15	1	740	31	19	339	1	305
34H	5	11	12	20	4	0	1	138	84	9
34P	3	23	1	0	2	0	1	0	428	0
34Q	0	0	0	0	8	0	1	339	1034	0
35F	7	2	14	3	46	0	8	293	3	228
35I	0	11	0	16	1	0	1	54	987	0
35O	5	11	1	1	3	0	1	141	143	0
35P	3	6	1	0	7	0	1	169	169	0
36A	6	8	13	14	7	0	2	218	46	100

* 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.

026056

055

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
37A	3	10	12	27	3	0	1	114	128	0
37C	3	8	2	12	3	0	1	116	252	0
37D	0	0	0	0	5	0	1	349	1034	0
38B	4	4	8	9	7	0	2	287	56	155
44A	5	11	13	22	4	0	1	140	81	13

* 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.

309-SH.2 COMSTAFF, MT.CLEVELAND APR/80

056

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
25A	3	2	1	2	6	145	2	591	73	426
26A	2	4	2	5	2	57	1	334	264	139
28A	2	4	1	4	2	41	1	339	256	135
29A	3	5	3	9	2	31	1	275	206	104
32A	2	2	2	2	4	136	1	558	140	353
33A	3	6	2	2	3	56	1	352	141	171
34B	2	4	0	3	2	43	1	323	314	111
36B	9	9	2	11	5	19	1	254	64	122
37A	8	9	3	7	6	33	1	285	63	151
37B	3	2	1	0	7	175	2	659	57	495
37C	7	10	6	13	5	26	1	247	73	114
38B	4	6	2	4	4	14	1	300	120	129
38C	5	4	4	5	7	44	2	367	56	236
39A	3	3	2	3	5	77	1	410	120	227
39B	4	3	6	4	12	69	3	436	26	319

* 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.

309-SH.2 COMSTAFF, MT.CLEVELAND APR/80

057

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
40A	4	5	1	1	4	61	1	382	114	205
40B	5	5	6	9	6	18	2	303	64	164
41A	2	2	1	1	8	116	2	596	58	431
41B	2	3	4	5	4	57	1	378	132	193
41C	5	4	5	6	8	38	2	362	43	240
42A	6	9	6	7	5	20	1	264	74	125
42B	2	4	1	2	2	64	1	361	331	147
43A	1	2	2	2	3	69	1	459	161	247
43B	3	5	4	8	3	44	1	309	127	142
43C	2	3	1	1	4	132	1	524	135	325
43D	6	6	4	7	6	62	2	347	65	207
54A	6	2	0	1	15	38	3	456	20	346
58A	3	5	0	2	3	68	1	369	169	178
59A	2	4	1	2	2	60	1	353	345	143
59B	4	5	4	7	5	28	1	316	81	164
59C	1	6	1	8	1	9	1	198	700	0
60A	1	2	6	7	4	54	1	390	116	209
62B	4	5	3	5	5	63	1	359	90	199
63A	4	7	1	4	3	22	1	283	168	109
63B	4	2	1	3	6	70	2	453	69	306
64A	1	5	2	1	2	10	1	304	310	95

* 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.

058

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
40A	1	5	1	1	2	0	1	274	696	0
42A	4	2	1	1	8	0	2	346	32	214
45A	3	4	0	1	3	108	1	455	155	254
47C	12	2	1	1	14	0	15	86	1	46
57A	3	4	3	8	3	0	1	258	136	85
58A	3	4	2	5	4	42	1	362	116	184
62A	2	3	2	5	3	0	1	316	143	127
84A	3	3	1	2	5	71	1	445	104	267

* 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.

309-SH.4 COMSTAFF, MT.CLEVELAND APR/80

059

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
75A	1	4	1	2	2	25	1	324	488	66
76A	3	6	0	4	2	44	1	294	320	105
79B	1	1	11	12	6	57	2	372	68	223
83A	3	9	1	8	2	0	1	187	259	23
84A	1	6	1	5	1	0	1	239	710	0
84B	1	7	0	10	1	0	1	153	776	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.

026061

Comstaff Pty. Ltd.

E.L. 1/68

Maps for Dighem II Survey

1500 (a*3)

Electromagnetics
Resistivity
Magnetics
Enhanced Magnetics

} Sheets 1-2

80-1

DEPT FILE COPY

TRANSPARENCIES HELD IN VERTICAL FILE

Duplicates

DIGHEM^{II} SURVEY

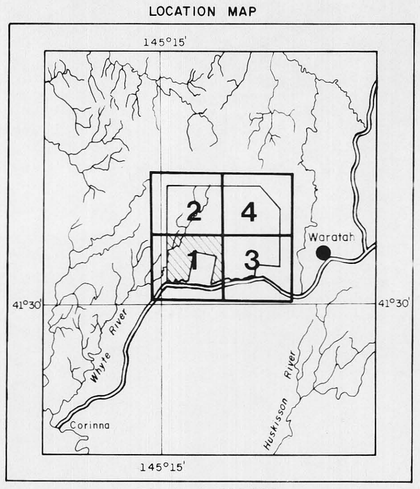
CLEVELAND AREA, TASMANIA

ELECTROMAGNETICS

FOR

COMSTAFF PROPRIETARY LIMITED

LOCATION MAP



Scale 1 : 500,000

5 cm

SCALE 1 : 15,000

3/4 1/2 0 1/2 1 1 1/2 Kilometres

1/4 0 1/4 1/2 3/4 Miles

026062

SHEET 1

2068

Flight line

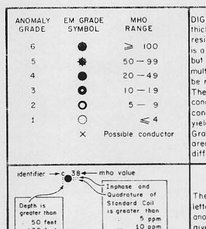
1256

Fiducials and numbers

1256

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.



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

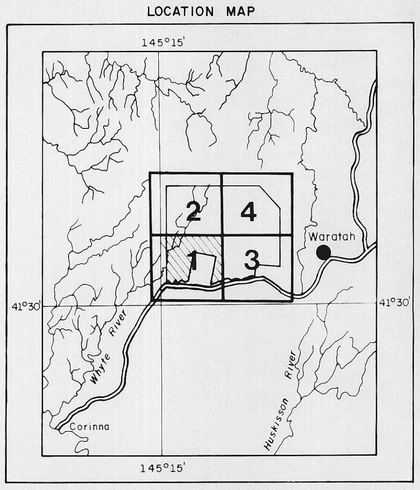
The actual mho value is plotted beside the EM grade symbol. The letter is the anomaly identifier. The horizontal rows of dots indicate anomaly amplitude on the flight record, and the vertical column gives the estimated depth. This depth may be unreliable because the stronger part of the conductor may 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.

