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REPORT ON 1990 EXPLORATION

ALBERTON AREA, TASMANIA
for
OCEANIA PTY LTD

by
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ALBERTON

0002

CONTENTS

FIGURES

All figures are located at the end of the main text before the appendices.

Note: Data tapes held in Records Dept.

SUMMARY

Initial exploration of gold leases in the Alberton area of NE Tasmania by the Minstock Group (Oceania Pty Ltd) has emphasized high resolution magnetic methods in order to define zones of interest or account for past finds. These techniques have never been employed previously in Tasmania.

The application was based on the observation that host Mathinna Beds adjacent to quartz veins was altered, oxidised and more magnetic than normal Mathinna Beds or quartz and generated distinct spikes in the magnetic field. It was hoped to define vein and fracture orientations in this way and so attempt an appraisal of the controls on mineralisation. And, consequently, likely locations for further exploration.

The anticipated spikiness in the magnetic field was observed but the magnetic survey has defined a repeated anomaly pattern in the region between the Rosalind-New Strahan and Mt Victoria mines in the Alberton goldfield.
These anomalies are thought to be due to local fracture sets within the apparently bland Mathinna Bed host rocks. Many fractures contain gold-bearing quartz.
The anomalous zones are intimately associated with previous workings and there seems little doubt that the method has outlined those areas which have some economic interest. There is little diffusion of effect.

Although it is possible to make some general correlations between cultural features (adits, shafts) recorded during the survey and old mine plans and magnetic anomalies and reefs a more careful correlation is required which must be based on thorough survey.

Magnetic trends and reef orientations can be shown to be consistent and implies a definite structural control on mineralisation. The distinct breaks in pattern suggest abrupt changes in composition of the host rocks - and consequent fracture and vein capacity and may be compatible with two series of thrusts or a thrusted, repeatedly overturned competent member of the Mathinna Beds. The data can be used to link surface and mine observations and resolve such issues as dip and unit relationships.

The full implications of the exploration completed cannot be appraised until the nature of lithological or vein frequency changes have been considered. This will require improved access and some minor trenching. More complete reconstruction of previous mining operations and predictions about veins worked must await comprehensive survey. Previous workers have been prepared to make sweeping assumptions about these rocks and their mineralisation - to their cost. A very careful, staged exploration process is required and it may require selection of one zone and re-entry to old workings to confirm grades, structures and correlations before any expenditure on shaft advance or drilling. The region near the Rosalind-Premier, or Cross reefs would appear, at this stage, to offer the greatest potential for cost effective exploration and perhaps subsequent re-development.

INTRODUCTION

This report describes exploration undertaken during 1990 on the Alberton leases held by the Minstock Group in North East Tasmania. These leases, of three square kilometres, straddle the primary gold-bearing structure in the region and the old mines and workings of the leases have produced significant amounts of gold (pre 1900).

Most exploration expenditure was directed toward magnetic surveys and discussion of results.

A more balanced geological, geophysical and geochemical programme had been proposed initially but the failure of surface methods to provide any improvement of historical data (see Appendix 3B) and the striking success of the initial magnetic work (Appendices 1 and 3A) has led to complete review of programme needs or emphases. Many of the possible options are discussed here and the particular requirements of each option and its significance are outlined.

In the original budgeting for 1990 exploration it had been thought that a modest allocation would provide a complete magnetic coverage. Access and terrain problems soon showed that this was not possible using any reasonable line spacing compromise (25 to 50 m). Much of this background is provided in Appendix 3A. A decision was therefore made to cover only part of the area - the region between the "Mercury" and "Mt Victoria" mines and to use this work as a calibration trial of the method. The application was innovative in terms of vein and structure studies, had never previously been attempted and carried an unknown chance of success.

Due to accidental loss of instrument - and subsequent opportunity to review data already acquired - it was possible to establish that the application was both specific and definitive (Appendix 3A). The exploration programme was recast and it was decided to complete magnetic survey of as much of the lease area as the budget permitted. This was argued on the basis that no surface geochemical method could be as specific in defining anomalous features; features known in many cases to be related to gold-bearing structures.

The contractor's reports for the initial survey and the follow up work are given as Appendices 1 and 2. All maps in pockets refer to Appendix 2. No diagrams from Appendix 1 have been included (other than those reproduced in Appendix 3) since Appendix 2 provides an integrated compilation.

THE MAGNETIC SURVEY

INTRODUCTION AND ACQUISITION DETAILS

The magnetic survey was contracted to the Geophysical Research Institute of the University of New England due to the particular instrumental and field requirements.

The Introduction (page 1) describing general policy issues related to the magnetic surveys and the decision process leading to coverage of most of the lease area held by Minstock do not offer any basis for use of the method.

Previous research dating initially from 1972 (Leaman, 1974) and Leaman (1987) has shown that quartz vein - host rock wall alteration produces a measurable change in local susceptibility contrasts. Increase in quartz content, alteration and associated fracturing or silicification leads to production of a disturbed magnetic field across rocks or materials which are either non magnetic or of uniformly low magnetisation. The presence of this effect was doubted initially by the contractor but results demonstrate both reality of effect and feasibility of method use (Appendix 1, 3A).

The application, or recognition of response pattern, depends upon adequate definition of variations in the magnetic field. The contractor and system employed have been able to provide sufficient detail - along profiles - but a line spacing compromise was forced by cost, budget and terrain considerations (also Appendix 1, 3A).

RESULTS

Results from the initial, and completion, surveys have been compiled and are best reviewed in profile form (Figure 3, Appendix 2). Extracts from this compilation form the basis of several other diagrams and textural references. Alternate presentations, as coloured, filtered images, are also included (Figures 7, 8, 9 of Appendix 2).

All forms of presentation reveal a series of anomalous zones in which the magnetic field is disturbed and which may be contrasted with larger areas in which the field is magnetically quiet and stable.

Inspection of Figure 3 (App. 2) suggests five such zones; near "Mt Victoria", "Cross-Long Struggle-Caxton", "Mercury", "Strahan" and SW of "Strahan" mining operations. These anomalous zones are oriented approximately E-W and are sub-parallel. Only one of them is not associated with previous mining activity and ground checks show that the responses are not simply related to ground disturbance or rubbish.

Indeed, the existence of one zone where no previous mining has occurred clearly indicates that the origin of such features is geological and not cultural.

There is, however, a marked correlation between creek lines and anomalous belts and it could be argued that the longer wavelength components of the anomalies could be related to local terrain or weathering-exposure factors. This argument could be sustained if all creeks were involved or the effect persisted the full length of creeks and tributaries within equivalent hill slope conditions. This can be shown not to be the case.
At Ragged Youth Creek (Cross-Long Struggle Mines) where the magnetic anomaly is unambiguously terminated on slope by a NNW-trending feature the creek and response are seen to be distinct features.

The image presentations also indicate, albeit diffusely, a NW grain in the Mathinna Beds.

Review of Figures 3, 4, 5 and 6 (Appendix 2) reveals variable response characteristics across the surveyed area.
Some features are present as symmetrical spikes (positive and negative parts), mirror symmetry (all positive), while others are more extensive and composed of several features of smaller amplitude. Some anomalous exceed 300 nT peak to peak.
Although some anomalies can be associated with workings or mining debris most are not and appear to represent the type of response anticipated for quartz vein-wall rock alteration.

The local concentration of responses, ordered systematically in extent and well separated, is the most obvious result of the survey.

INTERPRETATION

The interpretive notes given below are in two parts.

The first section provides a basic evaluation of quantitative implications and the potential structural value of the data set. It includes an assessment of selected anomalies in terms of source thickness, depth and dip estimates and whether any anomalies may be generated from moderate depths (>25 m). Various anomaly forms have been sampled as representatives.

The second section considers possible relationships between established cultural details and mineralisation or structural features within the present restrictions of survey location and precision.

Both studies should be regarded as provisional or preliminary at this stage but are intended as guidance for further work or evaluation should that be deemed necessary after integration of these results and provision of accurate survey location of both anomalies and adits.

Quantitative evaluation:

Profile segments selected for study may be located in Figure 3 of Appendix 2 (or the larger scale plots also part of Appendix 2).

Profile A1 (North Premier Reef)

Figure 3 presents the detail of the observed profile subsampled at 5 m intervals in order to expose the principal features and a possible solution. Only the longer wavelength elements of the profile have been matched but these suggest a source dipping NE. The source may be tabular or asymmetric as shown. The distinction is not readily resolved by this profile although the implication of dip is. The issue of asymmetry arises in later discussion (see D1 for example).

Profile A2 (North Strahan)

Figures 4 and 5 present the profile sampled at 5 m intervals.
A narrow, steeply dipping source is responsible for the principal anomaly. The precise shape of this feature cannot be matched using simple assumptions. There are several factors essential to a good fit of this profile. These include a calculation shift of -20 nT with respect to the observed data reference level (this may be credible on the basis of other profiles), a contrast offset across the source - more magnetic units to the left - which indicates that the source occupies a small fault and the negative component of the anomaly can only be fitted if there is wall alteration with reduced contrast compared to the central source or host Mathinna Beds. This option is reviewed for profile B1.
Figure 5 presents solutions using different depth ranges for the primary source. These illustrate the insensitivity of the analysis to depth extent since the two solutions represent a depth scale of 250 and 50 m respectively. (Figure 4 has a depth scale of 100 m). Most of the magnetic response has been generated in the upper 50 m, some of it within 1 m of the magnetometer.
The method is, however, able to suggest the thickness of the source and its dip direction.

Profile B1 (South Premier)

Figures 6 and 7 confirm the implications of previous profiles and suggest that the curve fit differential may be of the order of 20 nT. Narrow sources dip west.
Figure 7 demonstrates the nature of the alteration associated with the magnetic source. A large volume of host rock is less magnetic than either general background for the Mathinna Beds or the principal source. The alteration is asymmetrical and not present on both sides of the source. This appears to be a general characteristic.

Profile B2 (near Rosalind)

This profile is presented in Figure 8.
The anomalous zone is relatively thick and only one part of it has been modelled. There is evidence of alteration in the footwall if this solution is valid. It must be commented that insufficient of the principal anomalous zone has been sampled in this case to ensure minimum ambiguity of dip interpretation and the asymmetric variation to the right suggests more complexity - of the form shown on profile D1.

Profile C1 (near Mercury Creek)

This complex profile fragment sampled at 5 m intervals suggests some long wavelength elements. A partial solution has been suggested in Figure 9. A primary asymmetry is also indicated with an eroded saw tooth anomaly form not dissimilar to that of D1 but reversed in sense.

Such models suggest changes of lithology about some crucial structures which have been magnetised and silicified. Local changes in contrast are about an order of magnitude and consistent with property changes near the Portland Mine (see Leaman, 1987).

Profile C2 (near Mercury Mine)

A solution for this profile, subsampled at 5 m intervals, is shown in Figure 10. Two dipping sources up to 20 m across have been inferred. High frequency elements of the right hand source have been partly retained and these illustrate either the shallowness of the upper surface of the source or that such bodies act as envelopes for alteration and venation.

Profile I1 (south Sawpit Creek)

Figure 11 examines a single large spike anomaly within a moderately quiet background. The feature has been sampled with 2.5 m intervals.
A narrow, steeply dipping zone is again implied and its asymmetry suggests roof alteration.

Profile D1 (near Cross Reef)

The asymmetrical nature of many anomalies is represented by this profile (Figure 12).
Any solution must provide for the regional effects and primary forms. The abrupt anomalies near the creek at the Cross Reef are related to an abrupt termination of structure or lithology - perhaps both - while the mineralisation may be confined to the zone defined by the interface between lithological units which dips much more shallowly. This is a complex structure but one which may be resolved magnetically. The simple methods used here are, however, not wholly satisfactory and 3D methods should be considered for further analysis.

Profile D2 (near Caxton Reef #1)

This profile illustrates the change in character in the magnetic field in the region of Caxton Reef (in so far as it can be located with present information). Figure 13 shows that a narrow anomalous zone abuts substantial alteration or silicification - either of which diminish background magnetisation. This model suggests near vertical dips. Veins dip at up to 80 degrees to the east in this region and precise location is necessary before any assessment of the accuracy of the magnetic analysis is possible. The change in lithology or state may well bound the mineralisation.

Profile E1 (near Mt Victoria)

Figure 14 shows that part of the anomalous response near Long Struggle Creek is geometric in origin with respect to a magnetic source which is dipping very steeply. One side (right) of this body is associated with altered Mathinna Beds. It is probable (but not yet proven pending survey relocation) that the Mt Victoria vein system is aligned along the altered face of the magnetic material which may reflect changes in oxidation.

Comments:

The tests of potential quantitative applications of the data described above show that there are significant variations in rock properties within the Mathinna Beds. Some of these variations are clearly present as thin skins and may be associated with veins or fractures. Others represent bedding or lithology changes.

Dips inferred appear generally consistent with information collected by Hills (1923) or RGC Exploration. Some time has been spent in an effort to link the magnetic survey, its grid and observed anomalies with old mine plans. This was done in order to review the likely nature of changes in magnetic properties and their correlation with mineralisation or alteration.

Unfortunately it is not yet possible to unambiguously assign adit or shaft designations for the entire field. This reflects sightings not reported, workings not traversed, shafts disguised by collapse or regrowth, grid distortion and so on. It is possible, however, to assign general locations in many cases and a specific correlation in rare instances.

My attempts at correlation have been summarised in the two parts of Figure 15. Recorded shaft and adit positions shown in Figure 3 (Appendix 2) form the basis of correlations with registry maps of the workings.

The two creeks (including Sawpit Creek) which enclose the "Rosalind-Strahan" workings are fully defined, as is the southern tributary of Wilson Creek which locates the "Cross-Caxton" workings. Long Struggle Creek near "Mt Victoria" has also been located.
Patterns of shafts and adits do not, however, fully specify the old mine sites.

AT MT VICTORIA, approx 2150E, 250N, only one shaft and one adit has been located. This is not sufficient to establish the precise location of the reefs but an approximate location and orientation can be suggested. The reefs may lie near a magnetically spiky zone a little north of the creek. There are also suggestions of a subtle anomaly grain with orientation similar to the veins. The area to the east is magnetically quiet. On the basis of the present survey and presumptions this is taken to imply a general absence of contrasting lithologies, quartz fillings and, consequently, mineralisation.

The zone south of the creek is enigmatic.
Since the correlations noted near "Mt Victoria" are repeated elsewhere the issue of creek-related magnetic anomalies must be reviewed.
The zone south of Long Struggle Creek was termed 'noisy' by Stanley (See Appendix 2, Figure 11). Although the highest amplitude responses lie along or near the creek the entire area is magnetically distinct. The anomaly distribution implies a change in structure or lithology across the creek. This was indicated in Figure 14 where the source and altered width is little more than 20 metres. Possible targets or hosts would seem to be very specific.
The noisy character alone would not appear to indicate prospectivity since no other finds were made near the creek, or south of it. The crucial factor would appear to be the secondary cross grain. The magnetic field ghosts this (Figure 15) and it is nearly parallel with known reef orientations in this area. The magnetic contrast developed in the anomaly shown in Figure 14 is along trend and it seems likely that the mineralisation has occupied tension gapes near a structural and/or lithological intersection. The creek simply follows the primary structural grain - which also may be the most recent (see below). The mineralisation post dates both structural events.

These arguments are developed further later in this report but the implication from the "Mt Victoria" zone is that mineralisation is guided by secondary stress controls nearly perpendicular to the primary structuring or stress field. The intersection of these two systems has produced the largest gapes and so we find the Mt Victoria reefs directly beneath the main structure (along the creek) but within a NNE-trending fracture system which is evident in all blocks.

Is there a consistent view?
Consider next the CROSS-LONG STRUGGLE-CAXTON mineralisation.
This is marked by a strong response character change along

Wilson Creek to its principal tributary at 1850E, 450N and then along that tributary for 200 m to the east. The response fades and separates from the stream line near 2050E and is wholly undeveloped at the western end of the stream from 1600E, 75N.

Mineralisation is known to occur north and south of the creek but all major operations (in terms of yield and production) were to the south (so far as is known).
Several aspects of the relationships around this group of workings must be assessed since there are clear implications for other zones.

Old prospectors discovered most vein systems, subsequently mined, along the streams - including Wilson Creek.
The diverse character response patterns along this creek and its tributaries and the consistent curl of the anomalous change demonstrates the existence of a major structural or lithological change along the southern arm of the creek. Topographic or disturbance factors are not responsible.
The nature of this change is suggested in Figure 12. Mineralisation appears to lie within the material directly beneath the anomalous material or near the junction. This data could be examined more closely and associated with the mine descriptions once all shafts and adits have been located.

Figure 15 suggests a bat wing pattern for the anomalies which is consistent with a unit within a plunging fold and the whole truncated by a transverse structure. Secondary fracture systems can be inferred from the sublter magnetic grain (see images) which are parallel with both Caxton and Cross reefs although the trend emphasis changes around the altered zone. It seems likely therefore that all reefs are in the same horizon or lithology and that this has been more competent and regularly failed in brittle fracture allowing emplacement of quartz - all controlled by the secondary fracture orientations. A fold - unit control fully accounts for most reef orientation changes observed.
The inferences and patterns drawn from this zone are consistent with those at "Mt Victoria".

Workings identified north of the creek may be associated with "Hope", "New Wilson", "Dark Horse", "Telegraph" and "Ragged Youth". Minor magnetic responses can be related to the vein position at Dark Horse and Ragged Youth if my correlations are valid. There are suggestions of a N-NNE trend based on spikes and a NNW-NW trend based on filtered/smoothed anomaly forms.
South of the creek it is possible to locate the approximate position of the "Long Struggle" reefs but not the Caxton #2 or Cross with any precision. Too few adits have been labelled.
In each case, however, the inferred reef positions lie south of the strong anomalies near the creek but within the quieter part of the "noisy" zone. This relationship stresses the similarity with "Mt Victoria". The mineralisation occurs near a rock change.

The "POINT" and "MERCURY" mines region is not so readily assessed - partly due to a gap in survey. Cultural identifications are also limited and assumed positions are shown in Figure 15. Both mines lie within the third "noisy" area, but in the quieter parts. NNW and nearly N-S trends may be inferred. The "Frog" falls within a similar pattern.

The northernmost zone, extending from ROSALIND-PREMIER-SOFT SPUR -HANNAH AND NEW/OLD STRAHAN, lies between two noisy axes but is itself as noisy as other mineralised areas. The two bounding creek lines clearly conceal major structures.
Some reasonable location correlations appear possible for most mined reefs in this region. Vein orientations can be matched with identifiable secondary (filtered) trends and relatively quiet zones adjacent to high amplitude noise within the noisy region.

If it can be presumed that gold-bearing reefs lie within, or adjacent to, relatively noisy zones within the magnetic field then some exclusions are possible (e.g., NE of 2150E, 300N). Other zones, perhaps of more prospective interest, may also be inferred which are worthy of some shallow exploration for vein systems (e.g., 250E, 750N).

DISCUSSION

Previous workers, notably Hills (1923) and McIntosh Reid (1925), have attempted to explain the distribution and controls on emplacement of mineralisation and so predict prospectivity and guide future exploration.

Reid, for example, considered that NE trending veins dipping to the SE were lode fissures and that these were intersected by NW trending fault or fracture fissures which dip to the west. Intersections display heaves of up to 20 m and a southerly pitch. This is not so different from the views expressed above for the Cross-Caxton region except the order of structural scale and proportion can now be appreciated.

Hills has added some other views. He considered that fold axes were important (these trend 330-345 degrees) but noted that dips were variable and often overturned. It has never been possible to unify the information gleaned from inspection of mine workings due to the very limited amount of surface exposure on Garden Ridge. This new work has transformed this position and makes sense of Hills' grand concept for the area.

Hills considered that the gold mineralisation was concentrated in a compressional fold in a doubly thrusted belt facing to the SE. This zone varies from 500 to 800 m wide.

The western limit of this structure is evident at the western end of lines 1150 to 1850E where it can be seen to truncate all other character; whether noise due to lithology or mineralisation or creekline structuring. This structuring is the most recent major development affecting the Mathinna Beds in the area and it has carried either the hosts or the mineralisation into this narrow belt which includes all Alberton mineralisation and extends south to Mathinna.

Hills also considered the fault-fissure lodes the most valuable since these had greater length and depth extent. The problem is how to identify them, presuming they exist and his assumption is true. The subtler magnetic trends may do so, but there is no proof of large displacements on many of these trends. An appropriate stress field at the right time is the critical issue. He also noted that some reefs are present as saddles. The present modelling near Cross-Long Struggle is consistent with such a view although other features are impressed upon such structures and the discordant features have attracted the miners. We may assume, therefore, that these carry the best gold values.

Hills has also noted that many vein contacts are asymmetrical. One contact is sharp while the other may be irregular and diffuse with evidence of striation and movement. This type of relationship has been described above using the magnetic evidence alone where it was shown that some facets of magnetic sources were altered. This alteration may be on either face. The presence of movement could be interpreted as being related to the last major thrust movements which concentrated the mineralised belt. Striations prove that the quartz and gold were in place before the system came to rest and presumably before the western thrust fault cut off the mineralisation.

Before considering the zones most likely to repay further exploration two other comments must be made about previous reports.
All old reports refer to the benefits of further deep sinking on presumed vein lines and regularly use the word 'justified'.
Close reading produces no evidence to support these comments. There is no proof that anyone has known the extent of any reef and advance exploration was nìl in every case. Deep sinking of a shaft without due caution and consideration, of evidence not previously available - and still not transparent in its meaning - must be a risky and generally foolhardy exercise. These words and usages, such as justified, are encouraging but cannot be supported and should not be simply accepted by Minstock management.
I have also noted some glaring contradictions in estimates of grade and recovery from some of these mines. It should be borne in mind that undercapitalisation, waste of capital on processing prior to actual demonstration of resource (the saying about birds in the hand or bush comes to mind here) and generally limited gold recovery for effort expended led to closure of every mine or working. There is a message here.
I counsel caution and well considered exploration and evaluation before any attempt is made to plan any further mining. It is particularly important to choose the most prospective area and the one most likely to yield quickly before any development costs swamp the company.
Grade contradictions may be observed for nearly every mine if one contrasts the notes of Hills (1923) with the work by RGC in the same openings. While it is true that many of the reefs were not sampled or accessible to RGC those sites where comparisons were made suggest some differences in analyses. I think it would be wise for Minstock to accept the lower and more conservative value in each case.

Many examples may be quoted but values of 2.39 g/t for the Rosalind seems much less exciting than 30 g/t. Is this why the mine closed? Similar results were recorded in the Mercury mine. I do not think that the old value of 25 g/t should be accepted pending confirmation of the RGC work. A similar result applies to the Caxton#1 reef.

The other aspect of this question relates to the actual yield from this field. All previous workers note that there has been a loss of records. Yet all quote some yield. There are some differences. McIntosh Reid quotes 150 ozs for the Rosalind-Premier group of mines whereas RGC offer in excess of 5000 ozs. Which is really credible given the actual tonnage of quartz removed from these quite small mines? Similarly the

Ragged Youth may have only yielded 120 ozs, not 300 ozs. Only at the Mt Victoria is there little dispute; the yield there was in excess of 5000 ozs.

There is no doubt that much gold remains within or near the old workings of this field. But which should be further investigated on a priority basis?

RGC considered the Mercury zone to be the most risky on the basis of limited continuity of vein systems and diffusion. In view of the much more diffuse magnetic character across this entire region I conclude that the underground observations are valid and their conclusions should be accepted for the present.

The rich Mt Victoria zone seems an attractive proposition until it is realised that the veins were cut by faulting and not found again. The magnetic survey and the modelling described above account for this. The site is compact and might be accessible for review.

Similar comments may be made of the Long Struggle-Caxton reef system. The entire package, including the Cross reef, is more expansive and not so readily assessed or developed if necessary. It has been assumed that veins extended in depth at the Cross reef but this has not been established. In favour of the site is the magnetic evidence which suggests a plunging fold system carries the vein net and that this is probably concentrated south of the intersection of the Cross and Long Struggle reefs.

The Rosalind-Premier reef system may also be accessible and worthy of review. Correlation with the magnetic survey is uncertain but the characteristics of the magnetic field are compatible with considerable extensions of the vein systems.

CONCLUSIONS AND RECOMMENDATIONS

The magnetic survey which has formed the bulk of the 1990 exploration effort in the Alberton area has drawn attention to five restricted zones and limited portions of the Mathinna Beds.

Complete assessment of the survey and its implications has been restricted by the limited cultural information available. Until the survey grid has been properly located and linked with mine data it is not possible to complete any realistic review of possibilities. Enough preliminary associations can be made, however, to suggest that the magnetic survey - with its distinctive character definition of the magnetic field - can support further appraisal and exploration.

The magnetic data indicate the existence of complex structuring and translation of several units. Areas with a disturbed magnetic field are considered to contain silicified or altered Mathinna Beds with an abnormal quartz vein concentration. Some of these vein systems are gold bearing. Subtle regional textures in the magnetic field indicate a general N-NE grain for fractures which may be the orientation of many fold axes. These are disrupted by five major nearly E-W zones in which there is evidence for lithology repeats or variations and faults or thrusts are indicated. Superimposed on these features are a number of NNW-NW fracture zones. The largest of these truncates all other structures, including the major E-W features. Reef mineralisation is aligned along the two defined fracture sets adjacent to the most disturbed, and presumably competent or silicified, Mathinna Beds.

It is possible that two thrust sets intersect; one related to primary folding of the Mathinna Beds, and another related to compression due to granitoid intrusion. This two part stress history coupled with the tensions related to changes in lithology in tight folds could account for the regional vein control observed. It is possible that there were two periods of vein emplacement given the relationship between trend systems and vein orientations.

Several fracture sets are extensive, and extend well beyond known reef positions - as at Long Struggle and Caxton #1. Similar relationships may be observed at Rosalind, Hannah, and Mt Victoria. Each of these relationships and sites would seem, therefore, to offer potential.

Preliminary quantitative examination of the magnetic data suggests that it will be possible to extract useful structural information which will enable surface and underground observations to be linked for the first time. The data also define local zones of alteration. This work is incomplete pending proper survey of the area in order to establish the true location of all cultural and anomaly features and permit their proper integration and correlation.

The immediate need is for a complete surface survey tied to state datum. This survey must pick up the somewhat erratic line positions of the magnetic survey and all possible adit and shaft information.

The associations inferred for the Rosalind-Premier, Cross-Caxton and Mt Victoria workings should then be confirmed and the profiles relevant to these sites completely modelled and linked to extant records or drill holes. This should enable a decision to be taken as to which site should be explored in more detail. The present work, although uncertain due to positional doubts, would suggest that either of the first two zones may prove accessible for study. Access is important since predictions about rock conditions, ore conditions, rock properties must be linked to the model studies so that proper predictions about reef extent or depth can be made.

It is not clear how valuable the magnetic data might be in terms of depth extent. The data can define lateral extent but initial modelling indicate that many features have a very shallow origin (<50 m). Some regional features are present, and can be modelled (as at Long Struggle), which extend to depths in excess of 100 m.

The origin of the noisy magnetic field should also be established. It is predicted that this is due to siliceous or silicified Mathinna Beds with an abnormal vein content. If this is the case, and it can be shown that a significant proportion of such a vein system carries some gold then it may be possible to consider an open cast mining operation rather than the more confined reef option.

It is clear that many issues remain for resolution. Assessment of vein systems is notoriously difficult and no precipitate actions or decisions are advised until all available information has been integrated and assessed. It is also important that grades be confirmed since some doubt attaches to extant analyses and the reasons for closure of many operations.

I do not recommend that any mine openings be significantly extended (clearing operations excluded) until the region has been properly surveyed, the magnetic data implications have been checked and integrated with mine plans and structural predictions made of the extension of reef zones. Assembly of the information then available should allow a decision as to the most attractive prospect and the exploration requirements for its assessment may then be self evident.

