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RGC EXPLORATION PTY. LIMITED

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E.L. 41/83 - LAKE LEA

ANNUAL REPORT - 1988

Volume 1 of 2

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SUMMARY

E.L. 41/83 covers an area of 56 sq. km in Northern Tasmania. RGC Exploration Pty. Ltd. has carried out exploration on the licence during the past twelve months, with gold its principal target.

The area lies within a sequence of Ordovician sediments and Cambrian volcanics which have been extensively covered by Tertiary Basalt. Several old workings occur in the area within the Ordovician sediments. Minor gold bearing quartz lodes have been worked from Moina Sandstone at Blacks, Devonport & Upper Stormont Workings. Gold and bismuth have been extracted from the Stormont Bismuth Mine where mineralisation occurs in garnet-actinolite skarn.

Work during the last twelve months has concentrated on the north-eastern part of the Licence around the Stormont Bismuth Mine and Fletchers Adit areas. The areas are considered to host significant amounts of gold-bearing skarn.

The area was previously gridded and explored by Mt. Lyell Mining and Railway Co. and Comalco. Both Companies carried out geological mapping, ground magnetics, ground IP, soil sampling and minor rock chip sampling. Mt. Lyell also included the area in a regional stream sediment survey. The Mt. Lyell and Comalco data has been assessed and compiled.

RGCE partially refurbished and extended the Comalco grid. The Upper Stormont workings (old Stormont Gold Mine) were relocated during the gridding. Mapping of the grid was completed at a scale of 1:5,000. The overall interpretation is similar to that completed by R.A. Poltock for Comalco. Only one rock sample returned a value of >0.10 g/t Au (0.15). This sample was of sandstone located at the headwaters of Castle Creek.

The Upper Stormont workings were cleared and sampled. The host appears to be quartz veins in tubicolar sandstone. Out of 38 samples taken, only one returned a value >1 g/t Au.

Detailed mapping at a scale of 1:1,000 was completed over the Stormont Bismuth Mine and Fletchers Adit areas. This mapping and some close spaced magnetics defined drill targets within these areas.

Fifteen drill holes were completed in the Fletchers Adit and Stormont Bismuth Mine areas. All the holes showed the same broad, simple stratigraphy. Significant gold values were only obtained along strike from the Stormont Bismuth Mine. SD1 returned 13.0m @ 4.12 g/t Au and SD3 (80 m along strike to the south) returned 2.1m @ 12.77 g/t Au. Both intervals defined at a 1 g/t Au cut off. Indications are that the total amount of skarn in both areas is greater than what was thought by previous workers.

A number of reports were received during the year. They included Gregg Morrison's report on the styles of mineralisation in the Moina area. He concluded that the most immediate potential for gold mineralisation is in the garnet skarn at Stormont. Larry Meinert's report on the gold skarn potential in the area suggested that a more

mafic, oxidised pluton was necessary to form significant deposits. A stream sediment study undertaken recommended 50 gms of wet sieved -200 mesh fraction be collected and analysed for a variety of elements by neutron activation. The use of zircon as an indicator of stream and hydraulic effects was also recommended. Shell's 1980 aeromagnetic data over EL 41/83 was reviewed by Dr's John Bishop and David Leaman. John looked at identifying "bulls eye" anomalies, and doing some simple modelling on these to get an idea of depth and orientation of source.David analysed the data as part of his regional geophysical study of the entire Moina-Lorinna area. Results from his work to date on the magnetics indicates a number of structural trends, the intersection of which correlate with known mineralisation. He also suggests the presence of an extensive concealed mafic Cambrian Sequence, and interprets the Tertiary basalt as being patchy and thin (<50 metres thick).

A summary of the work planned for 1988 is,

(i) Continued assessment of previous work.

(ii) Completion of the regional geophysical appraisal, incorporating gravity data.

(iii) Follow-up drilling in the Stormont Bismuth Mine area.

(iv) Follow-up other areas of interest on the Lea River Grid.

(v) Follow-up stream sediment anomalies.

(vi) Investigate other areas of interest within E.L. 41/83 outside of the Lea River Grid.

This work will lead to the generation of further grids with subsequent detailed geology, geochemistry and geophysics. 1988 exploration cost approximately $190,000. The programme for 1989 is expected to cost $120,000.

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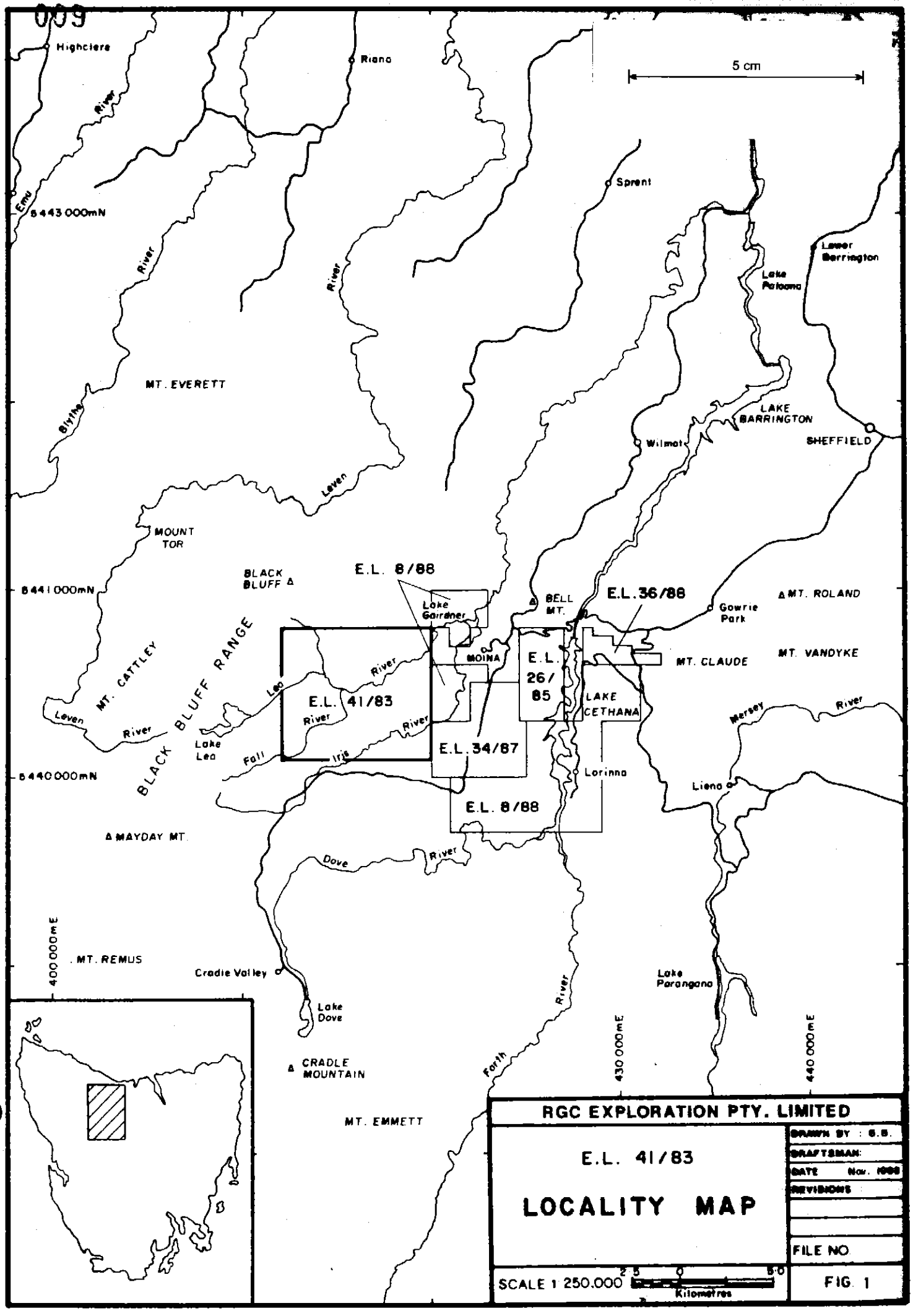
1. INTRODUCTION

E.L. 41/83 covers an area of 56 sq. km. south of Black Bluff in northern Tasmania (Figure 1). Lake Gairdner lies immediately to the northeast and Lake Lea to the west. The Lea & Fall Rivers flow through the area. The southern and central part of the Licence are well accessed by logging roads branching off the Cradle Mountain Road. The northeast part of the licence is accessed via 4WD tracks to the old Stormont Bismuth Mine and Devonport Mine workings. The Devonport Mine track is washed out just before it reaches the button-grass plains on the foot hills of Black Bluff Range. Vehicular access into the northwest part of the licence is not possible.

The Lake Lea licence is at the northern end of the Mt. Read volcanic belt where the Cambrian and Ordovician rocks structurally turn east-west around the northern end of the Precambrian Tyennan Block. Cambrian rocks outcrop mainly in the northern and central portions of the licence. They are unconformably overlain by a thick Ordovician sequence consisting of a lower unit of Owen Conglomerate equivalent, a central unit of Moina Sandstone and an upper unit of Gordon Limestone (Figure 2). These lithologies were folded and faulted during the Devonian along east-west and northwest trends. Emplacement of the Dolcoath Granite occurred also in the Devonian and outcrops some 5 km east of the licence. Tertiary basalt is widespread. Its distribution suggests the present drainage pattern is similar to that which existed in the Tertiary.

Several old workings occur within EL 41/83. Most were chasing gold, at grades better than 10 g/t Au, but tonnages were very low. The largest production was out of the Stormont Bismuth Mine with 6.3 tons of bismuth concentrate being produced grading 63% Bi and 450 g/t Au. This mineralisation occurred with skarn.

Several companies have carried out modern exploration in the area since 1961, but little emphasis was given to the region's gold potential. E.L. 41/83 was originally 112 sq.km. Mapping by R.A. Poltock allowed the area to be reduced by 50% (Roberts, 1985). During 1985/86 data compilation and a regional mapping/stream sediment survey were completed (Roberts, 1986). Several areas of interest were delineated (Figure 3). In 1987 work concentrated on the north east part of the licence around the Stormont Bismuth Mine & Fletcher's Adit areas. (Roberts, 1987). The aim of this report is to detail the work carried out by RGC Exploration Pty. Ltd. (formerly Gold Fields Exploration Pty. Ltd.) since December 1987, and to summarise the work planned for 1989.


Highclere
Riana
5 cm
Sprent
Emu River
5443000mN
River
River
Lower Barrington
Lake Patoona
MT. EVERETT
Blythe River
LAKE BARRINGTON
Wilmot
SHEFFIELD
Leven
MOUNT TOR
BLACK BLUFF Δ
E.L. 8/88
5441000mN
Lake Gairdner
BELL MT.
E.L. 36/88
Gowrie Park
Δ MT. ROLAND
MOINA
E.L. 26/85
MT. CLAUDE
MT. VANDYKE
MT. CATTLEY
BLACK BLUFF RANGE
Leven River
E.L. 41/83
River
Lea River
Lake Lea
Fall
Iris River
E.L. 34/87
LAKE CETHANA
Mersey River
5440000mN
Lorinna
Liena
E.L. 8/88
Δ MAYDAY MT.
Dove River
400000mE
MT. REMUS
Cradle Valley
Lake Parangana
Lake Dove
Forth River
Δ CRADLE MOUNTAIN
430000mE
440000mE
MT. EMMETT
RGC EXPLORATION PTY. LIMITED
E.L. 41/83
LOCALITY MAP
DRAWN BY : S.B.
DRAFTSMAN:
DATE Nov. 1988
REVISIONS
FILE NO.
SCALE 1:250,000
2.5 0 5.0
Kilometres
FIG. 1

2. LAND TENURE

E.L. 41/83 was granted on 21st December, 1983, to Renison Ltd., a wholly owned subsidiary of Renison Goldfields Consolidated (RGC). The licence was originally 112 sq. km., being reduced to 56 sq. km. in November 1985. Exploration is being carried out by RGC Exploration Pty. Limited (RGCE).

There are two current Stone Leases (1M/83 and 2M/83) within the Licence held by Gunns Holdings Pty. Limited.

Six land parcels fall within or encroach upon the licence (Figure 4). They are

1. land parcel 1883 - freehold land owned by Mr. K.A. Charleston.
2. land parcels 1056, 2010 & 2011 - Crown land leased by W.G. Wright Pty. Ltd.
3. land parcel 2035 - Crown land leased by J. & T. Gunn Property Holdings Ltd.
4. land parcel 2036 - Crown land leased by Mr. K.J. Cook.

3. EXPENDITURE

Expenditure on E.L. 41/83 since the previous renewal to the 28th September 1988 is $172,862 (Appendix 1). Expenditure to the renewal date is expected to be $190,000.

4. WORK DONE IN 1988

Work during 1988 was again centred around the Lea River Grid (LRG) in the northeastern portion of E.L. 41/83. Mapping and rock sampling of the entire grid at 1:5000 scale was completed. The Stormont Bismuth Mine (SBM) and the Fletcher's Adit (FA) areas were covered by mapping at 1:1000 scale. Assessment of the data obtained resulted in 15 holes being drilled. The Upper Stormont workings were cleared and chip/channel sampled.

Details and discussion of the work undertaken to date by RGCE follows.

4.1 REVIEW OF E.L. 8/65 REPORTS

Compilation of the review completed is given in Figures 5 & 6.

4.1.1 Regional Aeromagnetics

In March 1966 an aeromagnetic survey was flown by Australasian Mining & Engineering Geophysics Pty. Ltd. (AMEG). A proton magnetometer was used flown east-west at a 400 metre (1/4 mile) spacing with a terrain clearance of 90-275 metres (300-900 feet).

The data was interpreted by AMEG and again by Mr. J. Webb of Austral Exploration Services (AES) in 1968. No significant anomalism was identified in the E.L. 41/83 licence area. This suggests that magnetite skarns do not dominate here as they do in the area of the old Shepherd & Murphy Mine.

Another reinterpretation of the data was made by Compagnie Generale de Geophysique (CGG) in 1970. They considered the survey to have been poorly flown. However, they identified a main structural axis trending east-west north of FA. Related to this is a magnetic contact with possible mineralisation, and also a series of magnetic discontinuities (faults?) which trend northwest-southeast.

4.1.2 Regional Stream Sediment Geochemistry

During the 1966/67 field season stream sediment samples were collected at 400 metre (1/4 mile) intervals. The -35+80 mesh fraction was assayed for total tin and the -80 mesh fraction was assayed for zinc and copper. Anomalous samples were reassayed for lead and molybdenum.

4.1.3 Fletchers Adit - Stormont Bismuth Mine Areas

The work in these areas concentrated on defining a Bismuth resource.

Geology The early reports used the geology of Cordwell (1961) and Wilson (1962). Their work suggested the skarn occurred as a product of metasomatism of the basal portion of the Gordon Limestone. It was faulted and was located in the centre of synclinal folds striking northwest-southeast. The skarn in the FA area is interpreted to widen markedly to the north.

McKibben (1971) reports on mapping done on a grid established in the SBM area. Three outcrops of skarn were identified

1. SBM
2. Stormont West
3. Stormont East

The bodies are preserved as gritty folded synclinal outliers conformably overlying quartzites, sandstones and siltstones of the Moina Sandstone Formation. The Stormont East and SBM skarns are massive garnetiferous "calc-silicate" rocks while Stormont West is a highly magnetiferous chloritic skarn. Faulting strikes 330° and may have localised metasomatism and mineralisation. Disseminated bismuth occurs in the garnetiferous skarn. Tertiary basalt flows and siliceous gravel deposits (greybilly) obscure large sections of the grid to the east.

Geochemistry The FA area was investigated as it had the potential for a large tonnage and visible bismuth minerals had been observed in the pits above the adit. B-horizon soil samples were taken over the FA area in early 1967 (Reid, 1967). The samples were taken at a spacing of 60 x 60 metres (200 x 200 ft) and assayed for Mo, Sn, W & Bi. Results showed no bismuth anomalism occurred around the adit, but a strong anomaly did exist west of FA on the north side of the river. Subsequent regridding, soil sampling and trenching (Foster, 1969 & Dandy, 1970) confirmed the presence of anomalous bismuth in both the FA & SBM areas.

Dandy (1970) rock sampled the workings above FA, but obtained values less than those reported by Wilson (1962). Sampling of the trenches over the bismuth anomaly west of FA returned an average value of 187 ppm Bi for 26 samples. Samples consisted of "scree" sandstone and skarn.

McKibben (1971) chipped sampled the SBM & the Stormont East skarn. Values of 200 to 3700 ppm Bi and trace Bi were returned respectively.

Geophysics A variety of geophysical methods were used in the area. Ground magnetics using a fluxgate magnetometer was carried out by Foster (1969) and McKibben (1971). A strong magnetic response was obtained over the SBM. Foster considered the magnetics highlighted the SBM fault and was definitive in locating the basalt contact. A major response occurred over Stormont West which is exposed in Castle Creek. (McKibben, 1971).

McPhar VHEM survey (Foster, 1969) profiles are supposed to have expressed the faulting in the SBM & FA areas. In 1970 CGG recommended resistivity, gradient array IP, & SP surveys be conducted (Dandy, 1970). The sandstone is resistant with readings >500 ohm-m. Conductive axes trending northwest-southeast may be due to shear zones. The IP anomalous zones were regarded to have chargeabilities >20 msec, also trending northwest-southeast. However, there appeared to be no correlation with the conductive axes or with the magnetic anomalies. The main chargeability anomaly does correlate with the high bismuth soil anomalism existing west of FA. No significant SP anomalies were identified.
A scintillometer survey detected no significant variations.

The FA area was considered to contain around 5.5 x 10 tons of skarn. However, indications are that the area did fail to produce any significant grade. No further work was undertaken after 1970. The SBM area was estimated to have 2.5 x 10 tons of skarn in the three areas mapped. Limited potential for extension of the resources appeared to exist. No further work was therefore warranted.

4.2 LEA RIVER GRID

Geological mapping of the LRG at 1:5000 scale was completed. Its aim was to varify the mapping previously completed by R.A. Poltock for Comalco (Askins, 1978). Figures 7 and 8 show the current geology compilation.

4.2.1 Geology

Mapping of the refurbished and extended Comalco grid was hampered by the general lack of outcrop. This is caused by a covering of Tertiary rocks, areas of alluvium build up and the vegetation. The Tertiary basalt is extensive in its coverage, forming a thick soil which is prolific in covering surfaces down slope. The greybilly is also fairly widespread and can resemble Ordovician sandstone. The northern slopes of Stormont are often covered by a pink sandstone scree which makes mapping difficult. The rivers and creeks present the best exposures.

Cambrian schistose and quartz porphyry rocks outcrop as "windows" on top of Stormont, mapped on lines 2200W and 3000W. The Cambrian rocks are overlain unconformably by the Roland Conglomerate Formation. This formation is mainly well round and spherical quartz pebbles in a hematitic sand matrix. At the top of this unit is a pink sandstone, often with 5 to 10mm thick barren white quartz veins. The Roland Conglomerate is then considered to pass conformably into a light gravelly sandstone, the basal unit of the Moina Sandstone Formation.

The Moina Sandstone is made up of quartz grains that are well rounded and spherical. It is often tubicolar and can contain bands of shale or have a shaley component intermixed (greywacke). Within this sequence two white quartz masses occur. One is adjacent to the SBM and the other is positioned near 2800W/2000S. The upper most unit in the Moina Sandstone is a shale. It is often well layered, may have abundant calc-silicate minerals associated, and be hornfeslic. This unit seems to pass straight into skarn.

Field evidence does not suggest a wide transition zone between the shale and the overlying skarn rocks. The skarn is metasomatised Gordon Limestone Formation. No unaltered limestone has been identified on the grid. Two types of skarn seem to dominate. The first is a garnet skarn which has variable amounts of asscciated diopside, actinolite, epidote and calcite. The garnets themself can range from a brown-red to green. The second type is one that contains significant magnetite (magnetite skarn). This skarn type often appears to form the basal unit to the Formation. Overlying these rocks unconformably are Tertiary sediments and basalt.

The Tertiary sediments range from unconsolidated muds, which form bog holes where exposed, to siliceous sediments known locally as greybilly. The greybilly is often bleached in appearance and ranges from sandstone to a conglomerate, both with a siliceous matrix. The clastic components are well rounded, spherical quartz which represent reworked Ordovician rocks. A diagnostic feature of the greybilly is its lack of joint surfaces when exposed. The Tertiary basalt in the area forms a thick rich soil. It often appears to be fragmental in character with a white to light green zeolite as the matrix.

Structurally the area has been influenced by Devonian folding and faulting. The shape of the Lea River valley reflects the regional broad, open east-west trending syncline. The youngest rocks occur in the river exposures and the oldest rocks outcrop on the top of Stormont. Overprinting this regional trend locally are smaller, open northwest-southwest

trending folds. These folds produce the patchy outlier nature of the skarn bodies exposed. The major fauiting appears to sub-parallel these secondary trends and generally dip steeply to the west.

The alteration styles present are related to the intrusion of the Dolcoath Granite. The gravity data interpretation by Leaman (1988) and drilling nearby at the Shepherd & Murphy Mine area indicates that the top of the granite is shallowly dipping to the west beneath this area. The sandstone appears to be variably siliceous, and the nature of it would suggest that it is a unit with high permeability to solutions and gases. The shaley units tend to exhibit less alteration, except near the skarn contact where they can be hornfelsic, biotite often conspicuous. Calc-silicate minerals within the shale represents the metasomatic alteration of some carbonate mixed with the clastic sediments. The skarn represents the metasomatic alteration of the original limestone. Siliceous solutions worked their way through the underlying rocks along fractures, faults, and the more permeable lithologies. Total replacement of the limestone seems to have occurred. Some garnet skarn does have bunches of calcite crystals.

Gold mineralisation appears to only have two forms. The first is as fine disseminations in garnet skarn associated with blades of bismuthinite (SBM). The second is gold in quartz veins (Upper Stormont). The skarn related gold appears to be the form that could possibly represent a mineable resource. Base metals do occur in quartz veins within sandstone. However, these veins are thin and do not occur in significant numbers. The sandstone generally contains low levels of fine disseminated pyrite. Minor finely disseminated magnetite and/or pyrrhotite occurs.

4.2.2 Geochemistry

Sample locations and assays are shown in Figures 13 to 16. A listing of the assay results is in Appendix 2.

Rock outcrop and float samples collected were assayed for some or all of the following elements:
gold (fire assay), copper, lead, zinc, silver, bismuth, molybdenum, arsenic (AAS), tin, tungsten (XRF) by Analabs. Assay results were generally disappointing. All of the skarn samples were anomalous in bismuth up to a maximum value of 0.09% Bi. A sample located in skarn outcropping north of the Lea River on Line 3000W near 1000S returned a value of 0.27% Sn. Only one sample collected had a gold value greater than 0.10 g/t Au. A limonitic tubicolar sandstone with minor "crackle" development assayed 0.15 g/t Au. The sample is located near the headwaters of Castle Creek.

Break-of-slope samples were taken around Castle Creek. Six samples were collected and assayed for gold. Results are tabulated in Appendix 2 and shown on Figure 14. Some weakly anomalous values were returned of 0.09 g/t Au. One occurred to the southwest of the SBM and the other was near the rock sample that returned 0.15 g/t Au. This area requires follow-up. A description of break-of-slope sampling is given in the Annual Report for 1986 (Roberts, 1986).

4.2.3 Magnetics

The magnetics completed by RGCE (Roberts, 1987) identified several anomalies occurring south of the Lea River. These were positioned on Lines 2400W, 2500W, 2800W and around the SBM area. To give greater detail, these anomalies were covered by closely spaced magnetic traverses with readings taken at 5 metre intervals. The lines in the SBM area that this was done on were 3100W, 3150W and 3200W.

From the data obtained, profiles were generated and possible sources were modelled. The computer modelling was achieved with the assistance of Dr. J. Bishop of Mitre Geophysics in Tasmania.

Lines 2400W & 2500W - These anomalies occurred over an area mapped as basalt. Figure 17 is the profile of Line 2500W. The shape of the anomaly is wrong for the southern hemisphere. Therefore, it is regarded as reversal remnance which has been preserved in the basalt. It is highly magnetic. The anomaly on Line 2400 W is similar.

Line 2800W - Could possibly be a magnetite skarn source. Its base is considered to be less than 50 metres deep. Figure 18.

Lines 2950W to 3400W - These lines cover the SBM area. Profiles were generated at 50 metre line spacings. Lines 2950, 3050 & 3250 have only had fluxgate magnetometer readings taken along them by Comalco (Roberts, 1987). Figures 19 to 30 show the profiles. A number of anomalies existed that could be magnetite bearing skarn, some occurring under areas mapped as basalt. A large body on Line 3100W between 1425S to 1450S is not considered to represent skarn.

The magnetite skarn itself is considered not to be a significant gold-bearer, but occurs in an intimate association with the garnet skarn.

Colour image processing of the Comalco and RGC data was undertaken by Dr. J. Bishop.

4.3 STORMONT BISMUTH MINE AREA

1:500 and 1:1000 scale base sheets were prepared for the SBM area. The aim of the detailed study was to help locate targets to be drilled.

4.3.1 Geology

Last year the SBM was tape and compassed, channel sampled and mapped at a scale of 1:500 (Roberts, 1987). The tape and compass work was extended to include the area surrounding the mine, picking up the grid lines and roads (Figure 9). The workings consist almost entirely of garnet-actinolite skarn. Faults dipping 65°-75° to the southwest lie along the length of the workings, and are especially apparent at the southeastern end. Bedding appears to be at 55 to the northeast. These features suggest a relatively shallow wedge of skarn.

The rocks outcropping to the east of the fault zone are quartzites and sandstones dipping at 40° to the northeast. A plug of white quartz 50 metres long and about 7 metres wide occurs north of the mine apparently abutting against the fault zone.

Mapping of Castle Creek revealed alternating units of sandstone/quartzite with shale/hornfels containing variable amounts of calc-silicate minerals. Outcropping magnetite skarn was observed on tracks and workings south of the SBM. Outcrops to the northeast of the mine indicates the presence of additional garnet skarn. These two areas of outcropping skarn are the Stormont West and Stormont East reported by McKibben (1971).

The mapping was then extended over a larger area incorporating portions of lines 2800W through to 3300W. A plan at a scale of 1:1000 was produced (Figure 10). By positioning the location of magnetic anomalies and then relating these to the known geology, an appreciation of the overall structure was obtained. The position of the magnetic anomalies and the suggested location of fold axes are indicated on Figure 10.

Three sections were produced, Figures 31 & 32. Six drill holes were planned. An attempt was made on the sections to indicate probable and possible lithological boundaries. It is assumed, based on the field evidence, that the magnetite skarn forms the basal unit to the main skarn body. The shapes, therefore, rely on the assumption that certain anomalies are due to magnetite skarn.

4.3.2 Geochemistry

Rock samples were collected from outcrop and float during the 1:500 and 1:1000 scale mapping. Figures 33 & 34 are plans of the assays and their locations. A listing of the results is given in Appendix 2. The samples were assayed for gold (fire assay), copper, lead, zinc, silver, bismuth, molybdenum, arsenic (AAS), tin, tungsten (XRF). Only three samples had gold values >0.10 g/t Au, all were garnet skarn. The best was 0.67 g/t Au with 0.25% Bi which was a dump sample taken near a shaft located when positioning the planned drill site for hole SD2 (Figure 10).

4.4 UPPER STORMONT WORKINGS

Twelvetrees (1913) described the Stormont Gold Mine as having free gold occurring between thin leaves of quartz in a pink pug. Several chaotic narrow veins occur striking north. The gold was in a wire and crystalline(?) form with minor pyrite also present. Broadhurst (1934) described the gold as reefs in quartz. The lodes strike 330° and were 1.8 metres apart.

The workings were rediscovered during investigations over the LRG, some 120 metres SE of the SBM. They were cleared and tape and compass surveyed. The short trenches and water filled pits (shaft?), occur within tubicolar quartzite and extend over a length of 100 metres. The workings were chip/channel sampled. Results were disappointing with only one sample recording above 1 g/t Au (1.55) and four others above 0.1 g/t Au. The gold appears to be in thin (< 1cm wide) quartz veins. Figures 35 and 36 show the sample locations and the gold grades respectively at a scale of 1:500.

Other metals assayed for were copper, lead, zinc, silver, bismuth, molybdenum, arsenic, tin and tungsten. No significant values were returned. All assay results are tabulated in Appendix 2.

4.5 FLETCHERS ADIT AREA

From previous workers, the FA area is known to possess the potential to host a skarn body of considerable size. Detailed geology of the area, therefore, is a necessity. It was decided to map the area at a scale of 1:1000, similar to the SBM area. Chip/channel sampling and mapping of the old workings was also undertaken.

4.5.1 Geology

The bed of the Lea River in the FA area provided large areas of excellent outcrop. The river banks were tape and compassed. Figure 37 is a plan of the river with factual geology at a scale of 1:1000.

The river was then fitted back onto the expected position of the LRG. Some quite large distortions were identified. The remainder of the grid in the FA area was mapped and the factual geology is shown in Figures 11 & 12 at a scale of 1:1000. Skarn was identified in old pits and trenches created by previous workers on Line 2700W around 950S and on Line 3000W around 1050S. The best information was obtained in the river. It was decided to concentrate on the structure and relationships highlighted by its mapping.

The mapping suggested a simple stratigraphic sequence.

Alluvium		
Basalt Greybilly	))	Tertiary
Skarn Hornfels Sandstone	)))	Ordovician

The hornfels varied from shale through to a layered rock rich in calc-silicates. It seemed to be highly variable in thickness.

The sandstone was often siliceous. At times it had a high shale component, resembling a greywacke and some places contained abundant worm casts. In close proximity to the skarn it sometimes exhibited weak magnetism (magnetite?/pyrrhotite?).

Bedding in both the shale and sandstone was generally readily identifiable. Fold axes and lithology boundaries were then interpreted along the river bed. Figures 11 & 12.

Poles of bedding taken by Wilson (1962), Poltock (Askin, 1978) and M.J. Fleming were plotted on a Wulff Stereonet, Figure 38. The average strike and dip of the folds interpreted along the river bed gave an average fold axis plunging 8 toward 298 (magnetic).

Figure 39 represents the open regional east-west fold. Figures 40 & 41 show the effect of the smaller, local folding as observed in the river bed. The geology interpreted on the sections fits well with that observed on the grid. Figures 11 & 12 show the position of the section planes.

A <u>possible</u> fault occurs opposite FA in the river bed. This fault has been interpreted by other workers to have a significant effect on the skarn body. It has not been considered in this interpretation.

Drilling has been proposed based on the sections in Figures 40 & 41.

4.5.2 Geochemistry

Rock outcrop and float sampling was carried out during the 1:1000 scale mapping. Chip/channel sampling of old workings located in the area was also done. Samples were assayed by Analabs for Au (fire assay), Cu, Pb, Zn, Ag, Bi, Mo, As (AAS), Sn, W (XRF). The assay results are tabulated in Appendix 2.

A sample of the skarn outcropping in the Lea River bed directly north of FA returned an assay of 1.68 g/t Au and 0.29% Bi. This sample is close to a possible fault. Most other samples of the grid returned insignificant results. Chip samples from a small lode working referred to by Burns (1959) as No. 2 lode gave reasonable Cu, Pb, Zn, Ag values, but no gold. The best assay was 2.45% Cu. Figures 42 & 43 show the sample locations and assays for the grid rock geochemistry.

FA and the workings up-slope to the south have been cleared, tape/compassed, and chip/channel sampled. The adit appears to be on the contact between magnetite-bearing calc-silicate or skarn occurring on the eastern sidewall, and garnet skarn with visible bismuthinite on the western sidewall. The contact itself appears to be diffuse. The workings up-slope are within a mixture of calc-silicate rocks and garnet skarn. Outcropping exposures of skarn to the west of FA and along the bed of the Lea River have also been chip/channel sampled. 41 samples were collected in total.

Although anomalous, gold values from FA and the skarn to the west were low. One sample of magnetite-bearing calc-silicate recorded 0.19 g/t Au. The remainder returned between 0.11 g/t Au and 0.02 g/t Au. Better grades were achieved in the workings above the adit. The samples averaged above 0.5 g/t Au and two samples gave above 1.0 g/t Au. Sampling of the Lea River bed typically returned gold values below detection with only one sample containing 0.3 g/t Au. Base metals were low throughout, though values up to 0.17% were recorded in FA. Higher gold values generally coincided with high bismuth values. Bismuth ranged up to 0.37%.

Further small workings were found in the FA area during mapping. These were cleared, tape/compassed and chip/channel sampled. These seemed to be chasing base metal lode veins in the sandstone/quartzite or hornfels

(biotite and calc-silicate). No gold values above detection were obtained from any of these workings. The best base metal value was 0.3% Pb.

Figures 44 & 45 show the tape and compass location of all of the chip/channel samples in the FA area, their sample numbers and gold assay respectively. Other element assay results are tabulated in Appendix 2.

4.6 DRILLING

15 holes were drilled during the year. Six in the SBM area and nine in the FA area. The holes were designed to test the extent and gold bearing potential of the skarn rocks occurring in these areas based on the interpretations detailed previously.

A total of 1162.0 metres were drilled. The average drill rate was 11.2 metres per shift.

The surface location of the drill hole collars are plotted on Figures 10 to 12. Survey pickup of the hole collars in the FA area are awaited. Drill hole plots (Figures 46 to 60) and logs (including assays) for all of the holes drilled are included as Appendix 3.

The following table gives a summary of the holes.

Hole No.	Grid Position	Azimuth (Mag.)	Dip	Depth (Metres)	Started	Finished
FD1	1005S/2730W	-	-90°	61.1	13.5.88	18.5.88
FD2	960S/2705W	-	-90°	20.0	19.5.88	19.5.88
FD3	910S/2790W	-	-90°	95.0	20.5.88	26.5.88
FD4	930S/2915W	-	-90°	62.0	27.5.88	1.6.88
FD5	970S/2940W	-	-90°	29.5	2.6.88	4.6.88
FD6	1020S/2855W	-	-90°	184.3	5.6.88	20.6.88
FD7	805S/2730W	-	-90°	80.0	22.6.88	1.7.88
FD8	795S/2840W	-	-90°	127.8	4.7.88	18.7.88
FD9	1005S/2730W	020°	-40°	56.3	20.7.88	22.7.88
SD1	1552S/3135W	-	-90°	145.0	2.8.88	12.8.88
SD2	1500S/2950W	-	-90°	61.8	13.8.88	18.8.88
SD3	1595S/3080W	-	-90°	75.1	19.8.88	23.8.88
SD4	1750S/3200W	-	-90°	52.6	27.8.88	30.8.88
SD5	1620S/3000W	-	-90°	70.3	31.8.88	5.9.88
SD6	1590S/2800W	-	-90°	41.2	6.9.88	12.9.88

All of the holes showed a simple stratigraphy. A description follows. The lithologies are listed as they occurred down the hole, that is, from youngest to oldest.

Basalt - Good intersections in FD3 and FD8. It occurs as a breccia with fragments ranging from 1mm to 100's of cm. The fragments often showed thin reaction rimming. The matrix was a white to light green zeolite. Voids often occurred in the matrix and zeolite crystal are developed.

Tertiary Sediment - This was intersected in FD8, SD6 and possibly FD3. Generally layered, fine grained and unconsolidated.

Limestone - Intersected in FD1, FD3 and possibly in SD3, SD5 and FD8. In FD1 & FD3 it is grey to blue grey in colour and looks massive. Its contact with skarn is often sharp. Generally contains weakly disseminated pyrite. FD8, SD3 & SD5 have dark pug zones above the skarn. These contain disseminated euhedral pyrite grains. The pug may represent intensely leached limestone.

Skarn - The skarn is chaotic in appearance. It contains garnet-diopside-actinolite-epidote-magnetite-calcite in varying amounts and associations. The magnetite is generally richest at the top of the skarn intersection where it often resembles wrigglite. Toward the lower contact it is often only finely disseminated to about 5%. A transition zone between the skarn and the unit below generally occurs only over a few metres. An increased sandy component is often strongly silicified. Thin quartz-rich greisen veins may occur throughout the skarn, and often have a thin rimming of very fine-grained magnetite. Sulphides, mainly pyrite, are generally highly variable in occurrence, though are often associated with the magnetite.

Quartzite - This unit is characterised by its variable thickness and well broken nature. It is a strongly silicified sandstone, light grey in colour, that contains variable amounts of disseminated magnetite. Calc-silicate minerals and shale can occur in thin bands or interstitially.

Shale - Generally well layered with bands and "eyes" of light grey quartzite. Varies from buff to purple to pink in colour near the skarn, becoming more grey with depth. The colour variation may represent alteration of some of the clay component. The shale surrounding a quartzite band is not silicified. Scattered, patchy calc-silicate minerals occur throughout.

Sandstone - Grey, variably silicified sandstone is often tubicolar. Shale bands and intermixing are common. Patchy calc-siliciate minerals are also common. Pyrite also is patchy and occurs as fine grained aggregates, espcially associated with the worm casts. The lower unit is a gravelly sandstone.

Conglomerate - The contact between the sandstone and conglomerate is a bit leached and broken in SD1. The conglomerate is generally hematitic and is either a gravelly sandstone or a coarse pebble conglomerate.

The contact between the units is generally gradational. Greisen veining is thin, vuggy and of a low intensity. Only FD1 had a reasonable showing of mineralisation within the greisen veins.

Two holes, FD6 & SD1, were drilled well past the skarn in an attempt to investigate the position of the underlying granite.

Following are zones defined on a 0.1 g/t Au cut off.

Drill Hole	Depth (m)	Interval Width (m)	Grade (g/t Au)
FD1	30.0-32.0	1.0	0.16
FD4	20.0-25.0	5.0	0.32
FD6	12.0-15.0	3.0	0.15
	18.0-19.0	1.0	0.23
	21.0-22.0	1.0	0.13
	174.0-175.0	1.0	0.13
FD7	26.0-28.0	2.0	1.52
FD8	64.8-86.0	21.2	0.29
	89.0-93.0	4.0	0.27
	95.0-97.0	2.0	0.31
	98.0-99.0	1.0	0.11
FD9	12.0-13.0	1.0	0.18
SD1	4.5-17.5	13.0	4.12
	22.5-23.5	1.0	0.11
	25.5-29.4	3.9	0.25
SD3	16.9-19.0	2.1	12.77
	21.0-22.0	1.0	0.25
SD5	35.0-36.0	1.0	0.24

The drilling in the FA area confirmed the presence of an extensive skarn body. However, gold values were disappointing.

Drilling in the SBM area also confirmed the presence of a greater quantity of skarn than was originally interpreted. Significant gold values were obtained in skarn along strike to the south of the old workings, SD1 & SD3.

The 4.12 g/t Au intersected in SD1 was associated with 0.46% Bi and kicks in lead, zinc and silver. Visible bismuthinite was identified for the first

time in the core.

The gold mineralisation is associated with a fault zone from 12.6m to 19.5m.

The 12.77 g/t Au intersected in SD3 occurs some 80 metres along strike to the south from SD1. Bismuth is at a grade of 0.35% Bi and kicks again occur in zinc and silver, and also arsenic. A fault is associated.

The problem in the SBM area is whether or not a resource of an economic size can be defined. The skarn intersected in SD6 may indicate the body widens substantially to the south.

4.7 TECHNICAL REPORTS

A number of reports by consultants were submitted to RGC during the year. Following is a summary of the work received.

4.7.1 Overview of Mineralisation Styles

Dr. Gregg W. Morrison, from James Cook University, spent two weeks in Northern Tasmania examining gold occurrences. He was consulted to give an overview of the mineralisation styles observed and to evaluate the bulk tonnage gold mineralisation potential.

A copy of his report is given in Appendix 4.

The SBM & FA skarns Gregg interprets to be early (?) high temperature (+450° C) metasomatic replacement of limestone. Related to flourine-poor cupolas. He suggests the gold is in a Cu-Au-Bi signature which is related to the replacement and not retrogressive. The lack of significant retrograde overprinting or greisenisation suggests the skarn formed close to a pluton and not adjacent to a pre or syn-mineral fault in general. The area has immediate exploration potential due to the excellent results received to date and the disseminated nature of the ore.

Gregg has defined several stages of mineralisation affecting the area based on work on drill holes from the Narrawa-Higgs area (Figures 61 & 62 in Appendix 4).

The porphyry that exists in the Mariner 1 and 3 gridded areas may have potential for porphyry and epithermal styles of mineralisation if it is considered to be subaerial. This view is reinforced by the presence of advanced argillic alteration in some shear zones suggesting high temperature interaction of magmatic and meteoric waters (e.g. Goonumbla - Peak Hill - Temora NSW).

For the Moina area, Gregg concludes the best targets are in situations where Pb-Zn-Ag vein/replacement deposits are overprinted by Au-bearing greisen veins. He considers the locus of these deposits to be adjacent to the NW trending shears and faults cutting carbonate rocks and intruded by F-poor plugs or dykes.

4.7.2 Assessment of Gold Variability in High Energy Streams

Simon Gatehouse reviewed the current stream sampling methods employed by RGCE. The aim was to improve confidence and reproduceability in anomalous results from stream sediments sampled. A copy of his report is in Appendix 5.

In summary, bulk cyanide sampling and analytical techniques failed to reliably detect significant gold. The limiting factors were stream nugget and hydraulic effects. Evidence suggests that fine sediment sampling of these high energy streams may increase the reliability of sampling. To achieve an increase in quality, an index of trap site efficiency is required. Analysis of Zr will supply such an index if the assumptions, that the source variability of Zr is less than the hydraulic variability and less than that for gold, are considered reasonable.

The conclusions Simon makes are that nugget and hydraulic effects will cause difficulties as long as only gold is analysed. The gold contents in -200 mesh fractions from active stream locations are less subject to these effects than the coarser fractions, though the gold content is depleted. Analysis of ubiquitous heavy mineral elements will assist in resolving in-stream complexities, but simple stream size fractions do not give enough information about their concentration. Associated trace elements should be used to assess source and stream characteristics. Bulk cyanide techniques were found to be inadequate.

Therefore, Simon recommends a 50 gramme sample of wet field sieved -200 mesh sediment from moderate trap sites. This sample will be analysed by Neutron activation techniques.

4.7.3 Gold Skarn Potential

A report was submitted by Lawrence D. Meinert of Washington State University. (Appendix 6). He spent a couple of days looking at skarns in the Renison and Moina regions.

Larry has undertaken detailed examinations of gold skarns in North America. He considers that the SBM skarn has the mineralogical features which reflect the greatest potential for producing an economic gold deposit. However, he believes the composition of the associated pluton is a limiting factor in locating large deposits. The plutons should be more mafic and oxidised.

4.7.4 Modelling of some Lake Lea Aeromagnetic Anomalies

Dr. John Bishop of Mitre Geophysics was asked to look at the 1980 aeromagnetic data of Shell. Shell had the eastern portion E.L. 41/83 flown as part of its exploration of E.L. 7/74. See Figure 63 for the coverage of this survey. The aim was to identify "bull's eye" anomalies and model these to obtain some idea of the size and depth of source.

The definition of targets was concentrated on the Cambrian & Ordovician rocks. The anomalies within basalt were considered the least prospective.

Twenty-two anomalies were picked from the contour plan, Figure 63. Nine were chosen for preliminary modelling. Flight line profiles were created and a number of additional subtle anomalies were noticed on these profiles. Thus, it is considered the data could undergo a further more detailed appraisal. The profiles were then modelled. See Appendix 7 for the bodies generated from the modelling and for comments on each anomaly.

4.7.5 Regional Geophysical Appraisal

Dr. David Leaman of Leaman Geophysics in Hobart is currently studying the magnetics and gravity data over the Molna area.

The first phase report on the magnetics has been received (Appendix 8). The magnetics data offers a good deal of information on the structure in the area. A conjugate set of NW-SE and NE-SW structures have been identified. The northern wedge intersection zones caused by these structures relate to known mineralised locations when associated with an E-W trend. The E-W trend is thought to represent transform faulting in an old rift environment.

The data infers the presence of a concealed Cambrian mafic suite that appears to be widespread throughout. The Tertiary basalt is variable in character. The suggestion is that it may only be patchy and thin. Generally less than 50 metres thick.

Little evidence of alteration is apparent. The interpreted Cambrian mafics could be contact metamorphosed Cambrian felsics.

Known mineralisation appears to be concentrated on reactivated (Devonian) boundaries or structural trends. Many deposits have a possible magnetic expression. Also, a number of unexplained expressions have been noted.

The next phase report will be on the gravity data. To enhance this study, the Department of Mines took gravity readings in the area east of E.L. 41/83.

5. WORK PLANNED 1988

The following work is planned for the twelve months to December 22nd 1988.

1. Continued assessment of data detailed in previous Annual Reports. In particular E.L. 10/74.

2. Completion of the regional geophysical appraisal. This involves a study of the available gravity data. The gravity results and magnetic results will then be combined to produce areas of interest for follow-up.

3. Follow-up drilling of the gold intersections in the SBM area.

4. Other areas of interest on the Lea River Grid require identification and follow-up.

5. Stream sediment gold anomalies from the 1985/86 need to be resampled.

6. Mapping and rock sampling of the northwest region.

7. Mapping and chip/channel sampling of the Devonport Adit and Blacks Adit (Mariner 6).

8. Soil sampling for gold over the Mariner 4 grid plus petrographic examination of altered rocks on the grid.

This work will lead to the construction of further grids which will be geologically mapped, soil sampled and covered with geophysics. Definition of drill targets will result.

6. REFERENCES

ASKINS, P.W. (1978) EL 7/74 Moina, sheets 1,2 & 3. All investigations to September 1978. Comalco Ltd. Tas. Dept. Mines Open File Report 1305/78

BROADHURST, E. (1934) Extract from report on the Stormont and Black Bluff District. Unpubl. rep. Tas. Dept. Mines.

BURNS, K.L. (1959) The Stormont Bismuth Mine. Tech. Report Dept. Mines Tas. 3: 36-42.

CORDWELL, K.S. (1961) Report on Mt. Stormont Bismuth Mine. Moina Tas. New Consolidated Gold Fields (A/sia) P/L.

DANDY, B.C. (1979) Annual Report Moina Area E.L. 8/65. 1969-70. Mt. Lyell Mining & Railway Co. Ltd. Tas. Dept. Mines Open File Report 37/26.

FOSTER, M.J. (1969) Progress Report on Activities in E.L. 8/65 (Moina area) to March 1969. Mt. Lyell Mining & Railway Co. Ltd. Tas. Dept. Mines Open File Report 037/25.

JENNINGS, I.B. (1963) Middlesex, one mile geological map series, Explanatory Report. Tas. Dept. Mines, Geol. Surv. Explan. Report.

JENNINGS, I.B., (1979) et al Sheffield, Geological Atlas 1 mile series.(1979) Zone 7. Sheet 37 (8115S). Explanatory Report. Tas. Dept. Mines, Geol. Survey Explan. Report.

REID, H.G.W. (1943) Report on the Moina Mineral District. Tas. Dept. Mines Unpubl. Rept.

LEAMAN, D.E. (1988) Granites of W and NW Tasmania. Part 9. The Dolcoath Granite. MRV Project Report, Mines Dept., Tas.

McKIBBEN, J.P. (1971a) Annual Report on Moina Area E.L. 8/65. 1970-71. Mt. Lyell Mining & Railway Co. Ltd. Tas. Dept. Mines Open File Report 37/27.

McKIBBEN, J.P.(1972) Annual Report on Moina Area E.L. 8/65 1971-1972. The Mt. Lyell Mining & Railway Co. Ltd. Tas. Dept. Mines Open File Rept. 37/30.

REID, A.M. (1919) The Mining Fields of Moina, Mt. Claude and Lorinna. Dept. Mines Tas. Geol. Surv. Bull. 29.

REID, K.O. (1967) Progress Report on Activities in E.L. 8/65 (Moina Area) to June, 1967. Mt. Lyell Mining & Railway Co. Ltd. Tas. Dept. Mines Open File Report Q37/20.

ROBERTS, P.A. (1985) EL 41/83. Western 56 sq. km. Relinquishment Report.

ROBERTS, R.H. (1986) E.L. 41/83. Lake Lea Area. Annual Report - 1985/86.

ROBERTS, R.H. (1987) E.L. 41/83. Lake Lea Area. Annual Report - 1987.

SMITH, J.H. (1899) Report on the Bell Mount and Middlesex Mineral Fields. Ann. Rep. Sec. Min. Tas. for 1898-99.

TWELVETREES, W.H. (1907) Report on the Bell Mount and Middlesex districts. Ann. Rep. Sec. Min. Tas. 1907.

TWELVETREES, W.H. (1913) The Middlesex and Mount Claude Mining Field. Tas. Dept. Mines. Geol. Surv. Bull. 14.

WALLER, G.A. (1901) Report on Mineral Districts of Bell Mount Dove River, Five Mile Rise, Mt. Pelion and Barn Bluff. Ann. Rep. Sec. Min. Tas. for 1900-1901; 184-231.

WILSON, G.I. (1962) Report on Special Prospecting Licence No. 378. Mt. Stormont Area, Tasmania. Unpublished report for New Consolidated Gold Fields (A/sia) P/L.

Appendix I

Expenditure - 1985

APPENDIX 1

RGCE Expenditure - January 1988 to September 1988

Item		Cost
Salaries, wages, on-costs		$ 44,842
Travel & accommodation		$ 570
Consultants & contractors		$ 3,986
Assays $ 12,541		
Drilling		$ 95,582
Stores $ 7,962		
Vehicle/plant hire		$ 5,807
Office costs		$ 1,572
	TOTAL	$172,862

Appendix 2

Assay Results

(i) LRG Rock Geochemistry
(ii) Break-of-slope, Castle Creek
(iii) SBM Rock Geochemistry
(iv) Upper Stormont Channel Sampling
(v) FA Area Channel Sampling
(vi) FA Rock Geochemistry

(i) LRG Rock Geochemistry

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ANALABS

A Division of Macdonald Hamilton & Co. (S.A.) Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	95.1.08.05217	23/03/88	0368	1 OF 6

TUBE No.	SAMPLE No.	Cu	Cu	Pb	Pb	Zn	Zn	Ag	Ag	Bi
1										
2										
3										
4										
5										
6	T6881	5	-	5	-	10	-	<0.5	-	30
7										
8										
9										
10	T6894	10	-	10	-	20	-	<0.5	-	100
11	T6895	10	-	1700	-	35	-	0.5	-	110
12	T6896	50	-	25	-	135	-	<0.5	-	70
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										

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

AUTHORISED OFFICER

038

ANALABS

A Division of Macdonald Hamilton & Co. Pty Ltd

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	95.1.08.05217	23/03/88	0368	3 OF 6

TUBE No.	SAMPLE No.	Cu	Cu	Pb	Pb	Zn	Zn	Ag	Ag	Bi
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22	DETECTION	5	25	5	25	5	25	0.5	2	10
23	UNITS	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
24	METHOD	101	104	101	104	101	104	101	104	101
25										

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

AUTHORISED OFFICER

039

708040

ANALABS

A Division of Macdonald Hamilton & Co Pty Ltd

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	95.1.08.05217	23/03/88	0368	4 OF 6

TUBE No.	SAMPLE No.	As	Au	Pd/Pt						
1										
2										
3										
4										
5										
6	T6881	1	0.010	-						
7										
8										
9										
10	T6894	1	0.040	<0.008						
11	T6895	93	0.020	-						
12	T6896	1	<0.008	-						
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										

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

AUTHORISED OFFICER

ANALABS

A Division of Macdonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	95.1.08.05217	23/03/88	0368	6 OF 6

TUBE No.	SAMPLE No.	As	Au	AuChk						
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22	DETECTION	1	0.008	0.008						
23	UNITS	PPM	PPM	PPM						
24	METHOD	114	309	309						
25										

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

AUTHORISED OFFICER

041

708041

ANALABS

A Division of Macdonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	95.1.08.05195	23/03/88	0559	1 OF 2

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Bi	Mo	As	Au	AuChk
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14	T10251	5	20	10	1.0	10	70	8	<0.008	<0.008
15	T10252	<5	15	20	<0.5	<10	30	1	<0.008	-
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	5	5	5	0.5	10	10	1	0.008	0.008
24	UNITS	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
25	METHOD	103	103	103	103	103	103	114	309	309

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

AUTHORISED OFFICER

708043

042

ANALABS

A Division of Macdonald Hamilton & Co Pty. Ltd

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	95.1.08.05195	23/03/88	0559	2 OF 2

TUBE No	SAMPLE No.	Sn	Bi							
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14	T10251	5	<10							
15	T10252	8	<10							
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	3	10							
24	UNITS	PPM	PPM							
25	METHOD	401	401							

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

AUTHORISED OFFICER

043

1

ANALABS

A Division of Macdonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	95.1.08.05425	03/06/88	0560	1 OF 4

TUBE No.	SAMPLE No.	Cu	Cu	Pb	Pb	Zn	Zn	Ag	Ag	Bi
1	T10254	–	10	–	<5	–	165	–	4.0	–
2	T10256	–	25	–	65	–	135	–	5.0	–
3	T10259	–	5	–	<5	–	65	–	4.5	–
4	T10266	–	15	–	<5	–	85	–	5.0	–
5	T10274	–	15	–	65	–	150	–	1.5	–
6	T10276	–	15	–	30	–	230	–	1.5	–
7	T10277	–	25	–	<5	–	155	–	<0.5	–
8	T10283	–	50	–	<5	–	400	–	0.5	–
9	T10285	–	10	–	<5	–	310	–	<0.5	–
10	T10286	–	10	–	<5	–	300	–	<0.5	–
11	T10287	–	10	–	5	–	140	–	1.0	–
12	T10288	–	15	–	<5	–	145	–	0.5	–
13	T10289	–	245	–	5	–	140	–	<0.5	–
14	T10255	30	–	<5	–	55	–	0.5	–	10
15	T10257	5	–	<5	–	10	–	0.5	–	<10
16	T10258	5	–	<5	–	10	–	<0.5	–	<10
17	T10260	5	–	<5	–	5	–	0.5	–	10
18	T10261	10	–	<5	–	10	–	1.0	–	<10
19	T10262	5	–	<5	–	20	–	<0.5	–	<10
20	T10263	5	–	<5	–	15	–	0.5	–	10
21	T10264	20	–	<5	–	5	–	<0.5	–	10
22	T10265	25	–	<5	–	10	–	<0.5	–	20
23	T10267	15	–	<5	–	5	–	1.5	–	<10
24	T10268	5	–	<5	–	40	–	0.5	–	10
25	T10269	5	–	<5	–	5	–	<0.5	–	<10

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

AUTHORISED OFFICER

044

ANALABS

A Division of Macdonald Hamilton & Co. Pty Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	95.1.08.05425	03/06/88	0560	2 OF 4

TUBE No.	SAMPLE No.	Cu	Cu	Pb	Pb	Zn	Zn	Ag	Ag	Bi
1	T10270	10	-	<5	-	10	-	0.5	-	<10
2	T10271	5	-	<5	-	<5	-	0.5	-	<10
3	T10272	5	-	<5	-	5	-	1.5	-	<10
4	T10275	5	-	<5	-	35	-	0.5	-	<10
5	T10278	5	-	<5	-	5	-	0.5	-	<10
6	T10279	10	-	165	-	110	-	2.0	-	20
7	T10280	5	-	<5	-	30	-	1.0	-	<10
8	T10281	20	-	<5	-	20	-	1.0	-	10
9	T10282	10	-	<5	-	35	-	0.5	-	<10
10	T10284	15	-	<5	-	15	-	<0.5	-	<10
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	5	5	5	5	5	5	0.5	0.5	10
24	UNITS	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
25	METHOD	101	103	101	103	101	103	101	103	101

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

AUTHORISED OFFICER

045

708046

ANALABS

A Division of Macdonald Hamilton & Co. Pty Ltd

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	95.1.08.05425	03/06/88	0560	3 OF 4

TUBE No.	SAMPLE No.	Bi	Mo	Mo	As	Au	AuChk	Sn	W	
1	T10254	50	–	10	11	0.02	–	816	46	
2	T10256	20	–	30	4	<0.01	<0.01	33	18	
3	T10259	10	–	20	9	<0.01	–	17	13	
4	T10266	<10	–	30	60	<0.01	–	4	<10	
5	T10274	<10	–	<10	14	<0.01	–	14	<10	
6	T10276	10	–	30	7	0.02	–	12	<10	
7	T10277	<10	–	40	4	<0.01	–	7	<10	
8	T10283	10	–	30	7	<0.01	–	17	<10	
9	T10285	<10	–	10	5	<0.01	–	239	<10	
10	T10286	<10	–	20	19	<0.01	–	44	<10	
11	T10287	390	–	20	9	0.01	–	826	91	
12	T10288	170	–	20	2	<0.01	–	95	406	
13	T10289	850	–	10	4	<0.01	–	2660	454	
14	T10255	–	20	–	2	<0.01	–	82	12	
15	T10257	–	20	–	4	<0.01	–	15	<10	
16	T10258	–	30	–	11	<0.01	–	4	<10	
17	T10260	–	20	–	5	<0.01	0.02	7	<10	
18	T10261	–	30	–	24	<0.01	–	5	<10	
19	T10262	–	30	–	42	<0.01	–	4	<10	
20	T10263	–	30	–	6	<0.01	–	4	<10	
21	T10264	–	40	–	19	<0.01	–	6	<10	
22	T10265	–	20	–	30	<0.01	–	4	<10	
23	T10267	–	40	–	16	<0.01	–	3	<10	
24	T10268	–	30	–	3	<0.01	<0.01	<3	<10	
25	T10269	–	30	–	2	<0.01	–	<3	<10	

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

AUTHORISED OFFICER

046

ANALABS

A Division of Macdonald Hamilton & Co. Pty Ltd

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	95.1.08.05425	03/06/88	0560	4 OF 4

TUBE No.	SAMPLE No.	Bi	Mo	Mo	As	Au	AuChk	Sn	W	
1	T10270	–	30	–	15	<0.01	–	4	<10	
2	T10271	–	<10	–	1	0.08	–	<3	<10	
3	T10272	–	50	–	1	<0.01	–	4	<10	
4	T10275	–	30	–	5	<0.01	<0.01	<3	<10	
5	T10278	–	20	–	24	<0.01	–	6	<10	
6	T10279	–	<10	–	20	IS	–	IS	IS	
7	T10280	–	30	–	3	<0.01	–	4	<10	
8	T10281	–	60	–	8	0.15	–	7	<10	
9	T10282	–	40	–	14	0.07	–	4	<10	
10	T10284	–	50	–	20	<0.01	–	4	<10	
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	10	10	10	1	0.01	0.01	3	10	
24	UNITS	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	
25	METHOD	103	101	103	114	309	309	401	401	

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

AUTHORISED OFFICER

(ii) Break-of-Slope, Castle Creek

048

ANALABS

A Division of Wardrop Hamilton A.D.C. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	95.1.08.05089	01/02/89	0369	1 OF 1

TUBE No.	SAMPLE No.	Au	Au CHK							
1	T4849	0.090	-							
2	T4850	<0.002	-							
3	T4851	<0.008	-							
4	T4852	<0.008	<0.008							
5	T4853	<0.008	-							
6	T4854	0.090	-							
7	T4855	<0.008	-							
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	0.008	0.008							
24	UNITS	PPM	PPM							
25	METHOD	309	309							

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

AUTHORISED OFFICER

(iii) SBM Rock Geochemistry

708051

050

ANALABS

A Division of Macdonald Hamilton & Co. Pty Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	95.1.08.05217	23/03/88	0368	1 OF 6

TUBE No.	SAMPLE No.	Cu	Cu	Pb	Pb	Zn	Zn	Ag	Ag	Bi
1										
2										
3										
4										
5										
6										
7	T6891	5	-	25	-	85	-	0.5	-	50
8	T6892	10	-	10	-	90	-	<0.5	-	80
9	T6893	40	-	25	-	65	-	<0.5	-	700
10										
11										
12										
13										
14										
15										
16	T8655	10	-	20	-	95	-	<0.5	-	70
17	T8657	10	-	25	-	80	-	<0.5	-	110
18	T8658	15	-	805	-	100	-	2.0	-	2500
19	T8659	5	-	55	-	75	-	<0.5	-	130
20	T8660	-	-	-	-	-	-	-	-	-
21	T8661	45	-	25	-	70	-	<0.5	-	220
22	T8662	45	-	35	-	95	-	<0.5	-	660
23	T8663	25	-	75	-	85	-	<0.5	-	60
24	T8664	15	-	5	-	15	-	<0.5	-	60
25	T8665	10	-	165	-	125	-	<0.5	-	510

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

AUTHORISED OFFICER

708652

051

ANALABS

A Division of Mactonald Hamilton & Co. Pty Ltd

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	93.1.08.05217	23/03/88	0368	2 OF 6