80 1500

LOCATION MAP



Scale 1:500,000

DIGHEM^{III} SURVEY

CLEVELAND AREA, TASMANIA

RESISTIVITY

FOR

COMSTAFF PROPRIETARY LIMITED

5 cm

SCALE 1:15,000

3/4 1/2 0 1/2 1 1½ Kilometres

1/4 0 1/4 1/2 3/4 Miles

026063

SHEET 1

2869

Flight line

1202

Fiducials and numbers

1226

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.

80 -1500

DIGHEM^{II} SURVEY

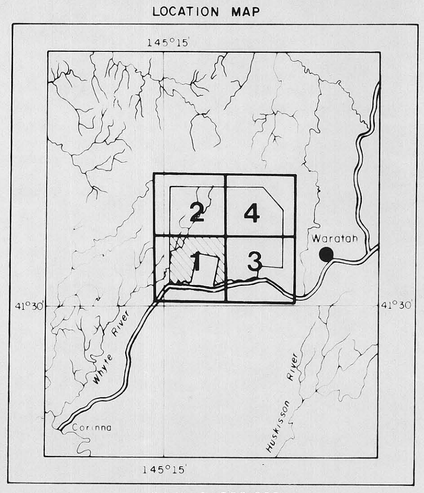
CLEVELAND AREA, TASMANIA

MAGNETICS

FOR

COMSTAFF PROPRIETARY LIMITED

LOCATION MAP



Scale 1 : 500,000

REGISTERED PROFESSIONAL ENGINEER
D. C. FRASER
PROVINCE OF ONTARIO

5 cm

SCALE 1 : 15,000

3/4 1/2 0 1/2 1 1 1/2 Kilometres

1/4 0 1/4 1/2 3/4 Miles

Flight line

1256

Fiducials and numbers

1256

ISOMAGNETIC LINES

(total field)

1000 ..... 1000 gammas

200 ..... 200 gammas

..... 50 gammas

..... 25 gammas

..... magnetic depression

Magnetic Inclination within the survey area: 72°

026064

SHEET 1

2863

80-1500

DIGHEM^{II} SURVEY

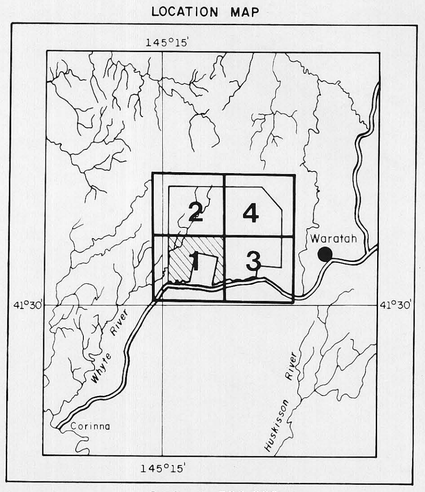
CLEVELAND AREA, TASMANIA

ENHANCED MAGNETICS

FOR

COMSTAFF PROPRIETARY LIMITED

LOCATION MAP



Scale 1 : 500,000

5 cm

SCALE 1 : 15,000

3/4 1/2 0 1/2 1 1½ Kilometres

1/4 0 1/4 1/2 3/4 Miles

Flight line

1255

Fiducials and numbers

1255

ISOMAGNETIC LINES

(enhanced field)

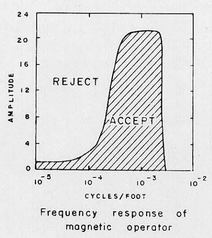
5000 ..... 5000 gammas

1000 ..... 1000 gammas

..... 200 gammas

..... 100 gammas

..... magnetic depression



Frequency response of magnetic operator

SHEET 1

2867

026065

80-1500

DIGHEM^{II} SURVEY

CLEVELAND AREA, TASMANIA

ELECTROMAGNETICS

FOR

COMSTAFF PROPRIETARY LIMITED

LOCATION MAP

Scale 1 : 500,000

SCALE 1 : 15,000

3/4 1/2 0 1/2 1 1 1/2 Kilometres

1/4 0 1/4 1/2 3/4 Miles

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 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
	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.

REGISTERED PROFESSIONAL ENGINEER
D. C. FRASER
PROVINCE OF ONTARIO

SHEET 2

2870

026066

80 - 1500

DIGHEM^{II} SURVEY

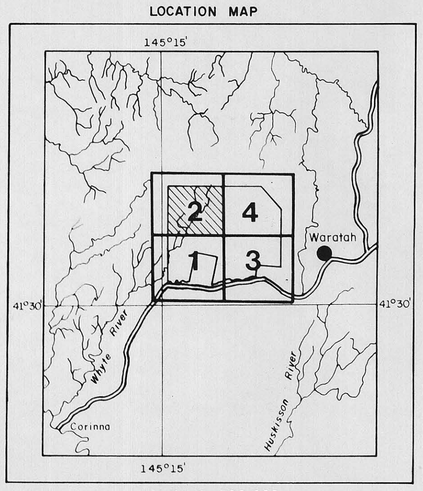
CLEVELAND AREA, TASMANIA

RESISTIVITY

FOR

COMSTAFF PROPRIETARY LIMITED

LOCATION MAP



Scale 1 : 500,000

REGISTERED PROFESSIONAL ENGINEER
D. C. FRASER
PROVINCE OF ONTARIO

SCALE 1 : 15,000

3/4 1/2 0 1/2 1 1 1/2 Kilometres

1/4 0 1/4 1/2 3/4 Miles

SHEET 2

026067

2871

80-1500

Flight line

1256

Fiducials and numbers

1056

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.

DIGHEM^{II} SURVEY

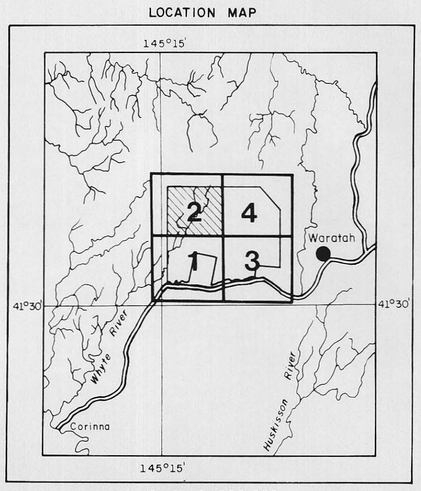
CLEVELAND AREA, TASMANIA

MAGNETICS

FOR

COMSTAFF PROPRIETARY LIMITED

LOCATION MAP



Scale 1 : 500,000

SCALE 1 : 15,000

3/4 1/2 0 1/2 1 1½ Kilometres

1/4 0 1/4 1/2 3/4 Miles

5 cm

Flight line

1256

Fiducials and numbers

1256

ISOMAGNETIC LINES

(total field)

