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DIGHEM II SURVEYS

IN

SHEFFIELD AREA, TASMANIA

FOR

CRA EXPLORATION PTY. LIMITED

BY

DIGHEM LIMITED

of M	A.O.	C.G.	E.O.	D.S.M.E.
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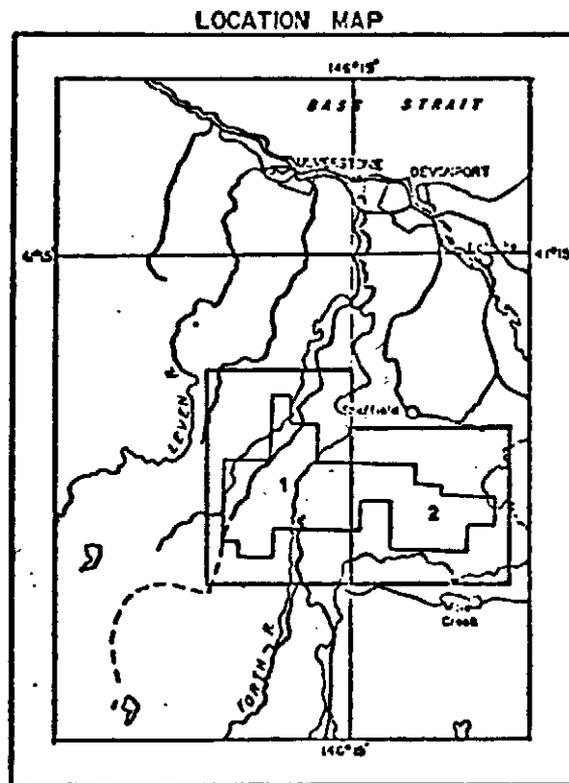
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TORONTO, ONTARIO
JULY 16, 1981.

SUMMARY

DIGHEM II airborne electromagnetic/resistivity/magnetic surveys of 1,434 line-km were flown in January and February, 1981 for CRA Exploration Pty.Limited in the Sheffield area of Tasmania.

Ground resistivities in the Sheffield area varied from conductive to highly resistive. Extensive low resistivity zones and numerous EM anomalies detected in the survey area reflect locally conductive bedrock and overburden features as well as cultural sources. Several targets were located which appear to warrant further follow-up work.



SHEFFIELD

FIGURE 1. THE SURVEY AREA

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|----- 5 cm -----|

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INTRODUCTION

A Dighem II survey of 1,434 line kilometres was flown with a 200 metre line spacing for the CRA Exploration Pty.Limited, from January 26 to February 13, 1981 in the Sheffield area, Tasmania. (Figure 1).

The Lama VH-PDU jet helicopter flew with an average airspeed of 116 km/h and EM bird height of 37 metres. Ancillary equipment consisted of a Geometrics 803 magnetometer with its bird at an average height of 52 metres, 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 coaxial and coplanar 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

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produces difficulties in flying the helicopter. The swinging results from the 5 m² 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

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

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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 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

¹This 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.

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bedrock conductors. The higher grades indicate increasingly higher conductances. Examples: DIGHEM's New Inco 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,

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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.

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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 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

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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

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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.

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Since discrete bodies normally are the targets of EM surveys, local base (or zero) levels are used to compute local anomaly amplitudes. This contrasts with the use of true zero levels which are used to compute true EM amplitudes. Local anomaly amplitudes are shown in the EM anomaly list and these are used to compute the vertical sheet parameters of conductance and depth. Not shown in the EM anomaly list are the true amplitudes which are used to compute the horizontal sheet and conductive earth parameters.

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

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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.

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

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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 coplanar 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 three 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 channel rides above the zero level on the orange profile paper (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 then 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 flight³. 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

³The 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.

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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.

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. 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.

-20-

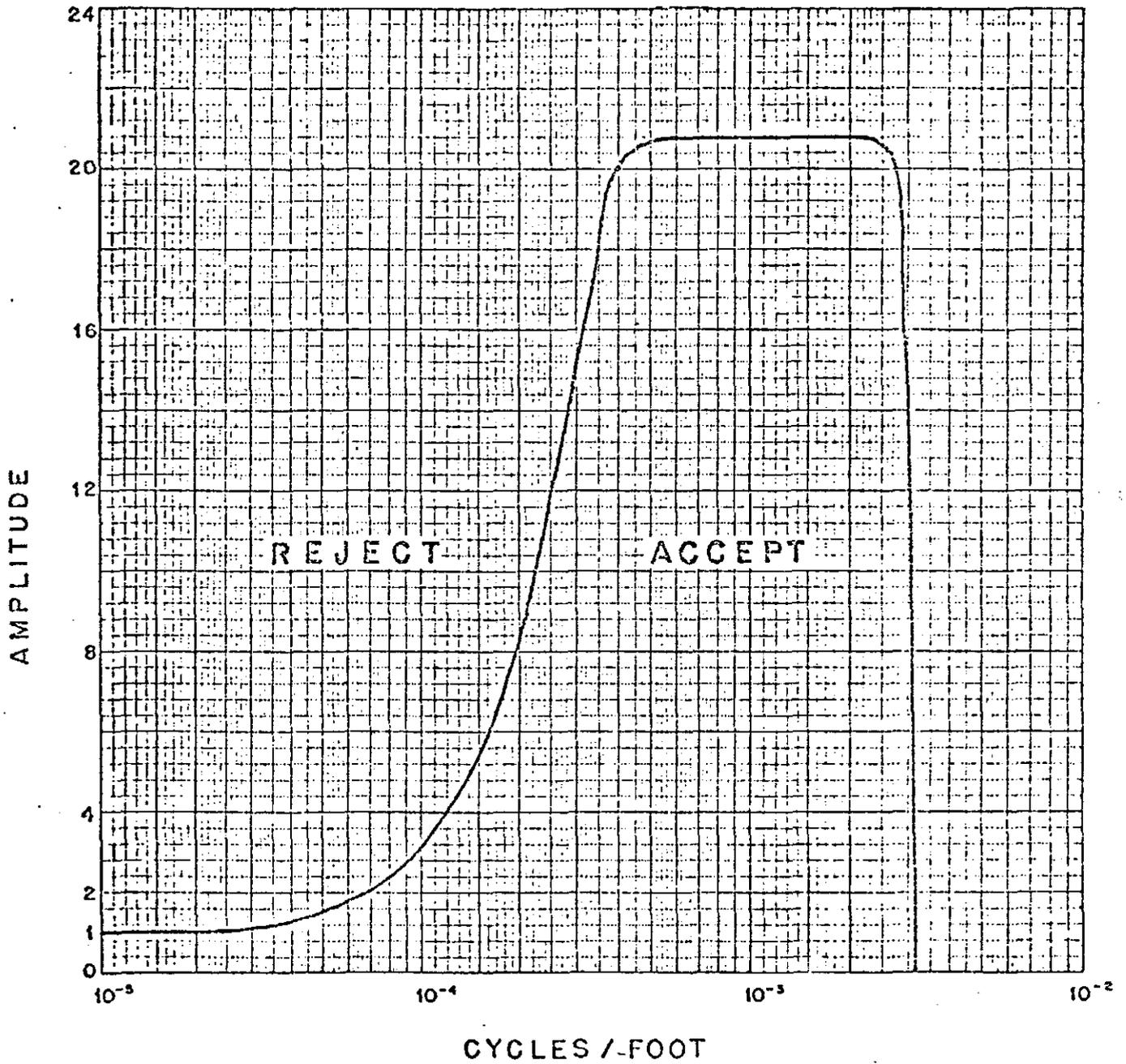


Figure 2

Frequency response of magnetic operator

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.

CONDUCTORS IN THE SURVEY AREA

The electromagnetic maps show the location of conductors and their interpreted conductance (i.e., conductivity-thickness product), depth, and, occasionally, the 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 listing appended to this report to ensure that none of the conductors are overlooked.

The survey consisted of a total of 1,434 line kilometres being flown at a line spacing of 200 metres in a magnetic north direction.

The EM maps indicate which anomalies are believed to be caused by culture or surficial sources. Generally, such anomalies are not commented on below as the discussions are directed to identifying bedrock features.

Sheffield Area

Resistivities in the Sheffield area range from about 15 ohm-m to in excess of 1,000 ohm-m. They reflect locally conductive bedrock and overburden features as well as culture. The area is active magnetically. Note the correlation between zones characterized by complex magnetic patterns and the low resistivity zones which appears to signify their geologic origin.

Numerous cultural sources, such as power lines, fences and the like, exist in the survey area. Because they tend to produce peaks on only the coaxial channels (22 and 23) and not on the coplanar channels (24 and 25), their cultural source can often be readily recognized. In some instances, these anomalies have also produced resistivity lows. In the ground follow-up program, those anomalies correlating with roads can be visually checked for culture while driving. They should be investigated if no obvious cultural source exists.

Responses 2xD, 3xH,
4xF-5000xB,
6xG, 6xE, 8xD,
9xC, 10xG

These x-type responses reflect conductive material at depth (presumably in the bedrock) which occurs along approximately east-southeast trends in the western part of the survey area.

Anomaly 19I-20xR,
Responses 1500xA,
24xN, 27xJ

This grade 1 anomaly and x-type responses reflect weak bedrock conductors of short strike length. They may occur along the same east-southeast trends as the conductors described earlier.

Group 1

The grade 1 and 2 anomalies and x-type responses of this grouping appear to reflect generally non-magnetic bedrock conductors. They have produced a low resistivity zone which portrays the conductivity distribution within the group better than the EM map.

Alternatively, the EM anomalies may merely reflect local variations within the conductive material buried at depth.

Anomalies 33Z-3500xH,
3400B-3500A

A pair of conductors is indicated by these grade 1 to 4 anomalies. They appear to occur in the bedrock and may extend beyond the survey boundary. The northern conductor, 33Z-3500xH, is magnetic. Due to the possible correlation of the conductors with roads, the area should be investigated carefully for cultural sources.

The extensive low resistivity zone which occurs in the northwest corner of the survey area appears to reflect conductors ranging from near-surface to bedrock. They are indicated by a large number of the EM anomalies and x-type responses. The apparent depth channel 41 on the grey digital profiles may be used to aid in distinguishing between near-surface conductors (e.g., overburden), buried bedrock conductors, and outcropping conductive rock units. Note, for example, profile for line 17. The apparent depth channel indicates that the geologic environment south of fiducial 2725 behaves as a homogeneous half-space. This means that a conductive rock unit exists for about 1,100 m south of fiducial 2725. Obviously, this rock unit extends to a great depth so that its lower boundary cannot be detected by the system. (The skin depth for the 900 Hz field of DIGHEM^{II} in a 90 ohm-m environment is 159 m.) Note also that between fiducials 2728 and 2729 the conductive material occurs at depth. For comparison purposes, refer to profile of line 18. The apparent depth channel indicates that the prominent quadrature responses just south of 18xA reflect surficial conductivity (e.g., overburden).

A number of EM anomalies and x-type responses associated with an extensive low resistivity zone in the central

part of the western sheet reflect bedrock, near-surface, and cultural sources. Similar to the low resistivity zone described above, the EM anomalies of interest (i.e., anomalies of non-surficial and non-cultural origin) reflect conductive material at depth (e.g., 37xE-41xB, 50B-53E, 50xH-53M) as well as conductive rock units of large depth extent (e.g., 35M, possibly 40xC, 46xD).

The low resistivity zone in the south central part of the survey area appears to reflect conductive bedrock and overburden features as well as culture. The broader outline of this low resistivity zone appears to indicate conductive near-surface features. A possibly magnetic bedrock conductor is indicated by responses 56xF-60xD. The grade 5 anomaly 61A reflects a cultural source which has produced a prominent localized low resistivity zone.

Anomaly 63D,
Responses 6100xA, 66xC

This grade 1 anomaly and x-type responses appear to reflect bedrock conductors. They are associated with a broad low resistivity zone which otherwise appears to reflect surface conductivity.

Anomaly 62A-63xB

This grade 1 anomaly appears to reflect a non-magnetic bedrock conductor which has produced a confined low resistivity zone.

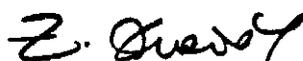
The most interesting feature in the eastern half of the survey area is an elliptically shaped low resistivity zone in the central part of sheet 2. The zone is also characterized by complex magnetic patterns. There are several EM anomalies of non-cultural, non-surficial origin associated with this zone. They are 98xH, which may extend towards 101xE, 1010A, 1010J, which are both slightly magnetic, and 1010M.

Responses 118xA-119xC
119xB, 121xA

These x-type responses reflect non-magnetic bedrock conductors. The EM profiles and the resistivity map indicate that 118xA-119xC extends further east to line 120 to the vicinity of fiducial 396.