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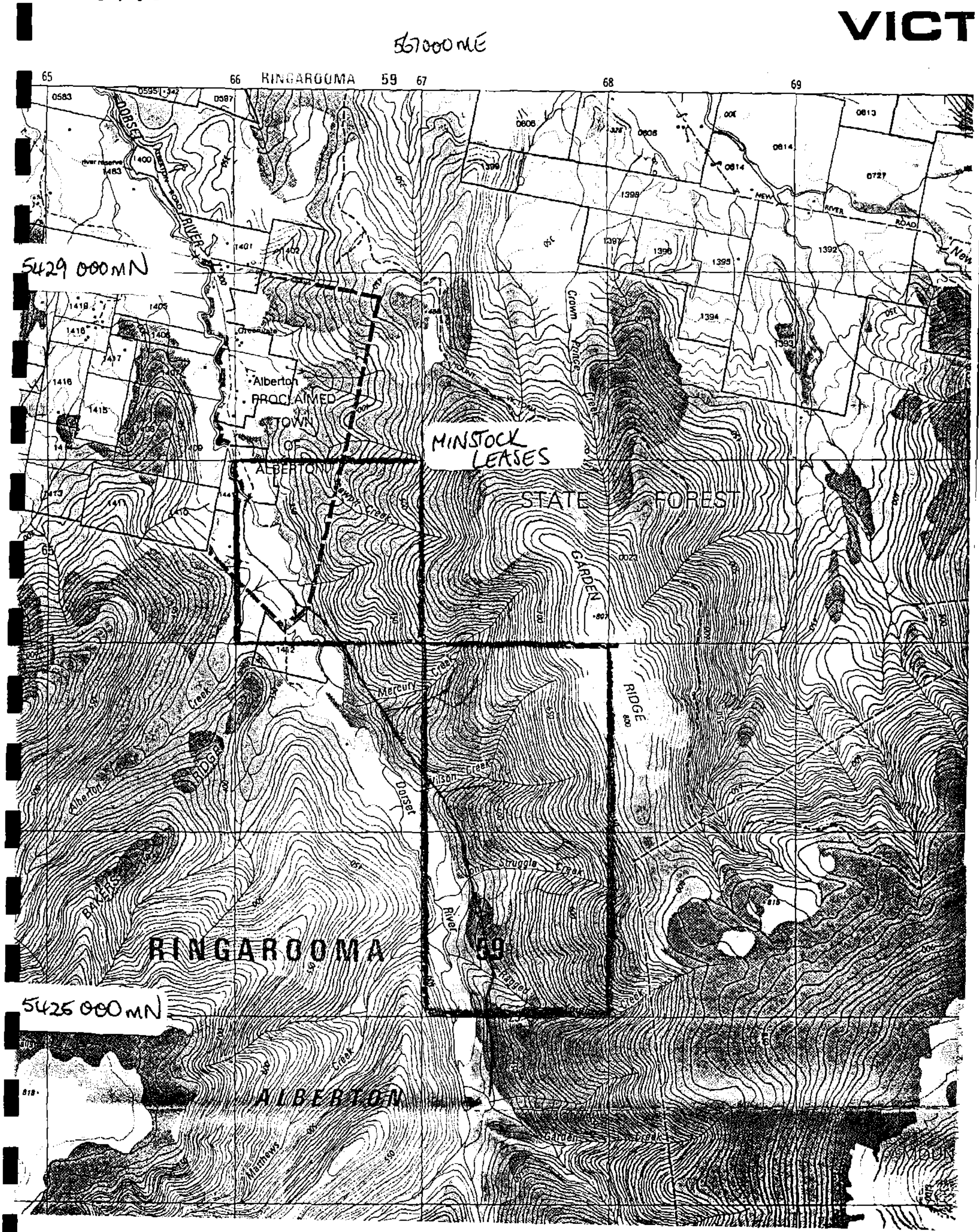
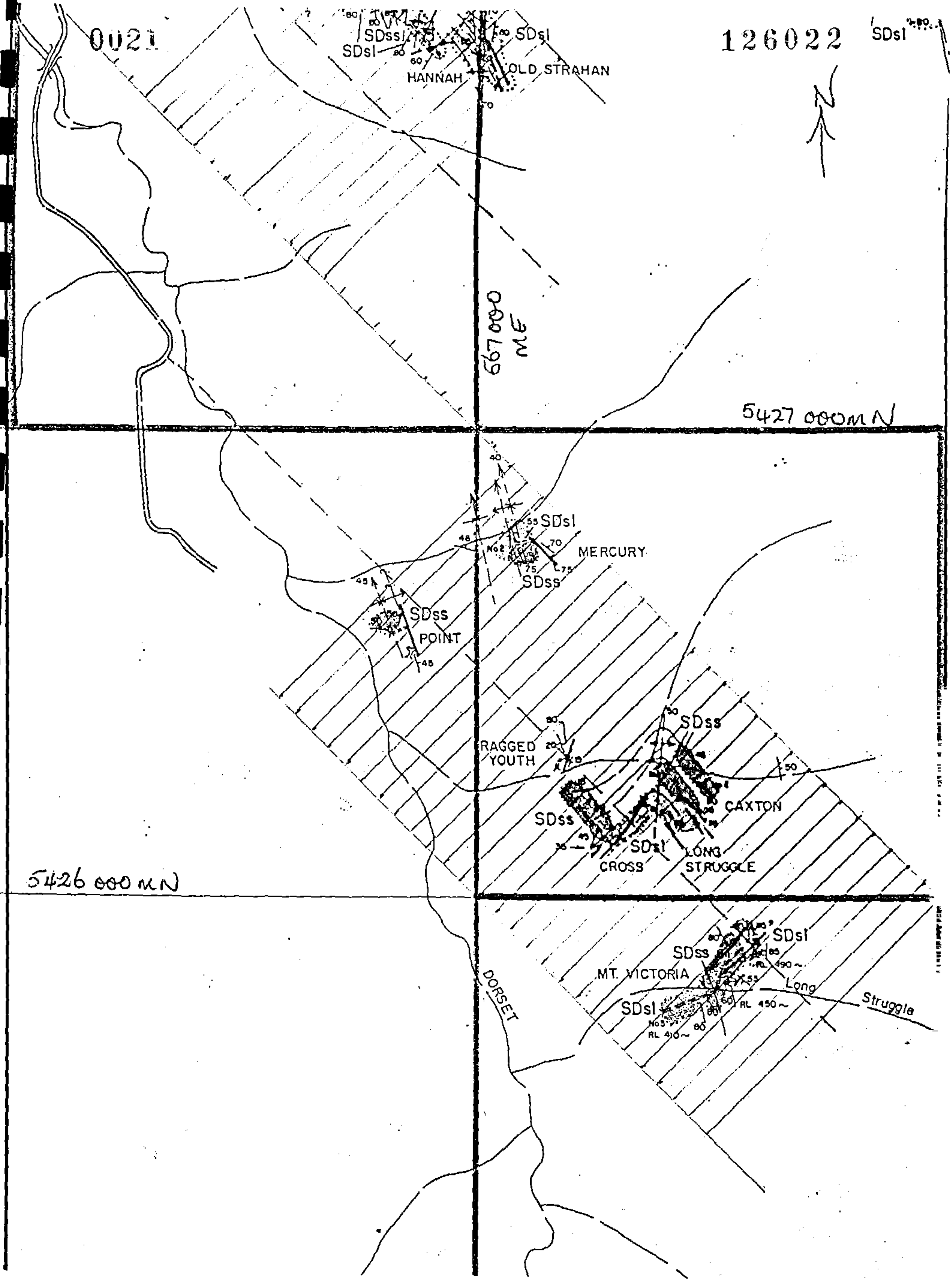


LOCATION OF ALBERTON LEASES

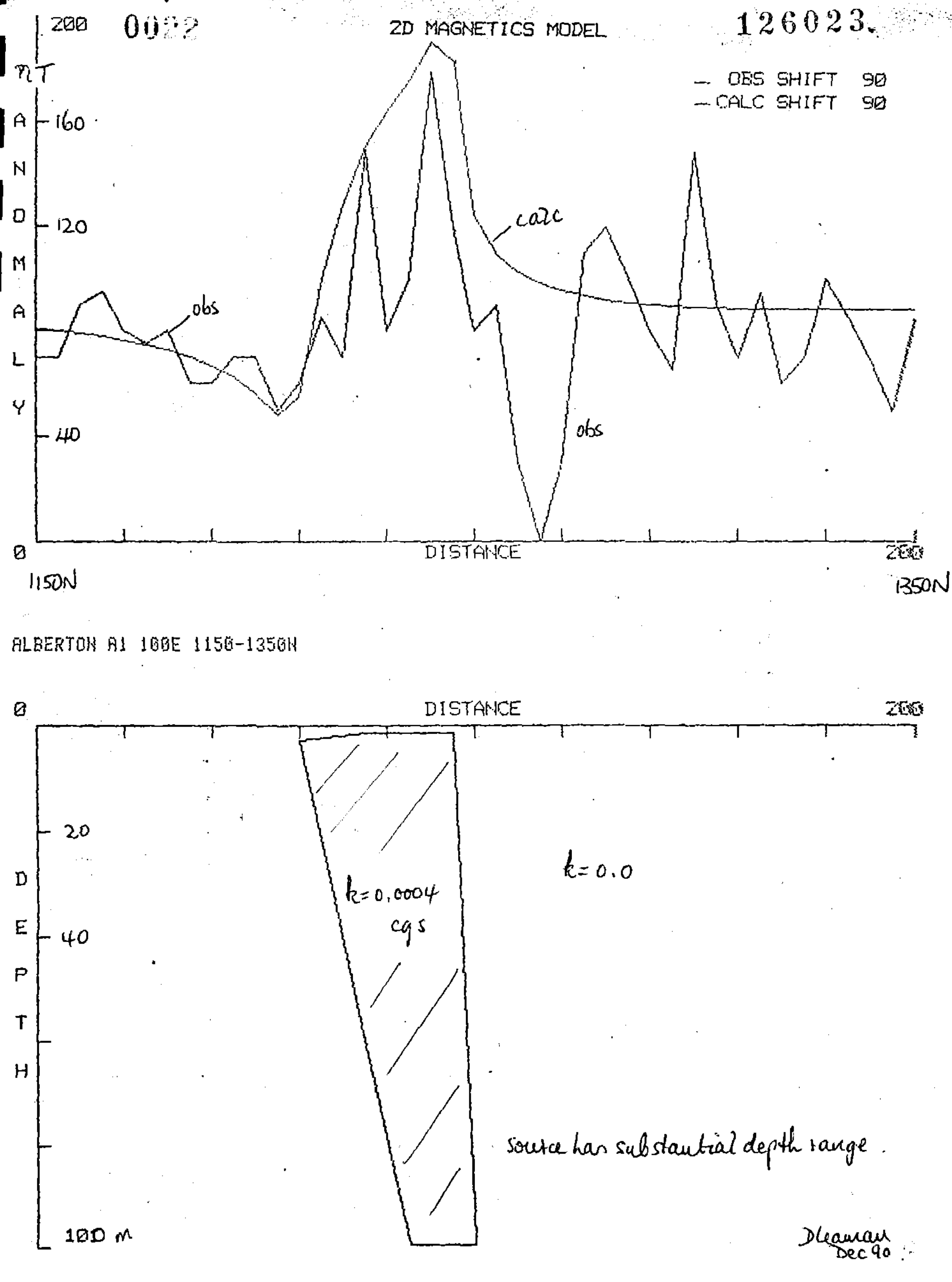
FIGURE 1



LOCATION OF MAGNETIC SURVEY GRIDS
Basemap after Gold Fields Exploration

FIGURE 2

 126023.



MAGNETICS MODEL PROFILE A1: 100E 1150-1350N

FIGURE 3

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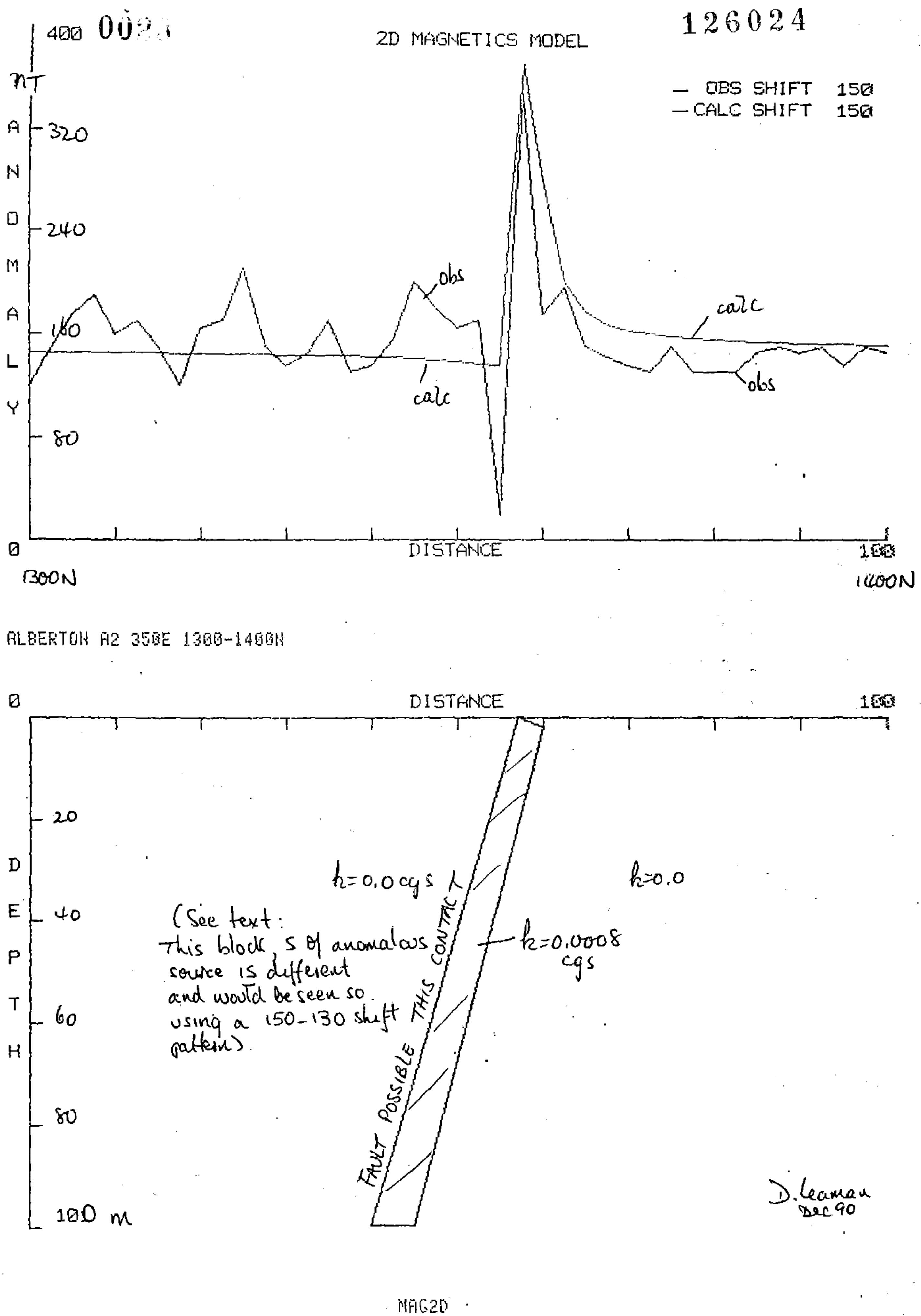
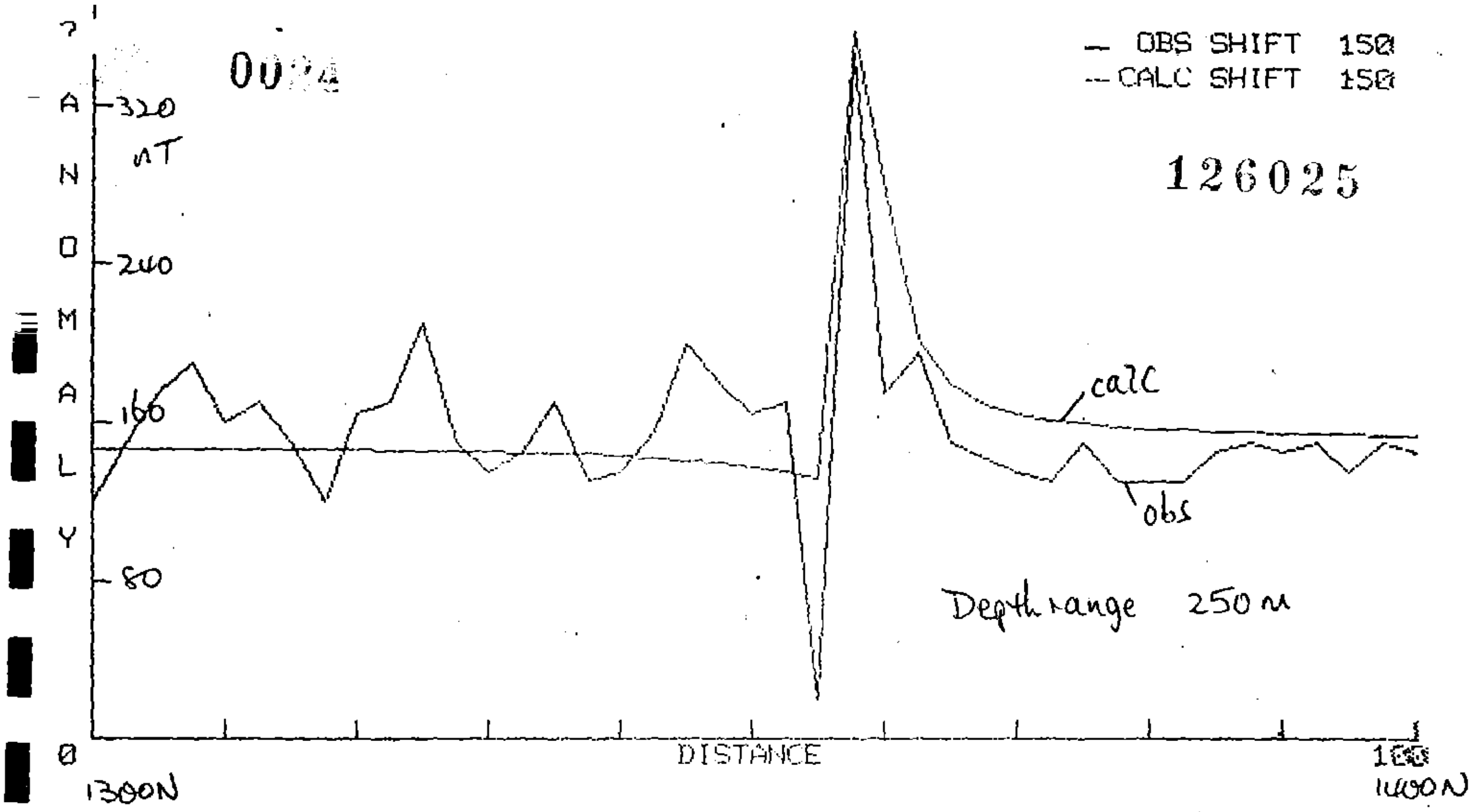


MAGNETICS MODEL PROFILE A2: 350E 1300-1400N

FIGURE 4

126025



MODEL AS IN FIGURE 4

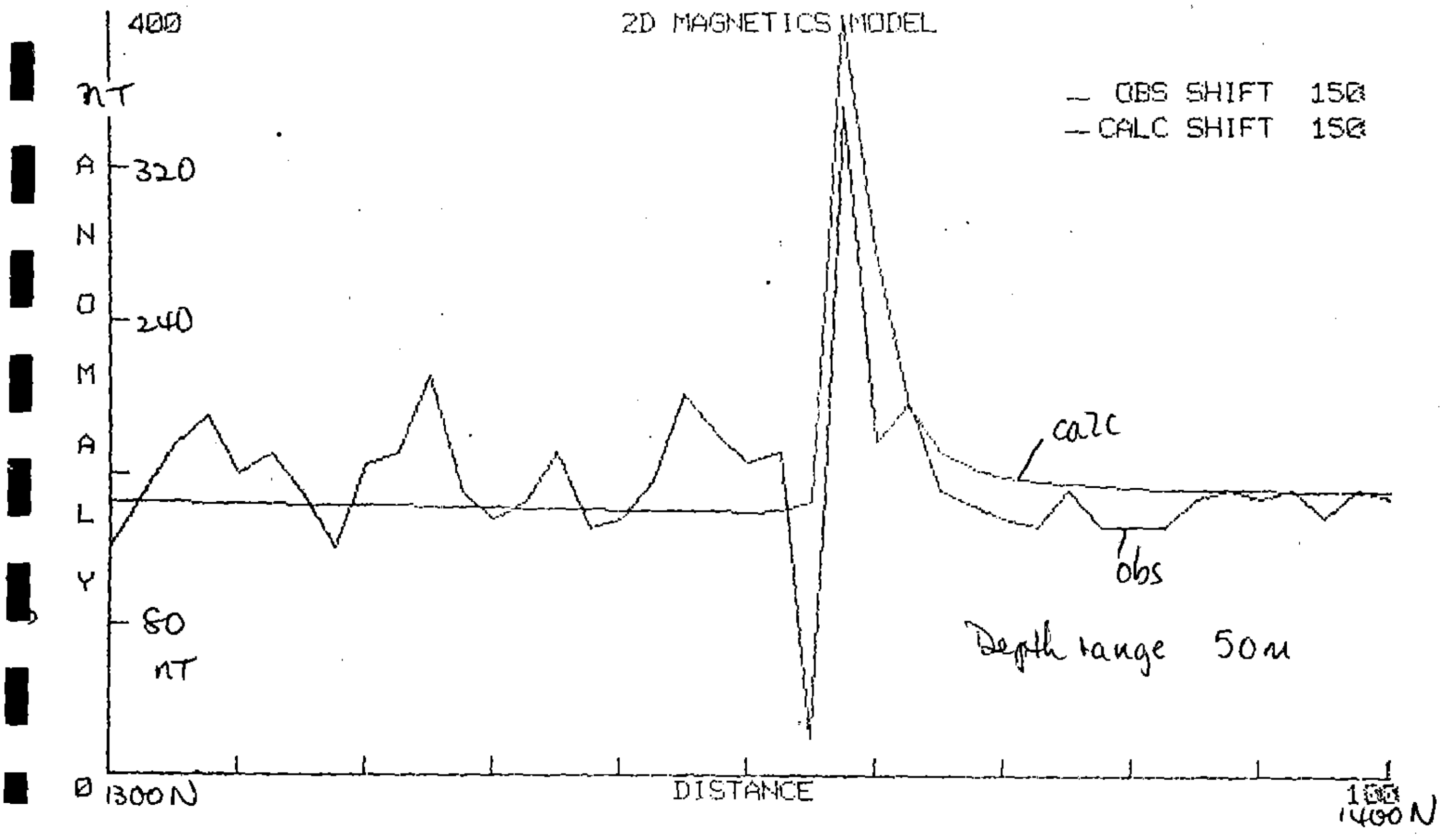
ALBERTON A2 350E 1300-1400N
D=250M

MAG2D
LEAMAN GEOPHYSICS

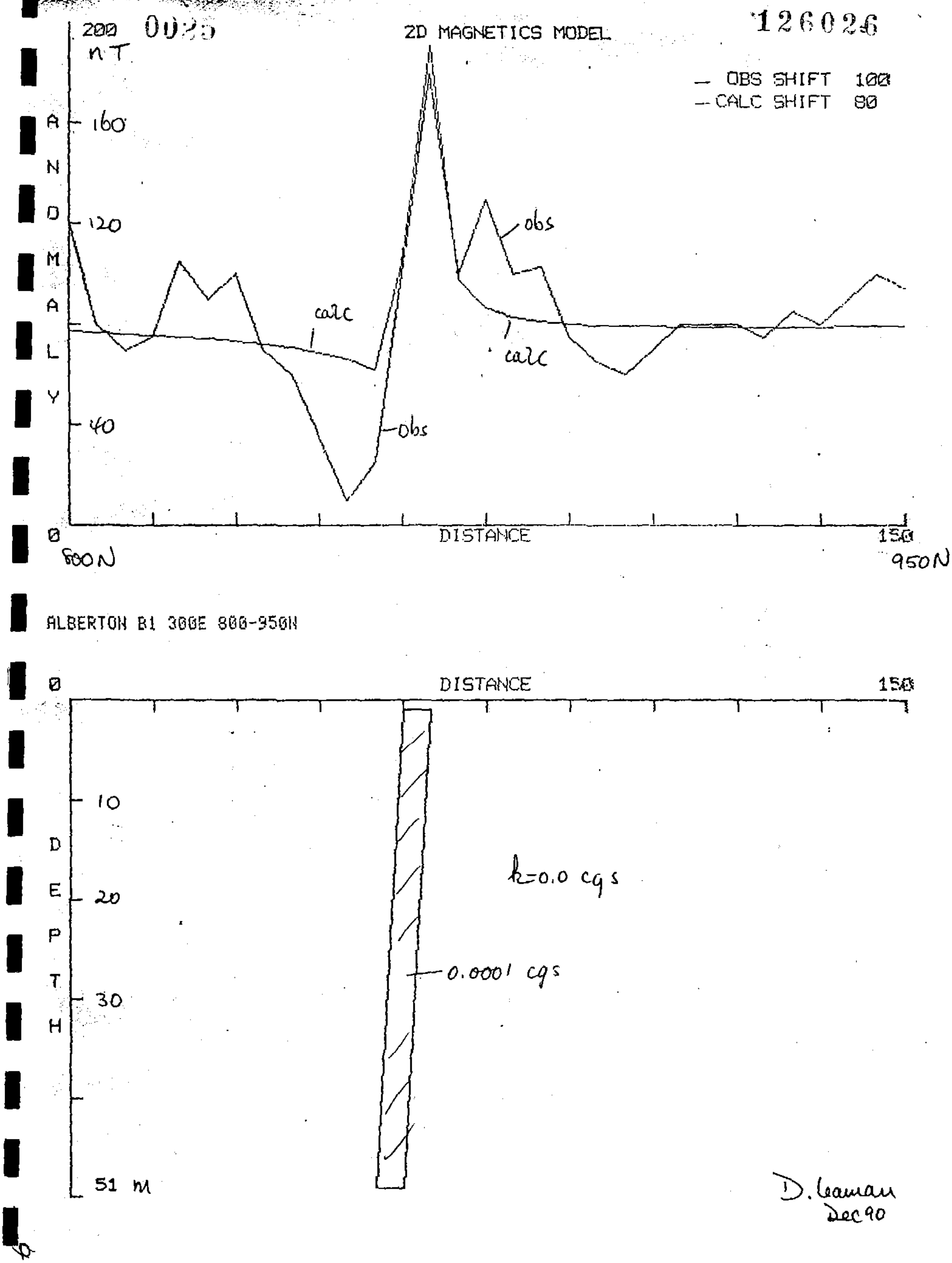
ALBERTON A2 350E 1300-1400N

MAGNETICS MODEL PROFILE A2 EFFECT OF DEPTH TEST FIGURE 5

LINE PARAMETERS - ORIGIN,LIMIT,INCR : 0 100 2.5



126026



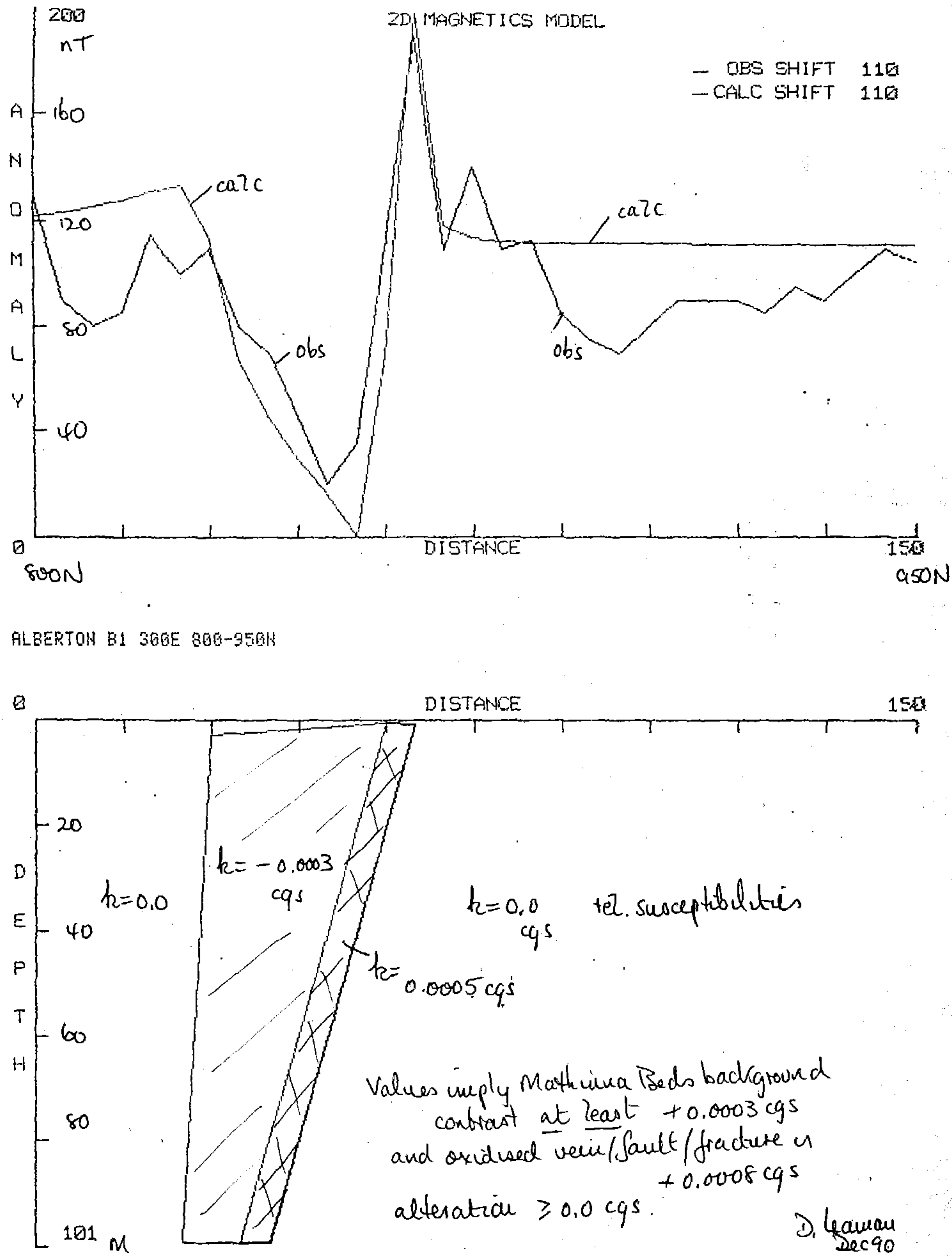
MAGNETICS MODEL PROFILE B1: 300E 800-950N
(WITHOUT WALL ALTERATION)

FIGURE 6

60 1 35 100 25 100 30 3

LINE PARAMETERS - ORIGIN,LIMIT,INCR : 0 150 5

126027



MAGNETICS MODEL PROFILE B1:
(WITH WALL ALTERATION)

FIGURE 7

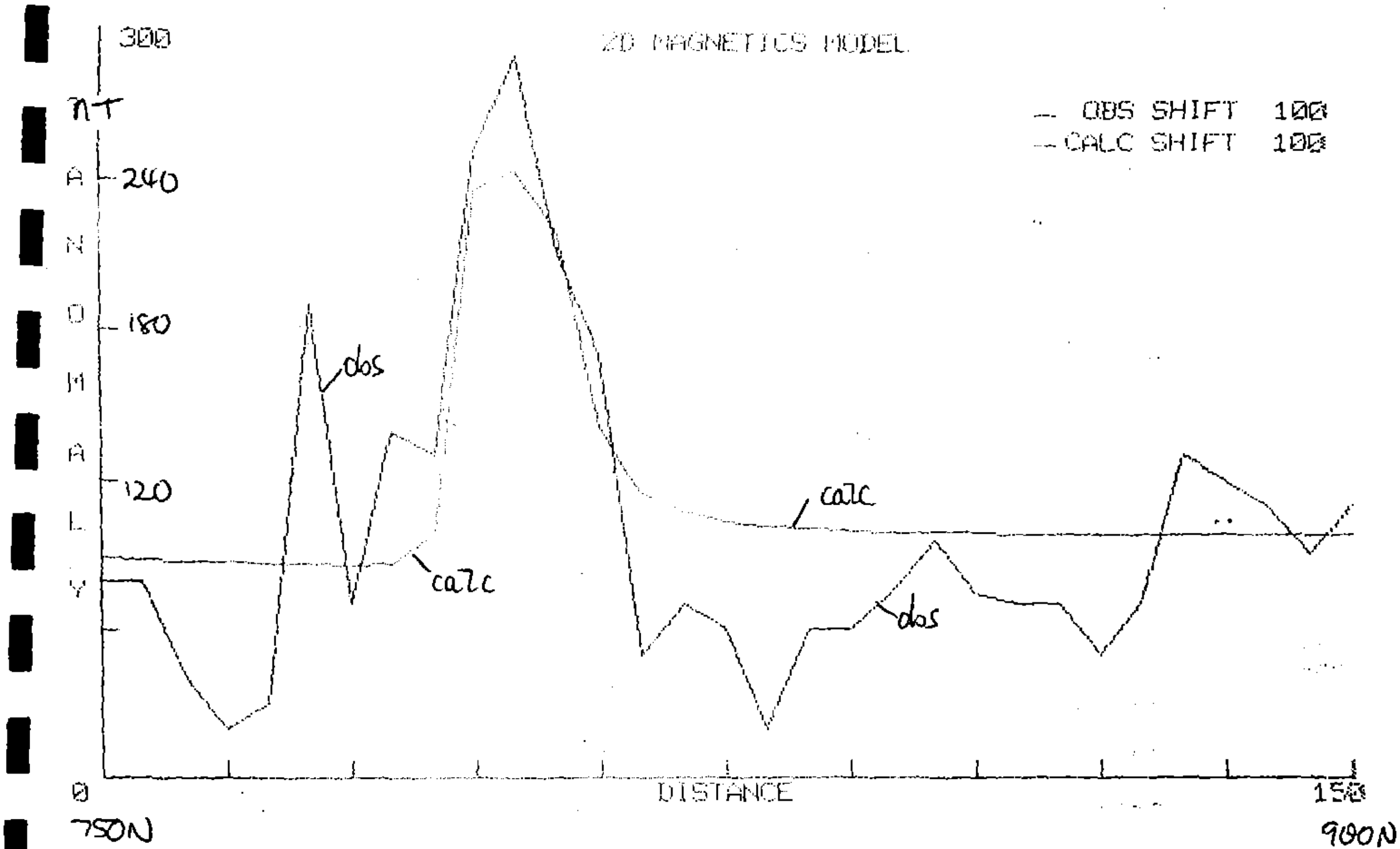
SUSC REM MAG REM INC REM DEC UNITS CGS* 1000