1000 ..... 1000 gammas

200 ..... 200 gammas

..... 50 gammas

..... 25 gammas

..... magnetic depression

Magnetic Inclination within the survey area : 72°

026068

SHEET 2

2873

80 – 1508

DIGHEM^{II} SURVEY

CLEVELAND AREA, TASMANIA

ENHANCED MAGNETICS

FOR

COMSTAFF PROPRIETARY LIMITED

LOCATION MAP

Scale 1 : 500,000

SCALE 1 : 15,000

3/4 1/2 0 1/2 1 1 1/2 Kilometres

1/4 0 1/4 1/2 3/4 Miles

5 cm

Flight line

Fiducials and numbers

ISOMAGNETIC LINES

(enhanced field)

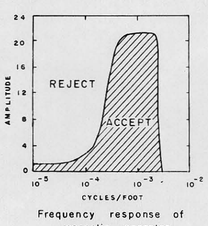
5000 ..... 5000 gammas

1000 ..... 1000 gammas

..... 200 gammas

..... 100 gammas

..... magnetic depression



Frequency response of magnetic operator

REGISTERED PROFESSIONAL ENGINEER
D. C. FRASER
PROVINCE OF ONTARIO

026069

SHEET 2

2872

80-1508

Comstaff Pty. Ltd.

026070

EL. 1/68

Maps for Dighem II Survey

Transparencies and Tapes Held

500 (3 of 3)

Electromagnetics
Resistivity
Magnetics
Enhanced Magnetics

} Sheets 3-4

80-1

OPEN FILE

TRANSPARENCIES HELD IN VERTPLAN - Duplicates

DIGHEM^{II} SURVEY

CLEVELAND AREA, TASMANIA

ELECTROMAGNETICS

FOR

COMSTAFF PROPRIETARY LIMITED

LOCATION MAP

Scale 1 : 500,000

SCALE 1 : 15,000

3/4 1/2 0 1/2 1 1 1/2 Kilometres

1/4 0 1/4 1/2 3/4 Miles

5 cm

SHEET 3

2874

026071

80 - 1500

REGISTERED PROFESSIONAL ENGINEER
D. C. FRASER
PROVINCE OF ONTARIO

Flight line

1282

Fiducials and numbers

1282

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

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identifier → C 38 ← mho value

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

In-phase 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.

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	Conductor axis
S	Probable surface response
S?	Possible surface response
L	Probable line (power, telephone, pipe, or fence)
L?	Possible line
?	Questionable anomaly
V	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 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 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.

DIGHEM^{II} SURVEY

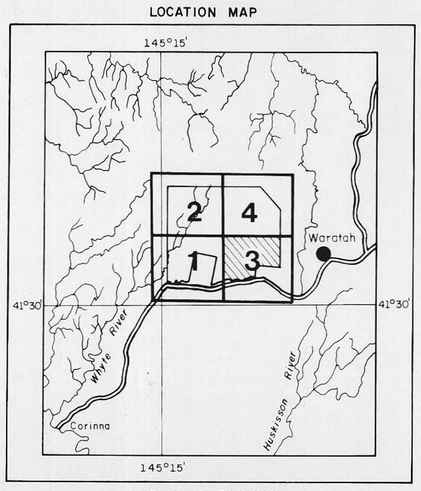
CLEVELAND AREA, TASMANIA

RESISTIVITY

FOR

COMSTAFF PROPRIETARY LIMITED

LOCATION MAP



Scale 1 : 500,000

SCALE 1 : 15,000

3/4 1/2 0 1/2 1 1½ Kilometres

1/4 0 1/4 1/2 3/4 Miles

5 cm

SHEET 3

2877

026072

80-1500

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.

REGISTERED PROFESSIONAL ENGINEER
D. C. FRASER
PROVINCE OF ONTARIO

DIGHEM^{II} SURVEY

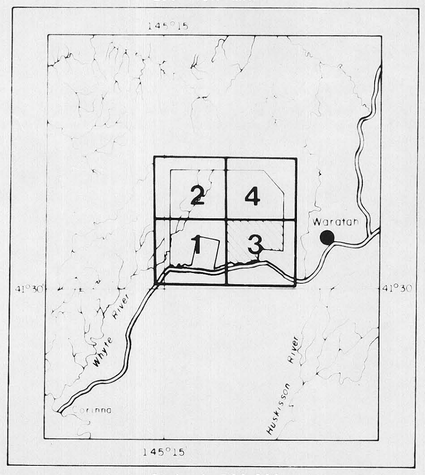
CLEVELAND AREA, TASMANIA

MAGNETICS

FOR

COMSTAFF PROPRIETARY LIMITED

LOCATION MAP



Scale 1 : 500,000

SCALE 1 : 15,000

3/4 1/2 0 1/2 1 1 1/2 Kilometres

1/4 0 1/4 1/2 3/4 Miles

SHEET 3

2876

026073

5 cm

80-1500

Flight line

1255

Fiducials and numbers

1235

ISOMAGNETIC LINES

(total field)

1000 ..... 1000 gammas

200 ..... 200 gammas

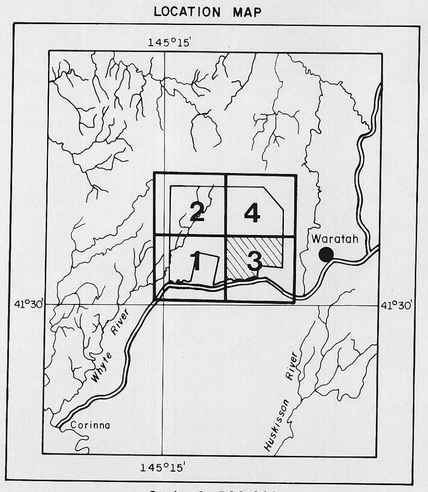
..... 50 gammas

..... 25 gammas

..... magnetic depression

Magnetic Inclination within the survey area : 72°

LOCATION MAP



Scale 1:500,000

DIGHEM^{II} SURVEY

CLEVELAND AREA, TASMANIA

ENHANCED MAGNETICS

FOR

COMSTAFF PROPRIETARY LIMITED

SCALE 1:15,000

3/4 1/2 0 1/2 1 1½ Kilometres

1/4 0 1/4 1/2 3/4 Miles

SHEET 3

026074

5 cm

80-1500

Flight line

Fiducials and numbers

ISOMAGNETIC LINES

(enhanced field)