Responses 146xA-147xA These x-type responses indicate a bedrock conductor which may extend beyond the survey boundary.

Respectfully submitted,
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Eight map sheets accompany this report:

Electromagnetics Tash 447, 448	2 map sheets
Resistivity Tash 449, 450	2 map sheets
Magnetics Tash 453, 454	2 map sheets
Enhanced magnetics Tash 451, 452	2 map sheets

A P P E N D I X ATHE 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/ Label	Parameter	Scale units/mm	Noise
20 MAG	magnetometer	10 gamma	2 gamma
21 ALT	bird height	10 feet	5 feet
22 CXI	coaxial coil-pair inphase	1 ppm	1-2 ppm
23 CXQ	coaxial coil-pair quadrature	1 ppm	1-2 ppm
24 CPI	coplanar coil-pair inphase	1 ppm	1-2 ppm
25 CPQ	coplanar coil-pair quadrature	1 ppm	1-2 ppm
26 VLFT	VLF-EM total field	1 %	1-2 %
27 VLFQ	VLF-EM vertical quadrature	1 %	1-2 %
28 CXS	ambient noise monitor (coaxial coil)	1 ppm	1 ppm
29 CPS	ambient noise monitor (coplanar coil)	1 ppm	1 ppm
33 DIFI	difference function inphase	1 ppm	1-2 ppm
34 DIFQ	difference function quadrature	1 ppm	1-2 ppm
35 REC1	first anomaly recognition function	1 ppm	1-2 ppm
36 REC2	second anomaly recognition function	1 ppm	1-2 ppm
37 SIGT	conductance	1 mho	
40 RES	log resistivity at main frequency	.03 decade	
41 DP	apparent depth at main frequency	3 m	
45 RES2	log resistivity at secondary frequency	.03 decade	
46 DP2	apparent depth at secondary frequency	3 m	

Note: Channels 42 to 44 are experimental.

(ii)

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.

(iii)

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.

(iv)

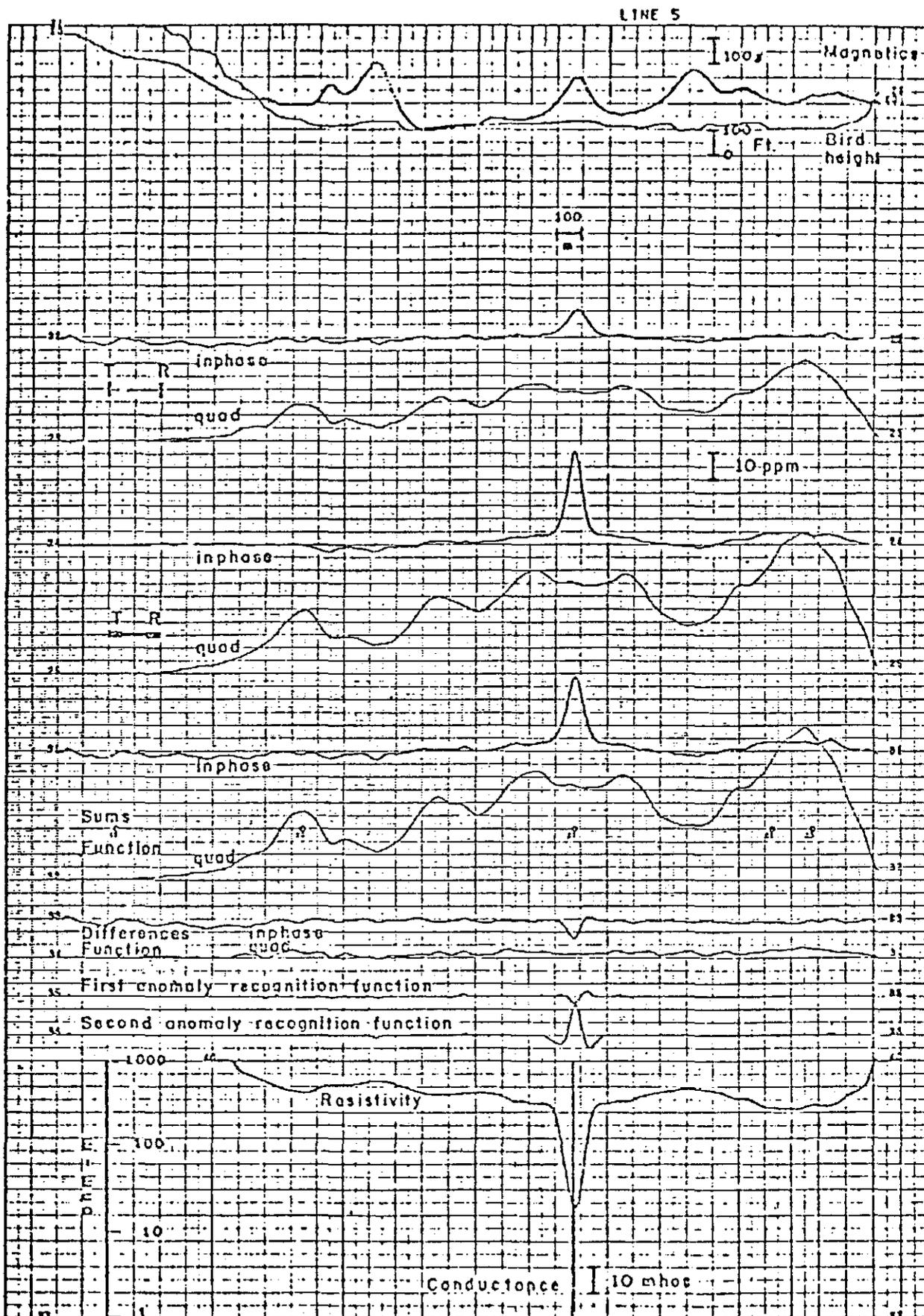


Fig. A1. Flight over Montcalm deposit, with line parallel to strike

(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.

(vi)

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

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

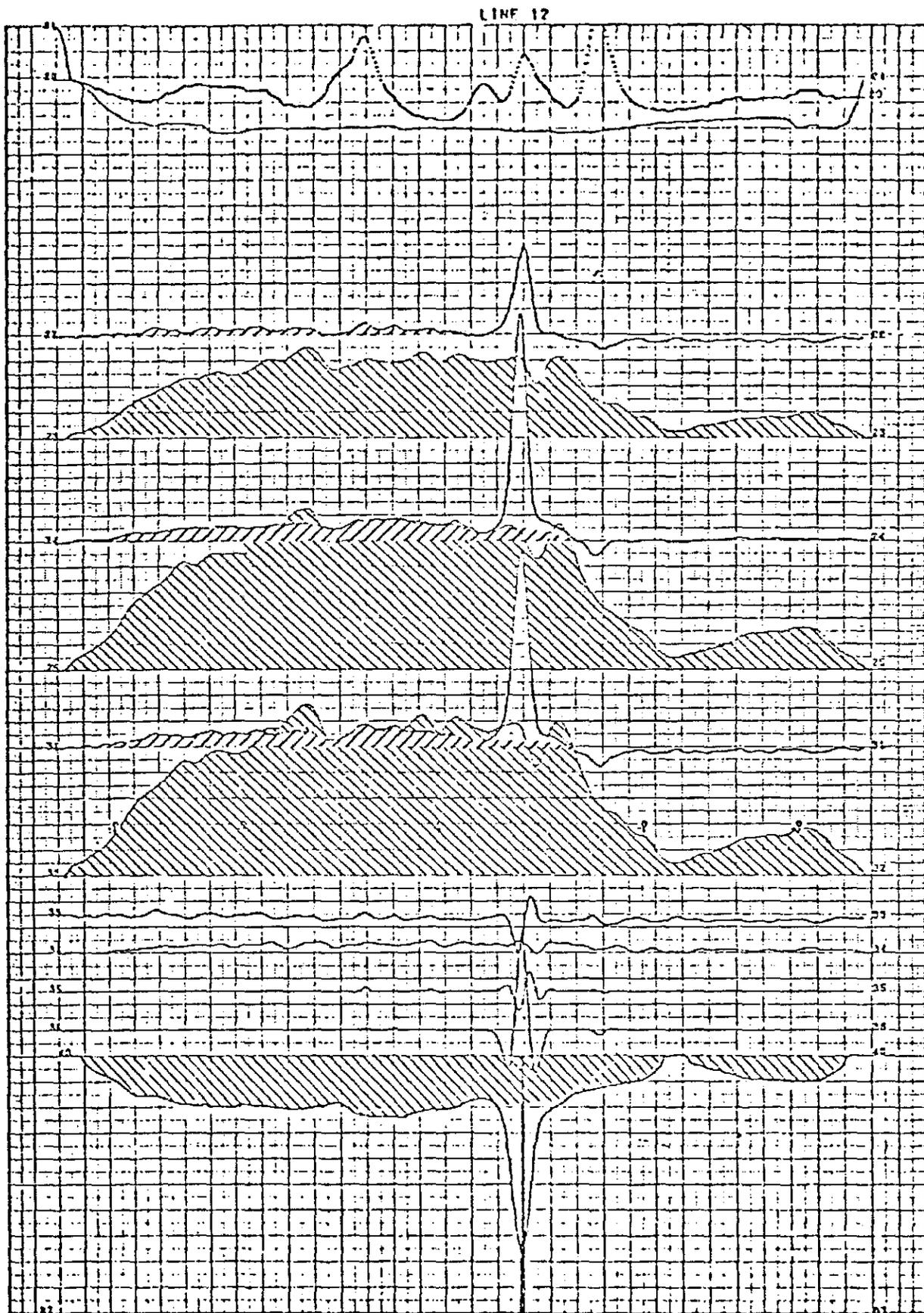


Fig. A2. Flight over Montcalm deposit, with line perpendicular to strike.

(viii)

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.

(ix)

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,

(x)

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

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ANOMALY	COAXIAL COIL		COPLANAR COIL		VERTICAL DIKE		HORIZONTAL SHEET		CONDUCTIVE EARTH	
	PPM	PPM	PPM	PPM	MHOS	FEET	MHOS	FEET	OHM-M	FEET
2A	3	2	5	2	12	174	1	391	108	27
2B	7	1	20	0	230	123	7	362	5	29
3A	4	8	10	17	4	20	2	133	52	3
4A	2	4	4	5	4	82	2	194	55	7
5A	4	6	9	16	4	31	1	142	71	3
5B	1	0	2	2	8	291	1	225	35	9
6A	5	8	2	8	3	16	1	155	176	1
7A	3	11	5	22	2	0	1	94	156	
8A	2	5	3	9	2	45	1	133	110	2
8B	7	15	8	23	3	0	1	80	84	
8000A	2	18	8	26	2	0	1	85	157	
8000B	2	10	6	21	2	1	1	97	132	
8000C	5	0	0	4	9	202	1	135	291	
8000D	2	23	2	44	1	0	1	32	392	
8000F	6	7	4	9	5	47	1	140	74	
8000G	1	6	0	15	3	34	2	160	54	
8000H	3	0	0	0	18	267	1	192	180	
10A	2	36	9	63	1	0	1	66	123	
10B	2	10	3	21	1	1	1	138	158	
10C	4	5	8	10	6	118	2	137	50	
10D	1	25	1	40	1	0	1	67	139	

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.

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	COAXIAL COIL		COPLANAR COIL		.	VERTICAL DIKE		.	HORIZONTAL SHEET		CONDUCTIVE EARTH	
10E	2	3	3	3	.	3	132	.	2	235	52	11
12A	5	21	3	36	.	2	0	.	1	79	87	
12B	2	6	2	9	.	2	40	.	1	84	126	
12D	2	23	1	43	.	1	0	.	1	55	113	
12E	4	35	10	57	.	1	0	.	1	68	77	
12H	4	22	7	40	.	2	0	.	1	73	80	
12I	3	25	10	33	.	3	10	.	1	111	53	2
13A	4	9	4	10	.	3	25	.	1	134	62	3
13B	2	2	0	0	.	2	69	.	1	140	1035	
14A	4	13	3	23	.	1	0	.	1	69	123	
14B	4	20	4	24	.	1	0	.	1	69	135	
14D	3	3	4	1	.	8	192	.	1	136	37	3
14E	0	0	5	0	.	35	303	.	1	127	78	2
14F	0	10	1	25	.	1	3	.	1	71	119	
14G	1	0	0	0	.	2	120	.	1	55	746	
14H	0	3	0	3	.	2	10+	.	1	249	78	11
15A	6	2	1	0	.	15	159	.	1	112	39	
15B	3	2	2	0	.	5	137	.	1	154	58	44
15C	4	5	3	2	.	5	86	.	1	104	57	
15E	2	14	1	25	.	1	0	.	1	99	106	
15F	3	3	5	7	.	5	70	.	2	272	47	15
1600B	2	6	4	11	.	2	73	.	1	208	80	90
16A	3	17	6	31	.	1	0	.	1	32	76	
16C	8	38	7	45	.	2	0	.	1	68	85	
16D	1	4	1	1	.	2	123	.	1	120	38	2
16E	4	0	4	0	.	20	173	.	2	136	43	3+
16F	4	6	7	11	.	4	46	.	2	230	37	124

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 LINE, OR BECAUSE OF A SHALLOW DIP OR OVERBURDEN EFFECTS.