TUBE No.	SAMPLE No.	Cu	Cu	Pb	Pb	Zn	Zn	Ag	Ag	Bi
1	T8666	10	–	30	–	100	–	<0.5	–	180
2	T8667	350	–	15	–	470	–	<0.5	–	640
3	T8668	125	–	5	–	220	–	<0.5	–	160
4	T8669	35	–	30	–	80	–	<0.5	–	440
5	T8670	5	–	<5	–	10	–	0.5	–	<10
6	T8671	5	–	15	–	125	–	<0.5	–	10
7	T8672	20	–	25	–	165	–	<0.5	–	<10
8	T8673	20	–	<5	–	15	–	<0.5	–	<10
9	T8674	60	–	35	–	45	–	<0.5	–	<10
10	T8675	65	–	20	–	60	–	<0.5	–	40
11	T8676	15	–	<5	–	20	–	<0.5	–	<10
12	T8677	10	–	<5	–	30	–	<0.5	–	20
13	T8678	25	–	<5	–	15	–	<0.5	–	10
14	T8679	5	–	60	–	115	–	<0.5	–	470
15	T8680	–	–	–	–	–	–	–	–	–
16	T8681	10	–	20	–	80	–	<0.5	–	90
17	T8682	5	–	<5	–	90	–	<0.5	–	<10
18	T8683	5	–	<5	–	25	–	<0.5	–	10
19	T8684	5	–	<5	–	135	–	<0.5	–	<10
20	T8685	90	–	20	–	165	–	<0.5	–	<10
21	T8686	40	–	30	–	105	–	<0.5	–	40
22	T8687	90	–	20	–	165	–	<0.5	–	10
23										
24										
25										

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

AUTHORISED OFFICER

705053

052

ANALABS

A Division of Macdonald Hamilton & Co. Pty Ltd

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	95.1.08.05217	23/03/88	0368	3 OF 6

TUBE No.	SAMPLE No.	Cu	Cu	Pb	Pb	Zn	Zn	Ag	Ag	Bi
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22	DETECTION	5	25	5	25	5	25	0.5	2	10
23	UNITS	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
24	METHOD	101	104	101	104	101	104	101	104	101
25										

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

AUTHORISED OFFICER

053

ANALABS

A Division of Macdonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	95.1.08.05217	23/03/88	0368	4 OF 6

TUBE No.	SAMPLE No.	As	Au	AuChk						
1										
2										
3										
4										
5										
6										
7	T6891	9	0.020	–						
8	T6892	92	0.010	–						
9	T6893	5	0.010	–						
10										
11										
12										
13										
14										
15										
16	T8655	62	<0.008	–						
17	T8657	5	<0.008	–						
18	T8658	2	0.670	–						
19	T8659	2	0.010	–						
20	T8660	–	0.120	0.120						
21	T8661	10	0.040	–						
22	T8662	11	0.020	–						
23	T8663	17	<0.008	–						
24	T8664	5	0.020	–						
25	T8665	12	0.150	–						

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

AUTHORISED OFFICER

054

ANALABS

A Division of Macdonald Hamilton & Co. Pty Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No	PAGE
	95.1.08.05217	23/03/88	0368	5 OF 6

TUBE No.	SAMPLE No.	As	Au	AuChk						
1	T8666	6	<0.008	–						
2	T8667	35	0.040	–						
3	T8668	6	<0.008	–						
4	T8669	6	0.010	–						
5	T8670	1	<0.008	–						
6	T8671	15	<0.008	–						
7	T8672	8	0.010	–						
8	T8673	18	<0.008	–						
9	T8674	17	<0.008	–						
10	T8675	33	<0.008	–						
11	T8676	5	<0.008	–						
12	T8677	6	<0.008	–						
13	T8678	24	<0.008	–						
14	T8679	2	0.170	–						
15	T8680	–	2.810	2.880						
16	T8681	6	<0.008	–						
17	T8682	6	<0.008	–						
18	T8683	5	<0.008	–						
19	T8684	4	0.010	–						
20	T8685	9	<0.008	–						
21	T8686	6	<0.008	–						
22	T8687	10	<0.008	–						
23										
24										
25										

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

AUTHORISED OFFICER

055

708056

ANALABS

A Division of Macdonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	95.1.08.05217	23/03/88	0368	6 OF 6

TUBE No.	SAMPLE No.	As	Au	AuChk						
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22	DETECTION	1	0.008	0.008						
23	UNITS	PPM	PPM	PPM						
24	METHOD	114	309	309						
25										

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

AUTHORISED OFFICER

(iv) Upper Stormont Channel Sampling

1057

ANALABS

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ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	95.1.08.05032	29/01/88	0367	1 OF 4

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Bi	Mo	As	Au	Au(ch)
1	T9424	20	150	135	<0.5	<10	75	42	<0.008	-
2	T9425	10	65	25	0.5	<10	75	13	<0.008	-
3	T9426	15	40	10	<0.5	<10	70	14	<0.008	<0.008
4	T9427	15	60	35	<0.5	<10	65	72	0.110	0.170
5	T9428	20	65	25	<0.5	<10	50	37	<0.008	0.010
6	T9429	20	95	30	0.5	<10	60	22	<0.008	<0.008
7	T9430	15	20	5	<0.5	<10	55	30	<0.008	-
8	T9431	15	50	25	<0.5	<10	50	31	0.040	-
9	T9432	10	50	<5	0.5	<10	65	15	0.046	0.040
10	T9433	25	35	5	<0.5	<10	55	24	0.020	-
11	T9434	20	40	<5	0.5	<10	35	95	0.026	0.020
12	T9435	10	25	5	<0.5	<10	25	6	0.010	-
13	T9436	20	120	30	0.5	<10	40	34	0.030	-
14	T9437	20	60	10	<0.5	<10	50	50	<0.008	-
15	T9438	30	200	195	0.5	<10	50	91	0.030	-
16	T9439	45	320	120	<0.5	<10	40	77	1.550	-
17	T9440	-	-	-	-	-	-	-	2.550	-
18	T9441	10	10	<5	<0.5	<10	70	9	<0.008	<0.008
19	T9442	15	15	<5	<0.5	<10	25	13	0.010	-
20	T9443	10	30	<5	<0.5	<10	60	6	<0.008	-
21	T9444	5	40	<5	<0.5	<10	55	3	<0.008	-
22	T9445	15	30	15	<0.5	<10	25	9	<0.008	-
23	T9446	10	35	5	<0.5	<10	15	4	<0.008	-
24	T9447	5	20	<5	<0.5	<10	45	9	<0.008	-
25	T9448	5	20	<5	<0.5	<10	50	5	<0.008	-

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

AUTHORISED OFFICER

058

ANALABS

A Division of Macdonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	95.1.08.05032	29/01/88	0367	2 OF 4

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Bi	Mo	As	Au	AuChk
1	T9449	5	30	<5	<0.5	<10	40	4	0.010	-
2	T9450	10	15	10	<0.5	<10	50	6	<0.008	-
3	T9451	10	10	5	<0.5	<10	10	2	<0.008	-
4	T9452	10	25	5	<0.5	<10	40	12	<0.008	-
5	T9453	65	40	15	<0.5	<10	45	23	0.150	-
6	T9454	30	65	10	<0.5	<10	50	27	0.100	-
7	T9455	5	15	<5	<0.5	<10	55	2	0.160	0.150
8	T9456	10	25	5	<0.5	<10	60	4	0.010	-
9	T9457	5	10	<5	<0.5	<10	45	6	<0.008	-
10	T9458	5	5	<5	<0.5	<10	50	1	<0.008	-
11	T9459	5	20	<5	<0.5	<10	50	1	<0.008	-
12	T9460	-	-	-	-	-	-	-	6.400	5.850
13	T9461	5	10	<5	<0.5	<10	50	1	0.020	-
14	T9462	5	15	5	<0.5	<10	55	<1	0.010	-
15	T9463	10	15	10	<0.5	<10	45	6	0.040	-
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	5	5	5	0.5	10	10	1	0.008	0.008
24	UNITS	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
25	METHOD	101	101	101	101	101	101	114	309	309

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

AUTHORISED OFFICER

708060

059

ANALABS

A Division of Macdonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	95.1.08.05032	29/01/88	0367	3 OF 4

TUBE No.	SAMPLE No.	Sn	W							
1	T9424	<3	<10							
2	T9425	4	<10							
3	T9426	3	<10							
4	T9427	3	11							
5	T9428	<3	<10							
6	T9429	5	<10							
7	T9430	6	<10							
8	T9431	<3	15							
9	T9432	<3	13							
10	T9433	8	12							
11	T9434	3	<10							
12	T9435	3	10							
13	T9436	12	16							
14	T9437	<3	<10							
15	T9438	6	24							
16	T9439	12	25							
17	T9440	—	—							
18	T9441	5	<10							
19	T9442	9	<10							
20	T9443	<3	<10							
21	T9444	<3	11							
22	T9445	<3	12							
23	T9446	7	<10							
24	T9447	<3	<10							
25	T9448	<3	<10							

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

AUTHORISED OFFICER

060

ANALABS

A Division of Macdonald Hamilton & Co. Pty Ltd

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	95.1.08.05032	29/01/88	0367	4 OF 4

TUBE No.	SAMPLE No.	Sn	W							
1	T9449	7	<10							
2	T9450	<3	13							
3	T9451	3	<10							
4	T9452	<3	<10							
5	T9453	<3	50							
6	T9454	<3	24							
7	T9455	<3	11							
8	T9456	<3	<10							
9	T9457	<3	<10							
10	T9458	<3	<10							
11	T9459	<3	<10							
12	T9460	-	-							
13	T9461	<3	<10							
14	T9462	3	<10							
15	T9463	<3	32							
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	3	10							
24	UNITS	PPM	PPM							
25	METHOD	401	401							

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

AUTHORISED OFFICER

(v) FA Area Channel Sampling

062

708063

ANALABS

A Division of Macdonald Hamilton & Co. Pty Ltd

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	95.1.08.05217	23/03/88	0368	1 OF 6

TUBE No.	SAMPLE No.	Cu	Cu	Pb	Pb	Zn	Zn	Ag	Ag	Bi
1	T6876	-	24500	-	1650	-	1600	-	43	240
2	T6877	-	3125	-	4525	-	9325	-	45	190
3	T6878	165	-	720	-	220	-	<0.5	-	60
4	T6879	185	-	525	-	95	-	<0.5	-	40
5										
6										
7										
8										
9										
10										
11										
12										
13	T6897	25	-	50	-	340	-	<0.5	-	80
14	T6898	100	-	45	-	100	-	<0.5	-	190
15	T6899	90	-	260	-	690	-	1.0	-	80
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										

063

708064

ANALABS

A Division of Macdonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	95.1.08.05217	23/03/88	0368	3 OF 6

TUBE No.	SAMPLE No.	Cu	Cu	Pb	Pb	Zn	Zn	Ag	Ag	Bi
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22	DETECTION	5	25	5	25	5	25	0.5	2	10
23	UNITS	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
24	METHOD	101	104	101	104	101	104	101	104	101
25										

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

AUTHORISED OFFICER

064

708063

ANALABS

A Division of Macdonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	95.1.08.05217	23/03/88	0368	4 OF 6

TUBE No.	SAMPLE No.	As	Au	AuChk						
1	T6876	18	0.030	–						
2	T6877	11	0.020	–						
3	T6878	9	<0.008	–						
4	T6879	16	<0.008	–						
5										
6										
7										
8										
9										
10										
11										
12										
13	T6897	19	0.010	–						
14	T6898	18	0.020	–						
15	T6899	14	<0.008	–						
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										

065

ANALABS

A Division of Macdonald Hamilton & Co. Pty Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	95.1.08.05217	23/03/88	0368	6 OF 6

TUBE No.	SAMPLE No.	As	Au	AuChk						
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22	DETECTION	1	0.008	0.008						
23	UNITS	PPM	PPM	PPM						
24	METHOD	114	309	309						
25										

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

AUTHORISED OFFICER

066

ANALABS

A Division of Macdonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	95.1.08.05195	23/03/88	0559	1 OF 2

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Bi	Mo	As	Au	AuChk
1	T10237	30	20	110	0.5	<10	<10	4	0.010	-
2	T10238	20	15	60	<0.5	10	40	3	0.010	-
3	T10239	55	20	120	<0.5	40	60	5	0.010	-
4	T10240	60	20	180	<0.5	60	20	2	0.010	-
5	T10241	20	15	90	<0.5	20	40	5	<0.008	-
6	T10242	30	20	270	<0.5	190	30	9	0.030	-
7	T10243	30	25	220	<0.5	30	60	18	0.010	-
8	T10244	35	130	110	0.5	2880	20	5	1.680	1.990
9	T10245	30	10	50	<0.5	30	60	4	<0.008	-
10	T10247	10	30	130	<0.5	10	40	10	0.030	-
11	T10248	20	25	75	1.0	<10	40	8	0.010	-
12	T10249	30	10	95	0.5	130	30	3	<0.008	-
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	5	5	5	0.5	10	10	1	0.008	0.008
24	UNITS	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
25	METHOD	103	103	103	103	103	103	114	309	309

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

AUTHORISED OFFICER

067

708068

ANALABS

A Division of Macdonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	95.1.08.05195	23/03/88	0559	2 OF 2

TUBE No.	SAMPLE No.	Sn	W							
1	T10237	17	22							
2	T10238	4	20							
3	T10239	92	719							
4	T10240	474	88							
5	T10241	254	26							
6	T10242	876	102							
7	T10243	172	97							
8	T10244	632	<10							
9	T10245	43	22							
10	T10247	149	24							
11	T10248	5	11							
12	T10249	1610	152							
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	3	10							
24	UNITS	PPM	PPM							
25	METHOD	401	401							

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

AUTHORISED OFFICER

(vi) FA Rock Geochemistry

069

ANALABS

A Division of Macdonald Hamilton & Co. Pty Ltd.

7080/0

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	95.1.08.05088	08/02/88	0556	1 OF 4

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Bi	Mo	As	Au	AuChk
1	T10201	15	60	145	<0.5	60	20	180	0.050	–
2	T10202	10	70	190	<0.5	100	20	5	0.030	–
3	T10203	5	130	175	1.5	240	10	5	0.110	–
4	T10204	5	135	175	0.5	250	10	5	0.110	–
5	T10205	5	55	100	0.5	70	10	8	0.040	–
6	T10206	5	55	110	<0.5	70	<10	28	0.030	–
7	T9464	5	50	115	<0.5	20	20	15	<0.008	–
8	T9465	5	45	160	<0.5	30	10	11	1.000	0.200
9	T9466	5	50	185	<0.5	20	10	8	<0.008	–
10	T9467	5	55	130	<0.5	20	10	7	<0.008	–
11	T9468	5	50	130	<0.5	30	10	5	<0.008	–
12	T9469	70	795	515	2.0	50	10	17	<0.008	–
13	T9470	10	50	130	<0.5	50	10	9	<0.008	<0.008
14	T9471	5	50	100	<0.5	30	10	7	<0.008	–
15	T9472	5	45	105	<0.5	60	<10	14	<0.008	–
16	T9473	5	45	130	<0.5	50	<10	20	<0.008	–
17	T9474	5	45	150	<0.5	40	<10	6	<0.008	–
18	T9475	5	45	170	<0.5	30	10	5	<0.008	–
19	T9476	10	45	105	<0.5	50	10	12	<0.008	–
20	T9477	40	45	145	1.0	70	30	12	<0.008	–
21	T9478	40	40	60	1.5	50	40	10	<0.008	–
22	T9479	45	30	80	<0.5	20	60	10	<0.008	–
23	T9480	–	–	–	–	–	–	–	5.730	6.210
24	T9481	10	470	230	<0.5	1700	<10	4	0.090	0.180
25	T9482	25	90	315	<0.5	80	10	8	0.040	–

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

AUTHORISED OFFICER

708071

070

ANALABS

A Division of Macdonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	95.1.08.05088	08/02/88	0556	2 OF 4

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Bi	Mo	As	Au	AuDup
1	T9483	15	1200	190	11.5	2400	10	4	0.460	-
2	T9484	75	1700	225	13.0	3700	10	3	1.810	1.450
3	T9485	20	215	235	1.0	550	<10	8	0.270	-
4	T9486	190	155	235	<0.5	560	10	5	0.200	-
5	T9487	115	770	265	2.0	3300	10	6	1.230	-
6	T9488	80	395	230	<0.5	3400	10	5	0.680	-
7	T9489	345	100	170	2.0	430	<10	13	0.070	-
8	T9490	935	60	190	3.5	820	10	13	0.190	-
9	T9491	1125	60	160	4.5	520	10	9	0.020	-
10	T9492	1225	100	200	4.5	1000	10	25	0.050	0.060
11	T9493	1050	65	155	3.0	400	<10	41	0.020	-
12	T9494	1500	65	140	4.5	350	10	64	0.070	-
13	T9495	1700	75	165	3.0	650	10	66	0.090	-
14	T9496	750	55	150	1.0	70	10	22	0.020	-
15	T9497	605	85	130	1.0	950	10	150	0.090	-
16	T9498	700	140	130	2.5	670	<10	230	0.030	-
17	T9499	765	60	165	4.5	230	10	18	0.050	-
18	T9500	-	-	-	-	-	-	-	2.770	2.820
19										
20										
21										
22										
23	DETECTION	5	5	5	0.5	10	10	1	0.008	0.008
24	UNITS	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
25	METHOD	103	103	103	103	103	103	114	309	309

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

AUTHORISED OFFICER

705072

071

ANALABS

A Division of Macdonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No	PAGE
	95.1.08.05088	08/02/88	0556	3 OF 4

TUBE No.	SAMPLE No.	AuRpt	Sn	W						
1	T10201	–	455	<10						
2	T10202	–	275	<10						
3	T10203	–	356	17						
4	T10204	–	354	<10						
5	T10205	–	467	36						
6	T10206	–	683	55						
7	T9464	–	846	102						
8	T9465	0.340	457	38						
9	T9466	–	422	19						
10	T9467	–	973	26						
11	T9468	–	1040	<10						
12	T9469	–	1310	111						
13	T9470	–	909	14						
14	T9471	–	726	22						
15	T9472	–	504	88						
16	T9473	–	479	76						
17	T9474	–	468	<10						
18	T9475	–	235	10						
19	T9476	–	281	15						
20	T9477	–	64	35						
21	T9478	–	36	40						
22	T9479	–	36	29						
23	T9480	–	–	–						
24	T9481	–	240	12						
25	T9482	–	638	<10						

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

AUTHORISED OFFICER

072

208073

ANALABS

A Division of Macdonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	95.1.08.05088	08/02/88	0556	4 OF 4

TUBE No.	SAMPLE No.	AuRpt	Sn	W						
1	T9483	-	249	<10						
2	T9484	1.990	293	<10						
3	T9485	-	181	10						
4	T9486	-	389	<10						
5	T9487	-	314	<10						
6	T9488	-	314	14						
7	T9489	-	653	11						
8	T9490	-	593	218						
9	T9491	-	470	388						
10	T9492	-	670	<10						
11	T9493	-	764	<10						
12	T9494	-	975	<10						
13	T9495	-	813	12						
14	T9496	-	871	<10						
15	T9497	-	624	17						
16	T9498	-	687	<10						
17	T9499	-	620	35						
18	T9500	-	-	-						
19										
20										
21										
22										
23	DETECTION	0.008	3	10						
24	UNITS	PPM	PPM	PPM						
25	METHOD	309	401	401						

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

AUTHORISED OFFICER

708074

073

ANALABS

A Division of Macdonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	95.1.08.05130	15/02/88	0557	1 OF 2

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Bi	Mo	As	Au	Au Chk
1	T10207	65	1650	265	9.5	30	50	6	<0.008	–
2	T10208	55	2950	205	8.0	30	40	6	<0.008	–
3	T10209	70	930	710	6.5	20	50	26	<0.008	<0.008
4	T10210	35	80	755	<0.5	30	50	9	<0.008	–
5	T10211	25	<5	310	<0.5	<10	10	3	<0.008	–
6	T10212	70	1750	265	11.5	<10	70	7	<0.008	–
7	T10213	250	755	145	1.5	60	50	16	<0.008	–
8	T10214	325	535	150	3.0	30	40	15	<0.008	–
9	T10215	130	300	85	1.0	30	40	6	<0.008	–
10	T10216	450	1020	310	2.5	20	10	13	<0.008	–
11	T10217	80	145	140	<0.5	<10	10	5	<0.008	–
12	T10218	75	<5	45	<0.5	40	30	5	<0.008	–
13	T10219	–	–	–	–	–	–	–	0.110	–
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	5	5	5	0.5	10	10	1	0.008	0.008
24	UNITS	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
25	METHOD	103	103	103	103	103	103	114	309	309

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

AUTHORISED OFFICER

074

708073

ANALABS

A Division of Macdonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	95.1.08.05130	15/02/88	0557	2 OF 2

TUBE No.	SAMPLE No.	Sn	W							
1	T10207	46	19							
2	T10208	27	<10							
3	T10209	75	49							
4	T10210	65	122							
5	T10211	128	<10							
6	T10212	52	20							
7	T10213	99	38							
8	T10214	81	24							
9	T10215	100	49							
10	T10216	52	105							
11	T10217	19	55							
12	T10218	62	86							
13	T10219	-	-							
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	3	10							
24	UNITS	PPM	PPM							
25	METHOD	401	401							

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

AUTHORISED OFFICER

Appendix 3

Drill Hole Logs

GOLD FIELDS EXPLORATION PTY. LIMITED

DRILL CORE RECORD

HOLE NO. 940 ED1

STATE : TASMANIA

PROJECT	EL 41/83 LAKE LEA
DESIGNED BY	M.J. Fleming
LOGGED BY	M.J. Fleming
COMMENCED	13th May 1988
COMPLETED	18th May 1988

PURPOSE

To test the gold bearing potential and extent of the skarn rocks occurring in the Lea River Valley opposite Fletcher's Adit.

LOG SUMMARY / GENERAL COMMENTS

Limestone passes into a garnet-diopside-actinolite-epidote skarn which has a variable magnetite sulphide content, though more abundant toward its downhole contact. Then a sequence of interbedded sandstone & shales, variably silicified, with patchy calc-silicates. Thin greisen veins are common.

ASSAY SUMMARY

INTERVAL From	INTERVAL To	Au	Cu	Pb	Zn	Bi	Mo	As	Sn	W				COMMENTS	
30.0m	32.0m	0.16	1250	35	145	425	5	5	2055	29				Petrology	Assays in ppm.

LOCATION

NORTHING	
EASTING	
R.L.	
GRID	1005S/2730W
LENGTH	61.1m

HOLE CONDITION

SIZE Hole Size	SIZE Depth
HQ	7.6m
NQ	61.1m

SIGNIFICANT CORE LOSS INTERVALS From	To	% Lost
0	7.6m	No Core

POOR GROUND CONDITION ZONES From	To	Condition
35.4m	39.7m	Strong to intense jointing with minor faulting.
46.5m	49.5m	Broken with minor small faults

HOLE CONDITIONS AFTER COMPLETION

7.6m of HQWL rods left in hole as casing with HQ shoe bit. All NQ rods removed. Hole open & making H_2O.

SURVEY DATA (Note: Bearing type must be same as Project Grid Type)

SURVEY Depth	SURVEY Bearing	SURVEY Dip	INTERVAL From	INTERVAL To	INTERVAL Distance	VERTICAL D. Sin. Dip	VERTICAL R.L.	HORIZONTAL D. Cos. Dip	HORIZONTAL Prog. Total
0m	068°	-90.0°	0	5.5	5.5				
11m	068°	-90.0°	5.5	18.0	12.5				
35m	068°	-88.9°	18.0	47.5	29.5				
60.0m	068°	-88.9°	47.5	61.1	13.6				
61.1m			=EOH.						
	(magnetic)								

SURVEY Depth	SURVEY Bearing	SURVEY Dip	INTERVAL From	INTERVAL To	INTERVAL Distance	VERTICAL D. Sin. Dip	VERTICAL R.L.	HORIZONTAL D. Cos. Dip	HORIZONTAL Prog. Total

GOLD FIELDS EXPLORATION PTY. LIMITED

ULV. PRESS

PROJECT: EL 41/83 LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD1

Page: 077

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION
				SUMMARY LOG
0	7.6			No core.
7.6	9.5			LIMESTONE Massive & weakly altered (dark zones) limestone with 1-2% disseminated pyrite.
9.5	35.4			SKARN A massive chaotic looking rock made up of garnet, actinolite, diopside, epidote, magnetite & calcite. These minerals occur as individual clusters or as a mixture of two or more. Shows a corroded appearance at times. Greisen veins common after 26.5m. Magnetite often has pyrite & chalcopyrite associated with pyrite being finely disseminated in other areas.
35.4	39.2			QUARTZITE An intensely silicified sandstone. Intensely jointed (broken) with common greisen veins & disseminated pyrite.
39.2	56.1			INTERBEDDED SHALE AND QUARTZITE Layered shale with bands of interbedded quartzite from 2mm to >2m thick. The quartzite is weak to moderately silicified sandstone & also occurs as discrete pods (3-10mm) within the shale. The shale is not silicified. Patchy calc-silicates occur throughout. Greisen veining common. Variably disseminated pyrite.
56.1	61.1			SILICEOUS SANDSTONE Moderately silicified sandstone with minor shale bands & patchy calc-silicates. Greisen veining common. Pyrite disseminated throughout & minor magnetite associated with the calc-silicates.

ASSAY DATA Sample No.	From	To	Rec. %

21807

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GOLD FIELDS EXPLORATION PTY. LIMITED

24.5.1988 PROJECT: LAKE LEA EL41/83

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD1 Page: 1

078

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION
0.0	7.6			Triconed. No core recovered.
7.6	9.5	1.9	100	LIMESTONE
				Dark grey fine-grained limestone throughout. Generally massive
				with bands (1-6cm) of vy dark grey limestone (baked?) grading diffusely
				into a grey limestone, chaotic in appearance.
				Alteration: The dark bands tend to indicate very weak alteration.
				Veining: Weak carbonate veining (<1 to 7mm), some with pyrite
				or chlorite? Variable angles to the core axis.
				Structure: Weakly jointed, most breaks related to carbonate
				veining. Shear at 9.1m, 25° to core axis, slickensided carbonate.
				Mineralisation: 1-2mm clusters of disseminated pyrite, patches of
				disseminated pyrite and vy thin pyritic veins. Pyrite 1-2%.
				Pyrite occurs throughout, but appears to be more abundant in the dark
				grey zones.
9.5	35.4	25.6	99	SKARN
				Contact sharp and irregular. Broken to 9.7m.
				9.5m to 9.8m: banded dark green actinolite, (with minor patchy
				magnetite) light green garnet-actinolite and brown-green garnet-actinolite.
				Variably limonite stained.
				9.8m to 12.2m: massive light brown-green garnet-actinolite-calcite
				skarn with irregular patches of disseminated and clustered magnetite.
				Is disruptive and etched in appearance.
				12.2m to 15.2m: "banded" green, brown-red garnet-actinolite grades
				into magnetite-garnet-actinolite ("wrigglite")
				15.2m to 26.5m: light brown-green and dark green garnet-actinolite-
				calcite skarn. Disruptive and etched in appearance grading into massive-
				chaotic with abundant irregular patches of carbonate (unaltered limestone?)
				21m to 26.2m.
				26.5m to 29.2m: Buff and very dark green garnet-actinolite skarn with
				minor irregular aggregates of magnetite. Chaotic banded appearance.
				29.2m to 35.4m: Grey-green actinolite-garnet-magnetite grading into a
				siliceous mixture of skarn and quartzite. Weakly banded in appearance
				and etched in areas associated with high sulphides.

ASSAY DATA

Sample No	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
T12001	9.5	10.0		X	30	60	185	X	X	X	11	1460	17
02	10.0	11.0		0.01	5	55	105	X	X	5	9	1050	X
03	11.0	12.2		X	5	50	100	X	X	15	9	1030	X
04	12.2	13.2		X	5	45	185	X	X	X	3	82	X
05	13.2	14.2		0.01	5	45	200	X	10	20	13	122	X
06	14.2	15.2		0.01	X	40	200	X	10	25	34	269	X
07	15.2	16.0		X	5	45	165	X	10	30	8	687	14
08	16.0	17.0		0.01	5	45	135	X	X	40	10	1250	129
09	17.0	18.0		X	5	45	90	X	X	40	5	1090	49
10	18.0	19.0		X	5	45	100	X	X	20	4	492	X
11	19.0	20.0		0.01	5	40	100	X	X	20	4	633	35
12	20.0	21.0		X	X	35	125	X	X	45	4	228	X
13	21.0	22.0		X	5	35	120	X	X	30	7	528	12
14	22.0	23.0		0.08	5	160	120	X	340	55	7	563	X
15	23.0	24.0		0.04	5	260	95	X	560	40	8	417	18
16	24.0	25.0		X	5	50	100	X	10	30	4	227	22
17	25.0	26.0		0.01	5	40	105	X	10	X	11	482	73
18	26.0	26.5		0.02	50	80	135	X	200	20	48	410	126
T12019	26.5	27.5		0.01	50	75	130	X	620	20	13	293	275

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GOLD FIELDS EXPLORATION PTY. LIMITED

24.5.88 PROJECT: LAKE LEA EL41/83

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD1 Page: 2

079

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
									ASSAY DATA									
				Alteration: Some olive green garnet associated with shears?	T12021	27.5	28.5		0.01	55	50	135	X	350	X	7	353	217
				may be retrogressive, 20-24m. Strongly siliceous from 30m to 35.6m.	22	28.5	29.2		X	30	40	130	X	X	10	9	253	88
				Veining: Calcite-chlorite? (black) veining common to 12.5m,	23	29.2	30.0		0.02	80	40	165	X	70	X	6	437	252
				then minor to 26.5m. <1-10mm at angles of 30° or 80° to CA.	24	30.0	31.0		0.24	1300	40	175	X	270	X	7	1010	X
				Quartz-greisen and quartz-pyrite veins common 26.5 to 35.6m, <1-12mm	25	31.0	32.0		0.07	1200	30	110	X	580	10	2	3100	57
				generally 70-80° to CA. Also thin, <1mm, black chlorite?	26	32.0	33.0		0.01	570	30	120	X	370	50	5	534	125
				Structure: Minor shearing at 11.2m, 18.6m, 20.8m with small fault	27	33.0	34.0		0.02	140	25	65	X	60	20	5	154	101
				at 21.3m, 60° to CA - minor leaching with carbonate fill. Weakly	28	34.0	34.7		0.01	270	25	130	0.5	130	70	4	266	62
				jointed throughout generally at 50-85° to CA. Breaks often occur	T12029	34.7	35.4		0.01	390	25	100	X	160	40	3	103	X
				along veins. Broken 33.3m to 34.0m with core loss.														
				Mineralisation: Massive magnetite (up to 60-65%) occurs from 13.0m														
				to 15.2m. It is patchy and irregular to 26.5m ranging from 0 to 1%														
				26.5m to 29.2m magnetite patchy and "banded", 5 to 10%. 29.2m to														
				35.6m abundant pyrite, magnetite and chalcopyrite occurring as fine														
				grained aggregates and bands with pyrite and chalcopyrite in quartz														
				veins and finely disseminated. Magnetite 5-10%, pyrite 10-15% and														
				chalcopyrite 1-2%.														
35.4	39.2	3.8	100	QUARTZITE.														
				Contact gradual over 1-2m.	T12030	35.4	37.0		X	95	20	55	X	50	60	12	67	84
				A light grey to grey quartzite with minor shale? patches. Bedding?	T12031	37.0	39.0		X	30	10	45	X	30	70	3	57	70
				at 80° to CA. Generally massive with some zones showing what may														
				be a variation in grainsize from <0.5mm to >10mm (an alteration feature?)														
				Alteration: Intense silicification and very minor yellow limonite														
				throughout.														
				Veining: Muscovite-quartz rich greisen veins very common up to														
				5mm and at 75-90° to CA. Thin pyrite-quartz and quartz veins also														
				common.														
				Structure: Intensely broken (jointed) with many joints coated														
				with very dark green-black chlorite or actinolite. Possible shear														
				at 37.2m, 80-90° to CA.														
				Mineralisation: Fine disseminated and euhedral pyrite with pyrite														
				also in veins. Pyrite 1-2%.														

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080

GOLD FIELDS EXPLORATION PTY. LIMITED

24.5.1988 PROJECT: LAKE LEA EL41/83

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD1 Page: 3

INTERVAL		RECOVERY		DESCRIPTION	ASSAY DATA													
From	To	m	%		Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
39.2	44.5	5.3	100	SHALE/QUARTZITE														
				Sharp contact-faulted? A layered buff-grey shale with irregular bands,	T12032	39.0	41.0		X	40	15	60	X	X	40	5	91	40
				patches, "fragments?" and "eyes" of grey quartzite which distort the	33	41.0	43.0		X	45	15	50	X	10	30	2	71	47
				planar layering of the shale. Bedding at 80° to CA.	T12034	43.0	45.0		X	30	20	45	X	30	40	4	91	45
				Alteration: Moderately siliceous to 42.0m. Mainly as quartzite														
				which gradually gives way in places to a siliceous sandstone.														
				Reduced silicification to 44.5m reflects the lesser amount of quartzite														
				contained within the shale. Minor limonite from 41.0m.														
				Veining: Quartz-muscovite-pyrite greisen veins common up to														
				14mm and at 70° to CA. Minor thin quartz-pyrite veins.														
				Structure: Very broken 39.2m to 39.7m, bleached? and minor pug,														
				possible fault. Remainder weakly to moderately broken with breaks														
				related to joints or bedding.														
				Mineralisation: Pyrite occurs in veins, as 1mm clusters of fine grains														
				or finely disseminated. Pyrite 1-2%.														
44.5	46.9	2.4	100	SILICEOUS SANDSTONE														
				Light grey siliceous sandstone becoming white quartzose in patches.	T12035	45.0	47.0		X	35	40	85	X	50	100	7	57	163
				Sharp contact.														
				Alteration: Moderate to strong silicification throughout. Strongly														
				limonitic in patches after 45.5m.														
				Veining: Vuggy quartz-muscovite veins common, some with														
				pyrite, fluorite and wolframite? Some of the quartz is smokey. Up to														
				30mm and at 75° to CA.														
				Structure: Very broken from 46.5m.														
				Mineralisation: Pyrite disseminated and in veins, 1%.														
46.9	56.1	9.2	100	INTERBEDDED SHALE AND SKARN (CALC-SILICATE HORNFELS)														
				Contact broken-sharp?	T12036	47.0	48.0		X	40	20	40	X	30	20	2	22	10
				Interbedded buff banded shale, dark grey-green skarn and minor grey-	37	48.0	49.0		X	70	25	70	X	60	20	4	127	43
				green sandstone/calc-silicates with very minor grey siliceous sandstone	38	49.0	50.4		X	235	25	80	X	90	30	5	131	51
				patches. This grades into mainly a dark grey to black shale after	39	50.4	52.0		X	45	20	50	X	30	30	2	34	38
				51.5m. Bedding at 75 to 80° to CA.	41	52.0	54.0		0.01	45	15	55	X	X	10	1		32
				Alteration: Weakly siliceous in patches throughout. Mainly assoc.	T12042	54.0	56.0		0.01	35	15	50	X	20	40	4	48	X
				with the sandstone where it occurs. Limonite staining associated														
				with veining and structures.														

708082

GOLD FIELDS EXPLORATION PTY. LIMITED

24.5.1988 PROJECT: LAKE LEA EL41/83

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD1 Page: 4

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	Sample No	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
				Veining: Quartz-muscovite ± pyrite greisen veins common.														
				Some smokey quartz and chlorite?/actinolite? may occur in addition.														
				Minor very thin limonite veins.														
				Structure: Fault at 49.1m, 70-80° to CA, then very broken														
				and leached to 49.5m. Core broken from 49.5m to 52.1m, related to														
				jointing.														
				Mineralisation: Abundant pyrite related to the skarn rich rocks														
				with minor magnetite in some places. The remaining rock has minor														
				pyrite in quartz veins or finely disseminated. Pyrite 1-2% overall,														
				but 5-10% 49.1m to 50.4m with minor chalcopyrite (<1%) and magnetite														
				(1-2%).														
56.1	61.1	5.0	100	SILICEOUS SANDSTONE														
				Gradual contact over 2-3 metres.	T12043	56.0	58.0		X	40	10	50	X	10	70	3	74	18
				Grey siliceous sandstone with light grey patches of quartzite, minor	44	58.0	60.0		0.01	75	20	60	X	20	80	10	77	16
				bands of shale (silicified?) and zones of intermixed sandstone/calc-	T12045	60.0	61.1		0.01	115	45	65	2.5	20	90	10	93	14
				silicates. Some of the sandstone appears corroded or etched, especially														
				when associated with disseminated sulphide.														
				Alteration: Silicification generally moderate with occasional														
				strong zones from 56.1m to 57.0m. Minor limonite on joint planes														
				and as thin veins.														
				Veining: Similar as above.														
				Structure: Moderately broken throughout related to jointing.														
				Mineralisation: Pyrite in quartz veins and disseminated throughout.														
				Related more strongly to the corroded and calc-silicate rich zones.														
				Pyrite 1-2%. Magnetite also associated with the calc-silicate zones.														
				END OF HOLE														
					ASSAY DETECTION (ppm)				0.01	5	5	5	0.5	10	5	1	3	10
					ANALABS METHOD				309	103	103	103	103	103	103	114	401	401
									X = BELOW DETECTION									

708083

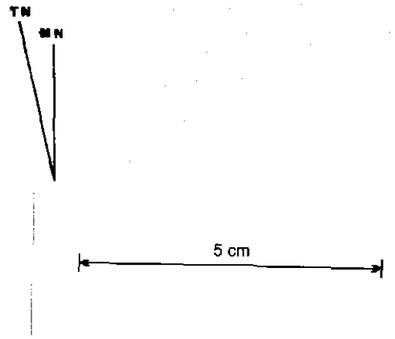
PROJECT : **LAKE LEA** HOLE No. **FD1**

RGC EXPLORATION PTY. LIMITED

DRILL HOLE PLOT

SCALE 1:500 10 5 0 10 20 METRES

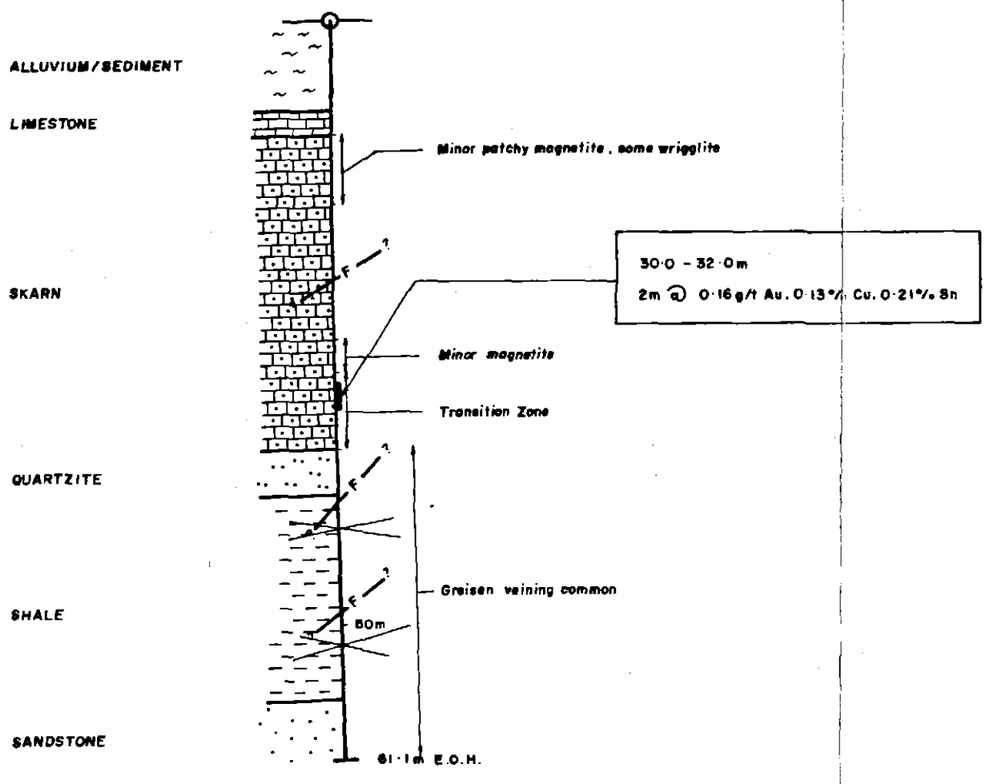
PLAN



LEGEND

- ALLUVIUM/SEDIMENT
- BASALT
- TERTIARY SEDIMENT
- LIMESTONE
- SKARN
- QUARTZITE
- SHALE
- SANDSTONE
- CONGLOMERATE
- BEDDING
- —F— FAULT

PROFILE



88-2888

FIG. 46

STATE : Tas.

HOLE No. **FD1**

083

708084

HOLE NO. : FD2
STATE : TASMANIA

GOLD FIELDS EXPLORATION PTY. LIMITED

DRILL CORE RECORD

DLV. PAGES

PROJECT	EL 41/83 LAKE LEA
DESIGNED BY	M. J. Fleming
LOGGED BY	M.J. Fleming
COMMENCED	19th May 1988
COMPLETED	19th May 1988

PURPOSE

To test the gold bearing potential and extent of the skarn rocks occurring in the Lea River valley opposite Fletcher's Adit.

LOG SUMMARY

Interbedded & intermixed silicified sandstone and shale with bands & patches of calc-silicate minerals. Only minor greisen veining. Very broken throughout with abundant core loss. Pyrite finely disseminated.

GENERAL COMMENTS

This hole is collarred stratigraphically below the skarn.

ASSAY SUMMARY

INTERVAL From	INTERVAL To													COMMENTS
														Hole not assayed.

LOCATION

NORTHING	
EASTING	
R.L.	
GRID	960S/2705W
LENGTH	20.0m

HOLE CONDITION

SIZE Hole Size	SIZE Depth
HQ	4.3m
NQ	20.0m

SIGNIFICANT CORE LOSS INTERVALS From	To	% Lost
0m	4.3m	No Core
4.3m	10.2m	41

POOR GROUND CONDITION ZONES From	To	Condition
4.3m	20.0m	Ground moderately to intensely
		broken due to jointing & faulting

HOLE CONDITIONS AFTER COMPLETION

Casing removed. A short length of poly-pipe was placed in the hole when the rig moved off to provide a permanent locator. Hole open.

SURVEY DATA (Note: Bearing type must be same as Project Grid Type)

SURVEY Depth	SURVEY Bearing	SURVEY Dip	INTERVAL From	INTERVAL To	INTERVAL Distance	VERTICAL D.Sin.Dip	VERTICAL R.L.	HORIZONTAL D.Cos.Dip	HORIZONTAL Prog.Total
0m	000°	-90.0°							
20.0m									

SURVEY Depth	SURVEY Bearing	SURVEY Dip	INTERVAL From	INTERVAL To	INTERVAL Distance	VERTICAL D.Sin.Dip	VERTICAL R.L.	HORIZONTAL D.Cos.Dip	HORIZONTAL Prog.Total

GOLD FIELDS EXPLORATION PTY. LIMITED

708085

084

DEV. PROSS FD2 PROJECT: EL 41/83 LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD2 Page:

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION
				SUMMARY LOG
0	4.3			No core.
4.3	18.2			INTERBEDDED SHALE AND SANDSTONE. Variable thicknesses of interbedded shale and sandstone. The sandstone is weakly to moderately silicified and often occurs as pods or blebs in the shale (filled worm casts?). Calc-silicates occur as bands up to 10cm thick or as irregular patches. The core is very broken due to jointing and faulting with abundant core loss in places. Thin greisen veins and fine disseminated pyrite occur throughout.
18.2	20.0			SILICEOUS SANDSTONE Weakly siliceous sandstone with minor scattered calc-silicates. The core is broken, thin greisen veins are common and trace fine disseminated pyrite occurs throughout.

ASSAY DATA Sample No.	From	To	Rec. %

GOLD FIELDS EXPLORATION PTY. LIMITED

708086

3.6.88 PROJECT: LAKE LEA 41/83

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD 2

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	ASSAY DATA Sample No	From	To	Rec. %
0	4.3			Tricone - no core recovered.				
4.3	10.2	3.5	59	QUARTZITE/CALC-SILICATE HORNFELS Grey brown quartzite to siliceous sandstone with interbedded green-grey siliceous calc-silicate hornfels. Minor buff coloured shale bands also occur. Some siliceous sandstone seem to contain minor calc-silicates. Alteration: Variably siliceous with abundant limonite occurring on jointed & broken surface and within leached zones. Veining: Very minor thin (1-2mm) greisen veins with quartz-muscovite. Most kaolinised & limonised. Structure: Core very broken throughout. Major faults occur between 4.6m to 5.2m, 6.1m to 7.7m - abundant puggy fault gouge & bleaching, 8.0m to 8.4m & between 9.5m to 10.2m. The core is so broken, a more accurate depth & the orientation are not identifiable. Mineralisation: Very minor disseminated pyrite, associated with the quartzite & siliceous sandstone primarily.				
10.2	18.2	6.7	84	SHALE/CALC-SILICATE HORNFELS Gradual contact. Buff-grey layered, porous shale interbedded with green calc-silicate hornfels approaching skarn. The 'skarn' bands range from 2-3mm up to 10cm & are banded by brown siliceous shale (hornfels). Much of the shale appears to contain mud "balls" variable in size. Bedding is at 70° to CA. Variably corroded in appearance. Alteration: Centred around the calc-silicate bands with the bounding shale becoming moderately siliceous. Strongly limonised veins & joints (siderite?). Veining: Minor thin quartz-muscovite-pyrite greisen veins throughout, generally at 35° to CA. Thin limonitic veining conspicuous & also very minor quartz veins, discontinuous. Structure: Very broken in patches related to jointing, bedding & faulting. Major faulting occurs at 13.2m - 65° to CA & strongly slickensided, between 14.0m to 14.5m - puggy & broken & between 16.8m to 17.6m - rubble.				

708087

080

GOLD FIELDS EXPLORATION PTY. LIMITED

3.6.88 PROJECT: LAKE LEA 41/83

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD 2 Page: 2 of 2

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION
				Mineralisation: Pyrite occurs throughout on joints & in veins. It also occurs as disseminated accretions of variable size within the more 'skarn'-like bands. Pyrite 1-2%.
18.2	20.0	1.8	100	SILICEOUS SANDSTONE
				Gradual contact over 1m.
				Grey-brown sandstone with minor patchy pervasive green calc-silicates. The calc-silicates appear to be finely dispersed through the sandstone or as rounded blobs up to 1-2 cm.
				Alteration: Weakly siliceous throughout.
				Veining: Thin, muscovite-rich greisen veins common, generally 80° to CA.
				Structure: Core broken due to jointing.
				Mineralisation: Minor pyrite occurring as fine disseminated grains or as a thin coating on joint planes.
				END OF HOLE.

ASSAY DATA Sample No.	From	To	Rec. %

087

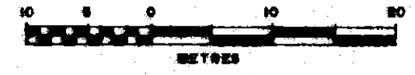
708088

PROJECT : **LAKE LEA** HOLE No. **FD2**

RGC EXPLORATION PTY. LIMITED

DRILL HOLE PLOT

SCALE 1:500



5 cm

PLAN

LEGEND

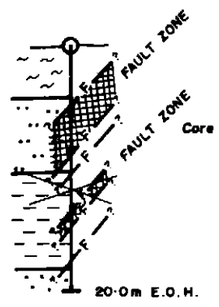
- ALLUVIUM/SEDIMENT
- BASALT
- TERTIARY SEDIMENT
- LIMESTONE
- SKARN
- QUARTZITE
- SHALE
- SANDSTONE
- CONGLOMERATE
- BEDDING
- —F— FAULT

ALLUVIUM/SEDIMENT

QUARTZITE

SHALE

SANDSTONE



Core very broken

PROFILE

88-2888

FIG. 47

STATE: Tas.

HOLE No. **FD2**

708089

0880

GOLD FIELDS EXPLORATION PTY. LIMITED

DRILL CORE RECORD

HOLE NO.: FD3

STATE : TASMANIA

ULV. PRESS

PROJECT	EL 41/83 LAKE LEA
DESIGNED BY	M.J. Fleming
LOGGED BY	M.J. Fleming
COMMENCED	20th May 1988
COMPLETED	26th May 1988

PURPOSE

To test the gold bearing potential and extent of the skarn rocks occurring in the Lea River Valley opposite Fletcher's Adit

LOG SUMMARY

GENERAL COMMENTS

Basalt and unconsolidated sediment passes into limestone which in turn passes into a garnet-diopside-actinolite-epidote skarn rock which has variable magnetite and/or pyrite, at times approaching wrigglite-textures. Then a siliceous transitional zone gives way to interbedded shale and sandstone with minor calc-silicate patches.

SSAY SUMMARY

INTERVAL From	INTERVAL To	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W			COMMENTS
47.2	48.0	0.01	5	165	200	<0.5	40	40	8	1020	16			Assays in ppm.
60.0	61.0	0.09	50	100	160	<0.5	1300	<10	14	598	334			Highest gold assay.

OCATION

NORTHING	
EASTING	
R.L.	
GRID	910S/2790W
LENGTH	95.0m

HOLE CONDITION

SIZE Hole Size	SIZE Depth
HQ	24.5m
NQ	95.0m

SIGNIFICANT CORE LOSS INTERVALS From	To	% Lost
0m	24.5m	No core
32.3m	43.9m	100
69.8m	72.9m	29

POOR GROUND CONDITION ZONES From	To	Condition
62.7m	76.5m	Well to very broken ground due
		to jointing and faulting.
86.8m	91.9m	Broken due to jointing.
87.2m	87.6m	Broken & puggy due to fault.
91.5m	91.8m	Very broken.

HOLE CONDITIONS AFTER COMPLETION

Casing removed. Poly collar pipe fitted when rig moved off as a locator. Hole open at the collar.

URVEY DATA (Note: Bearing type must be same as Project Grid Type)

SURVEY Depth	SURVEY Bearing	SURVEY Dip	INTERVAL From	INTERVAL To	INTERVAL Distance	VERTICAL D.Sin.Dip	VERTICAL R.L.	HORIZONTAL D.Cos.Dip	HORIZONTAL Prog.Total
0m	124°	-90.0°	0	17.5	17.5				
35m	124°	-88.0°	17.5	50.0	32.5				
65m	138°(?)	-88.0°	50.0	80.0	30.0				
95m	138°	-87.9°	80.0	95.0	15.0				
5.0m			=EOH						
	Magnetic								

SURVEY Depth	SURVEY Bearing	SURVEY Dip	INTERVAL From	INTERVAL To	INTERVAL Distance	VERTICAL D.Sin.Dip	VERTICAL R.L.	HORIZONTAL D.Cos.Dip	HORIZONTAL Prog.Total

708090

GOLD FIELDS EXPLORATION PTY. LIMITED

DLV. PRESS

PROJECT: EL 41/83 LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD3

Page:

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	ASSAY DATA Sample No.	From	To	Rec. %
				SUMMARY LOG				
0	24.5			No core.				
24.5	32.3			BASALT BRECCIA Angular to sub-rounded basalt fragments with a zeolite matrix. Limonised over the bottom 15cm.				
32.3	43.9			No core recovered - possible unconsolidated sediment.				
43.9	47.2			LIMESTONE Possibly weakly altered limestone with thin dark lithic? bands. Pyrite occurs finely disseminated.				
47.2	69.8			SKARN A massive chaotic looking rock with garnet, diopside, actinolite, epidote and magnetite in varying concentrations and associations. The magnetite-rich skarn approaches wrigglite texture in places. Greisen veining common after 58.9m. Pyrite occurs often associated with magnetite & finely disseminated elsewhere. A transition zone from 62.7m with quartzite is variably broken, especially at the bottom contact.				
69.8	72.9			QUARTZITE Strongly silicified sandstone with minor shale bands and calc-silicate patches. Well broken and jointed with abundant thin greisen veins and minor disseminated pyrite.				
72.9	86.1			INTERBEDDED SHALE & CALC-SILICATE HORNFELS Interbedded and intermixed shale with calc-silicate minerals with minor siliceous sandstone pods. Greisen veins are common and pyrite is finely disseminated. Evidence of faulting.				
86.1	95.0			INTERBEDDED SANDSTONE & SHALE Minor silicification, greisen veining, faulting & disseminated pyrite				

GOLD FIELDS EXPLORATION PTY. LIMITED

708091

090

7.6.88 PROJECT: LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD 3 Page: 1 of 5

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	ASSAY DATA Sample No.	From	To	Rec. %
0	24.5			HQ tricone - no core recovery.				
24.5	32.3	7.8	100	NQWL core to EOH. BASALT BRECCIA Angular to sub-rounded grey-brown basalt fragments from 1mm to 20cm in size. Some have a very thin black margin (glass?), with the black mineral forming part of the matrix. Some fragments have open & filled amygdales up to 4mm, generally spherical in shape. The matrix is characterised by a clear to white mineral which has filled the gaps between the fragments. Possibly a zeolite. The matrix slightly efferveses with acid. Some amygdales are filled with the same material. In some places the matrix has a green tinge & is quite hard (siliceous?). Over the last 15cm the rock is limonised, especially the matrix.				
32.3	43.9	0	0	Drillers description was that he was drilling a soil. Whatever it is was flushed totally out of the hole. Possibly a Tertiary mud or an old sink hole, part of the pre-basalt Karst topography. Fragments of rounded basalt recovered presumably fallen into the hole from higher up.				
43.9	47.2	3.3	100	LIMESTONE Grey limestone with minor disrupted & contorted (folded?) more lithic (dark grey shale) bands & zones. The limestone appears fragmental in places. Slight cavity development occurs at 44.0m. Alteration: Possibly cooked-up a bit to a marble. Requires some thin section work. Veining: Minor thin carbonate veins. Structure: The rock has definitely been deformed. Abundant microfolds occur within the more lithic units. Carbonate filled joints. Mineralisation: Pyrite occurs finely disseminated & in minor grain clusters (up to 5mm) throughout. Pyrite 1-2%.				

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GOLD FIELDS EXPLORATION PTY. LIMITED

7.6.88 PROJECT: LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD 3 Page: 2 of 5

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
									ASSAY DATA									
47.2	69.8	22.2	98	SKARN														
				Sharp, irregular contact.														
				47.2 to 58.9m - Green, buff coloured garnet-actinolite rock with	T12046	47.2	48.0		0.01	5	165	200	x	40	40	8	1020	16
				possible diopside & minor chlorite. The garnet varies from red	47	48.0	49.0		x	5	50	160	x	20	60	14	919	x
				brown to a green cream colour whereas the actinolite can be	48	49.0	50.0		0.01	5	45	130	x	40	40	7	514	98
				nearly black. Irregular patches & veins of calcite occur throughout.	49	50.0	51.0		0.01	5	45	130	x	50	40	7	522	x
				Alteration: Possibly some very minor retrogressive alteration	50	51.0	52.0		x	5	30	130	x	10	20	6	399	x
				associated with veining (eg. 49.3 & 53.0m).	51	52.0	53.0		x	5	40	130	x	30	40	5	394	x
				Veining: Carbonate veins up to 10mm thick. Variable angles &	52	53.0	54.0		0.01	5	35	175	x	40	40	3	275	21
				contorted. Minor carbonate-pyrite veins from 49.9m, some show	53	54.0	55.0		0.01	5	30	125	x	40	60	6	770	56
				minor shearing.	54	55.0	56.0		0.01	5	45	185	x	50	40	9	470	32
				Structure: Jointing at 45-65° to CA generally carbonate or clay	55	56.0	57.0		x	5	20	120	x	30	40	7	317	35
				filled. Minor shear at 51.9m, slickensided & at 35° to CA.	56	57.0	58.0		x	5	35	145	x	30	20	31	451	x
				Mineralisation: Trace very finely disseminated pyrite.	T12057	58.0	58.9		x	5	35	135	x	60	40	40	382	21
				Gradual contact over 10cm														
				58.9 to 62.7m - A pale buff/brown, green coloured garnet-actinolite	T12058	58.9	60.0		0.03	105	50	155	x	710	20	52	468	544
				rock with variable amounts of black magnetite rich skarn, in	59	60.0	61.0		0.09	50	100	160	x	1300	x	14	598	334
				places approaching "wrigglite" texture. Generally chaotic in	61	61.0	62.0		0.02	15	90	140	x	160	x	4	196	271
				appearance. The magnetite rich zones appear related to quartz	T12062	62.0	62.7		x	25	30	180	x	10	20	3	336	153
				& quartz-muscovite veining.														
				Alteration: A small siliceous band occurs at 59.8m.														
				Veining: Quartz veins common at 60-90° to CA & up to 5mm.														
				Minor quartz-muscovite (greisen) veins orientated similarly to the														
				quartz veins & very minor pyrite veins to 1mm.														
				Structure: Low angle, corroded joints occur with very uneven														
				surfaces & dusted with pyrite. Carbonate common on most joint														
				surfaces.														
				Mineralisation: Magnetite abundant to 60.5m. Pyrite occurs in														
				veins and as irregular granular aggregates associated with the														
				magnetite, overall 1-2%.														
				Sharp contact.														
				62.7 to 69.8 - A green grey garnet-actinolite rock with abundant	T12063	62.7	64.0		0.01	30	20	170	x	x	20	3	304	85
				siliceous zones (more detrital than limey). Highly variable in	64	64.0	65.0		x	35	20	165	x	x	40	3	249	196
				appearance, generally chaotic, & corroded (leached) in places.	65	65.0	66.0		0.01	90	25	145	x	10	40	5	255	146
				Magnetite occurs variably throughout, but seems related to the	66	66.0	67.0		x	30	35	195	x	x	40	10	254	98
				siliceous zones & quartz-greisen veins.														

708093

GOLD FIELDS EXPLORATION PTY. LIMITED

7.6.88 PROJECT: LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD 3 Page: 3 of 5

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	ASSAY DATA Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
				Alteration: Some zones that may represent a more detrital														
				original rock are highly silicified. Their contacts are sharp with	T12067	67.0	68.0		x	25	40	185	x	x	20	3	86	101
				the bounding skarn rocks & are often represent by joints which show	68	68.0	69.0		x	90	40	135	x	x	40	5	117	47
				very minor shearing & associated chlorite? Some siliceous	T12069	69.0	69.8		x	25	35	135	x	10	60	3	90	72
				interfingering occurs after 69.0m, tinged pink.														
				Veining: Quartz & quartz-muscovite (up to 10mm) are common,														
				as are irregular & discontinuous carbonate veins (up to 7mm).														
				Pyrite & chlorite? can be associated with the quartz rich veins.														
				Structure: Low angle joints affect the core to 66.6m.														
				Most seem coated with chlorite? & show evidence of minor														
				shearing. The core is generally broken, especially in the more														
				siliceous zones. Core loss around 68.2m may be due to the faulting.														
				Very broken around the bottom contact.														
				Mineralisation: Pyrite occurs throughout finely disseminated,														
				& irregular granular aggregates & in quartz veins. Often														
				associated with magnetite. Magnetite variable & associated														
				with quartz veins (bounding) & siliceous zones. Pyrite 2-3%,														
				magnetite 3-5%.														
69.8	72.9	2.2	71	QUARTZITE														
				Contact broken & gradational over at least 2 metres.	T12070	69.8	72.0		0.01	40	10	55	x	x	60	6	55	24
				A light grey quartzite, fairly massive, with minor thin bands of	T12071	72.0	74.0		x	45	30	85	x	10	60	4	50	26
				shale (soft) & calc-silicates. Often corroded in appearance around the														
				calc-silicate minerals. Some white silica patches around 70.7m have														
				small chlorite? flecks contained.														
				Alteration: Strongly silicified.														
				Veining: Abundant thin (1-2mm) quartz-muscovite veins at 70° to CA.														
				Structure: Well jointed and very broken throughout. Jointing parallels														
				quartz-muscovite veins. Possible faults at 69.9m & between														
				71.7m & 73.0m.														
				Mineralisation: Disseminated pyrite throughout, tr-1%.														
72.9	86.1	12.4	94	INTERBEDDED SHALE & CALC-SILICATE HORNFELS														
				Contact broken.														
				Interbedded buff/purple shale & green grey calc-silicate hornfels.														
				The shale contains variable layered blobs of light grey quartzite.														