1.0 0.5 0.0 0.0 0.0

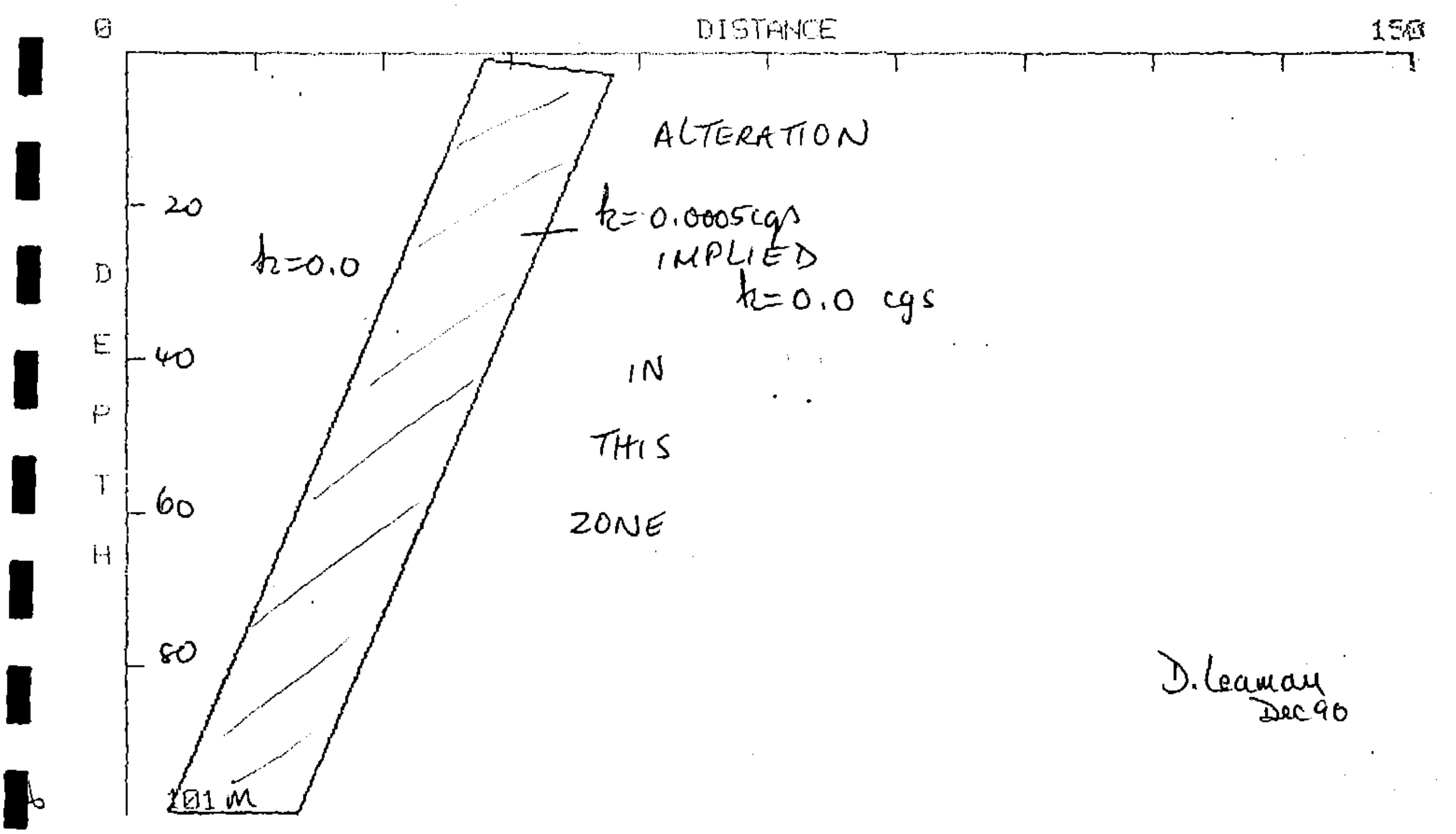
42 0027 57 3 20 100 5 100

LINE PARAMETERS - ORIGIN,LIMIT,INCR : 0 150 5

126028



ALBERTON B2 50E 750-900N

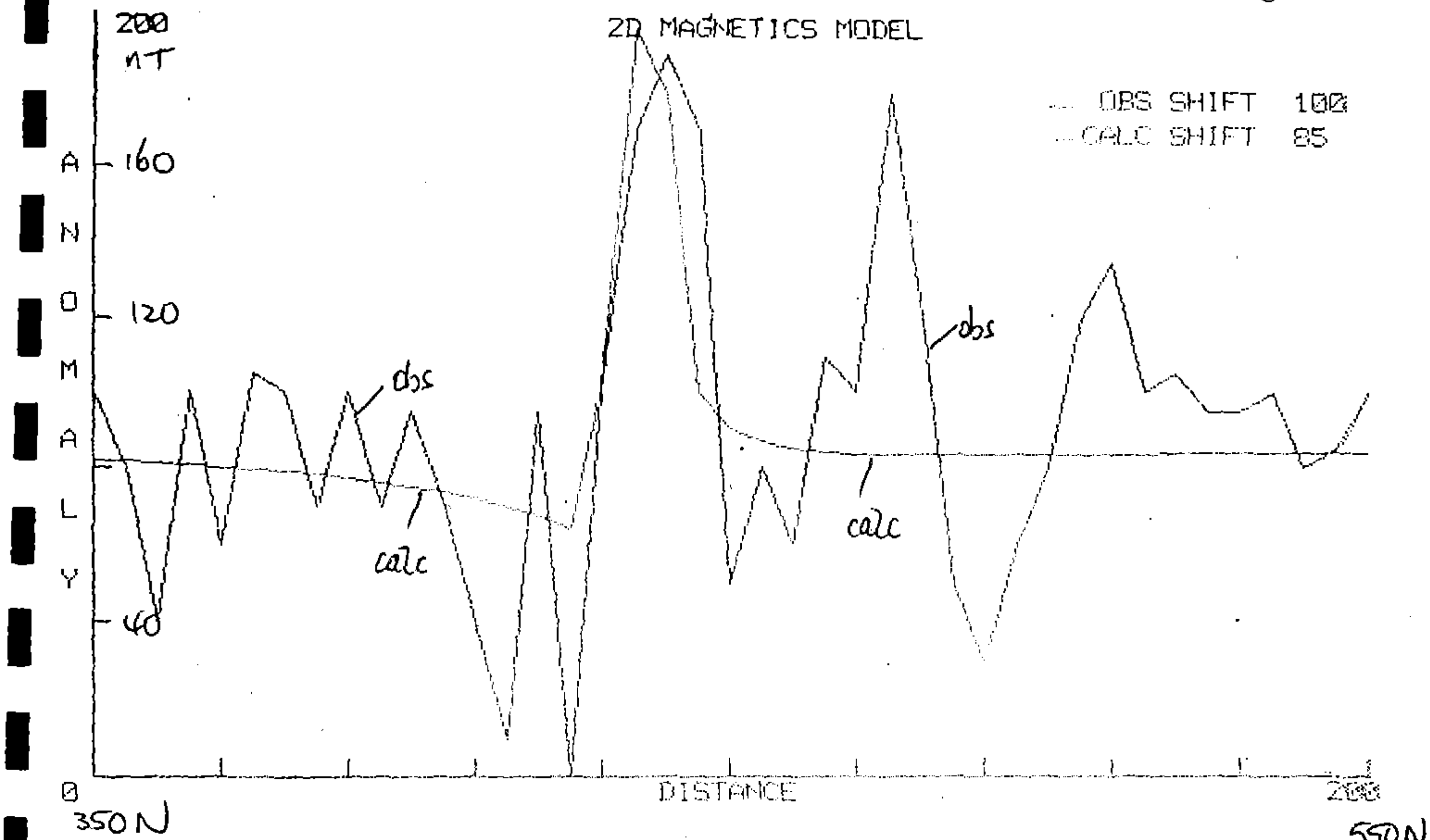


MAGNETICS MODEL PROFILE B2: 50E 750-900N

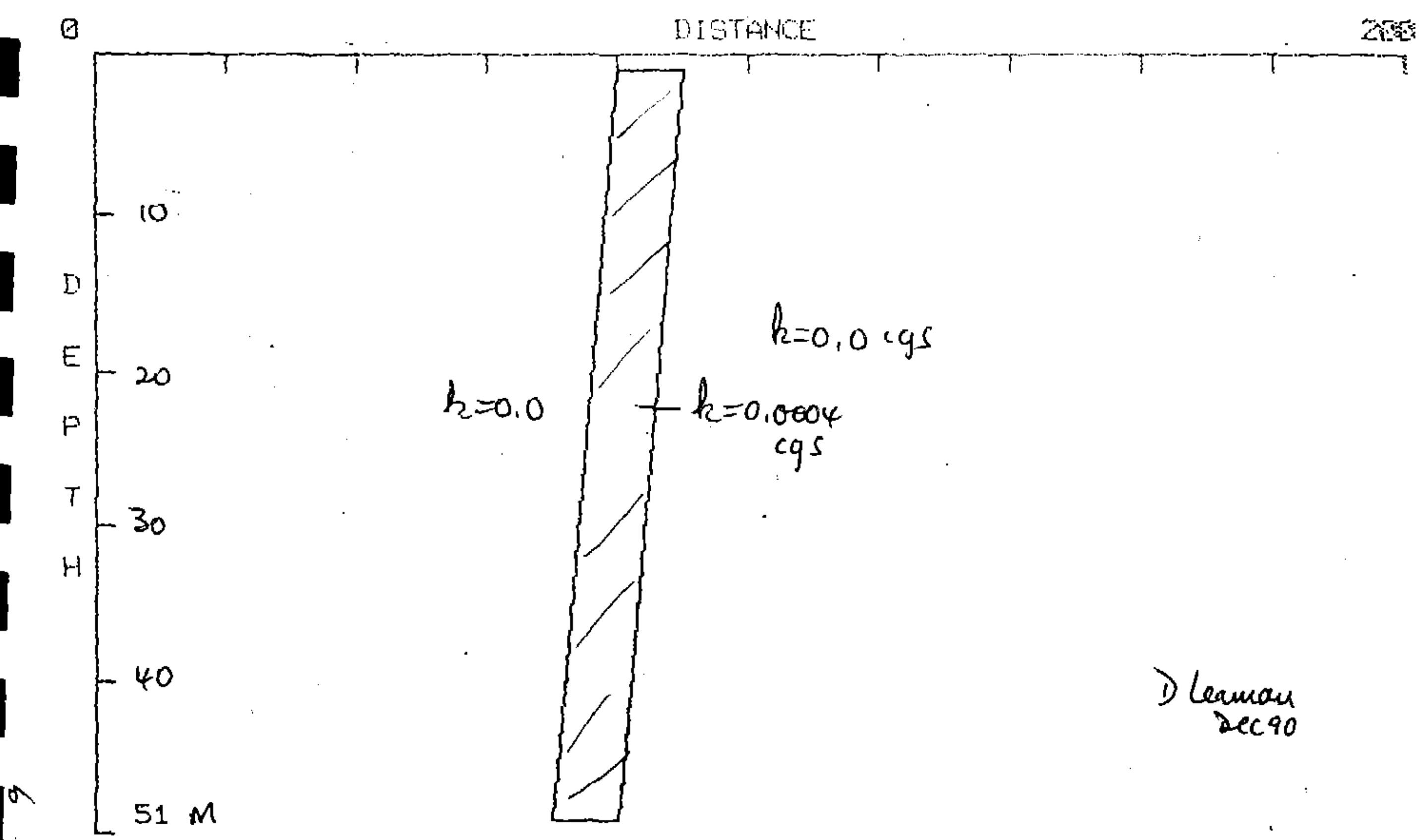
FIGURE 8

LINE PARAMETERS - ORIGIN,LIMIT,INCR 0 200 .5

0028 126029



ALBERTON C1 900E 350-550N



MAGNETICS MODEL PROFILE C1: 900E 350-550N

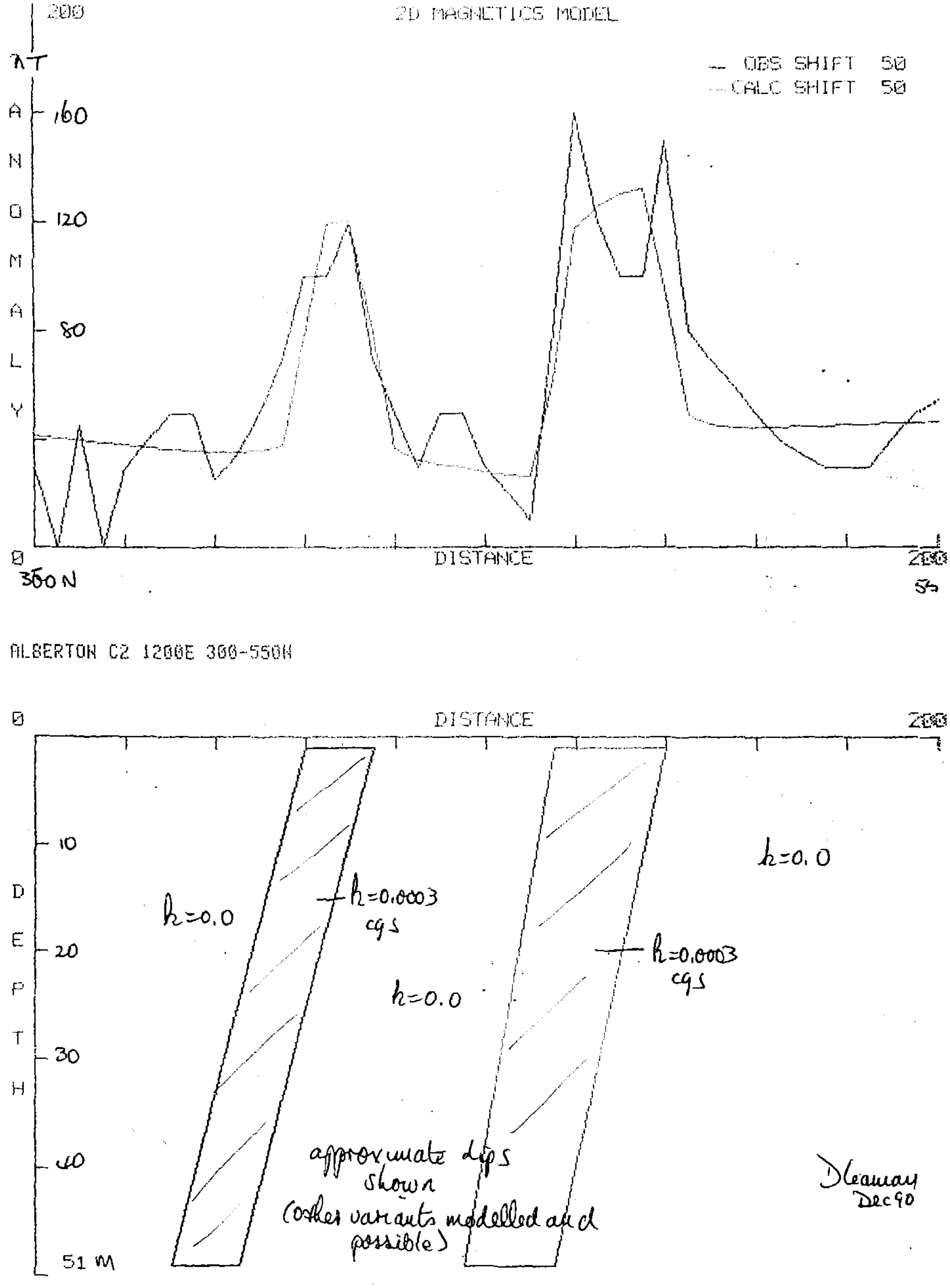
FIGURE 9

61750.0 -71.0 13.0 0.0 45.0

126030

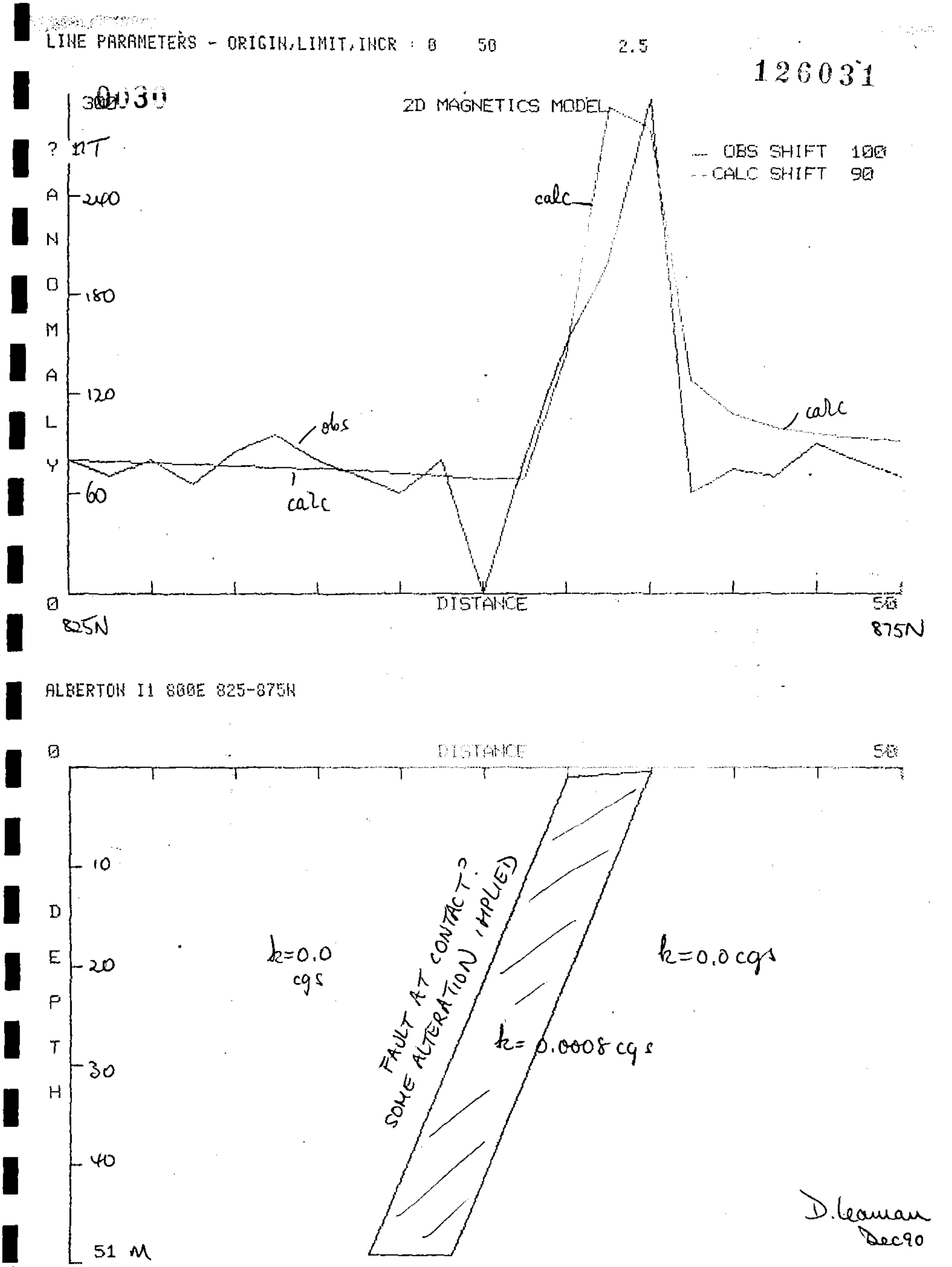
LINE PARAMETERS - ORIGIN,LIMIT,INCR : 0 200 5

0029



MAGNETICS MODEL PROFILE C2: 1200E 300-550N FIGURE 10

126031



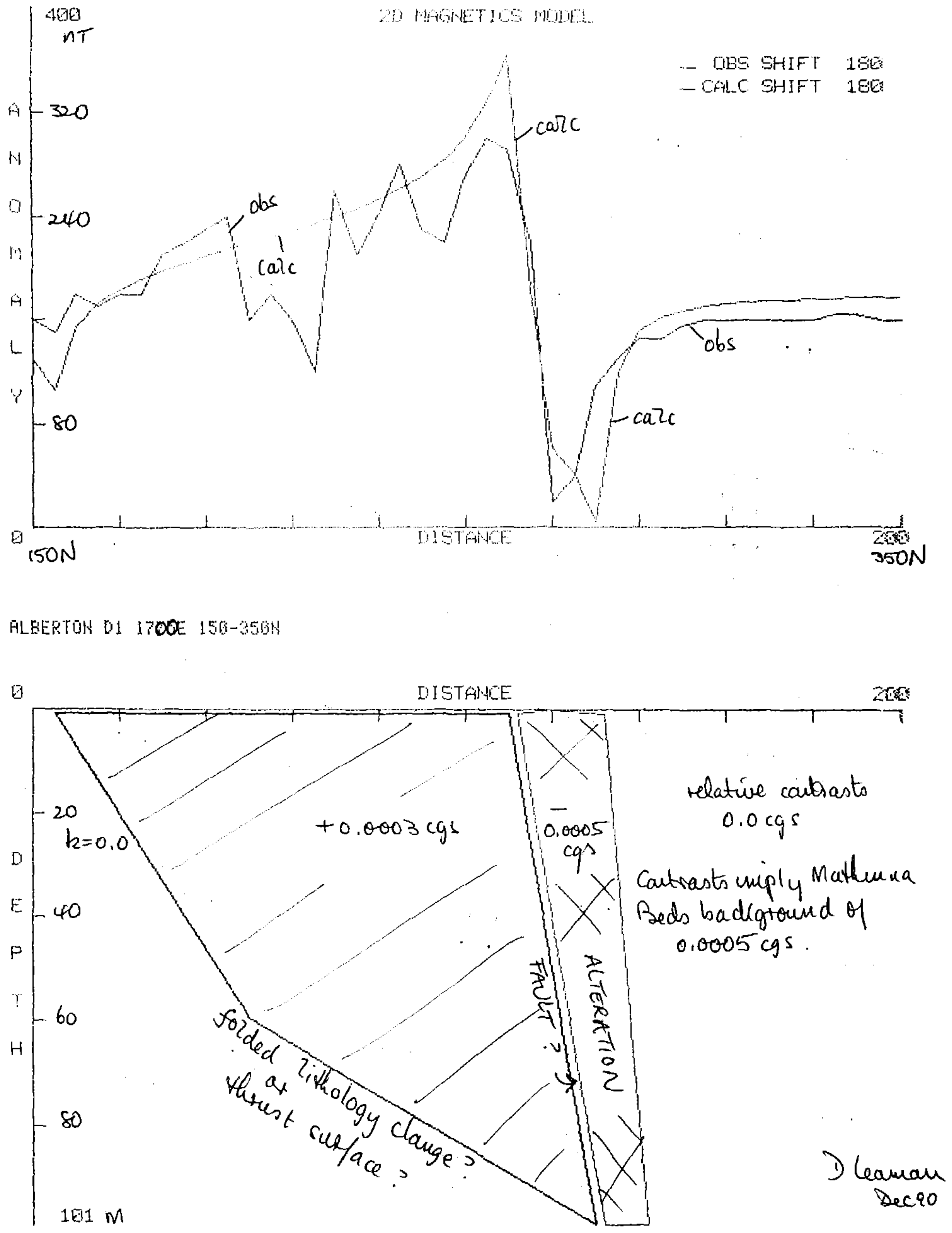
MAGNETICS MODEL PROFILE I1: 800E 825-875N

FIGURE 11

```
    5      1      110     1      130    100       50     60
  2.0     -0.5        0.0        0.0        0.0
  120      0      132     1      142    100      132    100       112      1
```