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	COAXIAL COIL		COPLANAR COIL		VERTICAL DIKE	HORIZONTAL SHEET		CONDUCTIVE EARTH		
17A	4	7	1	0	4	93	1	91	78	
17B	1	3	5	7	3	70	2	250	35	14
18A	8	10	0	13	1	0	1	105	88	
18C	4	20	2	22	1	0	1	124	72	2
18D	8	14	13	29	5	20	2	146	30	5
18E	3	4	4	3	4	72	2	206	35	10
18F	1	4	1	5	1	53	2	214	43	10
19B	2	19	2	29	1	0	1	86	90	
19C	1	1	0	0	2	171	1	145	94	4
19D	3	13	5	28	1	0	1	30	93	
19E	7	18	3	25	3	5	1	108	94	
19F	3	16	9	33	2	0	1	78	69	
19G	4	11	6	13	2	17	1	154	59	5
19H	1	16	0	25	1	2	1	126	424	
19I	1	7	0	7	1	13	1	261	1035	
19J	0	9	0	0	2	85	1	216	234	4
19K	3	11	13	25	3	0	2	125	39	2
20A	12	17	33	41	8	0	2	96	22	1
20B	1	5	0	0	3	69	2	173	53	6
20C	4	8	4	17	2	0	1	155	154	2
20D	2	8	1	7	1	9	1	32	232	
20E	2	0	0	0	5	221	1	94	153	
20G	2	1	0	0	2	74	2	130	53	6
20H	1	12	5	11	1	0	2	141	51	4
20I	0	0	5	4	6	279	2	212	48	11
20J	5	3	5	0	13	128	2	154	50	4
20M	3	2	4	2	12	195	1	127	54	3
20O	6	15	7	27	3	0	1	100	96	
20Q	1	1	3	0	8	301	1	228	68	11
20R	2	5	4	0	2	39	1	149	62	4
20T	0	7	4	19	1	0	1	150	123	3
21A	21	42	40	80	6	0	2	67	27	
21B	3	2	0	0	6	123	1	94	115	
21C	6	13	19	35	4	20	2	111	33	3

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	COAXIAL COIL		COPLANAR COIL		VERTICAL DIKE	HORIZONTAL SHEET	CONDUCTIVE EARTH			
21D	1	11	0	13	1	0	1	119	58	23
21E	2	4	1	0	2	69	2	148	42	51
21F	0	4	4	10	1	23	1	146	39	39
21G	1	0	0	5	2	117	1	174	119	52
21H	2	4	3	6	3	112	1	203	63	91
2100A	3	7	5	9	3	22	2	193	41	85
2100B	3	2	2	5	6	171	1	199	139	59
2100E	2	2	1	3	5	227	1	152	309	24
2100F	1	3	0	4	1	55	1	141	258	19
2100G	2	24	5	27	1	0	1	35	159	0
2100H	3	2	7	7	8	133	1	171	112	49
2100J	5	11	7	18	3	31	1	148	126	33
22A	3	0	7	3	9	103	2	145	39	43
22B	2	0	0	0	5	177	2	155	46	55
22C	3	22	7	35	1	0	1	57	104	0
22D	2	5	1	13	1	0	1	95	115	0
22E	4	4	0	5	3	100	1	197	425	25
22F	3	3	0	2	3	115	1	217	156	64
2200A	1	5	0	3	1	42	1	99	865	0
2200B	3	9	5	17	3	0	2	159	45	55
2200C	1	7	0	11	2	0	1	133	53	27
2200D	2	4	0	3	2	69	1	115	256	0
23A	0	0	0	0	1	20	1	231	237	61
23B	0	1	0	0	2	97	1	166	265	7
23C	0	14	10	22	4	0	1	100	60	0
23D	0	3	3	9	1	50	2	209	55	97
23E	5	7	6	9	5	67	2	117	25	37
23G	7	28	12	46	2	0	1	77	87	0
23H	2	5	0	10	1	54	1	161	165	37
23J	2	4	2	0	4	101	1	650	130	450

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	COAXIAL COIL		COPLANAR COIL		VERTICAL DIKE	HORIZONTAL SHEET	CONDUCTIVE EARTH			
24B	4	4	0	3	3	70	1	110	230	
24C	0	0	0	5	1	0	1	148	156	
24D	10	18	7	18	4	0	1	111	78	
24E	1	8	1	7	1	0	1	106	78	
24F	9	19	15	31	4	13	2	127	27	4
24G	2	0	4	4	12	221	1	176	71	5
24H	1	0	1	5	1	57	1	143	178	1
24I	1	11	3	20	3	18	1	1	603	
24J	1	1	0	0	3	198	1	111	930	
24K	1	2	3	2	4	163	2	242	34	13
24M	2	5	2	1	3	30	1	626	645	16
25C	9	7	5	9	7	147	2	213	50	11
25D	2	12	4	24	1	0	1	119	78	2
25E	2	1	2	0	4	135	1	103	95	
25F	5	20	13	39	3	0	1	60	76	
25H	4	10	5	22	2	0	1	126	114	1
25I	2	3	0	7	2	32	2	96	48	1
25J	7	33	15	56	2	0	2	90	30	2
25K	2	2	0	0	5	76	1	138	154	
25M	1	3	0	15	1	12	1	137	220	
25N	7	42	17	72	2	0	1	51	70	
25O	1	0	4	19	2	43	1	33	120	
25Q	5	11	10	18	4	15	2	170	33	7
25R	3	5	8	10	4	83	2	139	43	8
25U	1	0	3	1	11	235	1	161	64	4
26A	4	0	0	0	9	173	1	169	60	5
26B	3	6	0	0	2	73	1	102	102	
26C	9	20	11	29	4	7	1	72	81	
26D	3	8	9	22	3	9	1	63	95	
26E	8	0	0	0	2	115	1	205	741	
26G	13	56	26	96	3	0	2	64	43	
26H	0	5	3	15	1	0	2	95	28	1
26I	4	16	0	24	3	1	1	96	76	
26J	1	2	0	0	2	68	1	158	122	4
26K	4	23	8	42	1	0	1	76	97	
26N	11	31	23	56	4	0	2	77	35	
26O	0	0	2	3	4	270	1	185	76	6

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	COAXIAL COIL		COPLANAR COIL		VERTICAL DIKE	HORIZONTAL SHEET		CONDUCTIVE EARTH		
2600B	11	12	3	12	6	44	1	143	128	2
2600D	5	5	0	2	4	14	1	286	1035	
2600E	3	7	0	9	2	34	1	134	452	
2600G	9	40	18	70	2	0	1	59	51	
2600I	3	3	0	0	4	145	2	156	28	6
2600M	1	1	2	0	5	179	1	277	110	12
2600N	2	1	1	3	5	176	1	246	142	9
2600O	13	53	40	112	4	0	2	71	45	
2600Q	1	2	0	1	4	194	1	129	379	
2600T	1	3	9	15	3	42	1	178	70	5
2600U	3	3	4	5	4	77	1	202	89	6
2600V	5	1	0	0	9	192	1	369	1035	
27A	5	8	2	13	3	0	1	30	473	
27B	3	4	1	5	3	0	1	90	477	
27C	0	3	2	5	2	94	1	201	70	8
27D	8	23	17	49	3	0	2	101	45	2
27E	2	0	0	0	5	225	1	120	76	1
27F	12	29	23	50	4	0	2	92	29	1
27G	3	10	9	15	3	12	2	131	27	4
27H	5	9	9	14	5	15	2	126	26	4
27J	1	12	4	23	1	0	1	95	98	
27K	1	15	2	27	1	0	1	75	168	
27M	1	4	3	7	2	55	1	137	66	7
27N	10	35	20	67	3	0	1	58	57	
27P	0	2	0	0	3	124	1	130	241	2
27Q	3	2	5	5	7	129	1	133	59	7
28A	2	0	0	0	4	200	1	252	410	6
28B	4	4	0	7	4	36	1	120	536	
28C	3	1	1	7	5	159	1	147	99	3
28D	0	3	2	16	1	0	1	126	94	2
28E	3	6	5	7	4	107	1	158	65	6
28F	4	0	0	0	7	179	1	115	64	1
28G	3	22	5	23	1	0	1	91	65	
28H	4	12	1	4	2	45	1	114	55	2

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	COAXIAL COIL		COPLANAR COIL		VERTICAL DIKE	HORIZONTAL SHEET		CONDUCTIVE EARTH		
28I	2	7	3	13	1	27	1	118	88	2
28J	3	15	21	25	6	18	2	107	32	2
28K	11	26	24	59	4	0	2	34	38	
28N	3	15	0	3	4	72	1	125	91	2
28O	7	17	19	53	4	15	2	79	31	
28P	2	5	1	2	1	72	1	217	56	10
28Q	2	1	5	5	8	162	2	219	45	10
28U	6	30	19	60	3	0	1	93	75	
29A	2	14	5	27	1	0	1	120	97	1
29C	5	3	0	7	4	41	1	208	1035	
29G	0	19	3	20	1	0	1	134	56	3
29I	3	3	0	2	2	103	1	166	61	6
29J	3	19	11	32	3	21	2	115	45	3
29K	2	5	0	2	2	102	1	132	81	3
29M	2	5	2	9	2	50	1	141	57	4
29N	3	5	2	6	3	35	2	150	40	5
29P	13	52	27	90	3	0	2	93	42	2
29R	2	1	0	0	6	177	1	247	62	13
29T	4	11	14	13	4	57	2	151	30	6
29U	2	1	0	0	6	175	2	147	39	5
29V	2	2	0	3	2	162	3	214	24	12
29W	15	25	25	30	6	5	3	123	20	4
29X	2	0	0	0	8	263	1	235	1035	
29Y	2	0	0	2	7	227	1	511	1035	
30B	4	15	15	34	3	0	1	131	57	3
30C	3	3	3	17	3	35	1	128	56	3
30D	0	0	2	0	1	63	1	235	59	11
30F	10	29	23	50	4	0	2	105	29	2
30G	5	5	5	3	6	60	2	135	25	4
30H	1	4	0	3	2	55	1	110	89	1
30J	1	3	1	3	2	103	2	119	40	3
31A	5	0	1	5	6	113	1	175	948	
31C	7	16	10	29	3	13	1	124	58	3
31E	7	24	7	40	2	5	1	111	67	2

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	COAXIAL COIL		COPLANAR COIL		VERTICAL DIKE	HORIZONTAL SHEET	CONDUCTIVE EARTH			
31F	7	12	8	13	4	53	2	155	40	63
31G	2	0	0	0	3	128	2	195	45	83
31H	9	16	12	25	5	15	2	101	30	21
31I	4	2	0	0	12	207	2	140	36	43
31K	2	1	0	0	6	97	1	141	163	
31N	0	5	13	17	3	29	2	134	36	3
31O	2	0	0	0	5	222	2	206	43	100
31P	6	13	15	25	5	64	2	183	32	94
31Q	14	17	7	16	6	23	1	129	103	2
31T	9	16	17	53	5	0	2	129	49	3
31V	5	6	0	0	6	40	1	625	1035	
32A	2	0	0	0	4	110	1	129	945	
32B	5	4	5	7	7	79	1	131	55	2
32C	7	6	7	13	5	23	2	113	40	1
32D	0	4	0	2	4	91	1	127	56	1
32E	5	5	1	4	7	61	1	134	62	2
32F	1	11	3	30	1	0	1	116	115	
32G	0	24	7	45	1	0	1	54	248	
32H	0	3	4	0	4	131	1	426	379	17
32J	0	10	3	21	1	0	1	113	64	1
32K	4	3	10	21	4	25	2	120	52	2
32M	3	17	12	24	2	0	1	108	54	2
32N	1	11	2	17	3	37	1	121	112	1
32O	3	5	0	3	2	18	1	152	30	2
33A	11	21	5	20	3	0	1	92	96	
33B	3	0	0	0	5	208	1	125	74	3
33F	3	11	0	17	2	19	1	109	55	2
33G	17	42	31	70	5	0	2	86	26	1
33I	4	16	15	32	3	0	2	107	41	1
33J	9	24	14	33	4	0	1	102	74	1
33K	1	5	2	5	1	23	1	50	800	
33M	5	4	2	11	5	81	1	139	528	
33O	5	0	5	17	4	29	1	115	147	
33P	1	11	5	22	1	0	1	116	129	
33Q	3	13	3	16	4	2	2	129	49	2
33T	1	2	2	0	2	137	2	249	58	12

* 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.