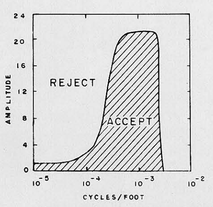
5000 gammas

1000 gammas

200 gammas

100 gammas

magnetic depression



Frequency response of magnetic operator

REGISTERED PROFESSIONAL ENGINEER
R. L. FRASER
PROVINCE OF ONTARIO

DIGHEM^{II} SURVEY

CLEVELAND AREA, TASMANIA

ELECTROMAGNETICS

FOR

COMSTAFF PROPRIETARY LIMITED

026075

SCALE 1 : 15,000

3/4 1/2 0 1/2 1 1 1/2 Kilometres

1/4 0 1/4 1/2 3/4 Miles

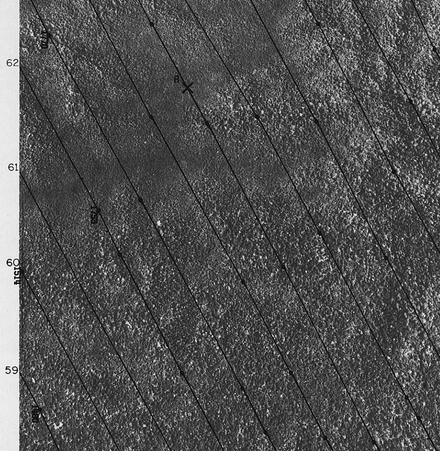
5 cm

SHEET 4

2879

80 -1500

LOCATION MAP



Scale 1 : 500,000

REGISTERED PROFESSIONAL ENGINEER
D. C. FRASER
PROVINCE OF ONTARIO

Flight line

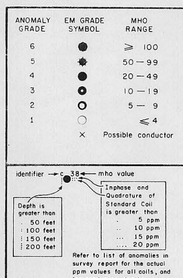
5521

Fiducials and numbers

9521

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.



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	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
100¢	Direct magnetic correlation at 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.

DIGHEM^{II} SURVEY

CLEVELAND AREA, TASMANIA

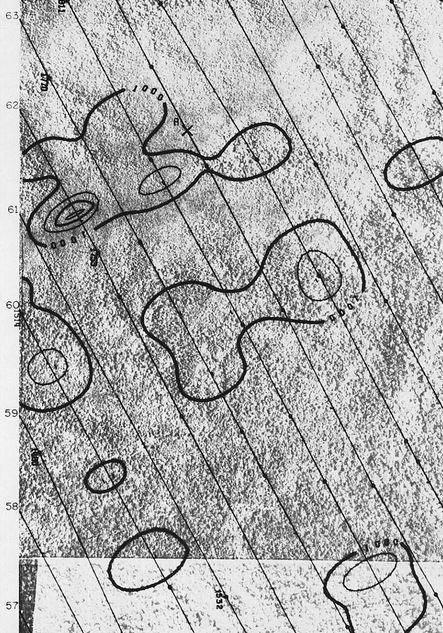
RESISTIVITY

FOR

COMSTAFF PROPRIETARY LIMITED

026076

LOCATION MAP



Scale 1:500,000

SCALE 1:15,000

3/4 1/2 0 1/2 1 1½ Kilometres

1/4 0 1/4 1/2 3/4 Miles

5 cm

SHEET 4

2878

80-1500

Flight line

Fiducials and numbers

LEGEND

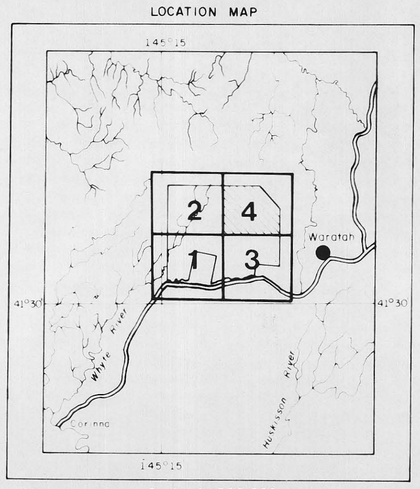
Contours in ohm-m at eight intervals per decade

100
75
56
42
31
23
17
13
10

Note

The numbers face in the direction of increasing value.

LOCATION MAP



Scale 1 : 500,000

DIGHEM^{II} SURVEY

CLEVELAND AREA, TASMANIA

MAGNETICS

FOR

COMSTAFF PROPRIETARY LIMITED

SCALE 1 : 15,000

3/4 1/2 0 1/2 1 1½ Kilometres

1/4 0 1/4 1/2 3/4 Miles

5 cm

SHEET 4

2081

026077

80 - 1500

Flight line

Fiducials and numbers

ISOMAGNETIC LINES

(total field)

1000 ..... 1000 gammas

200 ..... 200 gammas

..... 50 gammas

..... 25 gammas

..... magnetic depression

Magnetic Inclination within the survey area: 72°

DIGHEM^{II} SURVEY

CLEVELAND AREA, TASMANIA

ENHANCED MAGNETICS

FOR

COMSTAFF PROPRIETARY LIMITED

LOCATION MAP

Scale 1 500,000

SCALE 1 : 15,000

3/4 1/2 0 1/2 1 1 1/2 Kilometres

1/4 0 1/4 1/2 3/4 Miles

5 cm

SHEET 4

2880

Flight line

1600

Fiducials and numbers

1800

026078

80-1500'

ISOMAGNETIC LINES

(enhanced field)

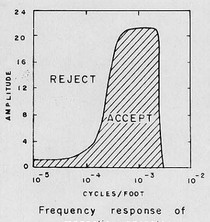
5000 ..... 5000 gammas

1000 ..... 1000 gammas

..... 200 gammas

..... 100 gammas

..... magnetic depression



Frequency response of magnetic operator

TCR 80-1500 C26079
RENEWAL APPLICATION FOR
EXPLORATION LICENCE 1/68
HEAZELWOOD
COMSTAFF PTY LTD
AUSTRALIAN ANGLO AMERICAN LTD

DIGHEM^{II} SURVEY

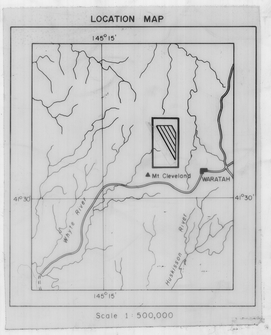
CLEVELAND AREA, TASMANIA

ELECTROMAGNETICS

FOR

COMSTAFF PROPRIETARY LIMITED

LOCATION MAP



Scale 1 : 500,000

Flight line

Fiducials and numbers

SCALE 1 : 15,000

3/4 1/2 0 1/2 1 1½ Kilometres

1/4 0 1/4 1/2 3/4 Miles

5 cm

REGISTERED PROFESSIONAL ENGINEER
D. C. FRASER
PROVINCE OF ONTARIO

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

identifier → 3 — mho value

Depth to conductor (approx. feet)
- 50 feet
- 100 feet
- 150 feet
- 200 feet

Explosive and Quadrature of Standard Coil is greater than
- 5 ppm
- 10 ppm
- 20 ppm
- 50 ppm

Refer to text of accompanying survey report for the actual ppm values for air coils, and for conductor depth.