LINE PARAMETERS - ORIGIN,LIMIT,INCR : 0   200   5

126032



MAGNETICS MODEL PROFILE D1: 1775E 150-350N

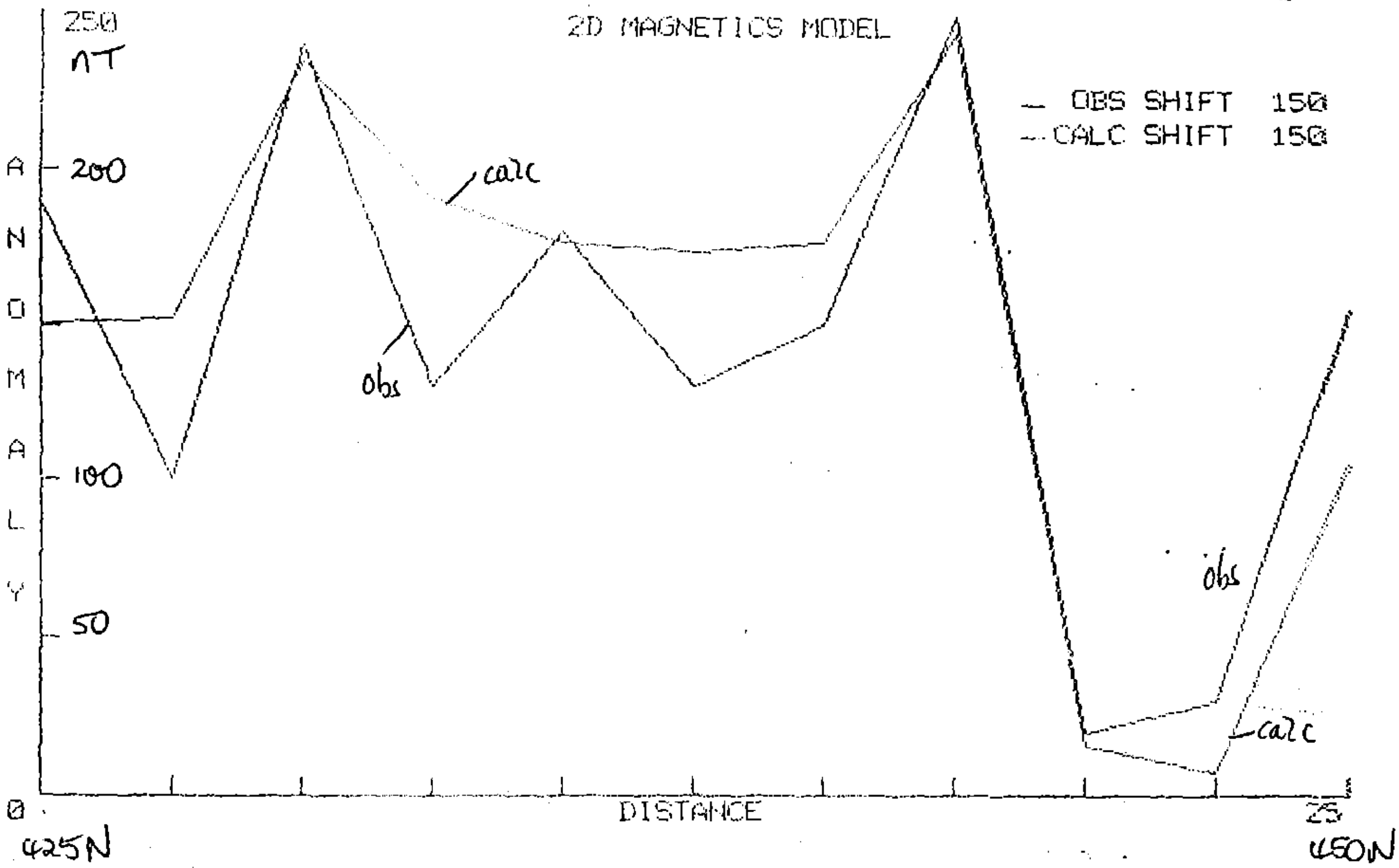
FIGURE 12

61750.0 -71.0 13.0 0.0 45.0

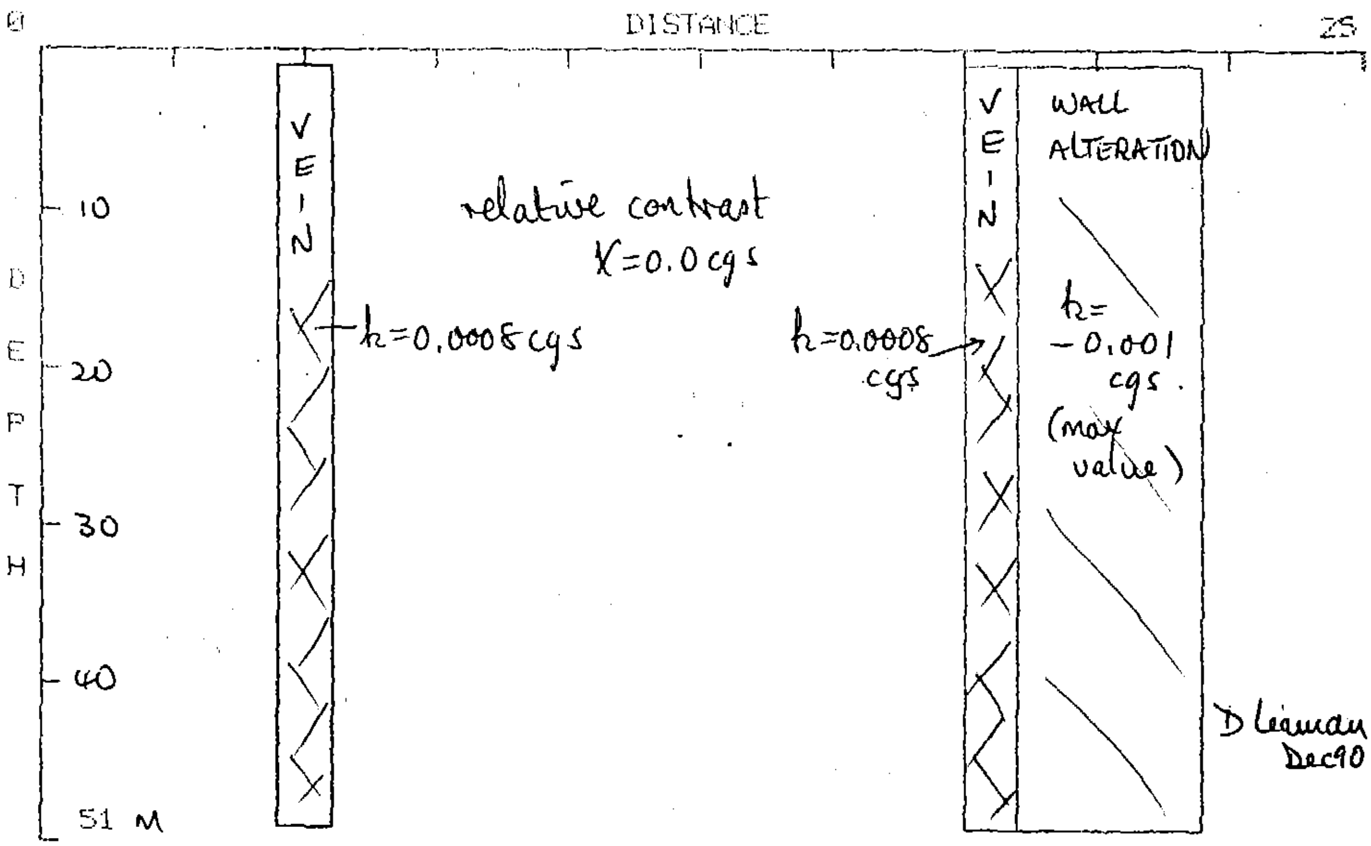
0032

LINE PARAMETERS - ORIGIN,LIMIT,INCR : 0 25 2.5

126033



ALBERTON D2 2000E 425-450N



MAGNETICS MODEL PROFILE D2: 2000E 425-450N

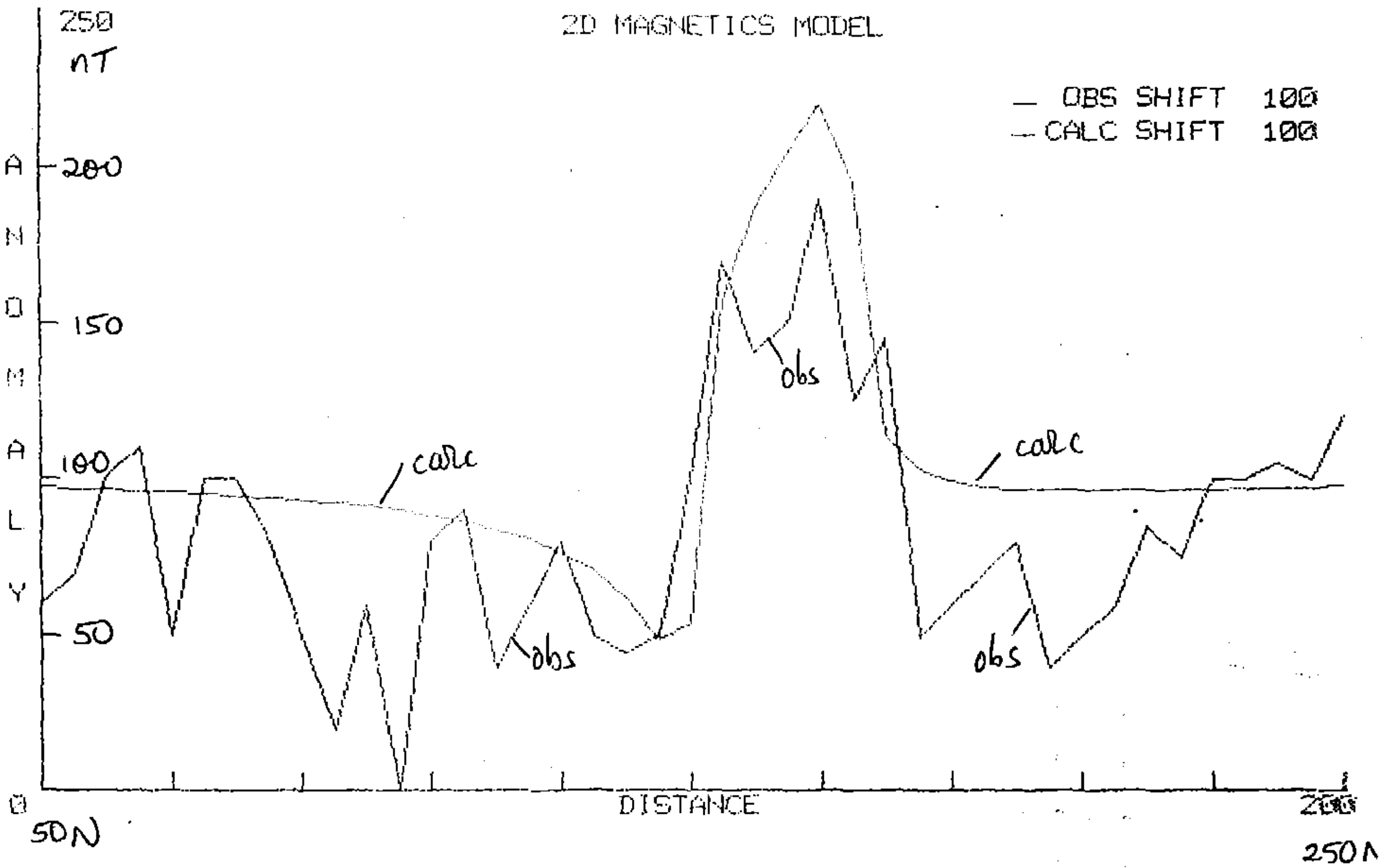
FIGURE 13

INTENSITY	INCLINATION	DECLINATION	OBS LEVEL	LINE DIRECTION
61750.0	-71.0	13.0	0.0	45.0

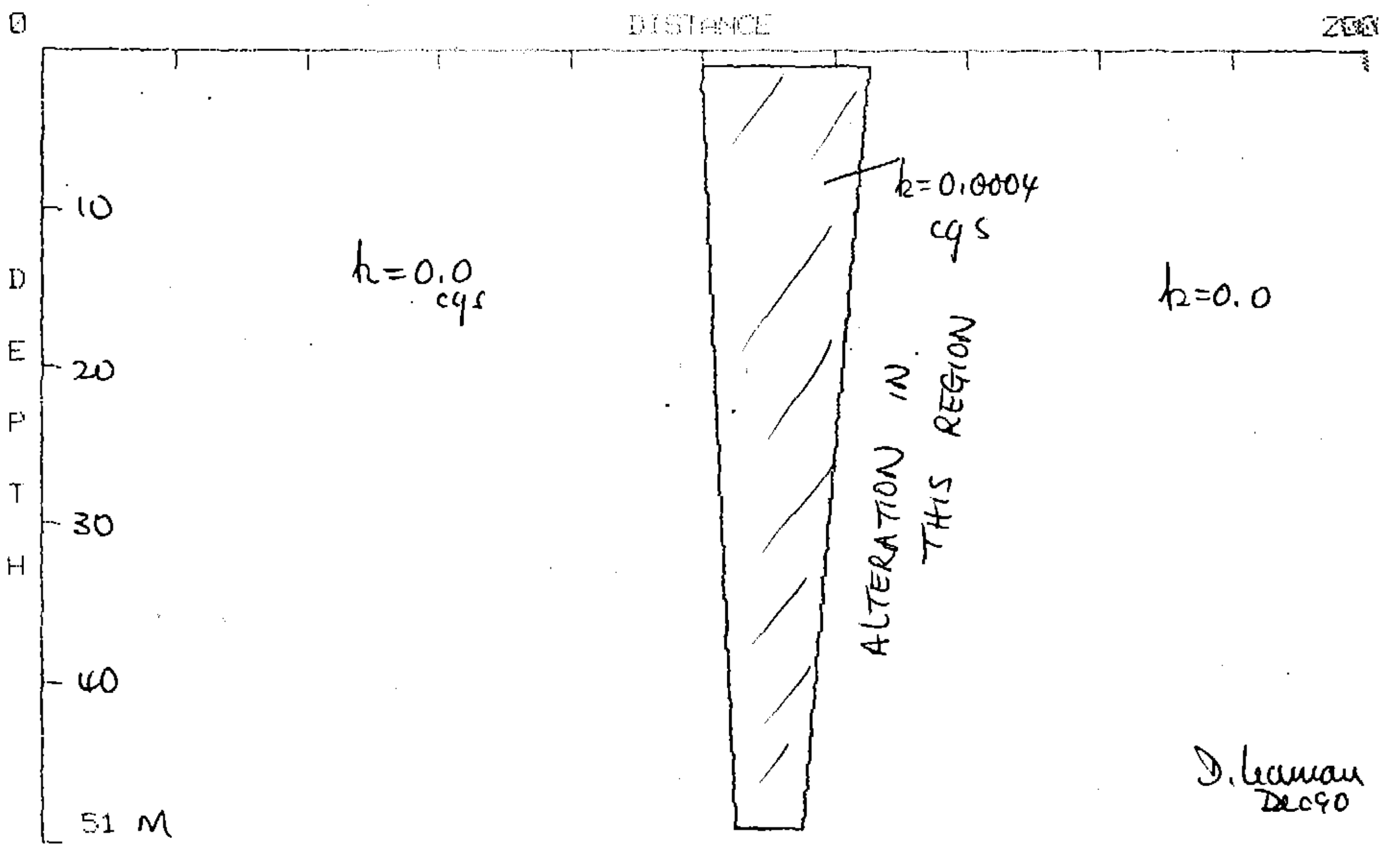
0033

LINE PARAMETERS - ORIGIN,LIMIT,INCR : 0 200 5

126034

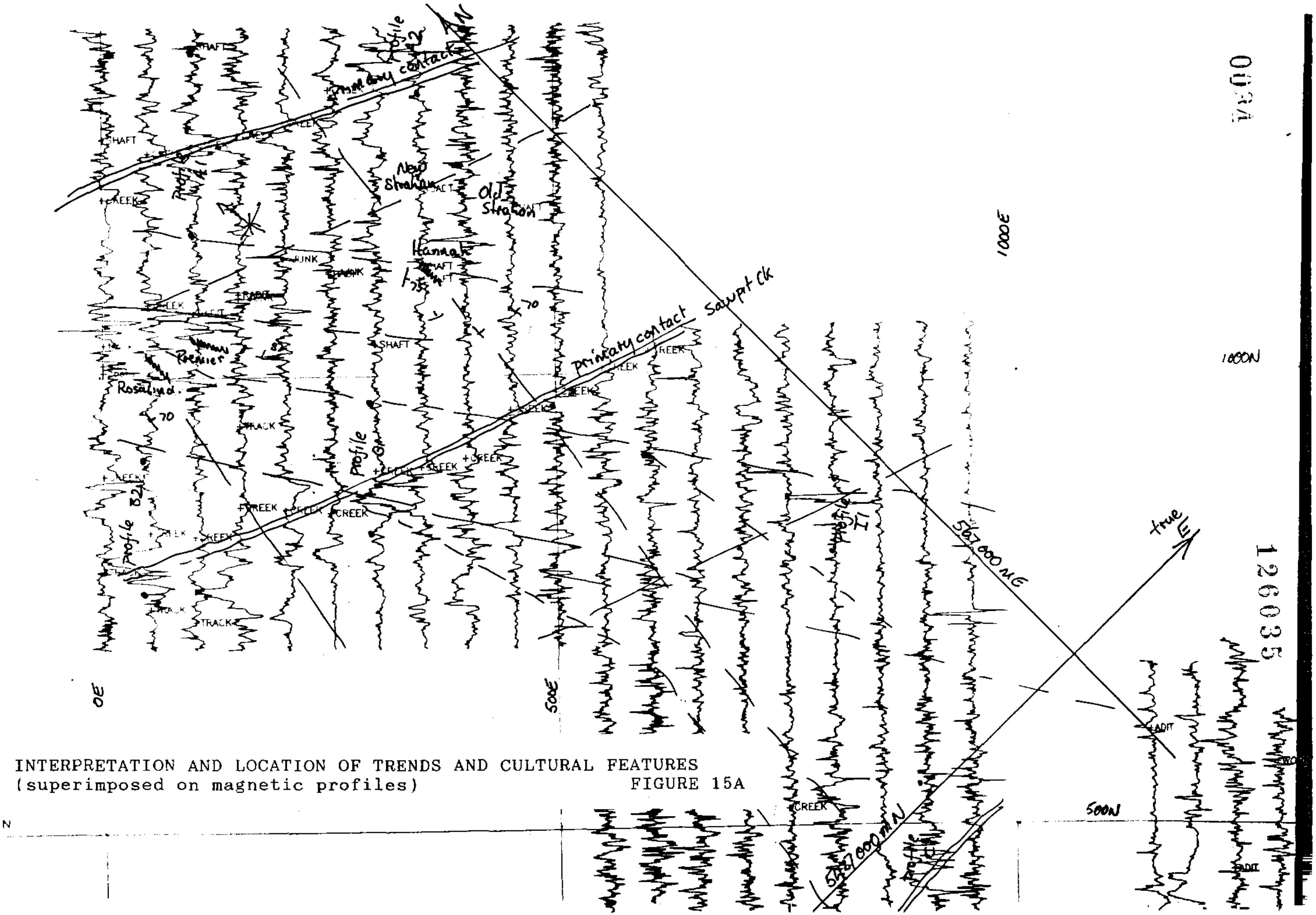


ALBERTON E1 2250E 50-250N



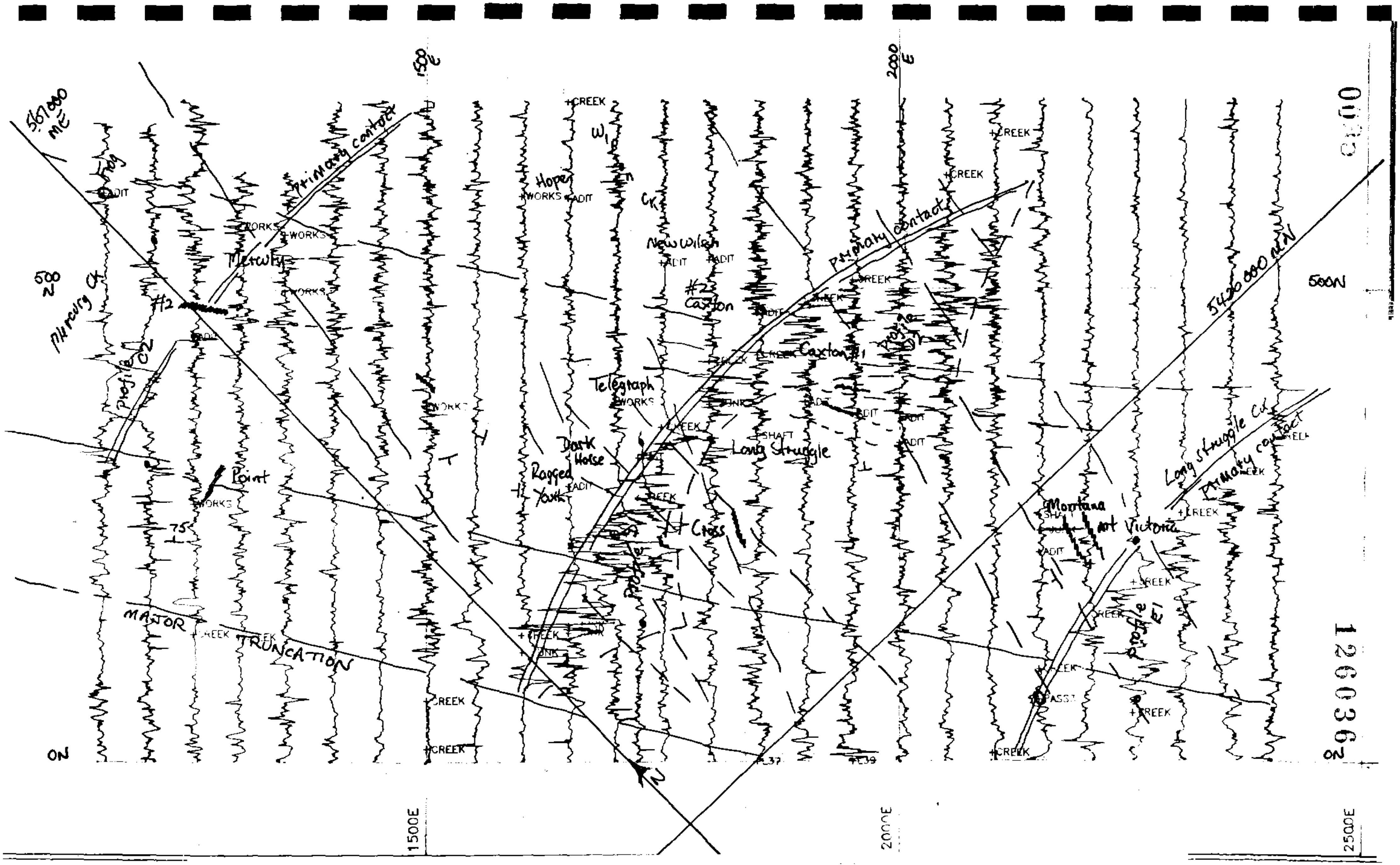
MAGNETICS MODEL PROFILE E1: 2250E 50-250N

FIGURE 14



INTERPRETATION AND LOCATION OF TRENDS AND CULTURAL FEATURES (superimposed on magnetic profiles)

FIGURE 15A



INTERPRETATION AND LOCATION OF TRENDS AND CULTURAL FEATURES
(superimposed on magnetic profiles) FIGURE 15B

APPENDIX ONE

GEOPHYSICAL RESEARCH INSTITUTE INITIAL REPORT

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THE GEOPHYSICAL RESEARCH INSTITUTE

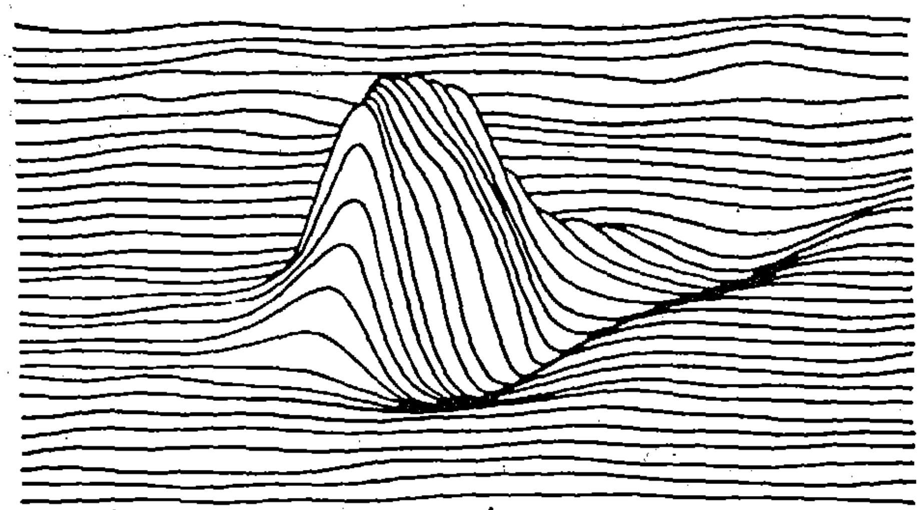
THE UNIVERSITY OF NEW ENGLAND ARMIDALE, N.S.W. 2351

TELEPHONE: (067) 732617, TELEX: AA 66050, FAX: (067) 733122

Project No. 9025.

A CAESIUM VAPOUR MAGNETOMETER SURVEY FOR GOLD EXPLORATION.

Garden Ridge,
Alberton, Tasmania.



MINERAL EXPLORATION, ARCHAEOLOGICAL EXPLORATION, CAESIUM MAGNETOMETERS, GEO-RADAR, GEOPHYSICAL COMPUTING, INDUCED POLARIZATION, GEOTECHNICAL SERVICES.

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Geophysical Research Institute.
Project No. 9025.

A CAESIUM VAPOUR MAGNETOMETER SURVEY FOR GOLD EXPLORATION.

Garden Ridge,
Alberton, Tasmania.

Prepared For:
Oceanea Tasmania Pty. Ltd.

By:
John M Stanley, Ph.D.
Peter J Clark, M.Sc.
October, 1990.

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A CAESIUM VAPOUR MAGNETOMETER SURVEY FOR GOLD EXPLORATION

INTRODUCTION

The Geophysical Research Institute has developed a rapid sampling caesium vapour magnetometer system which can efficiently record very closely spaced magnetic data.

Very closely sampled data recorded near the ground surface substantially increases the information bandwidth compared with conventional magnetometer surveys. Information in the band between 1 m and 20 m wavelength has provided an effective method for defining high frequency anomaly signatures such as those associated with narrow oxidized zones, alluvials containing concentrations of heavy minerals, narrow dykes and textual breaks occurring across shears.

In order to obtain this short wavelength information, magnetic field measurements must be determined at regular distance increments of 0.5 m along traverse lines. Ideally, traverse lines would also be separated by only 0.5 m, but a compromise line spacing of 10 m is usually justified.

The objective of this magnetic program was to endeavour to map oxidized zones in the wall rocks adjacent to potentially auriferous veins and faults. Extremely adverse conditions of access dictated that a further compromise in line spacing be made if a reasonable areal coverage was to be obtained within budget constraints. As no previous magnetic data was available from this geological environment, this excessively undersampled data (in the direction perpendicular to the survey lines) was intended to at least provide information from which future survey specifications might be defined and the merit of the magnetic method assessed for this exploration target.

LOCATION OF THE SURVEY GRID.

The area of interest was located near the Dorset River on the western flank of Garden Ridge. The nearest community was Alberton, approximately two km to the north. Garden Ridge is in the Mt Victoria area on the Ringarooma 1:25 000 map sheet, in northern Tasmania.

Prior to our commencement, a survey grid area had been defined by the marking of three, parallel control lines each supposedly separated by 350 m when projected to a horizontal plane. (A vertical relief of 400 m existed within the 75 Ha grid area.) From the sketch maps provided for us, the location of the survey grid with respect to Australian Map Grid coordinates is shown in Figure 1. All of our data has been projected onto the assumed grid as specified in this figure. However, attention is drawn to our suspicion that the three control lines were in fact not parallel. Information provided to us after the survey indicates that the true position of the control lines was more accurately defined by the dashed lines mapped in Figure 1.

It was also noted that the labelling of traverse line numbers along one of the control lines contained an error. The line numbers on control line 0 N were displaced 50 metres to the east. The two consistent control lines (350 N and 700 N) were assumed to be correct.

INSTRUMENTATION.

A TM-4 caesium vapour magnetometer was used as the field magnetometer. The system is capable of a maximum sample rate of 100 measurements per second with a reading accuracy of 0.001 nT, or of 400 measurements per second to an accuracy of 0.1 nT. Measurements taken at these high rates may be effectively filtered to eliminate 50 Hz electromagnetic interference existing at some localities. The 50 Hz filtered data is then resampled at regular distance increments along each traverse and this data is recorded.

The TM-4 system involves two operators. One operator is required to hold the sensor while the second controls the data acquisition system. The sensor is connected to the controller by a 6 m coaxial cable which allows the sensor to be maintained at a distance from the control electronics and therefore free from magnetic and electronic interference. The second operator may then also use a magnetic compass for navigation without this also interfering with the magnetic measurements.

The TM-4 has an in-built cotton thread odometer which electronically triggers the magnetometer to take measurements at preset nominal sample intervals. When the start and end coordinates of a profile are known, the actual sample interval is calculated during data recovery. By this method, it is normally possible to obtain better than 0.1% positional accuracy along lines.

During the survey, the current magnetic profile is displayed on the in-built graphics display screen. This facility enable immediate data validation, alerts the operator if small items of magnetic junk are encountered in the bush and it enables some on-site interpretation.

The logging system is interactive and permits the operator to record notes during the survey. Natural and cultural features such as creeks, geological exposure, fences, mine shafts or control pegs may be permanently recorded in the data file in order to assist interpretation. These observations can also be used to provide position control if grid control is not otherwise available.

A Geometrics model G856 proton precession magnetometer reading to 0.1 nT and sampling every 30 seconds was used for the base station.

DATA PROCESSING

Base-Station Correction.

All data were corrected for temporal changes in the Earth's magnetic field. The temporal variations were recorded on the Geometrics G856 base-station at thirty second intervals.

Data Recovery.

Individual magnetic measurements were recorded at regular distance increments as determined by an in-built cotton thread type odometer. Errors in the odometer (typically 0.5%) and slope corrections can be performed when true control distances are known. In the case of this survey, control lines were provided at 350 m intervals. By dividing the true length of each traverse segment between known control points by the number of data points in the segment, a linear adjustment can be performed which can be expected to reduce the positional error to typically 0.1%. However, as noted previously, there was uncertainty in the position of the control lines provided, and therefore after processing the data there still exists some uncertainty in the true position of the data.

Low-Pass Filtering.

Inspection of the data (Figures 2 and 3) revealed information that was predominantly in the 1 to 20 m waveband and 25 to 200 nT amplitude range. The short wavelength character indicated the importance of proper sampling practices both along lines and across lines.

Various low-pass filtering processes were attempted in order to investigate whether long wavelength components might be extracted from the data. These long wavelength components could be expected to be less adversely effected by the wide sampling of the data across the lines. While some linear features were preserved after various low-pass filters were applied, most of the useful information in the data was found to be contained in the high frequency band of the signal spectrum.

a. Butterworth, Low-Pass Filter.
This is a linear filter which discriminates on wavelength only. Figure 4 shows the results of applying a zero phase, 6th order Butterworth filter with a low-pass cut-off at 20 m wavelength.

b. Running Median Filter.
Median filters discriminate on the basis of amplitude and anomaly width. Figure 5 shows the result of a median filter with a window of 40 data points (20 m width).

c. Depth Discriminating, Non-Linear Filter.
We have determined that an advantageous approach to the removal of near surface interference such as that due to maghemite or laterite, is to apply a hybrid filter. This filter consists of a running median which modifies only data that falls outside a preset threshold range. This range is normally set at about one half of the RMS noise. Values that lie outside of this range are then interpolated back into the data from the adjacent accepted values. By this means, the filter does not necessarily modify every turning point in the data. Having stripped the long wavelength energy out of the outlying data values, the application of a low-pass Butterworth filter with a cut-off wavelength equal to the median window width, will complete the filtering of all anomalies with sources occurring within a depth of approximately half the cut-off wavelength. The filter applied to this data was designed with specifications that would suppress all anomalies which originated within approximately 10 metres of the ground surface.

Artificial Illumination Enhancement.

Artificial illumination can be effective in highlighting very subtle linear features, particularly when they are masked by relatively high amplitude, long wavelength anomalies. Artificial illumination preferentially enhances features that are perpendicular to the direction of illumination. Figures 6 and 7 show incident light enhancements of data processed with the hybrid filter. The incident light angles were 45 and 315 degrees respectively. Figure 8 shows an incident light enhancement (from 45 deg.) in grey scale, superimposed upon the filtered data printed in colour.

Scale Compression Enhancement.

An alternative attempt to reduce the effect of improper sampling across traverse lines was to compress the map scale by a factor of 10 in that direction only. The effect is an illusion of properly sampled data from an area where all linear anomalies happened to be oriented close to parallel to the survey direction. Linear coherence can now be more easily recognised.

DATA PRESENTATION.

The data has been provided in four formats.

a Profile Maps.
Profile maps of the raw data have been provided at three different scales that are most suited to quantitative interpretation and pattern recognition.
Note that magnetic positive is to the west.

b Colour Images.
The raw and filtered data have been presented as histogram equalized colour images at 1:5 000 scale.

c. Isometric Images.
Isometric images often compliment colour images. In particular, isometric images often reveal fine detail that is lost in colour images when the dynamic range of the data is large. Unfortunately, the isometric images in Figures 10 to 15 are made relatively ineffective by the sampling bias.

d. Digital Data.
The base-station corrected and recovered data was provided on 320 Kbyte, 5.25 inch floppy diskettes. An XYZ file and a GRI line format file were supplied. A Fortran subroutine for reading the GRI file format was provided.

INTERPRETATION.

Interpretation of the Garden Ridge data was not required of the GRI. However, a preliminary interpretation map (Figure 21) has been provided along with the following comments.

1. The most notable feature of the data was a zone of high amplitude, high frequency signature. Ragged Youth creek significantly hugs the northern boundary of this signature zone suggesting that the creek course is structurally controlled. The character of the signature is typical of an alteration zone although it could also be associated with a magnetically inhomogeneous geological unit or magnetite rich alluvial horizon.

2. Low-pass filtering enhanced a magnetic low feature which coincided with Ragged Youth creek even where it diverged from the signature zone referred to above. This feature appears to provide a structural control over both the position of the creek and the boundary of the above mentioned signature zone.

3. Both of the above magnetic features and the direction of Ragged Youth creek are abruptly terminated at the intersection with a cross-cutting signature boundary in the south-western corner of the survey area (local grid).

4. Linear features may be recognized as magnetic highs, lows or magnetically noisy bands.

5. Zones may be recognized by their signature.

6. Off-sets in some of the linear magnetic features have been noted, suggesting the presence of shears.

Figure 21 contains an interpretation map showing the major anomalous magnetic features.

Figure 22 contains a map of observations recorded by the operators during the survey. This map notes the position of mines and creeks.

Note:
This map of observations may be used to more accurately relocate the position of interpreted features on the ground given the uncertainty in the accuracy of the survey control lines.

CONCLUSIONS.

The adverse terrain and vegetation conditions substantially restricted our survey rate. The increased cost associated with these conditions correctly dictated that the line spacing be 50 m rather than the scientifically more logical 10 m or less.

The data obtained has provided evidence that structural information is contained in anomaly wavelengths in the 1 m to 20 m band. To more fully access this information, a line spacing of 10 m will be required. Filtering attempts to compensate for the sampling bias were of limited success.

Before recommending that a 10 m line spacing survey be commissioned, it would be prudent to determine whether the cost of obtaining the structural information available from such a survey is in fact justified in the endeavour to locate commercial mineralisation. If the features recognized from this sample data set bear little relationship to the known mineralisation, then further expenditure on magnetics would not be justified.

APPENDIX A

Breakdown of Costs.
Project No. 9025.

Garden Ridge, Tasmania.

CLIENT:	Minstock Mining Group.
CONTACT:	Les Pavitt.
SURVEY TYPE:	TM-4 Ground Magnetics.
OPERATORS:	Jonathan P Wilkie-Snow.
	Paul D Harbison.
SUPERVISOR:	Jonathan P Wilkie-Snow.

MOBILIZATION:

Personnel:	2 days	@	$ 400.00	$ 800.00	
Vehicle:	0 days	@	$ 100.00	$ 0.00	
Mileage:	0 km	@	$ 0.25	$ 0.00	
Accomm.:	0 night	@	cost	$ 0.00	
Airfares:		@	cost	$ 1,304.00	
Sub Total:				$ 2,104.00	
% charged (if shared mobilization) x 100 % =					$2,104.00

SURVEY:

Personnel and Equipment:	5 days	@	$ 850.00	$ 4,250.00	
Downtime:	1 day	@	$ 0.00	$No Charge	
Line kms (foot):	20 km	@	$ 30.00	$ 600.00	
Line kms (ATV):	0 km	@	$ 17.50	$ -	
Vehicle:		@	cost	$ 1,107.80	
Accomm.:		@	cost	$ 511.50	
Sub Total:					$ 6,469.30

ADDITIONAL SERVICES:

Interpretation:	1 day	@	$ 400.00	$No Charge	
Modelling:	0 days	@	$ 400.00	$No Charge	
Processing:	4 days	@	$ 400.00	$No Charge	
Sub Total:					$ 0.00
TOTAL					$ 8,573.30

APPENDIX B

Survey Technical Summary.
Project No. 9025.

Garden Ridge, Tasmania.

OBJECTIVE:	Geological Mapping.	
CLIENT:	Minstock Mining.	
CONTACT:	Les Pavitt.	
SURVEY DATES:	1st - 6th October, 1990.	
SURVEY DURATION:	6 days.	
DOWN TIME:	1 day due to rain.	
SURVEY TYPE:	TM-4 Cs Vapour High Definition Ground Magnetics.	
OPERATORS:	Jonathan P Wilkie-Snow.	
	Paul D Harbison.	
SUPERVISOR:	Jonathan P Wilkie-Snow.	
ACCOMMODATION:	Ringarooma Hotel (30th September - 4th October)	
	Lords Hotel Scottsdale (5th - 6th October).	
SURVEY SPECS:	Survey Mode:	Hand Carried.
	Line Bearing:	30°.
	Line Spacing:	15 m. 50M.
	Sample Interval:	0.5 m.
	Total Line Km:	15 km.
	50 Hz Filter:	OFF.
	Base Sample Interval:	30 seconds.
GRID SPECIFICATIONS:		
	Grid Type:	Local.
	Datum Reference:	Nil.
	Grid Boundaries:	0 E - 1250 E.
		0 N - 700 N.

SURVEY POSITIONING:

Three flagged base-lines had been provided. These were perpendicular to the survey direction and were separated by 350 metres.

OTHER COMMENTS:

Note uncertainties in the position of control lines as referred to in the text.