708094

GOLD FIELDS EXPLORATION PTY. LIMITED

7.6.88 PROJECT: LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD 3 Page 4 of 5

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	ASSAY DATA Sample No	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
				Bedding at 70° to CA. The contacts with the calc-silicates are sharp														
				& at times interfingering. The calc-silicate bands range from a few	T12072	74.0	76.0		0.01	35	10	65	x	10	60	3	67	x
				mm to over 1metre and appear to be dominantly quartz & diopside?	73	76.0	78.0		x	35	36	80	x	10	20	3	86	148
				Alteration: Silicification dominates. The shale is silicified in patches	74	78.0	80.0		x	25	25	55	1.5	x	40	4	23	x
				which may be related to structure & does contain variable amounts	75	80.0	82.0		0.01	35	35	85	x	10	40	4	37	10
				of quartzite which is generally bounded by a 'soft' shale. All	76	82.0	84.0		0.01	65	35	75	x	x	20	3	42	22
				occurrances of the calc-silicate hornfels are strongly silicified,	T12077	84.0	86.0		x	90	35	115	x	x	40	3	59	15
				interrupted with blobs & bands of calc-silicate rich minerals.														
				Some siliceous zones have a real pink tinge. Limonite on joint														
				surfaces is common throughout, especially from 72.9m to 76.2m.														
				Veining: Quartz-muscovite veins dominate. Some are vuggy & have														
				smoky quartz, pyrite & a bright pink mineral - feldspar?														
				(similar to veins at S & M). Generally at 70° to CA.														
				Structure: Broken to 76.5m. A fault occurs between 73.6m & 74.4m,														
				minor puggy & lost core. A second fault may exist between														
				75.8m & 76.2m where it is very broken & core lost. Jointing														
				generally parallel to bedding with a low angle joint also common.														
				Mineralisation: Pyrite occurs finely disseminated throughout & related														
				to the more siliceous zones, occurs as dusting or thin sheets on														
				joints & occurs in most quartz-muscovite veins. Overall 1-2%.														
86.1	95.0	8.6	97	INTERBEDDED SANDSTONE & SHALE														
				Sharp contact.														
				Dark grey interbedded sandstone & shale each showing variable														
				thicknesses and with contacts ranging from sharp through interfingering														
				to intermixed. Minor calc-silicate bands occur up to 20cm long with the														
				interval from 92.6m to EOH being dominated by sandstone.														
				Alteration: Light grey quartzite & siliceous patches occur throughout,														
				with the greater siliceous zones being related to the calc-silicate														
				bands, being pervasive around & through them. Minor leaching														
				has occurred in some calc-silicate bands. Limonite is obvious on														
				some jointed & in leached areas.														
				Veining: Only minor thin greisen veining occurs.														
				Structure: Moderately broken from 86.8m to 91.9m related mainly														
				to jointing. A fault zone occurs between 87.2m & 87.6m, the core														
				being very broken with minor pug. Very broken also between														

GOLD FIELDS EXPLORATION PTY. LIMITED

708095

094

15.6.88 PROJECT: LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD 3 Page: 5 of 5

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	Sample No.	From	To	Rec. %	ASSAY DATA Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
				91.5m & 91.8m (the core surrounding is strongly silicified).														
				Mineralisation: Pyrite occurs finely disseminated, as coating on joints & in some greisen veins, tr-1%.														
				END OF HOLE														
					ASSAY DETECTION (ppm)				0.01	5	5	5	0.5	10	10	1	3	10
					ANALABS METHOD				309	103	103	103	103	103	103	114	401	401
										X = BELOW DETECTION.								

095

708096

PROJECT : **LAKE LEA** HOLE No. **FD3**

RGC EXPLORATION PTY. LIMITED

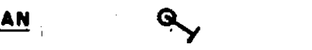
DRILL HOLE PLOT

SCALE 1:500

10 5 0 10 20

METRES

PLAN

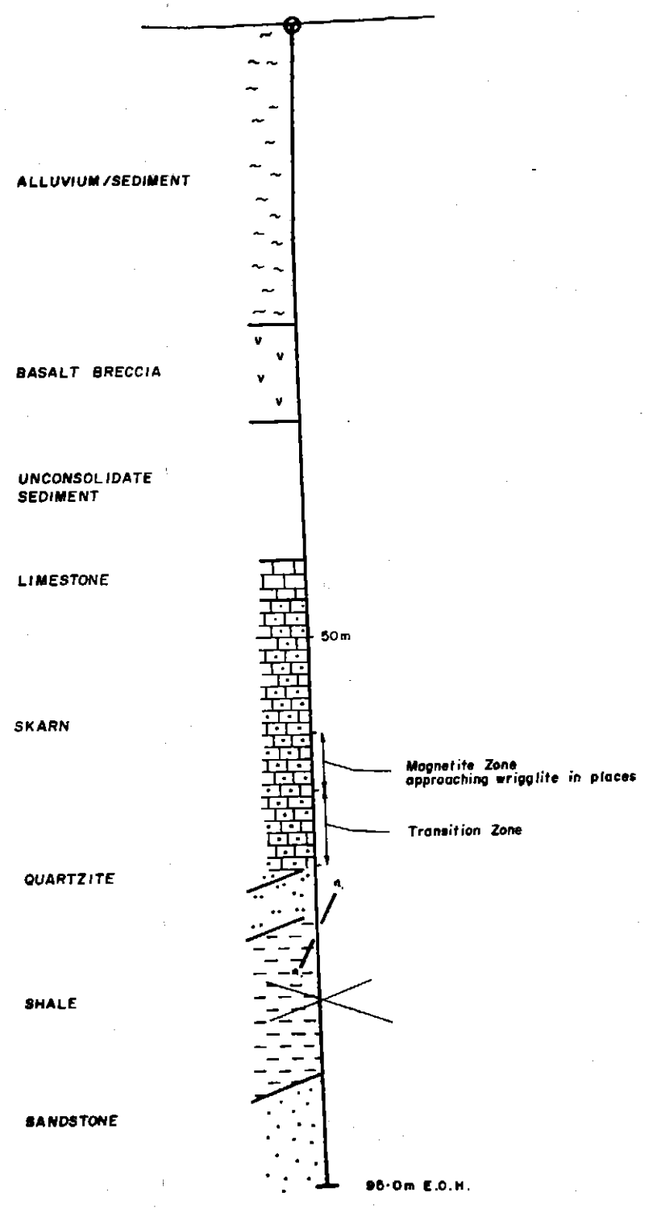


TN

MN

5 cm

PROFILE



LEGEND

- ALLUVIUM/SEDIMENT
- BASALT
- TERTIARY SEDIMENT
- LIMESTONE
- SKARN
- QUARTZITE
- SHALE
- SANDSTONE
- CONGLOMERATE
- BEDDING
- —F— FAULT

88-2888

FIG. 48

STATE: Tas.

HOLE No. **FD3**

708097

096

HOLE NO.: FD4
STATE : TASMANIA

GOLD FIELDS EXPLORATION PTY. LIMITED
DRILL CORE RECORD

DLV. PRESS

PROJECT	EL41/83 LAKE LEA
DESIGNED BY	M.J. Fleming
LOGGED BY	M.J. Fleming
COMMENCED	27th May 1988
COMPLETED	1st June 1988

PURPOSE

To test the gold bearing potential and extent of the skarn rocks occurring in the Lea River Valley opposite Fletcher's Adit.

LOG SUMMARY

GENERAL COMMENTS

The hole went straight into garnet-diopside-actinolite-epidote-magnetite skarn rock with variable pyrite content. The magnetite rich zones had textures approaching wrigglite. A transitional zone of some 3 metres passed into quartzite and then shale with minor quartzite pods and calc-silicate patches. The hole finished in sandstone, often having worm casts (tubicolar).

ASSAY SUMMARY

INTERVAL From	INTERVAL To	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W			COMMENTS
20.0m	25.0m	0.32	564	40	137	<0.5	780	<5	10	917	525			Assays in ppm.
26.0m	27.0m	0.03	260	55	175	0.5	750	<5	10	1010	293			
32.0m	32.7m	0.01	255	35	95	<0.5	2300	30	4	169	2630			

LOCATION

NORTHING	
EASTING	
R.L.	
GRID	930S/2915W
LENGTH	62.0m

HOLE CONDITION

SIZE Hole Size	SIZE Depth
HQ	17.0m
NQ	62.0m

SIGNIFICANT CORE LOSS INTERVALS

From	To	% Lost
0	17.0m	No core

POOR GROUND CONDITION ZONES

From	To	Condition
32.7m	41.0m	Well jointed (broken) with patchy core loss (faulting)
48.0m	48.5m	Broken & puggy - fault

HOLE CONDITIONS AFTER COMPLETION

Casing pulled and a poly collar pipe placed in. Top of hole collapsed, hole not open.

SURVEY DATA (Note: Bearing type must be same as Project Grid Type)

SURVEY Depth	SURVEY Bearing	SURVEY Dip	INTERVAL From	INTERVAL To	INTERVAL Distance	VERTICAL D.Sin.Dip	VERTICAL R.L.	HORIZONTAL D.Cos.Dip	HORIZONTAL Prog.Total
0m	289°	-90.0°	0	15.0	15.0				
30m	289°	-90.0°	15.0	45.0	30.0				
60m	289°	-90.0°	45.0	62.0	17.0				
62.0m			=EOH						
	(magnetic)								

SURVEY Depth	SURVEY Bearing	SURVEY Dip	INTERVAL From	INTERVAL To	INTERVAL Distance	VERTICAL D.Sin.Dip	VERTICAL R.L.	HORIZONTAL D.Cos.Dip	HORIZONTAL Prog.Total

708098

GOLD FIELDS EXPLORATION PTY. LIMITED

PROJECT: EL 41/83 LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD4

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION
				SUMMARY LOG
0	17.0			No core.
17.0	32.7			SKARN
				Massive and chaotic looking rock with varying amounts and associations of garnet, actinolite, diopside, epidote and magnetite. In places it appears banded and some rich magnetite zones approach wrigglite texture. Thin quartz veins are common with varying amounts of muscovite, pyrite, chlorite? & pink feldspar? Pyrite is finely disseminated, often associated with magnetite. A transitional zone occurs from 29.4m.
32.7	41.0			QUARTZITE
				Moderate to strongly silicified sandstone with minor shale bands and patchy calc-silicates. Thin greisen veins are common. Very jointed, broken with fault zones.
41.0	49.4			INTERBEDDED SHALE & QUARTZITE
				Banded shale has bands and pods, blobs of silicified sandstone & minor bands of calc-silicates. Thin vuggy greisen veins common. Broken in patches & minor disseminated magnetite occurs with the calc-silicates.
49.4	62.0			SANDSTONE
				Variably siliceous sandstone with minor shale bands and calc-silicate patches. Tubicles in places. Vuggy greisen veins common & some thick (> 10mm) white quartz veins also occurring. Patchy disseminated pyrite 2-3% and minor magnetite occurs associated with calc-silicates.

ASSAY DATA Sample No.	From	To	Rec. %

708099

860

GOLD FIELDS EXPLORATION PTY. LIMITED

16.6.88 PROJECT: LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD 4

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	ASSAY DATA Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
0	17.0			Triconed - no core recovered.														
				HQWL to 17.0m.														
				NQWL 17.0m to EOH.														
17.0	32.7	15.5	99	SKARN														
				17.0-19.0: A green buff coloured garnet-actinolite skarn, chaotic in	T12078	17.0	18.0		0.03	25	110	235	1.0	530	15	11	979	106
				appearance with irregular clusters of garnet & of actinolite of	T12079	18.0	19.0		0.05	90	100	220	X	550	15	11	435	404
				varying sizes. The actinolite appears almost like a matrix which														
				may indicate that the garnets form first. Possibly some diopside														
				also occurs.														
				Alteration: Some veins are bounded by reaction zones which are														
				siliceous & chloritic? or retrogressed to diopside?. Minor														
				leaching at 17.6m & 18.1m. Possible some weak sericite alteration														
				of the actinolite, especially in the more leached zones.														
				Veining: Most veins are siliceous with varying amounts of														
				K-feldspar? chlorite & pyrite. Some very thin chlorite? & pyrite														
				veins occur.														
				Structure: Possible minor fault or shear at 18.1m.														
				Mineralisation: Pyrite occurs mainly in the veins, but minor														
				disseminated euhedral grains occur in the more actinolite rich														
				patches (eg. 18.8m), 1-2%. Trace bismuthinite at 18.8m.														
				19.0-29.4: A green & black garnet-actinolite-magnetite skarn,	T12081	19.0	20.0		0.06	195	35	130	0.5	810	5	8	636	429
				chaotic texturally & with some textures approaching "wrigglite"	82	20.0	21.0		0.56	620	35	150	X	820	X	14	847	420
				in the more magnetite rich portions. Almost banded in appearance	83	21.0	22.0		0.27	385	40	120	X	480	X	12	987	603
				with bands 70-80° to CA (reflecting original bedding with varying	84	22.0	23.0		0.12	525	55	130	X	900	X	11	1020	552
				compositions?). Mineral associations vary constantly.	85	23.0	24.0		0.31	615	40	150	X	900	5	12	870	543
				Alteration: Weak to moderate silicification of the minor more	86	24.0	25.0		0.35	675	30	135	0.5	800	10	3	859	508
				lithic bands present at 19.1m, 22.3m, 23.8m, 24.7m & 29.0m.	87	25.0	26.0		0.05	360	35	150	0.5	510	X	4	764	269
				Minor sericite alteration in some veins.	88	26.0	27.0		0.03	260	55	175	0.5	750	X	10	1010	293
				Veining: Siliceous veins are common with variable amounts of	89	27.0	28.0		0.02	130	20	150	X	540	15	6	483	301
				muscovite, K-feldspar?, pyrite up to 10mm. Thin pyrite-chlorite	T12090	28.0	29.4		0.01	100	25	165	X	130	10	6	379	370
				veins are also common (<1-2mm).														
				Structure: Core generally broken along veins. Possible shear at														
				26.7m.														
				Mineralisation: Magnetite occurs throughout, though highly variable														
				in concentration. The more rich zones can have massive blobs or														

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	ASSAY DATA Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
				bands, or have textures which may approach wrigglite. Intimately														
				associated with the richer sulphide areas. Magnetite 10-15%														
				overall. Sulphide, pyrite with minor chalcopyrite & possibly some														
				pyrrhotite (20.2m), occurs in veins, as irregular granular masses														
				of varying size & is often intimately associated with magnetite.														
				Pyrite 5-10%, chalcopyrite trace.														
				29.4-32.7: Gradual contact over ½ metre. A green-grey more	T12091	29.4	30.0		0.01	200	25	150	X	790	20	7	262	516
				calc-silicate hornfels type zone obviously representing the	92	30.0	31.0		X	95	25	165	X	280	20	7	234	225
				transition between the carbonate beds & the more lithic units	93	31.0	32.0		0.01	100	20	110	X	100	40	7	144	93
				beneath. Alternating zones of mainly pure lithic material	T12094	32.0	32.7		0.01	255	35	95	X	2300	30	4	169	2630
				(originally shale & sandstone) with zones hosting variable amounts														
				of calc-silicate mineral (or minerals?). Contacts generally diffuse														
				over a couple of cm.														
				Alteration: Variably silicified throughout, with the more sandy														
				zones being altered the most intensely. Very weak sericite														
				alteration appears to affect the more calc-silicate rich zones and														
				also some veins.														
				Veining: Quartz veins with muscovite & pyrite are common.														
				Thin pyrite-chlorite? veins still occur.														
				Structure: Only minor jointing.														
				Mineralisation: Fine magnetite occurs variably disseminated														
				throughout, 2-5%. Pyrite occurs in veins, as small (1-3mm)														
				granular aggregates & finely disseminated. Associated, as is the														
				magnetite, with the more calc-silicate rich zones. Pyrite 1-3%.														
32.7	41.0	7.3	88	QUARTZITE														
				Sharp contact.														
				A light grey quartzite with thin shale bands variably clustered	T12095	32.7	35.0		X	60	30	50	X	350	50	8	52	71
				throughout. Also minor calc-silicate bearing zones occur (eg. 38.2m).	96	35.0	37.0		X	85	20	85	X	120	40	6	73	67
				The shale is more interbedded after 39.6m in equal proportion to	97	37.0	39.0		0.01	60	30	70	0.5	100	40	4	71	91
				the quartzite.	T12098	39.0	41.0		X	30	15	55	X	80	35	3	60	62
				Alteration: The quartzite represents sandstone which has been														
				moderately to strongly silicified. Some joint surfaces, veins and														
				some shale units have been weakly limonised.														
				Veining: Thin greisen veins are common with pyrite. Generally at														
				35-80° to CA.														

708101

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GOLD FIELDS EXPLORATION PTY. LIMITED

16.6.88 PROJECT: LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD 4 Page: 3 of 4

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	ASSAY DATA Sample No	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
				Structure: Core well broken throughout. Faulting occurs between														
				35.3m-36.5m, 38.1m-38.7m & 39.2m-39.6m, all show substantial														
				core loss. Possible bedding angle is 65° to CA. Broken nature due														
				to being well jointed.														
				Mineralisation: Pyrite occurs in veins & finely disseminated throughout														
				the quartzite. Some joints have a pyrite coating. Pyrite 1-2%.														
41.0	49.4	8.1	96	SHALE WITH MINOR INTERBEDDED CALC-SILICATE HORNFELS														
				Sharp contact.														
				Buff & purple coloured banded shale with rounded blobs and bands	T12099	41.0	43.0		0.01	40	10	65	X	X	20	3	51	20
				of light grey quartzite. Bedding at 75° to CA. Occasional calc-silicate	T12201	43.0	45.0		0.02	80	10	70	X	X	10	3	66	21
				rich bands occur green grey in colour. Contacts are sharp but irregular,	02	45.0	47.0		X	140	10	115	X	120	20	4	165	234
				variable in thickness (1cm to 30cm). Main mineral probably diopside?	T12203	47.0	49.0		0.01	80	5	65	X	110	20	6	94	808
				Alteration: Minor weakly silicified patches in the shale & some														
				calc-silicate zones have associated siliceous patches. Limonite														
				on joint planes is common.														
				Veining: Greisen veins are common with pyrite often associated and														
				possibly some fluorite.														
				Structure: Very broken in places, due to jointing. Major fault														
				48.0m to 48.5m, broken & puggy.														
				Mineralisation: Pyrite occurs in veins & as fine or aggregate														
				dissemination associated with the more calc-silicate & quartzite														
				rich areas. Pyrite 1-2%. Minor magnetite occurs at 45.7m in														
				a calc-silicate rich band.														
49.4	62.0	11.9	94	SANDSTONE														
				Contact gradational over 2 metres.														
				A grey intermixed sandstone and shale passes gradually into a	T12204	49.0	51.0		0.01	40	X	65	X	X	30	4	39	74
				dark grey sandstone around 51.9m which has occasional grey shaley	05	51.0	53.0		0.01	55	10	65	X	20	40	3	52	56
				bands. From 54.1m to 58.7m is a more siliceous grey zone which has	06	53.0	55.0		0.01	45	5	60	X	10	30	4	49	23
				chaotic patches of minor calc-silicate minerals 57.5 to 58.7m has the	07	55.0	57.0		0.01	55	5	45	0.5	X	30	8	55	37
				appearance of calc-silicate-magnetite veining. Tubicular from 54.5m	08	57.0	59.0		X	130	20	85	0.5	90	20	9	73	88
				to 57.0m.	T12209	59.0	61.0		0.01	50	5	55	X	10	30	4	41	21
				Alteration: Weakly siliceous from 54.5m & becoming moderate to														
				strong from 57.1m to 58.7m. Limonite & minor sericite alteration														
				associated with the more calc-silicate rich zones.														

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GOLD FIELDS EXPLORATION PTY. LIMITED

17.6.88 PROJECT: LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD 4 Page: 4 of 4

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION
				Veining: Quartz-muscovite-pyrite greisen veins common, often vuggy, sometimes leached & minor smokey quartz. Some thin, limonite veins are bounded by a bleached zone. A quartz-chlorite-pyrite vein occurs at 54.2m at 50° CA & 20mm thick. 57.2m to 58.7m skarn veins? at 20° CA & >10mm thick.
				Structure: Overall weak to moderately broken, mainly along veins.
				Mineralisation: Pyrite occurs in most greisen veins & as patchy thin coating on most joint surfaces. Between 54.8m & 58.7m it occurs as small masses of aggregated grains & as fine disseminations. The remainder has only trace amounts of very finely disseminated pyrite. Overall pyrite is 2-3%. Magnetite occurs at 57.5m to 58.7m, in places coarse.
				END OF HOLE

ASSAY DATA

Sample No.	From	To	Rec %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
ASSAY DETECTION (ppm)				0.01	5	5	5	0.5	10	5	1	3	10
ANALABS METHOD				309	103	103	103	103	103	103	114	401	401
						X = BELOW DETECTION							

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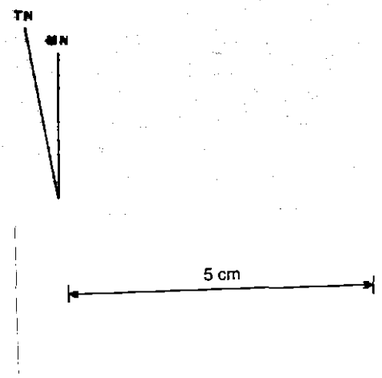
PROJECT: LAKE LEA HOLE No. FD4

RGC EXPLORATION PTY. LIMITED

DRILL HOLE PLOT

SCALE 1:500



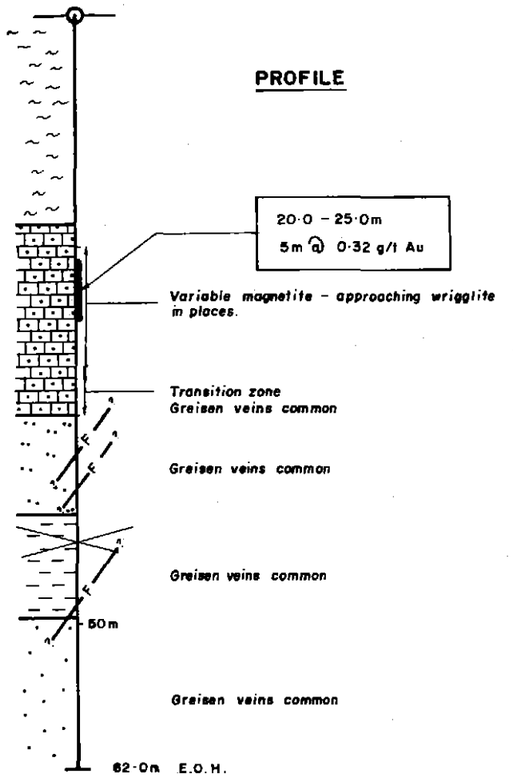


LEGEND

- ALLUVIUM/SEDIMENT
- BASALT
- TERTIARY SEDIMENT
- LIMESTONE
- SKARN
- QUARTZITE
- SHALE
- SANDSTONE
- CONGLOMERATE
- BEDDING
- —F— FAULT

PLAN

PROFILE



88-2888

FIG. 49

STATE: Tas.

HOLE No. FD4

708104

GOLD FIELDS EXPLORATION PTY. LIMITED

DRILL CORE RECORD

HOLE NO.	FD5
STATE	TASMANIA

DLV. PRESS

PROJECT	EL 41/83 LAKE LEA
DESIGNED BY	M.J. Fleming
LOGGED BY	M.J. Fleming
COMMENCED	2nd June 1988
COMPLETED	4th June 1988

PURPOSE

To test the gold bearing potential and extent of the skarn rocks occurring in the Lea River Valley opposite Fletcher's Adit.

LOG SUMMARY / GENERAL COMMENTS

The hole started in the transitional skarn/quartzite zone that occurs at the base of the main skarn sequence. It then passed into a normal footwall sequence of a band of quartzite followed by interbedded shale and quartzite, then into variably silicified sandstone.

ASSAY SUMMARY

INTERVAL From	INTERVAL To	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W			COMMENTS
12.5m	13.5m	<0.008	160	130	190	<0.5	370	80	12	212	1640			Assays in ppm.

LOCATION

NORTHING	
EASTING	
R.L.	
GRID	970S/2940W
LENGTH	29.5m

HOLE CONDITION

SIZE Hole Size	SIZE Depth
HQ	9.5m
NQ	29.5m

SIGNIFICANT CORE LOSS INTERVALS From	To	% Lost
0	9.5m	No core
9.5m	17.9m	39
23.9m	29.5m	27

POOR GROUND CONDITION ZONES From	To	Condition
9.5m	23.9m	Well jointed, broken & faulting.
24.9m	26.3m	Very broken - fault.
28.5m	29.0m	Very broken - fault.

HOLE CONDITIONS AFTER COMPLETION

Casing removed and poly collar pipe placed in. The hole is open.

SURVEY DATA (Note: Bearing type must be same as Project Grid Type)

SURVEY Depth	SURVEY Bearing	SURVEY Dip	INTERVAL From	INTERVAL To	INTERVAL Distance	VERTICAL D.Sin.Dip	VERTICAL R.L.	HORIZONTAL D.Cos.Dip	HORIZONTAL Prog.Total
0m	238°	-90.0°	0	14.5	14.5				
29m	238°	-90.0°	14.5	29.5	15.0				
29.5m			=EOH						
	(magnetic)								

SURVEY Depth	SURVEY Bearing	SURVEY Dip	INTERVAL From	INTERVAL To	INTERVAL Distance	VERTICAL D.Sin.Dip	VERTICAL R.L.	HORIZONTAL D.Cos.Dip	HORIZONTAL Prog.Total

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GOLD FIELDS EXPLORATION PTY. LIMITED

ULV. PRESS

PROJECT: EL 41/83 LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD5

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	ASSAY DATA Sample No.	From	To	Rec. %
				SUMMARY LOG				
0	9.5			No core				
9.5	16.4			INTERBEDDED SKARN AND SANDSTONE Garnet, actinolite, diopside & epidote? Skarn is interbedded with and contaminates variably siliceous sandstone. Very broken due to jointing and faulting with abundant core loss. Pyrite is variable occurring up to 5% in patches. Minor disseminated magnetite associated with the skarn rocks.				
16.4	17.9			QUARTZITE Thin band of intensely silicified sandstone, very broken, with minor thin vuggy greisen veins.				
17.9	23.9			QUARTZITE WITH SHALE BANDS Interbedded siliceous sandstone and shale. Jointed (broken) throughout.				
23.9	29.5			SILICIFIED SANDSTONE Moderately silicified sandstone with minor shale bands. Very broken in patches and minor greisen veining.				

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GOLD FIELDS EXPLORATION PTY. LIMITED

28/6/88 PROJECT: LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD 5 Page: 1 of 2

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	ASSAY DATA Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
0	9.5			Triconed - no core recovered														
				HQ triconing 0 - 9.5m														
				NQWL 9.5 - 29.5m (EOH)														
9.5	16.4	4.2	61	INTERBEDDED SKARN & SANDSTONE														
				The hole starts in a actinolite-garnet skarn, green brown in colour.	T12210	9.5	10.5	28	0.010	125	125	205	X	250	80	15	203	376
				After which there is alternate grey to dark grey siliceous sandstone	11	10.5	11.5	41	X	70	125	110	0.5	70	140	15	98	113
				and skarn. The skarn is leached, often being porous & is corroded in	12	11.5	12.5	28	X	110	115	120	X	140	140	13	111	96
				appearance. Light brown shale occurs between 14.7m & 15.5m. The	13	12.5	13.5	54	X	160	130	190	X	370	80	12	212	1640
				sandstone has a variable calc-silicate component.	14	13.5	14.5	76	X	130	125	250	X	100	100	14	141	220
				Alteration: The sandstone is moderately silicified, with the whiter	15	14.5	15.5	39	X	70	135	190	X	60	100	2	145	193
				patches being more intensely altered. The skarn, being strongly	T12216	15.5	16.4	36	0.010	110	130	130	X	210	120	20	149	293
				leached, has had the amphiboles & pyroxenes? altered to sericite?														
				(clayey minerals). Limonite on joints, in veins & on breaks is														
				common. Minor pervasive limonite also occurs.														
				Veining: Quartz veining with minor pyrite common & variable in form.														
				Thin chlorite & siderite veins occur, the siderite often on joint?														
				surfaces.														
				Structure: The core is very broken with substantial core loss. The														
				broken nature is related to jointing. Core loss may be related to														
				faulting, major loss occurs between 9.5 to 10.7m, 11.9 to 12.9m &														
				14.7 to 15.5m. Possible fault 11.9 to 12.9m.														
				Mineralisation: Disseminated pyrite occurs throughout & is more														
				concentrated between 14.0 to 14.7m (up to 5%). Pyrite also occurs														
				in some veins. Pyrite overall 1-2%. Trace amounts of magnetite														
				occurs associated with the skarn rocks.														
16.4	17.9	0.9	60	QUARTZITE														
				Contact broken.														
				A brown and light grey quartzite, generally massive in appearance.	T12217	16.4	17.9	40	X	40	140	70	0.5	130	60	10	36	20
				Alteration: Probably the product of intensely silicified sandstone.														
				Minor dark zones indicates minor pelitic and/or calc-silicate														
				component of the original rock. Limonite is strong throughout														
				on joint surfaces & as patchy pervasive zones.														

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GOLD FIELDS EXPLORATION PTY. LIMITED

29.6.88 PROJECT: LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD 5 Page: 2 of 2

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	Sample No.	From	To	Rec. %	ASSAY DATA Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
				Veining: Only minor thin vuggy quartz veins, generally random with ± muscovite ± pyrite.														
				Structure: Very broken throughout related to jointing.														
				Mineralisation: Pyrite occurs in the quartz veins & as very fine disseminations (tr-1%).														
17.9	23.9	5.3	88	QUARTZITE WITH SHALE BANDS														
				Contact gradual over 0.5m.														
				A brown and grey quartzite with thin bands of light brown shale.	T12218	17.9	20.0	64	0.010	40	140	90	x	60	120	7	49	22
				The shaley unit is often made up of very thin alternating zones of	19	20.0	22.0	60	x	45	130	80	x	60	100	7	54	18
				shale & quartzite (as layers & blobs). The shale bands are at 20-30°	T12221	22.0	24.0	67	0.020	50	135	85	x	70	100	5	71	150
				to CA - bedding?														
				Alteration: Moderate to intense silicification of sandstone to quartzite.														
				Limonite is again abundant on joint planes, in veins & as patchy														
				pervasive zones.														
				Veining: Thin quartz veins occur throughout, often with minor														
				disseminated pyrite (vuggy). Obvious greisen veins after 23.6m.														
				Structure: Broken throughout - related to jointing. Substantial core														
				loss spread throughout the interval. Fault at 21.4m, very broken														
				with gouge & pug. Possible minor shearing at 20.6m - 20.8m.														
				Mineralisation: Pyrite occurs in finely disseminated patches & in														
				the quartz veins (1-2%).														
23.9	29.5	4.1	73	SILICIFIED SANDSTONE														
				Contact gradual over 30cm.														
				A grey silicified massive sandstone with only minor shale bands.	T12222	24.0	26.0	50	0.010	75	125	95	x	60	80	4	64	65
				Alteration: The sandstone is moderately silicified. Obvious limonite	23	26.0	28.0	51	0.030	70	155	100	x	40	100	6	63	150
				to ~26m.	T12224	28.0	29.5	54	0.020	105	155	125	x	80	110	9	68	60
				Veining: Minor quartz-muscovite ± pyrite veins (greisen) up to 10mm.														
				Structure: Very broken in patches with substantial core loss occurring														
				24.9m to 26.3m & 28.5m to 29.0m.														
				Mineralisation: Pyrite finely disseminated throughout & in some veins														
				(1-2%).														
					ASSAY DETECTION (ppm)				0.008	5	5	5	0.5	10	10	1	3	10
					ANALABS METHOD				309	103	103	103	103	103	103	114	401	401
				END OF HOLE							X = BELOW DETECTION							

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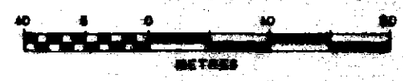
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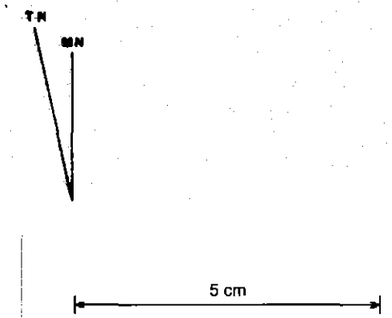
PROJECT: LAKE LEA HOLE No. FD5

RGC EXPLORATION PTY. LIMITED

DRILL HOLE PLOT

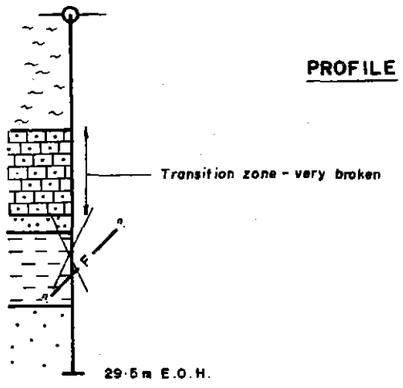
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PLAN

PROFILE



LEGEND

- ALLUVIUM/SEDIMENT
- BASALT
- TERTIARY SEDIMENT
- LIMESTONE
- SKARN
- QUARTZITE
- SHALE
- SANDSTONE
- CONGLOMERATE
- BEDDING
- —F— FAULT

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FIG. 50

STATE: Tas.

HOLE No. FD5

708109

GOLD FIELDS EXPLORATION PTY. LIMITED

DRILL CORE RECORD

HOLE NO.	FD6
STATE	TASMANIA

DEV. PRESS

PROJECT	EL 41/83 LAKE LE
DESIGNED BY	M.J. Fleming
LOGGED BY	M.J. Fleming
COMMENCED	5th June 1988
COMPLETED	20th June 1988

PURPOSE

To test the gold bearing potential and extent of the skarn rocks occurring in the Lea River Valley opposite Fletcher's Adit.

LOG SUMMARY / GENERAL COMMENTS

The hole is drilled into garnet-actinolite-diopside-epidote-magnetite skarn, the magnetite rich patches approaching wrigglite-texture. The skarn then passes through a transitional zone into a quartzite band and then into an interbedded shale & sandstone sequence. Following is a thick sequence of dominantly sandstone, variably siliceous & often tubicolar, which coarsens toward its lower contact. The lower contact is sharp into a hematitic conglomerate.

ASSAY SUMMARY

INTERVAL From	INTERVAL To	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W			COMMENTS
12.0m	15.0m	0.150	348	192	300	<0.5	587	40	25	909	230			Assays in ppm.
15.0m	16.0m	0.030	55	175	185	<0.5	100	40	7	1070	222			
18.0m	19.0m	0.230	30	310	165	1.0	570	40	11	1420	236			
21.0m	22.0m	0.130	370	175	170	<0.5	670	60	17	766	615			
22.0m	26.0m	0.023	166	199	185	0.9	363	30	10	1803	503			
174.0m	175.0m	0.130	30	135	70	<0.5	10	60	9	117	28			

LOCATION

NORTHING	
EASTING	
R.L.	
GRID	1020S/2855W
LENGTH	184.3m

HOLE CONDITION

SIZE Hole Size	SIZE Depth
HQ	12.0m
NQ	184.3m

SIGNIFICANT CORE LOSS INTERVALS From	To	% Lost
0	12.0m	No core
37.4m	39.3m	40
42.4m	43.3m	33
50.0m	54.6m	38
77.2m	79.2m	45

POOR GROUND CONDITION ZONES From	To	Condition
36.8m	57.9m	Well jointed, broken.
74.0m	95.2m	Well jointed, broken.
99.3m	106.6m	Well jointed, broken.
148.8m	161.8m	Well jointed, broken.

HOLE CONDITIONS AFTER COMPLETION

Casing pulled and poly casing put in place when rig moved off. Hole open and making water.

SURVEY DATA (Note: Bearing type must be same as Project Grid Type)

SURVEY Depth	SURVEY Bearing	SURVEY Dip	INTERVAL From	INTERVAL To	INTERVAL Distance	VERTICAL D.Sin.Dip	VERTICAL R.L.	HORIZONTAL D.Cos.Dip	HORIZONTAL Prog.Total
0m	113°	-90.0°	0	27.5	27.5				
55m	113°	-88.9°	27.5	82.5	55.0				
110m	107°	-90.0°	82.5	145.0	62.5				
180m	107°	-88.7°	145.0	184.3	39.3				
184.3m			=EOH						
	(magnetic)								

SURVEY Depth	SURVEY Bearing	SURVEY Dip	INTERVAL From	INTERVAL To	INTERVAL Distance	VERTICAL D.Sin.Dip	VERTICAL R.L.	HORIZONTAL D.Cos.Dip	HORIZONTAL Prog.Total

GOLD FIELDS EXPLORATION PTY. LIMITED

DRILL CORE LOG AND ASSAY DATA

FD6 PROJECT: EL 41/83 LAKE LEA HOLE NUMBER: FD6 Page:

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	ASSAY DATA Sample No.	From	To	Rec. %
				SUMMARY LOG				
0	12.0			No core.				
12.0	36.8			SKARN Massive & chaotic looking rock with varying concentrations and associations of garnet, actinolite, diopside, epidote & magnetite. Magnetite rich zones display wrigglite texture. Banded appearance may be enhanced by alteration rimmed veins. A transitional zone from 31.6m. Greisen veins throughout with some pink feldspar? veins also occurring in places.				
36.8	41.2			QUARTZITE Intensely silicified sandstone with minor shale bands and calc-silicate patches. Well broken with vuggy greisen veins common.				
41.2	57.9			INTERBEDDED SHALE AND SILICEOUS SANDSTONE Banded shale with interbedded sandstone as layers and pads variably silicified. Patches of calc-silicates common. Vuggy greisen veins common. Broken, related to jointing & veins.				
57.9	180.1			SANDSTONE Variably siliceous sandstone with tubicolar patches common. Zones of interbedded and intermixed shale occur, and to a lesser extent calc-silicates. Some pale yellow zones may reflect altered interstitial clays mixed with the sandstone (greywacke?). Greisen veining decreases in concentration with depth. Pyrite occurs in patches of fine disseminations and/or fine grained pods. Variable jointed and broken. From 161.8m gravel sized fragments become obvious.				
180.1	184.3			CONGLOMERATE A sharp contact into a rounded quartz pebble conglomerate which is variably hematised. Minor pyrite and magnetite occurs.				

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GOLD FIELDS EXPLORATION PTY. LIMITED

1.7.88 PROJECT: LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD 6 Page: 1 of 8

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	ASSAY DATA Sample No	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
0	12.0			Triconed - no core recovered.														
				0-12.0m HQ triconed														
				12.0-184.3mNQWL														
12.0	36.8	24.3	98	SKARN														
				12.0m to 15.1m - A black & light green garnet-magnetite-actinolite	T12225	12.0	13.0	75	0.140	365	155	365	X	150	20	24	1240	29
				skarn with patches of fine grained green pyroxene? associated with the	26	13.0	14.0	75	0.070	130	265	290	0.5	690	60	40	870	167
				more magnetite-rich areas. Compositional variable throughout with	T12227	14.0	15.0	96	0.240	550	155	245	X	920	40	12	618	493
				the magnetite-rich areas displaying concentric layered or "wrigglitic"														
				textures.														
				Alteration: Some of the magnetic-rich areas appear to be variably														
				silicified, with an intense band at 14.4m. Minor limonite occurs														
				to 15.2m with minor leaching associated.														
				Veining: Thin quartz ± pyrite (±muscovite) & thin pyrite ± chlorite?														
				veins are common.														
				Structure: Generally competant with minor jointing. Some joint														
				surfaces have patches of sheet pyrite (?veins). Core loss of 40cm														
				occurs between 12.0 & 13.0m. A fault occurs at 13.2m, 10cm thick														
				- leached & broken with pug, 50-70° to CA. At 13.8m is a shear,														
				70° to CA.														
				Mineralisation: Pyrite & magnetite are intimate associates. They often														
				form concentric shapes with "bands" alternating pyrite & magnetite?														
				with massive magnetite often between. Magnetite also occurs in														
				layered wriggles (wrigglite) with gaugue minerals (garnet?), overall														
				15-20%. Pyrite 5-10%.														
				15.1m to 20.3m - Pink brown & green garnet-actinolite skarn with	T12228	15.0	16.0	96	0.030	55	175	185	X	100	40	7	1070	222
				minor fine grained patches of pyroxene? or actinolite. Generally	29	16.0	17.0	97	0.010	35	170	165	X	20	40	3	642	20
				chaotic in appearance with generally discrete garnet rich & actinolite	30	17.0	18.0	97	0.020	30	175	150	X	20	40	5	839	29
				rich patches, at times resembling layering (60-70° to CA). Green garnet	31	18.0	19.0	97	0.230	30	310	165	1.0	570	40	11	1420	236
				from 19.4m.	T12232	19.0	20.0	97	0.030	35	20	280	1.0	110	60	13	587	88
				Alteration: Some of the actinolite may be weakly altered to chlorite														
				or sericite.														
				Veining: Minor quartz+actinolite (chlorite?)+pyroxene? veins and minor														
				calcite ± actinolite (chlorite?) veins.														

GOLD FIELDS EXPLORATION PTY. LIMITED

1.7.88 PROJECT: LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD 6 Page: 2 of 8

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	ASSAY DATA Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
				Structure: Weakly jointed, most breaks on veins.														
				Mineralisation: No obvious mineralisation.														
				20.3m to 31.6m. Green & black garnet-actinolite-magnetite-pyroxene?	T12233	20.0	21.0	97	0.030	250	185	190	0.5	240	40	11	522	434
				skarn. Chaotic but broadly layered in appearance with irregular patches	34	21.0	22.0	97	0.130	370	175	170	X	670	60	17	766	615
				of one mineral dominating the others. The layered appearance may	35	22.0	23.0	99	0.040	125	205	180	1.0	720	20	10	2110	282
				be enhanced by veining.	36	23.0	24.0	100	0.010	115	205	180	0.5	130	40	12	2490	434
				Alteration: Moderate to weak silicification may be related to the	37	24.0	25.0	100	0.010	140	215	200	1.5	260	20	7	1400	831
				more magnetite rich areas. Also there is minor sericite? &	38	25.0	26.0	99	0.030	285	170	180	0.5	340	40	12	1210	465
				chlorite? alteration of the garnet & actinolite.	39	26.0	27.0	97	0.010	410	160	150	0.5	510	40	11	988	383
				Veining: Abundant quartz veins generally at 50-70° to CA with	41	27.0	28.0	97	0.030	395	175	170	X	950	40	17	787	497
				±muscovite ±pyrite ±feldspar (K? or albite?) ±chlorite? Minor	42	28.0	29.0	97	0.030	350	160	185	0.5	270	40	9	827	277
				quartz ±chlorite? veins very thin.	43	29.0	30.0	96	0.030	235	160	160	0.5	180	20	12	490	347
				Structure: Weakly jointed throughout with the joint planes often coated	44	30.0	31.0	96	0.010	495	155	175	0.5	340	20	7	705	605
				in patches with pyrite.	T12245	31.0	32.0	88	0.020	90	150	175	1.0	60	40	4	264	269
				Mineralisation: Magnetite occurs in irregular patches, often with														
				associated pyrite & in finely disseminated bands. Textures in														
				places approach "wrigglite". Magnetite 10-15%. Pyrite occurs														
				with magnetite as thin bands, often concentric, or as disseminated														
				aggregates. It also occurs in veins & on joint surfaces. Pyrite														
				3-5% & chalcopyrite tr-1%.														
				31.6m to 36.8m Green grey skarn with minor siliceous bands grading	T12246	32.0	33.0	100	X	65	170	180	0.5	40	20	16	230	234
				into skarn & grey quartzite after 35.1m. Generally massive, &	47	33.0	34.0	100	X	120	165	245	1.0	10	X	7	214	80
				chaotic in appearance. Skarn garnet-actinolite ±pyroxene? with	48	34.0	35.0	100	X	75	170	210	X	X	40	8	145	507
				minor patches & bands of magnetite.	49	35.0	36.0	92	X	65	165	150	X	X	60	7	95	54
				Alteration: Intense silicification in the quartzite areas which probably	T12250	36.0	36.8	92	X	25	90	90	X	X	60	7	198	179
				represent original sandy material in the limestone.														
				Veining: Quartz veins common ± muscovite ±calcite ±pyrite ±feldspar														
				±chlorite? Minor thin chlorite? ±pyrite veins also occur. Most														
				veins are bounded by a dark reaction zone which pervades into the														
				skarn rock.														
				Structure: Weakly jointed. Most breaks relate to veins.														
				Mineralisation: Magnetite occurs in patches & bands, & finely														
				disseminated throughout, 1-3%. Pyrite occurs in veins &														
				disseminated, occasionally in clusters, in patches at times														
				associated with some of the magnetite, tr-1%.														

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GOLD FIELDS EXPLORATION PTY. LIMITED

1.7.88 PROJECT: LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD 6

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
									ASSAY DATA									
36.8	41.2	3.7	84	QUARTZITE														
				Gradual contact over 3.5 metres.														
				Light grey quartzite with minor shale bands at 70-80° to CA.	T12251	36.8	38.0	72	0.010	50	155	90	x	x	100	6	69	30
				Alteration: Intense silicification of an original sandstone.	52	38.0	40.0	74	x	65	165	95	x	x	80	6	74	61
				Veining: Vuggy quartz-muscovite-pyrite veins common up to 5mm &	T12253	40.0	41.2	88	x	80	150	100	x	x	80	9	67	32
				at 80° to CA. Minor thin pyrite-chlorite? veins.														
				Structure: Quartzite well broken throughout-mainly related to jointing														
				or veins. Core loss between 38m & 39m.														
				Mineralisation: Pyrite occurs mainly in veins & occasionally as														
				fine disseminated grains. Pyrite 1-2%.														
41.2	57.9	14.7	88	INTERBEDDED SHALE & SILICEOUS SANDSTONE														
				Contact gradual over 4 metres.														
				A white, brown & purple shale interbedded with a light grey to	T12254	41.2	43.0	83	0.010	55	165	120	x	x	60	7	54	48
				dark grey sandstone, often siliceous. The shale bands are variable	55	43.0	45.0	81	x	45	165	100	x	x	60	10	60	32
				in thickness & have uneven contacts with the sandstone. Where the	56	45.0	47.0	77	0.010	50	155	95	x	x	40	12	58	30
				sandstone occurs as small lenses or nodules within the shale bands,	57	47.0	49.0	85	x	80	155	110	x	x	40	6	72	353
				it is often altered to light grey quartzite. The shale bands are at	58	49.0	51.0	88	0.010	250	160	145	x	410	20	6	206	23
				80° to CA. Calc-silicate rich bands and patches are common.	59	51.0	53.0	60	x	45	140	100	x	x	20	6	67	43
				Alteration: Weak to intense silicification of the sandstone occurs.	61	53.0	55.0	62	0.070	80	150	100	x	x	60	4	51	27
				Most intense, generally where the sandstone occurs as lenses	T12262	55.0	57.0	92	0.030	55	155	95	x	x	40	3	65	26
				or nodules within the shale. Very minor limonite staining occurs														
				throughout, related more to the shale & calc-silicate zones -														
				especially on joint planes. There is minor patchy leaching														
				evident.														
				Veining: Quartz ±muscovite ±pyrite veins are common up to 5mm &														
				sometimes vuggy. Some very thin siderite? veins occur - limonitic.														
				Structure: Core broken. Breaks related mostly to joints & veins.														
				Minor shale pug at 44.5m-fault? Faults occur at 49.6m, leached														
				gouge with pug for 2cm at 70° to CA; at 52.7m, pug & broken														
				gouge with core loss for 60cm; & between 52.8m to 53.4m														
				where there is substantial core loss. The hole started making water														
				at 51.2m.														
				Mineralisation: Trace to 1% pyrite occurs in veins, as thin selvages														
				on joint surfaces (or with siderite?) & as occassional fine														
				discrete grains, especially with the calc-silicate zones. Trace														

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GOLD FIELDS EXPLORATION PTY. LIMITED

1.7.88 PROJECT: LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD 6 Page: 4 of 8

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	ASSAY DATA Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
				magnetite is also associated with some of these calc-silicates.														
57.9	95.4	34.7	93	SANDSTONE														
				Gradual contact over 5 metres.														
				Dark grey to light grey sandstone, often tubicular. Shale bands,	T12263	57.0	59.0	94	X	45	150	90	X	X	80	4	42	22
				dark grey, brown or white, are common up to 60cm thick. These often	64	59.0	61.0	94	X	80	155	240	X	X	100	2	34	20
				show gradational contacts with minor siliceous blobs or lenses. Minor	65	61.0	63.0	95	X	60	155	100	X	X	100	2	53	33
				calc-silicates are also common occurring interstitially with the	T12266	63.0	64.0	94	X	50	150	90	X	X	40	4	38	16
				sandstone in varying proportions or as discrete calc-silicate rich blobs														
				or aggregate of blobs, often leached & etched ("eaten away").	T12267	68.0	70.0	100	0.020	80	165	85	X	X	60	9	66	28
				Alteration: The sandstone is variably siliceous in patches. Moderate	68	70.0	71.0	100	0.020	65	175	85	X	X	80	11	28	X
				silicification occurs between 70 & 72 metres, 74 to 77 metres &	69	71.0	72.0	100	X	115	185	95	X	X	80	10	36	16
				92 to 95.4 metres. Minor yellow & brown limonite alteration occurs	70	72.0	73.0	98	0.010	150	180	110	X	X	60	7	83	51
				with the more calc-silicate rich zones - either	71	73.0	75.0	93	0.020	120	175	95	X	X	80	8	363	17
				siderite? or reflects the higher sulphide content?. Limonite also	72	75.0	77.0	88	0.010	60	205	180	X	X	80	10	44	25
				occurs on some joint planes (siderite?) especially within the more	73	77.0	79.0	59	0.010	60	185	115	X	X	100	5	88	94
				shaley units. These may be some very weak chlorite? alteration	74	79.0	81.0	87	X	60	240	210	X	X	100	9	39	23
				of the calc-silicates.	75	81.0	83.0	97	X	50	175	85	X	X	100	7	24	17
				Veining: Quartz-muscovite ±pyrite ±siderite? ±chlorite? greisen	T12276	83.0	85.0	87	X	65	190	90	X	X	60	2	48	20
				veins dominate, although with a low intensity. Generally 3-4mm														
				at 70° to CA, however, some do occur at low angles, especially	T12277	89.0	90.0	96	X	95	170	65	X	X	60	3	57	X
				the chlorite-pyrite rich veins.	T12278	90.0	91.0	97	0.010	85	170	70	X	X	60	6	23	13
				Minor thin pyrite, chlorite & siderite also are present. A														
				40mm quartz-pyrite-calc-silicate vein occurs at 70.2m & at 80°														
				to CA.														
				Structure: Core general broken in character. Major broken zones are														
				59.9m, 74m to 87.2m, 94.5m & 95.2m. Most broken ground is														
				related to jointing. Very broken 78.1m to 79.2m Only minor														
				shearing occurs. Core loss between 83m to 84m.														
				Mineralisation: Pyrite occurs disseminated in both sandstone & more														
				strongly with the calc-silicate rich zones. It also occurs in veins.														
				Overall pyrite is 1-2%.														
95.4	109.5	12.5	89	INTERBEDDED SANDSTONE & SHALE														
				Contact sharp but irregular.														
				The sandstone is grey with minor white (siliceous) zones and tinged														

GOLD FIELDS EXPLORATION PTY. LIMITED

1.7.88 PROJECT: LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD 6

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	ASSAY DATA Sample No	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
				purpled or green (calc-silicates) in patches. It is variably intermixed														
				& interbedded with buff to purple coloured shale. Calc-silicate rich	T12279	95.4	97.0	93	X	40	195	120	X	X	60	2	57	33
				zones are associated with both the sandstone & shale, occurring as	81	97.0	99.0	87	X	60	225	120	X	X	60	2	44	39
				interstitial minerals, minor irregular bands or as single or aggregated	82	99.0	101.0	85	X	40	165	85	X	X	40	2	17	11
				nodules or 'blobs'. The sandstone can display tubicles.	83	101.0	103.0	90	X	40	195	95	X	X	60	2	15	X
				Alteration: Weak to moderate silicification of both portions of the	84	103.0	105.0	76	X	50	185	115	X	X	60	9	9	12
				sandstone & shale occurs. Limonite is associated with the more	85	105.0	107.0	97	X	55	180	180	X	X	40	3	16	X
				calc-silicate rich patches & occurs on some joint surfaces & in some	T12286	107.0	109.5	95	X	70	180	105	X	X	60	2	48	21
				veins (siderite?).														
				Veining: Thin siderite? veins are common. Only minor quartz-muscovite														
				±pyrite ±siderite? vuggy greisen veins occur, some up to 40mm														
				at 101.7m & 102.7m.														
				Structure: Well jointed throughout. Broken at 99.3 to 100m, 101.3m to														
				101.8m, 103.5 to 104.6m & 106.6m. Strongly leached at 104.7m &														
				105.8m, associated with calc-silicate rich bands. Only minor														
				evidence of weak shearing.														
				Mineralisation: Pyrite occurs variably disseminated throughout,														
				concentrated more with the calc-silicate rich patches. It also is in														
				veins & as small patchy coating on some joints. Overall 1-2%.														
109.5	128.4	18.1	96	SILICEOUS SANDSTONE														
				A sharp but irregular & interfingering contact.														
				A grey & yellow to white coloured sandstone with minor bands,	T12287	111.0	112.0	94	X	110	225	100	0.5	30	20	9	33	30
				blobs & interstitial light yellow shale &/or pale green calc-silicates. The	T12288	112.0	113.0	91	X	80	185	100	X	X	20	17	25	10
				sandstone is often tubicular, & is a little more gritty between 121 to														
				125m.	T12289	118.3	120.0	99	X	60	180	75	X	X	60	10	30	X
				Alteration: Strongly siliceous in patches from 109.5 to 118.3m.	90	120.0	122.0	96	X	75	190	70	X	X	20	5	8	X
				Then only weak to moderate silicification. The shale bands are	91	122.0	124.0	97	X	80	195	65	X	X	60	7	15	10
				typical unsilicified, but may be slight limonised. Limonite is minor	92	124.0	126.0	99	0.030	60	170	65	X	X	40	4	16	X
				in some veins & on some joints (siderite?).	T12293	126.0	128.4	100	X	60	170	65	X	X	40	10	15	X
				Veining: Only minor veining throughout. Low angle chlorite?-pyrite														
				veins, very thin siderite? veins and some vuggy quartz-muscovite														
				±pyrite veins, one at 122.4 is 40mm thick.														
				Structure: Weak to moderatly broken 109.5 to 121.0m, also broken at														
				127.6m. The broken areas related to jointing &/or veining.														

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GOLD FIELDS EXPLORATION PTY. LIMITED

1.7.88 PROJECT: LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD 6 Page: 6 of 8

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	ASSAY DATA Sample No	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
				Mineralisation: Pyrite occurs variable disseminated throughout. Also in some veins & on some joint surfaces. At 120.5m it occurs with quartz in tension gashes formed in filled tubicles. 109.5m to 123.0m, pyrite is 1-2%, 123.0 to 128.4m, pyrite is 2-3% occurring in irregular granular aggregates in the sandstone.														
128.4	141.1	12.6	99	SANDSTONE														
				A very gradual contact.														
				A grey tubicular sandstone with shaley bands up to 30cm thick.	T12294	135.0	137.0	98	X	65	170	70	X	X	20	7	31	X
				The shale is very light coloured. The sandstone has an increasing	95	137.0	139.0	98	X	50	175	65	X	X	60	8	8	X
				proportion of fragments greater than 2mm & up to 5mm. Only very	T12296	139.0	141.1	99	X	55	170	65	X	X	40	13	69	X
				minor small patches of calc-silicates.														
				Alteration: Weakly silicified throughout. Only very minor limonite associated with veins or joints.														
				Veining: Only very weak vuggy quartz-muscovite-pyrite veins & very thin siderite? veins. At 129.9m there is a 260mm quartz vein with minor pyrite & included shale fragments, at 55° to CA.														
				Structure: Minor shearing at 136.7m. Very weakly jointed.														
				Mineralisation: Pyrite variable throughout, 1-2%.														
141.1	148.8	7.4	96	SANDSTONE WITH CALC-SILICATE														
				A sharp but irregular contact.														
				A grey & yellow tubicular sandstone with zones of calc-silicate	T12297	141.1	142.1	100	X	145	170	100	X	10	80	10	26	X
				minerals in irregular blobs or bands or interstitial in variable proportions.	98	142.1	143.0	98	X	80	165	70	X	X	100	9	22	X
				The calc-silicates at times appear to be related to veins (eg 145.9m).	T12299	143.0	144.0	98	X	55	170	65	X	X	40	6	10	X
				Alteration: Strongly silicified in places, the remainder weak to	T12301	144.0	145.0	98	X	120	190	125	X	20	60	4	113	93
				moderate. Some of the calc-silicate rich patches are strongly	T12302	145.0	146.4	94	X	150	185	105	X	10	60	7	37	18
				limonised.														
				Veining: Only minor thin vuggy greisen veins. At 145.9m is a 90mm greisen vein with abundant magnetite.														
				Structure: Broken 141.1 to 141.4m, 142.0m & at 147.5m. The broken zones are related to jointing & minor shearing.														
				Mineralisation: Pyrite occurs throughout, associated mainly with the calc-silicate rich zones, pyrite 3-5%. Minor magnetite occurs with the vein at 145.9m.														

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	ASSAY DATA Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
148.8	161.8	12.5	96	INTERBEDDED SANDSTONE & SHALE														
				Sharp contact at 148.8, may be sheared.														
				A light grey sandstone, poorly sorted with fragments up to 5mm in	T12303	152.0	153.0	97	X	85	190	145	X	40	20	2	74	X
				places. The shale is generally very light or purple coloured, often	T12304	153.0	154.3	97	0.010	90	180	240	X	30	20	2	85	41
				alternating. The shale is of varying thickness up to 0.9m & often														
				contains silicified sandstone lenses or 'blobs'. Bedding is at 80° to CA.	T12305	159.0	159.5	97	X	60	160	85	X	X	80	10	310	29
				Minor irregular calc-silicate patches occur, with one zone at 152.0m to														
				154.5m. It appears to be a calc-silicate charged sandstone unit.														
				Alteration: Weak to moderate silicification of the sandstone. Minor														
				limonite associated with some calc-silicates & in thin siderite?														
				veins & as slight discolouration of some of the shale.														
				Veining: Minor vuggy quartz veins, up to 30mm, with minor muscovite														
				& pyrite. Thin siderite? veins common. Also some minor														
				low angle quartz-chlorite? veins.														
				Structure: Broken throughout. Strongly broken at 151.7 to 152.0m,														
				156.3 to 157.7m & 158.5m. Breaks related to jointing and veining.														
				Faulting at 149.0m for 5cm with broken rock & pug at 80° to CA,														
				at 155.2m for 1cm with gouge & pug at 80° to CA.														
				Mineralisation: Pyrite weakly disseminated & in veins, tr-1%.														
				From 152.0 to 154.5m pyrite is disseminated, quite strongly														
				in patches with minor magnetite also disseminated. Magnetite 1-2%														
				& pyrite 5%. Possible some cassiterite in a vein at 159.1m.														
161.8	180.1	16.9	92	SANDSTONE/GRAVEL														
				Gradual contact over 3 metres.														
				Light grey to very pale green poorly sorted sandstone with	T12306	164.9	166.0	88	0.010	105	130	65	X	20	80	2	117	11
				gravel intervals & minor shale bands. The 3 size fractions are variably	07	166.0	167.0	84	0.070	115	130	80	0.5	20	80	4	11	10
				intermixed & some poorly developed graded bedding may exist at	T12308	167.0	167.8	81	X	30	140	70	X	X	80	2	49	X
				162.3m. Bedding at 60° to CA.														
				Alteration: The sandstone is variably silicified. Minor greisenisation	T12309	174.0	175.0	81	0.130	30	135	70	X	10	60	9	117	28
				is associated with some greisen veins at 173.5m & 178.7m, the	T12310	175.0	176.0	89	X	105	125	70	X	X	40	8	7	18
				muscovite weakly sericitised.														
				Veining: Very minor vuggy greisen veins as well as thin chlorite-quartz-	T12311	177.9	179.0	93	X	25	120	60	X	10	100	2	102	342
				muscovite? veins & few thin siderite?-pyrite veins. The minor	T12312	179.0	180.0	90	X	25	125	60	X	10	60	3	30	25
				calc-silicate present seem to be related to veining.														

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GOLD FIELDS EXPLORATION PTY. LIMITED

15.7.88 PROJECT: LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD 6 Page: 8 of 8

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
				Structure: Weak to moderately broken (jointed & veined) throughout.														
				Mineralisation: Pyrite variably disseminated throughout & in some veins,														
				1-2%. Magnetite occurs associated with the greisenisation at														
				178.7m & interstitial at 165.0m, 165.7m & 167.0 to 167.8m &														
				178.0m, overall 1-2%.														
180.1	184.3	4.0	95	CONGLOMERATE														
				A sharp but irregular contact at 180.1.														
				A grey-red conglomerate of large rounded quartz & hematitic	T12313	180.0	181.0	90	X	20	125	60	X	10	60	9	39	X
				pebbles in a matrix of sand, & hematite in places.	14	181.0	182.0	95	X	25	130	60	X	X	60	1	45	17
				Alteration: Weak to moderate silicification & moderately hematised.	15	182.0	183.0	97	X	25	130	60	X	X	40	X	35	X
				Veining: Minor low angle quartz-pyrite-calc-silicate & quartz-	T12316	183.0	184.3	97	X	25	120	65	X	X	40	1	36	X
				pyrite-muscovite veins, some showing wall rock magnetite.														
				Structure: Nil														
				Mineralisation: Pyrite occurs in veins & weakly disseminated, 1-2%.														
				Magnetite is associated in the wall rock of some veins, at 180.6m,														
				& also interstitial in the matrix, 182.8m to 183.1m. Magnetite 2-3%.														
				END OF HOLE														
					ASSAY	DETECTION (ppm)			0.008	5	5	5	0.5	10	5	1	3	10
					ANALABS METHOD				309	103	103	103	103	103	103	114	401	401
											X = BELOW DETECTION							

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708119

PROJECT: **LAKE LEA** HOLE No. **FD6**

RGC EXPLORATION PTY. LIMITED

DRILL HOLE PLOT

SCALE 1:500

10 5 0 10 20

METRES

PLAN

PROFILE

12·0 – 15·0m
3·0m @ 0·15 g/t Au

18·0 – 19·0m
1m @ 0·23 g/t Au, 0·14% Sn

21·0 – 22·0m
1m @ 0·13 g/t Au

174·0 – 175·0m
1m @ 0·15 g/t Au

Patches of wriggilite

Patchy magnetite – wriggilite in places

Greisen veins common

Transition zone with minor magnetite

Silicified

Calc-silicate minerals throughout

Gravelly sandstone

Hematitic

184·5 m E.O.H.