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	COAXIAL COIL		COPLANAR COIL		VERTICAL DIKE	HORIZONTAL SHEET	CONDUCTIVE EARTH			
33V	3	5	3	5	3	89	1	258	66	13
33W	3	1	2	0	6	125	1	229	172	7
33X	3	5	1	0	2	0	1	584	1035	
33Z	5	10	11	23	4	21	1	185	96	6
34A	3	0	0	0	5	141	1	142	174	
34B	1	3	1	10	1	0	1	116	54	2
34C	4	15	3	23	2	0	1	93	54	
34E	2	10	5	12	2	15	1	114	57	1
34F	0	0	1	0	4	329	2	180	41	7
34G	1	9	13	33	2	0	2	95	36	1
34H	3	2	15	15	14	70	3	131	22	5
34I	6	3	15	20	9	59	2	113	24	3
34J	0	3	5	0	2	23	2	103	30	1
34K	2	1	0	1	4	181	1	110	37	
34M	3	4	2	0	6	142	1	696	517	25
34N	0	1	2	0	5	310	1	701	401	29
3400A	1	1	10	5	12	189	1	230	58	11
3400B	5	1	5	1	31	217	1	216	72	10
35A	5	13	9	23	3	0	1	105	63	
35B	0	2	0	0	1	0	1	205	77	7
35C	1	0	4	10	3	97	2	128	48	2
35D	13	7	20	0	39	71	3	203	17	17
35E	0	0	20	25	6	63	2	131	25	7
35F	26	21	16	27	11	25	2	100	30	7
35G	4	15	4	32	2	0	2	97	38	
35J	5	13	14	42	3	0	1	91	107	
35K	1	0	0	0	3	66	1	113	296	
35M	10	45	40	97	6	0	2	58	27	
35O	5	35	12	67	2	0	1	57	123	
35R	5	4	0	0	11	52	1	602	1035	
3500A	0	0	5	0	8	177	3	259	15	1

* 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.

327 SH 1 C.R.A. SHEFFIELD MAY/81

	COAXIAL COIL		COPLANAR COIL		VERTICAL DIKE	HORIZONTAL SHEET		CONDUCTIVE EARTH		
36A	10	13	0	0	4	0	1	171	253	
36D	5	9	3	11	3	26	1	146	74	3
36E	3	0	0	0	3	120	1	212	139	6
36F	4	4	3	5	4	80	1	141	77	3
36G	1	0	4	0	14	250	1	153	55	4
36H	3	13	9	13	2	7	1	121	63	2
36I	4	1	1	14	3	73	1	114	84	1
36K	4	13	8	24	2	0	1	125	151	
36M	8	21	13	36	3	0	2	67	42	
36N	0	0	0	1	3	111	1	79	62	
36O	3	3	0	0	5	27	1	566	1035	
37A	17	2	0	0	51	104	1	205	217	5
37C	6	27	16	52	3	0	1	91	85	
37D	4	11	6	19	2	13	1	135	61	3
37E	3	3	0	1	7	94	1	707	1035	
38A	9	16	20	31	6	0	2	105	50	
38C	2	3	0	15	1	0	1	36	122	
38D	0	1	2	3	5	230	1	75	150	
38F	1	7	0	22	3	31	1	71	855	
38G	3	29	17	55	3	0	1	72	86	
38H	3	5	1	0	15	43	1	129	507	
39A	4	3	2	5	5	0	1	175	239	
39B	3	22	6	33	1	0	1	90	124	
39C	3	21	14	34	4	13	2	126	38	4
39E	7	25	9	45	2	0	1	64	132	
39F	4	5	0	0	3	0	1	157	248	
39G	5	5	0	1	4	116	1	647	1035	
3900B	3	9	9	19	3	0	1	122	81	
3900C	3	4	2	2	4	0	1	234	132	5
402	6	16	11	32	2	0	1	97	73	

* 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.

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	COAXIAL COIL		COPLANAR COIL		VERTICAL DIKE	HORIZONTAL SHEET		CONDUCTIVE EARTH		
40C	4	13	7	23	2	0	1	111	97	5
40D	2	10	0	13	1	0	1	117	290	0
40E	2	9	1	0	2	0	1	671	1035	0
41B	10	25	22	53	4	2	2	98	35	14
41C	3	14	3	22	1	0	1	125	119	13
41F	5	13	7	35	2	0	1	95	123	0
41G	4	7	0	0	4	0	1	143	212	0
41H	3	3	0	1	6	135	1	688	1035	0
42A	9	25	16	43	3	0	2	57	47	0
42B	4	13	2	17	2	0	1	97	55	0
42D	3	4	0	0	4	133	1	70	750	0
42E	0	0	5	0	3	123	1	250	65	12
42F	5	9	13	12	6	46	2	177	46	7
43B	5	13	17	38	4	0	2	96	39	1
43E	0	4	1	1	1	1	1	148	224	0
43G	5	1	5	3	19	148	1	90	1035	0
43I	5	13	4	23	2	19	1	117	153	0
43J	1	0	0	0	5	117	1	218	134	6
43N	2	2	0	0	3	124	1	671	1035	0
44A	5	21	11	40	2	0	1	90	75	0
44B	3	21	7	35	1	0	1	94	31	0
44C	4	2	8	0	16	155	1	123	53	2
44D	2	10	0	15	1	0	1	32	438	0
44E	3	4	0	0	5	97	1	654	1035	0
4400A	1	0	1	0	3	160	1	68	836	0
45A	0	9	3	14	1	0	1	101	156	0
45C	2	4	9	3	5	93	1	113	54	0
45D	5	10	14	19	5	45	2	112	44	0

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327 SH 1 C.R.A. SHEFFIELD MAY/81

	COAXIAL COIL		COPLANAR COIL		VERTICAL DIKE	HORIZONTAL SHEET		CONDUCTIVE EARTH		
45E	5	12	7	3	4	65	1	98	91	3
45F	4	11	5	19	2	19	1	98	105	0
45G	2	4	1	1	3	159	1	67	370	0
45H	3	7	0	5	2	20	1	67	748	0
45I	13	3	1	0	48	56	1	235	1019	0
45J	0	6	0	0	1	52	1	72	743	0
45K	4	9	10	23	3	17	1	101	150	0
46A	1	0	1	0	48	355	1	125	103	10
4600A	3	15	8	29	2	0	1	102	79	7
4600B	9	5	4	0	8	95	1	165	57	60
4600C	2	5	1	10	2	61	1	125	86	25
4600E	2	7	0	9	1	23	1	99	115	0
4600G	0	0	1	0	7	433	1	210	107	93
4600H	4	15	5	24	2	0	1	102	131	0
4600I	4	12	9	25	3	0	1	39	139	0
47A	3	6	1	11	2	0	1	106	77	0
47C	3	4	4	10	5	77	2	129	53	30
47D	3	5	1	6	2	57	1	106	62	13
47E	2	23	4	33	1	0	1	72	142	0
47F	2	10	1	11	1	0	1	47	753	0
47G	1	0	2	0	3	156	1	602	401	193
48A	1	1	0	0	3	75	1	165	156	20
48E	3	3	9	2	12	111	2	116	36	31
48D	2	0	0	0	5	197	1	159	129	35
49A	3	15	2	20	2	0	1	125	253	0
49C	3	12	6	19	2	8	2	115	49	2
49D	2	3	7	9	5	109	2	107	42	1
49E	4	3	0	0	4	0	1	142	169	0
49G	1	12	0	17	1	0	1	92	163	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.

327 SH 1 C.R.A. SHEFFIELD MAY/81

	COAXIAL COIL		COPLANAR COIL		VERTICAL DIKE	HORIZONTAL SHEET		CONDUCTIVE EARTH		
50A	5	7	0	0	4	57	1	91	128	0
50B	3	1	6	5	14	167	1	141	62	3-
50C	2	12	6	9	2	0	1	144	71	3
50D	1	3	0	1	2	90	1	125	259	0
51A	5	7	1	0	3	61	1	207	442	20
51B	3	5	4	7	3	39	1	191	134	50
51C	3	14	2	11	2	0	1	58	61	7
51D	12	23	26	43	5	0	2	66	42	0
51E	0	1	0	0	4	93	1	77	146	0
51F	2	21	5	39	1	0	1	37	188	0
51G	3	15	6	29	2	0	1	34	100	0
51H	2	4	0	3	2	20	1	203	431	0
5100A	3	25	6	44	1	0	1	30	124	0
5100B	3	10	2	19	2	11	1	146	128	3
5100C	3	12	5	25	2	0	1	107	112	0
5100E	2	2	0	0	3	60	1	35	637	0
52A	3	34	4	43	1	0	1	25	413	0
52C	2	7	4	9	2	33	1	119	105	1
52D	3	12	11	14	6	43	1	70	39	0
52G	3	5	0	0	7	27	1	634	1035	0
52H	17	5	0	0	16	11	1	640	1035	0
52I	1	23	3	44	1	0	1	34	216	0
52K	1	1	1	2	4	136	1	120	306	0
5200A	2	7	2	14	1	0	1	129	220	0
5200B	3	4	0	6	2	19	1	149	236	0
53A	0	2	0	0	2	52	1	92	318	0
53E	2	19	2	23	1	0	1	23	402	0
53C	2	1	2	0	3	125	1	140	133	1
53D	3	11	3	19	2	0	1	111	139	0
53E	4	3	3	0	13	152	1	158	153	2

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

227 SH 1 C.R.A. SHEFFIELD MAY/81

	COAXIAL COIL		COPLANAR COIL		VERTICAL DIKE	HORIZONTAL SHEET	CONDUCTIVE EARTH			
53F	4	3	0	0	5	0	1	539	1035	
53G	15	14	0	0	7	0	1	611	1035	
53I	0	3	0	3	2	121	1	252	1035	
53J	1	4	0	7	2	65	1	151	1035	
53K	2	6	1	10	1	0	1	141	171	
53M	2	2	0	0	4	145	1	302	1035	
5300A	1	22	5	57	1	0	1	31	143	
5300C	3	7	1	9	2	64	1	141	175	2
5300E	0	0	0	0	1	60	1	139	344	3
5300F	9	51	31	100	3	0	1	65	61	
54A	0	5	0	0	1	0	1	119	243	
54B	3	12	2	15	1	0	1	65	315	
54E	5	0	1	1	102	227	1	177	227	3
54G	4	0	1	0	6	65	1	309	127	13
55A	4	17	6	30	2	0	1	66	166	
55B	2	15	6	34	1	0	1	64	204	
55C	1	1	0	0	1	78	1	123	535	
56A	3	2	0	2	4	181	1	234	1035	
56B	1	1	1	0	5	163	1	225	1035	
56C	4	7	0	11	2	0	1	76	1035	
56D	9	11	0	0	6	10	1	526	1035	
56F	4	5	2	2	5	95	1	209	341	3
57B	7	12	0	0	7	0	1	580	1035	
5700A	3	2	0	0	13	65	1	539	1035	
5700E	1	2	0	0	5	47	1	548	1035	
57E	10	5	0	0	8	0	1	579	1035	

* 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.

327 SH 1 C.R.A. SHEFFIELD MAY/81

	COAXIAL COIL		COPLANAR COIL		VERTICAL DIKE		HORIZONTAL SHEET		CONDUCTIVE EARTH	
58D	2	2	9	3	16	121	2	346	41	23
59A	3	3	0	0	6	0	1	498	1035	
59C	7	3	0	0	23	148	1	251	361	5
60A	7	12	0	1	8	43	1	144	427	
61A	22	0	54	22	51	23	5	167	6	10
6100A	3	2	4	5	5	121	1	216	207	6
6100B	3	1	2	2	15	187	1	243	216	7
62A	3	9	4	10	2	13	1	108	235	
62B	5	7	2	5	8	55	1	136	151	
62D	5	3	2	5	9	122	1	149	152	2
63A	0	25	0	42	1	3	1	44	286	
63B	1	2	0	1	2	121	1	53	931	
63C	3	1	3	0	7	175	1	71	211	
63D	1	4	5	5	3	83	1	190	110	6
63E	3	1	0	0	4	65	1	152	241	
64A	3	3	2	0	6	193	1	310	276	13
65A	2	15	3	24	1	0	1	20	571	0
65B	2	5	1	12	1	0	1	104	242	0
65C	4	5	1	0	5	100	1	177	202	3
66A	2	5	2	10	2	0	1	84	457	0
67B	4	11	0	12	4	26	1	699	1035	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.