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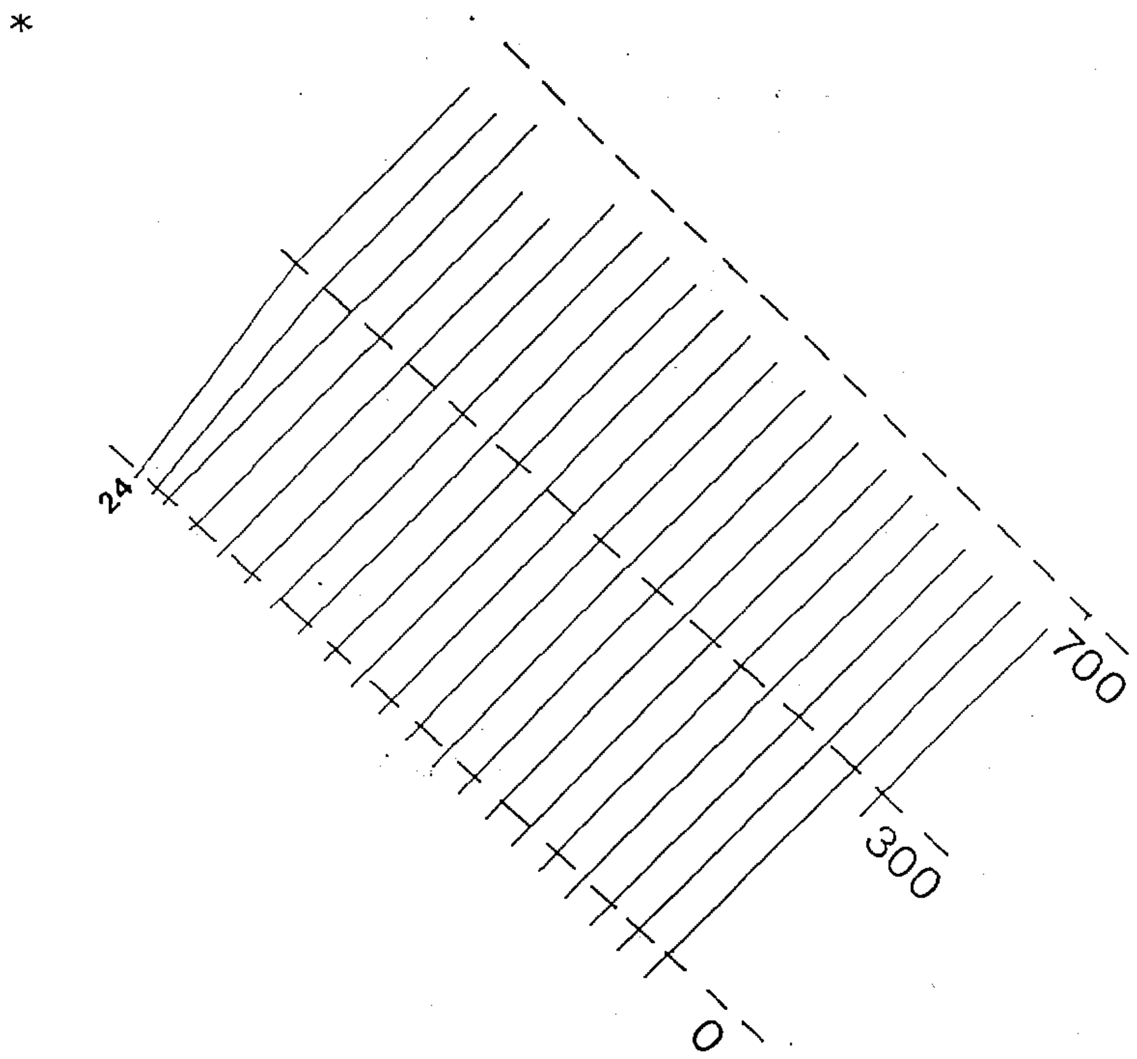

Remarks:

Surveyed and Processed by:

THE GEOPHYSCIAL RESEARCH INSTITUTE
University of New England
Armidale NSW 2351
Tel: (067) 73 2617
FAX: (067) 71 1661

LEGEND

—— Assumed Grid.

– – Suspected True Location of The Control Lines.

* At this point a slope corrected topolite length gave a distance of 450 metres between Control Lines 350 N and 700 N.

5 cm

Location Map of

TOTAL MAGNETIC INTENSITY

Location: ALBERTON, TASMANIA
Processed For: OCEANEA TAS. P/L
Map Scale: 1:10000

FIGURE NO. 1

APPENDIX TWO

GEOPHYSICAL RESEARCH INSTITUTE COMPLETION REPORT

Note: Figure 10 of this report has not been reproduced separately. It contains cultural information and has been overprinted on Figure 3.

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THE GEOPHYSICAL RESEARCH INSTITUTE

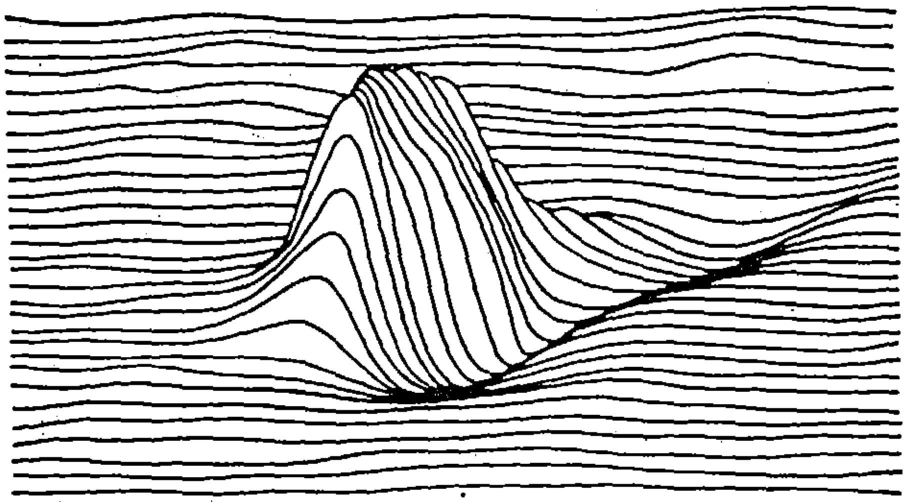
THE UNIVERSITY OF NEW ENGLAND ARMIDALE, N.S.W. 2351

TELEPHONE: (067) 732617, TELEX: AA 66050, FAX: (067) 733122

Project No. 9036.
(Supplement to Project No. 9025.)

A CAESIUM VAPOUR MAGNETOMETER SURVEY FOR GOLD EXPLORATION.

Garden Ridge,
Alberton, Tasmania.



INERAL EXPLORATION, ARCHAEOLOGICAL EXPLORATION, CAESIUM MAGNETOMETERS, GEO-RADAR, GEOPHYSICAL COMPUTING, INDUCED POLARIZATION, GEOTECHNICAL SERVICES.

Geophysical Research Institute.
Project No. 9036.
(Supplement to Project No. 9025.)

A CAESIUM VAPOUR MAGNETOMETER SURVEY FOR GOLD EXPLORATION.

Garden Ridge,
Alberton, Tasmania.

Prepared For:
Oceanea Tasmania Pty. Ltd.

By:
John M Stanley, Ph.D.
Peter J Clark, M.Sc.
December, 1990.

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CONTENTS

LIST OF FIGURES.

A CAESIUM VAPOUR MAGNETOMETER SURVEY FOR GOLD EXPLORATION

INTRODUCTION

In October this year the Geophysical Research Institute reported on a caesium vapour magnetometer survey conducted over the southern section of Oceanea Tasmania's Leases at Alberton. That survey was terminated prematurely after the magnetometer sensor was accidentally damaged. This report supplements our previous report with details of a follow-up survey.

LOCATION OF THE SURVEY GRID.

The area surveyed has been previously marked with a local grid. Having extended the area covered, the origin of this local grid was redefined. All of the data from the original survey was reprocessed and appended to the present survey. The figures accompanying this report therefore replace the previous figures. The "cultural feature" map (Figure 10) defines the position of creeks and major mines and this information best locates the data in relation to the Alberton gold field.

INSTRUMENTATION.

The instrumentation used in both surveys was identical (Ref: Report 9025).

DATA PROCESSING

Base-Station Correction.

All data were corrected for temporal changes in the Earth's magnetic field. The temporal variations were recorded with a Geometrics G856 base-station at 30 second intervals. The base-station location was identical during both surveys.

Data Recovery.

Data recovery was performed exactly as for our previous survey. Some uncertainty was noted to exist in the true position of the data because of difficulties in both establishing the base grid and in conducting the magnetic traverses in the mountainous, forested terrain. However, when a "cultural feature" map (showing creek crossings encountered during the survey) plotted at 1:25 000 scale was overlaid upon a 1:25 000 topographical map, the creek positions at either end of the survey grid (some 2.5 km apart) were observed to match very well. It could be concluded from this that the maximum error in the position of any data point was less than 25 m. As previously noted, the most precise relocation of any magnetic anomaly can be achieved by measuring its distance from the nearest control point such as a base-line or feature (mine or creek) noted on the cultural feature map.

Low-Pass Filtering.

The most useful filters determined in our previous investigation were the Low-Pass Butterworth (10 m cutoff) and a Depth Discriminating, Non Linear Filter designed to suppress dipolar anomalies originating within approximately 10 metres of the ground surface. Artificial illumination in grey scale applied from 45 degrees was superimposed upon the filtered data printed in colour.

DATA PRESENTATION.

The data has been provided in three formats.

a Profile Maps.
Profile maps of the raw data have been provided at four different scales (Figures 1 - 6) that are most suited to quantitative interpretation and pattern recognition. Note that magnetic positive is to the west.

b Colour Images.
The raw and filtered data was presented as histogram equalized colour images at 1:5 000 scale (Figure 7). The filtered data was presented as shaded relief in grey scale superimposed upon colour at 1:5 000 scale (Figures 8 and 9).

c. Digital Data.
The base-station corrected and recovered data was provided on 320 Kbyte, 5.25 inch floppy diskettes. A Fortran subroutine for reading the GRI format writing to an XYZ format file was provided.

INTERPRETATION.

Figure 11 contains a map upon which the most obvious magnetic features have been sketched. The location of mine adits and shafts have also been plotted.

The feature most confidently recognized from the data are linear magnetic "lows" oriented at approximately 75° magnetic. Each of these linears is accompanied by a creek but there is evidence that the creek is following a geological structure, rather than the magnetic anomaly being associated with the creek alluvials.

Each of the above mentioned linears are associated with a magnetically noisy zone. The source of this magnetic noise is near surface. Occurrences of very magnetic, ferruginous, (meta?) sediments were noted. These noisy zones could be due to alluvials and scree that has been shed from potentially mineralized alteration occurring along shears.

A pattern of very narrow, sometimes positive, sometimes negative linear features can be recognised striking between about 300 and 340° magnetic. These can only be mapped where linear continuity extends over a long distance. Even the most obvious of these features cannot be mapped with great precision because the line spacing was too wide. We feel sure that these structures could be mapped in great detail from a closely spaced survey. However, a closely spaced survey would only map the structures where they exist close to the ground surface.

The magnetic data also contained a number of localized areas where the magnetic field was anomalously high. Some of these were probably related to concentrations of the previously mentioned ferruginous scree. However, at 1700 E, 200 N (local grid) a more significant anomaly was noted. The centre of this anomaly was relocated and marked with bright pink flagging. This point was about 10 m south (local grid) from a conspicuous adit. An in-fill line was surveyed 25 m south of the adit. Figure 2 contains the magnetic profiles over this anomaly. The northern contact of the anomaly source is approximately 15 m from the Wilson Creek. The source must occur close to the ground surface (as evidenced by a very steep inflection point) and it must extend to considerable depth (as evidenced by a long flank extending 75 or 100 m to the north). The adit shown must drive through this body and a geological examination would be readily possible.

CONCLUSIONS.

Interpretation of the data has been severely frustrated by the wide separation between survey lines. There is ample evidence that many narrow structural features are characterized by a magnetic signature. However, to reliably correlate narrow features from traverse lines that were separated by 50 m is nearly impossible. It is felt that considerably more information could be obtained from magnetics if the line spacing were reduced to 10 or 12.5 m. The logistical difficulties and additional cost involved in surveying with a closer line spacing are a major problem and clearly it is wise to establish the economic value of the presently available information before contemplating a more detailed survey. A follow-up program to establish whether a relationship exists between the structures that can be mapped by magnetics and economic mineralization must be given priority.

APPENDIX A

Breakdown of Costs.
Project No. 9036.

Garden Ridge, Tasmania.

CLIENT: Minstock Mining Group.

CONTACT: Les Pavitt.

SURVEY TYPE: TM-4, Hand Held.

OPERATORS: John M Stanley.
Warren Lee.

SUPERVISOR: John M Stanley.

MOBILIZATION:

Personnel:	2 days	@	$ 400.00	$ 800.00	
Vehicle:	0 days	@	$ 100.00	$ 0.00	
Mileage:	0 km	@	$ 0.25	$ 0.00	
Accomm.:	0 night	@	cost	$ 0.00	
Airfares:		@	cost	$ 1,201.00	
Sub Total:				$ 2,001.00	
% charged (if shared mobilization) x 100 % =					$ 2,001.00

SURVEY:

Personnel and Equipment:	5 days	@	$ 850.00	$ 4,250.00	
Downtime:	0 days	@	$ 0.00	$ 0.00	
Line kms (foot):	20 km	@	$ 30.00	$ 600.00	
Line kms (ATV):	0 km	@	$ 17.50	$ -	
Vehicle:		@	cost	$ 953.00	
Accomm.:	7 nights	@	cost	$ 767.00	
Sub Total:					$ 6,570.00

ADDITIONAL SERVICES:

Interpretation:	0 days	@	$ 400.00	$ 0.00	
Modelling:	0 days	@	$ 400.00	$ 0.00	
Processing:	0 days	@	$ 400.00	$ 0.00	
Sub Total:					$ 0.00
TOTAL					$ 8,571.00

APPENDIX B

Survey Technical Summary.
Project No. 9036.

Garden Ridge, Tasmania.

OBJECTIVE:	Geological Mapping.
CLIENT:	Minstock Mining Group.
CONTACT:	Les Pavitt.
SURVEY DATES:	25th - 30th November, 1990.
SURVEY DURATION:	6 days.
DOWN TIME:	Nil.
SURVEY TYPE:	TM-4, Hand Held.
OPERATORS:	John M Stanley. Warren Lee.
SUPERVISOR:	John M Stanley.
ACCOMMODATION:	Lords Hotel, Scottsdale.

SURVEY SPECS:

Survey Mode:	Hand Carried.
Line Bearing:	30°.
Line Spacing:	50 m.
Sample Interval:	0.25 m.
Total Line Km:	20 km.

GRID SPECIFICATIONS:

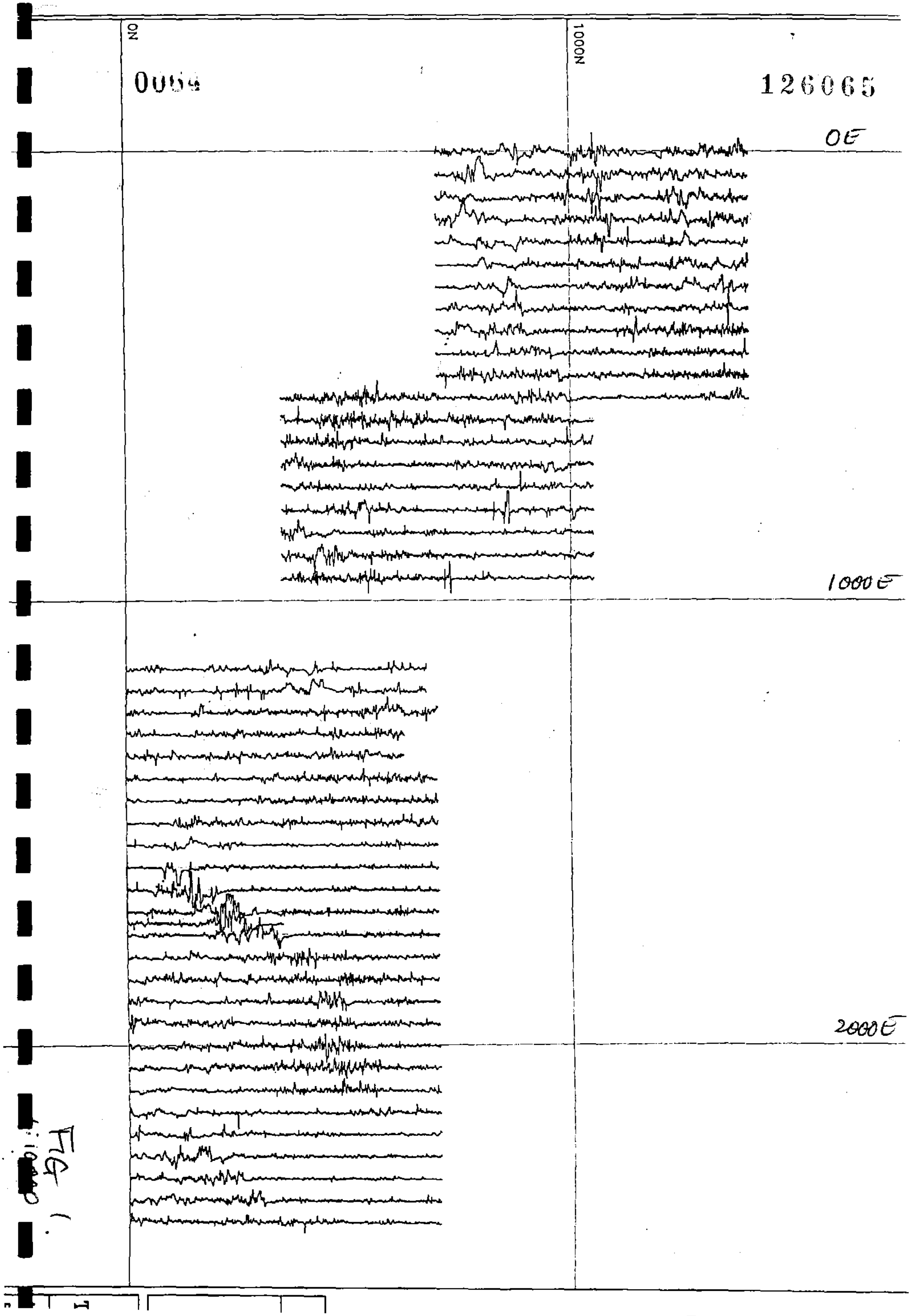
Grid Type:	Local.
Datum Reference:	N.A.
Grid Boundaries:	0 E - 2500 E. 0 N - 1400 N.

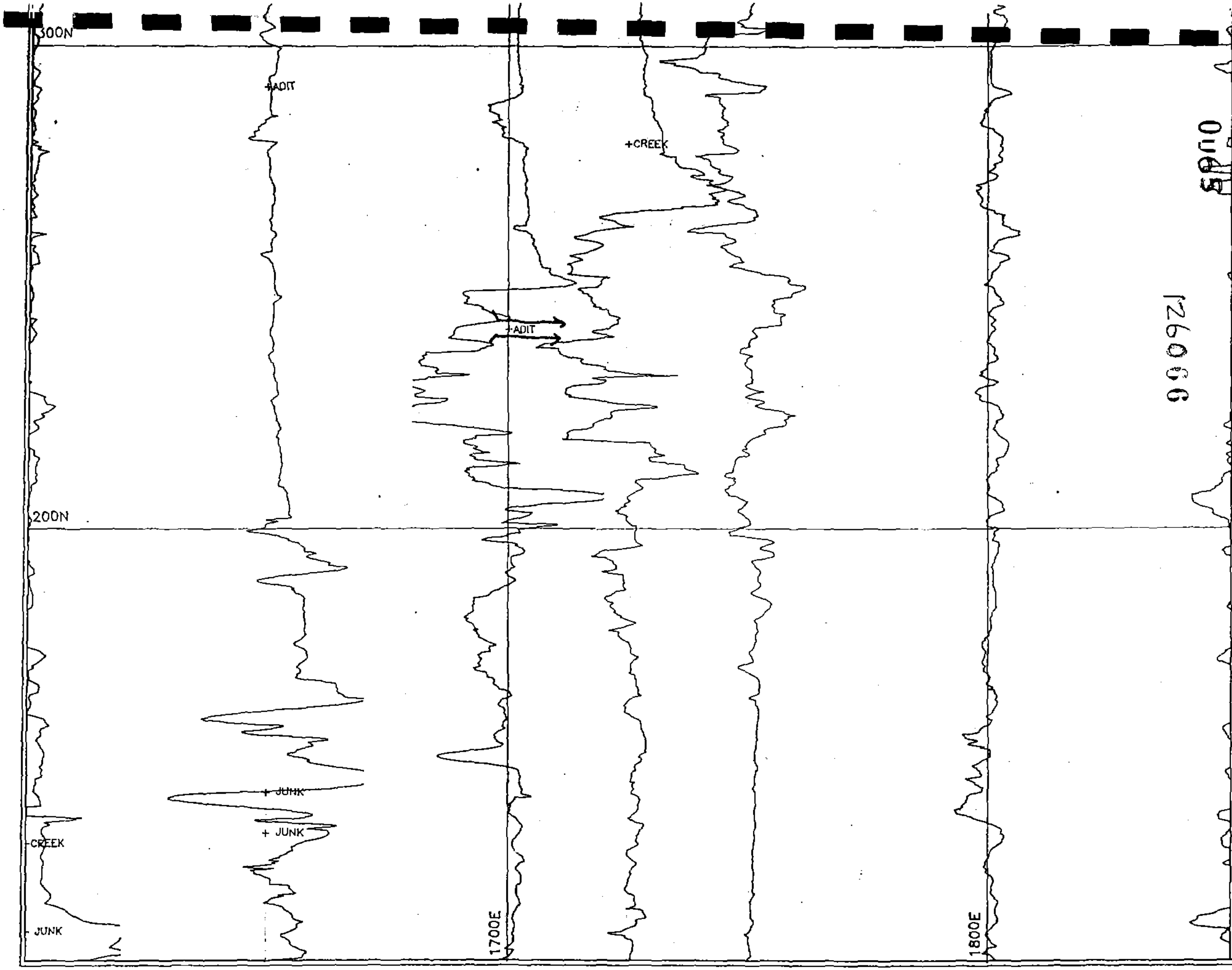
SURVEY POSITIONING:

Flagged control lines provided.

OTHER COMMENTS:

126065





Field:

TM-4 Cs Vapour
Sample Interval:
Line Spacing:
Resolution:

Base:

GEOMETRICS G-8
Sample Interval:
Resolution:

Data Processing:

BASE-STATION co
Non-linear filter:

Data Presentation:

Magnetic High: We

Legend

* The position flc
the survey
relocation
of interest

Map Spe

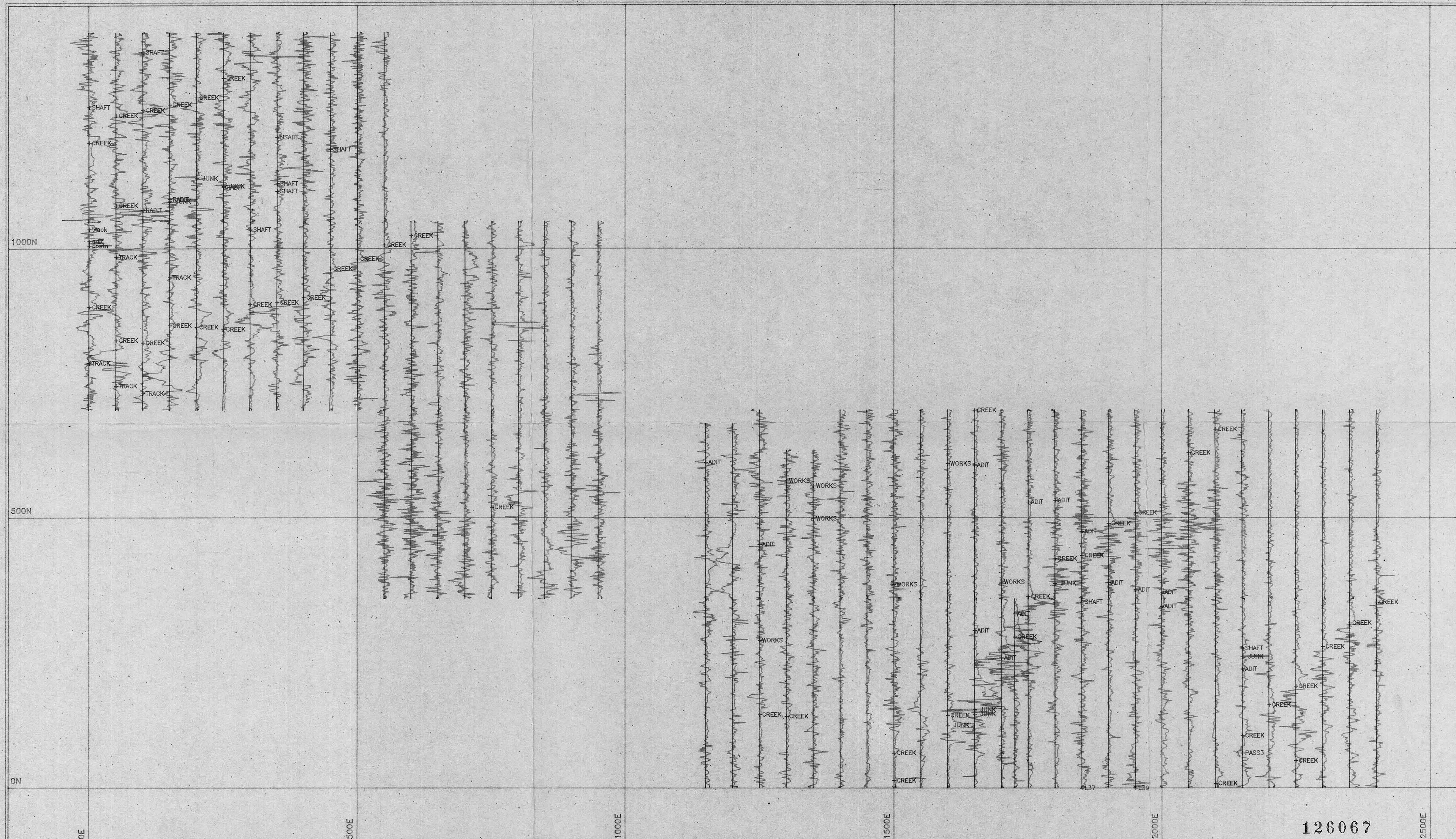
Map Scale:
Profile Scale:
Profile Base Level:
+ve Clipping Range:
-ve Clipping Range:
Data Plot Interval:
Processed By:
Processing Date:

Profile

TOTAL MAGNET

Location: ALE
Processed For: MIN
Map Scale: 1:1

FIGURE NO.



Remarks:

Surveyed and Processed by:

THE GEOPHYSCIAL RESEARCH INSTITUTE
University of New England
Armidale NSW 2351
Tel: (067) 73 2617
FAX: (067) 71 1661

Survey Instrument:

Field:

TM-4 Cs Vapour Magnetometer
Sample interval: 0,25m
Line Spacing: 50.0m
Resolution: 0.1nT
50 Hz Filter: OFF.

Base:

GEOMETRICS G-856 Proton Magnetometer.
Sample interval: 15.0 seconds.
Resolution: 0.1 nT

Data Processing:

BASE-STATION corrected.
Non-linear filter: W7R125 (DESPIKED)

Data Presentation:

Magnetic High: West
Magnetic Low: East

5 cm

Map Specifications

Map Scale:	1:5000
Profile Scale:	200nT/cm
Profile Base Level:	61725nT
+ve Clipping Range:	200nT
-ve Clipping Range:	200nT
Data Plot Interval:	1data points
Processed By:	P.J.CLARK
Processing Date:	12/13/90

Profile Map of

TOTAL MAGNETIC INTENSITY

Location: ALBERTON, TASMANIA
Processed For: MINSTOCK, 9036/9025
Map Scale: 1:5000

FIGURE NO. 3

10018

91-3210.

10019

Remarks:

Surveyed and Processed by:

THE GEOPHYSCIAL RESEARCH INSTITUTE
University of New England
Armidale NSW 2351
Tel: (067) 73 2617
FAX: (067) 71 1661

Survey Instrument:

Field:

TM–4 Cs Vapour Magnetometer
Sample Interval: 0.25m
Line Spacing: 50.0m
Resolution: 0.1nT
50 Hz Filter: OFF.

Base:

GEOMETRICS G–856 Proton Magnetometer.
Sample Interval: 15.0 seconds.
Resolution: 0.1 nT

Data Processing:

BASE–STATION corrected.
Non–linear filter: W7R125 (DESPIKED)

Data Presentation:

Magnetic High: West
Magnetic Low: East

91-3210

Map Specifications

Map Scale:	1:2500
Profile Scale:	100nT/cm
Profile Base Level:	61725nT
+ve Clipping Range:	200nT
–ve Clipping Range:	200nT
Data Plot Interval:	1data points
Processed By:	P.J.CLARK
Processing Date:	12/07/90

Profile Map of

TOTAL MAGNETIC INTENSITY

Location: ALBERTON, TASMANIA
Processed For: MINSTOCK, 9036/9025
Map Scale: 1:2500

FIGURE NO. 4

5 cm

126068

10020

Remarks:

Surveyed and Processed by:

THE GEOPHYSCIAL RESEARCH INSTITUTE
University of New England
Armidale NSW 2351
Tel: (067) 73 2617
FAX: (067) 71 1661

Survey Instrument:

Field:

TM-4 Cs Vapour Magnetometer
Sample Interval: 0.25m
Line Spacing: 50.0m
Resolution: 0.1nT
50 Hz Filter: OFF.

Base:

GEOMETRICS G-856 Proton Magnetometer.
Sample interval: 15.0 seconds.
Resolution: 0.1 nT

Data Processing:

BASE-STATION corrected.
Non-linear filter: W7R125 (DESPIKED)

Data Presentation:

Magnetic High: West
Magnetic Low: East

Map Specifications

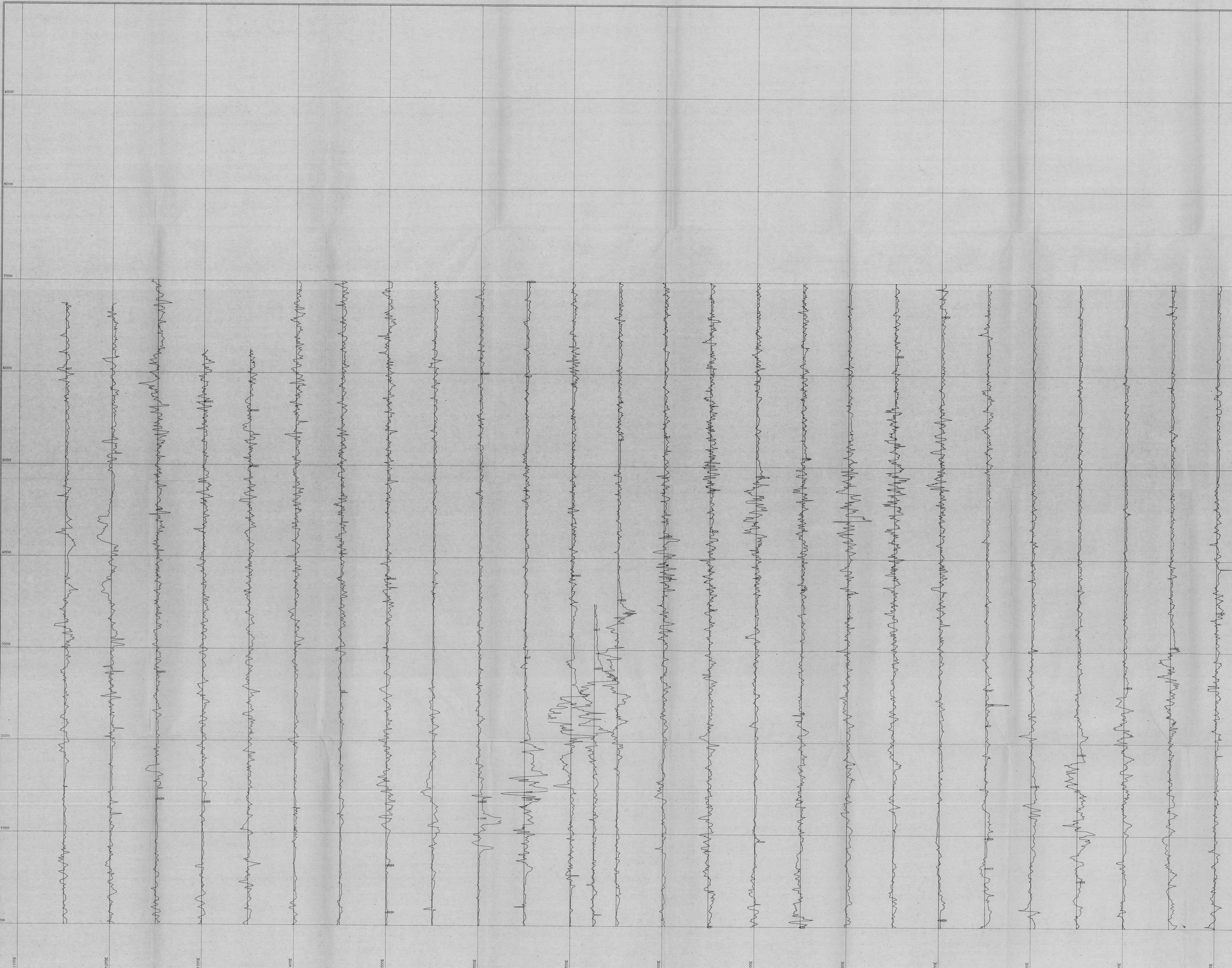
Map Scale:	1:1250
Profile Scale:	100nT/cm
Profile Base Level:	61725nT
+ve Clipping Range:	200nT
-ve Clipping Range:	200nT
Data Plot Interval:	1data points
Processed By:	P.J.CLARK
Processing Date:	12/13/90

Profile Map of
TOTAL MAGNETIC INTENSITY

Location:	ALBERTON, TASMANIA
Processed For:	MINSTOCK, 9036/9025
Map Scale:	1:1250

FIGURE NO. 5

16021



Remarks:

Surveyed and Processed by:

THE GEOPHYSCIAL RESEARCH INSTITUTE
University of New England
Armidale NSW 2351
Tel: (067) 73 2617
FAX: (067) 71 1661

Survey Instrument:

Field:

TM-4 Cs Vapour Magnetometer
Sample Interval: 0.25m
Line Spacing: 50.0m
Resolution: 0.1nT
50 Hz Filter: OFF.