50m

100m

150m

MN

TN

ALLUVIUM /SEDIMENT

SKARN

QUARTZITE

SHALE

SANDSTONE

CONGLOMERATE

LEGEND

ALLUVIUM/SEDIMENT

BASALT

TERTIARY SEDIMENT

LIMESTONE

SKARN

QUARTZITE

SHALE

SANDSTONE

CONGLOMERATE

BEDDING

FAULT

88-2888

5 cm

FIG. 51

STATE: Tas.

HOLE No. FD6

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HOLE NO.: FD7
STATE : TASMANIA

GOLD FIELDS EXPLORATION PTY. LIMITED

DRILL CORE RECORD

ULV. PRESS

PROJECT	EL 41/83 LAKE LEA
DESIGNED BY	M.J. Fleming
LOGGED BY	M.J. Fleming
COMMENCED	22nd June 1988
COMPLETED	1st July 1988

PURPOSE

To test the gold bearing potential and extent of the skarn rocks occurring in the Lea River Valley opposite Fletcher's Adit.

LOG SUMMARY / GENERAL COMMENTS

The hole starts in a good garnet-actinolite-diopside skarn with minor epidote and no obvious magnetite. Then a sharp contact into a very thin quartzite band, shattered. This passes into a normal footwall sequence of interbedded shales and quartzite, then sandstone variably *tubicolar*.

ASSAY SUMMARY

INTERVAL From	INTERVAL To	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W			COMMENTS
21.0	22.0	0.068	50	310	170	17.0	310	25	5	1500	<20			All assays in ppm.
26.0	28.0	1.515	15	995	225	10.0	1930	30	3	185	<20			

LOCATION

NORTHING	
EASTING	
R.L.	
GRID	805S/2730W
LENGTH	80.0m

HOLE CONDITION

SIZE Hole Size	SIZE Depth
HQ	21.0m
NQ	80.0m

SIGNIFICANT CORE LOSS INTERVALS From	To	% Lost
0	21.0m	No core
35.0m	37.4m	45
40.4m	44.4m	40
46.3m	51.4m	39
52.4m	55.0m	29

POOR GROUND CONDITION ZONES From	To	Condition
35.6m	52.8m	Very broken due to jointing
		and minor faulting.

HOLE CONDITIONS AFTER COMPLETION

Casing pulled & poly pipe put in place when rig moved off. Hole open.

SURVEY DATA (Note: Bearing type must be same as Project Grid Type)

SURVEY Depth	SURVEY Bearing	SURVEY Dip	INTERVAL From	INTERVAL To	INTERVAL Distance	VERTICAL D.Sin.Dip	VERTICAL R.L.	HORIZONTAL D.Cos.Dip	HORIZONTAL Prog. Total
0m	204°	-90.0°	0	15.0	15.0				
30m	204°	-89.0°	15.0	42.5	27.5				
55m	179°	-88.3°	42.5	67.5	25.0				
80m	172°	-89.0°	67.5	80.0	12.5				
80.0m			=EOH						
	(magnetic)								

SURVEY Depth	SURVEY Bearing	SURVEY Dip	INTERVAL From	INTERVAL To	INTERVAL Distance	VERTICAL D.Sin.Dip	VERTICAL R.L.	HORIZONTAL D.Cos.Dip	HORIZONTAL Prog. Total

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GOLD FIELDS EXPLORATION PTY. LIMITED

LV. PRESS

PROJECT: EL 41/83 LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD7 Page:

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	ASSAY DATA Sample No.	From	To	Rec. %
				SUMMARY LOG				
0	21.0			No core.				
21.0	35.6			SKARN A massive mottled looking garnet-actinolite-diopside rock with minor thin veins or bands of epidote. Some zones of intense leaching occur which are strongly corroded, possibly related to faulting.				
35.6	36.2			QUARTZITE A thin band of intensely silicified sandstone. Very broken.				
36.2	42.9			INTERBEDDED QUARTZITE AND SHALE Strongly silicified sandstone interbedded & intermixed with banded shale. Minor calc-silicate rich patches. Well broken with water return being lost at 36.4m.				
42.9	52.8			SHALE Banded shale with minor thin bands and pods/blobs of siliceous sandstone (some resemble worm casts). Minor calc-silicate rich zones. Thin vuggy greisen veins common. Well broken due to jointing & faulting.				
52.8	80.0			SANDSTONE Variably siliceous sandstone, often tubicolar and containing shale as thin bands or intermixed (greywacke-tinged yellow). Minor patchy calc-silicates occur. Thin greisen veins are common.				

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GOLD FIELDS EXPLORATION PTY. LIMITED

29.7.88 PROJECT: LAKE LEA EL 41/83

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD 7 Page: 1 of 3

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	ASSAY DATA Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
0	21.0			Triconed. No core recovered.														
				0-21m HQ triconed														
				21-80m NQWL core.														
21.0	35.6	13.0	89	SKARN														
				A green & brown garnet-actinolite-diopside?-epidote? rock with a	T12317	21.0	22.0	100	0.068	50	310	170	17.0	310	25	5	1500	X
				chaotic mottled texture. It appears fairly consistant chemically	18	22.0	23.0	96	0.028	35	170	155	7.5	170	30	21	570	X
				throughout, with minor patches of dark actinolite (chlorite?)-diopside?-	19	23.0	24.0	91	0.037	50	480	160	18.0	420	15	5	460	X
				pyrite. There is no magnetite-rich patches in this intersection.	21	24.0	25.0	91	0.019	15	35	230	X	X	25	3	250	X
				Alteration: Zones of intense leaching occur 21.0m to 21.7m, 22.1m to	22	25.0	26.0	92	0.024	15	275	160	9.0	240	30	3	270	X
				24.0m, 27.5m to 28.2m, at 31.0m & 35.5m to 35.6m. In these zones	23	26.0	27.0	94	0.420	15	685	200	15.0	860	35	2	200	X
				the actinolite is corroded, there is weak chlorite/sericite alteration	24	27.0	28.0	94	2.610	15	1300	245	5.0	3000	25	3	170	X
				& they are often strongly limonised. Possibly structure related.	25	28.0	29.0	92	0.033	5	65	245	X	30	25	4	230	X
				Veining: Minor thin calcite &/or actinolite (chlorite?) veins occur	26	29.0	30.0	74	X	125	50	220	X	10	30	7	280	30
				throughout, generally <1mm to 5mm thick & at low angles to the	27	30.0	31.0	74	X	10	55	230	X	20	25	4	390	30
				CA. Possibly some minor epidote? also associated.	28	31.0	32.0	74	X	X	30	215	X	10	35	2	110	X
				Structure: Generally massive & only very minor jointing. Possible	29	32.0	33.0	98	X	210	25	210	X	20	50	6	140	X
				faults occur 23.4m to 23.9m & at 31.0m. Both locations broken	30	33.0	34.0	98	0.010	10	95	200	1.0	X	105	2	310	X
				& extremely leached with substantial core loss, 0.8m, at 31.0m.	31	34.0	35.0	98	X	15	30	195	X	10	120	4	460	65
				Mineralisation: Pyrite occurs variably throughout, related to the	T12332	35.0	35.6	63	0.015	15	40	280	X	60	330	3	220	X
				leached zones where it occurs in granular aggregates & with the														
				actinolite (chlorite?) - diopside patches where it also forms fine														
				grained aggregated blobs. Pyrite overall tr-1%.														
35.6	36.2	0.2	33	QUARTZITE														
				Sharp contact.														
				A light grey intensely silicified sandstone. Very broken with	T12333	35.6	38.0	59	X	35	25	125	X	20	65	4	25	30
				substantial core loss-fault?. Vuggy quartz & minor thin dark actinolite														
				(chlorite?) veins. Has peppered green tinging - possibly minor calc-														
				silicate or greisenisation minerals (altered muscovite). No obvious														
				mineralisation.														

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GOLD FIELDS EXPLORATION PTY. LIMITED

29.7.88 PROJECT: LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD 7

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	ASSAY DATA Sample No.	From	To	Rec %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
36.2	42.9	4.6	69	INTERBEDDED QUARTZITE & SHALE														
				Contact broken.														
				A light grey quartzite interbedded & intermixed with a very light	T12334	38.0	40.0	78	X	45	20	100	X	10	90	4	40	25
				buff through brown to at times purple shale. Minor calc-silicate	T12335	40.0	42.0	68	X	30	30	90	X	30	75	3	10	25
				rich bands, green & often limonised brown-yellow, are common.														
				The unit is layered with a CA angle at 70-80° - bedding, often														
				contorted.														
				Alteration: Strong silicification of the more sandy bands to quartzite -														
				the shales appear unaffected. The calc-silicate rich bands are														
				variably limonised, quite intense in places (37.9m).														
				Veining: Only minor thin, vuggy quartz ± chlorite? veins. Also only														
				minor very thin siderite? veins.														
				Structure: Very well broken throughout the unit. Hole losing H_2O														
				at 36.4m. Patchy core loss could be related to intense broken														
				nature. Breaks appear to be related to joints & bedding, often														
				clay or siderite? coated.														
				Mineralisation: Minor disseminated pyrite in trace amounts occurs														
				throughout.														
42.9	52.8	6.5	66	SHALE														
				Contact broken.														
				A very light buff through to purple to grey shale with minor	T12336	42.0	44.0	58	X	30	30	90	X	X	60	3	40	25
				"eyes" or "blobs" of quartzite (filled warm holes eg. 43.5m &44.3m) &	37	44.0	46.0	76	0.011	70	30	160	X	X	45	4	100	20
				patches of varying sizes with calc-silicate minerals in varying	38	46.0	48.0	55	X	35	30	95	X	10	55	3	45	30
				quantities. Generally massive in appearance. Minor bedding at	39	48.0	50.0	64	X	20	15	85	X	X	35	1	30	45
				70° to CA.	T12341	50.0	52.0	74	X	25	10	105	X	X	55	X	50	25
				Alteration: The minor quartzite is intensely silicified sandstone.														
				Some of the richer calc-silicate bands are strongly limonised														
				with a zone 44.9m to 45.2m being totally altered.														
				Veining: Vuggy thin quartz-muscovite ± fluorite veins are common.														
				Very thin siderite?-pyrite veins occur throughout.														
				Structure: The core is broken throughout - in some places intensely.														
				Core loss is common & obvious faulting occurs at 44.6m, 45.1m,														
				47.0m & 51.0m.														
				Mineralisation: Pyrite occurs variably disseminated throughout, with														
				some siderite?veins & associated with the calc-silicate rich														

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GOLD FIELDS EXPLORATION PTY. LIMITED

29.7.88 PROJECT: LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD 7 Page: 3 of 3

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION
				patches, overall 1-2%.
52.8	80.0	25.9	95	SANDSTONE
				A sharp broken contact.
				Generally dark grey or light grey tinged yellow, green or purple.
				Massive with minor, very patchy calc-silicates & the odd thin shale
				band, at an angle of 80° to CA.(bedding). Its overall appearance is
				quite mottled, indicating variable reacting. Tubicular in places.
				Alteration: Weak to intense silicification occurs throughout. The
				calc-silicate patches have undergone varying degrees of limonisation.
				Veining: Thin quartz-muscovite-pyrite greisen veins are common. Very
				thin siderite? & pyrite viens also occur throughout.
				Structure: The unit is moderately jointed with only minor well
				broken zones - generally related to low angle jointing.
				Mineralisation: Pyrite occurs throughout finely disseminated, in
				veins, on some joint surfaces & concentrated in the more
				calc-silicate rich patches. Overall pyrite content is 1-2%.
				END OF HOLE

ASSAY DATA

Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
T12342	52.0	54.0	71	X	10	X	65	X	20	55	3	25	35
43	54.0	56.0	88	X	35	X	65	X	20	85	2	45	X
44	56.0	58.0	91	X	60	X	65	X	10	85	2	35	X
T12345	58.0	60.0	91	X	35	X	90	X	X	90	3	45	X
T12346	63.5	64.0	100	X	15	10	45	X	X	70	2	35	X
T12347	68.0	70.0	100	X	75	25	65	X	10	85	2	40	X
T12348	70.0	72.0	100	X	50	20	65	X	X	80	1	70	X
ASSAY DETECTION (ppm)				0.008	5	5	5	0.5	10	5	1	3	20
ANALABS METHOD				309	103	103	103	103	103	103	114	401	401

X = BELOW DETECTION

PROJECT: LAKE LEA HOLE No. FD7

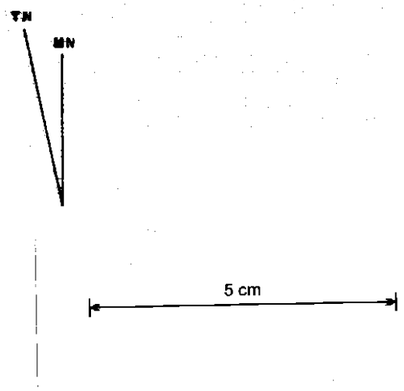
RGC EXPLORATION PTY. LIMITED

DRILL HOLE PLOT

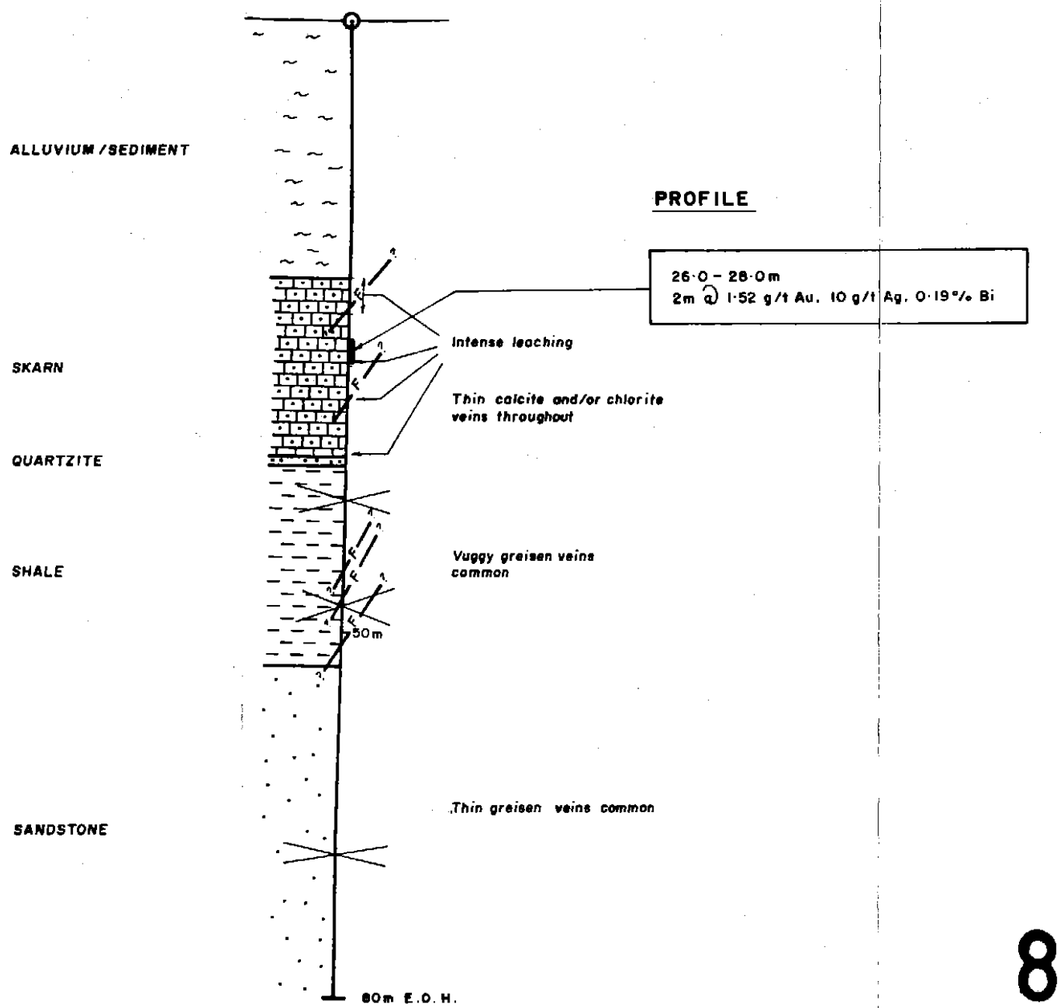
SCALE 1:500



PLAN



PROFILE



LEGEND

- ALLUVIUM/SEDIMENT
- BASALT
- TERTIARY SEDIMENT
- LIMESTONE
- SKARN
- QUARTZITE
- SHALE
- SANDSTONE
- CONGLOMERATE
- BEDDING
- —F— FAULT

88-2888

FIG. 62

STATE: Tas.

HOLE No. FD7

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HOLE NO.: FD8
STATE : TASMANIA

GOLD FIELDS EXPLORATION PTY. LIMITED

DRILL CORE RECORD

DLV. PRESS

PROJECT	EL41/83 LAKE LEA
DESIGNED BY	M.J. Fleming
LOGGED BY	M.J. Fleming
COMMENCED	4th July 1988
COMPLETED	18th July 1988

PURPOSE

To test the gold bearing potential and extent of the skarn rocks occurring in the Lea River Valley opposite Fletcher's Adit.

LOG SUMMARY / GENERAL COMMENTS

The hole went into basalt breccia after only 3 metres of triconing. 55 metres of basalt then went into variably unconsolidated & puggy sediment & weathered skarn before passing into almost 20 metres of leached skarn, then fresh garnet-diopside-actinolite-epidote--magnetite skarn. From 100 metres depth follow a normal footwall sequence of quartzite, interbedded shale and sandstone, and tubicolar sandstone.

SSAY SUMMARY

INTERVAL From	INTERVAL To	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W			COMMENTS
64.8	86.0	0.292	153	141	421	0.8	827	23	18	828	76			All assays in ppm.
89.0	93.0	0.265	344	43	420	<0.5	315	34	42	288	<20			
95.0	97.0	0.313	105	35	225	2.1	60	25	3	640	25			
98.0	99.0	0.110	40	35	270	1.5	70	20	1	130	180			

OCATION

NORTHING	
EASTING	
R.L.	
GRID	795S/2840W
LENGTH	127.8m

HOLE CONDITION

SIZE Hole Size	SIZE Depth
HQ	3.0m
NQ	127.8m

SIGNIFICANT CORE LOSS INTERVALS From	To	% Lost
0m	3.0m	No core
10.8m	16.8m	85
28.2m	36.5m	36
58.8m	84.7m	56
109.2m	111.4m	31

POOR GROUND CONDITION ZONES From	To	Condition
3.0m	58.3m	Broken and faulted
58.3m	86.1m	Generally unconsolidated & leached
103.2m	112.5m	Well jointed, broken

HOLE CONDITIONS AFTER COMPLETION

Casing pulled and hole collapsed at the collar. Poly pipe placed in hole.

URVEY DATA (Note Bearing type must be same as Project Grid Type)

SURVEY Depth	SURVEY Bearing	SURVEY Dip	INTERVAL From	INTERVAL To	INTERVAL Distance	VERTICAL D.Sin.Dip	VERTICAL R.L.	HORIZONTAL D.Cos.Dip	HORIZONTAL Prog.Total
0m	309°	-90.0°	0	20.0	20.0				
40m	309°	-89.4°	20.0	60.0	40.0				
80m	300°	-89.2°	60.0	103.5	43.5				
127m	283°	-90.0°	103.5	127.8	24.3				
127.8m			=EOH						
	(magnetic)								

SURVEY Depth	SURVEY Bearing	SURVEY Dip	INTERVAL From	INTERVAL To	INTERVAL Distance	VERTICAL D.Sin.Dip	VERTICAL R.L.	HORIZONTAL D.Cos.Dip	HORIZONTAL Prog.Total

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GOLD FIELDS EXPLORATION PTY. LIMITED

FD8 PROJECT: EL 41/83 LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD8 Page: 126

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	ASSAY DATA Sample No.	From	To	Rec. %
				SUMMARY LOG				
0	3.0			No core.				
3.0	58.3			BASALT BRECCIA A basalt fragmental (size range <1mm to >500mm) with a clear & white zeolite matrix, 20-30% by volume and often vuggy. Generally well broken with breaks being irregular or faulted.				
58.3	67.8			TERTIARY SEDIMENT WITH WEATHERED SKARN An unconsolidated layered sediment grading into a puggy, weathered and leached skarn and sediment. Abundant core loss.				
67.8	86.1			WEATHERED AND LEACHED SKARN A zone of leached skarn with a patch of more resistant wrigglite occurring. Minor greisen veining and abundant core loss.				
86.1	99.7			SKARN A massive chaotic looking garnet-actinolite-diopside-epidote-magnetite skarn, variable in composition throughout. A zone which is leached & limonised appears related to a structure. Greisen veins are common. Pyrite is mainly associated with magnetite & trace chalcopyrite occurs.				
99.7	103.2			QUARTZITE Moderate to strongly silicified sandstone with abundant interstitial calc-silicates.				
103.2	116.9			INTERBEDDED SHALE AND SANDSTONE Layered shale interbedded with bands & pods/blobs of siliceous sandstone. Well broken. Patches of calc-silicate minerals common after 112.5m. Thin greisen veining.				
116.9	127.8			SANDSTONE Variably silicified sandstone, often tubicolar and with minor interbedded & intermixing shale. Greisen veins common.				

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GOLD FIELDS EXPLORATION PTY. LIMITED

4.8.88 PROJECT: LAKE LEA EL41/83 **DRILL CORE LOG AND ASSAY DATA** HOLE NUMBER: FD 8 Page: 1 of 2

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INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	ASSAY DATA Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
				0-3.0m HQ triconed (cased)														
				3.0m-127.8m NQWL core														
0	3.0			Triconed - no core recovered.														
3.0	58.3	42.2	76	BASALT BRECCIA														
				A grey to grey-brown basalt occurring as dominantly angular fragments ranging in size from <1mm to >500mm. Some fragments show a thin reaction rim & some fragment edges are diffuse due to the grading into numerous very fine fragments. The matrix (~25-30% by volume) is clear & white zeolite, often vuggy & occasionally tinged green. Some occurrances of the zeolite resemble amygdales.													
				Alteration: The basalt is variably limonised as is some zeolite. Its occurrance appears related to structures. After 50m, some zeolite has altered to clay and released its fragments - appears faulted, but most probably isn't.													
				Veining: Apparent veining by zeolite more than likely reflects fragments that have not separated greatly or undergone any rotation. So no veining is obvious.													
				Structure: The unit is well broken and often faulted. Obvious faults occur between 10.8m & 16.8m (abundant core loss and intensely broken), @ 22.8m (intensely broken with core loss), between 28.0m & 31.0m (intensely broken with pug and core loss) and between 43.0m and 48.0m (broken with core loss in patches). No well developed joint sets occur. Most breaks are irregular.													
				Mineralisation: Nil apparent.														
58.3	67.8	4.0	42	TERTIARY SEDIMENT WITH WEATHERED SKARN														
				Contact is broken with core loss. Sediment in contact appears slightly baked. A fine brown, unconsolidated and layered (@ 30-35° to CA) sediment grades into (after 59 metres) a unit comprising a fine to gravelly sediment generally brown; abundant weathered skarn fragments up to a few centimetres in size; zones of puggy weathered and leached skarn (often magnetic) and minor carboniferous wood fragments. All of these are variably intermixed.	T12349	64.8	67.8	17	0.378	175	145	635	0.5	800	30	6	1500	150

GOLD FIELDS EXPLORATION PTY. LIMITED

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4.8.88 PROJECT: LAKE LEA EL41/83

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD8

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	Sample No.	From	To	Rec. %	ASSAY DATA Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
				Alteration: Limonised, weathered and leached.														
				Veining: None obvious														
				Structure: Broken with copious core loss due to its unconsolidated nature.														
				Mineralisation: Remanent magnetite occurs in the leached and weathered skarn.														
67.8	86.1	8.0	44	WEATHERED AND LEACHED SKARN														
				Contact gradual, puggy, broken and has core loss.														
				Green, black and light brown weathered and leached skarn with obvious	T12350	67.8	69.8	25	0.219	350	25	525	0.5	740	25	30	1750	80
				magnetite patches grades into 2.5m of "wrigglite" skarn @ 69.8m.	51	69.8	71.0	88	0.229	550	25	370	0.5	1200	20	100	930	100
				This then passes through a broken zone into a light brown weathered	52	71.0	72.3	65	0.155	625	30	315	X	990	20	32	820	270
				skarn which has patches of intense leaching and core loss. A sedimentary	53	72.3	73.8	67	0.118	15	105	480	X	320	20	3	990	40
				fragmental character still appears to be present between 76.8m and	54	73.8	76.8	23	0.055	5	100	215	X	180	20	2	420	X
				82.8m, possibly a sediment filled void in the original limestone.	56	76.8	79.8	13	0.341	150	130	335	X	990	25	36	1050	35
				Alteration: Weathering and leaching is generally intense.	56	79.8	82.8	40	0.661	15	375	670	2.5	2000	15	3	250	100
				In some places free garnets are floating in pug.	57	82.8	85.0	59	0.242	5	60	210	X	120	30	4	260	X
				The amphiboles and pyroxenes are altered to sericite?	T12358	85.0	86.0	94	0.253	X	330	270	1.0	680	30	1	160	X
				Veining: Some evidence of vuggy greisen veins still exists, especially in the wrigglite. The high fluorite content of the wrigglite may have made it more resistant to weathering. Some, thin quartz ± pyrite veins also occur in the wrigglite.														
				Structure: Well broken with abundant core loss.														
				Mineralisation: Magnetite occurs assoc. with the wrigglite texture (10%). Some flourite is most probably also present in the wrigglite (20%). Pyrite occurs also in the wrigglite finely disseminated and is in some veins and coats thinly some joint surfaces (overall 3%). Possible some specularite hematite occurs @ 73.6m - altered pyrite or magnetite.														
86.1	99.7	12.5	92	SKARN														
				A gradual contact over a couple of cm.														
				A green garnet-diopside?± epidote? skarn, quite massive in appearance,														
				passes sharply into 2.4 metres of brown leached skarn @ 90.2m.														

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GOLD FIELDS EXPLORATION PTY. LIMITED

4.8.88 PROJECT: LAKE LEA EL41/83 **DRILL CORE LOG AND ASSAY DATA** HOLE NUMBER: FD8 Page: 3 of 5

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION
				Following is a green and black garnet-actinolite±diopside(?)±magnetite skarn, that has the typical chaotic skarn look. The magnetite occurs in rich zones (92.6m to 93.2m).
				Alteration: The main alteration is related to the leached band which is strong limonised and some of the calc-silicates may be altered to sericite or chlorite. This appears to be structure controlled. Minor dark (chlorite) alteration seems to occur around some greisen veins.
				Veining: Greisen veining occurs throughout @ angles of 20-60° to CA. Generally thin they are quartz±muscovite± pyrite±chlorite(?)±siderite(?)
				Structure: Generally massive with only minor jointing. Faulting occurs @ 91.1m to 91.8m (vy broken and puggy with core loss) and @ 93.5m (2cm wide and fault gouge, black, and @ 20° to CA.)
				Mineralisation: Magnetite occurs in patches variable in size after 92.6m, up to 20%. Pyrite is often associated with the magnetite and is generally in its strongest concentrations. Pyrite also occurs in some veins and on some joints surfaces. It is in patchy disseminated aggregates throughout, overall 2-3%. Minor chalcopyrite occurs @ 87.7m.
99.7	103.2	2.9	83	QUARTZITE
				A gradational contact over 0.5 metres.
				A grey and brown silicified sandstone with abundant calc-silicates interstitial throughout.
				Alteration: Patchy and diffuse limonite alteration of some of the calc-silicates(?). Moderate to strong silicification of the sandstone.
				Veining: Only minor thin greisen veins and minor very thin siderite veins.
				Structure: Weakly jointed (bedding?) with only minor broken zones.

ASSAY DATA

Sample No	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
T12359	86.0	87.0	94	0.095	245	105	195	0.5	330	35	7	130	x
61	87.0	88.0	94	0.056	330	65	245	x	490	35	4	140	70
62	88.0	89.0	93	0.032	235	25	250	x	80	30	4	140	20
63	89.0	90.0	83	0.236	15	35	265	x	190	40	2	130	x
64	90.0	91.0	83	0.441	25	50	520	x	440	25	3	200	25
65	91.0	92.0	86	0.121	850	35	550	x	220	35	150	510	x
66	92.0	93.0	97	0.186	485	50	345	x	410	35	11	310	20
67	93.0	94.0	97	0.045	260	35	245	x	50	20	1	720	x
68	94.0	95.0	97	x	155	25	245	x	x	25	8	790	x
69	95.0	96.0	97	0.211	185	40	230	x	90	20	4	630	40
70	96.0	97.0	97	0.414	25	30	220	4.0	30	30	2	650	x
71	97.0	98.0	95	0.073	25	40	285	0.5	50	35	x	270	80
72	98.0	99.0	88	0.110	40	35	270	1.5	70	20	1	130	180
T12373	99.0	99.7	88	0.023	20	25	260	x	x	20	x	130	30
T12374	99.7	101.0	88	0.010	40	25	125	x	x	70	x	120	x
75	101.0	102.0	78	0.016	25	20	115	x	x	70	x	160	x
T12376	102.0	103.2	78	0.011	25	30	135	x	x	75	8	170	45

GOLD FIELDS EXPLORATION PTY. LIMITED

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4.8.88 PROJECT: LAKE LEA EL41/83 **DRILL CORE LOG AND ASSAY DATA** HOLE NUMBER: FD8 Page 4 of 5

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	Sample No	From	To	Rec. %	ASSAY DATA Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
				Mineralisation: Trace amounts of pyrite occurs finely disseminated,														
				in some veins and on some joint surfaces.														
103.2	112.5	8.0	86	INTERBEDDED SHALE & SANDSTONE														
				A gradational contact over 20-30 cm.														
				A light buff or grey and purple shale interbedded, moderately chaotically	T12377	103.2	105.0	88	x	25	25	95	x	x	55	6	25	x
				with bands, zones and discontinuous "blobs" of siliceous sandstone.	78	105.0	107.0	98	x	25	25	100	x	x	75	4	75	20
				Bedding is @ 50° to CA. Only minor calc-silicates occur, often	79	107.0	109.0	84	x	25	25	80	x	x	55	4	50	30
				associated interstitially with the silicified sandstone.	81	109.0	111.0	72	x	15	10	60	x	x	45	x	55	25
				Alteration: The sandstone occurrances are weakly to strongly	T12382	111.0	113.0	86	0.010	30	15	135	x	20	55	4	90	20
				silicified. Most strongly where more intimately														
				associated with the shale. The shale is at times														
				weakly limonised as is the calc-silicates(?) within the														
				sandstone and some joint surfaces.														
				Veining: Only minor thin greisen veins occur.														
				Structure: Well broken throughout-related to joints and bedding.														
				Some joints have a thin coating of limonite (siderite)														
				with minor dusting of pyrite. A fault occurs @														
				106.8m (pug).														
				Mineralisation: Only trace fine pyrite occurs throughout.														
112.5	116.9	3.9	89	SHALE WITH MINOR CALC-SILICATES														
				Contact appears gradational over a few cm's.														
				A light buff, grey and purple shale with patches of abundant green	T12383	113.0	114.0	90	x	85	25	145	x	x	45	x	50	20
				calc-silicate minerals; in places approaching skarn. Contacts are often	84	114.0	115.0	90	x	145	45	240	x	40	35	7	120	x
				diffuse and intermixed. Bedding @ 60° to CA.	T12385	115.0	116.0	88	x	90	40	160	x	20	70	9	120	30
				Alteration: Weak-patchy limonite alteration occurs which appears														
				to be related more to the calc-silicate rich areas.														
				Veining: Thin greisen veins occur throughout. Only minor,														
				very thin siderite (?) veins. A 50mm quartz vein														
				with minor pyrite and chlorite (?) occurs @ 116.9m.														
				Structure: Weakly jointed and broken.														
				Mineralisation: Abundant disseminated pyrite and some minor														
				magnetite (?) occurs with the calc-silicate rich areas.														
				Pyrite 1-2%.														

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GOLD FIELDS EXPLORATION PTY. LIMITED

4.8.88 PROJECT: LAKE LEA EL41/83

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD8 Page: 5 of 5

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION
116.9	127.8	10.5	96	SANDSTONE
				A sharp contact.
				Dark grey interbedded sandstone and shale passes into a dark grey and
				light grey sandstone which is at times tubicular.
				Alteration: Variable silicified throughout. Generally only weak,
				but at some points intense. Only very weak and
				patchy limonite alteration.
				Veining: Greisen veins are common as are very thin siderite
				veins.
				Structure: Weakly jointed and broken. A minor fault
				occurs @ 120m (broken with minor pug).
				Mineralisation: Pyrite occurs disseminated throughout and in some
				veins, tr-1%.
				END OF HOLE

ASSAY DATA

Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
T12386	116.0	118.0	87	X	65	20	105	X	20	35	X	55	X
87	118.0	120.0	97	X	20	15	85	X	30	35	X	90	20
88	120.0	122.0	95	0.029	65	15	80	X	90	65	11	45	35
89	122.0	124.0	95	X	55	15	70	X	10	60	X	45	20
90	124.0	126.0	100	X	60	20	55	X	10	70	13	40	20
T12391	126.0	127.8	100	X	95	15	70	X	X	75	14	40	25
ASSAY	DETECTION (ppm)			0.008	5	5	5	0.5	10	5	1	3	20
ANALABS	METHOD			309	103	103	103	103	103	103	114	401	401
						X = BELOW DETECTION							

PROJECT: LAKE LEA HOLE No. FD8

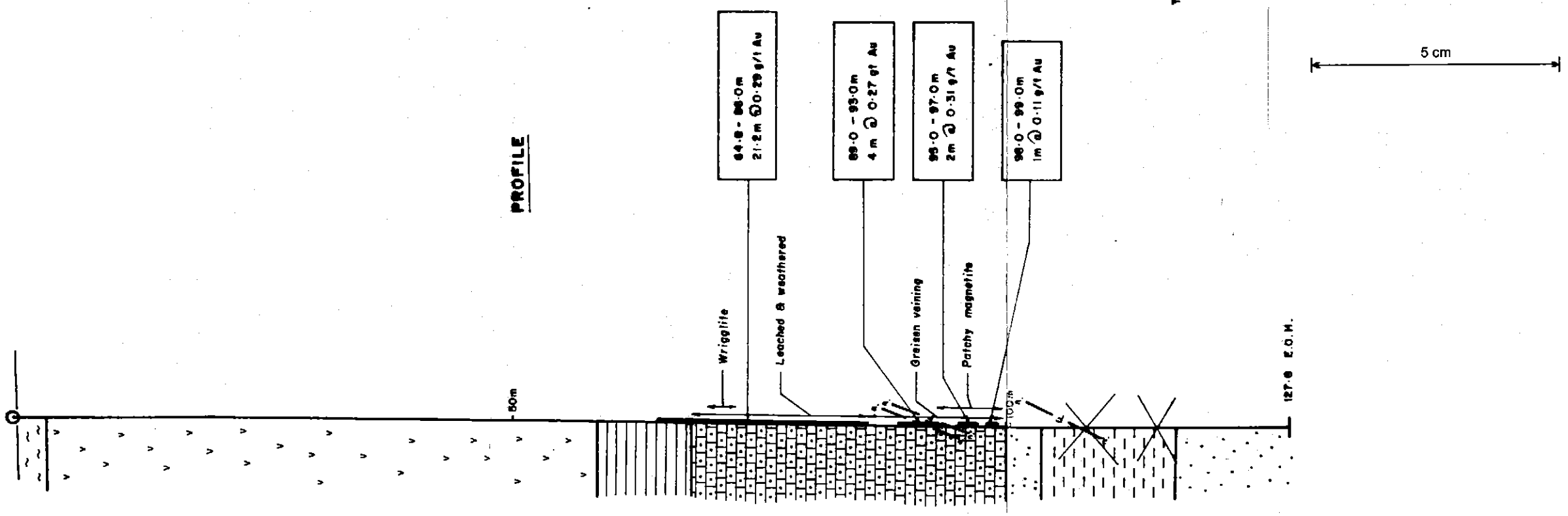
RGC EXPLORATION PTY. LIMITED

DRILL HOLE PLOT

SCALE 1:500 10 5 0 10 20 METRES

PLAN

PROFILE



LEGEND

- ALLUVIUM/SEDIMENT
- BASALT
- TERTIARY SEDIMENT
- LIMESTONE
- SKARN
- QUARTZITE
- SHALE
- SANDSTONE
- CONGLOMERATE
- BEDDING
- FAULT

ALLUVIUM/SEDIMENT

BASALT BRECCIA

TERTIARY SEDIMENT & LEACHED SKARN.

SKARN

QUARTZITE

SHALE

SANDSTONE

88-2888

FIG. 53

STATE: Tas.

HOLE No. FD8

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GOLD FIELDS EXPLORATION PTY. LIMITED

DRILL CORE RECORD

DEV. PAPER

HOLE NO.: FD9
STATE: TASMANIA

PROJECT	EL 41/83 LAKE LEA
DESIGNED BY	M.J. Fleming
LOGGED BY	M.J. Fleming
COMMENCED	20th July 1988
COMPLETED	22nd July 1988

PURPOSE

To test the gold bearing potential and extent of the skarn rocks occurring in the Lea River Valley opposite Fletcher's Adit.

LOG SUMMARY / GENERAL COMMENTS

The hole is drilled into garent-actinolite-diopside-epidote-magnetite-calcite skarn & intersects a 1 metre transition zone before passing into 3 metres of very broken quartzite. Following is a zone of shale and quartzite which is chaotic looking and at times appears to represent a healed broken zone (fault?) Then occurs a variably siliceous sandstone.

ASSAY SUMMARY

INTERVAL From	INTERVAL To	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W			COMMENTS
9.0	11.0	0.007	5	30	125	<0.5	<10	25	11	2225	55			All assays in ppm.
12.0	13.0	0.182	150	35	290	<0.5	450	10	12	320	160			

LOCATION

NORTHING	
EASTING	
R.L.	
GRID	1005S/2730W
LENGTH	56.3m

HOLE CONDITION

SIZE Hole Size	SIZE Depth
HQ	9.0m
NQ	56.3m

SIGNIFICANT CORE LOSS INTERVALS From	To	% Lost
0m	9.0m	No core
14.8m	16.2m	29
22.3m	25.0m	63
30.3m	31.8m	40
33.7m	38.0m	44
42.6m	51.4m	48

POOR GROUND CONDITION ZONES From	To	Condition
30.0m	49.4m	Jointed, broken.

HOLE CONDITIONS AFTER COMPLETION

Casing pulled and poly pipe placed in hole. Collapsed at collar.

SURVEY DATA (Note: Bearing type must be same as Project Grid Type)

SURVEY Depth	SURVEY Bearing	SURVEY Dip	INTERVAL From	INTERVAL To	INTERVAL Distance	VERTICAL D.Sin.Dip	VERTICAL R.L.	HORIZONTAL D.Cos.Dip	HORIZONTAL Prog.Total
0m	020°	-40.0°	0	7.5	7.5				
15m	020°	-40.0°	7.5	35.5	28.0				
56m	020°	-40.5°	35.5	56.3	20.8				
56.3m			=EOH						
	(magnetic)								

SURVEY Depth	SURVEY Bearing	SURVEY Dip	INTERVAL From	INTERVAL To	INTERVAL Distance	VERTICAL D.Sin.Dip	VERTICAL R.L.	HORIZONTAL D.Cos.Dip	HORIZONTAL Prog.Total

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GOLD FIELDS EXPLORATION PTY. LIMITED

PROJECT: EL 41/83 LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD9 Page:

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION
				SUMMARY LOG
0	9.0			No core
9.0	30.0			SKARN A massive but chaotic looking rock with varying combinations and amounts of garnet, diopside, actinolite, magnetite, epidote and calcite. A 2 metre zone of massive magnetite occurs.
30.0	31.0			SKARN-QUARTZITE TRANSITION Intermixed calc-silicate minerals and intensely silicified sandstone. Magnetite is disseminated throughout.
31.0	34.3			QUARTZITE Strongly silicified sandstone which is well broken & has minor thin vuggy greisen veins.
34.3	45.8			CHAOTIC SHALE AND QUARTZITE A chaotically mixed zone of shale and silicified sandstone. Large white quartz zones exist that are vuggy & appear to contain rotated fragments? of shale and sandstone with diffuse boundaries - healed fault zone? Broken due to jointing & minor thin greisen veins.
45.8	56.3			SANDSTONE Variably silicified sandstone with minor interbedding and intermixing of shale. Thick (<100mm) white quartz zones have interfingering and diffuse contacts, veins? Broken due to jointing to 49.4m & minor greisen veining.

ASSAY DATA Sample No.	From	To	Rec. %

GOLD FIELDS EXPLORATION PTY. LIMITED

8.8.88 PROJECT: LAKE LEA EL41/83

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD9 Page: 1 of 4

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	Sample No.	From	To	Rec. %	ASSAY DATA Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
				0.0m to 9.0m HQ triconed - HQWL casing														
				9.0m to 56.3m NQWL core to end of hole														
0.0	9.0			Triconed - no core recovered.														
9.0	30.0	17.6	84	SKARN														
				A brown & green garnet-actinolite ± diopside (?) skarn chaotic to massive in appearance. A zone from 12.5m to 14.5m of massive magnetite with minor actinolite? gangue occurs. Some epidote may be present as well as a minor peppering of irregular carbonate clumps (1mm to 10mm) in places.	T12392	9.0	10.0	88	0.010	5	30	105	X	X	25	15	2700	75
					93	10.0	11.0	96	X	5	30	140	X	X	25	7	1750	35
					94	11.0	12.0	97	X	X	25	175	X	X	25	2	970	X
					95	12.0	13.0	95	0.182	150	35	290	X	450	10	12	320	160
					96	13.0	14.0	99	0.017	25	40	265	X	610	X	6	310	140
				Alterations: Some minor leaching in places may have resulted in	97	14.0	15.0	94	0.019	5	45	200	X	100	10	13	510	35
				some of the diopside or actinolite altering to sericite?	98	15.0	16.0	71	0.009	X	30	170	X	X	20	10	460	120
				Is the actinolite an alteration mineral of diopside?	T12399	16.0	17.0	79	X	5	35	130	X	X	15	10	460	25
				"Porous" abund. actinolite occurs from 11.8m to 12.4m.	T12401	17.0	18.0	81	0.090	X	30	140	X	X	15	8	450	X
				Veining: Thin carbonate veining is common, calcite. Minor thin	02	18.0	19.0	83	X	5	35	115	X	X	20	11	570	50
				chlorite? ± quartz ± pyrite veins also occur.	03	19.0	20.0	92	X	5	30	135	X	X	20	5	430	30
				Structure: The unit is generally massive. Minor shearing seems	04	20.0	21.0	100	X	X	35	135	X	X	20	X	310	X
				relative common with most planes coated with carbonate	05	21.0	22.0	100	X	10	30	135	X	X	25	2	240	20
				and slickensided. Faulting occurs @ 16.0m (broken with	06	22.0	23.0	59	X	5	20	115	X	20	20	1	310	X
				core loss), @ 17.4m (broken, leached and core loss),	07	23.0	24.0	41	X	X	20	95	X	X	20	3	470	X
				between 22.8m to 23.9m (broken, leached and abund.	08	24.0	25.0	30	X	5	20	115	X	X	25	2	440	X
				core loss), between 24.3m to 25.1m (broken, leached and	09	25.0	26.0	82	X	X	20	115	X	X	20	4	480	X
				abund. core loss) and @ 29.5m (1cm of pug gouge @ 75°	10	26.0	27.0	82	0.017	5	50	140	X	100	25	X	270	X
				to CA).	11	27.0	28.0	94	0.068	655	70	185	0.5	180	20	14	340	50
				Mineralisation: Magnetite occurs in a massive 2 metre zone from	12	28.0	29.0	97	0.027	20	45	195	X	70	15	8	370	X
				12.5m where it av. 65%. In the remainder it only occurs	T12413	29.0	30.0	97	X	55	30	175	X	30	15	10	320	130
				in minor irregular aggregates as @ 27.5m. Pyrite occurs														
				variably throughout finely disseminated or in aggregate														
				pods, often associated with magnetite and veining.														
				Overall pyrite is 1-2%.														
30.0	31.0	0.7	70	SKARN-QUARTZITE TRANSITION														
				Gradational contact over a couple of cm.														
				Basically intermixed calc-silicate minerals, green & brown														

GOLD FIELDS EXPLORATION PTY. LIMITED

8.8.88 PROJECT: LAKE LEA EL 41/83

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD 9 Page: 2 of 4

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	ASSAY DATA Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
				and a light grey sandstone that has been intensely silicified. Some														
				of the calc-silicates may be altered to clayey minerals. Magnetite is	T12414	30.0	31.0	78	x	40	20	135	x	30	40	5	140	110
				abundantly disseminated throughout & appears more obvious in the														
				quartzite. The unit is jointed & has abundant very thin chlorite?														
				veins, chaotic, & some quartz-pyrite-actinolite? (chlorite?) veins.														
				Pyrite is also finely disseminated, overall 1-2%.														
31.0	34.3	2.5	77	QUARTZITE														
				A gradual contact over 30cm.														
				A strongly silicified light grey sandstone with minor	T12415	31.0	33.0	70	x	15	25	70	x	x	60	3	40	x
				thin bands of light buff and purple shale @ angles of 30° to CA	T12416	33.0	35.2	73	x	20	25	70	x	x	70	4	25	x
				(bedding?). The up-hole contacts with the shale are generally														
				diffuse & uneven whereas the down-hole contacts are sharp but														
				interfingering. Some spotty green patches indicates finely intercollated														
				calc-silicate minerals.														
				Alteration: The sandstone is strongly silicified.														
				Veining: Only minor thin vuggy quartz greisen veins.														
				Structure: Very broken from 31.0m to 31.8m with core loss - possible														
				fault. The remainder jointed.														
				Mineralisation: Trace pyrite as fine disseminations & some grains														
				occur on joint surfaces.														
34.3	45.8	7.1	62	CHAOTIC SHALE & QUARTZITE														
				A broken contact, possibly gradational over a metre.														
				A chaotic intermixed zone of light buff shale with	T12417	35.2	37.0	50	x	25	30	70	x	60	60	4	40	x
				dark grey & light grey quartzite with abundant white quartz which is	18	37.0	39.0	74	x	15	20	75	x	x	45	5	45	30
				often vuggy & can contain coarse magnetite, some pyrite & a	19	39.0	40.4	89	x	45	20	75	x	x	50	5	40	65
				fibrous light green "clayey?" looking mineral - a chlorite? These	21	40.4	42.6	82	x	45	35	125	x	20	25	4	120	45
				white quartz zones (some up to 0.5m) often seem to contain	22	42.6	44.3	41	x	20	15	215	x	x	25	4	120	170
				intermixed shale & quartzite fragments! - Possibly a healed fault	T12423	44.3	46.0	35	x	45	5	135	x	x	40	6	60	x
				zone. Some minor green calc-silicate rich patches also occur.														
				Alteration: The sandstone is often moderately to strongly silicified.														
				The green mineral in the white quartz zones have														
				been altered, in varying degrees, to clay.														
				Veining: Thin quartz-muscovite ± pyrite greisen veins occur throughout.														
				The white quartz may represent quartz veining.														

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GOLD FIELDS EXPLORATION PTY. LIMITED

8.8.88 PROJECT: LAKE LEA EL 41/83

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD 9 Page: 3 of 4

INTERVAL		RECOVERY		DESCRIPTION	ASSAY DATA													
From	To	m	%		Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
				Structure: The core is broken throughout, extremely broken after														
				42.6m. Most breaks related to jointing, with the joints														
				often coated thinly by siderite? & at times, between														
				36.5m & 40.0m, a pink mineral. Core loss occurs														
				throughout with faults occurring @ 36.3m (broken with														
				minor pug), @ 42.0m (broken with puggy gouge & core														
				loss @ 20° to CA) & between 42.6m to 45.9m (very														
				broken with abundant core loss).														
				Mineralisation: Magnetite & pyrite occur in veins (if the white quartz														
				are veins), irregularly finely disseminated and in														
				association with the calc-silicate rich zones. Both														
				average 1-2%.														
45.8	56.3	8.0	76	SANDSTONE														
				Contact appears gradational; broken.														
				A light grey silicified sandstone, with a weak wrinkled	T12424	46.0	47.9	63	x	40	10	65	x	x	60	11	40	x
				texture possible related to the silicification, passes into weakly	25	47.9	49.5	63	x	95	x	40	x	x	70	23	45	x
				silicified grey & pale yellow (altered shale) sandstone @ 49.4m. The	26	49.5	50.8	69	x	55	10	35	x	x	60	2	25	x
				contact is marked by a +10cm white quartz vein. Minor shaley	27	50.8	52.0	65	x	65	30	40	x	x	70	6	40	x
				patches occur throughout to 54.5m. At 54.5m the hole passes into	28	52.0	54.0	97	x	40	20	40	x	x	65	2	30	x
				a silicified purple & light buff shale unit that has obvious green patches	T12429	54.0	56.3	91	x	25	20	70	x	x	60	2	40	x
				of calc-silicates. The wrinkle texture is quite strong in patches.														
				Alteration: The unit is variably silicified. Initially it is strongly														
				altered to 49.4m. After 54.5m the more shaley unit														
				seems to be weakly to moderately silicified. Alteration														
				of a minor shale fraction in the sandstone to clayey														
				minerals may result in the pale yellow tinge. Some														
				siderite is developed with clayey minerals @ 46.2m.														
				Veining: Thick (>100mm) white quartz veins occur to 53.4m.														
				They often have interfingering contacts with the country														
				rock & contain pyrites with minor magnetite, pyrrhotite?														
				& a green mineral (clay?, sericite?, chlorite?). To														
				49.5m this white quartz vein could resemble zones of														
				just very intense silicification which could explain its														
				diffuse boundaries. Vuggy thin quartz-muscovite														
				±chlorite? ±pyrite greisen veins occur throughout. Some														

GOLD FIELDS EXPLORATION PTY. LIMITED

8.8.88 PROJECT: LAKE LEA EL 41/83

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: FD 9 Page: 4 of 4

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION
				greisen veins seem to cut the white quartz veins (eg. @ 52.8m).
				Structure: The core is broken to 49.4m with minor core loss. Could be related to the well jointed character of this siliceous unit. The remainder is only weakly jointed. Core loss, minor pug & the very broken nature of the core between 50.8m to 51.4m probably indicates a fault.
				Mineralisation: Pyrite occurs variably disseminated throughout in the sandstone, it occurs in veins, on some joint surfaces & associated with the calc-silicate rich zones. Overall pyrite is 1-2%. Trace magnetite, & possibly some pyrrhotite, is a minor associate of some veins.
				END OF HOLE

ASSAY DATA Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
ASSAY DETECTION (ppm)				0.008	5	5	5	0.5	10	5	1	3	20
ANALABS METHOD				309	103	103	103	103	103	103	114	401	401
						X = BELOW DETECTION							

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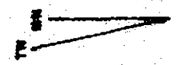
PROJECT: LAKE LEA HOLE No. FD9

RGC EXPLORATION PTY. LIMITED

DRILL HOLE PLOT

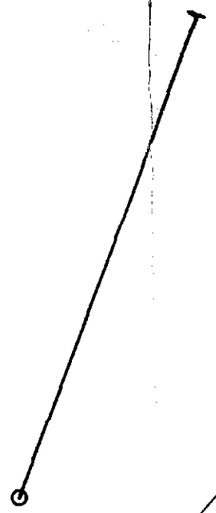
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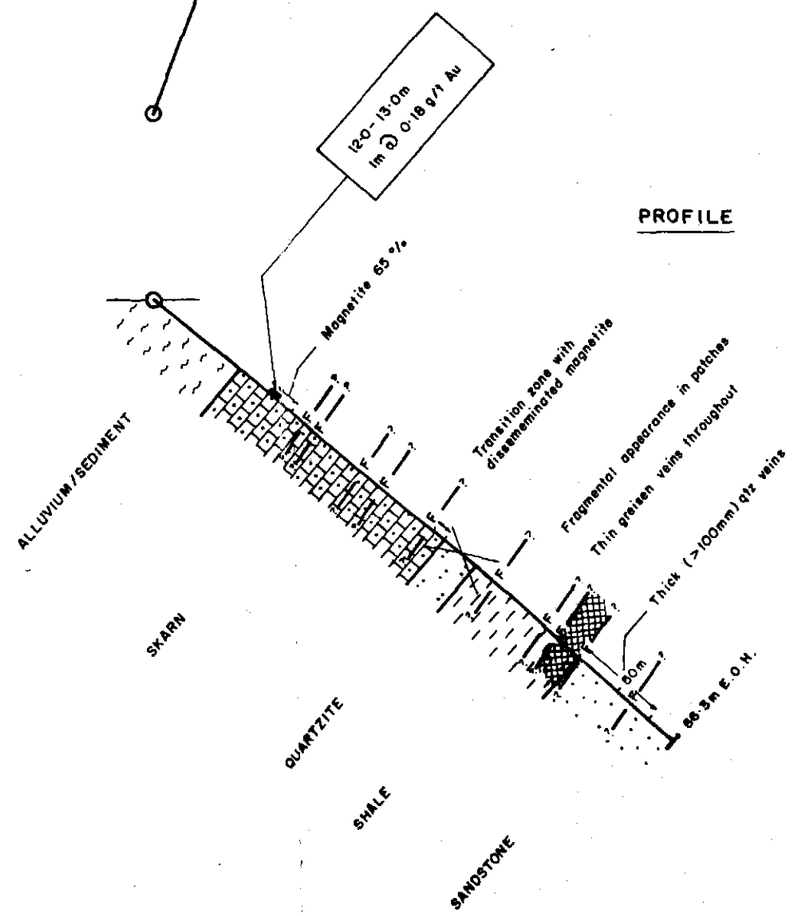


5 cm

PLAN



PROFILE



LEGEND

- ALLUVIUM/SEDIMENT
- BASALT
- TERTIARY SEDIMENT
- LIMESTONE
- SKARN
- QUARTZITE
- SHALE
- SANDSTONE
- CONGLOMERATE
- BEDDING
- —F— FAULT

88-2888

FIG. 54

STATE: Tas.

HOLE No. FD9

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HOLE NO. : SD1
STATE : TASMANIA

GOLD FIELDS EXPLORATION PTY. LIMITED

DRILL CORE RECORD

PROJECT	EL41/83 LAKE LEA
DESIGNED BY	R.H. Roberts
LOGGED BY	M.J. Fleming
COMMENCED	2nd August 1988
COMPLETED	12th August 1988

PURPOSE

To test the extent and gold bearing potential of the skarn rocks occurring along strike to the south of the Stormont Bismuth Mine.

LOG SUMMARY / GENERAL COMMENTS

The hole starts in skarn and passes into a normal footwall sequence, ending in a pebbly sandstone (Roland Conglomerate). The skarn is mineralised in gold from the collar to 17.5m. The mineralisation appears related to a leached fault zone. Only a very thin quartzite band is intersected at the base of the skarn.

ASSAY SUMMARY

INTERVAL From	INTERVAL To	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W			COMMENTS
4.5	17.5	4.121	30	609	310	0.7	4597	<10	3	43	13			All assays in ppm.
22.5	23.5	0.110	5	100	305	<0.5	320	<10	5	146	14			
25.5	29.4	0.246	11	32	260	<0.5	272	<10	4	287	14			

LOCATION

NORTHING	5405930.4
EASTING	418888.2
R.L.	628.7
GRID	15525/3135 W
LENGTH	145.0m

HOLE CONDITION

SIZE Hole Size	SIZE Depth
HQ	4.5
NQ	145.0

SIGNIFICANT CORE LOSS INTERVALS From	To	% Lost
0	4.5m	No core
13.5m	16.5m	49
38.0m	42.8m	41
50.0m	53.7m	43
90.2m	98.7m	37
112.5m	115.3m	39

POOR GROUND CONDITION ZONES From	To	Condition
12.6m	19.5m	Fault zone, leached & broken.
91.1m	100.6m	Abundant joint, vein & bedding
		partings.
112.0m	114.6m	Fault.

HOLE CONDITIONS AFTER COMPLETION

Casing removed and poly pipe inserted when rig moved off.

SURVEY DATA (Note: Bearing type must be same as Project Grid Type)

SURVEY Depth	Bearing	Dip	INTERVAL From	To	Distance	VERTICAL D.Sin.Dip	R.L.	HORIZONTAL D.Cos.Dip	Prog.Total
0m	279°	-90.0°	0	15.0	15.0				
30m	279°	-89.4°	15.0	45.0	30.0				
60m	315°	-89.6°	45.0	75.0	30.0				
90m	347°	-89.0°	75.0	105.0	30.0				
120m	357°	-89.0°	105.0	132.5	27.5				
145m	018°	-89.3°	132.5	145.0	12.5				
145.0m			=EOH						
	(magnetic)								

SURVEY Depth	Bearing	Dip	INTERVAL From	To	Distance	VERTICAL D.Sin.Dip	R.L.	HORIZONTAL D.Cos.Dip	Prog.Total

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GOLD FIELDS EXPLORATION PTY. LIMITED

DEV. PRESS

PROJECT: EL 41/83 LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: SD1

Page:

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION
				SUMMARY LOG
0	4.5			No core.
4.5	29.4			SKARN A green, brown & black garnet-diopside ± actinolite + epidote skarn, compositionally variable throughout. Minor calcite. Variably leached & decomposed associated with a fault zone between 12.6m & 19.5m. Bismuthinite occurs between 12.0m & 17.1m. After 19.5m fine grained magnetite is common with disseminated pyrite and chalcopyrite.
29.4	55.1			SHALE Quartzite with intermixed calc-silicates to 30.1m. Then interbedded buff-purple shale and grey quartzite to 55.1m. Calc-silicate patches common throughout. Variable silicification, especially of sandstone to quartzite. Only minor thin veining. Moderately to well broken. A puggy fault occurs between 47.7m & 47.9m. Trace disseminated pyrite.
55.1	136.7			SANDSTONE Grey sandstone, variably siliceous, with shale bands up to several metres thick. Shale also occurs intermixed and altered to a pale yellow colour. Tubicolar zones are common. Only minor thin greisen veins occur, with minor thick quartz veins, up to 0.5m, after 110m. Disseminated and nodules of pyrite occurs throughout to 1%. Moderately broken with minor shears & faults. A sandstone gravel occurs from 117.6m.
136.7	145.0			PEBBLY SANDSTONE A pink (hematitic) & grey sandstone with occasional rounded pebbles. Weak to moderately silicified. 1.2% pyrite occurs disseminated.