S	Conductor axis
S?	Probable surface response
?	Possible surface response
L	Probable line (power, telephone, pipe, or fence)
L?	Possible line
?	Questionable anomaly
○	Apparent thickness >10m
DIG	Dip
DC's	Direct magnetic correlation of EDC gamma

DIGHEM anomalies are divided into six gr
conductor quality by means of the conduct
thickness and depth.
symbols can stand alone with geology wh
program. The actual mho values are pl
quantitative data. The anomaly grade and
anomaly amplitude on the flight record, on
overburden effects.

The actual mho value is plotted beside the
letter is the anomaly identifier. The horizo
gives the estimated depth. This depth ma
the stronger part of the conductor may be
of the flight line, or because of a shallow

DIGHEM maps are designed to provide a
length, strike direction, conductance and
is comparable to an interpretation from a
having the same line spacing.

AUSTRALIAN ANGLO AMERICAN LTD
COMSTAFF PTY LTD
HEAZELWOOD
EXPLORATION LICENCE 1/68
RENEWAL APPLICATION FOR
TCR 80-1500

TCR 80-1500 026080
RENEWAL APPLICATION FOR
EXPLORATION LICENCE 1/68
HEAZELWOOD
COMSTAFF PTY LTD
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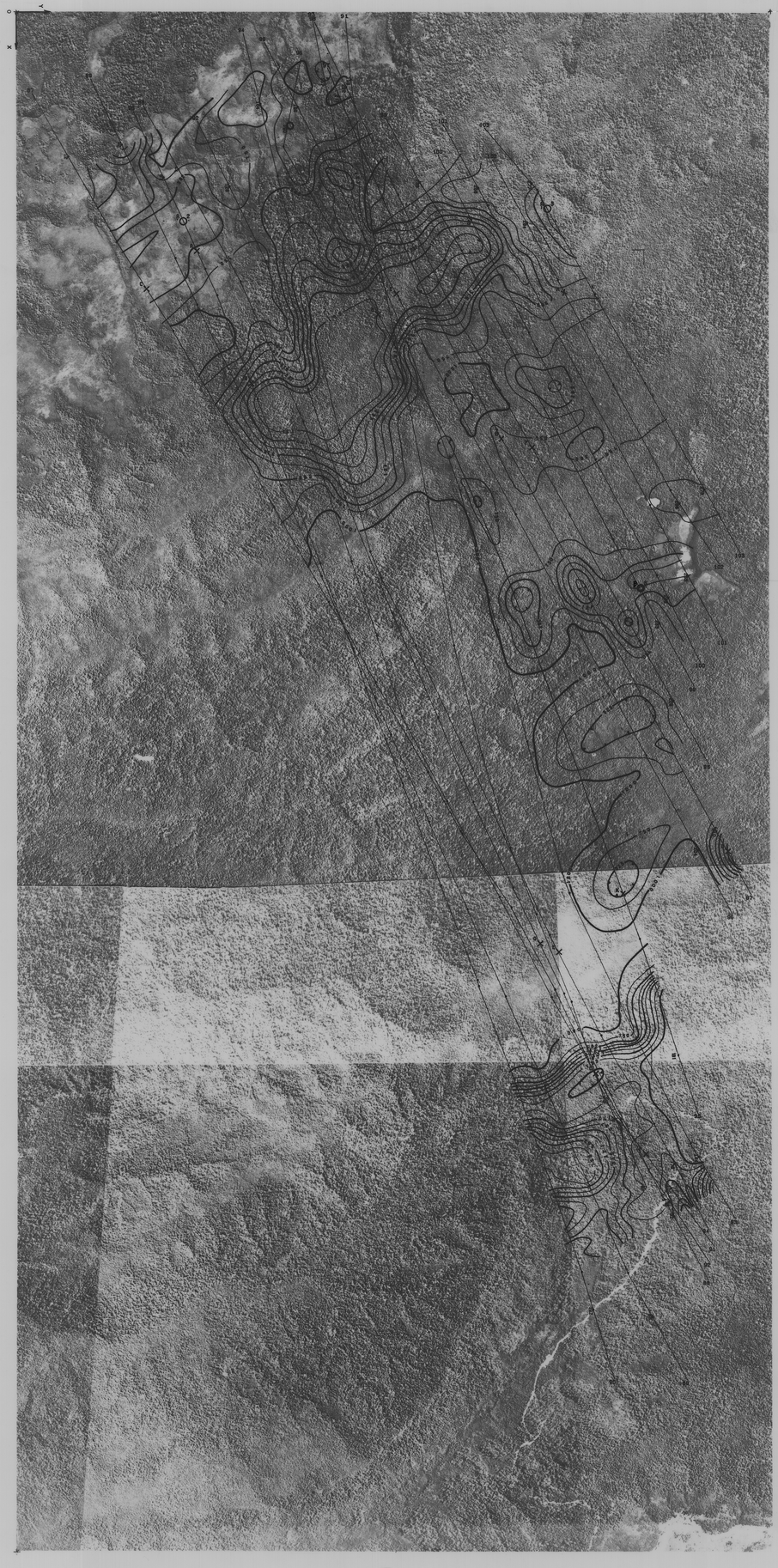