Base:

GEOMETRICS G-856 Proton Magnetometer.
Sample Interval: 15.0 seconds.
Resolution: 0.1 nT

Data Processing:

BASE-STATION corrected.
Non-linear filter: W7R125 (DESPIKED)

Data Presentation:

Magnetic High: West
Magnetic Low: East

91-3210.

Map Specifications

Map Scale:	1:1250
Profile Scale:	100nT/cm
Profile Base Level:	61725nT
+ve Clipping Range:	200nT
−ve Clipping Range:	200nT
Data Plot Interval:	1data points
Processed By:	P.J.CLARK
Processing Date:	12/07/90

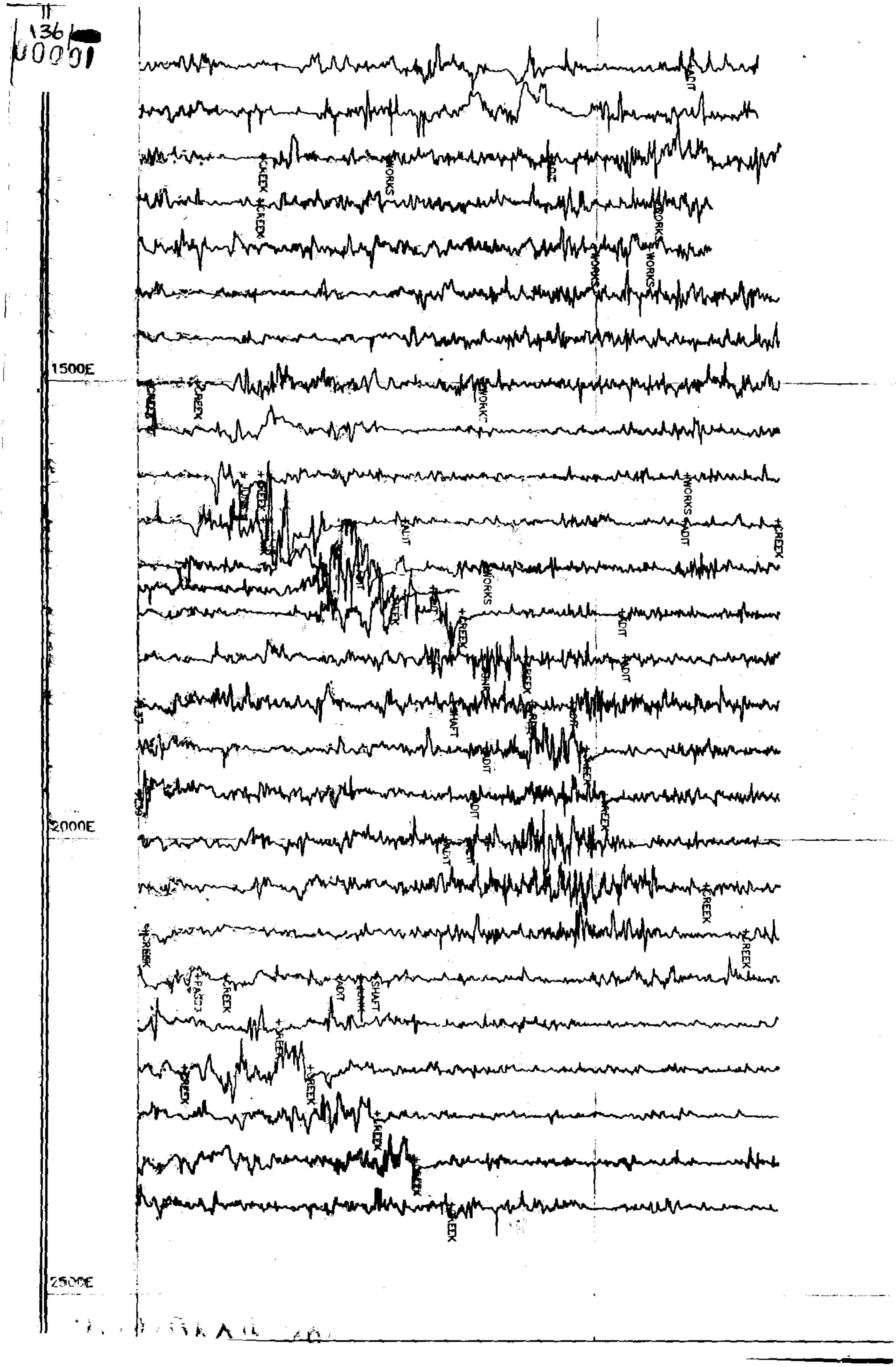
Profile Map of
TOTAL MAGNETIC INTENSITY

Location: ALBERTON, TASMANIA
Processed For: MINSTOCK, 9036/9025
Map Scale: 1:1250

FIGURE NO. 6

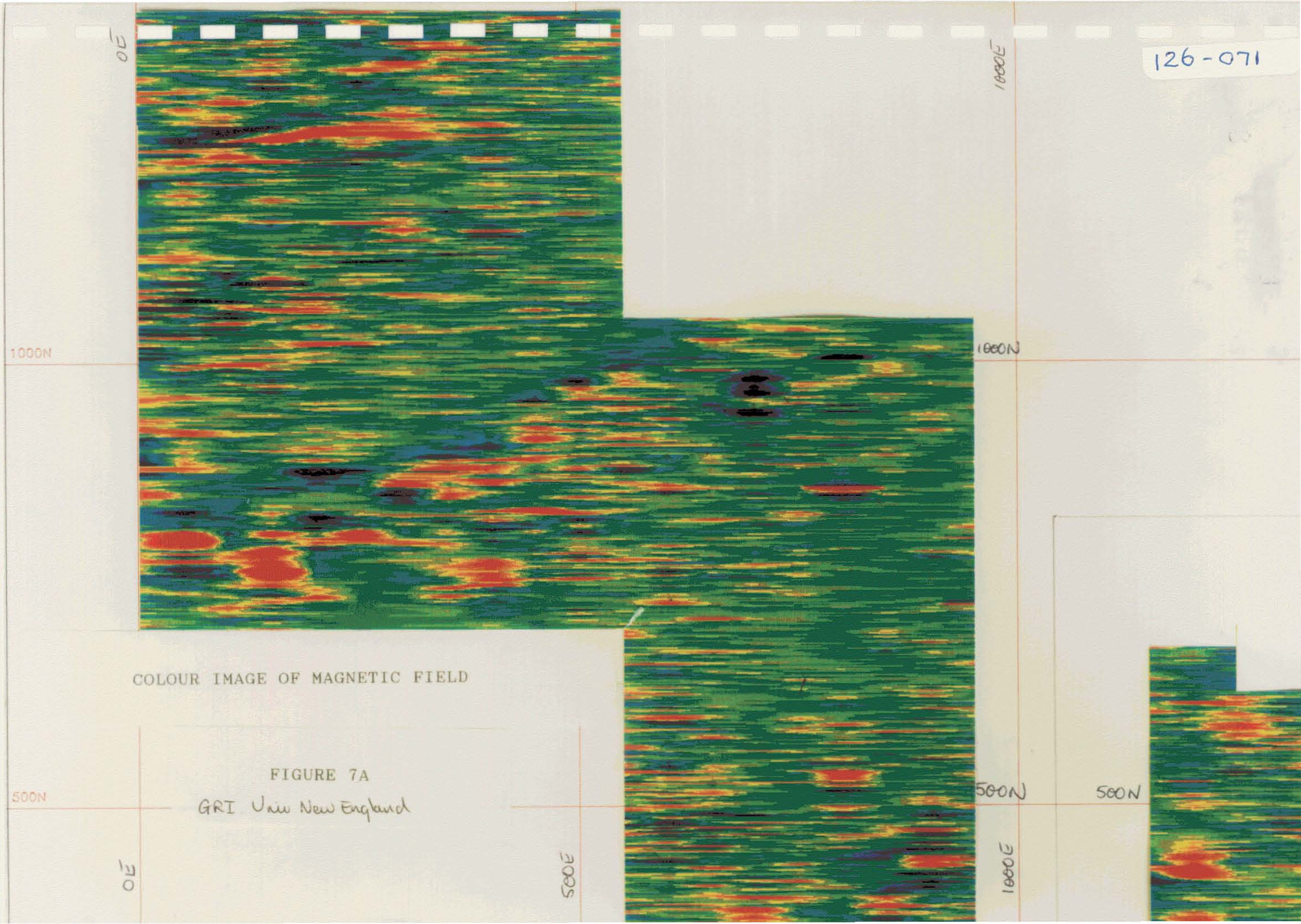
5 cm

126070



1500E
2000E
2500E
ADIT
CREEK
WORKS
SHAFT

126-071

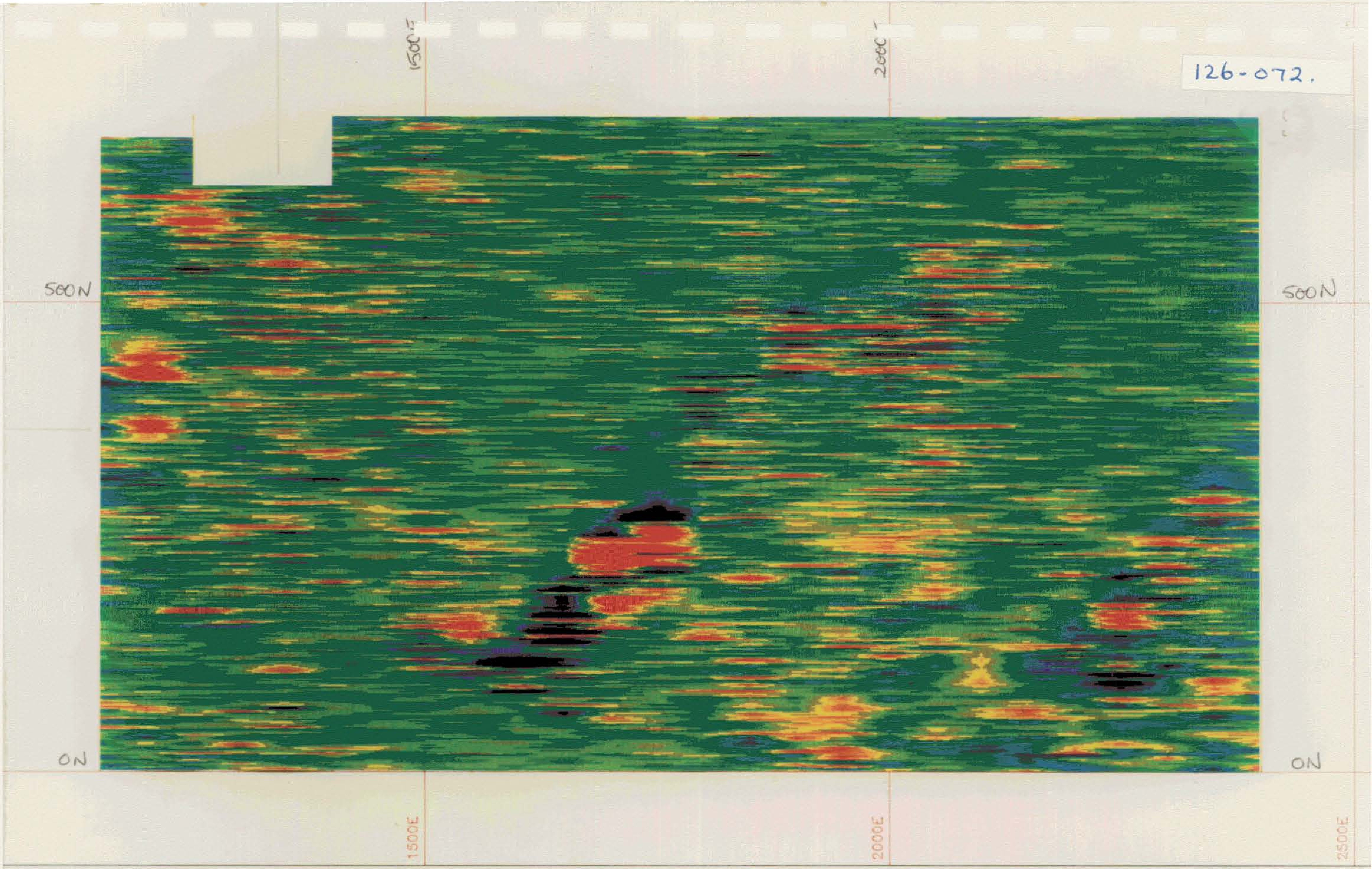


COLOUR IMAGE OF MAGNETIC FIELD

FIGURE 7A

GRI Uni New England

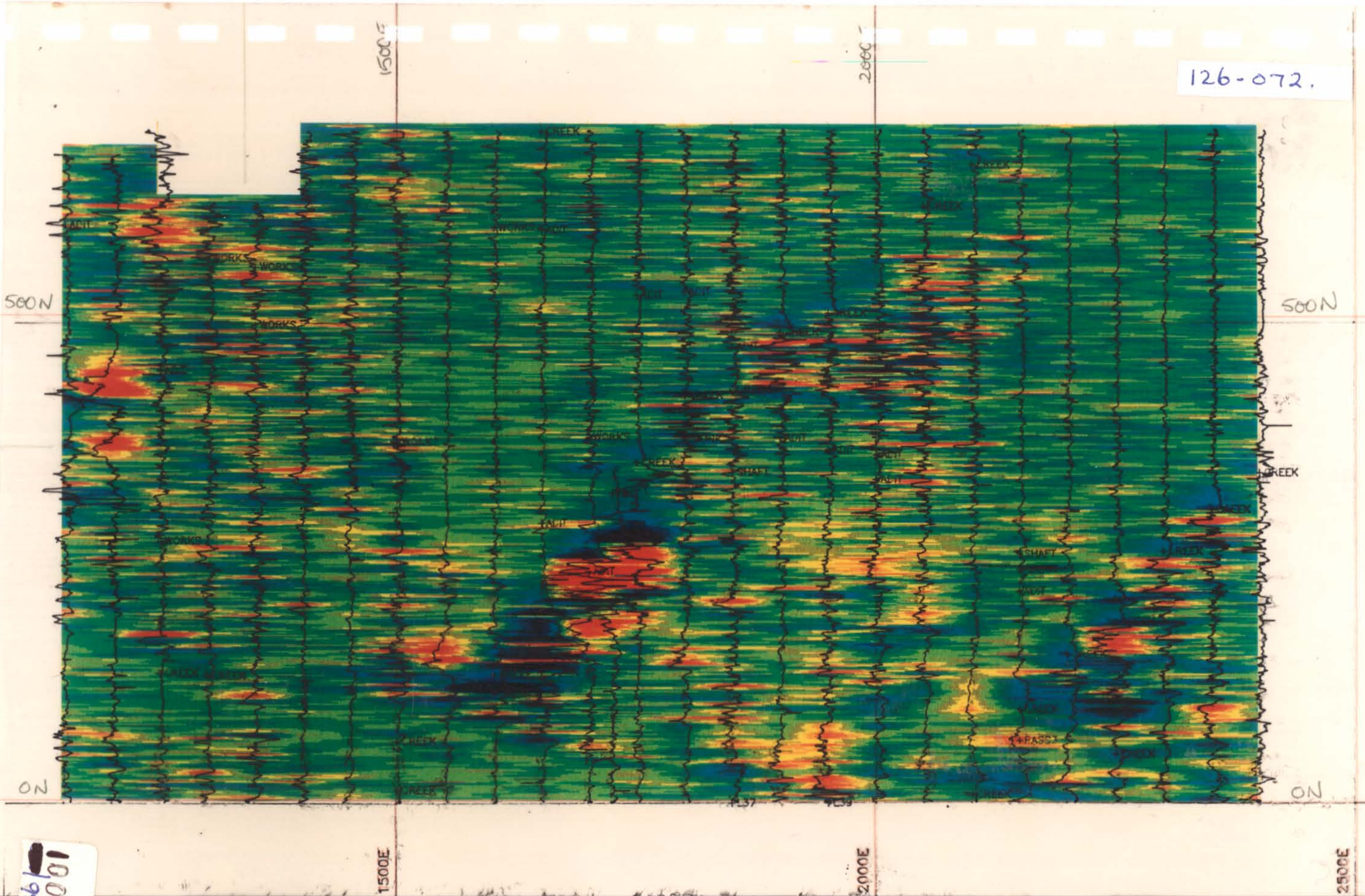
126-072.



COLOUR IMAGE OF MAGNETIC FIELD

FIGURE 7B

GRI Uni New England



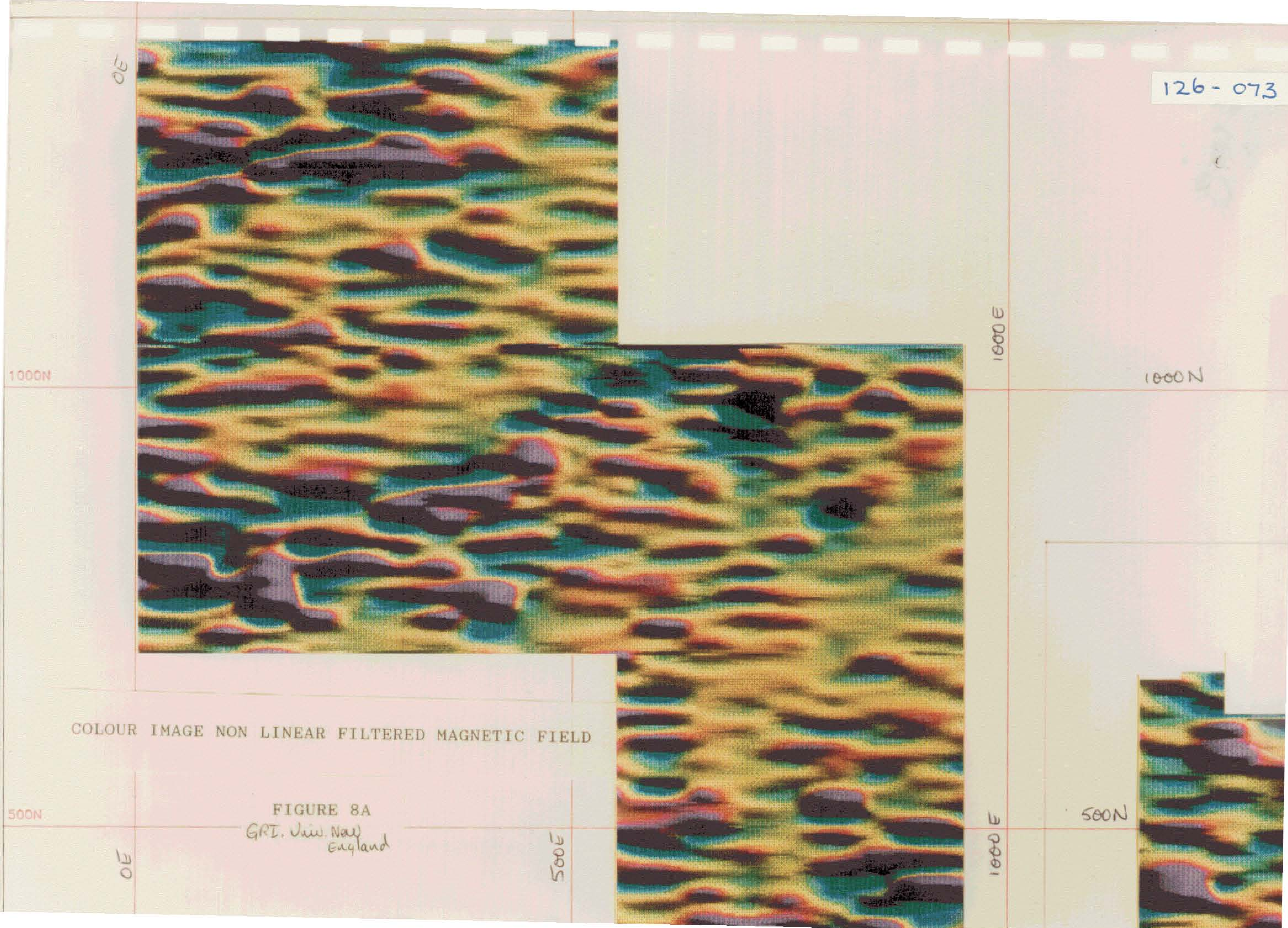
COLOUR IMAGE OF MAGNETIC FIELD

FIGURE 7B

GRI Uni New England

126-072.