ASSAY DATA Sample No.	From	To	Rec. %

GOLD FIELDS EXPLORATION PTY. LIMITED

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22.8.88 PROJECT: LAKE LEA EL 41/83

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: SD 1 Page: 1 of 5

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
									ASSAY DATA									
				0 - 4.5m HQ triconed														
				4.5m - 145.0m NQWL core														
0	4.5	0		Triconed - no core recovered														
4.5	29.4	21.9	88	SKARN														
				Green, brown & black garnet-diopside ±actinolite ±epidote	T12431	4.5	5.5	93	2.440	10	80	445	X	440	X	3	39	13
				±calcite skarn. Compositionally the skarn is highly variable throughout.	32	5.5	6.5	93	1.300	5	75	295	X	490	X	2	82	X
				Starts out as diopside(?)-garnet ±calcite ±actinolite to around 12.6m,	33	6.5	7.5	95	0.130	5	30	275	X	130	X	3	35	X
				after which it becomes variably leached & decomposed. From 19.5m,	34	7.5	8.5	98	0.270	10	105	250	4.0	9200	X	3	79	23
				the garnet-actinolite-diopside(?) ±calcite ±epidote has a variable	35	8.5	9.5	98	2.470	15	100	240	0.5	3100	X	2	27	X
				magnetite content. Some minor patches of shaley sediment may	36	9.5	10.5	94	1.670	25	100	180	X	3500	X	X	4	20
				occur after 27.0m. Textures are chaotic, with almost a banded	37	10.5	11.5	78	3.390	25	340	215	X	4800	X	X	X	X
				character between 24.0m & 26.0m, 80° to CA, which may reflect possible	38	11.5	12.6	78	7.070	15	1750	255	X	4200	X	1	18	X
				epidote rich veining. Strongly corroded @ 23.6m.	39	12.6	13.5	78	11.400	80	1250	490	X	8200	X	4	54	18
				Alteration: Moderate to intense leaching occurs between 12.6m &	41	13.5	14.5	20	6.750	35	700	330	X	2700	X	7	40	26
				19.5m, with abundant clays & limonite occurring in places.	42	14.5	15.5	67	6.800	70	2200	340	1.5	11500	X	1	34	16
				Some patchy actinolite & epidote seems to occur, especially	43	15.5	16.5	67	4.990	70	825	435	X	8300	X	2	84	20
				after 19.5m, may be structure related.	44	16.5	17.5	83	5.330	25	315	300	X	3600	X	4	59	X
				Veining: Thin calcite veins are common, often @ 40° to CA &	45	17.5	18.5	83	0.040	10	35	270	0.5	60	X	3	71	21
				associated with chlorite(?). Vuggy, thin quartz ±epidote	46	18.5	19.5	83	0.050	5	25	475	X	80	X	43	80	18
				±chlorite(?) ±albite(?) veins are also common after 19.5m.	47	19.5	20.5	100	0.060	5	65	385	X	100	X	13	191	17
				Epidote-actinolite-quartz veins(?) or bands occur @ 25.5m.	48	20.5	21.5	100	X	5	35	335	X	20	X	33	292	13
				Structure: Overall only weakly jointed. Minor low angle shears occur	49	21.5	22.5	100	0.030	5	25	285	X	30	X	5	331	X
				between 6.0m & 9.0m. Major fault zone with copious leaching	50	22.5	23.5	94	0.110	5	100	305	X	320	X	5	146	14
				occurs between 12.6m & 19.5m. Core loss occurs between	51	23.5	24.5	96	0.040	5	30	360	X	40	X	3	132	18
				12.6m & 16.1m, @ 17.6m & @ 19.4m.	52	24.5	25.5	100	X	5	20	340	X	X	X	2	111	X
				Mineralisation: An abundant grey-silvery metallic mineral occurs	53	25.5	26.5	100	0.280	10	40	290	X	480	X	4	204	30
				from 12.0m to 17.1m. In the leached area it resembles	54	26.5	27.5	100	0.090	5	40	235	X	100	X	6	354	17
				hematite in fine grained aggregates, but could be bismuthinite	55	27.5	28.5	100	0.330	10	25	265	X	120	X	4	326	X
				In this interval 3-5%. After 19.5m fine grained magnetite occurs	T12456	28.5	29.4	97	0.290	20	20	250	X	400	X	2	261	X
				in variable concentrations, overall 5%. Also, after 19.5m is														
				minor disseminated pyrite, tr-1% & trace chalcopyrite.														
29.4	37.3	6.9	87	INTERBEDDED SHALE & QUARTZITE														
				Contact is gradual over 10cm.														

GOLD FIELDS EXPLORATION PTY. LIMITED

22.8.88 PROJECT: LAKE LEA EL 41/83

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: SD 1 Page: 2 of 5

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION
				A light buff to light to purple banded shale (bedding 70° to CA)
				interbedded & intermixed with light grey to light green quartzite.
				Thicknesses of beds are highly variable & throughout is smattered
				patches, of varying size, that are rich in calc-silicates. From 29.4m
				to 30.1m is quartzite with copious thin bands & patches of
				calc-silicates. After this is a zone of dominantly shale which is
				broken up by quartzite bands, up to 0.5m thick.
				Alteration: The quartzite is moderately silicified sandstone.
				Some of the shale is also weakly silicified. Limonite occurs
				on nearly all joint surfaces & stains the calc-silicate rich
				patches & some veins. Calc-silicate rich areas often appear
				leached.
				Veining: Veining is weakly developed. Often very thin & limonised.
				Minerals present are quartz, calcite(?), siderite(?), albite(?) &
				chlorite(?).
				Structure: Moderately to well broken throughout. No major core loss
				is apparent. Jointing appears to be the dominant reason for
				the broken nature.
				Mineralisation: The quartzite interval 29.4m to 30.1m has trace
				disseminated magnetite (or pyrrhotite) & trace disseminated
				pyrite. Only trace disseminated pyrite occurs throughout.
37.3	55.1	12.6	71	SHALE
				Gradational contact over 2 metres.
				Dark purple & buff-pink shale with minor interbanded &
				nodules of light grey quartzite. Calc-silicate patches common.
				Alteration: The quartzite is moderately silicified sandstone. The
				calc-silicates often appear altered being weakly limonised
				& having what seems to be an alteration rim, variably weakly
				siliceous.
				Veining: Weak in intensity & very thin. Often siderite(?) &/or clay.
				Clay & albite(?) @ 42.1m.
				Structure: Well broken throughout with core loss. Puggy & broken
				fault zone with core loss from 47.7m to 47.9m.
				Mineralisation: Trace to 1% pyrite occurs mainly on joint surfaces
				& finely disseminated in the calc-silicate rich patches.

ASSAY DATA

Sample No	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
T12457	29.4	30.1	97	X	10	25	205	X	130	20	5	94	X
58	30.1	32.0	93	X	80	45	145	X	30	X	9	16	X
59	32.0	34.0	87	X	25	25	115	X	X	X	17	X	X
T12461	34.0	36.0	70	X	15	35	110	X	X	X	25	X	X

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GOLD FIELDS EXPLORATION PTY. LIMITED

22.8.88 PROJECT: LAKE LEA EL 41/83

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: SD 1 Page: 3 of 5

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
									ASSAY DATA									
55.1	91.1	34.9	97	SANDSTONE														
				Gradual contact over 10cm.														
				Dark grey to a mixture of light brown, yellow, green & grey.	T12462	55.0	57.0	95	X	15	X	65	X	X	X	13	X	X
				Tubicles occur throughout. Minor patches of shale & calc-silicates.	63	57.0	59.0	99	X	35	10	80	X	X	20	8	X	12
				Alteration: The sandstone is variably silicified, generally weak to														
				moderate in a couple of zones. Weakly limonised in patches,	T12464	63.2	65.0	100	X	20	5	115	X	X	X	13	3	10
				especially related to the shale or calc-silicates. The light	65	65.0	67.2	73	X	25	30	165	X	X	80	13	X	11
				yellow patchy sandstone may represent a low shale content of	66	67.2	69.0	93	X	50	65	100	X	X	20	18	6	X
				the sandstone - more of a greywacke.	67	69.0	71.0	97	X	55	35	135	X	X	40	23	6	26
				Veining: Few, thin siderite(?) veins occur throughout. A 140mm	68	71.0	73.0	93	X	20	X	80	X	X	60	14	9	16
				vuggy quartz-pyrite-chlorite(?) vein occurs @ 79.4m, 60° to	T12469	73.0	74.0	92	X	20	15	135	X	X	X	27	6	14
				CA. Some thin veins of the same type also occur.														
				Structure: Moderatly broken throughout, related to jointing. Minor	T12470	76.0	78.0	95	X	15	15	55	X	X	40	15	X	23
				faulting occurs @ 75.5m (broken & leached) & @ 79.6m	71	78.0	80.0	100	X	15	X	60	X	X	60	16	4	17
				(puggy, 60° to CA). Sheared @ 86.5m.	72	80.0	82.0	99	X	15	X	60	X	X	60	21	X	X
				Mineralisation: Pyrite occurs on joint planes, disseminated in the	73	82.0	84.0	95	X	15	X	50	X	X	80	24	X	X
				calc-silicate patches, in some veins & in disseminated aggregates	74	84.0	86.0	100	X	20	35	60	X	X	80	32	X	X
				associated with the light yellow zones in the sandstone. Overall	75	86.0	88.0	100	X	25	10	65	6.5	X	80	26	3	10
				1-2%.	T12476	88.0	90.0	100	X	25	5	80	6.5	X	60	26	4	X
91.1	100.6	6.7	71	SHALE														
				Gradual contact over 1m.														
				Light grey & purple layered shale with minor sandstone nodules	T12477	99.8	101.0	94	X	25	X	85	6.0	X	60	18	4	X
				& calc-silicate patches. Bedding @ 70° to CA.														
				Alteration: Weak silicification of the sandstone, & often the calc-														
				silicates are leached (corroded). Joint planes are often														
				limonised (siderite?).														
				Veining: Only very thin siderite? & chlorite(?)-pyrite veins														
				Structure: Very broken throughout, related to jointing. No obvious														
				faulting.														
				Mineralisation: Trace to 1% pyrite occurs as patchy coating on joint														
				planes, as disseminated grains with calc-silicate minerals,														
				& in veins.														
100.6	114.6	12.4	88	SANDSTONE														
				Gradual contact over 2m.														

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GOLD FIELDS EXPLORATION PTY. LIMITED

22.8.88 PROJECT: LAKE LEA EL 41/83

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: SD 1 Page: 4 of 5

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
				Light grey sandstone & quartzite with minor pale yellow shale														
				intermixed in zones throughout. Very minor pepperring of calc-silicate	T12478	101.0	102.0	94	X	130	35	265	1.5	X	40	90	8	X
				minerals occur in places. Tubicles are common.	79	102.0	102.9	94	X	50	10	85	X	X	40	7	X	X
				Alteration: Silicification is variable throughout, ranging from weak to	81	102.9	104.0	91	X	40	25	120	X	X	60	11	5	X
				moderate. Calc-silicate zones are generally weakly limonised	82	104.0	105.0	70	X	70	45	110	X	X	60	24	3	11
				& leached.	83	105.0	106.0	97	X	155	10	70	1.0	10	60	22	9	13
				Veining: Some minor quartz veins occur. One is 550mm thick @ 112.5m	84	106.0	107.0	97	X	115	X	85	X	X	60	25	5	15
				& is weakly vuggy & contains clay. These seem to be related to	T12485	107.0	108.0	97	X	190	X	80	X	X	60	30	5	X
				healed shear zones.														
				Structure: Weakly to moderately broken, related to jointing. Shearing	T12486	111.0	112.0	100	X	65	X	165	X	X	60	25	3	X
				& faulting (broken puggy) occurs between 112.0m & 114.6m.	87	112.0	113.7	65	X	30	10	150	X	X	80	16	7	X
				Mineralisation: Trace to 1% pyrite occurs as fine disseminations, as	T12488	113.7	114.6	78	X	90	60	125	X	X	60	11	4	23
				fine grained aggregates or nodules, & as patchy coatings on														
				some joint surfaces.														
114.6	117.6	2.4	80	SHALE														
				Contact is broken but appears sharp.														
				Light grey shale, weakly layered grades into a light buff														
				coloured shale @ 116.8m. Moderately broken with light grey quartzite														
				bands & nodules in places. Some joint surfaces are coated in white														
				clay (veins?).														
117.6	136.7	17.9	94	SANDSTONE/GRAVEL														
				Contact gradational over 1m.														
				A light grey rock made up from a mixture of sand & white	T12489	135.0	136.7	100	0.070	370	10	155	X	X	40	18	X	15
				quartzose gravel fragments, often rounded & spherical. Variably interbedded														
				& intermixed with the sand/gravel is a pale buff/yellow coloured shale.														
				Bedding angles range from 40°-60° to CA.														
				Alteration: Silicification of the sand/gravel is variable & ranges from														
				weak to intense. It is so intense @ 126.6m that it resembles														
				quartz veining.														
				Veining: Only very minor quartz veining. A 60mm quartz vein occurs @														
				126.8m which has thick, diffuse, siliceous boundaries.														
				Structure: Moderately broken to 126.8m, related to jointing. Hole														
				started making water @ 126.8m. Sheared & faulted														
				135.7m to 136.1m.														

708147

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GOLD FIELDS EXPLORATION PTY. LIMITED

22.8.88 PROJECT: LAKE LEA EL 41/83

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: SD 1 Page: 5 of 5

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION
				Mineralisation: Pyrite is 1-2% overall & occurs as fine grained aggregated "clasts"(?) (eg. 132.0m), as finely disseminated grains sparsely distributed throughout & as fine dustings on joint planes.
136.7	145.0	7.6	92	PEBBLY SANDSTONE
				Contact is sharp, but puggy & clayey over 10cm-unconformity?
				A pink grey sandstone with occasional white, pink red or grey
				rounded & spherical pebbles. Generally massive in appearance.
				Alterations: Variably siliceous, weak to moderate. Variably
				hematised, strongest (redder) near the contact.
				Veining: Minor very thin vuggy quartz-muscovite-pyrite & pyrite
				veins. Pyrite veins @ 20°- 30° to CA.
				Structure: Moderately to well broken related to jointing. Joints coated
				with pyrite & a pale green clayey mineral.
				Mineralisation: 1-2% pyrite occurs as coatings on joints, as veins &
				as very fine dissemjnations variably scattered throughout.
				END OF HOLE

ASSAY DATA Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
T12490	136.7	137.9	83	X	10	X	50	X	X	80	10	5	12
91	137.9	139.0	70	X	10	X	45	X	X	60	6	4	10
T12492	139.0	141.0	84	X	10	X	50	X	X	100	10	5	13
ASSAY DETECTION (ppm)				0.008	5	5	5	0.5	10	20	1	3	10
ANALABS METHOD.				309	103	103	103	103	103	103	114	401	401
							X = BELOW DETECTION.						

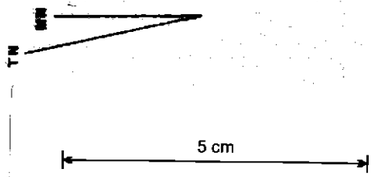
PROJECT: LAKE LEA HOLE No. SD1

RGC EXPLORATION PTY. LIMITED

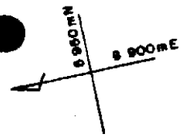
DRILL HOLE PLOT

SCALE 1:500





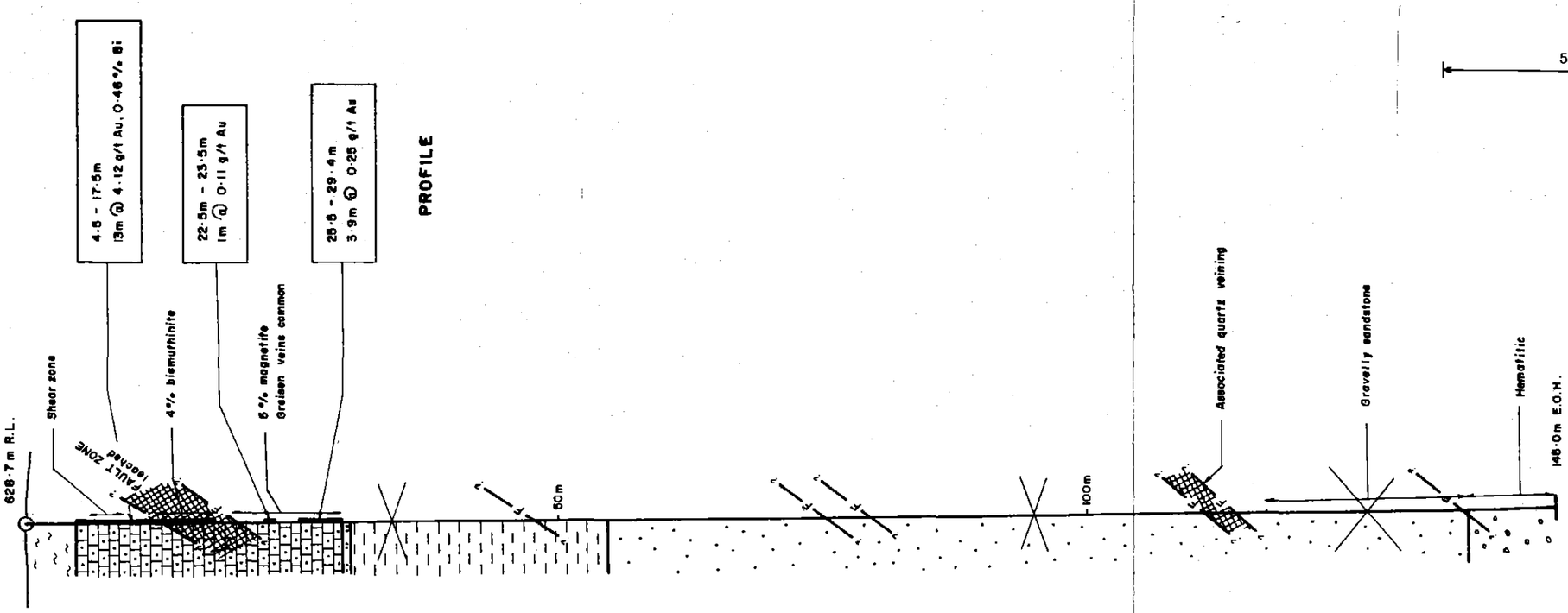
PLAN



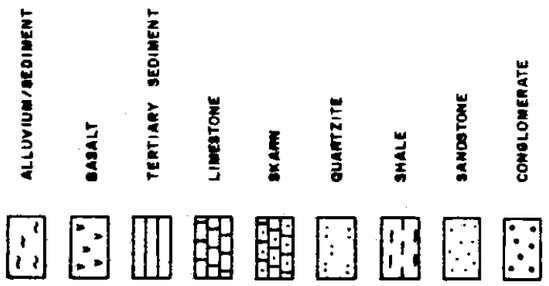
5 405 930·4mE
418 888·2mE

628·7 m R.L.

PROFILE



LEGEND



88-2888

FIG. 85

STATE: Tas.

HOLE No. SD1

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708149

HOLE NO. : SD2
STATE : TASMANIA

GOLD FIELDS EXPLORATION PTY. LIMITED

DRILL CORE RECORD

PROJECT	EL 41/83 LAKE LEA
DESIGNED BY	R.H. Roberts
LOGGED BY	M.J. Fleming
COMMENCED	13th August 1988
COMPLETED	18th August 1988

PURPOSE

To test a magnetic anomaly which may represent a folded repetition of the same type of skarn rocks that occur at the Stormont Bismuth Mine.

LOG SUMMARY / GENERAL COMMENTS

The hole was drilled into typical footwall rocks. The presence of quartzite indicates a very close proximity to skarn. A shaft located nearby has skarn rocks on its dump.

SSAY SUMMARY

INTERVAL From	INTERVAL To	COMMENTS
		No samples for assaying were taken.

CATION

NORTHING	5405950.5
EASTING	419077.5
R.L.	621.1
GRID	1500S/2950W
LENGTH	61.8m

HOLE CONDITION

SIZE	
Hole Size	Depth
HQ	11.0m
NQ	61.8m

SIGNIFICANT CORE LOSS INTERVALS		
From	To	% Lost
0	11.0m	No core
11.0m	20.3m	30
27.6m	27.9m	83

POOR GROUND CONDITION ZONES		
From	To	Condition
11.0	21.2	Intensley broken-related to jointing.

HOLE CONDITIONS AFTER COMPLETION

Casing removed & poly pipe inserted when drill rig moved off.

RVEY DATA (Note Bearing type must be same as Project Grid Type)

SURVEY			INTERVAL			VERTICAL		HORIZONTAL		SURVEY			INTERVAL			VERTICAL		HORIZONTAL	
epth	Bearing	Dip	From	To	Distance	D.Sin.Dip	R.L.	D.Cos.Dip	Prog.Total	Depth	Bearing	Dip	From	To	Distance	D.Sin.Dip	R.L.	D.Cos.Dip	Prog.Total
0	105°	-90.0°	0	15.0	15.0														
30m	105°	-89.2°	15.0	45.0	30.0														
60m	099°	-89.0°	45.0	61.8	16.8														
.8m			=EOH																
	(magnetic)																		

708150

GOLD FIELDS EXPLORATION PTY. LIMITED

PROJECT: EL 41/83 LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: SD2

Page: 149

INTERVAL		RECOVERY		DESCRIPTION	ASSAY DATA			
om	To	m	%		Sample No.	From	To	Rec. %
				SUMMARY LOG				
0	11.0			No core.				
1.0	15.7			QUARTZITE Light grey/brown strongly silicified sandstone. Minor shale bands and calc-silicate patches. Vuggy greisen veins common. Intensely broken with trace vein and disseminated pyrite.				
5.7	26.9			SHALE Banded shale with minor bands and pods of quartzite. Irregular calc-silicate rich patches occur. Bedding @ 80° to C.A. Broken to 21.2m with only minor shearing obvious. Trace vein and disseminated pyrite.				
6.9	61.8			SANDSTONE Variably silicified sandstone with minor shale occurring as bands or being intermixed. Rich calc-silicate zones occur. Often tubicolar. Pyrite occurs weakly disseminated and as minor small pods. Some poddy sphalerite may also occur.				

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GOLD FIELDS EXPLORATION PTY. LIMITED

3.9.88 PROJECT: EL 41/83 LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: SD2 Page 1 of 2

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION
				0m - 11.0m Triconed HQWL casing.
				11.0 -61.8m NQWL core.
0	11.0			Triconed - no core recovered
1.0	15.7	3.2	69	QUARTZITE
				Light grey and light brown quartzite with minor light shaley patches and variably disseminated green calc-silicate minerals, up to~20% in places. Generally massive in appearance.
				Alteration: Strongly silicified sandstone with variable bleaching & contamination by some veining material. Strongly limonised on joint surfaces.
				Veining: Some vuggy quartz-skarn? (actinolite?) -muscovite -pyrite veins common 2-10mm thick & @ 10-20° to CA. Often limonised.
				Structure: Intensely broken throughout - related to jointing.
				Mineralisation: Trace pyrite occurs in veins and variably disseminated.
5.7	26.9	9.0	80	SHALE
				Contact sharp.
				Grey, purple or light pink/buff shale, often banded, with minor bands and poddy lenses of light grey quartzite common to 21.2m, after which irregular green calc-silicate rich patches, up to 30cm, become obvious in a more massive looking shale. Bedding @ 80° to CA.
				Alteration: The sandstone in moderately to strongly silicified to quartzite. The shale is weakly altered in places approaching hornfels, especially in contact with the calc-silicate rich patches which are variably limonised brown (or altered to pale brown clayey minerals).
				Veining: Only minor thin chlorite? -pyrite veins & few very thin quartz-pyrite.
				Structure: Broken throughout, only weakly after 21.2m. Some minor shearing & some puggy leaching but no evidence of major faulting.
				Mineralisation: Trace -1% pyrite occurs on some joint surfaces, in some veins & as scattered fine grained aggregates.

ASSAY DATA Sample No.	From	To	Rec. %

708152

GOLD FIELDS EXPLORATION PTY. LIMITED

PROJECT: EL 41/83 LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: SD2

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION
6.9	61.8	33.8	97	SANDSTONE Sharp contact. A light grey to light green quartzite with abundant intermixed green & yellow-brown limonised calc-silicates & only very thin minor dark grey shale bands passes into, @ 29.8m, a grey-brown sandstone with variably intermixed & interbedded shale. This unit is variably silicified and often contains tubicles. Minor calc-silicates are poddy & smattered throughout. Alteration of some of the shale to clayey minerals gives the sandstone a pale-yellow appearance, often highlighting the contained worm casts and sulphides. A relatively calc-silicate rich zone occurs between 42.0m to 49.0m with a patch from 47.7m to 50.5m looking hornfelsic. Alteration: Silicification of the sandstone is variable, becoming quite intense @ 27.0m to 28.0m & 40.7m to 42.1m. Some of the intermixed shale could be altered to clayey minerals, giving the light yellow colouration that occurs frequently & resembles bleaching. The calc-silicate minerals are variably altered to clay, corroded & limonised. Veining: Only very thin & minor quartz-chlorite? veining (Minor thin quartz-pyrite after 55.0m). Structure: Broken to 27.9m & then fairly competant with the occasional broken patch due to jointing. No faulting obvious. Mineralisation: Pyrite occurs variably throughout from finely disseminated in trace amounts to irregular shaped aggregates of fine grains in patches up to 5-10% often related to the pale yellow colouration. Here it is commonly related to a dark metallic looking mineral, sphalerite?, which is also poddy. END OF HOLE.

ASSAY DATA Sample No.	From	To	Rec. %

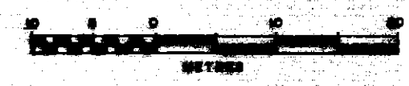
708153

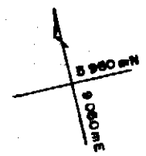
PROJECT : LAKE LEA HOLE No. SD2

RGC EXPLORATION PTY. LIMITED

DRILL HOLE PLOT

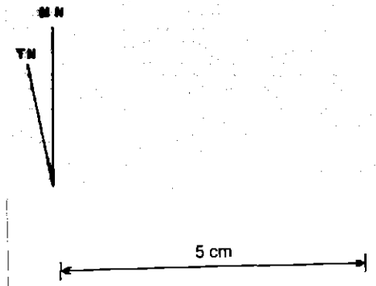
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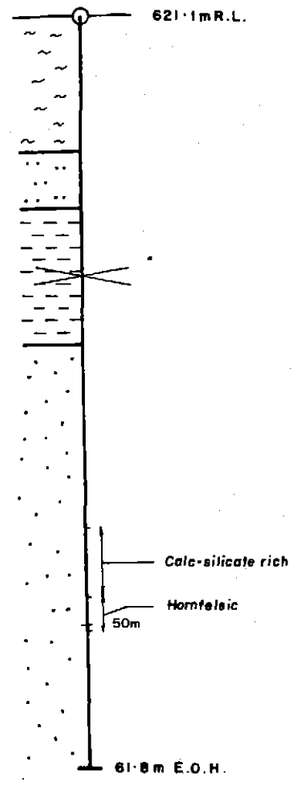




5 405 950·3mN
419 077·3mE

PLAN





PROFILE

LEGEND

600m R.L.

ALLUVIUM/SEDIMENT

BASALT

TERTIARY SEDIMENT

LIMESTONE

SKARN

QUARTZITE

SHALE

SANDSTONE

550m R.L.

CONGLOMERATE

BEDDING

—F— FAULT

88 - 2888

FIG. 86

STATE: Tas.

HOLE No. SD2

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HOLE NO.: SD3
STATE : TASMANIA

GOLD FIELDS EXPLORATION PTY. LIMITED
DRILL CORE RECORD

PROJECT	EL 41/83 LAKE LEA
DESIGNED BY	R.H. Roberts
LOGGED BY	M.J. Fleming
COMMENCED	19th August 1988
COMPLETED	23rd August 1988

PURPOSE

To test the extent and gold bearing potential of the skarn rocks occurring along strike to the south of the Stormont Bismuth Mine.

LOG SUMMARY / GENERAL COMMENTS

The hole starts in a puggy, extremely leached skarn? rock which is fault contacted to a 20 metre intersection of fresh skarn which has only trace disseminated magnetite associated. A downhole interval of 2.1 metres at 12.77 g/t Au straddles the fault. A normal footwall sequence is encountered below the skarn of quartzite, shale and then sandstone.

ASSAY SUMMARY

INTERVAL From	INTERVAL To	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W			COMMENTS
13.9	16.9	0.010	30	175	1250	3.5	10	<10	87	10	41			All assays in ppm.
16.9	19.0	12.767	18	62	355	4.3	3548	<10	145	44	<10			
21.0	22.0	0.250	15	<5	335	<0.5	80	<10	2	89	<10			

LOCATION

NORTHING	5405 864.8
EASTING	418 929.3
R.L.	638.7
GRID	1595S/3080W
LENGTH	75.1m

HOLE CONDITION

SIZE Hole Size	SIZE Depth
HQ	17.0m
NQ	75.1m

SIGNIFICANT CORE LOSS INTERVALS From	To	% Lost
0	11.0	No core
11.0	13.9	90

POOR GROUND CONDITION ZONES From	To	Condition
17.4	18.0	Fault, puggy and broken.

HOLE CONDITIONS AFTER COMPLETION

Casing removed & poly pipe inserted when drill rig moved off.

SURVEY DATA (Note: Bearing type must be same as Project Grid Type)

SURVEY Depth	SURVEY Bearing	SURVEY Dip	INTERVAL From	INTERVAL To	INTERVAL Distance	VERTICAL D.Sin.Dip	VERTICAL R.L.	HORIZONTAL D.Cos.Dip	HORIZONTAL Prog.Total
0	253°	-90.0°	0	17.5	17.5				
35m	253°	-89.5°	17.5	54.5	37.0				
74m	229°	-89.7°	54.5	75.1	20.6				
75.1m			=EOH						
	(magnetic)								

SURVEY Depth	SURVEY Bearing	SURVEY Dip	INTERVAL From	INTERVAL To	INTERVAL Distance	VERTICAL D.Sin.Dip	VERTICAL R.L.	HORIZONTAL D.Cos.Dip	HORIZONTAL Prog.Total

708155

GOLD FIELDS EXPLORATION PTY. LIMITED

DRILL CORE LOG AND ASSAY DATA

PROJECT: EL 41/83 LAKE LEA

HOLE NUMBER: SD3

Page:

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION
				SUMMARY LOG
0	11.0			No core.
11.0	18.0			LEACHED & WEATHERED SKARN A dark pug grades into an intensely leached skarn rock. Disseminated pyrite is conspicuous. 15-20% magnetite occurs between 16.7m to 17.4m.
18.0	38.6			SKARN A faulted contact passes into a garnet-diopside-epidote-actinolite skarn. Disseminated magnetite occurs after 27.0m. Thin greisen veins are common between 35.2m & 38.6m. A fault zone occurs between 34.0m & 35.2m. A transition zone is intersected at the base of the unit after 35.2m.
38.6	42.2			QUARTZITE A light to dark grey quartzite with intermixed and interbedded calc-silicates. Disseminated magnetite is common throughout (3-5%). Thin greisen veins are common.
42.2	63.9			SHALE An interbedded and intermixed shale and siliceous sandstone unit passes into a broadly banded shale unit at 49.4m. Calc-silicate patches are common. Bedding is at 70° to CA. Thin greisen veins are common to 49.4m. Minor disseminated magnetite and pyrite.
63.9	75.1			SANDSTONE Variably silicified sandstone with occasional intermixing of calc-silicates or shale often tubicolar. 1-2% pyrite and trace disseminated magnetite.

ASSAY DATA Sample No.	From	To	Rec. %

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GOLD FIELDS EXPLORATION PTY. LIMITED

5.9.88 PROJECT: EL 41/83 LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: SD3

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	ASSAY DATA Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
				0-11m Triconed HQWL														
				11.0m - 17.0m NQWL core, hole reamed out to HQWL.														
				17.0m - 75.1m NQWL core														
0	11.0			Triconed - no core recovered.														
11.0	18.0	3.7	53	LEACHED & WEATHERED SKARN														
				A dark green-grey to black pug with minor light grey "bleached"	T12493	11.0	13.9	10	0.010	40	90	980	X	X	X	88	5	21
				skarn patches (garnet rich) grades into a weathered black-green & brown	94	13.9	16.9	80	0.010	30	175	1250	3.5	10	X	87	10	41
				magnetite rich skarn @ 16.7m.	T12495	16.9	18.0	94	21.200	20	100	410	8.0	6400	X	266	42	X
				Alteration: Intense clay formation to 16.7m. Strongly limonised in the														
				calc-silicate? rich zones from 16.7m to 18.0m.														
				Veining: Minor thin white veins (clay?) in the puggy zone. The veins are														
				often discontinous or highly contorted.														
				Structure: Abundant core loss occurs through the puggy zone. A major														
				fault occurs from 17.4m to 18.0m, marked by core loss, sheared														
				pug & well broken nature.														
				Mineralisation: 1-2% Disseminated pyrite occurs throughout the pug														
				zone. 15-20% magnetite occurs between 16.7m to 17.4m. Trace														
				magnetite & pyrite may occur from 17.4m to 18.0m.														
18.0	38.6	19.9	97	SKARN														
				Contact faulted.														
				A variety of greens, pink & light brown skarn rock with highly	T12496	18.0	19.0	83	3.490	15	20	295	X	410	X	12	46	X
				variable mineral composition & associations throughout. A diopside-	97	19.0	20.0	85	0.030	15	X	205	X	X	X	X	99	X
				garnet-epidote-actinolite rock passes into garnet-diopside-epidote-	98	20.0	21.0	100	0.030	10	X	325	X	X	X	X	69	X
				actinolite at 21.2m. From 23.3m, a metre of diopside rich skarn occurs,	T12499	21.0	22.0	100	0.250	15	X	335	X	80	X	2	89	X
				after which garnet skarn dominates to 34.9m. Minor magnetite occurs	T12501	22.0	23.0	100	0.010	10	10	210	X	X	X	5	135	X
				from 27.0m, generally finely disseminated, & minor calcite occurs	02	23.0	24.0	98	X	10	X	290	2.5	X	X	6	112	X
				within some of the epidote-rich patches. After the faulted contact, a	03	24.0	25.0	98	0.010	15	105	325	X	X	X	10	84	X
				transition zone occurs to 38.6m. The transition zone is an intermixing of	04	25.0	26.0	96	X	15	X	215	X	X	X	7	100	X
				garnet-actinolite-magnetite-diopside with quartzite.	05	26.0	27.0	91	0.010	10	15	240	7.0	X	X	X	114	13
				Alteration: Some very minor limonite alteration occurs for a few cm	06	27.0	28.0	100	X	10	10	190	X	X	X	X	115	25
				past the contact. Also limonised around the fault zone @ 34.9m	07	28.0	29.0	100	X	10	15	180	2.5	X	X	X	65	X
				to 35.2m The clastic component of the transition zone is strongly	08	29.0	30.0	100	X	10	10	185	X	X	X	X	67	X
				silicified.	09	30.0	31.0	100	X	10	20	220	X	X	X	10	156	11

GOLD FIELDS EXPLORATION PTY. LIMITED

DRILL CORE LOG AND ASSAY DATA

PROJECT: EL 41/83 LAKE LEA

HOLE NUMBER: SD3

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
				Veining: Minor thin calcite and actinolite ± epidote veins occur to														
				35.2m. Thin greisen veins are then common to 38.6m.	T12510	31.0	32.0	100	X	25	10	270	X	X	X	6	149	16
				Structure: A major fault occurs 34.9m to 35.2m being very broken &	11	32.0	33.0	97	0.020	10	X	350	X	X	X	X	63	15
				puggy. Return was lost @ 34.0m. The rest of the core is only	12	33.0	34.0	97	0.050	15	25	240	3.5	140	X	6	261	X
				weakly broken, with the majority of breaks relating to veins.	13	34.0	35.2	96	0.020	30	5	230	2.0	250	X	10	284	X
				Mineralisation: Trace disseminated magnetite occurs from 27.0m. It	14	35.2	36.0	93	0.040	25	X	220	X	130	X	4	209	X
				increases to 1-2% after 32.6m. Trace pyrite occurs after 35.2 m,	15	36.0	37.0	93	0.050	15	X	200	5.5	350	X	12	199	16
				mainly associated with veins.	16	37.0	38.0	100	0.030	25	X	190	X	150	X	8	166	30
					T12517	38.0	38.6	96	0.020	50	X	200	X	330	X	18	120	43
38.6	42.2	3.4	94	QUARTZITE														
				Gradational contact over 40cm.														
				Light grey to dark grey quartzite with variable intermixing (dark grey)	T12518	38.6	40.0	96	0.010	60	X	90	X	100	20	4	48	17
				& interbedded calc-silicates. Generally massive, but banded in appearance	19	40.0	42.0	94	0.010	20	X	60	X	100	40	2	87	57
				(bedding) where minor pale yellow shale bands occur. Bedding @														
				60° to CA.														
				Alteration: Strong silicification of what was originally a sand rich unit.														
				Veining: Thin greisen veins are common, often @ 60° to CA.														
				Structure: Moderately broken, strong in patches. Most breaks parallel														
				bedding.														
				Mineralisation: 3-5% disseminated magnetite (dark/grey areas) common														
				throughout. Trace -1% pyrite occurs in veins & is finely disseminated.														
42.2	49.4	6.7	93	INTERBEDDED SHALE & SANDSTONE														
				Gradational contact over 3-4 metres.														
				Interbedded & intermixed light grey, light buff & purple shale	T12521	42.0	44.0	75	0.020	15	X	85	X	190	20	7	92	54
				with light grey to dark grey siliceous sandstone. Intermixed green	22	44.0	46.0	90	0.010	30	X	135	X	230	20	5	80	60
				calc-silicates & magnetite (dark grey quartzite) are common throughout.	T12523	46.0	48.0	100	0.120	25	X	120	X	50	20	8	33	X
				Bedding is at 70° to CA. Bed contacts are often distinct but highly														
				irregular, only broadly layered.														
				Alteration: The sandstone is moderately to strongly silicified to														
				quartzite. Some of the shale is also weakly silicified.														
				Veining: Thin greisen veins are common throughout.														
				Structure: Broken to 43.7m & @ 49.4m.														
				Mineralisation: 2-3% disseminated magnetite occurs to 47.1m,														
				associated with the siliceous sandstone (dark grey areas) or														
				the calc-silicate rich patches. Trace -1% pyrite occurs throughout														

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GOLD FIELDS EXPLORATION PTY. LIMITED

5.9.88 PROJECT: EL 41/83 LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: SD3 Page: 3 of 4

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	ASSAY DATA Sample No.	From	To	Rec. %
				on joint surfaces, in veins & disseminated in the siliceous sandstone & calc-silicate rich patches.				
49.4	63.9	13.8	95	SHALE Gradational contact over 1 metre. Light & dark grey, purple, pink & buff coloured shale with minor light grey siliceous sandstone bands & pods & common green calc-silicate rich patches. Generally massive in appearance, with bedding in the odd layered bands @ 70° to CA. A light grey quartzite zone with intermixed green calc-silicates occurs from 59.8m to 61.9m. Alteration: The sandstone is moderately silicified. The quartzite band is moderate to strongly altered sandstone. Some parts of the calc-silicate rich zones appear bleached with weak limonite alteration. Veining: Some thin calcite & siderite veins occur. Only few thin greisen veins occur. Coarse euhedral pyrite occurs in one thin vein @ 58.8m. Structure: Weakly broken with minor moderately broken patches, especially the quartzite band. Breaks related to jointing. Mineralisation: Trace -1% pyrite occurs in veins, on joint surfaces & disseminated in the siliceous sandstone & calc-silicate rich patches. Trace disseminated magnetite is related to some calc-silicate rich patches.				
63.9	75.1	10.4	92	SANDSTONE Contact broken. A grey sandstone with green and pale yellow discolourations due to calc-silicates and intermixed shale respectively. The sandstone is often tubicolar. Alteration: The sandstone is variably weakly silicified. The pale yellow colour of the shale rich intermixing may be the result of their alteration to clayey minerals. Minor clayey minerals associated with the calc-silicate rich patches. Veining: Minor thin greisen veins & some minor vuggy pyrite veins. One, @ 68.3m, has large, 1cm, euhedral crystals of pyrite. Structure: Weakly to moderately broken throughout. Well broken after 73.2m. Most breaks related to jointing.				

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GOLD FIELDS EXPLORATION PTY. LIMITED

15.9.88 PROJECT: EL 41/83 LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: SD3 Page: 4 of 4

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION
				Mineralisation: 1-2% pyrite occurring in veins & finely disseminated throughout. Some dark nodules @ 66.0m may be fine granular aggregates of sphalerite. Trace disseminated magnetite occurs to 71.5m.
				END OF HOLE.

Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
ASSAY DETECTION (ppm)				0.008	5	5	5	0.5	10	10	2	3	10
ANALABS METHOD				309	103	103	103	103	103	103	401	401	401
						X = BELOW DETECTION							

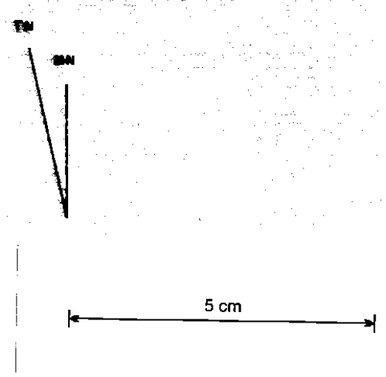
PROJECT: LAKE LEA HOLE No. SD3

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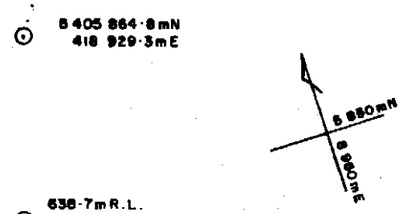
RGC EXPLORATION PTY. LIMITED
DRILL HOLE PLOT

SCALE 1:500

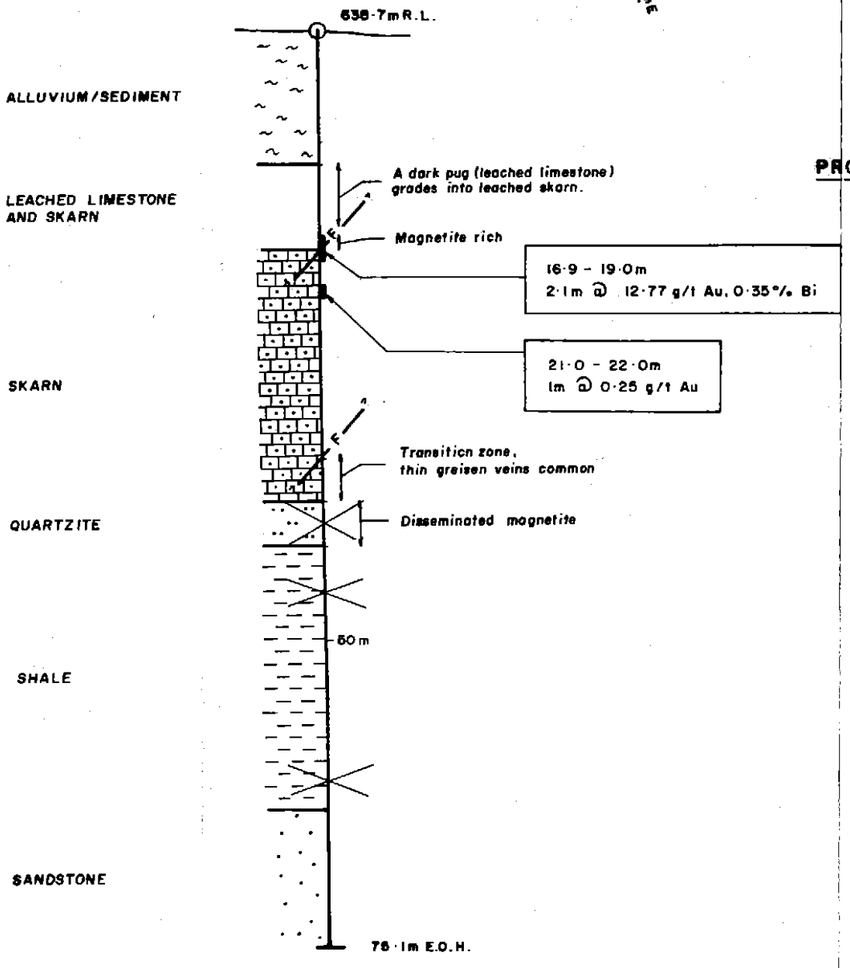




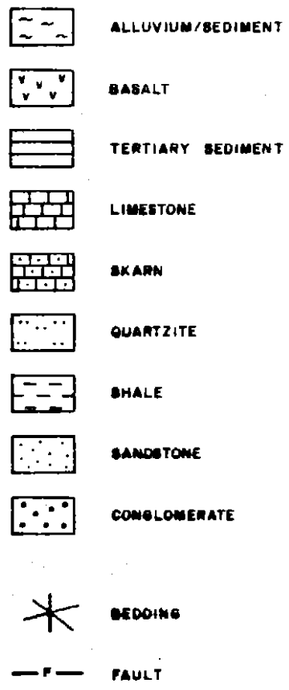
PLAN



PROFILE



LEGEND



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FIG. 57

STATE: Tas.

HOLE No. SD3

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GOLD FIELDS EXPLORATION PTY. LIMITED

DRILL CORE RECORD

HOLE NO. : SD4

STATE : TASMANIA

ULV. PRESS

PROJECT	EL41/83 LAKE LEA
DESIGNED BY	R.H. Roberts
LOGGED BY	M.J. Fleming
COMMENCED	27th August 1988
COMPLETED	30th August 1988

PURPOSE

To test a magnetic anomaly which may represent a folded repetition of the skarn rocks that occur in the Stormont Bismuth Mine.

LOG SUMMARY / GENERAL COMMENTS

The hole starts in shale and then passes into sandstone at 9.5 metres. The lithologies in this hole are similar to those encountered well into the footwall sequence, at the base of the skarn, in other holes (e.g. SD3).

ASSAY SUMMARY

INTERVAL From	INTERVAL To	COMMENTS
		No significant assay results.

LOCATION

NORTHING	5405709.8
EASTING	418736.8
R.L.	659.2
GRID	17505/3200N
LENGTH	52.6m

HOLE CONDITION

SIZE Hole Size	SIZE Depth
HQ	3.4m
NQ	52.6m

SIGNIFICANT CORE LOSS INTERVALS From	To	% Lost
0	3.4m	No core
3.4m	14.8m	52
19.0m	31.0m	30

POOR GROUND CONDITION ZONES From	To	Condition
3.4	38.4	Intensely broken - appears related to jointing.
51.0	52.6	Broken due to jointing and vein partings.

HOLE CONDITIONS AFTER COMPLETION

Casing removed & poly pipe inserted when the drill rig moved off.

SURVEY DATA (Note: Bearing type must be same as Project Grid Type)

SURVEY Depth	SURVEY Bearing	SURVEY Dip	INTERVAL From	INTERVAL To	INTERVAL Distance	VERTICAL D.Sin.Dip	VERTICAL R.L.	HORIZONTAL D.Cos.Dip	HORIZONTAL Prog.Total
0	325°	-90.0°	0	10.0	10.0				
20m	325°	-89.0°	10.0	36.0	26.0				
52m	315°	-89.6°	36.0	52.6	16.6				
52.6m			=EOH						
	(magnetic)								

SURVEY Depth	SURVEY Bearing	SURVEY Dip	INTERVAL From	INTERVAL To	INTERVAL Distance	VERTICAL D.Sin.Dip	VERTICAL R.L.	HORIZONTAL D.Cos.Dip	HORIZONTAL Prog.Total

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GOLD FIELDS EXPLORATION PTY. LIMITED

DEV. PRESS

PROJECT: EL 41/83 LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: SD4

Page:

INTERVAL		RECOVERY		DESCRIPTION	ASSAY DATA			
From	To	m	%		Sample No	From	To	Rec. %
0	3.4			SUMMARY LOG No core				
3.4	9.5			SHALE Grey, buff and purple shale with minor poddy light grey quartzite. Intensely broken throughout with abundant core loss. Hole made water at 7.0m.				
9.5	52.6			SANDSTONE Generally grey sandstone with variable silicification. Minor shale is interbedded and intermixed. Calc-silicates occur as interstitial patches of varying concentration; >50% from 21.0m to 25.0m. Often tubicolar. 1-2% pyrite occurs throughout. Magnetite occurs associated with the calc-silicate patches.				

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GOLD FIELDS EXPLORATION PTY. LIMITED

23.9.88 PROJECT: EL 41/83 LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: SD 4 Page: 1 of 2

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	ASSAY DATA Sample No.	From	To	Rec. %										
				0 - 3.4m Triconed, HQWL														
				3.4m - 52.6m NQWL core														
0	3.4			Triconed - no core recovered														
3.4	9.5	2.2	36	SHALE														
				Grey, light buff & purple shale with minor pods & "eyes" of quartzite. Generally massive in appearance with no obvious layering.														
				Alteration: Quartzite moderately silicified sandstone. Limonite occurs on many joint surfaces.														
				Veining: Possibly some minor thin greisen veins. Vein quartz appears to be associated with the position in the hole that was making water @ 7.0m.														
				Structure: Intensely broken throughout with abundant core loss. Difficult to locate any faulting. Most breaks appear related to jointing. The shale often appears corroded (leached?).														
				Mineralisation: Trace pyrite occurs on some joint surfaces.														
9.5	52.6	36.4	84	SANDSTONE														
				Contact gradational over 0.5 metres, very broken.														
				A dark & light grey, pale yellow, pale green & brown sandstone, variably silicified. Minor shale occurs in purple and buff zones of interbedded units or intermixing. The pale yellow sandstone seems to be pale yellow shale intermixed with the sandstone. Calc-silicate minerals occur as interstitial patches within the sandstone, highly variable in concentration & occurance. However, a distinct unit from 21.0m to 25.0m occurs which, even though it is interstitial to the sandstone, has a >50% constituent of calc-silicate minerals including magnetite. The contacts on this unit are gradational. Also the presence of calc-silicate patches in the sandstone appears more common after this unit. Tubicles are common throughout.	T12524	20.0	21.0	46	0.010	85	135	465	0.6	X	40	18	13	14
					25	21.0	22.5	47	0.110	170	75	275	X	30	20	10	41	25
					26	22.5	24.4	63	0.050	80	115	290	X	90	20	3	40	25
					27	24.4	25.1	50	0.020	110	135	230	X	X	40	12	17	23
					28	25.1	26.0	75	0.010	75	10	100	X	X	60	62	6	X
				Alteration: Silicification is highly variable throughout. Generally non-existant to weak, intense in only one or two thin zones. Limonite on joint surfaces persists to 14.0m. The pale yellow colouration may be due to bleaching of the shale that is intermixed with the sandstone in these units. The calc-silicate	T12529	26.0	27.0	85	0.110	90	15	130	X	X	60	26	9	12

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GOLD FIELDS EXPLORATION PTY. LIMITED

23.9.88 PROJECT: EL 41/83 LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: SD4 Page: 2 of 2

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION
				rich unit from 21.0m to 25.0m is in places highly corroded with minor limonite formation indicating weak to moderate leaching has occurred.
				Veining: Only minor thin vuggy greisen veins occur throughout. They often contain pyrite & are leached & parted. A vuggy thin quartz-pyrite-sphalerite-galena vein occurs @ 32.3m & @ 20° to CA.
				Structure: Well broken to 38.4m with core loss to 14.8m, 20.0m to 25.1m & 28.4m to 32.5m. Again well broken after 51.0m. The broken ground appears to be related to jointing & thin altered greisen vien parting. Possible major faulting difficult to identify.
				Mineralisation: 1-2% pyrite occurs throughout in viens on some joint surfaces finely disseminated (often related to calc-silicates) & as fine grained aggregates, the latter especially in the pale yellow units. Magnetite is present up to 2-3% in the calc-silicate rich unit & sphalerite & galena are present in the vein @ 32.3m.
				END OF HOLE

ASSAY DATA

Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
T12530	49.0	50.0	100	0.010	80	10	160	X	X	60	24	13	45
31	50.0	51.0	100	X	100	15	240	0.5	X	40	8	15	15
32	51.0	52.0	93	0.010	40	90	240	X	X	40	6	17	X
T12533	52.0	52.6	88	0.010	30	10	115	X	X	40	8	6	X
ASSAY DETECTION (ppm)				0.008	5	5	5	0.5	10	10	2	3	10
ANALABS METHOD				309	103	103	103	103	103	103	401	401	401

X = BELOW DETECTION

7081165

PROJECT: LAKE LEA HOLE No. SD4

RGC EXPLORATION PTY. LIMITED

DRILL HOLE PLOT

SCALE 1:500 METRES

5 cm

PLAN

5 406 709·8mN
418 736·8mE

6 700mN
6 790mE

PROFILE

659·2mR.L.

ALLUVIUM/SEDIMENT

SHALE

Intensely broken

21·0 – 22·5m
1·5m @ 0·11 g/t Au

Abundant interstitial calc-silicates

26·0 – 27·0m
1m @ 0·11 g/t Au

A thin greisen vein with sphalerite and galena

SANDSTONE

50m

82·6m E.O.H.

650m R.L.

600m R.L.

LEGEND

- ALLUVIUM/SEDIMENT
- BASALT
- TERTIARY SEDIMENT
- LIMESTONE
- SKARN
- QUARTZITE
- SHALE
- SANDSTONE
- CONGLOMERATE
- BEDDING
- —F— FAULT

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FIG. 58

STATE: Tas.

HOLE No. SD4

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GOLD FIELDS EXPLORATION PTY. LIMITED

DRILL CORE RECORD

HOLE NO. :	SD5
STATE :	TASMANIA

DEV. PRESS

PROJECT	EL41/83 LAKE LEA
DESIGNED BY	R.H. Roberts
LOGGED BY	M.J. Fleming
COMMENCED	31st August 1988
COMPLETED	5th September 1988

PURPOSE

To test the extent and gold bearing potential of the skarn rocks occurring along strike to the south of the Stormont Bismuth Mine.

LOG SUMMARY / GENERAL COMMENTS

The hole first intersects pug & leached skarn similar to that in SD3. Then through a sharp contact into fresh skarn for 15 metres. A normal footwall sequence of quartzite, shale and then sandstone completes the hole. Some rich magnetite patches occur within the skarn, but no leached fault with associated gold mineralisation is encountered.

ASSAY SUMMARY

INTERVAL From	INTERVAL To	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W			COMMENTS
35.0	36.0	0.240	10	<5	240	<0.5	<10	<10	11	48	<10			All assays in ppm.

LOCATION

NORTHING	5405797.7
EASTING	418987.6
R.L.	652.3
GRID	16205/3000W
LENGTH	70.3m

HOLE CONDITION

SIZE Hole Size	SIZE Depth
HQ	27.0m
NQ	70.3m

SIGNIFICANT CORE LOSS INTERVALS From	To	% Lost
0	12.0m	No core
12.0m	27.4m	95

POOR GROUND CONDITION ZONES From	To	Condition
12.0m	29.2m	Intensely leached rock with abundant pug.
55.8m	63.0m	Breaks related to jointing and vein parting. Minor shearing.

HOLE CONDITIONS AFTER COMPLETION

Casing removed when the drill rig was moved off. Poly pipe was placed in the hole at a later date.

SURVEY DATA (Note: Bearing type must be same as Project Grid Type)

SURVEY Depth	SURVEY Bearing	SURVEY Dip	INTERVAL From	INTERVAL To	INTERVAL Distance	VERTICAL D.Sin.Dip	VERTICAL R.L.	HORIZONTAL D.Cos.Dip	HORIZONTAL Prog.Total
0	025°	-90.0°	0	17.5	17.5				
35m	025°	-89.9°	17.5	52.5	35.0				
70m	056°	-89.2°	52.5	70.3	17.8				
70.3m			=EOH						

SURVEY Depth	SURVEY Bearing	SURVEY Dip	INTERVAL From	INTERVAL To	INTERVAL Distance	VERTICAL D.Sin.Dip	VERTICAL R.L.	HORIZONTAL D.Cos.Dip	HORIZONTAL Prog.Total

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GOLD FIELDS EXPLORATION PTY. LIMITED

DEV. PRESS

PROJECT: EL 41/83 LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: SD5

Page: 1 of 6

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION
				SUMMARY LOG
0	12.0			No core.
12.0	28.4			INTENSELY LEACHED ROCK Dark pug with obvious disseminated pyrite. Also a white bleached unit (skarn?) occurs.
28.4	45.4			SKARN Leached skarn, with a rich magnetite patch, passes sharply into fresh skarn at 29.2m. The skarn is garnet-diopside-epidote-actinolite in varying proportions with magnetite occurring as rich zones (to 12 mm) and rimming greisen veins. No obvious major faulting. The basal 0.6m is a transition zone.
45.4	46.3			QUARTZITE Light grey intensely silicified sandstone with minor interstitial calc-silicates and disseminated magnetite.
46.3	59.1			SHALE Banded shale with interbedded light grey quartzite to 50.9m. Bedding at 75° to 80° to CA. Minor irregular calc-silicate patches occur throughout. Possible fault at 50.9m to 52.0m. Very broken after 55.8m. Fine disseminated magnetite occurs associated with quartzite, calc-silicate patches and greisen veins.
59.1	70.3			SANDSTONE Variably siliceous sandstone with shale bands and intermixing. Patchy calc-silicates occur. Often tubicolar.