327 SH 1 C.R.A. SHEFFIELD MAY/81

	COAXIAL COIL		COPLANAR COIL		VERTICAL DIKE	HORIZONTAL SHEET		CONDUCTIVE EARTH		
62A	2	3	3	5	3	70	1	234	297	54
69A	3	2	0	4	4	107	1	370	1035	0
6900A	2	5	2	7	2	33	1	231	1035	0

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 OF THE CONDUCTOR MAY BE DEEPER OR TO ONE SIDE OF THE FLIGHT
 LINE, OR BECAUSE OF A SHALLOW DIP OR OVERBURDEN EFFECTS.

C.R.V. SHEFFIELD MAY/81

AXIAL COIL		COPLANAR COIL		VERTICAL DIKE		HORIZONTAL SHEET		CONDUCTIVE EARTH	
AL PH	QJAD PPM	REAL PPM	QJAD PPM	COND MHOS	DEPTH* FEET	COND MHOS	DEPTH FEET	RESIS OHM-M	DEPTH FEET
0	11	0	17	1	0	1	71	874	0
3	4	2	0	5	170	1	214	150	79
4	5	4	7	4	82	1	135	154	54
4	0	0	0	8	162	1	224	107	79
2	14	0	11	1	0	1	28	614	0
L	5	7	9	3	55	1	111	99	5
20	11	6	0	19	61	1	130	108	55
L	5	0	3	1	32	1	31	694	0
17	10	11	12	15	65	1	120	84	20
14	17	11	20	6	16	1	125	75	21
3	15	6	10	5	25	1	137	127	13
5	9	5	1	7	64	1	133	139	37
3	10	0	0	3	43	1	270	1035	0
1	4	0	0	1	26	1	205	1035	0
2	3	0	0	2	42	1	133	1035	0
4	1	3	2	14	151	1	290	188	110
0	4	0	1	1	6	1	108	978	0

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

327 S4 2 C.R.A. SHEFFIELD MAY/81

LINE & ANOMALY	COAXIAL COIL		COPLANAR COIL		VERTICAL DIKE		HORIZONTAL SHEET		CONDUCTIVE EARTH	
	REAL PPM	QUAD PPM	REAL PPM	QUAD PPM	COND MHOS	DEPTH* FEET	COND MHOS	DEPTH FEET	RESIS OHM-M	DEPTH FEET
92A	1	14	4	15	1	3	1	128	398	0
93A	4	4	2	0	5	68	1	338	225	174
97A	5	27	9	45	2	0	1	59	120	0
97B	2	12	0	21	1	0	1	63	452	0
97C	1	4	1	4	2	71	1	128	930	0
98A	7	24	14	42	3	0	1	78	111	0
9900A	1	4	2	1	4	123	1	79	956	0
99A	1	5	0	5	1	0	1	154	157	30
99B	2	4	1	1	3	140	1	115	157	0
100A	5	1	3	0	28	215	1	154	295	12
100B	2	4	0	1	3	150	1	78	434	0
100C	0	22	3	41	1	5	1	50	143	0
100E	5	0	5	0	15	162	1	126	78	25
1000A	2	3	10	15	3	44	1	171	63	63
1000B	3	5	5	3	5	87	1	148	85	33
1000C	5	7	4	13	3	21	1	103	112	0
1000D	2	0	3	0	20	220	2	177	54	61
1000E	5	19	3	25	2	0	1	95	89	0
101A	5	3	1	3	4	73	1	156	212	22
1010A	1	0	4	0	728	330	1	156	77	50

* 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 OVBURDEN EFFECTS.

227 SH 2 C.R.A. SHEFFIELD MAY/81

LINE & ANOMALY	COAXIAL COIL		COPLANAR COIL		VERTICAL DIKE		HORIZONTAL SHEET		CONDUCTIVE EARTH	
	REAL PPM	QUAD PPM	REAL PPM	QUAD PPM	COND MHOS	DEPTH* FEET	COND MHOS	DEPTH FEET	RESIS CHM-M	DEPTH FEET
1010B	3	23	6	51	1	0	1	58	109	0
1010C	2	21	4	42	1	0	1	34	145	0
1010E	3	25	6	42	1	0	1	88	107	0
1010F	4	16	6	31	2	0	1	81	92	0
1010H	5	26	12	45	2	0	1	32	67	0
1010J	2	10	0	11	1	21	1	142	102	36
1010M	3	5	3	13	4	103	1	244	64	126
102A	5	3	0	0	11	142	1	138	157	3
102B	2	5	6	9	4	108	1	131	93	31
102C	2	12	1	21	1	0	1	68	106	0
102D	2	3	3	13	2	74	1	119	86	31
102E	2	9	1	10	1	10	1	85	92	0
103A	1	14	0	35	1	8	1	44	237	0
103C	7	10	14	34	4	43	1	86	72	1
103D	9	14	15	40	4	21	1	99	76	0
103F	5	0	0	0	6	125	1	135	1035	0
103G	2	7	1	3	1	12	1	102	179	0
103H	2	2	0	0	3	221	1	456	1035	0
104A	2	5	3	1	3	74	1	134	102	54
104C	2	13	11	13	2	0	1	170	56	62
105A	3	14	5	27	1	0	1	104	129	0
105B	5	0	5	7	10	112	1	117	91	10
105D	2	2	3	1	9	115	1	97	225	0

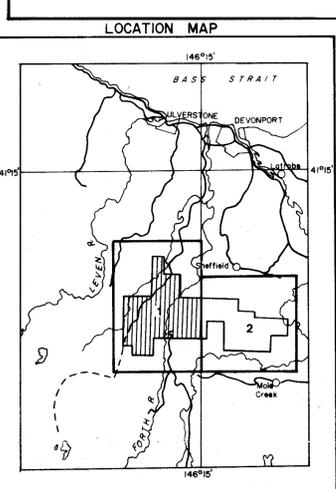
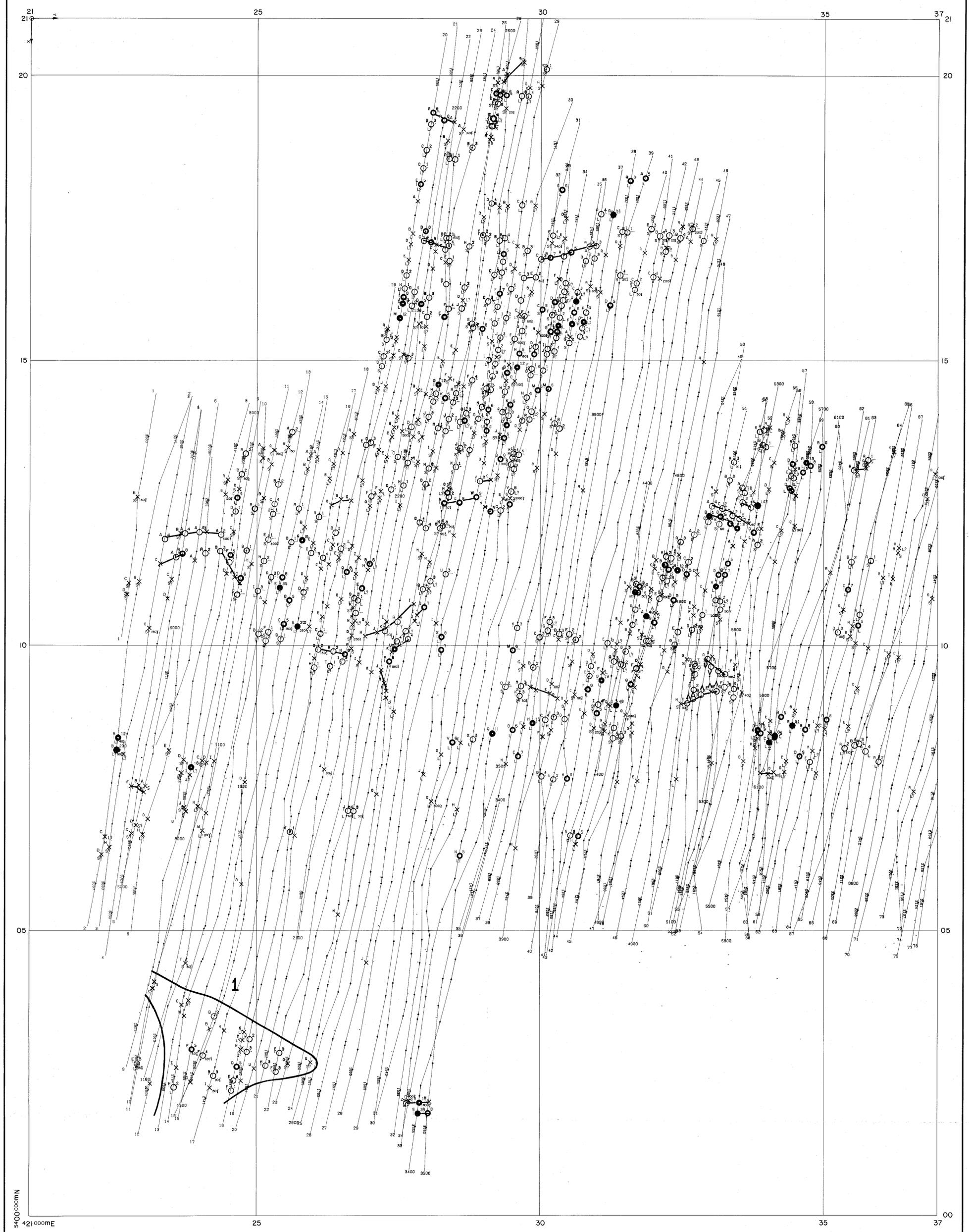
* ESTIMATED DEPTH MAY BE UNRELIABLE BECAUSE THE STRONGER PART OF THE CONDUCTOR MAY BE DEEPER OR TO ONE SIDE OF THE FLIGHT LINE, OR BECAUSE OF A SHALLOW DIP OR OVERBURDEN EFFECTS.

327 SH 2 C.R.A. SHEFFIELD MAY/61

LINE & ANOMALY	COAXIAL COIL		COPLANAR COIL		VERTICAL DIKE		HORIZONTAL SHEET		CONDUCTIVE EARTH	
	REAL PPM	QUAD PPM	REAL PPM	QUAD PPM	COND MHOS	DEPTH* FEET	COND MHOS	DEPTH FEET	RESIS OHM-M	DEPTH FEET
105E	1	2	2	0	7	206	1	130	314	0
113A	2	5	0	3	1	59	1	177	1035	0
114A	2	5	0	0	2	119	1	249	810	4
115A	1	9	2	13	1	0	1	78	325	0
116A	2	3	0	2	5	140	1	249	338	52
126A	2	7	0	10	1	17	1	119	1035	0
129A	0	11	0	22	1	4	1	54	732	0
133A	0	4	0	0	1	77	1	120	1010	0
136A	2	4	0	0	2	116	1	199	1035	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.

TERMINATION OF JOB

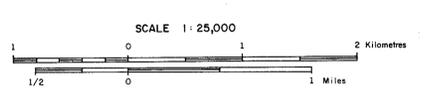


DIGHEM^{II} SURVEY

SHEFFIELD AREA, TASMANIA

ELECTROMAGNETICS

FOR
C.R.A. EXPLORATION PTY. LIMITED



SHEET 1

Flight line
Fiducials
and
numbers

ANOMALY GRADE	EM GRADE SYMBOL	MNO RANGE	DIGHEM anomalies are divided into six grades of conductivity - thickness product. This product is a measure of conductance, and is a geologic parameter. Most surveys yield Grade 1 anomalies but highly conducting crays 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 the 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 Mogan River camp yield Grade 4 anomalies, while Magnet and Whate give Grade 5. Graphite and sulphides can occur at all grades but, in this survey only, field work may show that the different grades indicate different types of conductors.
6	●	> 100	
5	●	50 - 99	
4	●	20 - 49	
3	●	10 - 19	
2	●	5 - 9	
1	○	< 4	
	×		Possible conductor

ANOMALY GRADE	EM GRADE SYMBOL	MNO RANGE	EM GRADE SYMBOL	MNO RANGE
6	●	> 100	○	100 - 1000
5	●	50 - 99	○	100 - 1000
4	●	20 - 49	○	100 - 1000
3	●	10 - 19	○	100 - 1000
2	●	5 - 9	○	100 - 1000
1	○	< 4	○	100 - 1000