136/ 00001

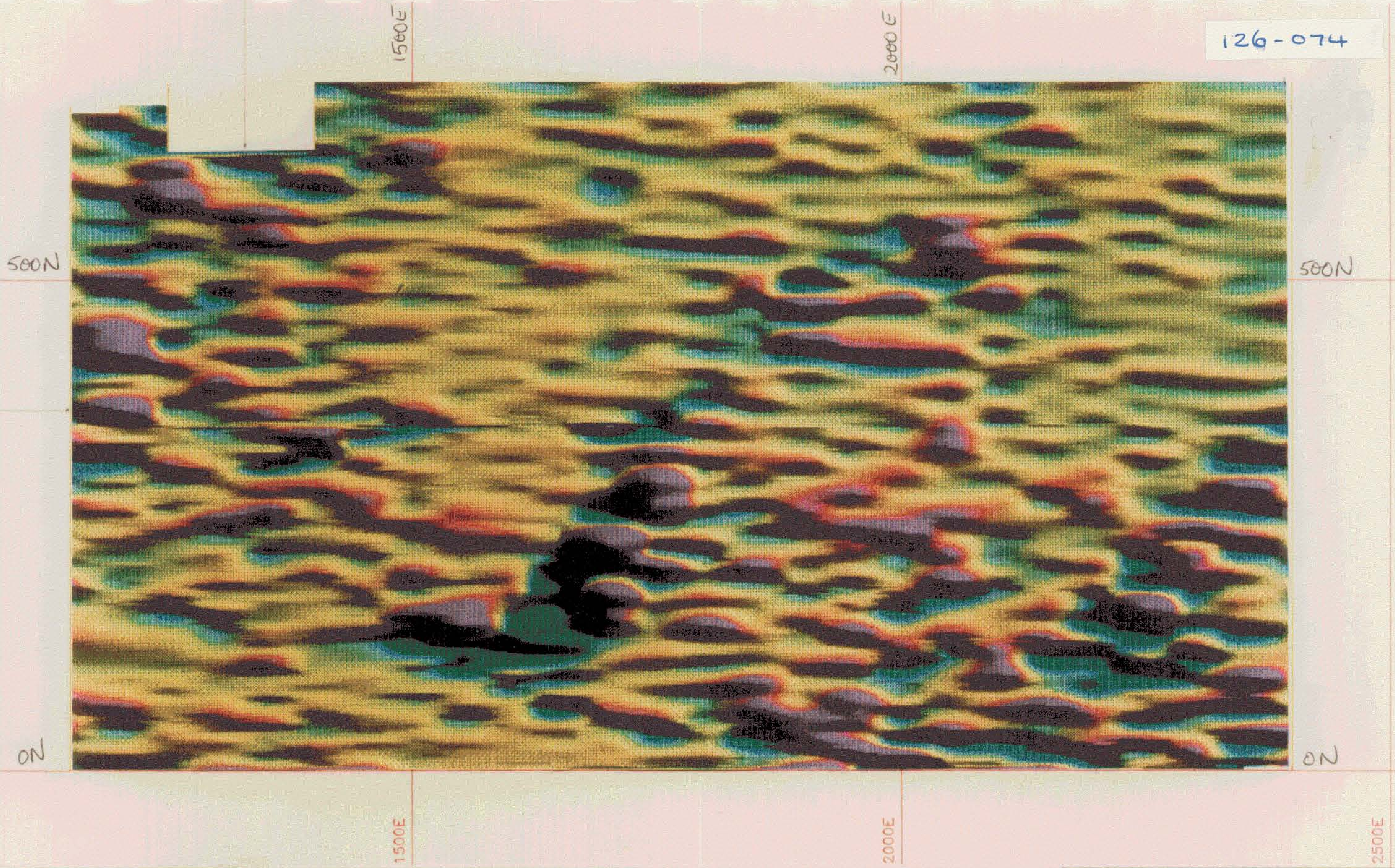


COLOUR IMAGE NON LINEAR FILTERED MAGNETIC FIELD

FIGURE 8A

GRI. Univ. New England

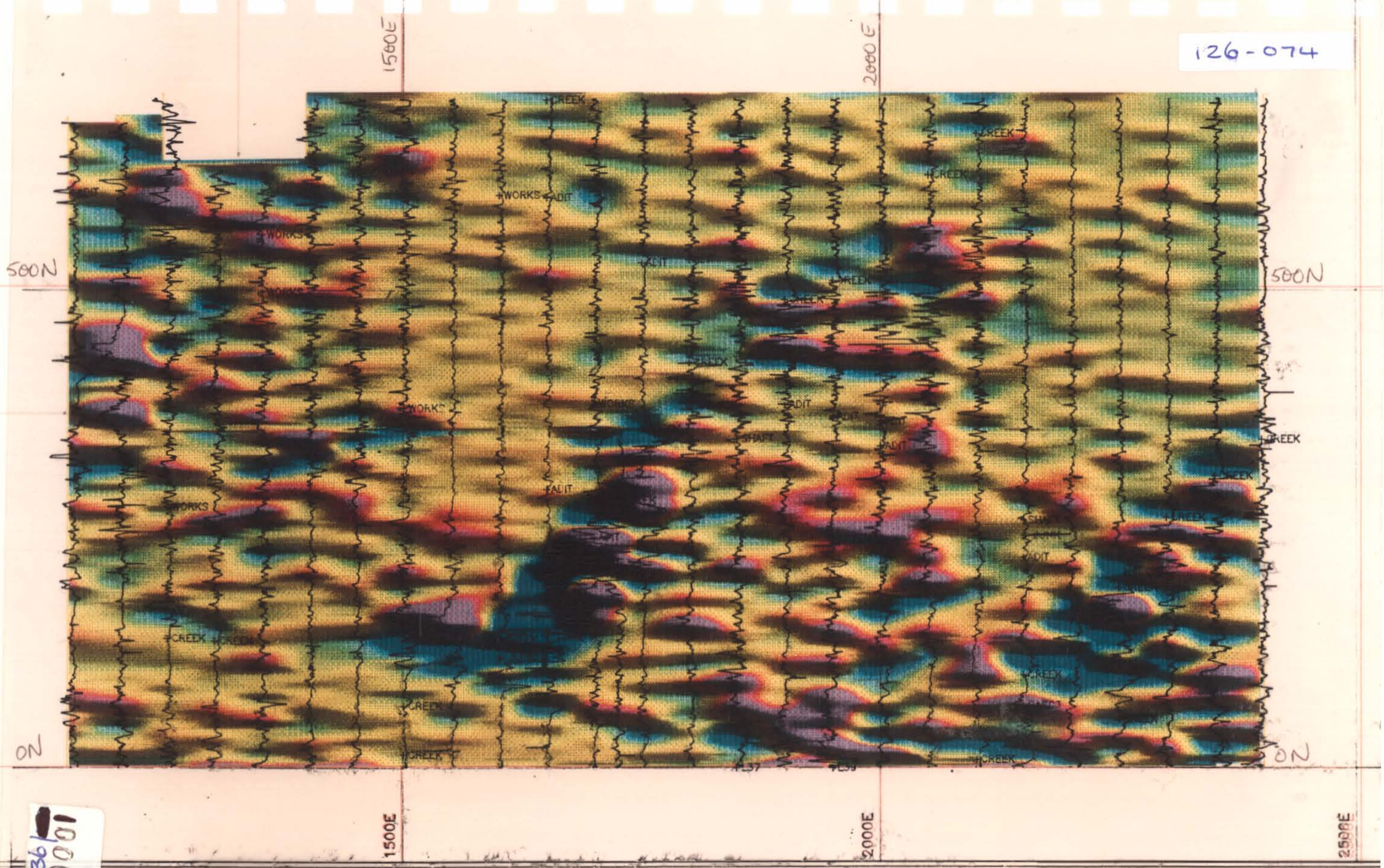
126-074



COLOUR IMAGE NON LINEAR FILTERED MAGNETIC FIELD FIGURE 8B

GRI Univ New England

126-074

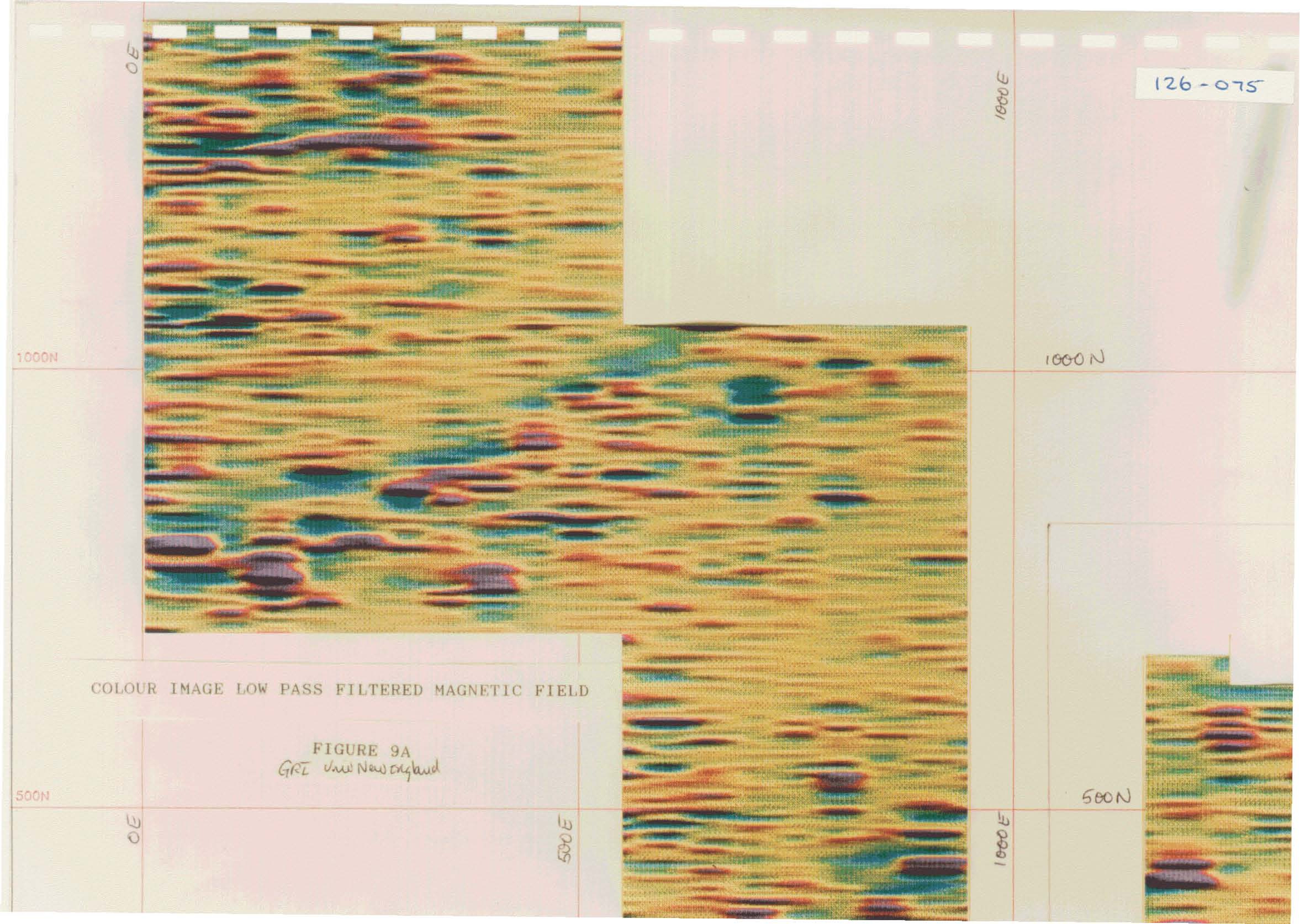


136/00001

COLOUR IMAGE NON LINEAR FILTERED MAGNETIC FIELD FIGURE 8B

GRI Univ New England

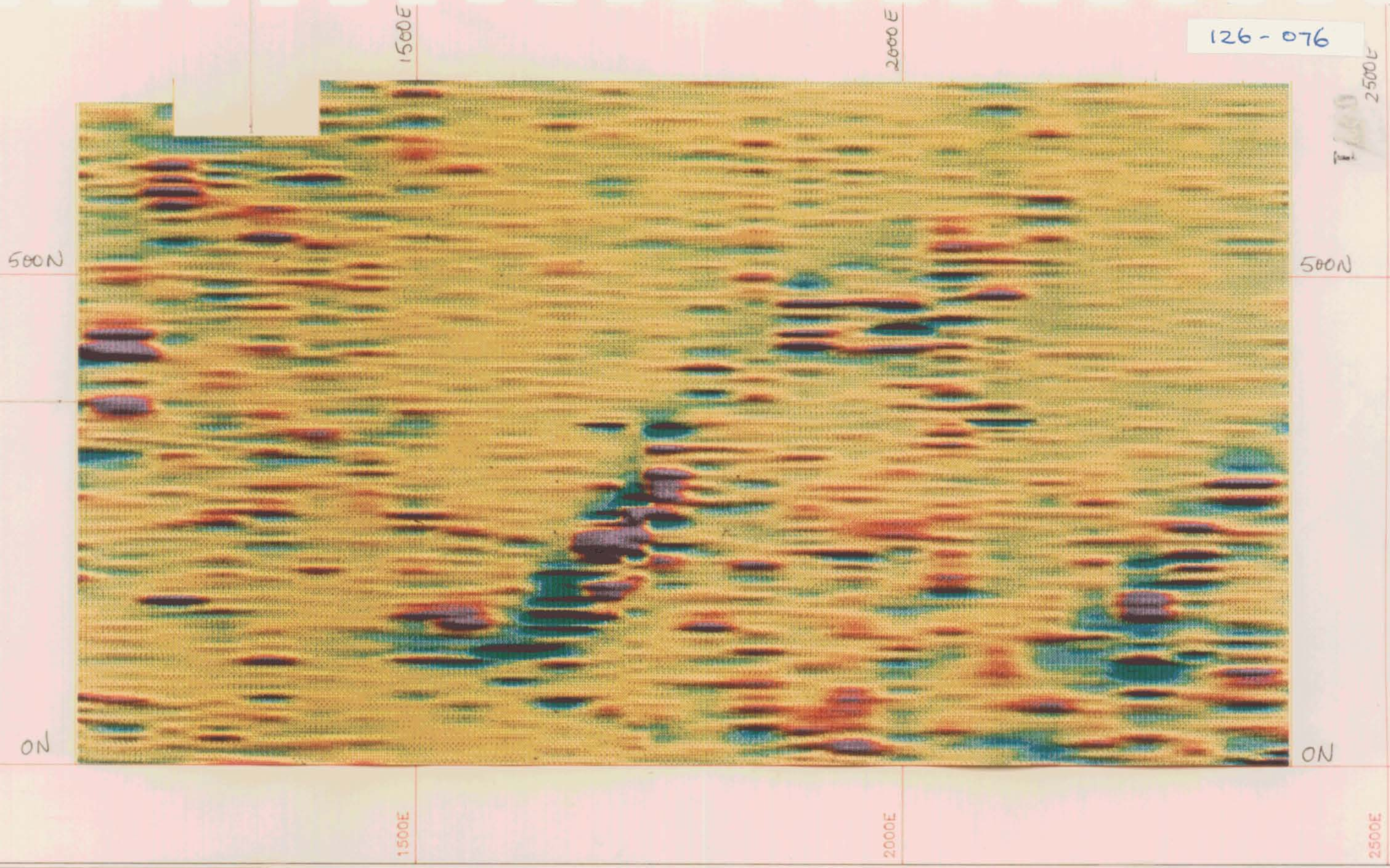
126-075



COLOUR IMAGE LOW PASS FILTERED MAGNETIC FIELD

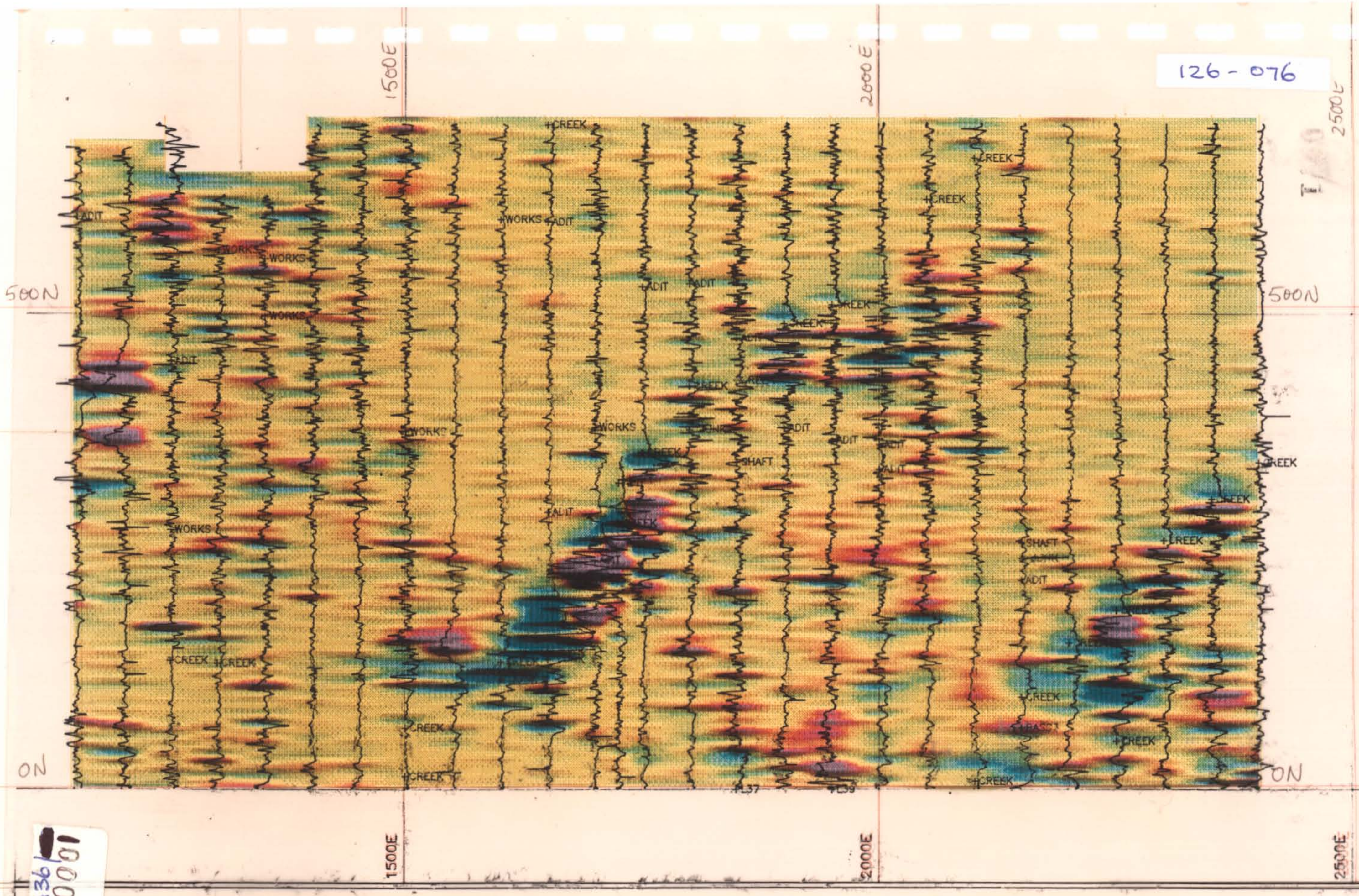
FIGURE 9A
GRL Univ New England

126 - 076



COLOUR IMAGE LOW PASS FILTERED MAGNETIC FIELD FIGURE 9B

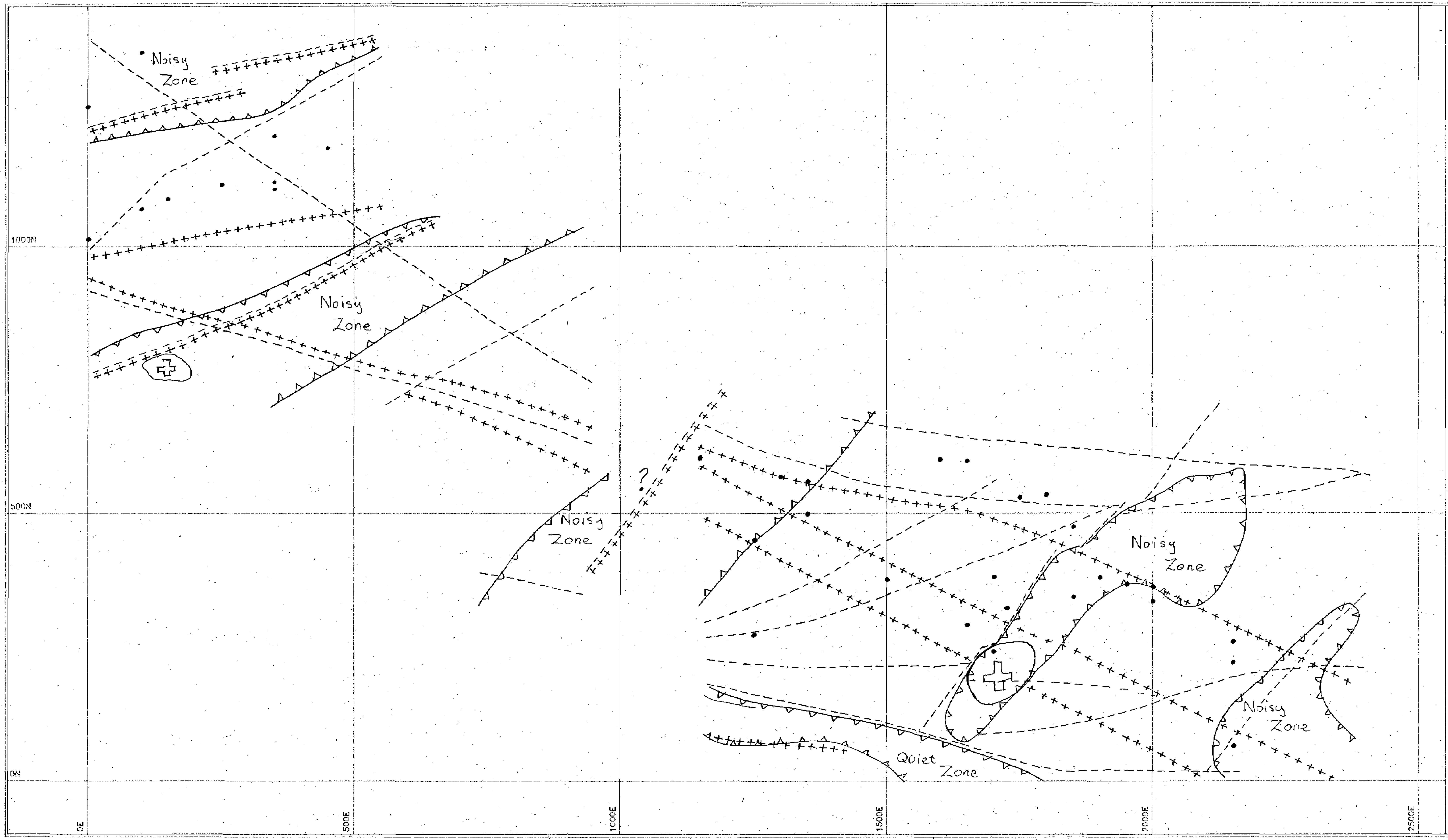
GRI Uni New England



COLOUR IMAGE LOW PASS FILTERED MAGNETIC FIELD FIGURE 9B

GRI Univ New England

10022



Remarks:

Surveyed and Processed by:

THE GEOPHYSCIAL RESEARCH INSTITUTE
University of New England
Armidale NSW 2351
Tel: (067) 73 2817
FAX: (067) 71 1661

LEGEND

Creek.

+ + + Magnetic High.

— — — Magnetic Low.

△—△ Contact Between Magnetic Signatures.

● Mine

5 cm

Interpretation Map of

TOTAL MAGNETIC INTENSITY

Location:	ALBERTON, TASMANIA
Processed For:	MINSTOCK, 9036/9025
Map Scale:	1:5000

FIGURE NO. 11

91-3210

APPENDIX 3A

LEAMAN GEOPHYSICS APPRAISAL OF INITIAL SURVEY

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REVIEW
EXPLORATION STATUS

ALBERTON AREA, TASMANIA
for
OCEANA PTY LTD

by
Dr. D.E. Leaman

November 1990

ALBERTON

0074 126080

INTRODUCTION

An initial trial exploration programme of the Alberton leases held by the Minstock Group was to include some geological mapping, a detailed ground magnetic survey and some geochemical sampling. The programme was directed toward evaluation of gold content of the area and any relevant structural controls - including vein system orientations. The proposal and use of a high resolution ground magnetic survey was innovative and nothing comparable had ever been attempted previously.

Loss of the magnetometer due to accident during the survey, however, has provided an opportunity to review work done and assess whether to emphasise particular elements of the original programme and to delay or omit others.

Although the magnetic survey was not completed it is important, in view of the cost of survey, to determine whether the method was yielding useful information and whether the survey should be completed.

The magnetic survey had been specified as a compromise in order to gain response patterns over a wide area. This inevitably meant that many particular features might not be traceable between profiles. Demonstration of response was considered more important since this would mean that the mean could be used widely in the gold-bearing Mathinna Beds of north-east Tasmania. Previous experience with ground magnetic surveys had shown that veins could be identified as magnetic spikes - due to oxidation effects in the wall rocks - but that the effect was often obscured by coarse sampling (even at 1-2 m) and 1 nT instrumental precision using normal magnetometers. These problems limited the ability to separate noise from structural signal.

While it had been hoped to cover the entire 3 sq km area (Figure 1) the terrain, budget and permissible duration of survey ultimately restricted the initial endeavour. In order, therefore, to provide a useful test of the magnetic methods proposed a block of survey was defined which included the Mercury, Mt Victoria and Long Struggle mines with an option to continue northward as far as budget permitted should the work prove easier than the line surveyor indicated.

This basic survey test was terminated by accident.

THE MAGNETIC SURVEY

The magnetic survey was contracted to the Geophysical Research Institute of the University of New England due to the particular instrumental and field requirements.

The contractor has supplied complete details of the survey completed to date, including an array of presentation styles and filter tests of the data. Some extracts are shown in Figures 4 and 5. Full details will be supplied after decisions have been taken on whether to complete or terminate the survey since this report is an interim status evaluation.

The contractor originally advised that the line spacing should not exceed 10 m but the terrain, budgetary considerations, need for reasonable coverage and use of the method in virtual research mode led to a compromise of 50 m. After completing the present coverage the contractor has agreed that the compromise has been proven reasonable and justified. The original discussion was based on the data density across the area and this ignored the fundamental problems associated with access within it.

The location of the proposed initial survey block is shown in Figure 1 which also presents a regional structural compilation by Gold Fields Exploration Pty Ltd. It may be noted that this compilation remains the best current geological data base of its type.

Profiles from the survey are shown in Figure 2, as presented by the contractor.
The contractor and geologists engaged to infill Figure 1 have noted that the nominal line positions indicated may not be true. This is not considered a serious problem in that the lines are labelled and recoverable. The cultural information recorded by the magnetic contractor is also a considerable help in locating old prospects. It has always been recognised that any specific targetting would require detailed and precise survey but the costs of such work cannot be justified early in a exploration programme in such difficult country.

Figure 2 shows that the spiky character sought has been observed and that it is restricted to certain areas. Much of the surveyed block is not anomalous. The profiles also reveal that the major disturbance (from 500E, 100N to 900E, 500N) has a general trend a little north of east (see Figure 3 for a true grid). This is an unexpected result since it has always been assumed that the ruling trend controlling these gold deposits is NW or NNW.
The easterly trend is, however, truncated by such a trend but it is much more subtle.
Various presentations offered by the contractor confirm this character and relationship.

0076 126082

OTHER INFORMATION

In order to assess the absolute value of the magnetic survey completed all other sources of information have been considered. These include the geological appraisals of government geologists from the turn of the century and the assessment by Gold Fields Exploration Pty Ltd in 1987.

Very little usable information can be extracted from this information which tends to be dominated by grade information, notions about how to work the vein systems and minutiae of the operations. It is not possible to simply integrate this information but Gold Fields did attempt it (e.g., Figure 1).

I have extracted from this information the pertinent data on the zones which have actually produced gold in significant amounts. Many of the vein systems were patchy or minor producers and others yielded no mineralisation. This information has been plotted and overprinted on the magnetic profiles, or filtered versions of the data, as Figures 3, 4 and 5.

* This information was to have been supported by detailed mapping from the regional mapping division of the Division of Mines and Mineral Resources (Appendix). Little was reported which could assist understanding of the area or account for the diversity of vein orientations and relationships observed in old workings. Observation of dispersed cleavages is not particularly practical or useful. Two other comments may be made about this work.
It is presumed that the general occurrence of arsenopyrite augers well for the area economically. There is no justification for such an assumption and Loftus Hills in 1923 showed that there is only a correlation between gold and arsenic minerals at relative low abundances. I cannot recommend vein finger printing when so little is understood about the fundamental genetic relationships between the quartz, structure and gold. It is certainly not justified as part of a grass roots exploration programme. Such a programme need rapid focus and small areas to study.

* Funds were available for 3 days work only; in the original proposal I indicated clearly that 3 weeks work were required for an adequate detailed survey. This was refused by Minister.
RHF. 21.6.93

DISCUSSION

Has the magnetic survey produced useful and possibly significant results? Should the survey be completed at cost of delay or reduction in geochemical survey?

I believe the answer to be yes to both questions.

Consider Figures 3, 4 and 5.

It is desirable in any exploration programme that the methods used be able to define features of clear interest, recognise and filter known mineralised sites and to suggest others.

Figure 3, for all its location deficiencies, shows that this has been achieved.

This simple diagram shows the strong correlation between veining and structuring near the Mercury, Cross Reef, Long Struggle and Caxton mines. The Mt Victoria site has not been adequately covered.
Not only is there correlation between anomalous disturbance of the magnetic field and veins, the orientation of the magnetic trends match those observed for producing veins. The patterns also suggest how those, often conflicting trends may be related. This is a primary achievement for this initial work and relates Caxton and Cross Reefs especially.

The method also suggests that significant tracts are lacking in magnetic sources (vein walls) and therefore unlikely to contain an economic vein system. Such areas should not be explored further in detail. This type of decision has not been possible previously.

There are also some important corrollaries to these observations.

The Long Struggle zone is not particularly significant, but veins in the Caxton and Cross Reefs areas extend more than 300 m from known occurrences. The extensions are N-S and E-W respectively but are related by the Long Struggle dispersed vein system. This is a very specific description of these vein systems and is a tightly located as the line locations. It is also a much sharper view than is ever likely to be provided geochemically although chemical data may establish general gold and arsenic levels.
The magnetic data suggest that the vein character extends far beyond the reach of any previous mining activity! This indicates a major vein system which is known to carry gold.

Prospects such as Point, Ragged Youth can be immediately distinguished as minor by comparison and would not be considered significant.

This aspect is emphasized in Figures 4 and 5 where different filters have been applied to the data. The filters do not work well in such data due to the heavy on line bias of the observations and tend to produce stretched patterns. The diagrams do stress the generally anomalous character of the Cross Reef in particular.

The Cross Reef anomaly or trend is terminated by a NNW- trending feature. This may be observed in all styles of presentation. The principal anomalous zone therefore lies at the intersection of two primary fracture trends. This is specific target information which should be followed up.

I do not believe there to be any doubt that the magnetic methods employed can identify mineralised ground, integrate structural information and separate primary, secondary target zones or barren country rock. The method should be applied to the entire area.
The definition of the results obtained is far more specific and focussed than I have ever seen geochemically.

The present work would also suggest a possible target volume, for subsequent detailed review, west of Cross Reefs. The anomaly pattern is consistent with past sampling within the Cross Reef mine where, as noted by Gold Fields Exploration, a rich zone was never followed up. This zone is described in Figure 6 and marked in Figures 3, 4 and 5 by the broken line north of the worked veins. The extant magnetic data suggest that this feature extends 150 m to the west and should certainly be traced. The main axis of the filtered magnetic anomalies (magnetic field with spikes removed) corresponds directly to this position (Figure 5).

0079

126085

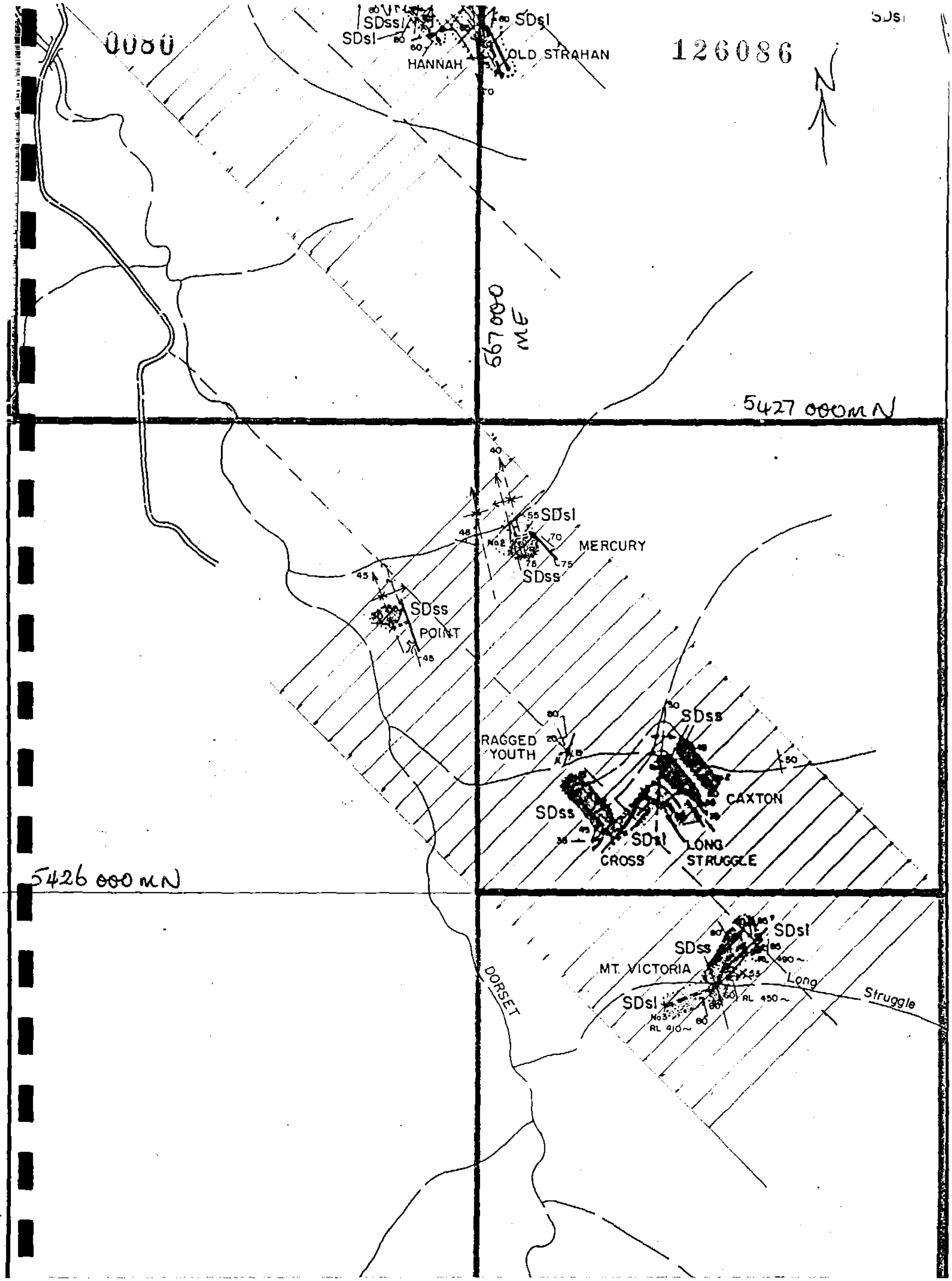
Report submitted on behalf of
Leaman Geophysics
by

D. Leaman

Dr. D.E. Leaman, B.Sc., Ph.D
M.Aus.I.M.M., M.M.I.C.A

Nov 1, 1990

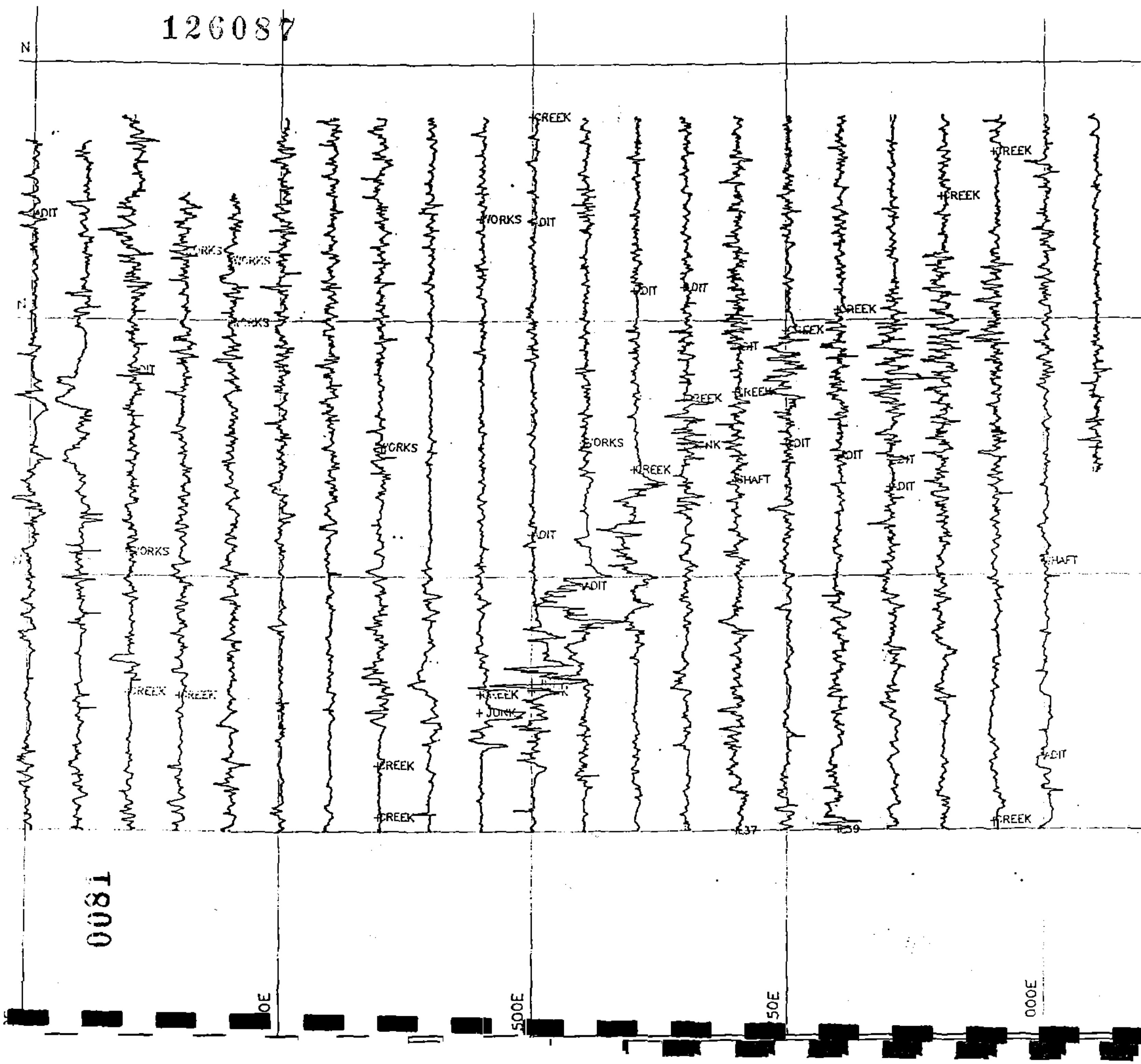
0080 126086



LOCATION OF PROPOSED INITIAL SURVEY GRID
Basemap after Gold Fields Exploration

FIGURE 1

126087



Surveyed and Processed by:
The Geophysical Research Inst.
University of New England
Armidale, N.S.W. 2351
Phone (067) 732617
Fax (067) 711661

Survey Instrumentation:
TM-4 Cs Vapour Magnetometer
Sample Interval: 0.5 m
Line Interval : 50.0 m
Resolution : 0.1 nT

Data Processing:
Diurnal magnetic variations corrected using Geometrics G-865 proton precession magnetometer cycling every 30 seconds.