ASSAY DATA Sample No.	From	To	Rec. %

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GOLD FIELDS EXPLORATION PTY. LIMITED

26.9.88 PROJECT: EL 41/83 LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: SD5 Page: 1 of 4

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	ASSAY DATA Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
				0m - 12.0m Triconed HQWL														
				12.0m - 27.0m NQWL core, hole reamed out to HQWL														
				27.0m - 70.3m NQWL core														
0	12.0			Tricone - no core recovered.														
12.0	28.4	1.5	9	INTENSELY LEACHED ROCK														
				Grey and black pug with minor white bleached clayey rock? Possible	T12534	12.0	27.4	5	0.010	30	125	215	X	X	X	21	4	14
				intensely leached skarn. Abundant core loss between 12.0m & 27.4m.	35	27.4	28.8	79	0.010	30	110	715	X	X	X	51	29	16
				Finely disseminated pyrite present throughout to 1%, especially obvious														
				in the black pug. Evidence of thin veining in the white bleached														
				clayey zones.														
28.4	29.2	0.7	83	LEACHED SKARN														
				Contacted leached with core loss.														
				Brown & green garnet-actinolite? skarn. The actinolite? appears														
				to be the leached alteration of diopside. A magnetite rich skarn patch														
				occurs around 28.6m. The majority of the green minerals, diopside,														
				actinolite & epidote, appear to be leached away or altered to clay.														
				Alteration: Medium to strong leaching with associated bleaching of the														
				garnet rich zones. Some alteration of diopside? to actinolite?														
				Veining: Evidence of only very thin veining.														
				Structure: Broken with core loss. Puggy leached zone @ around 29.1m														
				may be a fault zone. Dark grey pug with abundant pyrite.														
				Mineralisation: A rich 5cm zone of disseminated magnetite occurs at														
				28.6m & also in a thin band close to the upper contact. Disseminated														
				pyrite occurs in the possible fault zone @ 29.1m.														
29.2	45.4	15.9	98	SKARN														
				A sharp irregular contact.														
				A green & brown diopside-garnet-epidote-actinolite skarn persists to														
				37.4m. The garnet is generally reddy brown, the actinolite occurs in														
				dark green patches or "tension" veins & the light green epidote occurs														
				as small, thin, highly irregular shoots, often in clusters. Some														
				magnetite-rich bands occur to 29.7m & then after only as few														
				disseminated grains, related to veining? To 40.1m is a brown-green														

GOLD FIELDS EXPLORATION PTY. LIMITED

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26.9.88 PROJECT: EL 41/83 LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: SD5

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INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	ASSAY DATA Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
				garnet rich skarn. To 44.8m is a garnet-diopside-actinolite-epidote skarn														
				with magnetite being associated with a dark rimming around greisen														
				veins. Composition & mineral associations are highly variable throughout	T12536	28.8	30.0	92	0.070	10	5	390	X	X	X	X	35	X
				this zone. The last 0.6m is a transition zone which has a siliceous	37	30.0	31.0	100	X	10	X	365	X	X	X	4	22	X
				component & magnetite disseminated throughout.	38	31.0	32.0	100	0.010	15	X	300	X	X	X	X	33	X
				Alteration: Alteration within the skarn is difficult to identify. In the	39	32.0	33.0	100	0.010	5	X	240	X	X	X	X	21	X
				transition zone, the siliceous component could be silicified clastic	T12541	33.0	34.0	100	X	15	X	250	X	X	X	X	60	X
				sediment.	42	34.0	35.0	100	0.010	10	X	235	1.0	10	X	6	46	X
				Veining: Some very thin epidote-actinolite veins and actinolite filled	43	35.0	36.0	100	0.240	10	X	240	X	X	X	11	48	X
				"tension" gaps occur to 40.1m. After 40.1m greisen veins up to	44	36.0	37.0	100	0.010	10	X	205	X	X	X	4	32	X
				10mm thick & generally @ 80° to CA are common. These veins	45	37.0	38.0	100	X	10	15	205	1.0	X	X	13	60	X
				are invariably ruined by disseminated magnetite.	46	38.0	39.0	100	X	10	20	170	X	10	X	X	47	10
				Structure: Competant throughout with only minor jointing. Most seem	47	39.0	40.0	100	0.020	10	15	180	X	X	X	5	67	X
				to be calcite coated.	48	40.0	41.0	93	0.010	20	15	295	X	170	X	X	67	X
				Mineralisation: Rich magnetite zones (12mm) occur to 29.7m. After	49	41.0	42.0	91	X	20	31	250	X	140	X	X	83	X
				this only sparse few grains occur to 40.1m, related to the veining?	50	42.0	43.0	91	X	15	20	205	X	50	X	2	169	12
				40.1m to 44.8m magnetite is associated with greisen veining occurring	51	43.0	44.0	92	X	40	25	250	X	80	X	11	202	48
				as a dark rimming zone 44.8m to 45.4 magnetite is finely	T12552	44.0	45.4	94	X	50	30	195	X	160	X	3	61	35
				disseminated throughout. Pyrite occurs in some greisen veins and as														
				fine grained pods @ 44.6m.														
45.4	46.3	0.7	82	QUARTZITE														
				Contact appears sharp, but is broken.														
				A light grey quartzite with disseminated dark patches and minor	T12553	45.4	46.3	82	X	30	X	95	X	X	20	5	29	18
				interstitial calc-silicate minerals.														
				Alteration: Strongly silicified sandstone. Corroded in places.														
				Veining: Some thin vuggy greisen &/or calc-silicate veins.														
				Structure: Well broken due to jointing. Joints often clay coated. Core														
				loss. No obvious faulting.														
				Mineralisation: Disseminated magnetite occurs throughout, 1-2%, in														
				dark grey patches. Some disseminated pyrite also present.														
46.3	50.9	4.2	91	INTERBEDDED SHALE AND QUARTZITE														
				Sharp contact.														
				Light grey and dark grey shale, occasionally pale yellow, interbedded														
				with light grey quartzite. Some brown and green calc-silicate rich														

GOLD FIELDS EXPLORATION PTY. LIMITED

26.9.88 PROJECT: EL 41/83 LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: SD 5 Page: 3 of 4

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION	ASSAY DATA Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
				zones are common. Shale is generally layered, bedding @ 80° to CA.														
				Alteration: The shale is weakly to moderately silicified. The	T12554	46.3	48.0	92	x	20	x	90	x	80	20	x	64	33
				quartzite is strongly silicified sandstone. The calc-silicate rich	55	48.0	50.0	97	x	15	45	275	x	70	20	4	74	15
				zones are strongly limonised, as are some calc-silicate rich veins.														
				Veining: Some low angle calc-silicate rich veins occur. Often where														
				they are cut by very thin greisen veins, magnetite occurs. Thin,														
				vuggy greisen veins are common, generally @ 80° to CA. Some														
				have a high pyrite content & minor sphalerite.														
				Structure: Generally broken, related to jointing & vein partings.														
				Mineralisation: Abundant disseminated magnetite associated with														
				the quartzite & rims some greisen veins that pass through the														
				calc-silicate rich zones. Pyrite occurs mainly in veins with only														
				very minor presence as fine disseminations.														
50.9	59.1	6.7	81	SHALE														
				Contact gradational over one metre.														
				Grey, purple, light buff shale, at times layered, with minor bands	T12556	50.0	52.0	62	X	25	45	135	x	90	x	3	62	36
				& pods of quartzite & minor patches that are rich in calc-silicate														
				minerals. Bedding is @ 75° to CA. The calc-silicate rich patches														
				are highly irregular in form & shape.														
				Alteration: The quartzite is strongly altered sandstone. The shale around														
				the calc-silicate rich patches is often weakly silicified & patches														
				of the calc-silicates are limonised.														
				Veining: Thin greisen veins occur throughout. Also, very thin clayey														
				veins are present, often at a lower angle than the greisen veins.														
				Structure: The core is broken to 52.0m. A fault possibly occurs														
				between 50.9m & 52.0m as there is substantial core loss. Very														
				broken after 55.8m with obvious shearing to 57.6m.														
				Mineralisation: Magnetite occurs related to the calc-silicate rich														
				patches. Pyrite occurs in veins and finely disseminated associated														
				with the quartzite & calc-silicate rich patches.														
59.1	70.3	10.3	92	SANDSTONE														
				Contact gradual over 0.5m.														
				Variably silicified light grey sandstone with light buff, light														
				yellow and purple shale bands and intermixing. Minor pods &														

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GOLD FIELDS EXPLORATION PTY. LIMITED

26.9.88 PROJECT: EL 41/83 LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: SD 5 Page: 4 of 4

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION
				disseminated calc-silicates occur. Often tubicolar.
				Alteration: Variably silicified throughout from strong to nil. Possible alteration of some shale to clayey minerals giving the pale yellow colouration. Some calc-silicates limonised.
				Veining: Minor thin greisen veins, some with very high pyrite contents. Some very thin chlorite? veins.
				Structure: Well broken to 63.0m, @ 64.1m & 68.9m to 69.1m. The latter due to minor shearing. Most breaks related to joints & vein partings.
				Mineralisation: Minor disseminated magnetite related to calc-silicates. Pyrite mainly occurs in veins & on joint surfaces, and is also finely disseminated throughout.
				END OF HOLE

Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W

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PROJECT: LAKE LEA HOLE No. SD5

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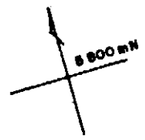
DRILL HOLE PLOT

SCALE 1:1000





5 cm



5 406 797·7 mN
418 967·6 mE

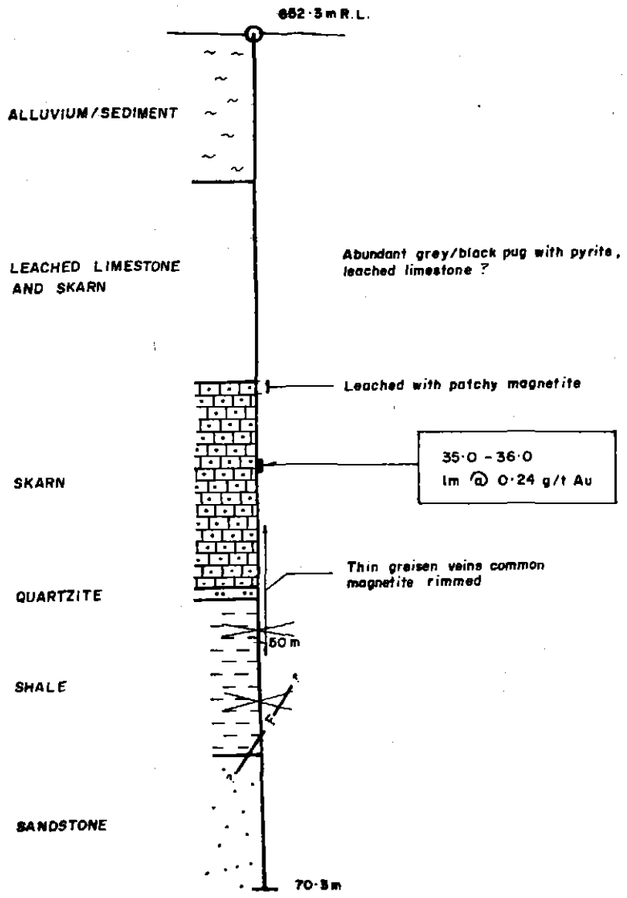
PLAN

650m R.L.

800m R.L.

LEGEND

- ALLUVIUM/SEDIMENT
- BASALT
- TERTIARY SEDIMENT
- LIMESTONE
- SKARN
- QUARTZITE
- SHALE
- SANDSTONE
- CONGLOMERATE
- BEDDING
- —F— FAULT



PROFILE

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FIG. 69

STATE: Tas.

HOLE No. SD5

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GOLD FIELDS EXPLORATION PTY. LIMITED

DRILL CORE RECORD

HOLE NO. : SD6

STATE : TASMANIA

DLV. PRESS

PROJECT	EL 41/83 LAKE LEA
DESIGNED BY	R.H. Roberts
LOGGED BY	M.J. Fleming
COMMENCED	6th September 1988
COMPLETED	12th September 1988

PURPOSE

To test a magnetic anomaly which may represent a folded repetition of the skarn rocks that occur in the Stormont Bismuth Mine. Along strike and to the south of SD2.

LOG SUMMARY / GENERAL COMMENTS

Unconsolidated sediment (Tertiary?) is intersected to 25.0m before passing into 6.3 metres of fresh skarn. The top 2.1 metres being rich in magnetite. Quartzite occurs at the base of the skarn and the hole finishes in shale with interbedded siliceous sandstone. No significant gold mineralisation occurs.

ASSAY SUMMARY

INTERVAL From	INTERVAL To	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W			COMMENTS
25.0	27.0	0.025	538	53	203	<0.5	2050	<10	95	400	152			All assays in ppm.

LOCATION

NORTHING	
EASTING	
R.L.	
GRID	1590S/2800W
LENGTH	41.2m

HOLE CONDITION

SIZE Hole Size	SIZE Depth
HQ	22.5m
NQ	41.2m

SIGNIFICANT CORE LOSS INTERVALS From	To	% Lost
0	16.0m	No core
16.0m	25.0m	89
34.8m	41.2m	30

POOR GROUND CONDITION ZONES From	To	Condition
16.0	25.0	Unconsolidated sediment.

HOLE CONDITIONS AFTER COMPLETION

Casing was removed when the drill rig moved off. The rig blocked the hole when moving. Relocated by digging and a poly pipe was inserted.

SURVEY DATA (Note: Bearing type must be same as Project Grid Type)

SURVEY Depth	SURVEY Bearing	SURVEY Dip	INTERVAL From	INTERVAL To	INTERVAL Distance	VERTICAL D.Sin.Dip	VERTICAL R.L.	HORIZONTAL D.Cos.Dip	HORIZONTAL Prog.Total	SURVEY Depth	SURVEY Bearing	SURVEY Dip	INTERVAL From	INTERVAL To	INTERVAL Distance	VERTICAL D.Sin.Dip	VERTICAL R.L.	HORIZONTAL D.Cos.Dip	HORIZONTAL Prog.Total
0	091°	-90.0°	0	20.0	20. 0														
40m	091°	-89.7°	20.0	41.2	21.2														
41.2m			=EOH																

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GOLD FIELDS EXPLORATION PTY. LIMITED

PROJECT: EL 41/83 LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: SD6

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION
				SUMMARY LOG
0	16.0			No core
16.0	25.0			*Unconsolidated sediment* (Tertiary?) and boulder fragments of greybilly and tubicolar sandstone.
25.0	31.3			SKARN A garnet-actinolite ± diopside ± epidote ± magnetite skarn rock. Rich in magnetite to 27.1m. Abundant greisen veining is rimmed by magnetite.
31.3	34.8			QUARTZITE A grey, strongly silicified sandstone with minor thin shale bands. Well jointed and broken and minor (1-2%) magnetite being finely disseminated throughout.
34.8	41.2			INTERBEDDED SHALE & SANDSTONE Banded shale with bands and pods of grey silicified sandstone (quartzite). Calc-silicate patches are rare. Possible faulting from 37.4m to 38.2m. Minor disseminated magnetite and pyrite.

ASSAY DATA Sample No.	From	To	Rec. %

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GOLD FIELDS EXPLORATION PTY. LIMITED

26.9.88 PROJECT: EL 41/83 LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: SD 6 Page 1 of 3

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION
				0m - 16.0m Triconed, HQWL
				16.0m - 22.5m NQWL core, hole reamed out to HQWL.
				22.5m - 41.2m NQWL core.
0	16.0			Triconed, no core recovered.
16.0	22.5	0.6	9	Mainly weathered rock with only 60cm of core recovered. The rock type is Tertiary greybilly, possibly cored greybilly boulders intersected in the weathered profile.
22.5	25.0	0.4	16	Unconsolidated Tertiary sediment, fine grained & dark grey, with the last 20cm being tubicolar Moina sandstone. Obviously rolled down over the skarn from a higher elevation, must be post Devonian structural events.
25.0	31.3	6.3	100	SKARN
				A black & green magnetite rich skarn to 27.1m. The magnetite occurs in rich fine grained patches and bands as well as disseminated through the calc-silicate rich zones. Then a garnet-actinolite ±diopside ±epidote ±magnetite skarn occurs. Generally green and brown with dark grey to black bands & patches, chaotic in appearance.
				Alteration: Limonised in the odd patch. No retrogression obvious. Most veins have dark reaction rims.
				Veining: Abundant thin greisen veins occur throughout. Generally a strong pyrite association and nearly always with a dark disseminated magnetite rim. Various angles to core axis & various stages, some veins cutting & displacing others.
				Structure: Weakly jointed with most breaks related to vein partings.
				Mineralisation: 15-20% magnetite occurs 25.0m to 27.1m. Fine grained & shows weak wrigglite textures. 1-2% magnetite occurs through the remainder in fine disseminated patches and rimming most greisen veins. Pyrite is trace to 1% overall occurring mainly in veins, but also in sparodic fine disseminations.

ASSAY DATA

Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
T12557	25.0	26.0	100	0.040	910	80	235	X	2700	X	130	456	176
58	26.0	27.0	100	0.010	165	25	170	X	1400	X	60	344	128
59	27.0	28.0	100	0.030	140	70	185	X	780	X	33	290	138
T12561	28.0	29.0	100	X	110	30	165	X	280	X	14	181	45
62	29.0	30.0	100	X	100	45	190	X	290	X	15	143	34
T12563	30.0	31.3	100	0.030	110	100	210	3.0	480	X	24	103	84

GOLD FIELDS EXPLORATION PTY. LIMITED

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PROJECT:

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: SD6

INTERVAL		RECOVERY		DESCRIPTION	ASSAY DATA													
From	To	m	%		Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
31.3	34.8	3.0	87	QUARTZITE														
				Contact gradational over 10cm.														
				A grey to light grey quartzite with only a few bands of purple and	T12564	31.3	33.2	84	X	40	X	95	X	70	20	X	36	22
				buff coloured shale bedding, @ 85-90° to CA. Disseminated magnetite														
				is common but patchy and disseminated calc-silicates are rare, being														
				most common within 40cm of the contact with the skarn.														
				Alteration: The quartzite is a strongly silicified sandstone. Some														
				joints are clay coated & some are weakly limonised.														
				Veining: Only weakly veined. Those present being pyrite-chlorite?														
				(calc-silicates?) ±magnetite & vuggy.														
				Structure: Well broken throughout related to joints.														
				Mineralisation: 1-2% magnetite occurs throughout finely disseminated														
				in patches & in the odd vein. Pyrite occurs in veins, on joint														
				surfaces and as minor fine disseminations.														
34.8	41.2	4.5	70	INTERBEDDED SHALE & SANDSTONE														
				Contact broken.														
				Interbedded grey, purple & light buff shale, often layered in														
				appearance, with variably silicified grey sandstone to 38.0m. Finely														
				disseminated calc-silicate rich patches are rare. Then mainly a grey														
				layered shale with minor thin bands & pods of quartzite to the end of														
				hole. Bedding is @ 85° to CA.														
				Alteration: The sandstone is variably silicified from weak to strong.														
				Limonite occurs on some joint surfaces.														
				Veining: Only minor very thin chlorite ±pyrite veins occur.														
				Structure: Well broken throughout & appears related to jointing.														
				However, some evidence of leaching & core loss could indicate														
				the presence of faults, especially between 37.4m & 38.2m.														
				Mineralisation: Minor disseminated magnetite occurs associated														
				with some of the sandstone, & pyrite is present in some veins, on														
				some joint surfaces & finely disseminated associated with the														
				sandstone.														
				END OF HOLE														
				N.B. Tray No.2, 29.7m to 34.5m, was dropped by the drillers. The														

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GOLD FIELDS EXPLORATION PTY. LIMITED

26.9.88 PROJECT: EL 41/83 LAKE LEA

DRILL CORE LOG AND ASSAY DATA

HOLE NUMBER: SD 6 Page: 3 of 3

INTERVAL From	INTERVAL To	RECOVERY m	RECOVERY %	DESCRIPTION
				skarn in this tray has been fitted back together by MJF, but
				the remainder is too broken.

Sample No.	From	To	Rec. %	Au	Cu	Pb	Zn	Ag	Bi	Mo	As	Sn	W
ASSAY DETECTION (ppm)				0.008	5	5	5	0.5	10	10	2	3	10
ANALABS METHOD				309	103	103	103	103	103	103	401	401	401
						X = BELOW DETECTION							

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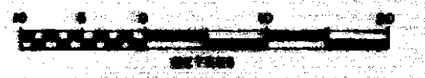
708178

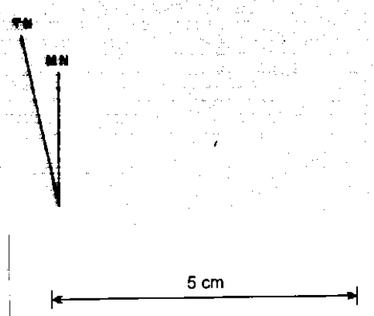
PROJECT: LAKE LEA HOLE No. SD6

RGC EXPLORATION PTY. LIMITED

DRILL HOLE PLOT

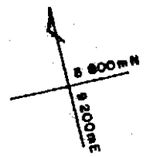
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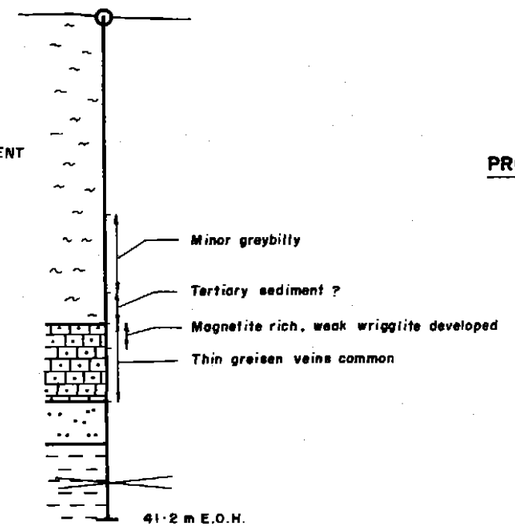


PLAN

5 405 818·4 mN
419 200·3 mE



PROFILE



LEGEND

- ALLUVIUM/SEDIMENT
- BASALT
- TERTIARY SEDIMENT
- LIMESTONE
- SKARN
- QUARTZITE
- SHALE
- SANDSTONE
- CONGLOMERATE
- BEDDING
- —F— FAULT

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FIG. 60

STATE: Tas.

HOLE No. SD6

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Appendix 4

An Overview of Gold Occurrences in Northern Tasmania

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AN OVERVIEW OF GOLD OCCURRENCES IN NORTHERN TASMANIA

for Goldfields Exploration

Dr G.W. Morrison
28 Park St
PIMLICO, Qld 4812

November, 1987

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OTHER OCCURRENCES NOT VISITED	17
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II. NARRAWA REWARD HOLE DG1	23

SUMMARY

Two weeks were spent on field visits and data review of the Moina, Lisle-Golconda, Mount Horror, Henty, Beaconsfield, Lefroy and Mathinna gold occurrences of northern Tasmania. The objective was an overview of mineralisation styles and an evaluation of potential, particularly for bulk tonnage gold mineralisation.

The Moina field is a zoned, polymetallic, deep subvolcanic intrusive system with wrigglite Sn skarns (Moina), garnet-Cu-Bi-Au skarns (Stormont), structurally controlled vein-replacement style Pb-Sn-Ag massive sulphides (Round Mount) and greisen-type quartz veins with Sn-Mo, Mo-W-Bi and Cu-Bi-Au variants (Higgs-Narrawa). The most immediate potential for gold mineralisation is in the garnet skarn at Stormont and in the area between Stormont and Fletchers Adit. Deposits of this type are localised in Gordon Limestone adjacent to F-poor cupolas of Colcoath granite and are not clearly related to regional or local structures. For the field as a whole the best grass-roots target is the situation in which Pb-Zn-Ag vein/replacement deposits are overprinted by Au-bearing greisen veins. The locus of these deposits is adjacent to major NW trending shears and faults cutting carbonate rocks and intruded by F-poor plugs or dykes. The best analogy is with the Leadville District of Colorado and the best target areas are near Round Mount and the Bismuth Creek Fault at Moina.

The Lisle-Golconda field is also a deep subvolcanic porphyry system but developed entirely in a clastic sediment host. The gold occurrences are poorly developed low sulphide quartz veins associated with molybdenite, tourmaline and greisen style veins. The field as a whole may have some potential for stockwork and breccia-hosted gold mineralisation.

The Mount Horror area contains a number of discrete plutonic quartz veins anomalous in W-Sn-As-Bi-Ag-Au. They are interpreted to be related to the Blue Tier batholith and as plutonic level equivalents of some of the Moina veins. Such an environment has little potential for bulk tonnage gold mineralisation.

A brief reconnaissance of the data and drill core suggest the Henty occurrence is polymetallic semi-massive sulphide formed, at least in part, by replacement of carbonate units that have been incorporated in a major shear zone. The style of mineralisation and the element association do not require precursor volcanogenic mineralisation or imply a significant intrusive input. The best analogy is probably with Thompson-Bousquet or Hemlo and the Archean 'break' environment in general. The Henty Fault is considered a crustal scale structure with good potential for more discoveries of Henty style or more typical 'break' style mineralisation.

Beaconsfield is a quartz-ankerite-sulphide vein associated with quartz-ankerite replacement

bodies in a flexure between two major shears. A surprising feature of the veins is the abundance of banded chalcedonic silica and euhedral quartz crystals exhibiting explosion texture. These textures suggest formation at shallow crustal levels from a boiling hydrothermal fluid. The mineralisation could represent an epithermal level expression of deep crustal metamorphic fluid escaping up major structures of Taberraberan or younger age. Analogy with active warm springs on the Alpine Fault of New Zealand suggests even the Tamar Fracture Zone could be the major fluid conduit. If this could be established in fact then a new exploration model might be appropriate.

Lefroy is a fairly typical example of a turbidite hosted, intermediate level, metamorphic gold-quartz vein deposit. The ore controlling structures are tension gashes between zones of axial planar shear on Taberraberan folds. The best analogy is with the Hodgkinson Goldfield of North Queensland where numerous small scale oreshoots are characteristic and alluvial production far outweighs hard rock production.

Mathinna has a similar host sequence, vein character and origin to Lefroy but is centred on a crustal scale structure that gives it a potential for larger orebodies or groups of high grade ore shoots that might be mined in a bulk tonnage open cut. An analogy with the Jamestown and Carson Hill developments in the Mother Lode District of California is warranted for Mathinna and the concept may be applicable elsewhere along the Manganna-Forester belt.

The overall impression of northern Tasmania is of a wide range of deposit styles all formed as part of the Taberraberan orogeny. The most important controls on the orefields are the long lived crustal scale structures or 'breaks' (Henty, Mathinna, Tamar) and intrusions emplaced at subvolcanic levels. Smaller scale structures, particularly NW trending folds and shears and associated tension frctures localise mineralisation in many of the fields but the best potential is where combinations of structures, intrusions and host rocks with potential for replacement co-exist.

MOINA DISTRICT

Moina is one of the principal mineral districts in north-central Tasmania better known for its tin-fluorite occurrences than for its gold occurrences. Five days were spent visiting representative occurrences in the district and graphic logging drill core from Higgs-Narrawa in an effort to establish the distribution and timing of the various styles of mineralisation.

HIGGS - NARRAWA REWARD

An evaluation of bulk tonnage potential based on a reconnaissance of surface and underground workings and graphic logging of two representative drill holes.

The Higgs and Narrawa Reward workings have produced approximately 28 kg of gold from quartz veins and disseminations in sheared sandstone, siltstone, calc-silicates and porphyry dykes. The old workings were limited in depth by a rapid fall off in grade that has been interpreted as the transition from surface enriched to primary mineralisation. Similarly in the recent exploration programme encouraging results from rock chip sampling have not been duplicated in drilling intersecting the shear zone approximately 100 m below the workings. There are two possible explanations for the grade drop off:

1. Surface enrichment due to oxidation as suggested by most previous workers
2. Structure controlling small shoots with shallow plunge so that drill intersections below old workings intersect the structure but not the ore shoot.

For the explanation based on surface enrichment there is strong support in the nature of the workings the available assay data and the fact that similar features have been noted in many other goldfields of northern Tasmania. However there are some puzzling observations:

1. Fresh sulphides are exposed near surface or within a few centimetres of surface in many places suggesting oxidation is incomplete.
2. In all the drill holes there is strong depletion of all elements analysed including gold down to approximately 30 m. The cutoff to anomalous grades is sharp and in ND1 and DG1 at least, below the level of even partial oxidation and distinctly below the level of complete oxidation (<10 m).
3. Good surface gold grades are restricted to discrete patches (eg. main Higgs workings, West Higgs) with only occasional good grades between.

These features suggest the simple process of surface oxidation and gold enrichment typical of the arid environment in Western Australia is not entirely applicable here.

A structural explanation is suggested by observations of ore shoot geometry and surface grade

distribution. In the Higgs and Narrawa Reward workings the principal 'reef' is an irregular shear zone striking NW and dipping approximately 70°NE and hence cutting bedding which has a similar strike but shallower dip. The orientations of the walls of the workings and the distribution of ore shoots suggest the low angle intersection causes refraction of the shear zone where it intersects beds of varying competence at low angles. The geometry is consistent with the process of Reidel Shear that gives rise to a complex of small, shallow plunging ore shoots. This model is well documented for the Far Fanning deposit in North Queensland (Roy Kidd, BSc Hons thesis, JCUNQ, 1985) where moderately plunging ore zones have been shown to consist of numerous shallow plunging ore shoots with dimensions of a few metres by 10's of centimetres. Definition of ore reserves at Far Fanning was so difficult that eventually 5000 tonne bulk samples were taken to establish overall grade and leachability (Elliot and Houtgraaf, 1986).

Plotting of all the assay data and features of the drill core on graphic logs for holes ND1 and DG1 has demonstrated a strong overall element zoning pattern and distinct controls on gold distribution. Although there is some duplication in DG1 there is a strong single pass zoning pattern in ND1 from shallow Pb-Zn-Ag through Cu-Bi-Au (As, W) to Mo-W-Bi and Sn-Mo (As) at depth. This is similar to the zoning pattern for the whole Moina field relative to the Dolcoath granite and suggests that even dykes that are part of the system may telescope the whole zoning pattern. In DG1 the dykes themselves are sheared, and mineralised with the whole element assemblage, suggesting deformation, intrusion and mineralisation are broadly contemporaneous. Overprinting relationships suggest the deeper zones are younger and that the gold mineralisation is most closely linked to the earliest stage of greisen alteration overprinting the Pb-Zn-Ag mineralisation. If the zoning pattern and time sequence are more generally applicable then there may be a distinct 'gold corridor' in space and time and on a variety of scales that may help focus exploration.

For Narrawa and Higgs the complexities of variable surface grades, ore shoot geometry and element zoning make definition of deep exploration targets difficult. The fundamental problem at this stage seems to be the depth extent of the good surface grades. This could be tested with a programme of detailed surface rock chip sampling and drill hole sampling to a few metres or tens of metres. Confidence in these results might justify a programme of shallow ore reserve definition.

STORMONT-FLETCHERS ADIT

Surface and adit reconnaissance to evaluate potential for skarn orebodies.

The Stormont Mine and Fletchers Adit have produced approximately 3.6 t Bi, 3 kg Au and 1.8 kg Ag from garnet and magnetite skarns and basemetal veins in transition beds between the

Moina Sandstone and Gordon Limestone. At the Stormont Mine mineralised garnet skarn is a trough-shaped, bedding conformable band underlain by shallow dipping magnetite-amphibole skarn and dragged up against a fault which is at a low angle to bedding strike. The magnetite-amphibole skarn is barren, banded and conformable to the underlying sandstone. It is interpreted as a pre-mineralisation reaction skarn formed by exchange of components between thinly bedded limey siltstones and sandstones. The magnetite-amphibole skarn is variably overprinted by light coloured garnet skarn close to its contact with the mineralised dark garnet (andradite) skarn. The andradite skarn is coarse grained and granular with interstitial cavities with quartz, chalcopyrite, bismuthinite and minor carbonate, epidote and amphibole. It contains relics of amphibole-magnetite skarn which have been strongly overprinted by garnet. The andradite skarn is interpreted as a high temperature (+450°C) metasomatic infiltration skarn replacing massive limestone and some adjacent interbeds. The lack of significant retrograde overprint or greisenisation suggests the skarn formed close to a pluton and not adjacent to a pre or syn-mineral fault.

At Fletchers Adit old reports suggest the tested mineralisation is largely restricted to veins and fault fillings cutting amphibole-magnetite skarn. In the wall of the adit bismuthinite is associated with garnet and pyroxene skarn whereas amphibole-magnetite reaction skarn contains pyrrhotite but no bismuth or gold. Geometric relationships suggest that if garnet skarn comparable to that at Stormont is present here then it is higher up the hill above the adit but possibly near the open cut from which Burns (1959, TDM Technical Notes p. 36) reports 3 m at 2.52% Bi and 7.1 g/t Au.

The excellent rock chip assays and the disseminated nature of the ore make the Stormont-Fletchers area an attractive exploration target for gold. The historic production grade of 7-10 g/t Au for 1% Bismuth is comparable to surface assays across the zone and the continuity of grade at surface suggests good overall grade in the zone. Detailed mapping at the mine should establish the exact geometry of the favourable skarn so that drilling can be optimised. Mapping and a magnetetic survey should be able to pinpoint other skarn pendants in the Stormont-Fletchers area.

MARINER GRIDS

On the Mariner 4 grid the principal rock type is K-feldspar-biotite-quartz porphyry interpreted as an equivalent of the Cambrian Mount Read volcanics. Locally the porphyry is strongly sheared and altered to sericite or silica-corundum-white mica/clay (pyrophyllite?, Kaolinite?) and cut by plutonic? buck-coarse comb quartz-pyrite-chalcopyrite veins. Work by Geopeko on Mariner 1 & 3 grids has identified similar porphyry with sericite-clay and greisen alteration and medium-fine comb quartz-pyrite-chalcopyrite-chlorite veins that are anomalous in Cu, Pb, Zn, Bi,

As, Sn and Au. This geochemistry and the petrology done by Geopeko suggest the mineralisation is of Devonian granite affiliation and that the porphyry itself might even be of this age.

There is no clear evidence for the intrusive or extrusive origin of the porphyry, but the alkaline character suggested by the high biotite and K-feldspar phenocryst content and low quartz and the paucity of volcanogenic mineralisation suggest this unit differs from typical Mount Read volcanics. In most volcanic successions potassic, near-saturated volcanics (ie. shoshonites) post date calc-alkaline volcanics, are more often subaerial and more typically contain epithermal rather than volcanogenic mineralisation (eg. Emperor Mine in the Mba Volcanics Fiji). Independent of the actual age of the porphyry there may be a potential in the unit for porphyry and epithermal styles of mineralisation. This is reinforced by the presence of advanced argillic alteration in some shear zones suggesting high temperature interaction of magmatic and meteoric waters. This type of alteration and the alkaline volcanic association are typical of some important gold districts (eg. Goonumbla-Peak Hill-Temora NSW) where early low grade gold mineralisation is part of a porphyry Cu-Au system and higher grade Au-Ag mineralisation is associated with silica and often enargite in zones of advanced argillic alteration.

OTHER STYLES OF MINERALISATION IN THE MOINA DISTRICT

At least three other styles of mineralisation are known in the Moina District:

1. Sn-rich veins and wrigglite skarns such as Tin Spur and Shepherd & Murphys.
2. W-Mo-Bi veins such as Squibs and Poveys.
3. Ag-Pb infill and replacement lodes such as Round Mount.

At Shepherd and Murphys granular garnet, pyroxene and wollastonite skarns and fluorite-magnetite-vesuvianite wrigglite skarn with anomalous Sn, W, F, Be is cut by retrograde amphibole-sulphide skarn with anomalous Zn, Cu, In, Cd, and Au, and by greisen type quartz veins with anomalous Sn, W, F, Bi, and minor As, Mo, Cu, Pb, Zn. The skarn is essentially conformable to stratigraphy but attenuated along major fractures. The primary skarn is considered the equivalent of the Stormont skarn but has developed from an F-rich rather than H_2O-rich fluid. The greisen veins occupy E-W tension fractures adjacent to a major NW trending shear. This geometry and vein style is comparable to that of the gold veins in the Lefroy field and suggest that similar regional structural processes were in operation during metamorphism and granitoid emplacement. Potential gold mineralisation in this environment is not in the primary skarn, but in shallow Bi-rich portions of the greisen vein system, in strongly retrograded skarn, and in possible replacement bodies adjacent to syn-mineral faults. It has been suggested that the Hugo skarn along the Bismuth Creek Fault might represent such a setting.

The W-Mo-Bi occurrences are single or multiple greisen-quartz veins with coarse crystalline wolframite, molybdenite and bismuthinite and locally anomalous W, As, Cu, Zn, Pb, Au, Sn. The veins typically occupy NW trending axial planar shear zones and cut Dolcoath granite as well as Moina sandstone. The quartz is always milky and vitreous with medium to fine comb texture and relatively tight packing. This texture, element association and geologic setting is consistent with a moderate to deep subvolcanic environment that is the logical depth extension of the Narrawa-Higgs greisen mineralisation and more granite proximal.

Although not visited as part of this reconnaissance the Round Mount Ag-Pb occurrences are an important extension of the conceptual model of the Moina District. Round Mount has produced virtually all the Ag and Pb of the district as well as 1300 oz. Au and 71.3 t Bi from a series of massive sulphide bodies and veins hosted in Moina sandstone. The massive sulphide bodies are bedding plane gapes and partial replacements of silty horizons within tightly folded and thrust faulted sandstone/siltstone sequences localised along NW trending axial planar shear zones. The orebodies are a complex series of shallow plunging shoots consisting of pyrite and argentiferous galena with sphalerite, chalcopyrite and bismuthinite in a gangue of milky quartz and siderite. The best gold is associated with Bi-Mo and muscovite in the Ag rich ore suggesting it may in part be a greisen overprint of the basemetal mineralisation. The interpretation is that these bodies are essentially larger scale versions of the basemetal pods observed in the Narrawa and Higgs drill core that were also overprinted by greisen style gold veins. The logical extension of this hypothesis is that basemetal replacement bodies with overprinting greisen gold mineralisation may be present in the Round Mount district where major NW trending faults cut transition beds or Gordon Limestone. Favourable structures and stratigraphy may be present in the vicinity of the Cockatoo Road and Machinery Creek or near Tin Spur Creek NW of the Hidden Treasure workings. In the general model Tin Spur (Sn, Au) is the deeper portion of the greisen part of the system and the Devonian gossan is an example of the Round Mount Ag Pb Au mineralisation style.

OVERVIEW OF THE MOINA DISTRICT

The Moina District is a classically zoned polymetallic deep subvolcanic system that is somewhat unusual for its combination of Sn-W-Mo-Bi, Cu-Bi-Au and Ag-Pb-Zn element associations. All of the mineralisation, possibly even including that on the Mariner grids, is associated with cupolas of the Devonian Dolcoath granite. Emplacement of at least early dyke phases of the granite overlaps axial planar shear on NW trending anticlines that is considered part of the Taberraberan Orogeny. The NW trending structures are the principal locus of mineralisation but NE and E trending tension structures formed by shear movement on the NW structures also host minerlisation. Greisen veins, the most common style of mineralisation, cut granite, porphyry, Moina sandstone, conglomerate, skarns and massive sulphides. The skarns are developed in

transition beds as well as massive Gordon Limestone whereas the massive sulphide occurrences are gapes in siltstone beds, partial replacements of sandstone and pods of retrograde skarn. There are no well documented occurrences of greisen stockworks or hydrothermal breccias which might be expected in such a system.

The overall element zoning pattern away from the granite is also the general mineralisation sequence from youngest to oldest:

Sn-W → W-Mo-Bi → Cu-Bi-Au → Ag-Pb-Zn

In detail however, there are several stages of mineralisation in particular early? high temperature skarns related to F-bearing cupolas (Moina Sn) and OH-bearing cupolas (Stormont Au-Bi) are likely overprinted by retrograde assemblages (including Round Mount type Pb-Zn-Ag massive sulphides) and greisen veins with a Sn-W or W-Mo-Bi character. Gold mineralisation is in two distinct associations - early high temperature Cu-Bi-Au skarns (Stormont) and later moderate temperature greisen veins also with a Cu-Bi-Au signature (Narrawa-Higgs). There is immediate exploration potential at the Stormont mine and in the Stormont-Fletchers Adit area for moderate tonnage skarn gold mineralisation. In the greisen association, veins are dominant and many of the occurrences are likely to be small high grade pods. However the coincidence of greisen veins in major structures with podiform sulphide bodies as suggested for the Round Mount area holds a potential for high grade moderate to large tonnage orebodies. The ideal situation would be to have a small greisen type cupola emplaced near a major structure that juxtaposed clastic and carbonate sediments. The best analogue for this environment is the Leadville District Colorado (Thompson, 1981; paper attached).

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LISLE-GOLCONDA

Evaluation of granitoid-porphyry models and bulk tonnage potential based on brief visits to the Panama vein deposits and Lisle alluvials.

In the Lisle-Golconda area workings were predominantly alluvial-eluvial but sourced in the contact aureole of a Devonian biotite granodiorite intruding sandstone and siltstone of the Mathinna Beds. Brief reports in the literature emphasise the following features.

1. Veins occur in the granodiorite and sediments but are concentrated in the contact aureole.

2. The veins were typically narrow, isolated and discontinuous.

3. Ore shoots were high grade but so small and irregular as to be generally uneconomic.

4. Veins were predominantly barren white buck quartz with cross-cutting fine comb quartz and fractures containing sulphides and gold.

5. Sulphides were generally sparse but dominated by pyrite, arsenopyrite and chalcopyrite with minor local galena and sphalerite.

6. Quartz-tourmaline-molybdenite veins occur in the granite. Greisen alteration and vein fill were seen in quartz samples at Lisle and kaolinite alteration (?weathered greisen) is also referred to.

7. Reports of sandstone hosted gold mineralisastion may represent fracture fillings in brittle or permeable beds adjacent to veins.

8. Gold fineness is reported as low or around 750 for quartz samples but very high for alluvial gold. Texture and distribution of the alluvial gold suggest it may have been derived from surface reprecipitation following breakdown of sulphides in quartz veins (Marshall, 1969, Pipers River Explanatory Notes, p. 106)

This combination of features is suggestive of a porphyry to shallow plutonic environment and a magmatic source of mineralisation. Some analogy might be made with the general environment of the Moina district. The possibility of sandstone or granodiorite hosted stockworks similar to Salave Spain has already been suggested by Mel Jones. Ground checks of the reported disseminated mineralisation particularly Bessells Reward may be worthwhile. The possibility of hydrothermal breccia hosted mineralisation (c.f. Kidston) might also be entertained. The overall feeling from the descriptions and field visit is that the hydrothermal system as a whole is poorly developed and that the intrusive body is a shallow pluton rather than a porphyry plug.

MOUNT HORROR AREA

An evaluation of the potential for bulk mineable gold mineralisation related to intrusive rocks based on a field reconnaissance of the Gorge Creek Tungsten prospect and Mount Horror arsenopyrite occurrence.

At the Gorge Creek Tungsten prospect widely spaced discrete quartz veins 20-120 mm thick cut hornfelsed sandstone, siltstone and shale in the contact aureole of the Blue Tier Batholith. The mapped width of the contact aureole (approx. 2 km), the spotted nature of some hornfels and the lack of obvious hydrothermal alteration suggest the area is underlain at moderate depth (approx. 500 m?) by the shallow dipping surface of a pluton. The veins themselves consist of tightly packed coarse euhedral-subhedral glassy-milky quartz grains with coarse oriented laths of wolframite and minor interstitial pyrite, arsenopyrite and chalcopyrite. Assayed high grade samples (Hermann, 1987, GFEL report EL17/86) are also anomalous in Sn, Bi, Au but not in Mo, Ag.

The Mount Horror arsenopyrite prospect is a prominent lode up to 2 m wide of silicified sheared and brecciated metasediment with patches, infill and veins of euhedral buck quartz with scattered euhedra of arsenopyrite and minor pyrite. Assayed chip samples (Hermann, 1987) have anomalous As, Sn, Ag, Au and variable W, Bi.

The geologic setting, vein style, plutonic buck character of the quartz and element assemblage are consistent with a magmatic-plutonic origin for the mineralisation and a genetic relationship to the Blue Tier Batholith. In similar systems elsewhere (eg. Chillagoe tin deposits) veins, shear zones and high temperature skarns are the only common mineralisation styles and gold is a minor component associated with bismuth sulphides and chalcopyrite. Consequently it is considered that the Mount Horror area has limited potential for bulk tonnage gold mineralisation.

BEACONSFIELD

A reconnaissance of reef intersections in holes B11, 10, 12B and 15 to interpret the mineralisation style and evaluate the possibility of replacement style ore elsewhere in the field.

The Beaconsfield deposit produced 26.15 tonnes of gold at an average grade of 24.7 g/t from quartz-carbonate veins hosted in Ordovician siltstone and limestone. The reef structure is a sinusoidal flexure partly bound by shears cross-cutting a thrust faulted sequence that includes ultramafic rocks as well as Cambrian and Ordovician sediments. There are no significant late intrusives in the sequence and quartz-ankerite-sericite-pyrite alteration appears limited to the reef structure. The reef structure includes crystalline ankerite-quartz that is at least in part a replacement of the host rocks. It is cut by quartz-ankerite sulphide veins and vein breccias that host essentially all the ore. The sulphide assemblage is dominated by pyrite and arsenopyrite with minor galena, chalcopyrite, low Fe sphalerite and tennantite. The gold is predominantly free and occurs as pale fine inclusions in pyrite or as orange coarse grains in fractured pyrite and quartz.

The distinctive feature of ore intersections studied is the nature of the quartz veins. The veins are irregularly distributed and quite variable in thickness, orientation and carbonate content. Only two varieties of quartz are evident - massive tightly packed fine to coarse euhedra characterised by 'explosion texture' and microcrystalline, almost chalcedonic, banded quartz. The 'explosion texture' consists of alternating zones that are white and fluid inclusion-rich or clear and inclusion poor disposed both concentrically and radially relative to crystal centres. This texture is only reported from epithermal systems where it is interpreted as a product of fluctuating boiling conditions. This quartz occurs in discrete veins which host much of the coarse free gold, as patches within replacement ankerite and as bands within the microcrystalline quartz.

The overall interpretation based on the quartz texture, sulphide assemblage, gold distribution, alteration and structural controls is that Beaconsfield formed at shallow crustal levels from a boiling hydrothermal fluid. Given the lack of evidence for intrusive activity and the overall structural environment it seems possible Beaconsfield represents a very shallow expression of a dominantly metamorphic system possibly similar to the modern warm springs on the Alpine Fault of New Zealand (Dave Craw, paper in Proceedings of Pacrim Conference, 1987). One suggestion based on the New Zealand experience is that the mineralisation could be any age Taberraberan or younger - possibly even related to fluid escape up the Tamar Fracture Zone. A survey of fluid inclusions, dating of alteration sericite and a review of the New Zealand metamorphic-epithermal story may help confirm this somewhat unusual interpretation of Beaconsfield and open up new possibilities for exploration in this area. For example, a Tamar Fracture Zone age would open up possibilities of vein, stockwork, breccia replacement and even hotspring style mineralisation in the Permo-Triassic sedimentary rocks.

MATHINNA

An evaluation of the concept that the 'zone of close folding' is a regional scale 'break' with a bulk tonnage potential where stockworked quartzite and high grade shale hosted veins occur together. Based on a reconnaissance of the Jubilee and New Eldorado workings.

The Mathinna Goldfield produced 270,895 oz of gold at an average grade of 0.856 oz/t from quartz veins hosted in siltstone and sandstone of the Mathinna Beds. The host rocks are folded with axial planes striking NW, and a strong cleavage striking NW and dipping SW. The mineralisation is localised around and partly in 400 m wide 'zone of close folding' characterised by numerous tight folds and strong, crudely axial planar shears. The field is characterised by small discontinuous reefs with an overall random orientation but local preferred orientation crudely parallel to shearing (eg. Jubilee), in late NE trending faults (eg. Golden Gate) and in other cross faults (eg. City of Hobart). The impression gained from the Jubilee and New Eldorado is that the latest and most brittle stage of deformation was the mineralising event, that intersections of such structures often localised shoots and that such mineralisation could overprint sheared siltstone, silicified and brecciated sandstone and early saddle reef type quartz veins. The apparent randomness of the mineralised structures and the generally small size of the shoots (approx. 100-1000 tons) made underground exploration extremely difficult.

The quartz veins themselves consist of white to glassy crystalline buck quartz cut by veins of very fine delicate fibre quartz, networks of millimetre scale spider veinlets and sulphide-bearing fractures. The impression from the literature is that most of the gold was free but associated with the sulphides which made up 1-1.5% of the quartz sent for crushing. Arsenopyrite and pyrite were the principal sulphides but chalcopyrite, galena and sphalerite were also present and considered the best indicators of grade. Gold fineness estimated from assays presented by Finucane 1935 (TGS Bull. 43) is probably 820-920 which is typical of the Mother Lode-Charters Towers type orogenic deposits in the classification of Morrison & Rose 1987 (AMIRA NQ Gold Project Final Report).

The overall characteristics of the field are consistent with the orogenic model recently developed for the Charters Towers, Mother Lode and some Archean deposits. The concept is one of deep crustal metamorphic and mantle derived fluids channelling up crustal scale sutures and precipitating largely in the brittle and brittle-ductile regimes in response to wall rock interaction, overall declining temperature and the development of structural traps. Granitoid plutons may be broadly contemporaneous with mineralisation in this setting and may provide heat that concentrates and focuses fluid flow, but they are neither essential to mineralisation nor the major source of ore components. In a situation like Mathinna where the only host rocks are clastic sediments structural rather than chemical controls are of prime importance.

Historically this class of deposit is characterised by single quartz veins with high grade shoots rather than bulk minable styles of mineralisation. However, the recently developed Carson Hill and Jamestown open pit mines in the Mother Lode district are attempting to bulk mine groups of widely spaced high grade quartz veins localised in a major structure containing sheared rocks with low grade gold (see attached papers). Such a model may be applicable in the zone of close folding at Mathinna and elsewhere along the Manganna-Forester belt. Attractive sites are zones of intersection between the major structure and cross-structures (eg. intersection of NW and NE structures south of Golden Gate) particularly where a combination of shale hosted high grade veins and sandstone hosted stockwork veins may be present.

LEFROY

Attempted classification of mineralisation type based on a brief reconnaissance of dump material and a literature review.

The Lefroy Goldfield produced 172,075 oz Au at an overall grade of 1 oz/ton from a series of quartz reefs hosted in sandstones and siltstones of the Mathinna Beds. The sediments strike 330° and dip 30-45°W and have generally open folds with axial planes parallel to strike. The reefs are within a north-northwest trending corridor of soft ground and occupy a series of parallel fractures striking east and dipping south. Ore shoots have a predominantly shallow westerly plunge. The reef geometry is consistent with formation in tension gashes formed by axial planar shear. Massive vitreous white buck quartz occurs in the fractures and shear zones but is barren. Mineralised quartz is localised in the fractures particularly footwall or hangingwall adjacent to and cutting buck quartz. The mineralised quartz is vuggy holocrystalline fine to medium comb with fine fractures and infill of stibnite and pyrite rarely with chalcopyrite and arsenopyrite.

Although detailed information is sparse the structural controls, quartz types, element association, apparent scarcity of basemetal sulphides and silver, and high but variable gold fineness are consistent with the orogenic class of deposits typified by the Mother Lode, California; Bralorne, British Columbia; and Charters Towers, Queensland deposits. The low sulphide, low basemetal Sb-As-Cu association is typical of some sediment-hosted orogenic vein deposits in the Hodgkinson Field, Queensland and Otago Schist, New Zealand. A derivation from predominantly metamorphic fluids at intermediate crustal levels seems likely for these deposits. Such deposits are generally best known as sources of major alluvial fields and few have developed bulk tonnage deposits.

HENTY

An attempt at classification of deposit style and origin based on brief discussions concerning regional and deposit geology, a reconnaissance of the fault zone in hole HP4 and a reconnaissance of the ore zone in several drill holes.

The Henty Fault Zone is likely a crustal scale structure with significant strike-slip displacement. The lithologies included in the Henty River Sequence (ultramafics-gabbro-mafic volcanics-greywacke-siltstone), their attenuation along the Fault Zone and the possibility of a partial correlation with the Farrell Slate suggest the Henty Fault Zone could originally have been a major suture with oceanic crust separating two continental blocks capped with volcanics. The likely deformation history in such a sequence would be:

* Early isoclinal folding and thrusting possibly partly overlapping with sedimentation and volcanism.
* Strike-slip faulting following closure of the suture, deep erosion and formation of fault-controlled conglomerates.
* Tensional faulting following relaxation of stress.

In this model the strike-slip faults might be expected to cut at least the lower part of the Owen Conglomerate sequence and hence may be comparable to the Great Lyell Fault.

The fault rocks in hole HP4 have crush, shear and weak mylonitic fabrics suggesting multiple reactivation in the brittle-ductile transition and brittle deformation regimes. In the majority of shear related ore deposits this is the mineralised zone. For example at Hemlo, mylonites of the ductile zone are not mineralised whereas the brittle-ductile transition is. At Henty the weak mylonitic fabric is overprinted by the shear and crush zone fabrics. In the ore zones pyrite-silica and vein mineralisation is overprinted by barren yellow sericite-green (Cr?) mica alteration with shear fabric. This suggests the mineralisation timing is between the mylonite and shear events.

The massive pyrite of the ore zone has two textural varieties. The more common variety is massive to weakly banded fine crystalline pyrite with a vague rectilinear pattern of prismatic clots of quartz-carbonate (eg. T8945). The other variety is well laminated or banded with alternating fine pyrite layers and clastic silica-sericite layers (eg. T8948). Observations on samples of semi-massive pyrite and weakly pyritic rocks suggest the more massive blocky pyrite is a replacement of partly silicified carbonate rocks (eg. T8946) and the banded pyrite is a replacement of the volcaniclastic rocks. The extension of this idea is that the thick carbonate unit in HP13 is in fact the precursor of both the massive blocky silica-carbonate rock ('chert') and the massive blocky pyrite in the ore zone. It is thus possible that the ore is related to deformation and replacement rather than to pre-existing volcanogenic mineralisation.

Gold is reported from a variety of settings within the ore zone. The main styles noted in the core and accompanying mineragraphic reports were:

* 5-10 μm particulate gold associated with chalcopyrite and to a lesser degree galena, sphalerite, tetrahedrite and bismuth/bismuthinite and interstitial to massive granular pyrite (eg. T8819).

  3-5 μm gold associated with chalcopyrite in carbonate-quartz-chalcopyrite- pyrite-sphalerite-tetrahedrite veins cutting network pyrite veinlets in partly silicified dolomite (T8946)

* 2-7 μm free gold grains imbedded in quartz-sericite shears cutting silicified dolomite? (T5880). The same rock also contains stringy shears with chalcopyrite-pyrite-galena (T5879) and gash veins and breccias with purple fluorite or calcite-fluorite-sphalerite (T5880) but these do not appear to contain gold.

While this review may not be complete there is a suggestion of the following sequence of events in the Henty Fault Zone.

1. A brittle-ductile shear zone juxtaposing volcaniclastic rocks with a lens of shale-carbonate-jasper.

2. Variable silicification of the carbonate accompanying shearing of all rock types.

3. Shattering of silicified rocks and shearing of unsilicified rocks leading to gash vein infill and replacement by quartz-carbonate-pyrite-chalcopyrite - galena-sphalerite-tetrahedrite-bismuth-bismuthinite-gold. Late fluorite-carbonate-sulphide veinlets and chalcopyrite-pyrite-galena shears.

4. Shear overprint with yellow sericite-green Cr mica ± carbonate, pyrite.

This sequence of events, the styles of mineralisation and the element associations require neither precursor volcanogenic-exhalative mineralisation nor late intrusive input to account for gold mineralisation. An analogy to Archean 'break' type mineralisation (eg. Thompson-Bousquet, Hemlo) is probably more valid conceptually and is supported by the restriction of mineralisation to strongly deformed rocks, the regional significance of the Henty Fault Zone, and the presence of Cr mica-sericite alteration. The paucity of crystalline quartz does not allow a classification of the deposit by the quartz method but microprobe analysis of gold composition and a reconnaissance of fluid inclusions may be of interest. For example, the combination of high gold fineness (+900) and low salinity CO_2-bearing fluid inclusions would favour a metamorphic-break model, moderate gold fineness (400-800) and moderate salinity low CO_2 fluid inclusions would favour a volcanogenic model (cf. Morrison & Rose, 1987 AMIRA NQ Gold Final Report.)

OVERVIEW OF NORTHERN TASMANIA GOLD MINERALISATION

The review of the known styles of gold mineralisation in northern Tasmania has allowed definition of some specific exploration targets but there are some general concepts that suggest other possible styles and areas of mineralisation.

1. On the metallogenic map of Tasmania there is a distinct lack of gold occurrences within all the Precambrian blocks and in the Paleozoic rocks adjacent to the Rocky Cape Block. In fact, with the exception of the reported occurrence near Corinna and the by-product gold in the Cambrian VMS deposits, there are no gold occurrences reported from rocks older than Ordovician. The simplest explanation is that the bulk of gold mineralisation is related to the Taberraberan Orogeny, that thinner crustal segments with more younger Paleozoic strata are most effected, and that some crustal segments (eg. West of the Rosebery Fault) are less amenable to gold mineralisation.

2. Many of the occurrences, particularly those with a metamorphic chacter are associated with crustal scale breaks or lineaments (eg. Henty Fault, Beaconsfield area, Manganna-Lyndhurst). Such structures are increasingly being recognised as the fundamental control on much Archean (eg. Kalgoorlie, Hemlo) and Phanerozoic (eg. Mother Lode) gold mineralisation. The distinctive features are: a broad zone with heterogeneous strain; evidence of multiple reactivation in ductile and brittle regimes; dominant brittle or brittle-ductile deformation regime during a major orogenic episode; juxtaposition of vastly different lithofacies or ages; zones of concentration of mafic and felsic intrusions; and local pervasive but often subtle alteration. The current interpretation is that such structures are zones of concentration of the deep crustal-mantle fluid which is responsible for mineralisation (Colvine et al., 1984, paper attached). Possible structures of this type in northern Tasmania include:

    * the Henty-Great Lyell-Linda Fault System and extensions
    * the Rosebery Fault System
    * the Arthur Lineament
    * the Tamar Fracture Zone and offshoots of thrusts at Beaconsfield and elsewhere adjacent to the Badger Head Block
    * the Manganna-Lyndhurst zone of close folding and possibly similar NW trending shear zones or sediment enclaves in granite as near Lefroy, Lisle-Golconda and approx. 15 km NE of the Anchor tin mine.

    Mineralisation in such structures can have the form of quartz veins, stockworks or sulphide bodies. There are numerous examples, particularly in the Archean literature describing regional to local scale exploration in this environment.

3. An interesting feature of northern Tasmania is the apparent association of porphyry and pluton level gold mineralisation with Sn-W-Mo granite systems. The concept of a distinction between gold and tin granites in northern Tasmania (Klominsky and Groves, 1970) may be partly applicable in that the tin occurrences are associated with granites and some gold occurrences (Golconda, Lisle) are associated with granodiorites. However, there are gold occurrences associated with tin granites (eg.

Mt Horror) gold production from tin deposits (Aberfoyle, Storeys Creek) and intimately associated Au and Sn-W-Mo occurrences (Moina). The critical factor here which is also evident in a review of world literature is that significant gold mineralisation only seems to be developed in subvolcanic porphyry systems and not in plutonic systems. Plutons may host gold mineralisation but they are rarely genetically related (Golding & Peters, 1987, Pacrim Paper on Charters Towers)

At Moina, high temperature skarns have tin mineralisation adjacent to fluorine-rich cupolas (Shepherd & Murphy's) and gold mineralisation adjacent to fluorine-poor cupolas (Stormont). Lower temperature greisen style mineralisation seems to have Pb-Zn-Ag, Cu-Bi-Au and Sn-W-Mo variants (Higgs-Narrawa). Clearly there are some areas with an overall polymetallic character and some that are Sn or Au dominant. This is explained in the newer granite literature by the suite concept in which different basement types melt to give different major and metallic element associations. Consequently gold granites are localised in specific basement terranes that may or may not have associated tin mineralisation.

Of additional interest in northern Tasmania intrusive-related gold systems is the observation that no stockwork, subvolcanic breccia diatreme or epithermal style occurrences have been identified. There seems to be no good reason why they should not be.

I. HIGGS ND1 DIAMOND DRILL HOLE GRAPHIC LOG AND NOTES

Methodology

Given good assay data for Pb Zn Cu Ag Bi Mo W Sn As Au identify element associations based on coincident anomalies then test if these correspond to visible features in core. See accompanying graph paper log.

Identified element associations (purely emperical)

1. Pb-Zn-Ag (Sn), Pb-Zn (Ag, Cu)
2. Cu-Bi-As
3. Cu-Bi-W
4. Au
5. Mo-W-Bi (Sn, As)
6. Sn-Mo (As)

Notable zoning for hole in order listed where 1 is shallow and 6 is deep. This is similar to many classic zoning models and to the overall pattern relative to granite of the Moina field. Actual relationship of gold however is a little unclear.

Styles of mineralisation and mineral assemblages

1. Pyrite fracture fillings and anastomosing veinlet network
2. Pyrite-galena-sphalerite-quartz (chalcopyrite) pods formed on bedding plane partings in peletic rocks and as tension gash type climbing veins in sandstones.
3. Quartz-phlogopite-pyrite-chalcopyrite (bismuthinite?, scheelite?, arsenopyrite?) tension gash climbing veinlets.
4. Fluorite (pale purple)-phlogopite-pyrite-chalcopyrite-quartz irregular branching veinlets.
5. Quartz-fluorite (purple)-molybdenite veinlets in quartzite and disseminations associated with phlogopite in gritty quartzite.
6. Quartz-wolframite-siderite-fluorite (dark purple-green)-pyrite 1-2 cm thick comb quartz veins
7. Pyrite ± molybdenite (arsenopyrite?) fracture fillings or veinlets

Style 1 is fairly common in the upper part of the hole and particularly near the broken zone (approx. 60 m) where the Cu-As (Bi) association is developed.

Style 2 is recognisable wherever the Pb-Zn-Ag association is present.

Styles 2, 3, 4, co-exist in the Au interval (92-103 m) where Pb-Zn and Cu-Bi-W associations are also present. Given that Style 2 has no Au elsewhere best guess is that Style 3 and 4 are gold-bearing.

Styles 5 & 6 co-exist in the Mo-W-Bi zone whereas Styles 6 & 7 co-exist in the Sn-Mo zone

Cross-cutting relationships are fairly poor but the interpreted time sequence is:

1 → 2 → 3 + 4 → 5 + 6 + 7

Relationship to Lithology

There is a suggestion of upward coarsening graded units of siltstone → fine sandstone → interbedded siltstone/sandstone locally tubicular → massive sandstone → gritty sandstone → conglomerate. There is no clear element association relationship to specific units but styles differ with host rock grain size in particular:

* basemetal pods occur only as partings in silty rocks
* massive sandstones have veins and fractures
* gritty sandstones have disseminations due to matrix replacement
* climbing veins are common in interbedded units and at massive-bedded host contacts.

Relationship to Alteration

Silty rocks are locally dark brown due to hornfels biotite and bleached yellow to buff with some amphibole or clinopyroxene along vein margins. Massive sandstones are naturally white-yellow due to low mica content. Down to 94 m there is variable bleaching of silty rocks and no particular relationship between the basemetal styles of mineralisation and alteration. Below 94 m there is complete bleaching and local development of phlogopite-fluorite suggesting pervasive greisen alteration in the Sn-W-Mo vein area.

Relationship to Structure

The only prominent fault zone in the hole is around 60 m. There is strong development of pyrite veinlets and fractures in this area and a Cu-Bi-As association but the exact timing relationships are unclear.

The Pb-Zn-Ag bedding plane pods correspond to gaps created by deformation in interbedded sandstone-siltstone. In many places (eg. 91-95 m) they occupy the short limbs of meso-scale 'Z' folds. The overall relationships of the pods suggest Reidel Shear where the shear plane and bedding strikes are at low angle and the differing competence of the beds causes gaping.

Apart from the minor crumple folds there appear to be no significant variations in bedding orientation in this hole.

Overall Feeling

Somewhat surprising suggestion from the phlogopite-fluorite association in the inferred gold stage that gold is rather more closely linked to the Sn-W-Mo greisen than to the basemetal assemblage. This in turn suggests that the porphyry dykes and related steep structures may be more important controls on gold distribution than the Reidel-type shears evident from surface mapping and basemetal distribution.

The consistency of the zoning pattern in this hole with the overall zoning of the Moina field (Sn-W → Mo-W-Bi → Bi-Cu-Au? → Pb-Zn-Ag) suggests a 'gold corridor' may be able to be defined as a target for broader exploration. The position of gold within the zoning pattern needs to be checked for the other Higgs and Narrawa holes before this model is applied.

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II. NARRAWA REWARD HOLE DG1

Plotted using a geochemical base then looking for controls and relationships of gold mineralisation for comparison with Higgs ND1. See accompanying graph paper log.

Geochem plot identifies four mineralised zones with combinations of Pb-Zn-Ag, Sn-W-Mo and Au partly in a broad zone of weak greisen Mo-W mineralisation.

The upper two zones near 30 and 40 m have Pb-Zn-Ag and Sn anomalies related to fine quartz-sulphide climbing veins and quartz-feldspar greisen veins respectively. The lower zone is in part hosted in a strongly sheared and altered porphyry dyke.

The main mineralised zone at 94-104 m is hosted in fine sandstone and siltstone. Mineralisation styles include:

1. basemetal climbing veins in siltstone and sandstone
2. basemetal replacement of matrix in gritty sandstone
3. narrow quartz-mica-sulphide-gold? veins
4. wolframite-molybdenite-quartz greisen veins

These styles are comparable to those in the polymetallic zone in ND1.