DIGHEM^{II} SURVEY

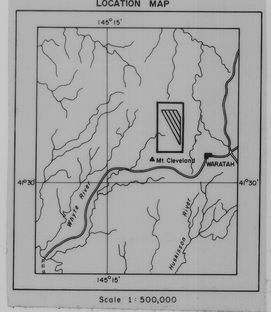
CLEVELAND AREA, TASMANIA

RESISTIVITY

FOR

COMSTAFF PROPRIETARY LIMITED

LOCATION MAP



Scale 1 : 500,000

SCALE 1 : 15,000

3/4 1/2 0 1/2 1 1½ Kilometres

1/4 0 1/4 1/2 3/4 Miles

5 cm

REGISTERED PROFESSIONAL ENGINEER
PROVINCE OF ONTARIO

Flight line

Fiducials and numbers

LEGEND

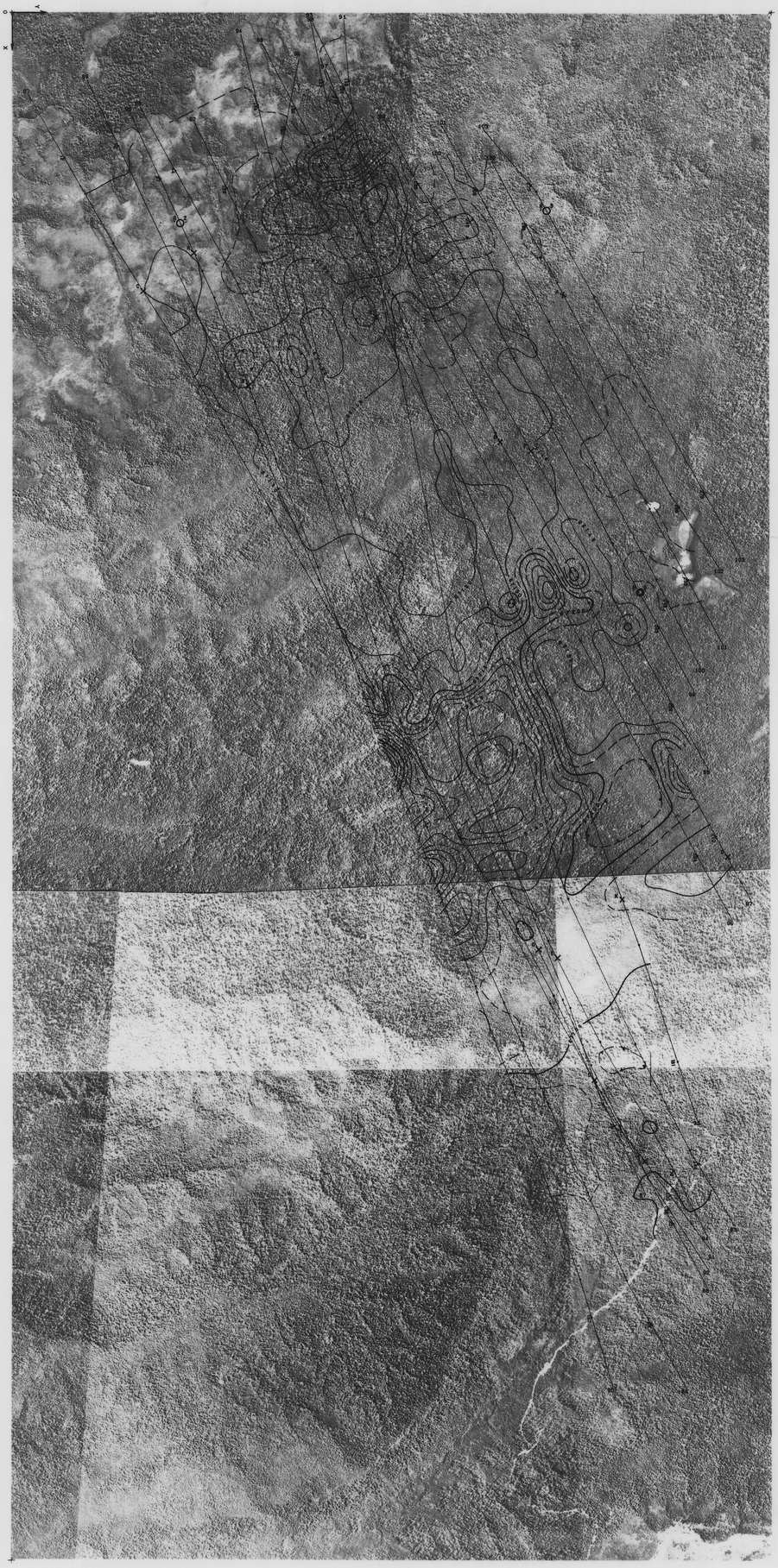
Contours in ohm-m at eight intervals per de

100
75
56
42
31
23
17
13
10

Note

The numbers face in the direction of increasing value.

TCR 80-1500 026081
RENEWAL APPLICATION FOR
EXPLORATION LICENCE 1/68
HEAZELWOOD
COMSTAFF PTY LTD
AUSTRALIAN ANGLO AMERICAN LTD



DIGHEM^{II} SURVEY

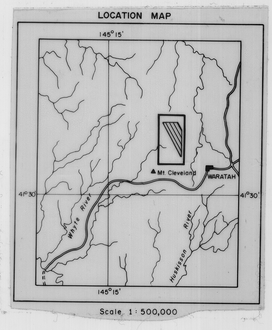
CLEVELAND AREA, TASMANIA

MAGNETICS

FOR

COMSTAFF PROPRIETARY LIMITED

LOCATION MAP



Scale 1 : 500,000

SCALE 1:15,000

3/4 1/2 0 1/2 1 1½ Kilometres

1/4 0 1/4 1/2 3/4 Miles

5 cm

Flight line

Fiducials and numbers

ISOMAGNETIC LINES
(total field)

1000 ..... 1000 gammas

200 ..... 200 gammas

..... 50 gammas

..... 25 gammas

..... magnetic depre

Magnetic Inclination within the survey area : 72°

REGISTERED PROFESSIONAL ENGINEER
PROVINCE OF ONTARIO

TCR 80-1500 026082
RENEWAL APPLICATION FOR
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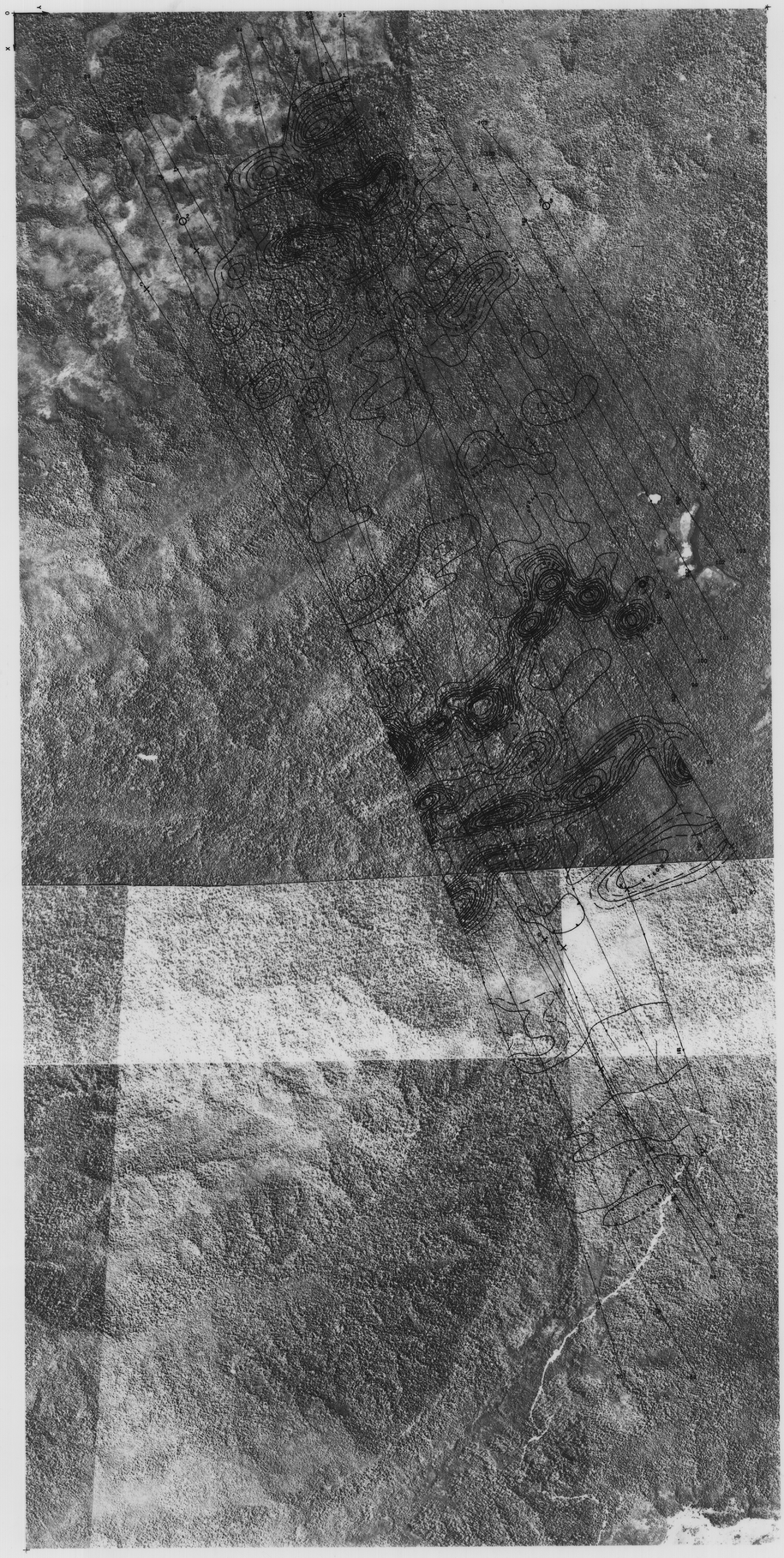