Map Specifications

Map Scale:	1:5000
Profile Scale:	250nT/cm
Profile Base Level:	61725nT
+ve Clipping Range:	Not Activated
-ve Clipping Range:	Not Activated
Data Plot Interval:	1data points
Processed By:	J.P.WILKIE-SNOW
Processing Date:	10/12/90

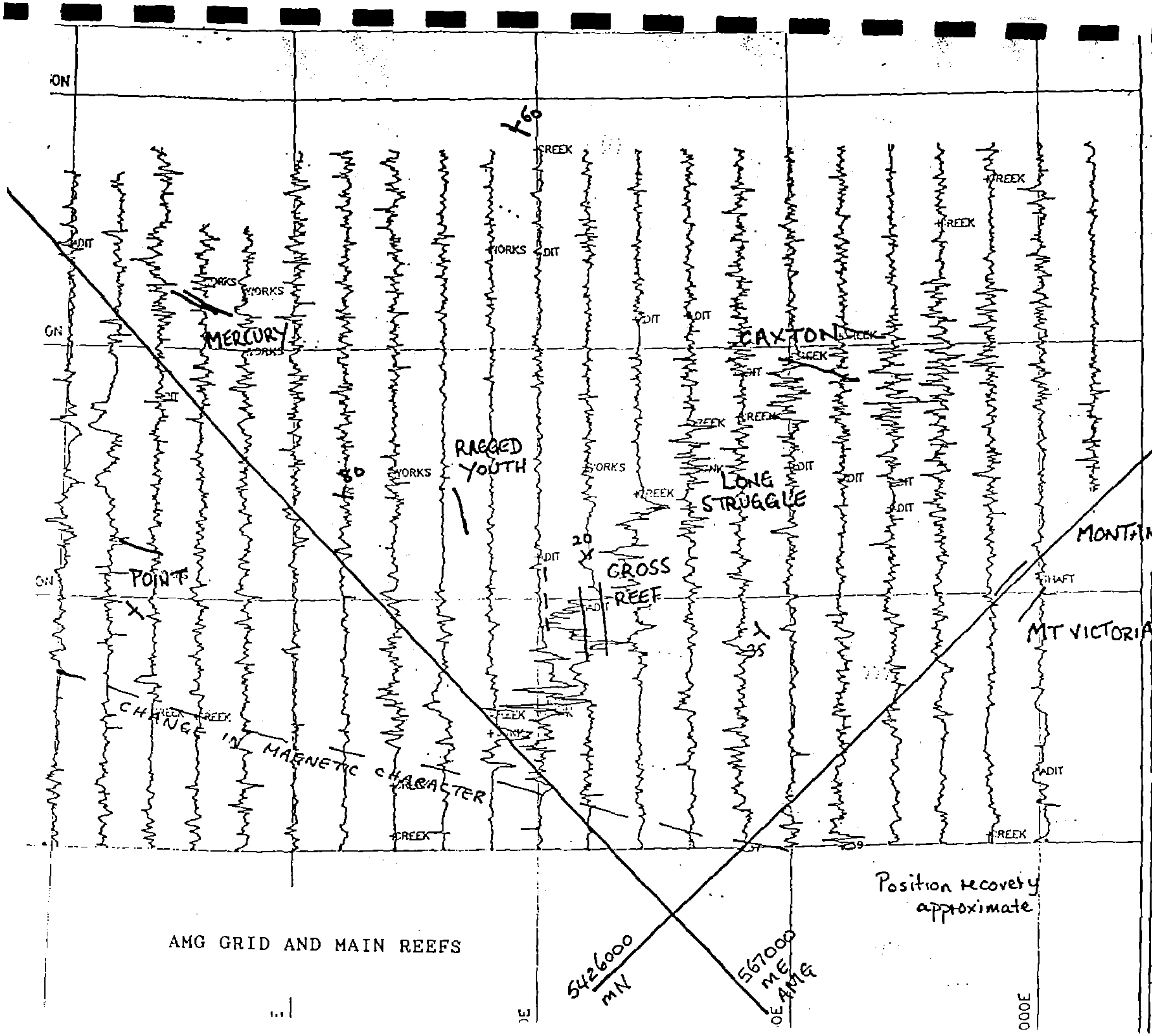
Profile Map of

TOTAL MAGNETIC INTENSITY

Location: ALBERTON, TASMANIA
Processed For: OCEANEA TAS. P/L
Map Scale: 1:5000

FIGURE NO. 2

120058



0082

Surveyed and Processed by:
The Geophysical Research Inst.
University of New England
Armidale, N.S.W. 2351
Phone (067) 732617
Fax (067) 711661

Survey Instrumentation:
TM-4 Cs Vapour Magnetometer
Sample Interval: 0.5 m
Line Interval : 50.0 m
Resolution : 0.1 nT

Data Processing:
Diurnal magnetic variations corrected using Geometrics G-865 proton precession magnetometer cycling every 30 seconds.

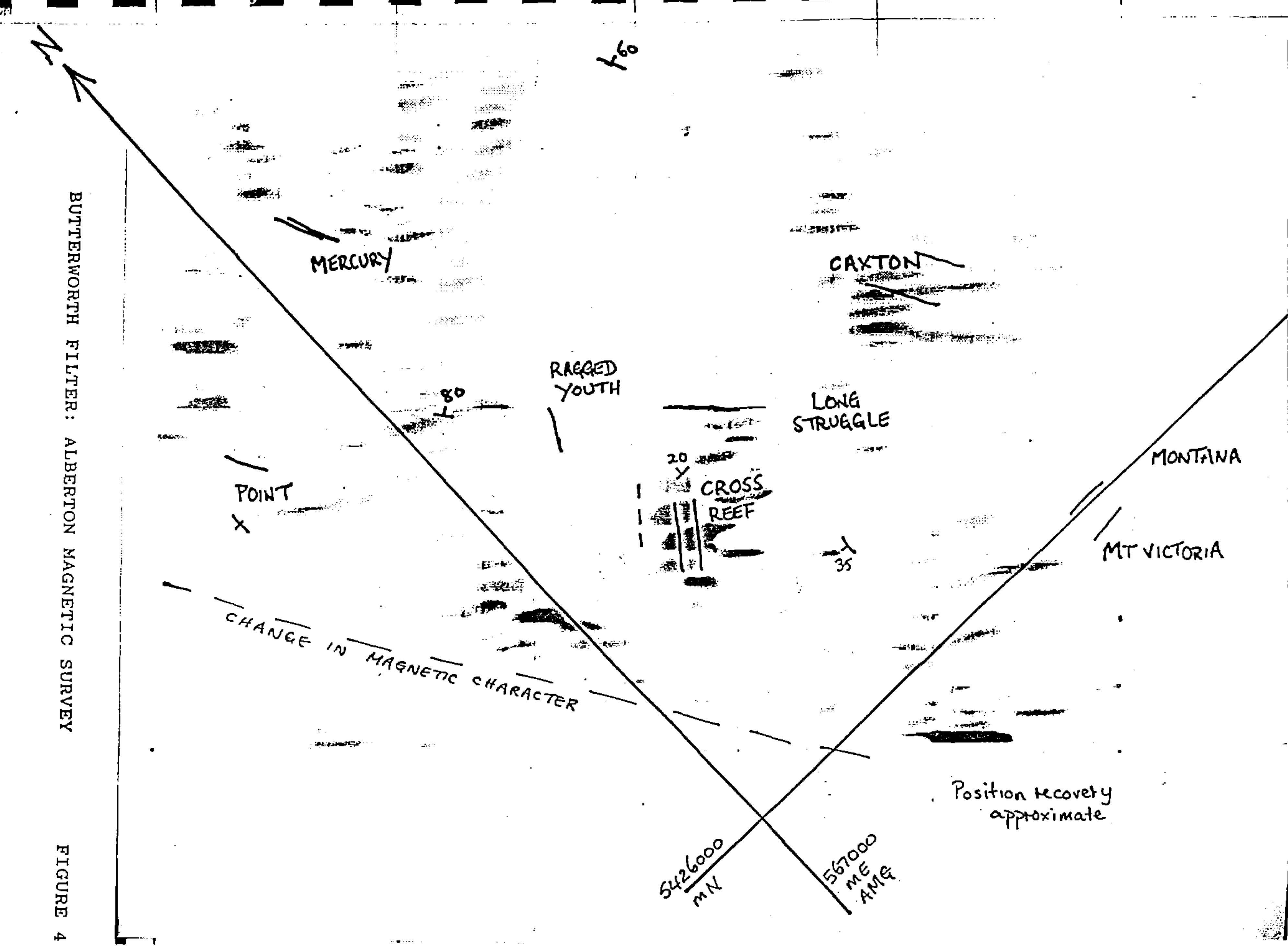
Map Specifications

Map Scale:	1:5000
Profile Scale:	250nT/cm
Profile Base Level:	61725nT
+ve Clipping Range:	Not Activated
-ve Clipping Range:	Not Activated
Data Plot Interval:	1data points
Processed By:	J.P.WILKIE-SNOW
Processing Date:	10/12/90

Profile Map of TOTAL MAGNETIC INTENSITY

Location:	ALBERTON, TASMANIA
Processed For:	OCEANEA TAS. P/L
Map Scale:	1:5000

FIGURE 3



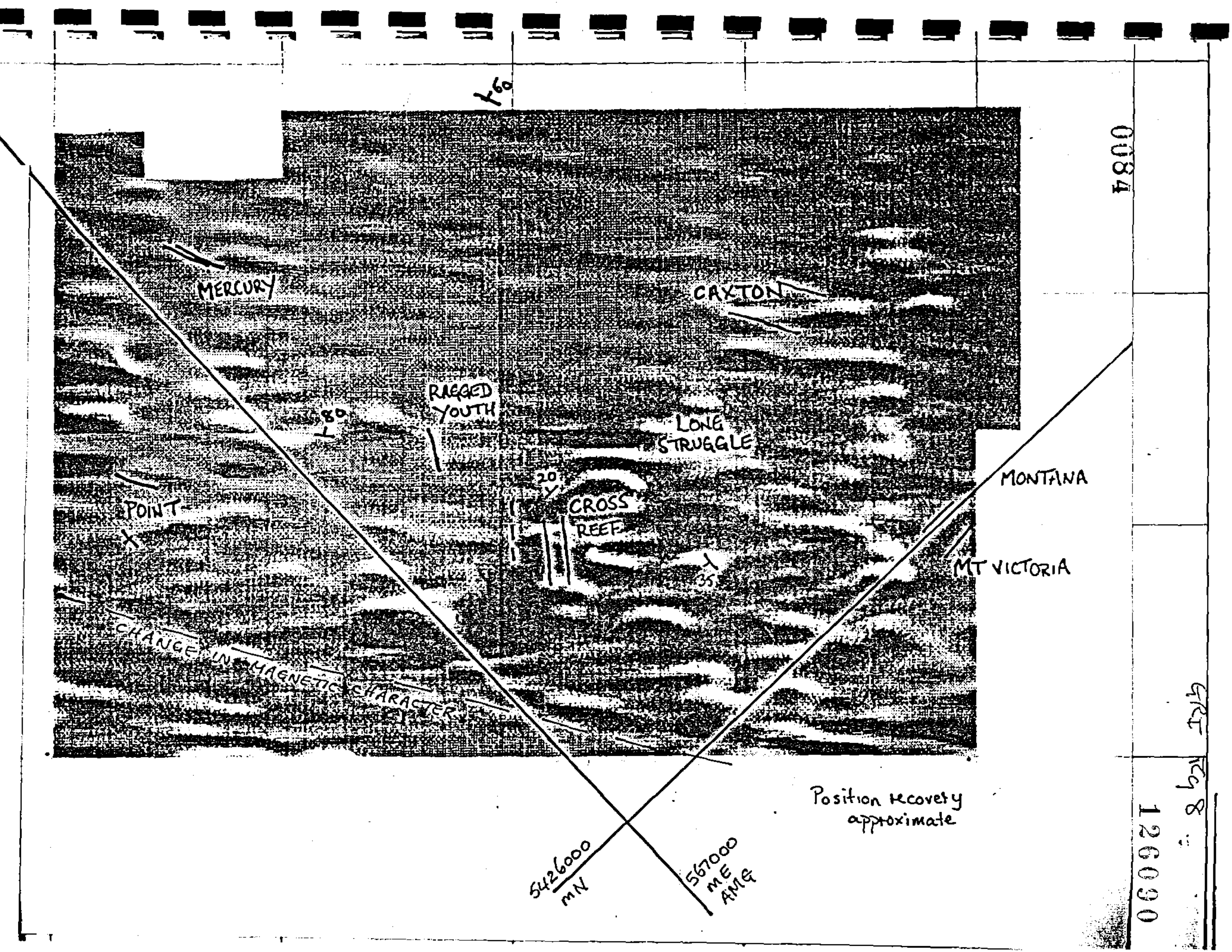
BUTTERWORTH FILTER: ALBERTON MAGNETIC SURVEY

FIGURE 4

0083

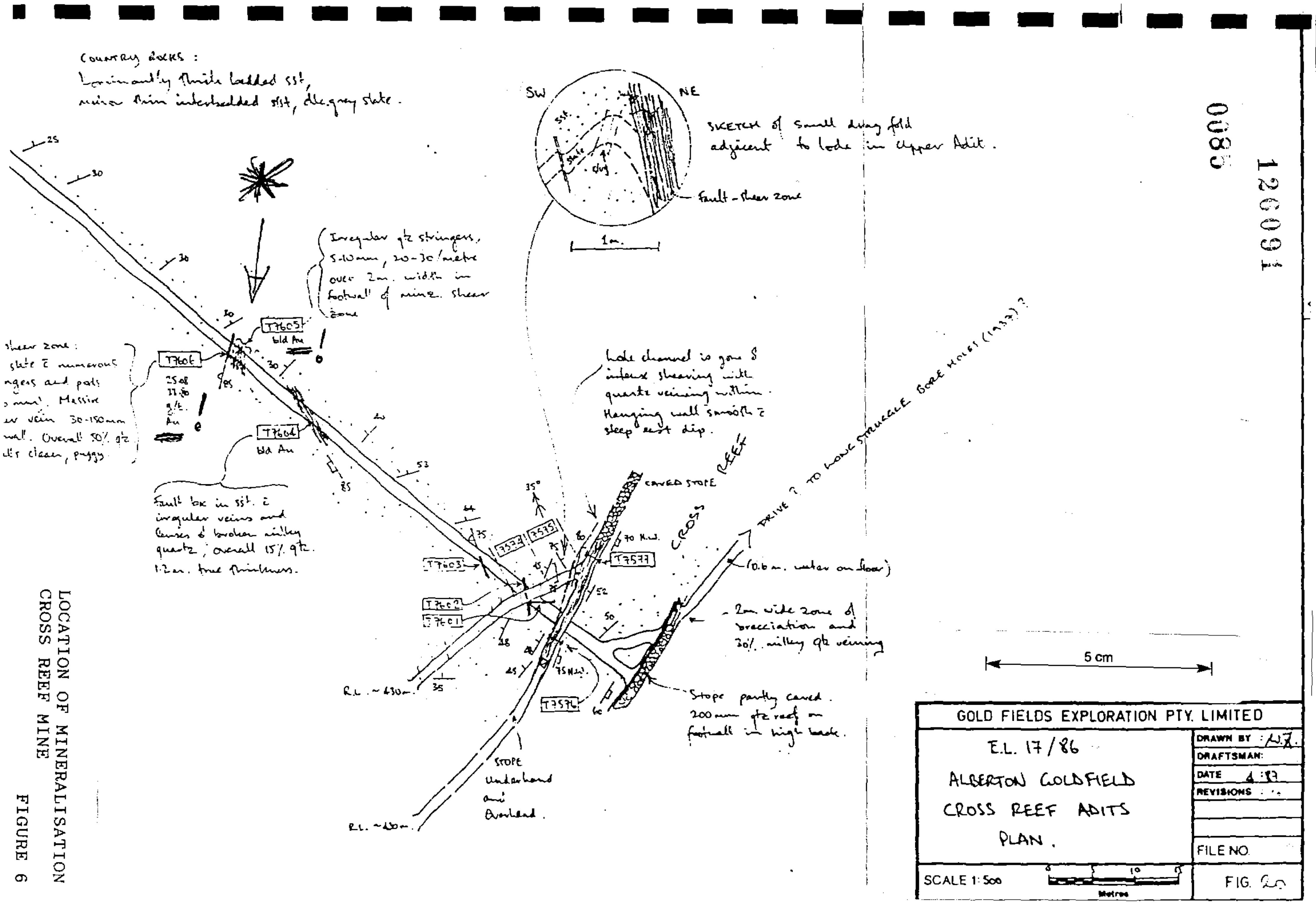
GRI Fig7

126089



MEDIAN WINDOW FILTER: ALBERTON MAGNETIC SURVEY

FIGURE 5



LOCATION OF MINERALISATION
CROSS REEF MINE

FIGURE 6

120091
0085

DEPARTMENT OF MINES SURFACE MAPPING

0087

APPENDIX

126093

Department of Resources & Energy

DIVISION OF MINES & MINERAL RESOURCES

TASMANIA

PO Box 56
ROSNY PARK
Tasmania 7018
Gordons Hill Road
ROSNY PARK
Ph (002) 30 8333
Fax (002) 44 2117

Enquiries: Dr R.H. Findlay
Phone: 30 8343
Your ref:
Our file: RHF34.90:JH

10 OCT 1990

Minstock Mining Group
84 Wells Parade
BLACKMANS BAY TAS 7052

Dear Mr Pavitt,

I enclose two maps giving geological details in your lease area in the Alberton Valley. The cost of fieldwork, travel and map preparation is $1,500 as agreed in your letter of 5 September (see attached invoice).

Figure 1 illustrates the lines walked and the position of the grid as prepared by your surveyor (blue lines). The surveyor appears to have started at Peg 24, to have walked the grid in a clockwise direction and to have ended up about 50 metres short whereupon he placed another peg 24 in the ground.

My traverses 25, 29, 34 and 36 follow the topolite lines run by the geophysics team. The line from JK25 ends up near EF27; that from EF34 may swing to cross or close with 34 low down the hill before curving back to arrive near JK33, and the line from EF36 ends near JK35. Nor does your surveyed grid base-line (JK) follow your proposed base-line; it is 50-70 yards further northeast than planned. I hope this does not cause confusion with the geophysical interpretation. However, any drilling predicated on the geophysics will require a proper site survey, topographical, geological, and geophysical, as a result of these errors.

Mineralisation is occurring as arsenopyrite in vuggy and solid quartz veins and in the country rock adjacent to veins. I believe, but have not proved, that the arsenopyrite here carries the gold; it does elsewhere in the Alberton gold-field.

The vegetation is dominated by 40-50 year-old regrowth and obviously these slopes have been clear-felled and hence I believe have been prospected for surface outcrops fairly thoroughly. Mining ceased in 1939; the demise of the boom seems to have coincided with the beginning of the Great Depression, and thus I suggest that lack of capital may have played the major role in not developing the field properly, rather than lack of gold. This idea can only be tested by an effective drilling programme however.

I would suggest it valuable for your group to consider concentrating on a detailed geological survey of the present mines which would involve their structural geological control and sampling for microscopy and fluid inclusion studies to determine whether gold is in the sulphides if present and the temperature/fluid inclusion "fingerprint" of the veins. Our broader research has suggested that we can begin "finger-printing" the veins according to their fluid inclusion characteristics. In addition it might also be appropriate to consider soil sampling for arsenic and gold which may lead to other prospects.

My belief is that you have a very prospective area; this belief can only be tested by a carefully planned "Phase II" which will ultimately involve detailed structural geological/geophysical analysis of the proposed test site and subsequent drilling.

Finally we can prepare reports for you on the 40 or so vein samples I collected at a cost of $50.00 per fluid inclusion chip, $18.00 per polished grain mount and at $80.00 per hour for the first hour and $40.00 per subsequent hour for thin section study and report preparation.

Yours sincerely,

Bob Findlay

Bob Findlay
PROJECT LEADER

Encl.

Strike
Dip - Bedding

Cleavage ; vertical cleavage

Bedding/cleavage intersection lineation

Strike
Dip - Master Joint

Vein, steep dip, strike

F
Fault, strike, steep dip
F

F
Dip of fault
F

Old — Young

Mine ; adits/shafts

Prospect pit/trench

Ab 75-90 Mines' Dept sample number
for polished section / fluid inclusion / isotope s
in preparation.

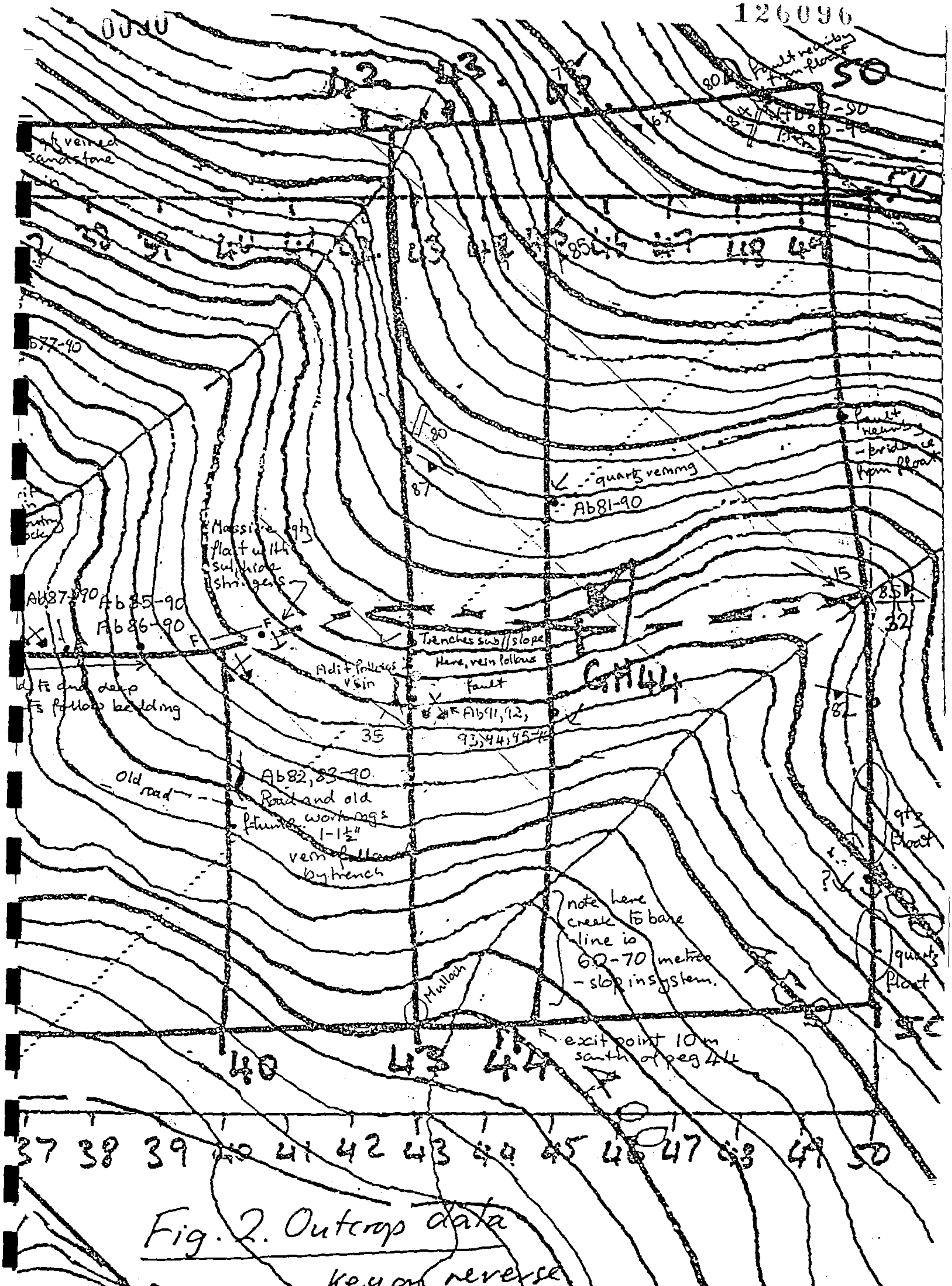
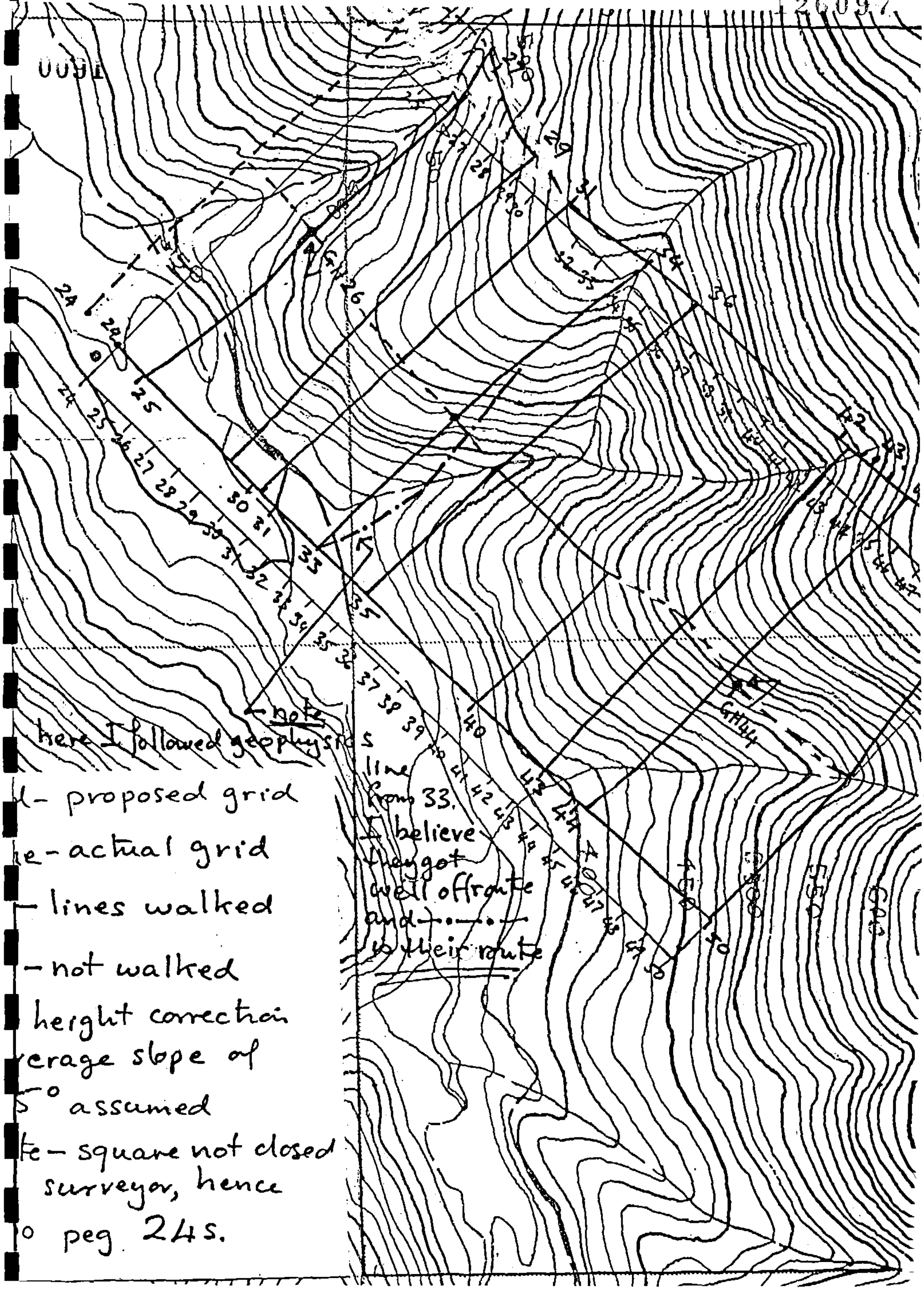


Fig. 2. Outcrop data
key on reverse

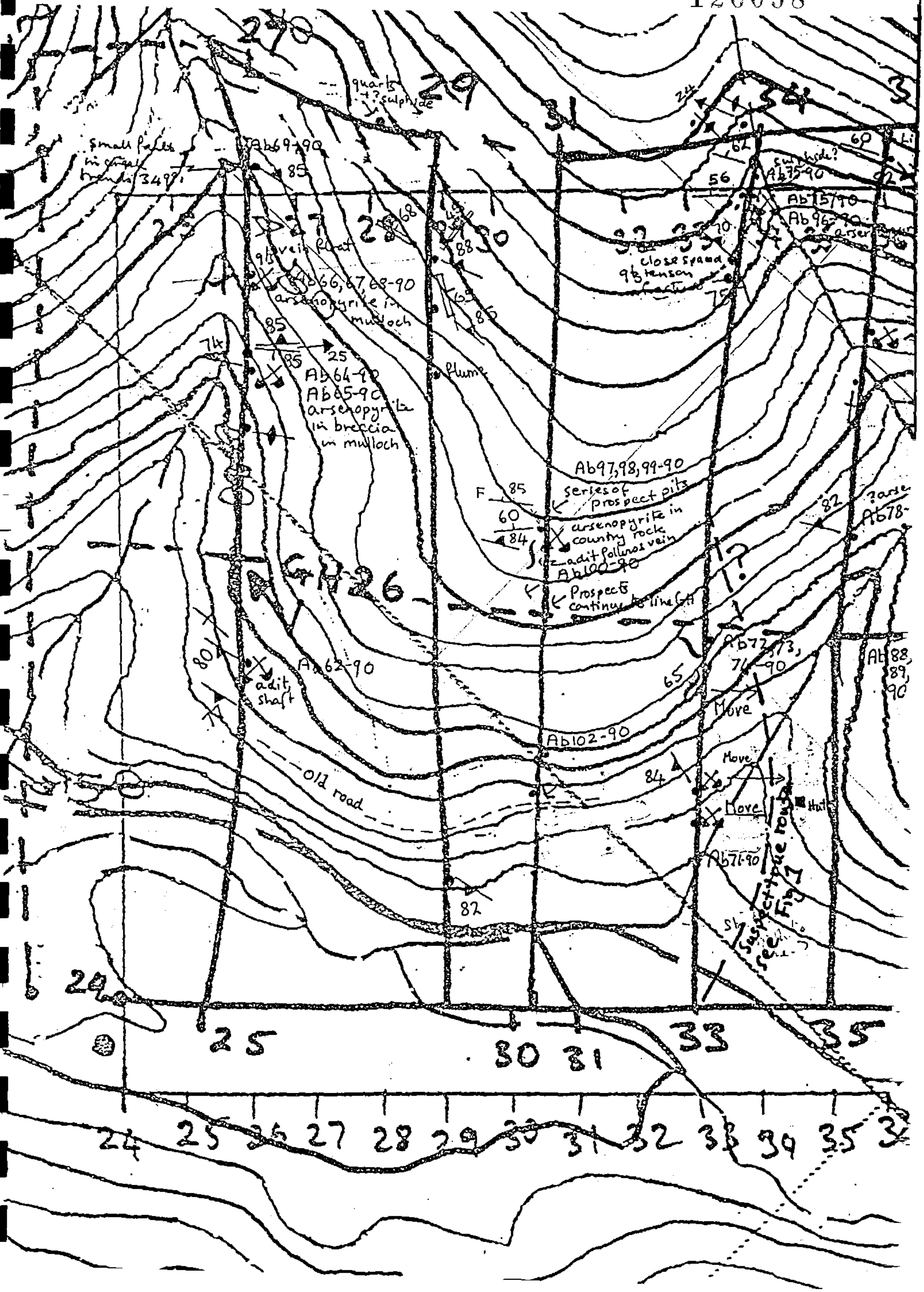
126097



note
here I followed geophysics line from 33. I believe they got well offroute and —·—·— is their route
GH44
l- proposed grid
e- actual grid
- lines walked
- not walked
height correction
erage slope of
5° assumed
te- square not closed
surveyor, hence
o peg 24s.

0092

126098



quartz + ? sulphide
small faults in area trend 349°
Ab69-90
Ab75-90
Ab75-90
Ab96-90
close spaced tension fractures
vein float
Ab66,67,68-90
arsenopyrite in mulloch
Plume
Ab64-90
Ab65-90
arsenopyrite in breccia in mulloch
Ab97,98,99-90
series of prospect pits
arsenopyrite in country rock
adit follows vein
Ab100-90
Prospects continue to line GH
GH26
Ab62-90
adit shaft
Ab72,73,74-90
Ab88,89,90
Ab78-
Ab102-90
Old road
Move
Move
Move
Hut
Ab71-90
see Fig 7
25
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