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

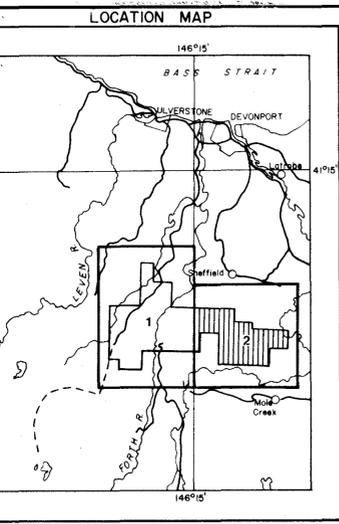
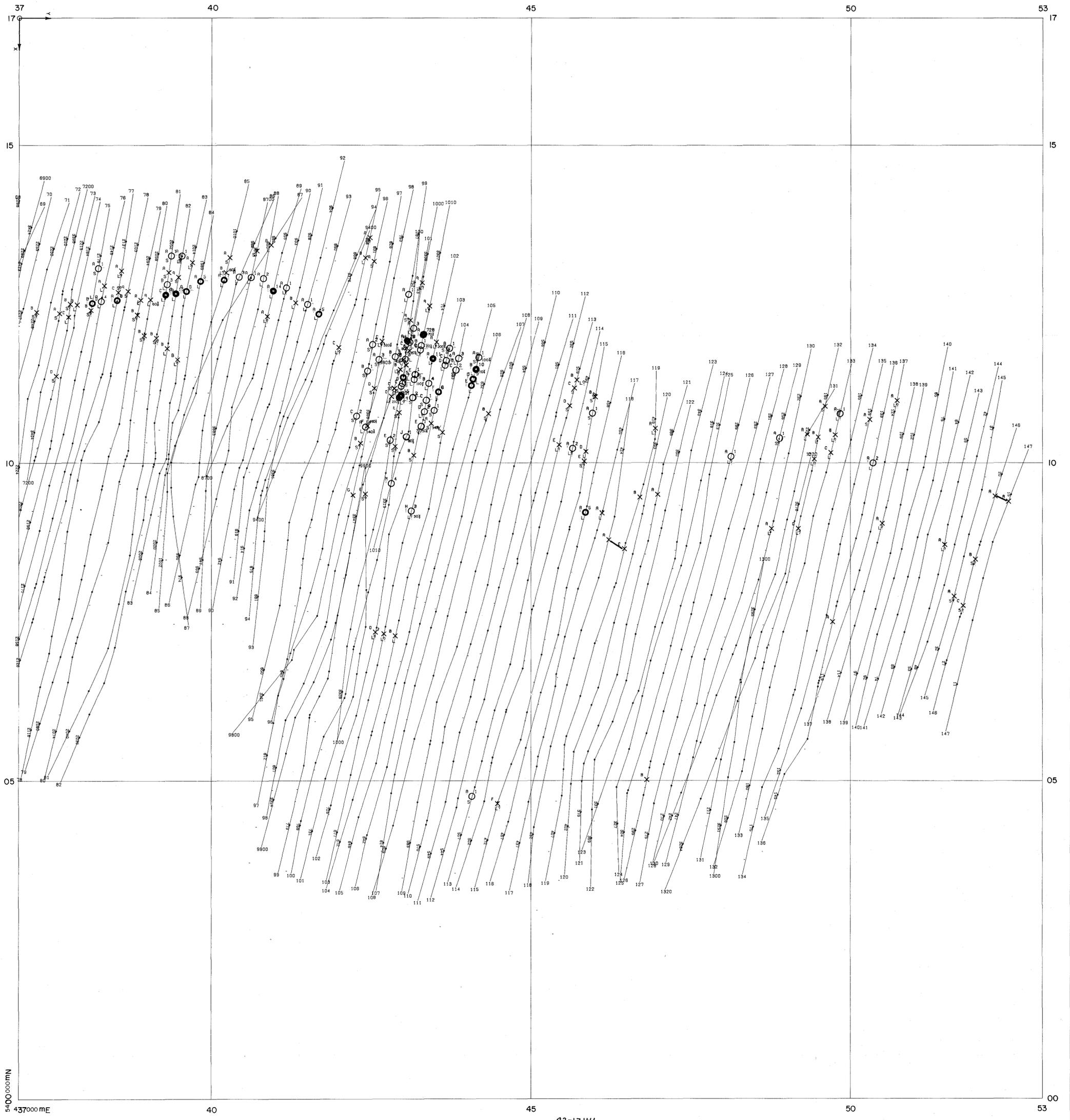
ANOMALY GRADE	EM GRADE SYMBOL	MNO RANGE	EM GRADE SYMBOL	MNO RANGE
6	●	> 100	○	100 - 1000
5	●	50 - 99	○	100 - 1000
4	●	20 - 49	○	100 - 1000
3	●	10 - 19	○	100 - 1000
2	●	5 - 9	○	100 - 1000
1	○	< 4	○	100 - 1000

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

ANOMALY GRADE	EM GRADE SYMBOL	MNO RANGE	EM GRADE SYMBOL	MNO RANGE
6	●	> 100	○	100 - 1000
5	●	50 - 99	○	100 - 1000
4	●	20 - 49	○	100 - 1000
3	●	10 - 19	○	100 - 1000
2	●	5 - 9	○	100 - 1000
1	○	< 4	○	100 - 1000

DIGHEM maps are designed to provide a correct impression of conductor quality by means of the conductivity grade symbols. The symbols can stand alone with geology, when forming a follow-up program. The actual MNO values are plotted for those who wish qualitative data. The anomaly ppm and depth are indicated by horizontal rows of 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.

Report No. 1263
Plan No. TASH 447



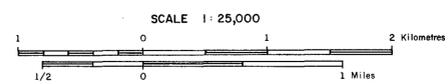
DIGHEM^{II} SURVEY

SHEFFIELD AREA, TASMANIA

ELECTROMAGNETICS

FOR

C.R.A. EXPLORATION PTY. LIMITED



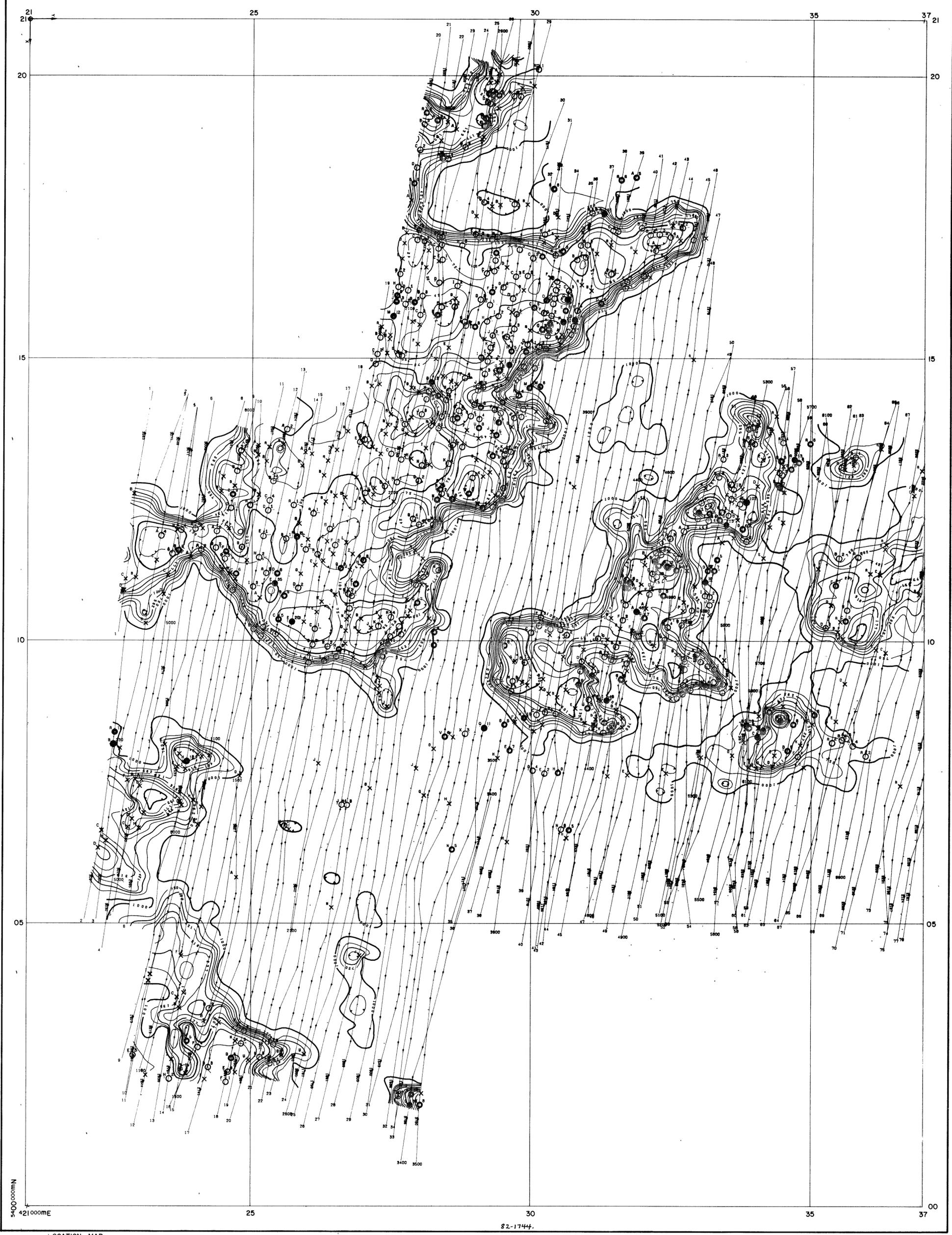
SHEET 2

ANOMALY GRADE	EM GRADE SYMBOL	MMD RANGE	DIGHEM anomalies are divided into six grades of conductivity-thickness product. This product is mhos is the reciprocal of resistance in ohms. The mho is a measure of conductivity, and is a geologic parameter. Most swamps yield Grade 1 anomalies but highly conducting clays can give Grade 2 anomalies. The multi-coal anomaly shapes often allow surface conductors to be recognized, and these are indicated by the letter S on this map. The remaining Grades 3 and 4 anomalies could be weak bedrock conductors. The higher grades indicate increasingly higher conductances. Examples: The ore bodies of the Mopani River camp yield Grade 4 anomalies, while Mopani and Whistle give Grade 3. 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.
6	●	> 100	
5	●	50 - 99	
4	●	20 - 49	
3	●	10 - 19	
2	●	5 - 9	
1	○	≤ 4	
	X		Possible conductor

Depth in metres	EM grade
50 feet	100 m
100 feet	150 m
150 feet	200 m
200 feet	250 m

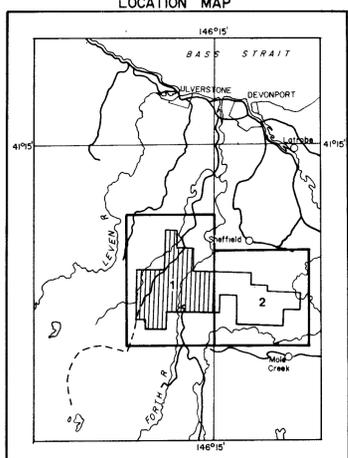
EM Grade	Conductor
5	Conductor with probable surface response
L	Possible line (power, telephone, pipe, or fence)
L?	Possible line
?	Questionable anomaly
⊖	Apparent thickness > 10m
∠	Dip
1000	Direct magnetic correction of 100 gamma

Report No. 71263
Plan No. TASH 448

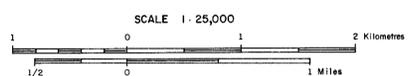


5400000mN
4210000mE

82-1744.