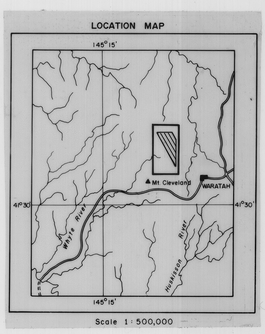
DIGHEM^{II} SURVEY

CLEVELAND AREA, TASMANIA

ENHANCED MAGNETICS

FOR

COMSTAFF PROPRIETARY LIMITED



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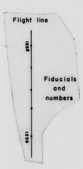
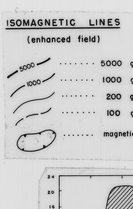
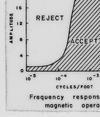
5 cm

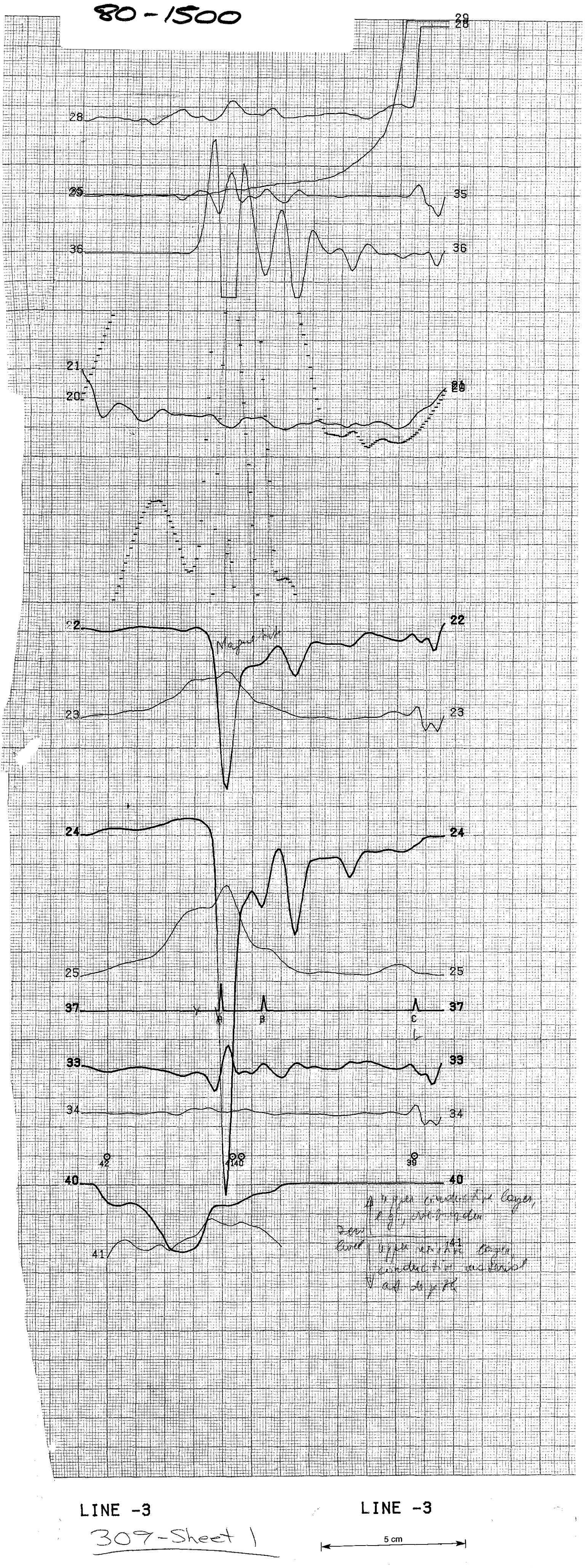






EL 1/68 : DIGHEM
COMPUTER PROFILES

80 - 1500



LINE -3

307-Sheet 1

LINE -3

5 cm

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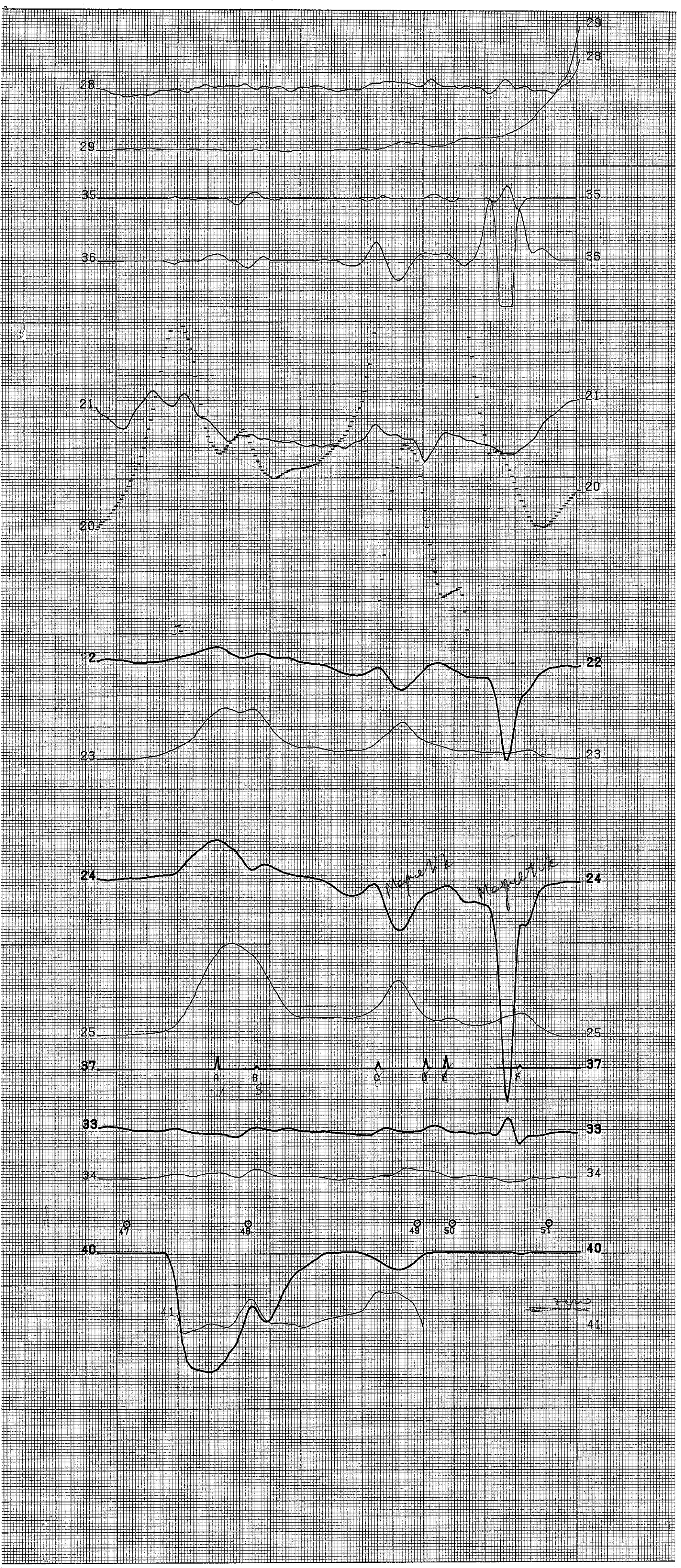