The lower ore zone (140-150 m) is largely hosted by strongly foliated porphyry dykes and includes

* basemetal climbing veins
* basemetal-pyrite replacement of feldspar phenocrysts
* quartz-molybdenite-mica greisen veins

Overall the styles of mineralisation and broad zoning pattern are comparable to Higgs ND1 but there are multiple gold zones and porphyry host to mineralisation. Of particular interest is the fact that the deformed porphyry dykes host basemetal, gold and greisen type mineralisation. If the dykes are Devonian the implication is that all the mineralisation styles post date emplacement of the dykes and that deformation was ongoing during dyke emplacement. These close timing relationships give encouragement to the idea that mineralisation could be more extensively developed in carbonate replacement bodies elsewhere.

OTHER OCCURRENCES NOT VISITED

The Cygnet occurrences on the south coast are interesting for their association with Cretaceous alkaline (shoshonitic?) intrusions and for reports of dykes and sills, tuffaceous breccia (diatreme? at the Mt Mary Mine) and chalcedonic or opaline silica (Martins Show). The suggestion is of a very shallow porphyry-epithermal environment that might have bonanza or bulk tonnage potential. It is also of interest that other occurrences associated with post tectonic alkaline subvolcanic intrusions (eg. Coronation Hill, NT and Allard Stock, Colorado) have notable platinoids associated with gold.

There is an interesting note in Reid's Bulletin on the Golconda District (TSG Bull 37, 1926, p.53) concerning the Whiting Prospect in the St. Patricks River area. Reid describes altered porphyry dykes hosting pyrite-arsenopyrite mineralisation and brecciated quartz bodies cutting porphyry dykes with muscovite, pyrite, chalcopyrite, arsenopyrite and rich ruby silver ore. There is a strong suggestion again of a shallow porphyry-epithermal mineralisation environment that may have bulk tonnage potential.

204 PROJECT: **NARRAWA** HOLE NO.: **ND-1**

GOLD FIELDS EXPLORATION PTY. LIMITED

DRILL HOLE PLOT

SCALE 1:1000 — 20 10 0 20 40 METRES

5406793·374 mN
425363·272 mE

600m R.L. — 020° MN ← → 200° MN

PLAN VIEW

5 cm

5100N 5000N 4900N 4800N

5750E/4940N
197°/-55°

WEST HIGGS CUT-7

CREEK

INTERPRETED TREND OF BRECCIATED QUARTZITES

550m R.L.

LEGEND

LITHOLOGIES

- QZT — Predominantly Quartzite
- QZT/Ps — Quartzite to Psammopelite
- Ps/Pe — Psammopelite to Pelite commonly with minor bands of calc-silicate
- Pelite rich units
- Cs — Calc Silicate rich units with pelite, psammopelite & quartzite
- SK — Garnet Skarn and banded calc-silicates

500m R.L.

STRUCTURE

- Bedding
- Contacts
- Shears
- V — Veins
- Microfolding
- Zn-Pb — Geochemical Association

450m R.L.

QTZ/Ps
CS
QTZ/Ps
Ps/Pe
Pb-Zn-Ag(Sn)
Pb-Zn
QTZ/Ps
Cu-As Bi±
Ps/Pe
Pe
Pb-Zn±Ag,Cu
Pb-Zn
Cu-Bi-W
QTZ/Ps
Sn±Mo
Au
Mo-W-Bi(Sn,As)
Sn-Mo±As
Cgl
Sn-W

Py, Gal. 1-2% SULPHIDE LAYERING

PATCHY Py-SER-QTZ ALTERATION

ZONE OF BRECCIATED AND BROKEN CORE WITH VUGGY Py MIN. (Py ≯ 5%)

MINOR Py-SER-QTZ ALTERATION

MINOR Py-BASE METAL VEINING BOTH PARALLEL TO C.A. AND PARALLEL TO BEDDING

MINOR Py-Cpy VEINING

83 - 103 m
20m @ 0·48g/t Au
incl. 92 - 93m
1m @ 6·18 g/t Au

134·3m

NOTE

JOINT FRACTURES OCCUR SUB-PARALLEL TO CORE AXIS THROUGHOUT THE DRILL HOLE. THESE FRACTURES ARE TYPICALLY COATED WITH PYRITE.

PYRITE ALSO COMMONLY OCCURS IN DENDRITIC MICROFRACTURES WITHIN THE QUARTZITES.

88-2888

GEOCHEMICAL ASSOCIATION

FIG. 61

STATE: **TAS.**

HOLE NO: **ND-1**

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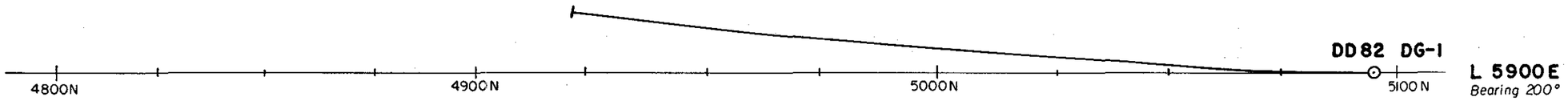
PROJECT: **NARRAWA** HOLE NO.: **DD82 DG-1**

RGC EXPLORATION PTY. LIMITED

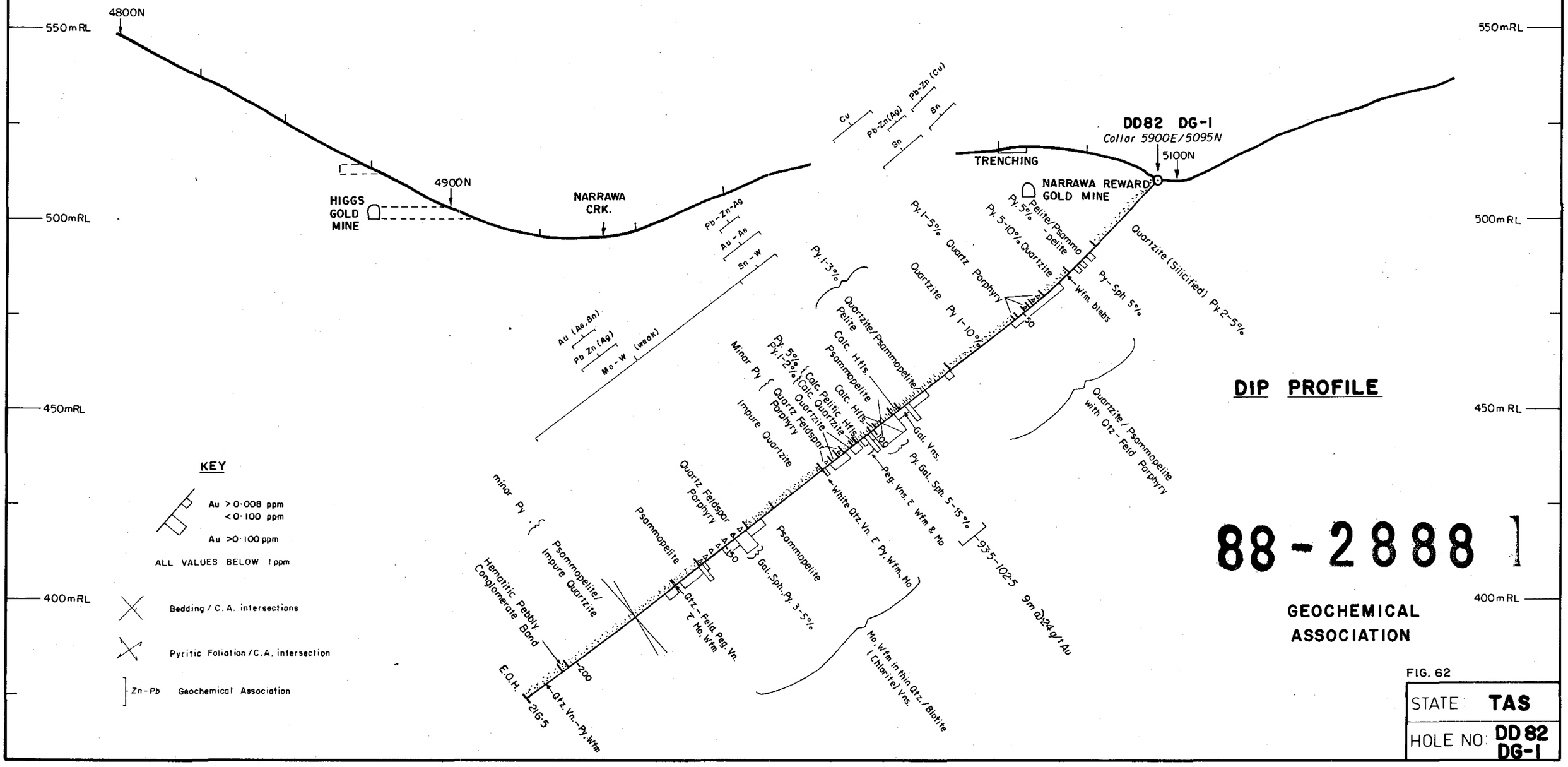
DRILL HOLE PLOT

SCALE 1 1000 — 20 0 20 40 METRES

5 cm



PLAN VIEW



DIP PROFILE

KEY

Au > 0·008 ppm
< 0·100 ppm

Au > 0·100 ppm

ALL VALUES BELOW 1 ppm

Bedding / C.A. intersections

Pyritic Foliation / C.A. intersection

Zn-Pb Geochemical Association

88-2888

GEOCHEMICAL ASSOCIATION

FIG. 62

STATE:	**TAS**
HOLE NO:	**DD 82 DG-1**

Aus I MM Charters Towers Conference 1986

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THE GEOLOGY AND DEVELOPMENT OF THE FAR FANNING GOLD DEPOSIT

by M. Elliott[1] and M. Houtgraaf[2]

1. Elliott Exploration Co. Pty. Ltd.

2. The Northern Queensland Co. Ltd.

Introduction

The Far Fanning gold deposit is situated 60 kilometres south-west of Townsville (Fig. 1). Previous recorded production is 3756 tonnes returning about 1600 ounces of gold. This has been taken from surface and shallow underground workings scattered over the strike length of the deposit of 1700 metres. The main production period was from 1895 to 1908.

Previous exploration involving extensive trenching and sampling has been carried out intermittently since the 1930's, by Gold Mines of Australia (1932), Placer (1974), Anaconda (1975), Marathon (1980-81), Aberfoyle (1981-82), and The Northern Queensland Company (NQC) (1983-present).

In 1980 Marathon undertook an extensive drilling programme to test the oxidised mineralisation. Over 200 percussion holes and 7 diamond holes were drilled along traverse lines spaced 29 to 103 metres apart covering a strike length of around 1800 metres.

Marathon estimated a resource of 1 million tonnes averaging 1 gram per tonne Au, using a 0.5 gram per tonne cut-off.

NQC Evaluation

NQC reviewed all the available data and calculated geological reserves of oxidised ore based on a 0.5 gram per tonne Au cut-off at just over 500,000 tonnes averaging 2.3 gram per tonne Au. The base of oxidation is between 16 to 24 metres below the surface.

1100 oz/mth prod

Further diamond drilling, trenching, sampling, mapping geophysics, and bulk sampling (for metallurgical test work) were carried out by NQC in 1985. By mid 1985, NQC management were satisfied that a potentially economic gold deposit had been outlined and commenced a more detailed evaluation programme.

This programme mainly involved closely spaced shallow airtrack drilling and trenching to prove up ore over the entire deposit for the first two 3 metre benches and to assist in the design of the open pits. This work started in November 1985 and was completed in February 1986. During this time over 2900 metres of trenching, 1200 drill holes, and 4000 assays had been completed.

Geology and Mineralisation

The Far Fanning gold deposit is hosted by an alternating sequence of feldspathic sandstone, arkose, minor quartzite, with grey-green and purple siltstone of upper Devonian age belonging to the Dotswood Formation (Fig. 2). It was deposited in the Burdekin Basin, in a fluctuating continental shallow marine environment. Sedimentation in the Burdekin Basin unconformably overlies an older granitoid basement (Ravenswood Granodiorite Complex).

The deposit occurs near the intersection of an axial trace of a broad regional open anticline and an east-west trending lineament which links two Permo-Carboniferous aged plutons set 26 kilometres apart.

Mineralisation at Far Fanning is controlled by tensional fractures and breccias generated by drag folding. Folding has resulted from movements along the regional lineament. This has produced a structurally disrupted zone up to a few hundred metres wide. At Far Fanning the disrupted sequence trends west to north-west and is characterised by open fold structures at the eastern end of the deposit (zones 7 and 8) and monoclines throughout the rest of the deposit (Fig. 3).

The deposit is delineated over a strike length of 1700 metres and is arbitrarily divided into 8 zones (Fig. 4). The deposit consists of a number of ore lenses. These ore lenses parallel and cross cut bedding and vary in width from 2 metres to over 20 metres. They can be traced along strike for distances of 10 to 200 metres. The overall dip of the ore lenses is roughly normal to the direction of maximum

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steepening of the fold. Therefore although the beds in the fold flexure mainly dip to the south (60 to 80 degrees), the ore lenses dip to the north (35 to 50 degrees).

In detail ore lenses consist of:

* discontinuous mineralised fracture sets
* metric size clast supported breccia pods (Fig. 5).

An increase in the density of fracturing is evident approaching the ore lenses. Sericite alteration and silicification are most evident in the highly fractured lenses, elsewhere alteration is weak to absent.

The highest grade and thickest individual mineralised veins and breccias within the ore lenses tend to be parallel to bedding. This is explained by bedding planes opening more than any other plane of weakness during folding to form a favourable and preferred site for ore deposition.

Mineralisation consists of gold set in vuggy, translucent to milky coloured quartz and iron rich veins and breccias in the oxidised zone. Gold is associated with pyrite and minor arsenopyrite, galena, and chalcopyrite in the sulphide zone. Gold is not readily visible and is commonly smaller than 200 microns which will assist the dissolution of the gold by cyanidation and assist in high recoveries (70 to 80%). A genetic model is shown in Figure 6. The fracture controlled vein style of mineralisation supported by the open space textures in the veins, and the limited extent of alteration, suggests the gold was deposited at high levels in the earth's crust by a fluid-poor mineralising system. The temperature of the mineralising fluid is unknown, but the style suggests an epithermal origin. The mineralising event probably occurred during the waning stage of the emplacement of the Permo-Carboniferous pluton in the region.

Selective Mining Method

The selective open pit mining method used at Far Fanning is similar to that used in many other recently commissioned gold mines in Western Australia.

For mine planning purposes, the ore lenses are described as having intermediate to weak ore outlines. This style of mineralisation contains significant low grade and waste

material between high grade veins and breccia pods (Fig. 7). This necessitates using small bench heights (three metres) and close spaced sampling to control grade. Internal dilution and edge dilution is a major problem for grade control. Internal dilution is included in reserve calculations and an overall mining dilution of 10% is used to allow for edge dilution.

Grade control in the pit is based on assay data and geology. Ore is mined by excavator under the supervision of the grade control geologist. Ore from the pit grading better than two grams per tonne gold is nominated high grade ore and directed to the crusher. Material in the one to two grams per tonne gold range is directed to a low grade stockpile. While in the process of mining, material of uncertain ore to waste category may be mined. In this case the grade control geologist will direct the material to a seperate stockpile for further sampling to determine its status.

The ore is non-rippable and hence has to be drilled and blasted. Waste is also drilled and blasted but its suitability for ripping is currently under investigation. A drill pattern of 2 metres by 3 metres with holes drilled at minus 70 degrees to a depth of 3 metres is used. Holes from every second drill line are sampled over the length of the hole for grade control purposes. The effectiveness of the grade control method is still under review while pit grades are reconciled with later processed samples taken from the crusher and the agglomerator.

Samples are prepared on site and the pulps sent to NQC's laboratory in Townsville. Samples undergo aqua regia digest, solvent extraction, and are determined for gold by AAS. A two day turn around is possible for urgent samples.

Eight open pits were designed to remove ore to the base of oxidation, which varies from 16 metres to 24 metres below the surface. All mine plans are prepared at 1:250 scale. The mine layout is shown in Figure 8.

Mine Construction

Construction of the treatment plant commenced in January 1986 and was completed in June 1986. The plant is designed to treat 300,000 tonnes of ore per annum. The ore is crushed to minus 12 millimetres and treated by NQC's cyanide agglomeration heap leaching technique. The first batch of

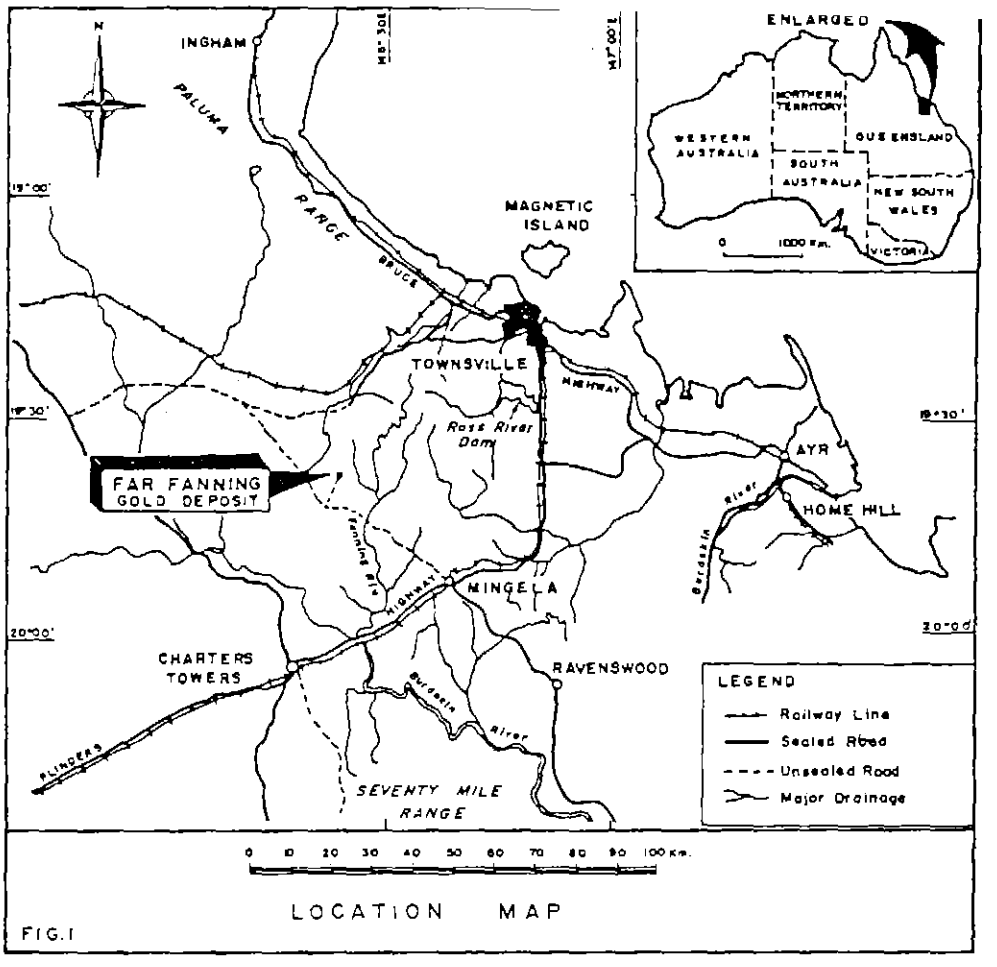
211

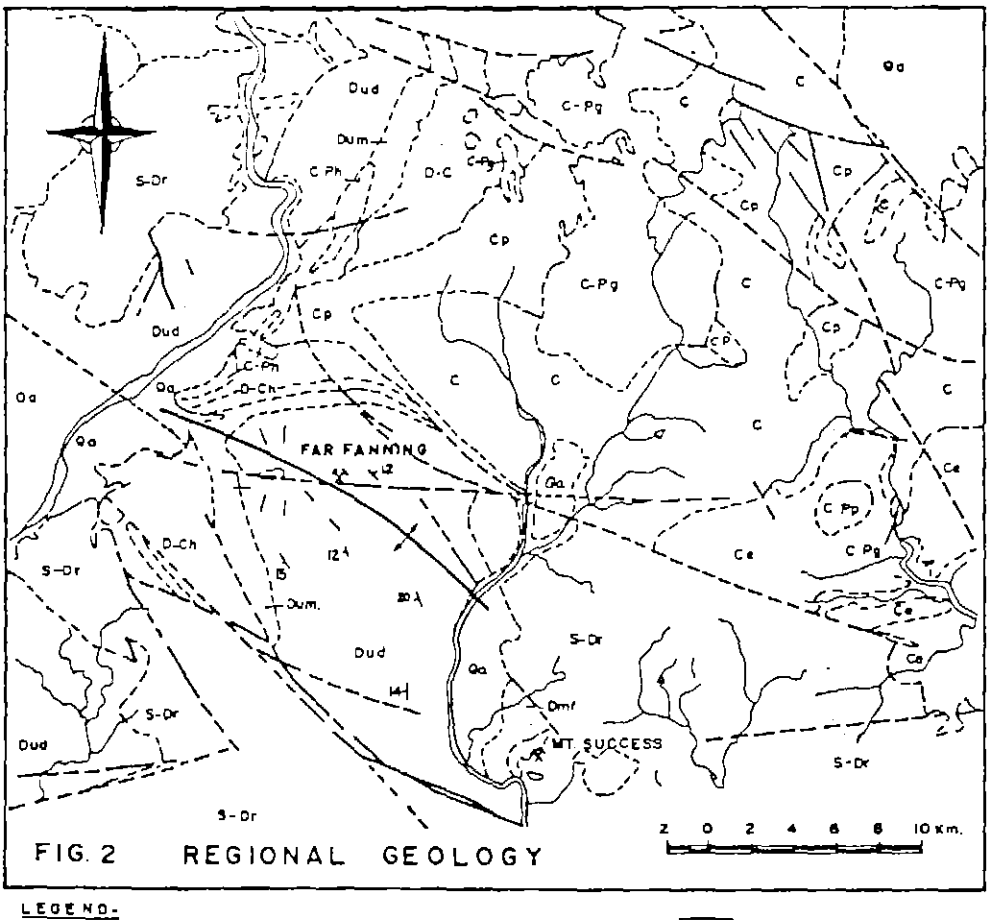
gold from the plant was sent to NQC's refinery at Ravenswood on the 12th of June.

The mine employs approximately 45 people of which 30 are contractors who carry out mining, crushing, and leach pad loading and unloading. NQC manages grade control and the leaching operation. Mining operates on two ten-hour shifts, five days per week. Mining ore is restricted to the day shift.

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LEGEND-

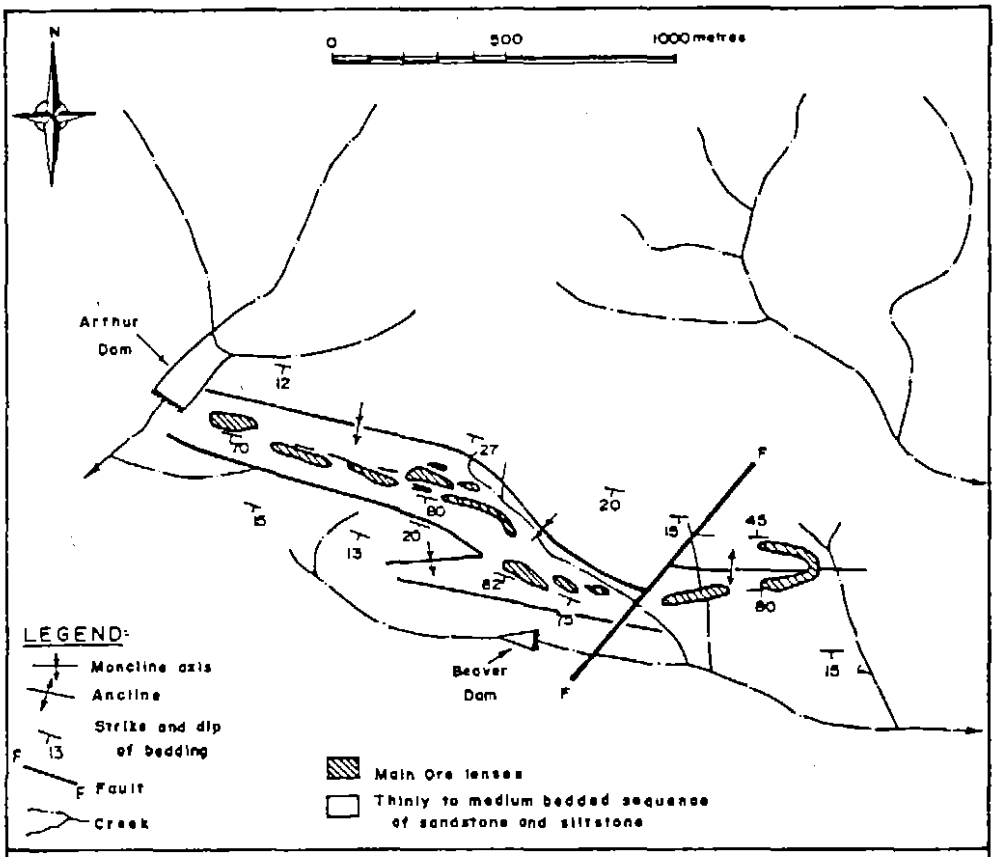
PERMIAN/CARB.	C-Ph	Pall Mall Adamellite	U. DEV.	Dum	Set. silst. shale
U. CARB.	C	Volcanics & Sediments		Dud	Set, congle., shale, tuff
U. DEV. TO L. CARB.	D-C	Set. shale, limestone & congle.	MIDDLE DEV.	Dmf	Limestone shale
			SIL. / L. DEV.	S-Dr	Granod to diorite

5 cm

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GEOLOGICAL INTERPRETATION OF THE MINE AREA

FIG. 3

5 cm

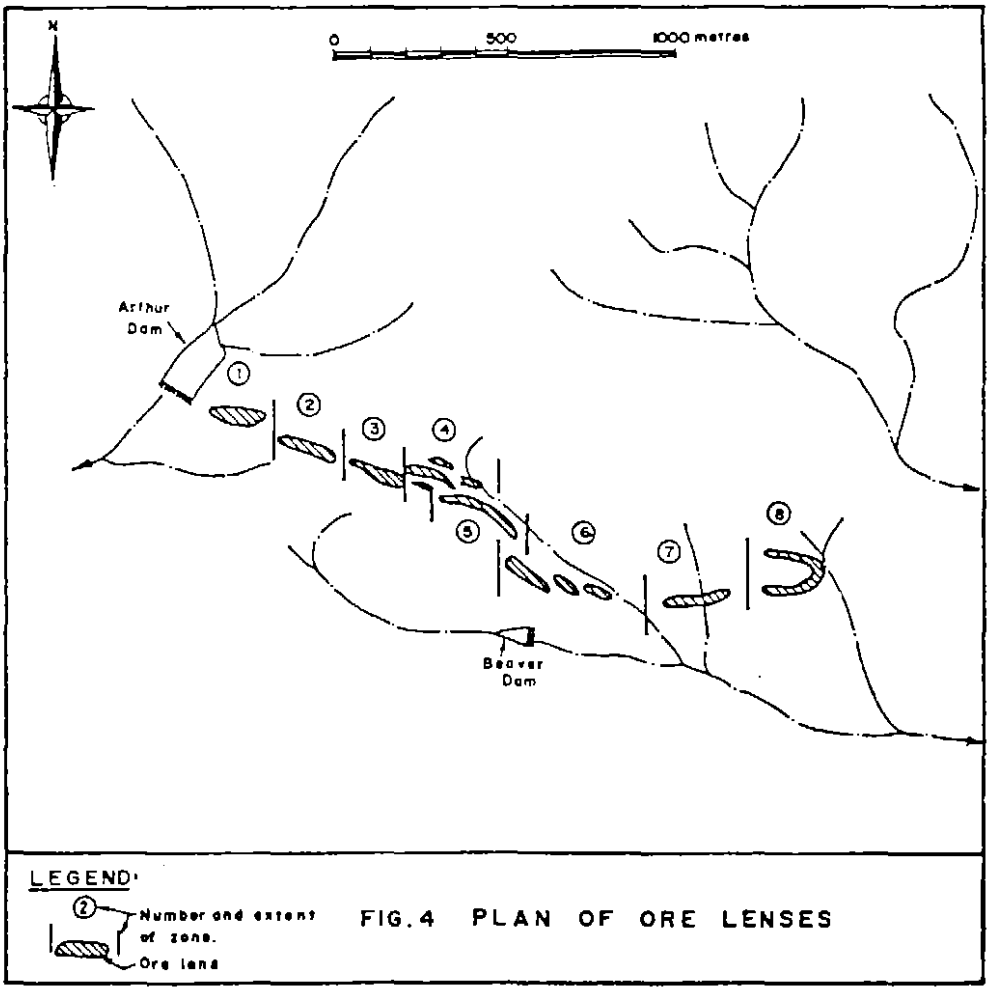
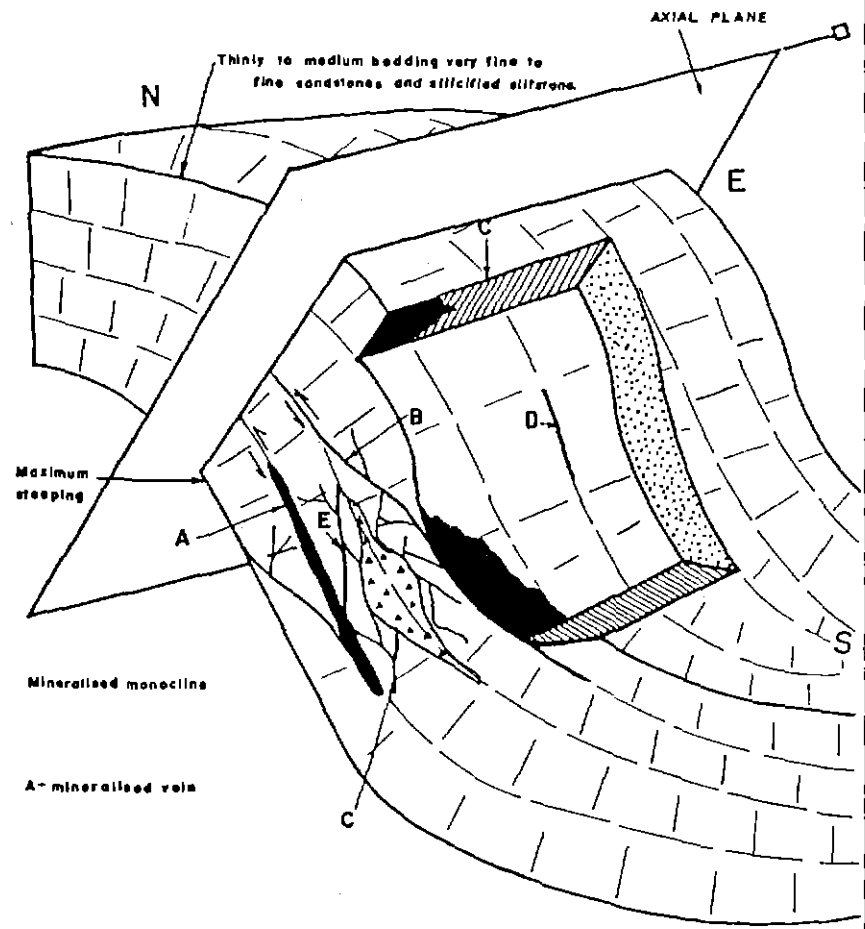


FIG. 4 PLAN OF ORE LENSES

88-2-88

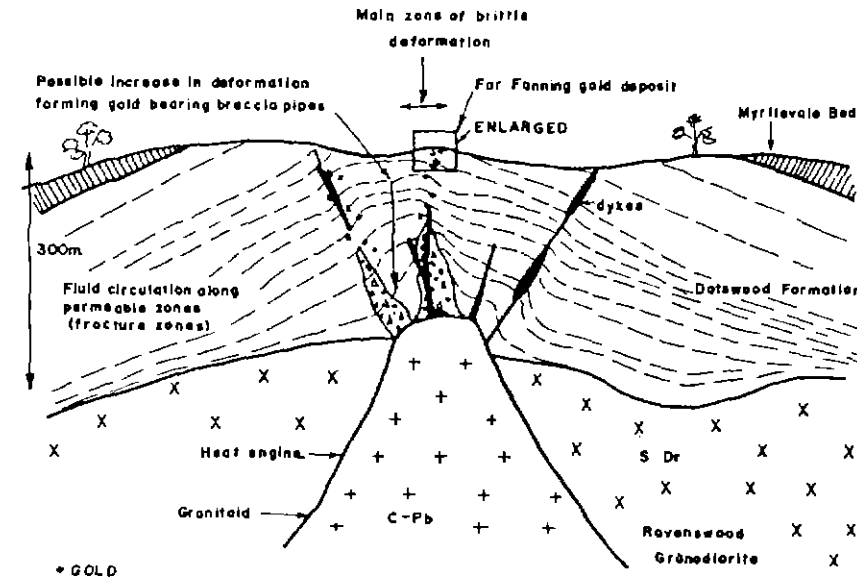
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214



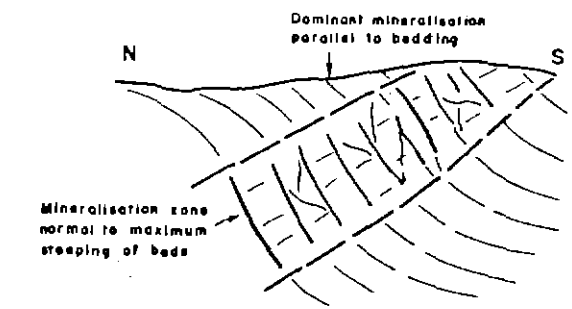
SCHEMATIC SKETCH OF MINERALISED FRACTURE AND VEIN SETS.

FIG. 5

CROSS-SECTION



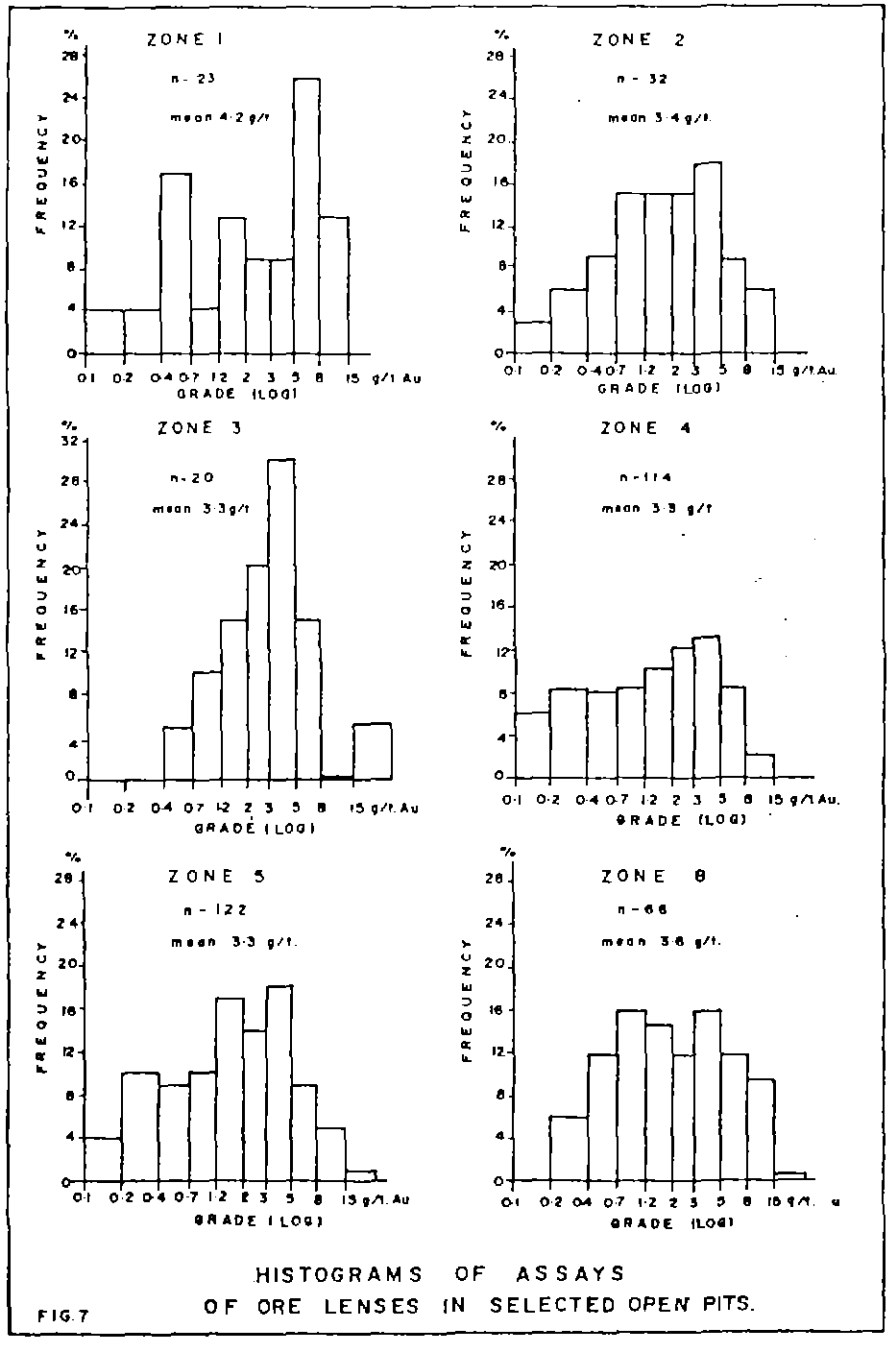
Not to scale



ENLARGED AREA

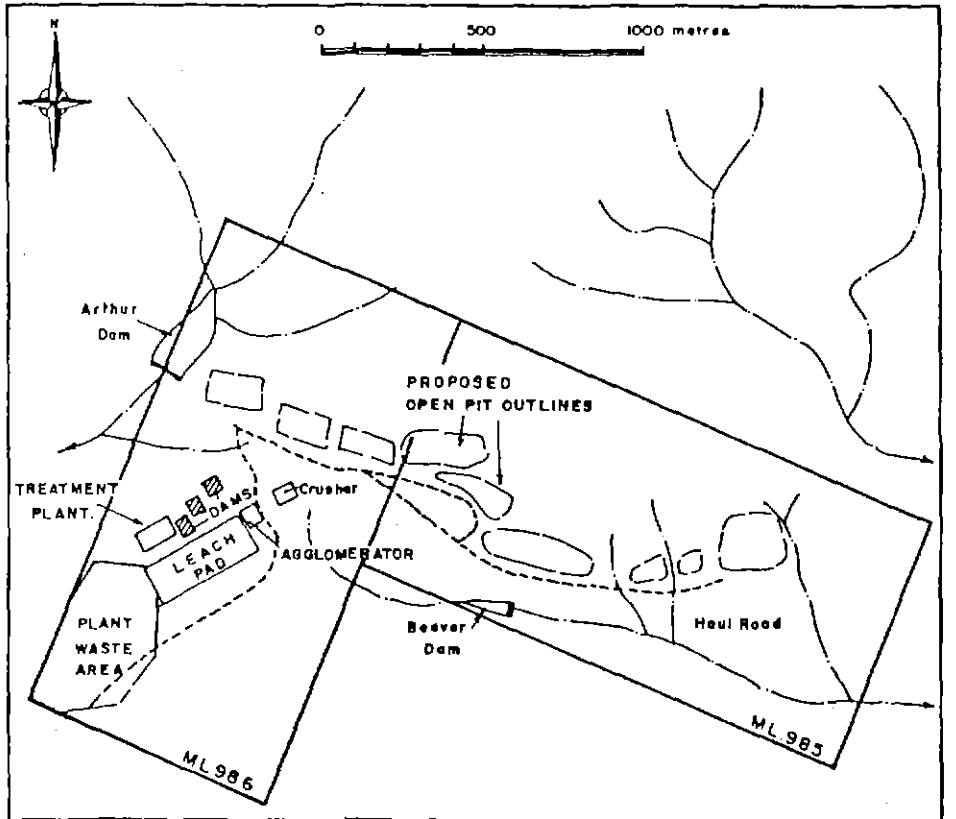
MINERALISATION MODEL FOR FAR FANNING GOLD DEPOSIT.

FIG. 6



HISTOGRAMS OF ASSAYS
OF ORE LENSES IN SELECTED OPEN PITS.

FIG. 7



MINE LAYOUT

FIG. 8

5 cm

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708215 29

708216

GEOLOGY OF THE JAMESTOWN MINE AREA MOTHER LODE GOLD BELT TUOLUMNE COUNTY, CALIFORNIA

By

P. H. Dohms, R. D. Hoagland
Condor Minerals Management, and
G. M. Algood
Sonora Mining Corp.

INTRODUCTION

This paper has been prepared as an introductory document for participants in the Society of Economic Geologists field trip to the California Mother Lode, March 1 - 5, 1984. As such, it is meant to present an overview of the deposits at Jamestown and to offer up some ideas for discussion. It is not meant to be a definitive treatise on the origin of the Mother Lode ores, which is a discussion we anticipate will continue for some years to come.

The visit to the Jamestown Mine will involve stops at two of the four principal deposits, the Harvard and the Dutch-App orebodies. Since exposures are somewhat restricted at the Harvard, rather less time is planned there than at the Dutch-App. Figure 1 shows the relative positions of these two deposits with respect to the Crystalline and Jumper properties of the Project, which will not be seen.

We would like to express our appreciation to the management of the Sonora Mining Corp. for giving us the opportunity to bring the Society to these deposits. It is through exposure to orebodies in the field that the Society gives its greatest service to its membership.

PROJECT HISTORY

The Project began in 1977 with literature research by staff of the Western Exploration office of the New Jersey Zinc Exploration Company in Tucson, Arizona. Field reconnaissance began in January, 1978 and the properties in the Jamestown district were first visited in July of that year. Geologic investigations and initial property acquisition consumed the following year. Drilling began on August 1, 1979 and continued until early November, 1981. During that time, some 116,349 feet of cuttings and core were drilled in 1137 holes.

Project engineering and feasibility studies continued through 1982. Environmental baseline studies continued concurrently and eventually lead to the preparation of an Environmental Impact Report.

In June of 1982, Gulf + Western, the parent company of New Jersey Zinc Exploration, embarked upon a course that eventually lead to the divestiture of all Natural Resource operations, including the Jamestown Project. Agreement in principal was reached with the ABM Group, the parent company of Sonora Mining Corp., in late May, 1983 and the project formally changed hands in mid-September of that same year. Since that time, engineering work and environmental and permitting reviews have proceeded at an accelerated pace.

GEOLOGY

The regional geologic picture has been well covered by Schweickert & Bogen (1983), by Albers (1981) and by Dodge, et al (1983) and will not be repeated here. Suffice to say that the Jamestown district lies along the historic Mother Lode, a major crustal suture over 200 miles in length. This feature is coincident, more or less, with the Melones Fault Zone. In the vicinity of the mines, the Lode separates essentially Paleozoic argillites of the Calaveras complex on the east from a Mesozoic island arc/ ocean floor crust complex on the west.

The deposits themselves present an east-dipping strataform appearance. The typical hanging wall rock is black Calaveras phyllite with a strong slaty cleavage. Locally, the phyllites are strongly graphitic. Moving down-section through the zone of mineralization and alteration, a footwall of metavolcanics and/or serpentinitic rock is eventually encountered. Regional strike in the Harvard - Dutch-App area is about N 30 W and dips average about 55 degrees east at depth. Dips at or near the surface within the weathering zone are somewhat steeper. Although they are intimately associated, mineralization and alteration features differ from property to property and will, therefore, be discussed separately for each mine.

HARVARD MINE

Two zones of mineralization are present at the Harvard Mine. The Footwall zone lies below and in contact with the prominent "Bull quartz vein". This zone was the higher grade of the two and has, therefore, been essentially mined out. It is associated with chloritic and ankeritic metavolcanics and generally contains moderate quantities of quartz-carbonate veining. Specimens from this zone can easily be collected on the dump of the #1 Shaft at the Harvard.

A second, lower grade, zone lies on the hanging wall of the "Bull quartz". It is from this zone that the majority of the recently discovered ore at the Harvard has been developed. Here the mineralization is closely associated with a fine grained to dense siliceous pyritic carbonate rock which was given the field name of "ankerite" (Knopf's "Grey Ore"). This rock also is commonly laced with late white veinlets of coarse, euhedral quartz and carbonate. Specimens of this material are rarely found on the #1 Shaft dump.

Gold has been observed both megascopically and microscopically to occur in its native form. In virtually every case, when gold is observed megascopically at the Harvard, it is associated with one of the late white quartz-carbonate veinlets mentioned above. In its finer state (<300 microns), gold has been observed both in finely divided free particles in a variety of rock types and, to a greater extent, in intimate association with pyrite.

Pyrite is the only megascopic sulfide identified to date at the Harvard. Minor amounts of sphalerite and chalcopyrite have been identified during microscopic examination. The gold-bearing pyrite is commonly euhedral and fairly fine grained. Ore zone sulfide contents vary up to 10% but average nearer to 2%. Interestingly, pyrite appears lacking in the late quartz-carbonate veinlets.

No correlation has been recognized between pyrite content and gold content. Similarly, attempts to definitively correlate gold content with any particular feature have failed and the old saw, "gold is where you find it", turns out to have a great deal of truth.

DUTCH-APP MINE

In order to save space, this section of the paper will dwell on the differences between the Harvard and Dutch-App deposits and only touch lightly on the similarities. As can be seen from the illustrations, the most evident difference is in the composition of the principal alteration zone. At the Dutch-App, rock alteration is marked by enormous zones of a peculiar rock termed "Quartz-Ankerite-Mariposite", or QAM. Good examples of this material can be collected from the dump at the App shaft and in the rock faces immediatly south of that shaft.

The first stop here will be at the old Dutch Shaft. While some interesting rocks and artifacts can be found here and many picturesque photos can be taken, this stop is of more historic interest than geologic. Most of the time available will be spent in the vicinity of the App shaft where three distinct ore zones are well exposed in outcrop.

At Quartz Mountain a highly graphitic phyllite of the Calaveras complex lies to the east of the deposits. As the uppermost of the three separate mineralized zones (the Heslep Zone) is approached this phyllite becomes siliceous while still retaining its graphitic nature. Within the Heslep zone itself, "ankerite" similar to that found in the hanging wall ore zone at the Harvard Mine appears common. As can be seen by the substantial surface workings, this zone received considerable attention from the early day miners. The western boundary of the Heslep ore zone is marked by the contact with the great Quartz-Ankerite-Mariposite alteration zone of Quartz Mountain.

Quartz Mountain itself owes it existence to the presence of this wide Quartz-Ankerite-Mariposite body. This body has been mapped to be in excess of 1000 feet wide, while massive quartz veins within it have been found in widths of up to 80 feet. Although most of this volume comprises very low grade mineralization, within it is found the Middle ore zone.

The typical appearance of Quartz-Ankerite-Mariposite is of a medium to coarsely crystalline light green rock laced with white veinlets of late quartz-carbonate. The color is derived from Mariposite, a chromium mica. The other major constituients of this rock are a medium to coarse crystalline white to light grey carbonate, again termed "ankerite". This "ankerite" is distinguished from the ankerite at the Harvard by its color and grain size. Pyrite is nearly ubiquitous, though at a somewhat lower concentration than at the Harvard.

The westernmost or App ore zone is localized within and adjacent to a sliver of graphitic phyllite lying immediately on the footwall of the prominent App quartz vein. Immediatly south of the App shaft, the ore expands into a Quartz-Ankerite-Mariposite zone exposed on the footwall of the App vein. The footwall of the App ore zone is the serpentinite exposed at the App Millsite located to the west of the shaft.

At the Dutch Shaft (approximately 1200 feet North of the App Shaft) the App ore zone apparently pinches out. Here one large ore zone, a continuation of the Heslep and Middle ore zones, occurs within a Quartz-Ankerite-Mariposite body.

The graphitic ore comprises a significant percentage of the reserves at the Dutch-App. This is in marked contrast to the Harvard where graphitic ore is very limited. At the Dutch-App, lesser ore grade mineralization has also been found associated with zones of sericite schist, chlorite schist and, rarely, talc schist. As at the Harvard, precise correlations of gold content with observed geologic features is difficult except on the broadest scale. Indeed, the exposures of Quartz-Ankerite-

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Mariposite near the App shaft are by no means uniformly mineralized and some of the most striking outcrops are quite deficient in gold content.

ORIGIN OF THE ORES

Any genetic model of the Mother Lode type of gold deposit is going to have to be able to satisfy a number of compelling questions. This section is intended to raise some of these questions, based on our observations and those of others.

Ore grade gold mineralization has been found in rocks considered to be alteration products of both hanging wall assemblage argillic rocks and footwall assemblage serpentines. Knopf (1929) noted that the alteration zones gradually cross the stratigraphic section downdip. Unfortunatly, the areas he studied are not accessible and the scale of this feature (several thousand feet) precludes easy testing by surface drilling.

The geometry of the deposits is also interesting. Ore shoots mined in the past show similarities throughout the Lode in that the longest dimension is steeply down dip. Mineralogies and grades of ores mined from depths past 6000 feet are virtually identical with exposures at surface where several thousand feet of erosion since the Miocene has been documented.

Ore grade mineralization occurs within envelopes of large zones showing late white quartz-carbonate veining thought to represent crackle and rubble brecciation. While visible gold is known to be associated with these veinlets, pyrite is absent from them in a very striking manner. Since most of the finely disseminated gold values are associated with pyrite, this lack is peculiar.

SUGGESTIONS FOR FUTURE STUDY

A number of avenues of investigation that would lead to greater understanding of these deposits lie open. This section of the paper will attempt to list some of these and outline how their evaluation will be helpful.

Whole rock and trace element chemistry of the following rock types needs investigation:

1. Unaltered, unmineralized hanging wall and footwall assemblage rocks.

2. Mineralized rocks of the various alteration zones.

3. Unmineralized rocks of the various alteration zones.

4. Late quartz-carbonate veinlets, both gold-bearing and barren.

5. The massive "bull quartz" veins.

Tihor and Crockett (1977), in a report of this type of work at the mineralogically similar Kerr Addison-type deposits in Canada, were able to draw some fascinating conclusions regarding the origin of the quartz-carbonate alteration.

Fluid inclusion work should be done, particularly in the "bull quartz" and the late white quartz-carbonate veinlets. Temperatures of formation of these rock types are needed before conclusions regarding their origin can be drawn. This work could also reveal data on the chemistry and origin of these ores.

Oxygen, carbon and sulfur isotope investigations are needed. The oxygen data can provide leads on the environment of origin of the ores. The sulfur, especially in comparisons of ore-zone and "country rock" pyrites, will be extremely useful given the intimate association of gold with pyrite in the deposits. The carbon isotope studies, in conjunction with the chemical work described below, will indicate whether the carbon was introduced into the system during mineralization, whether it was already present in the form of graphite, or some combination of the two.

Information regarding the chemical compositions of the three recognized principal carbonates is necessary. Slight chemical differences between the "grey ore" fine carbonate, the white, crystalline carbonate of the Quartz-Ankerite-Mariposite and the coarse, euhedral carbonate of the late white veinlets could have profound implications.

RESERVES

The total measured and potential reserves (Patton, 1983) total 24,762,500 undiluted tons of ore averaging 0.065 oz. Au/ton. Additional underground potential reserves total 12,920,000 tons of 0.136 oz. Au/ton average grade.

In addition, a coarse gold factor of +17% will be added to approximate gold not recovered by drilling. The coarse gold varies from mine to mine and the 17% is an average for the overall project. It was derived from Sonora Mining Corporations bulk metallurgical test work.

ORE DEVELOPMENT

Mining of these orebodies will be by standard open pit mining procedures. Initial development will be pioneered by bulldozers using hydraulic rippers. Standard drilling and blasting will be

employed for the more competent rock. The broken rock will be loaded by front-end loaders and power shovels into 80 yd. dump trucks. Ore will then be hauled to the mill site west of the Harvard mine area.

The mill will be sized to process 5000 t.p.d. The ore will be crushed and screened before grinding. Most of the gold values are within auriferous pyrite which will be concentrated by flotation. Any coarse gold will be recovered in a jig. Metallurgical test work by Sonora Mining Corp. resulted in a 94% recovery of precious metal values. The gold-bearing concentrates will be shipped out of state for smelting.

Once the Dutch-App and Jumper mines are brought on line, there will be a crushing plant constructed at the Dutch-App site. The crushed ore from here will be moved by conveyer across Woods Creek and Highway 49/108 to the mill site at the Harvard.

BIBLIOGRAPHY

ALBERS, John P., 1981, A Lithologic-Tectonic Framework for the Metallogenic Provinces of California: ECON. GEOL., v. 76, p. 765-790

DODGE, F.C.W., KISTLER, R.W., and SILBERMAN, M.L., 1983(in press), Isotopic Studies of Mariposite-bearing Rocks from the South-Central Mother Lode, California: California Geology

DUFFIELD, W.A., and SHARP, R.V., 1975, Geology of the Sierra Foothills Melange and Adjacent Areas, Amador County, California: U.S. Geol. Survey Professional Paper 827, 30p.

KNOPF, A., 1929, The Mother Lode System of California: U.S. Geol. Survey Professional Paper 157, 88p.

PATTON, T.C., 1983, Geology of the Mother Lode Projects, Tuolumne County, California, private report for Cimetta Engineering & Construction Co., in, Reclaimation Plan, California Gold Project, Sonora Mining Corp., Tuolumne County Planning Department, 1984.