DIGHEM^{II} SURVEY
SHEFFIELD AREA, TASMANIA
RESISTIVITY
FOR
C.R.A. EXPLORATION PTY. LIMITED



SHEET 1

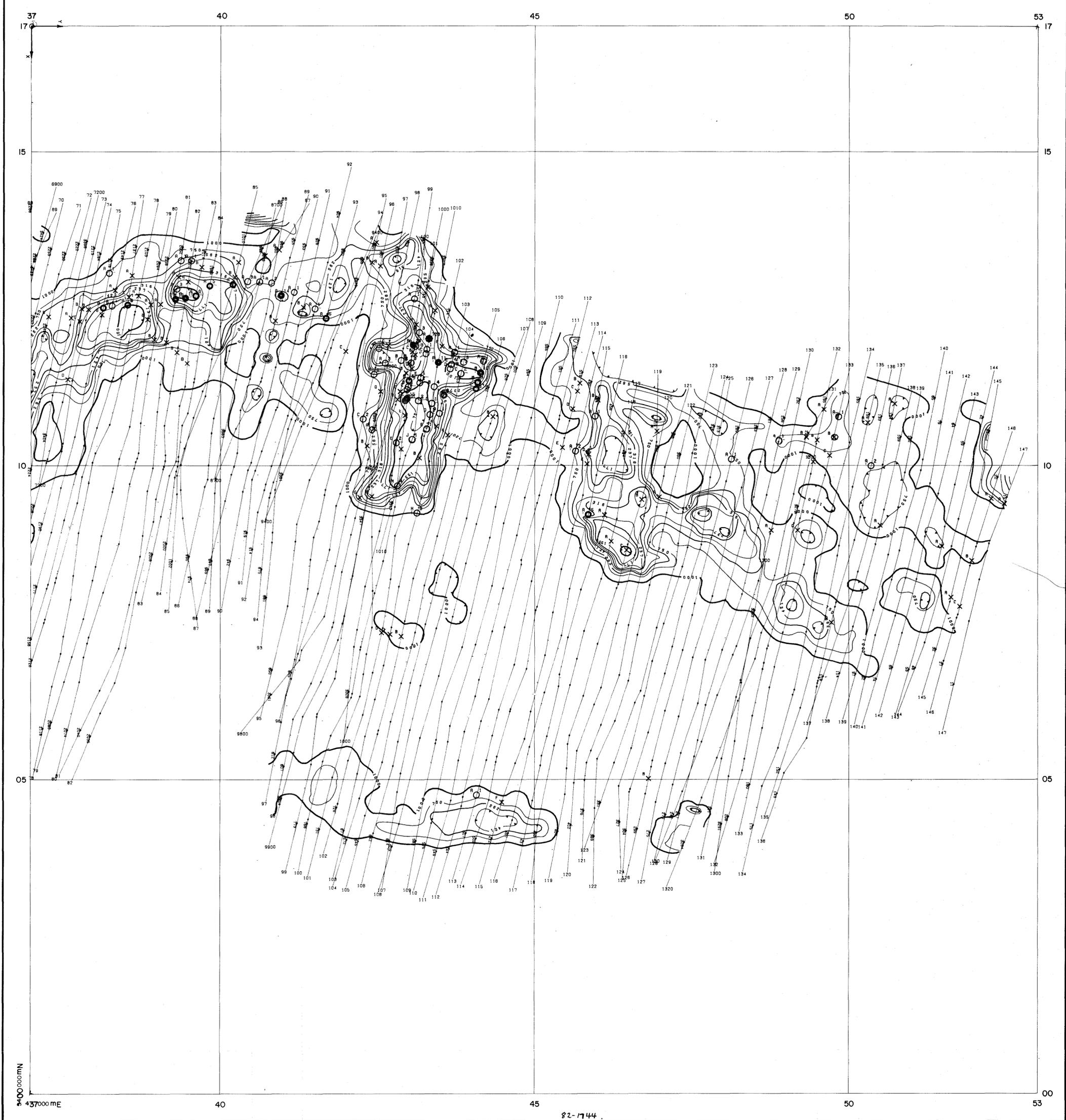
LEGEND
 Contours in ohm-m
 at eight intervals per decade

—	100
—	75
—	56
—	42
—	31
—	23
—	17
—	13
—	10

Note
 The numbers face in the direction of increasing value.

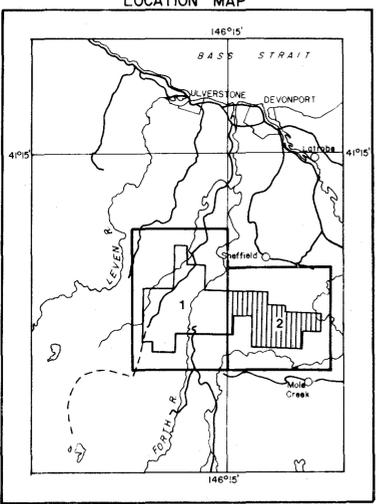
Report No. 11263
 Plan No. TASH 449

792066



9400000mN
437000mE

82-1744

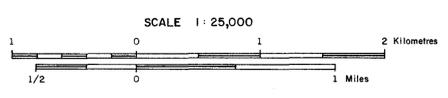


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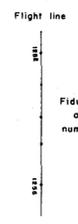
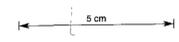
RES



DIGHEM^{II} SURVEY
SHEFFIELD AREA, TASMANIA
RESISTIVITY
FOR
C. R. A. EXPLORATION PTY. LIMITED

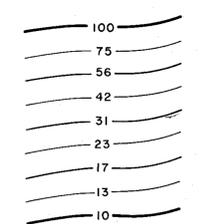


SHEET 2



LEGEND

Contours in ohm-m
at eight intervals per decade



Note

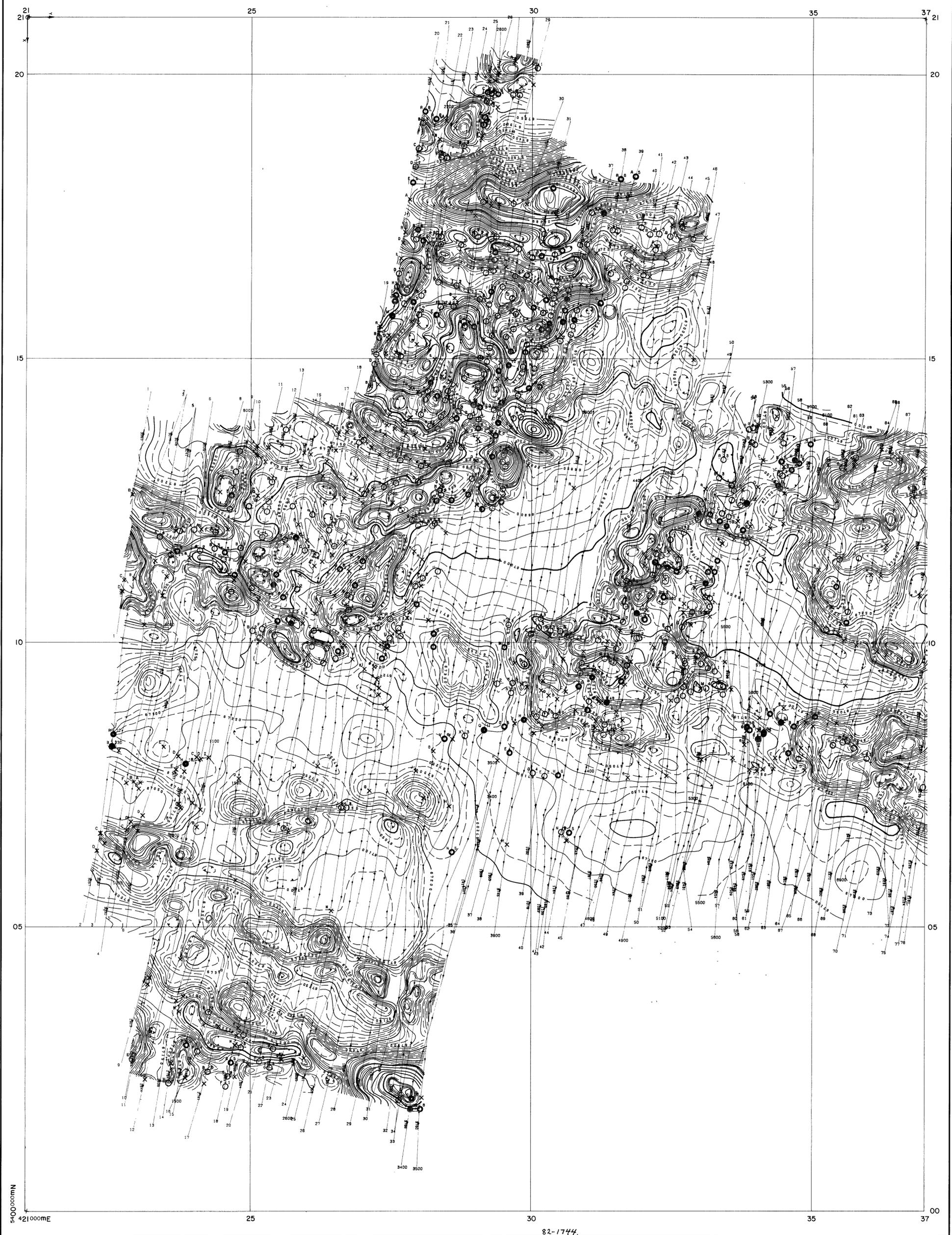
The numbers face in the
direction of increasing value.

Report No. 11263
Plan No. TASH 450

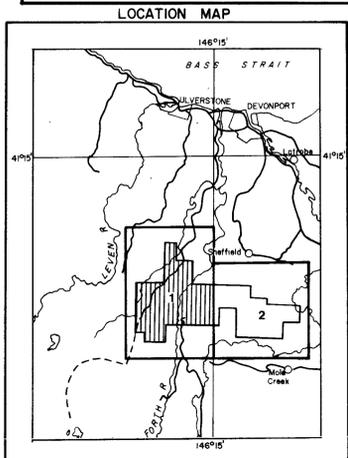
792067

JOB 327; JULY 1981

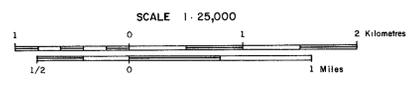
TASH 450 SH. 2.