LINE 4

LINE 4

5 cm

28
29
35
36
21
20
22
23
24
25
37
A
B
C
33
34
59
58
57
56
40
41
LINE -5
LINE -5
5 cm

MILLIMETER
KEUFFEL & ESSER CO.
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LINE 6

LINE 6

P.L.
29
28
28
29
35
35
36
36
21
21
20
20
22
22
23
23
24
24
Magnetic N
25
25
37
37
A
V
B
E
D
E
33
33
34
34
84
83
82
81
80
79
78
40
40
41
41
5 cm

LINE -7

LINE -7

P.L.

LINE 8

LINE 8

5 cm

MILLIMETER
KEUFFEL & ESSER CO.
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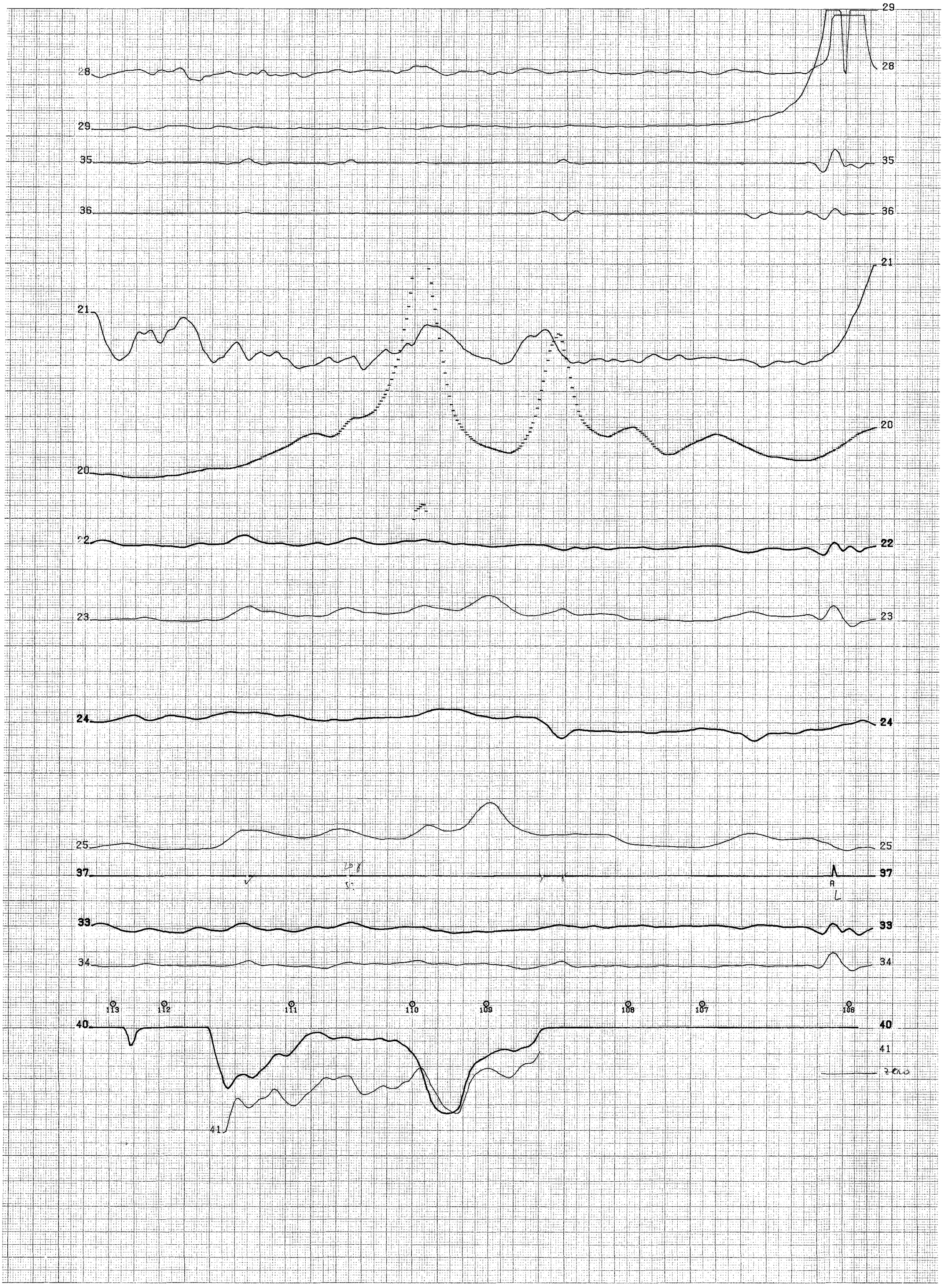

LINE -9

LINE -9