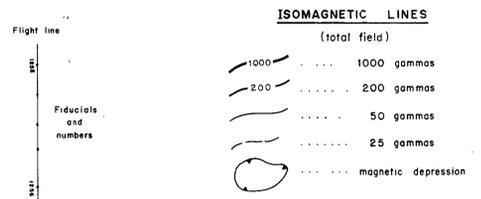
82-1744



DIGHEM^{II} SURVEY
SHEFFIELD AREA, TASMANIA
MAGNETICS
 FOR
C.R.A. EXPLORATION PTY. LIMITED



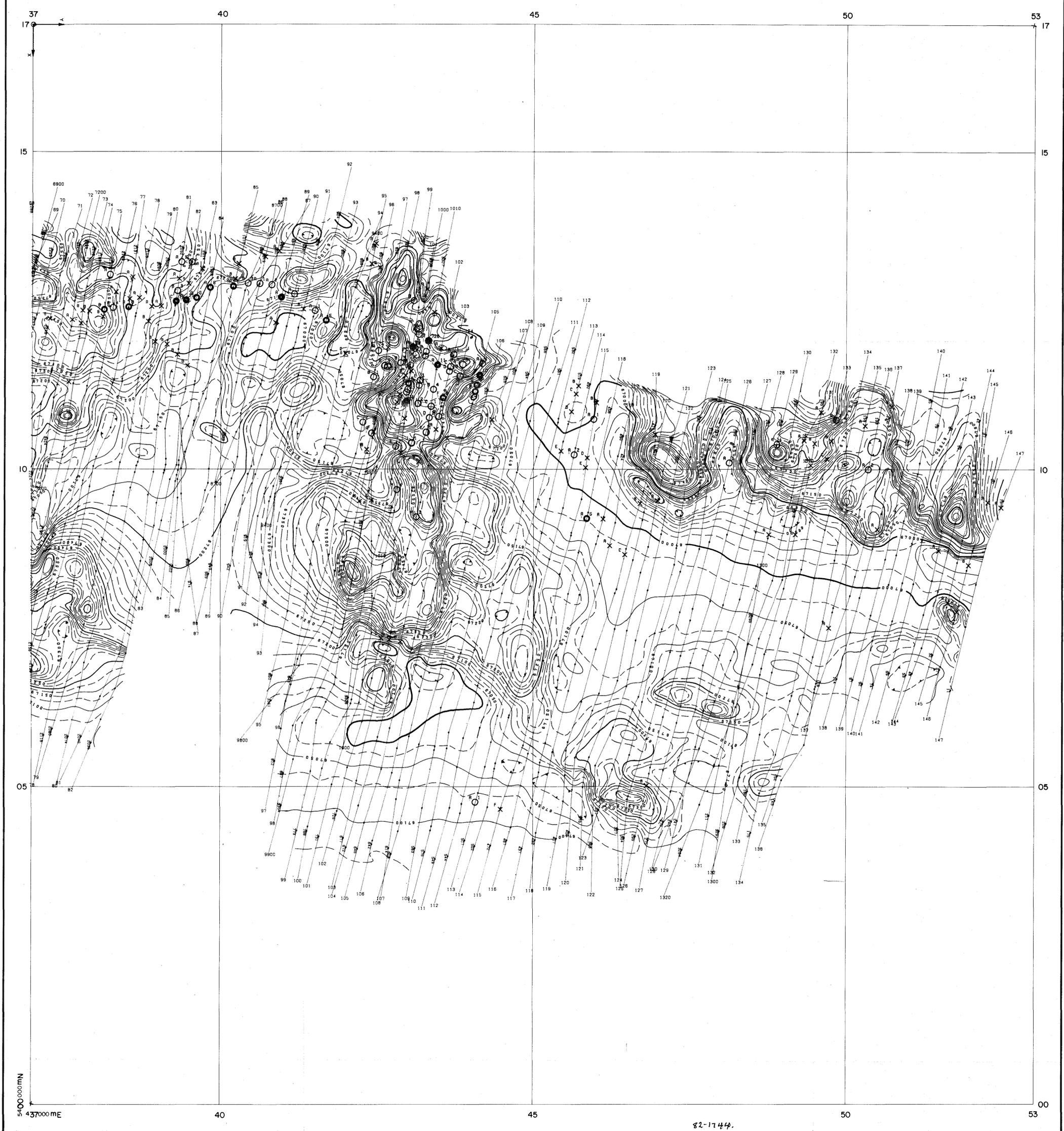
SHEET 1



Magnetic Inclination within the survey area 72°

Report No. 7243
 Plan No. TASH 453

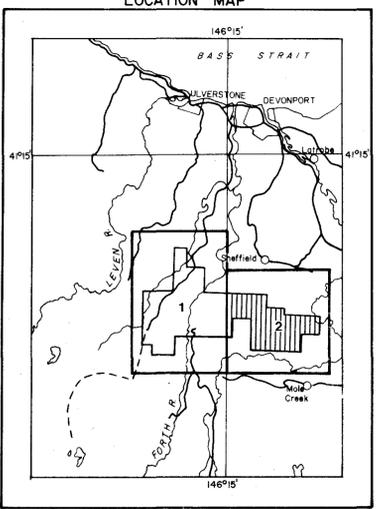
792068



5400000mN
4370000mE

82-1744

LOCATION MAP



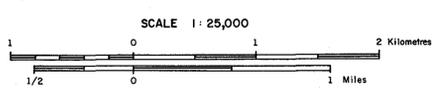
DIGHEM^{II} SURVEY

SHEFFIELD AREA, TASMANIA

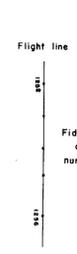
MAGNETICS

FOR

C.R.A. EXPLORATION PTY. LIMITED



SHEET 2



- ISOMAGNETIC LINES**
(total field)
- 1000 1000 gammas
 - 200 200 gammas
 - 50 50 gammas
 - 25 25 gammas
 - magnetic depression

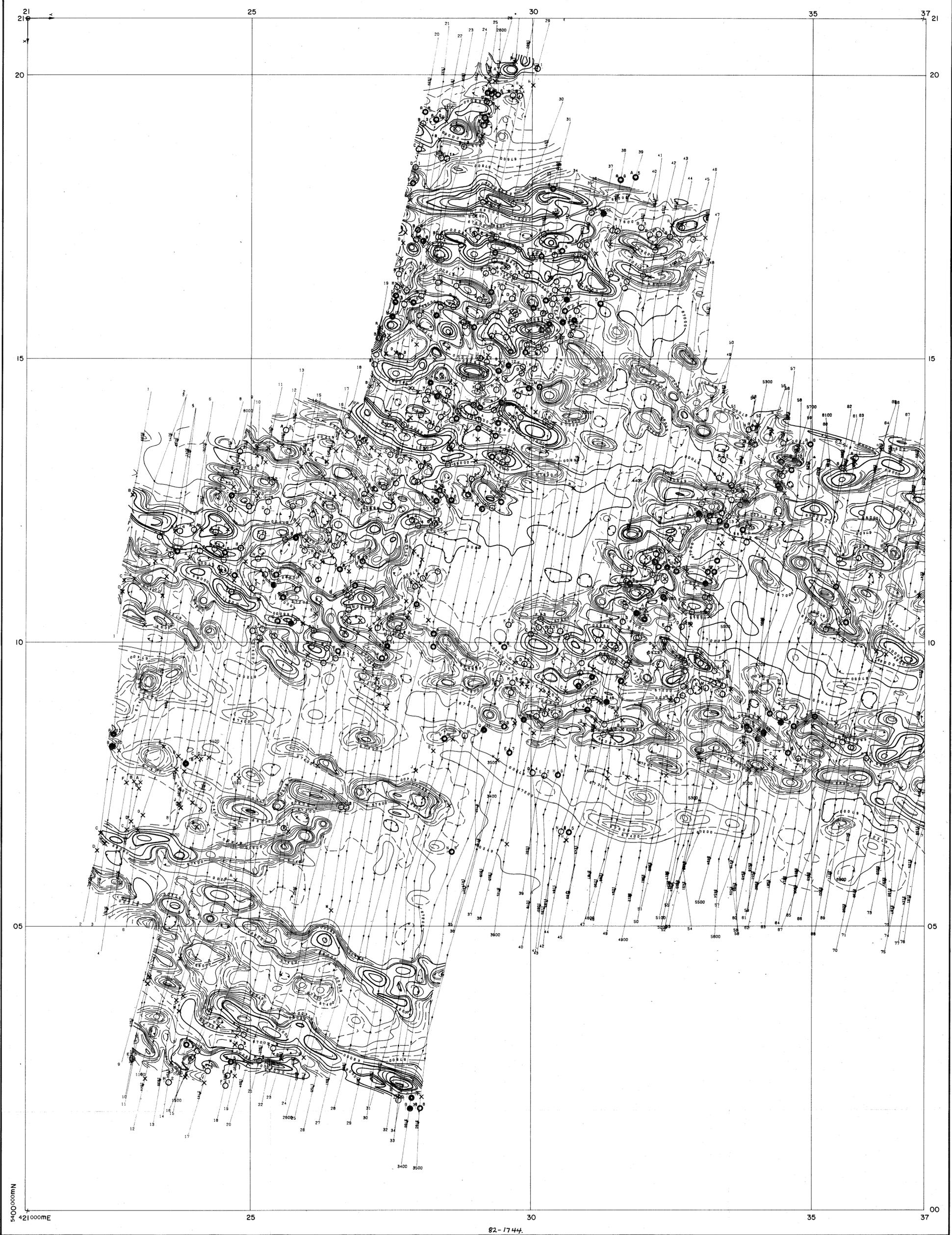
Magnetic Inclination within the survey area: 72°

Report No. 1263
Plan No. TASH 454

792069

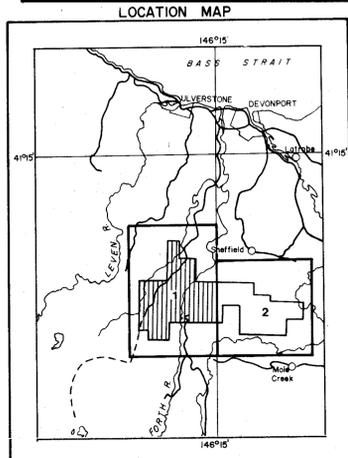
JOB 327, JULY 1981

TASH 454 Sht. 2



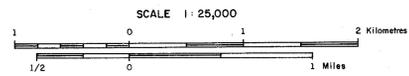
5400000M
421000E

82-1744



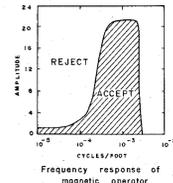
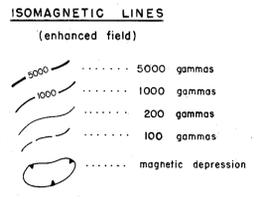
Scale 1:500,000

DIGHEM^{II} SURVEY
SHEFFIELD AREA, TASMANIA
ENHANCED MAGNETICS
 FOR
C.R.A. EXPLORATION PTY. LIMITED



SHEET 1

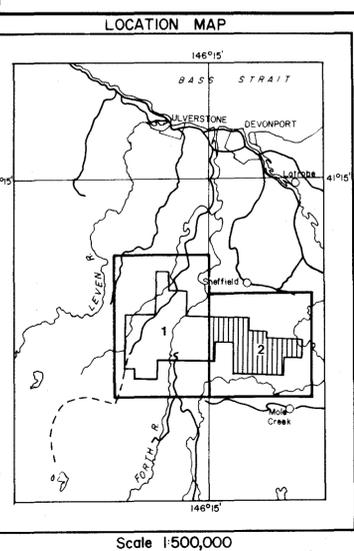
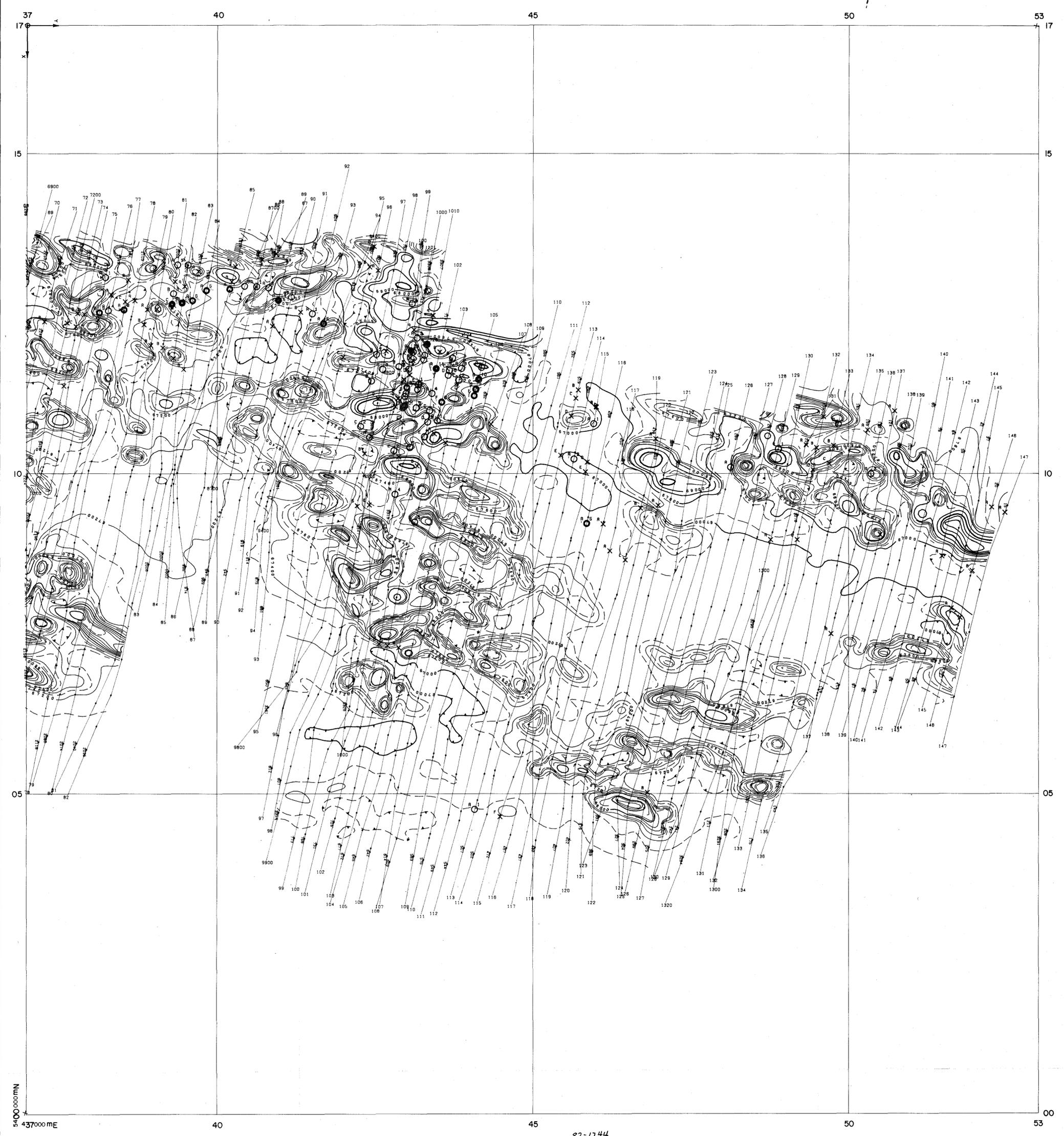
Flight line
 Fiducials and numbers



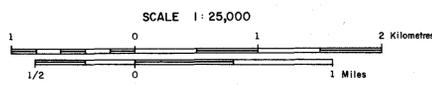
Report No. 7263
 Plan No. TASH 451

792070

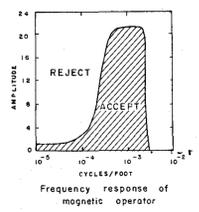
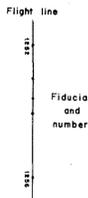
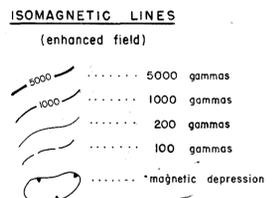
JOB 327; JULY 1981
 TASH 451 SH. 1



DIGHEM^{II} SURVEY
SHEFFIELD AREA, TASMANIA
ENHANCED MAGNETICS
 FOR
C.R.A. EXPLORATION PTY. LIMITED



SHEET 2



Report No. 11263
 Plan No. TASH 452

792071

JOB 327, JULY 1981

TASH 452 Sht. 2.