SCHWEICKERT, R.A., and BOGEN, N.L., 1983, Tectonic Transect of Sierran Paleozoic through Jurassic Accreted Belts, in, Guidebook of the Pacific Section of the Society of Economic Paleontologists and Mineralogists

THOR, L.A., and CROCKET, J.H., 1977, Gold Distribution in the Kirkland Lake-Larder Lake Area, with Emphasis on Kerr Addison-Type Ore Deposits, A Progress Report: in, Report of Activities, Part A; Geol. Surv. Can., Paper 77-1A

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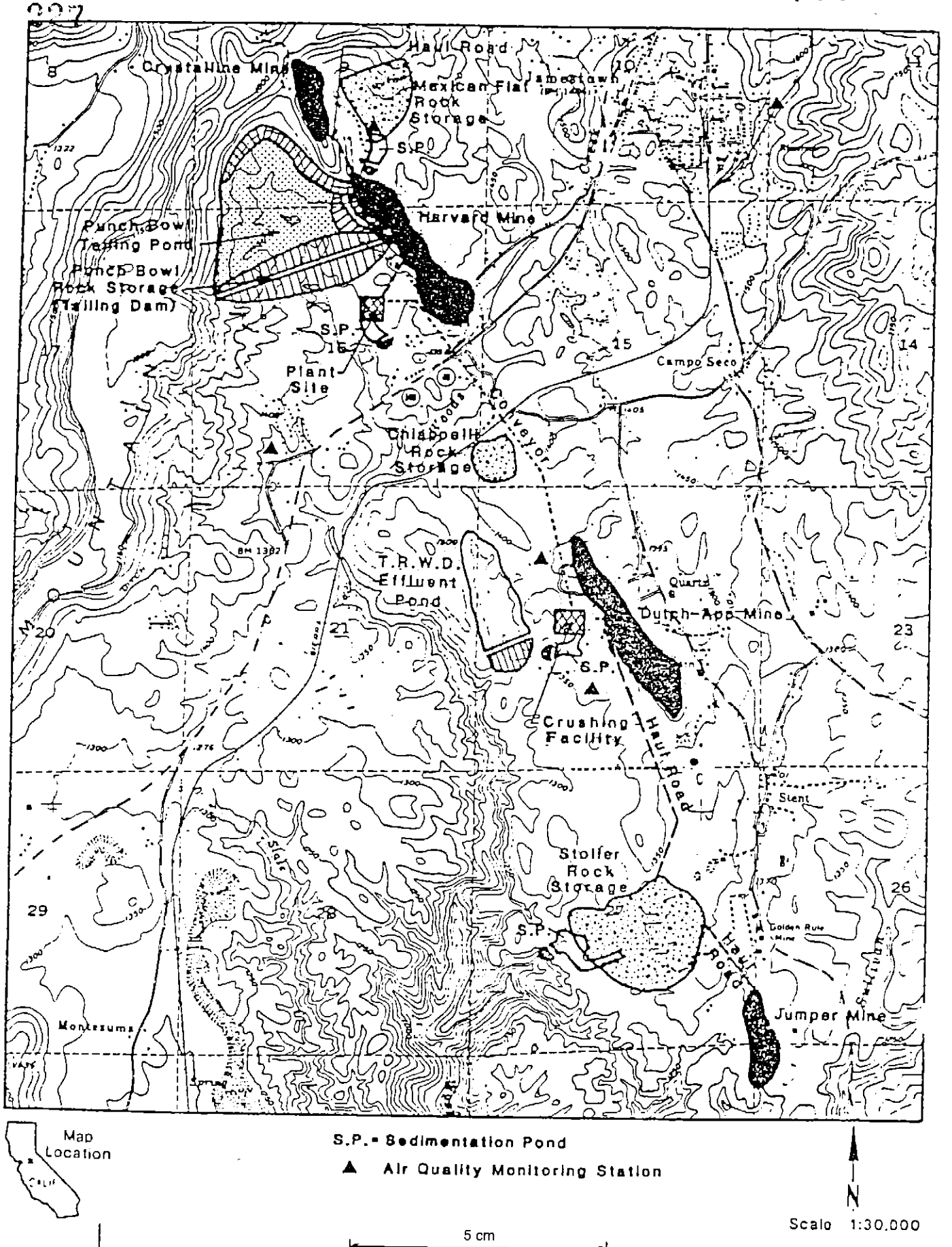
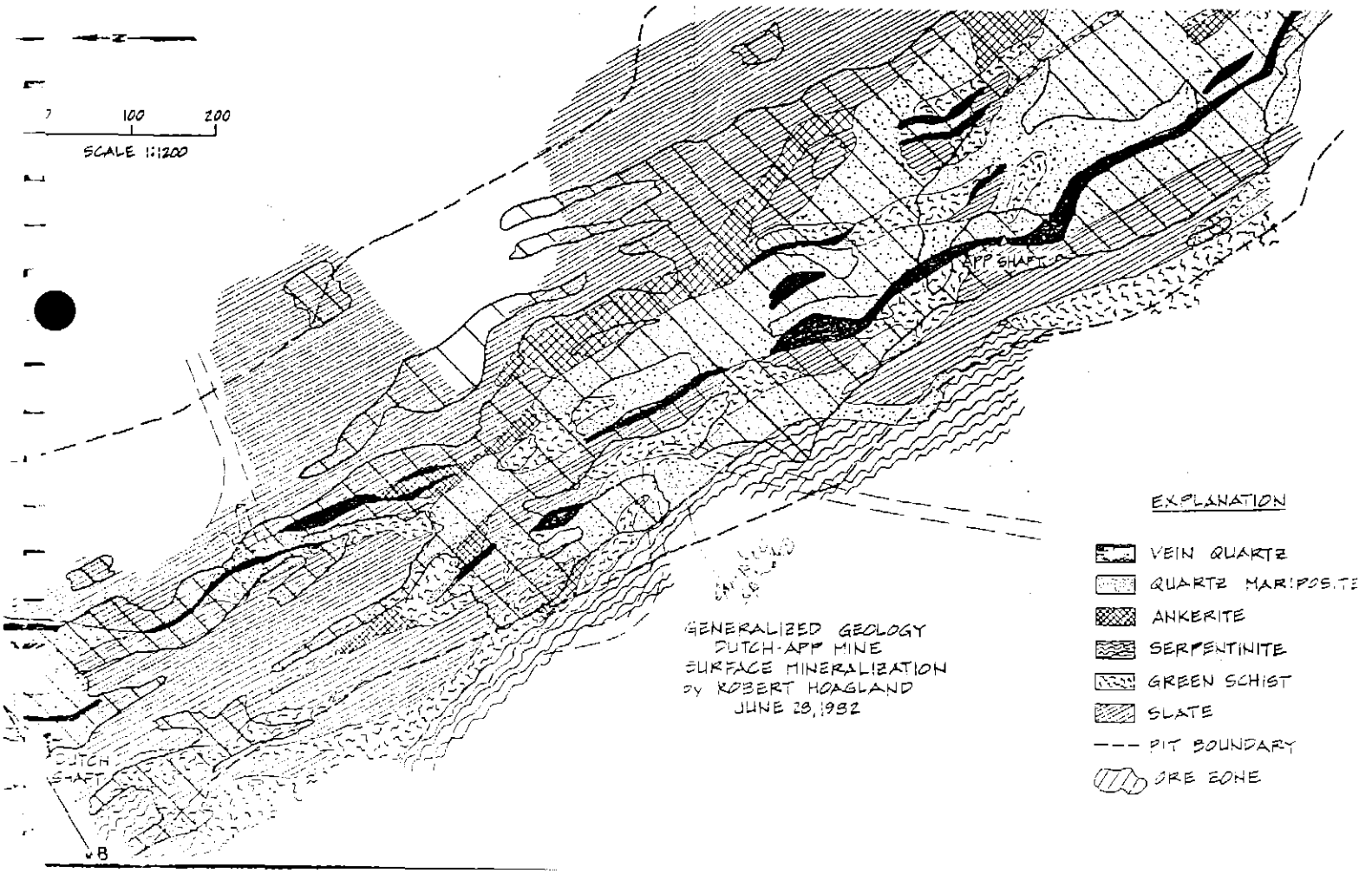


Figure 1

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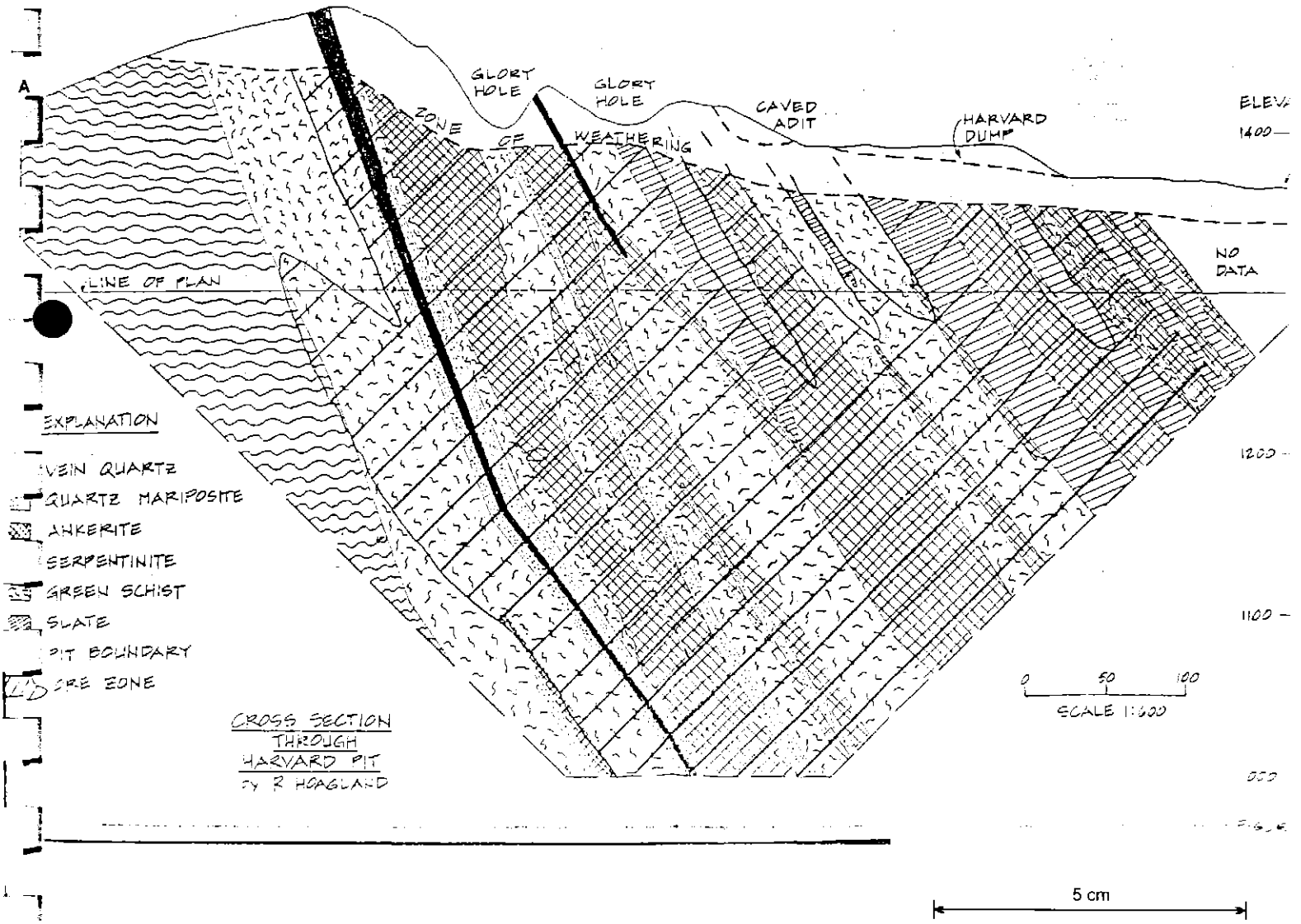


GENERALIZED GEOLOGY
DUTCH-APP MINE
SURFACE MINERALIZATION
by ROBERT HOAGLAND
JUNE 28, 1982

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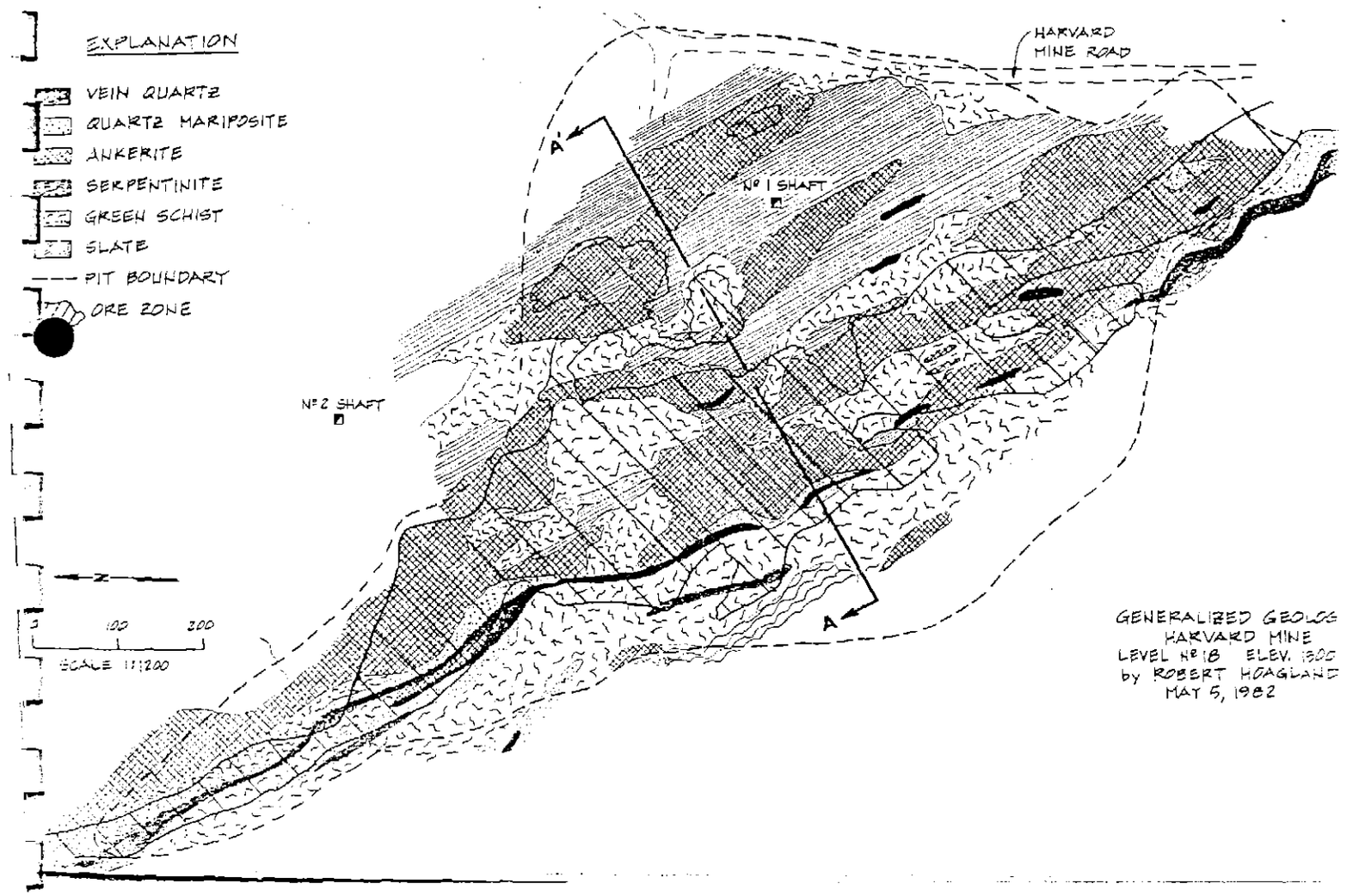
CROSS SECTION THROUGH HARVARD PIT
by R HOAGLAND

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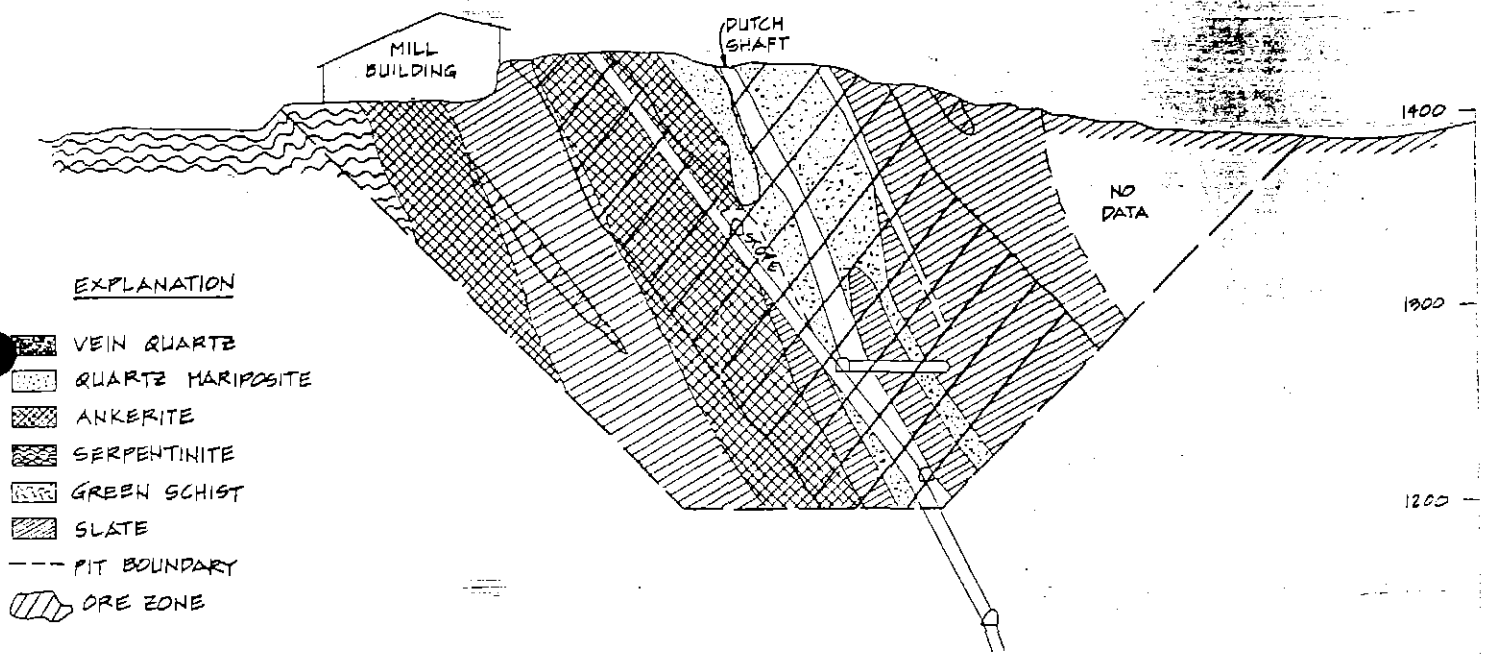
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CROSS SECTION
THROUGH
DUTCH SHAFT
by G. ALLGOOD

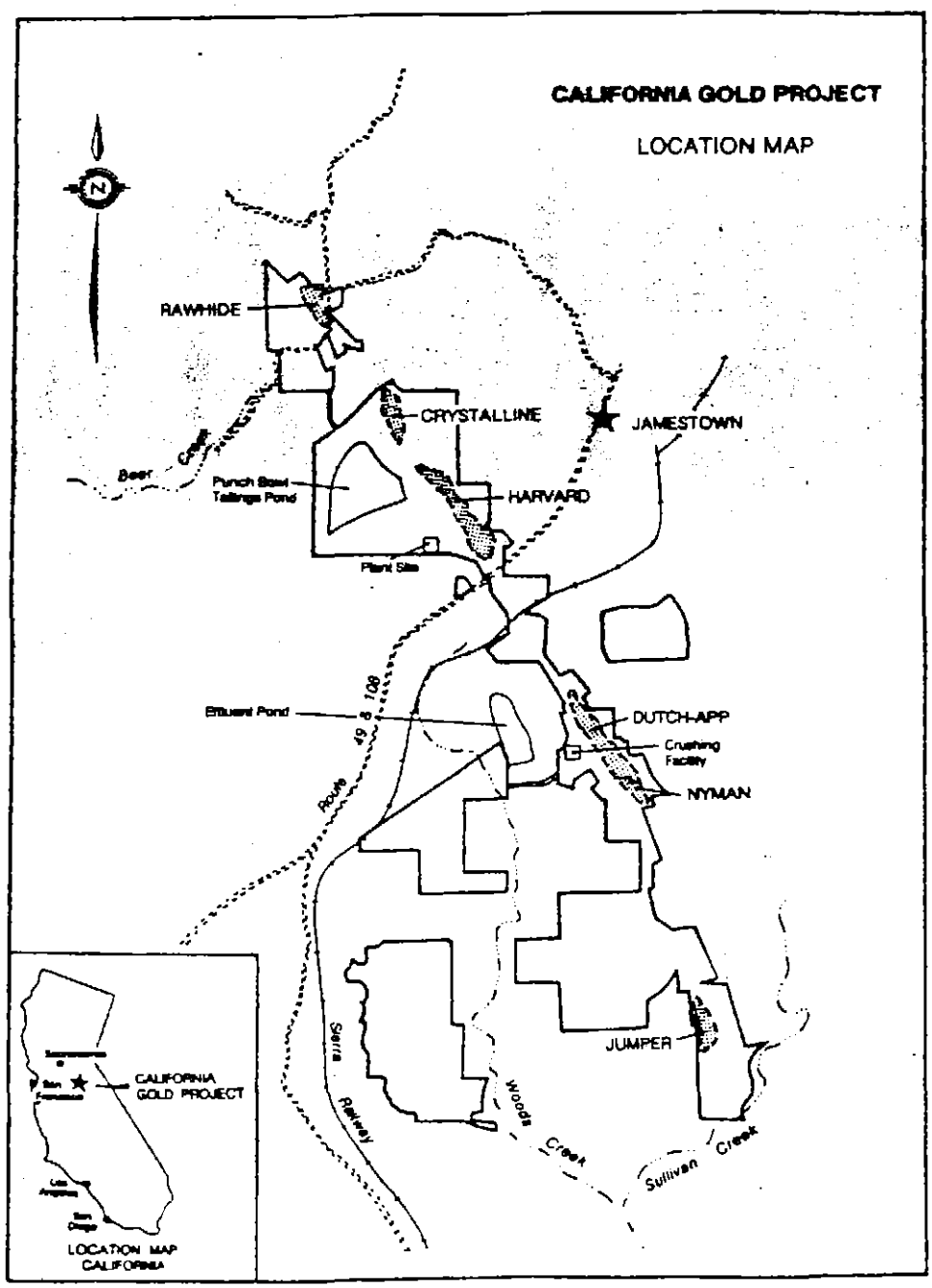
FIGURE

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Sonora Gold Corp Start Up

Open pit mine and proc
100,000/125,0



IN THE MOTHER LODE C central California, Sonora Go Corp. is conducting a project r quiring a capital expenditure about $32.4 million near Jamestow in Tuolumne county to develc precious metals deposits by open p methods and construct an ore pr cessing complex for start up in O tober. During the first year operation, production of gold estimated at 125,000 oz., and t processing facilities are believed be capable of producing more tha 300,000 oz. of gold annually wi costs running at $181 per ounce rank Sonora among the lower co producers in North America.

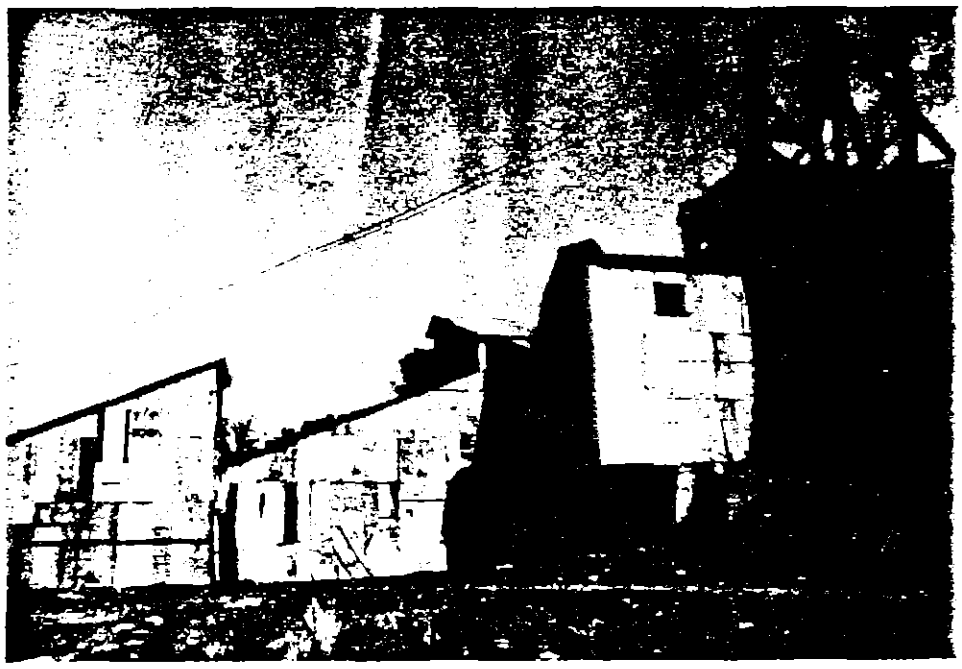
At the site, which is 125 miles ea of San Francisco and 70 mil southeast of Sacramento, 5000 to of ore per day will be processed the concentrating facilities and lat will be expanded to 7000 tons p day. On Sept. 21, 1983, the mini properties were acquired for $ million plus a 15% net operati profits interest from The Ne Jersey Zinc Co., a subsidiary Gulf & Western Industries In Sonora Gold is part of ABM Mini Group Inc., a Canadian firm hea quartered in Vancouver that conducting through subsidiaries e ploration and preproductic development programs at sever gold/silver prospects in the weste U.S.

Mining properties bein developed by Sonora Gold inclu 1826 acres purchased from Ne Jersey Zinc plus additional acrea acquired by the company just we of Jamestown. Contiguous pro erties include the Rawhid

708232

Project for Oct. 1984 Mother Lode

...cilities with extraction of ... of gold annually



Old mine buildings dating from the 1915 to 1931 period at the Dutc App property situated in the future open pit mining area of Sonora Gc Corp.

Crystalline, Harvard, Dutch-App, Nyman and Jumper deposits extending over a five-mile long by one-half mile wide trending belt.

In the Jamestown district, the first major ore deposit developed was the Harvard mine followed by the Dutch, Sweeney and App-Hestep. The properties were mined to depths ranging from 600 ft. at the Crystalline to 2300 ft. at the Dutch-App deposit. Mining ceased at the beginning of World War I but resumed in 1934 when an increase in the gold price brought renewed activity to the district.

Production continued until World War II when a government executive order terminated gold mining operations, and the Jamestown district was dormant until the mid-1970s when higher gold prices spurred renewed exploration and evaluation of the entire Mother Lode. Total reported gold production of Tuolumne county is 10,131,000 oz.

Activity of NJZ Starts in 1978

In 1978, the property acquisition was commenced by New Jersey Zinc in the Jamestown district and was followed by initial ground reconnaissance and a detailed geochemical sampling program in 1978 and 1979. Surface drilling began in Aug. 1979, and by Dec. 1981 a total of 116,349 ft. had been drilled in 1137 holes principally on 50 and 100-ft. centers. Presently more than 1250 drill holes have been completed. Most of the drilling was on the Harvard and somewhat less on the Dutch-App, with the remainder split among the other four properties.

Exploration conducted by New Jersey Zinc identified lower grade bulk tonnage deposits of auriferous schists interlaced in places with quartz stockwork. Gold occurs in its native state and also is associated with pyrite. By early in 1981, continuing work included proving additional ore reserves and conducting engineering studies. About $9 million were spent by New Jersey Zinc on exploration, feasibility and development on these gold properties.

About 16,000 samples representing 5 or 10-ft. drill intervals were assayed for gold principally by the atomic absorption method. Fire assaying checks were performed on all values over 0.06 oz. of gold per ton by two laboratories.

Majority of the exploration was by rotary drilling and assaying the recovered chips, with some core drilling also conducted. Ore reserves were calculated using a tonnage factor of 12 and a cutoff of 0.03 oz. of gold per ton for sulfide ore and a tonnage factor of 15 and cutoff of 0.02 oz. of gold per ton for oxidized ore. A 0.025 oz. per ton cutoff grade was used to calculate reserves at the smaller Rawhide and Jumper mines.

Proven ore reserves for open pit mining are estimated at 24,762,500 tons averaging 0.065 oz. of gold per ton, with an overall stripping ratio of 3.48-to-1. Ore reserves suitable

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708233



Old headframe at the Harvard mine situated in the middle of the open pit area being developed initially by Sonora Gold Corp. in the Mother Lode.

for mining by the underground method are calculated at 12,920,000 tons averaging 0.136 oz. of gold per ton. Contained gold is calculated at 1,609,560 oz. and 1,757,120 oz. from the open pit and underground reserves, respectively.

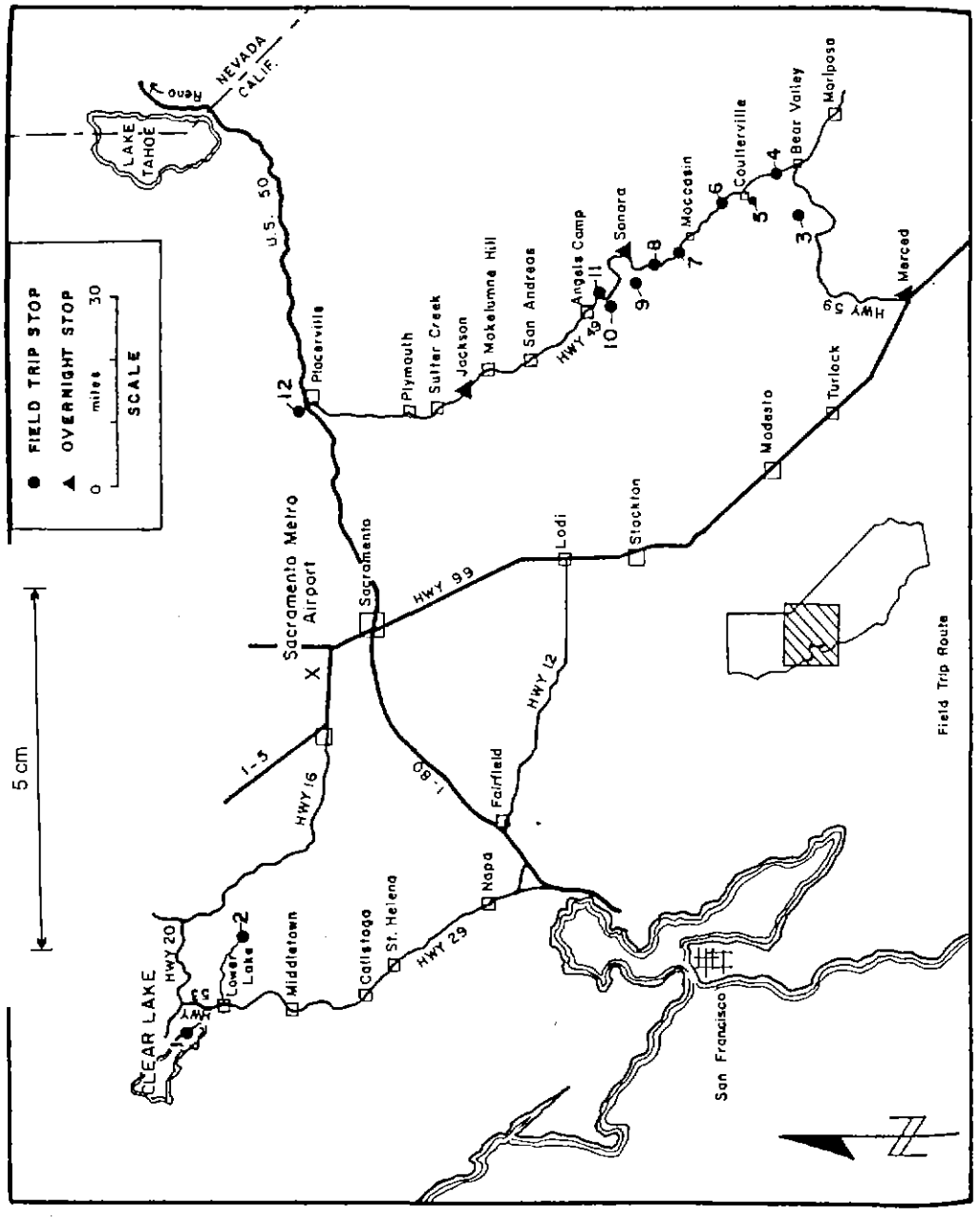
Further potential exists along strike, laterally and at depth in all of the deposits. Ore reserves are based on drill results conducted by New Jersey Zinc that included many holes stopped in mineralization at an average depth of 250 ft. Mining plans call for ultimate pit depth of 900 ft. in each of the deposits that contain 100,000,000 tons of possible open pit ore reserves. Proven open pit reserves are sufficient for 13 years at the projected initial milling rate of 5000 tons of ore per day. It is considered likely that the production rate could be doubled at some future stage of the mining operation.

Harvard First Deposit Developed

The lease agreement requires that the Harvard deposit be developed initially by Sonora, and the ultimate pit covering the Harvard and Crystalline orebodies is expected to provide adequate reserves for a mine production rate of 5000 tons per day on a seven-day per week schedule over a five to 10-year period. Further ore to feed the 5000-ton per day concentrator at capacity would originate from the Dutch-App orebody during the same period and extend two to five years beyond. Additional feed would then be required from the Jumper and Rawhide deposits.

The preliminary pit outlines are based on a 45° mining slope to an average depth of 250 ft. If this can be increased to the planned 50° to 55°, the ore reserve will be expanded substantially without seriously affecting the ore-to-waste production ratio. Just to a depth of 375 ft., there would be a 50% increase in mineable open pit ore reserves. Blast hole drilling will be with large rotary machines, and broken ore and waste will be loaded with diesel-powered shovels and large rubber-tired front-end loaders into 85-ton capacity trucks.

Ore will be hauled to the 5000-ton per day capacity flotation concentrator situated on the west side of the Harvard mine that will operate on a 360-day per year basis. Flotation concentrate containing 2 oz. of gold per ton and 2.4 oz. of silver per ton will be leached, with gold in the resulting solution recovered by electrolysis to extract 99.9% gold bullion. At an annual processing rate of 1,800,000 tons of ore, between 100,000 and 125,000 oz. of gold and 120,000 and 140,000 oz. of silver will be produced by Sonora. □



Calif. Soc. Nevada Field Guide 1987

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FIELD TRIP 4
PRECIOUS METAL DEPOSITS OF THE CENTRAL CALIFORNIA COAST RANGE AND SIERRA NEVADA FOOTHILL REGION

Tim K. Smith
Consultant

Ralph C. Loyd
California Division of Mines and Geology

H. Walter Schull
Consultant

FIELD TRIP PROGRAM

DAY 1 - APRIL 2, 1987
Leave Sacramento Metropolitan Airport 7:00 a.m.
STOP 1 - Sulfur Bank Mine, Clear Lake
STOP 2 - McLaughlin Mine, Knoxville
Night 1 - Merced

DAY 2 - APRIL 3, 1987
STOP 3 - Blue Moon Mine, Hornitos
STOP 4 - Pine Tree-Josephine Mine, Bear Valley
STOP 5 - Roadcut Exposure - Mariposite, Coulterville
STOP 6 - Stratigraphic Section, Coulterville
STOP 7 - Stratigraphic Section, Moccasin
STOP 8 - Roadcut Exposure - Pillow Basalt, Jamestown
Night 2 - Sonora

DAY 3 - APRIL 4, 1987
STOP 9 - Jamestown Mine, Jamestown
STOP 10 - Roadcut Exposure, Carson Hill
STOP 11 - Carson Hill Mine, Carson Hill
Night 3 - Jackson

DAY 4 - APRIL 5, 1987
STOP 12 - Melones Fault Zone Traverse, Placerville
END OF FIELD TRIP

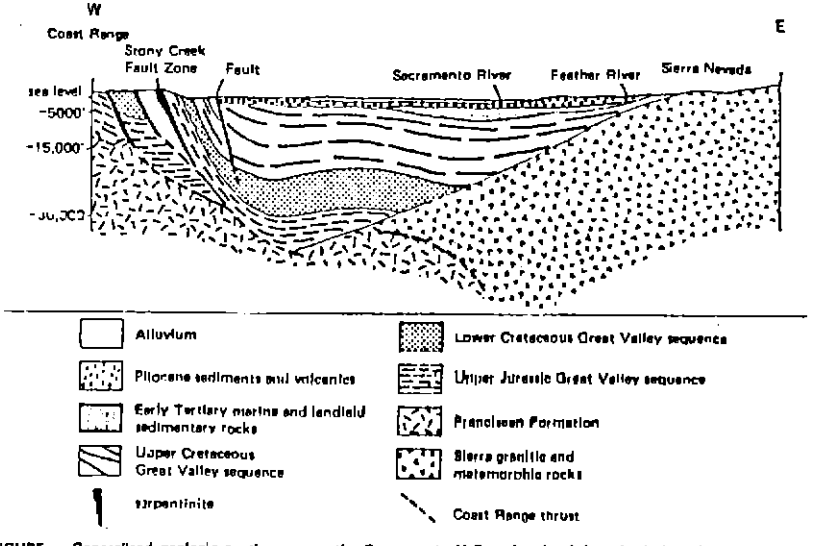


FIGURE Generalized geologic section across the Sacramento Valley showing inferred relationships of the Coast Range thrust in the northern part of the Great Valley.

708234

DAY 1 - THURSDAY, APRIL 2

Depart Sacramento Metropolitan Airport 7:00 a.m. Bus will be boarded near PSA terminal.

Mileage Cum.	Inc.	
0.0	0.0	Junction of airport exit road and Interstate Hwy 5 North. Road log odometer reading begins at point where vehicle merges into right lane of freeway.
8.0	8.0	Take Woodland exit (Business Loop 5 and State Hwy 113 offramp). Turn left at offramp traffic light onto East Main Street and proceed through downtown Woodland.
11.3	3.3	Leaving Woodland. Main street becomes State Hwy 16 at this point. Continue on Hwy 16 West through Madison and Esparto.
27.4	16.1	Entering foothill region of the Coast Range.
39.6	12.2	Entering Guinda.
44.4	4.8	Entering Rumsey.
46.9	2.5	Entering into lower foothill region of the California Coast Range. Bedded sedimentary deposits exposed along road are units of the Great Valley Sequence of Cretaceous age.
57.9	11.0	Serpentinite exposed on slopes to west mark trace of the Coast Range thrust fault.
59.0	1.1	Junction of State Hwys 16 and 20. Turn left onto State Hwy 20 West toward Clear Lake.
59.6	0.6	Note thermal hot spring deposit on slope to right.
60.3	0.7	Another hot spring on right.
62.4	2.3	Abbott mercury mine on right.
70.6	5.9	Flat lying Tertiary conglomerates (terrestrial and lacustrine) on left.
73.1	2.5	Lange Bros Aggregate operation on right.
77.3	4.2	Junction of State Hwys 20 and 53. Continue west on 20. We will return to this point after visiting the Sulfur Bank mine.
78.3	1.0	Quarry on right is producing decorative rock from cinder cone. The product has been marketed as far away as southern California.
79.4	1.1	Turn left onto Sulfur Bank Road.
80.7	1.3	Enter dirt road heading west along southern edge of water-filled pit of the Sulfur Bank mercury mine.
80.9	0.2	STOP 1. SULFUR BANK MERCURY MINE.

At this stop, we will be able to observe an active hydrothermal system similar in nature to the older system which governed mineralization at the McLaughlin mine some 20 miles to the southeast. The following description is taken from Volume 43 of the California Journal of Mines and Geology (Charles Averill, 1947):

"Sulphur Bank is a low, rounded hill on the shore of Clear Lake. It is situated in an area of Franciscan rocks overlain by a series of freshwater sediments of Plio-Pleistocene age capped by a Pleistocene basalt flow. The sediments consist of flat-lying sands and conglomerates deposited on a series of horizontal Franciscan shales and sandstone. A basalt extrusion broke through the overlying sedimentary strata, possibly at a point near the shore of Clear Lake, and spread out in a sheet over the sediments. Upon cooling, the basalt developed shrinkage cracks and formed the well known pillow structure commonly found in extrusive rocks which have been cooled under water.

Solfataric action has altered the rock to a great extent, with concentric weathering of the basalt common throughout the deposit. A thrust fault strikes approximately eastward across the southern extent of the mine workings. Through rifts in the hanging or north wall, hot sulfurous waters and steam now escape. The mineralizing solutions that probably rose through these rifts were to a certain degree trapped by the overlying basalt and deposited cinnabar at this point. The basalt sheet is not very extensive, being bound on the north and west by the waters of Clear Lake. To the south it may be faulted off and the faulted section eroded away, or it may have stopped in its flow before reaching the fault zone. Ore was found in commercial quantities from a depth of 30 or 40 feet below the surface to the lowest workings, which are more than 150 feet deep. The upper horizon contained sulfur in commercial quantities and was mined during the first years of operations (mining began here in 1865). Boiling hot springs are numerous throughout the mine area, and in one case action is of sufficient violence to throw a continual spray of mud and water into the air. It is quite certain that mineralization is proceeding at the present time in many of the springs and steam vents."

After mine tour return to Junction of State Hwys 20 and 53. Reset odometer.

0.0	0.0	Junction of State Hwys 20 and 53. Turn right on Hwy 53 heading south and proceed to Lower Lake.
4.4	4.4	Entering community of Clear Lake. Mount Konocti, a composite cone of andesitic composition, visible to right.
7.0	2.6	Entering community of Lower Lake.
7.4	0.4	Turn left onto Morgan Valley Road toward Knoxville.
12.3	4.9	Old mercury mine on slope to left.
20.2	7.9	STOP 2. Turn right into Homestake's Mclaughlin mill entrance — check in at security office. Refer to articl on the McLaughlin mine at back o field guide. After mill tour return to Morga Valley Road and reset odometer.
0.0	0.0	Turn right onto Morgan Valley Roa toward Mclaughlin mine site.
4.3	4.3	STOP 3. Turn left into McLaughli mine entrance immediately after pass ing through tunnel. After mine tour return to Morga Valley Road and reset odometer.
0.0	0.0	Turn right onto Morgan Valley Roa and return to Lower Lake.
17.1	17.1	Junction of Morgan Valley Road an State Hwy 29 in Lower Lake. Tur left on Hwy 29 toward Napa.
31.2	14.1	Entering Middletown.
37.5	6.3	Napa County Line.
48.1	10.6	Entering Calistoga.
56.3	8.2	Entering St. Helena, home of Christian Brothers, Sutter Home, BV, Mondavi, Inglenook and other famous Napa Valley wineries.
66.0	9.7	Entering Yountville.
72.3	6.3	Entering Napa.
81.4	9.1	Junction of State Hwys 29 and 12. Turn left onto Hwy 12 east.
87.5	6.1	Merger of State Hwy 12 and Interstate Hwy 80 east. Proceed east.
92.3	4.8	Take State Hwy 12 exit to Suisun. Continue east to Lodi.
138.2	45.9	Entering Lodi.
140.9	2.7	Junction of State Hwys 12 and 99. Turn right onto Hwy 99 South on-ramp to Merced.

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216.9 76.0 Take State Hwy 140 exit in Merced. We will be staying at the Pine Cone Inn Motel located at the base of the offramp.

END OF DAY 1

DAY 2 - Friday, April 3

Depart Pine Cone Inn 7:45 a.m.

0.0 0.0 Junction of State Hwys 59 and 140 at Pine Cone Inn. Proceed north on Hwy 59 to Snelling.

8.1 8.1 Keep to right at Y intersection in road. Continue on to Snelling.

12.2 4.1 Genstar aggregate operation along Merced River on right.

16.1 3.9 Note dredge tailings in Merced River plain.

17.9 1.8 Entering Snelling. Note: Hwy 59 terminates in Snelling but road continues east as Merced Falls Road (J16).

24.8 6.6 Turn right onto Hornitos Road.

24.7 0.2 First observed exposures of Sierra Nevada Bedrock. Here, the bedrock consists of Late Jurassic black slates.

24.9 0.2 Turn left and proceed across bridge to Hornitos.

28.5 3.6 Entering into metavolcanic island arc sequence of Late Jurassic age. Here, the sequence consists mainly of felsic volcanic rocks with some quartz porphyry intrusions.

32.0 3.5 Historic mining town of Hornitos. Continue on J16 East. Presently passing through the Hornitos gold mining district.

33.3 1.3 STOP 3. BLUE MOON MASSIVE SULFIDE DEPOSIT.

Turn left onto dirt road leading to Westmin Resources field office located 3.5 miles to the north. Company representatives will meet group at J16 turnoff point.

After tour of the Blue Moon site, return to J16 and reset odometer.

STOP 1: Blue Moon No. 2 shaft site: This stop will provide the opportunity to see a surface cross-section of the stratigraphy hosting the Blue Moon deposits.
— time required 1 1/2 - 2 hours

STOP 2: American Eagle hill: Exposures of massive barite on the West Zone horizon will be examined. Immediate host rocks and alteration zone also be compared to stop 1.
— time required 45 minutes

STOP 3: Field site: Massive sulfide intersections will be examined in drill core from the West Zone horizon (B33) and Main Zone (B40). A condensed section of drill hole stratigraphy will be examined if time permits.
— time required 1 1/7 hours

STOP 4: Manuela's bar, Hornitos: This stop is a necessity at the end of the trip. You can play "When the Blue Moon turns to gold" on the juke box.

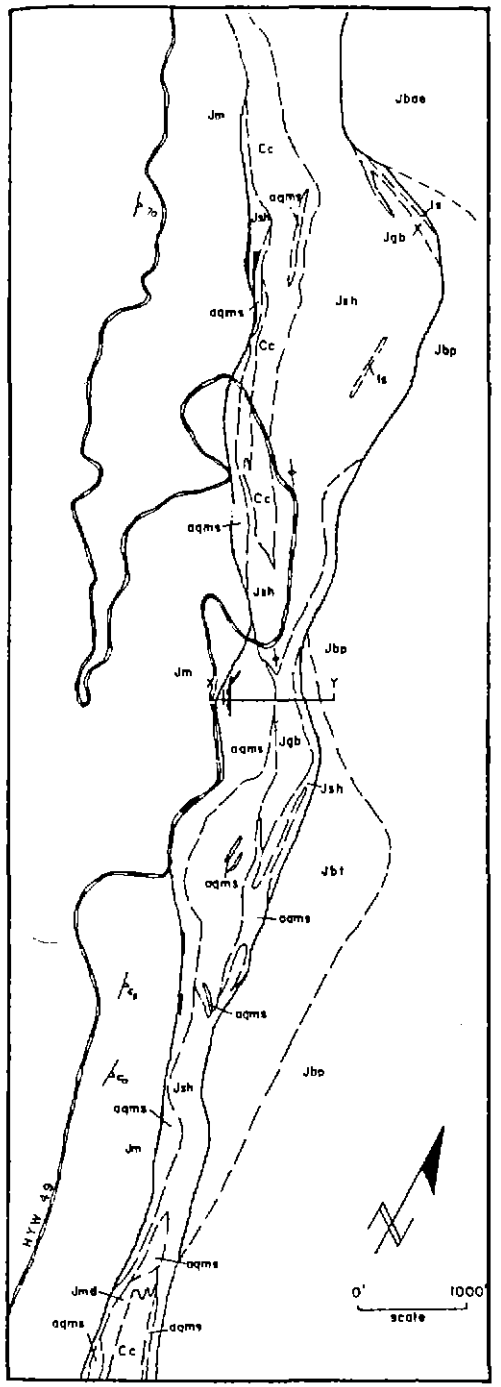
0.0 0.0 Turn left on J16 east to Bear Valley.

4.5 4.5 Entering into Penon Blanco volcanics. The Penon Blanco volcanics are predominantly basaltic to intermediate volcaniclastics, with coarse breccia and flow units common in some locals. Pyroxene predominates over amphibole and has commonly been uralitized.

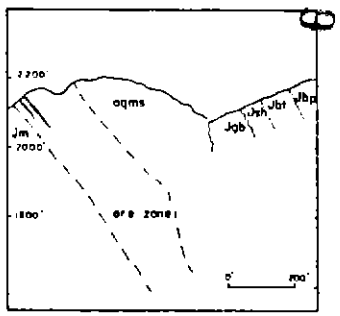
9.0 4.5 Junction of J16 and State Hwy 49 at Bear Valley. Turn left on Hwy 49 North toward Coulterville. Now passing through the Bagby gold mining district of the Mother Lode.

10.3 1.3 STOP 4. PINE TREE-JOSEPHINE GOLD MINE PROJECT, GOLDENBELL RESOURCES. Turn left into Goldenbell Resources field office entrance.

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GEOLOGY OF THE PINE TREE MINE AREA



CROSS SECTION X–Y

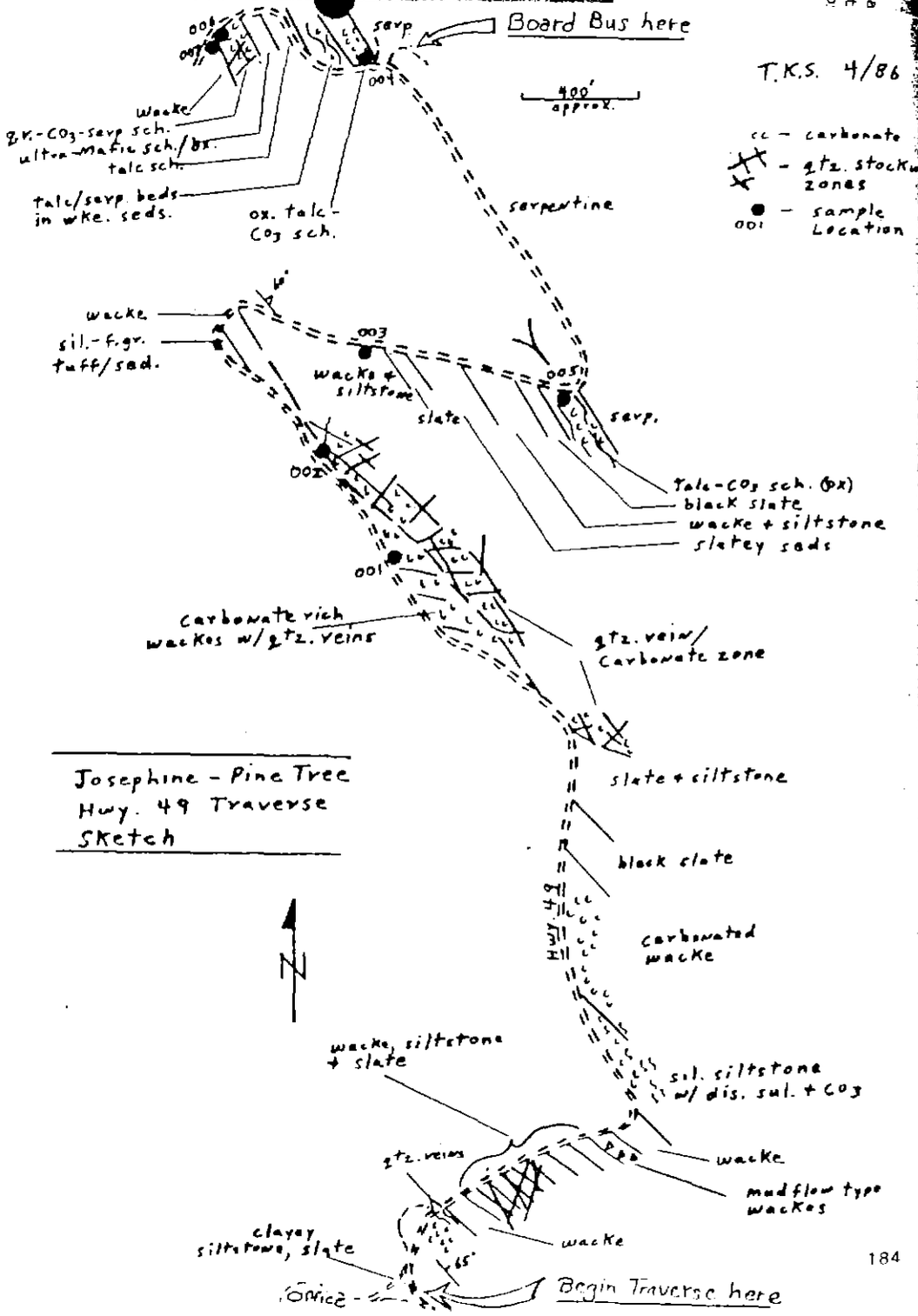
LEGEND

- aqms — ANKERITE - QUARTZ - MARIPOSITE SCHIST
- QUARTZ VEINS
- Jsh — SERPENTINIZED HARZBURGITE (serpentinite, peridotite, and pyroxenite)
- Jgb — RODINGITE GABBRO
- Jmd — HORNBLENDE METADIORITE
- Jm — MARIPOSA FORMATION (slate, metagraywacke, and metadacite)
- Jbae — BAGBY EPICLASTICS (volcaniclastics and argillite)
- Jbt / Jbp — BULLION MOUNTAIN VOLCANICS (basaltic metatuff (Jbt) and porphyritic breccia and agglomerate (Jbp))
- Is — METALIMESTONE
- Cc — CALAVERAS COMPLEX (phyllite and argillite)
- Geologic Contact
- Fault Trace, Melones Fault Zone

JURASSIC: upper; middle to upper
CARBONIFEROUS

Source: Goldenbell Mining Corporation

5 cm



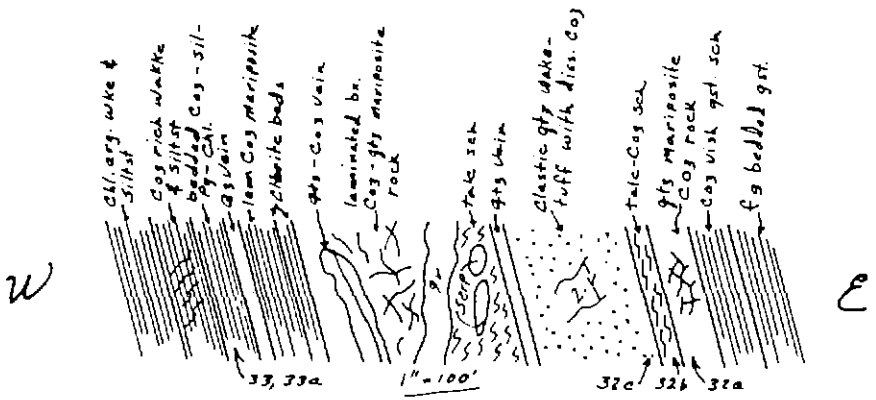
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The Pine Tree-Josephine mine area is located near the southern terminus of the Mother Lode belt. The property consists of over 3300 acres of land acquired by Goldenbell Resources in late 1984. The company is presently pursuing the required permits from Mariposa County in order to develop an open pit mine and to construct a processing mill. The Pine Tree and Josephine mines were active almost continuously between the early 1850s and the early 1870s, and periodically until 1944. Their total combined production amounted to over 124,000 ounces of gold.

Exploration drilling by Goldenbell Resources has defined a mineralized zone having a strike length of some 2,700 feet, a width of 100 to 200 feet and a depth exceeding 800 feet. The company estimates its resources at about 25,000,000 tons grading about 0.06 ounces per ton. Within this zone, the gold occurs in disseminated form in association with ankerite-quartz-mariposite schist present in a sequence of metavolcanic and sedimentary deposits which have been intruded by ultramafic rock (serpentinite), gabbro and diorite. These rocks are bounded on the east and west by splays of the Melones fault (see geology map and cross section).

0.0	0.0	After a presentation at the field office, the group will make a roadcut traverse of the property by walking along Hwy 49 to a point located 1.2 miles north (see Josephine-Pine Tree Hwy 49 traverse sketch).
1.2	1.2	Board Bus
3.9	2.7	Merced River crossing. The old mining town of Bagby is now inundated by Lake McClure.
5.3	1.4	Dirt road leading off to left is entrance to the Gold Specimen mine. Entering into the Coulterville mining district.
9.9	4.6	Visible to the left is the Virginia Mine property. The Virginia mine is one of the oldest patented mine claims in Mariposa County. Note the large quartz vein exposure capping Virginia Point.
13.9	4.0	Entering Coulterville. Turn left onto State Hwy 132 West toward Modesto.
14.1	0.2	STOP 5. MARIPOSITE EXPOSURE. Refer to accompanying Coulterville "Mother Lode" section and rock sample analyses. After stop is complete, return to Hwy 49 and reset odometer.
0.0	0.0	Junction of State Hwys 49 and 132. Turn left onto Hwy 49 North toward Moccasin.
3.0	3.0	STOP 6. HAIGH RANCH MOTHER LODE TRAVERSE. Note the thick section of water washed laminated silica-carbonate-green mica rock cut by numerous quartz veins. Two assays of the laminated rock ran 5 to 65 ppm gold.
4.2	1.2	Tuolumne County Line. Penon Blanco Peak visible to the east.
5.4	1.2	Haigh quarry on right. Mariposite-bearing carbonate rock has been quarried here for decorative rock. Mariposite from this quarry has been dated at 116 +3 m.y. by K-Ar and 155 +3 m.y. by Rb-Sr.
8.7	3.3	Moccasin Creek. Entering the Jacksonville gold mining district. Note indications of placer mining along Moccasin Creek.
10.0	1.3	Community of Moccasin on right. Hetch Hetchy aqueduct and power plant and a State fish hatchery in foreground.
10.6	0.6	Junction of State Hwys 49 and 120. Turn left.
12.7	2.1	Turn right onto Jacksonville Road north.
13.3	0.6	Stevens Bar Bridge. Town of Jacksonville now inundated by Don Pedro

5 cm



"Mother Lode Structure"
Geologic Section - Coulterville 1" = 100'

COULTERVILLE SECTION

SAMPLE	AU.ppb	AG.ppm	AS.ppm	SB.ppm	MO.ppm
CV13-32	80	.1	63	.8	NR*
CV13-32A	-5	.1	9	.8	4
CV13-32B	-5	.1	230	3.4	NR
CV13-32C	-5	.1	19	.4	NR
CV13-33	275	.1	35	.8	2
CV13-33A	50	.4	150	11	NR
STEVENS BAR/MOCCASIN PT. SECTION					
MOC14-1	250	.1	33	.4	1
M.P.14-1A	20	.2	23	.2	NR
MOC14-2	80	.1	29	2	NR
M.P.14-2B	5	.2	24	.2	NR
HARVARD/HWY. 120 SECTION					
JT-10	825	.7	NR	NR	NR

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Reservoir. The Eagle-Shamutt mine is situated just to the north adjacent to the reservoir. The mine yielded about 300,000 ounces of gold, about half of which was produced from open pit mining.

13.5 0.2 STOP 7. Stratigraphic section along the Mother Lode gold belt. Pull off on dirt road on left side of Jacksonville Road at north end of Stevens Bar Bridge. Refer to sketch and rock sample assays of the Moccasin/Stevens Bar section.

19.2 5.7 STOP 8. Pillow basalts exposed along Jacksonville roadcut. Pull off on wide shoulder area to right. Entering the Jamestown gold mining district.

20.8 1.6 Turn left onto Jamestown-Jacksonville Road.

21.2 0.4 South slope of Quartz Mountain on left. Most of Quartz Mountain is controlled by Sonora Mining Corp. Long term mining plans call for the development of a pit site here.

22.2 1.0 Turn right and continue to Jamestown.

22.7 0.5 Keep left at Y intersection.

23.4 0.7 Keep left at Y intersection, entering Jamestown.

23.8 0.4 Turn right onto Main Street, Jamestown.

24.0 0.2 Turn right onto State Hwys 49/108 East toward Sonora.

27.1 0.2 Turn right onto Main Street Sonora (State Hwy 108).

27.3 0.2 Turn right into Sonora Townhouse Motel.

END OF DAY 2

DAY 3 - Saturday, April 4

0.0 0.0 Junction of State Hwys 108 west and 49 south (Main Street Sonora). Turn right and proceed west toward Jamestown.

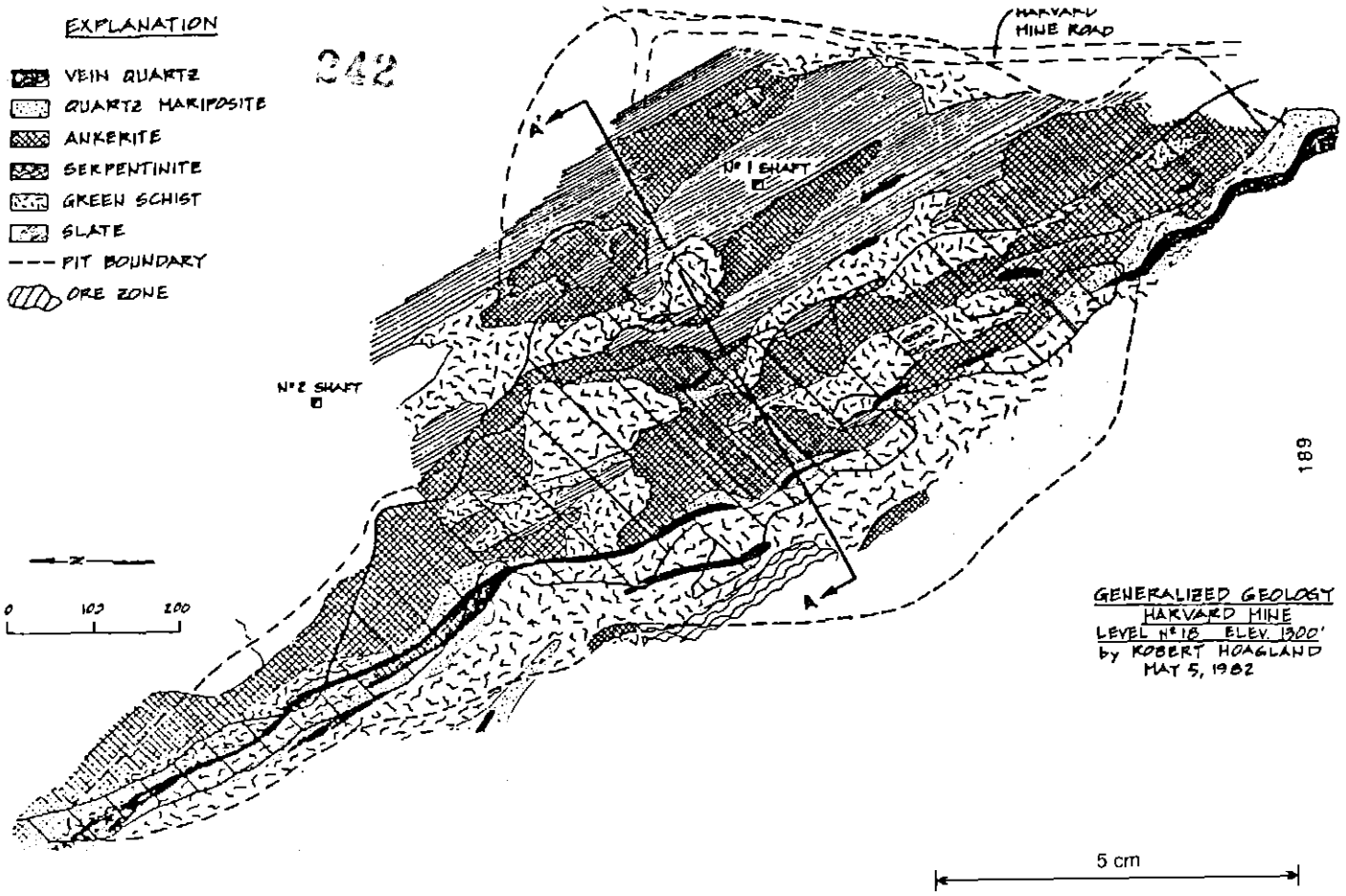
4.2 4.2 To right is Sonora Mining Corp.'s Jamestown mine pit site now just under initial stages of development. The headframe of the famous Harvard mine was located at the top of the hill until dismantled last fall.

5.0 0.8 STOP 9. JAMESTOWN MINE, Sonora Mining Corp. Turn right onto High School Road. Proceed to offices of Sonora Mining Corp.

The Jamestown mine lies along the historic Mother Lode gold belt about one mile west of the community of Jamestown, Tuolumne County. Here, the Mother Lode belt lies along the trace of the Melones fault zone. Gold mineralization at the site has occurred in disseminated form in association with altered Mesozoic volcanic and sedimentary rocks which have been metamorphosed to the lower greenschist facies. Stratigraphic units exposed on the property include serpentinite, cherty sedimentary rocks, carbonaceous slates, meta tuffaceous rocks, and quartz-carbonate rocks, including mariposite. In addition a massive bull quartz vein is exposed along the prominent ridge line (see geologic map and cross section). The volcanic and sedimentary rocks are characterized by the presence of chlorite and sericite. The units form a layered sequence which strikes north/northwest and dips steeply to the east. The serpentinite body exposed along the western margin of the ore zone is thought to form the base of the sequence.

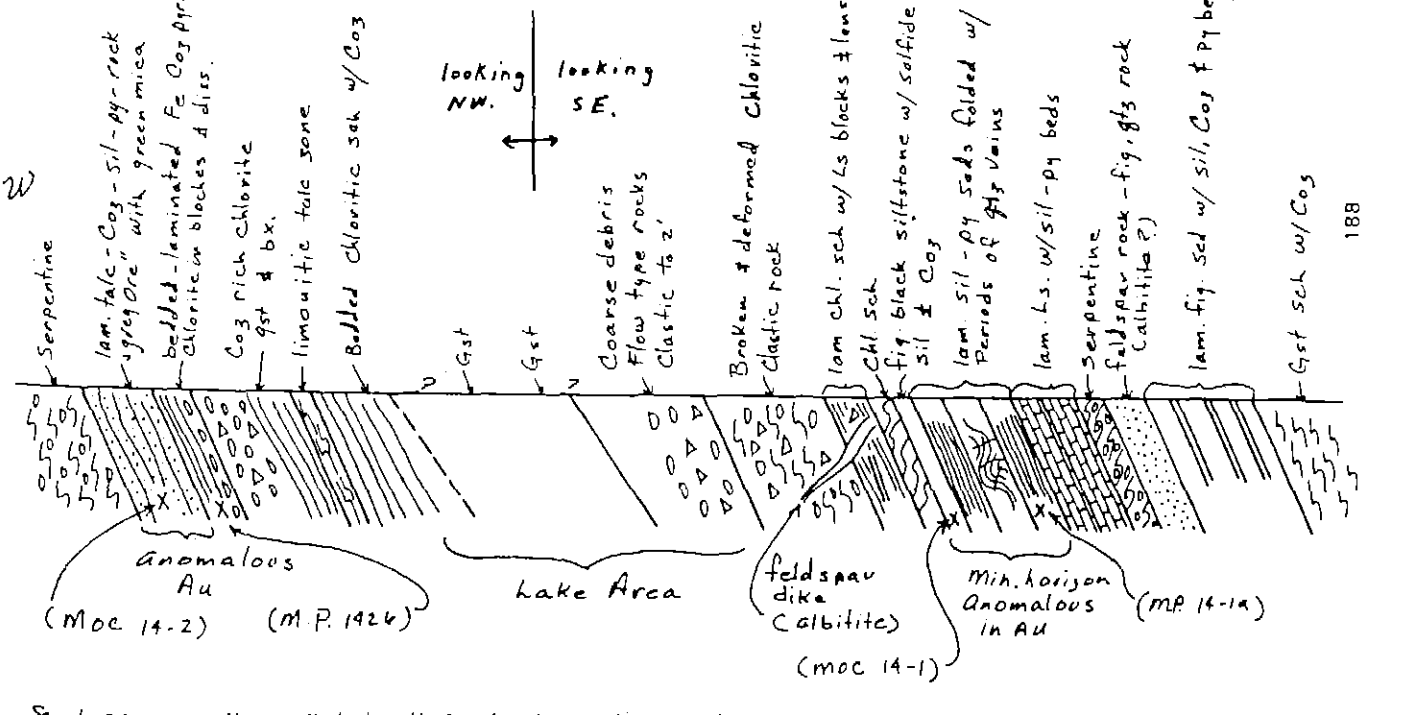
Exploration drilling conducted by New Jersey Zinc in the early 1980s as well as earlier work on the property, formally known as the Harvard mine, has outlined 14 million tons of ore averaging 0.072 ounces of gold per ton. Gold-bearing ore is often encountered within, but not confined to the zones of pronounced alteration. Computer projections from the drilling data indicate that some nine distinct mineralized zones are spaced along

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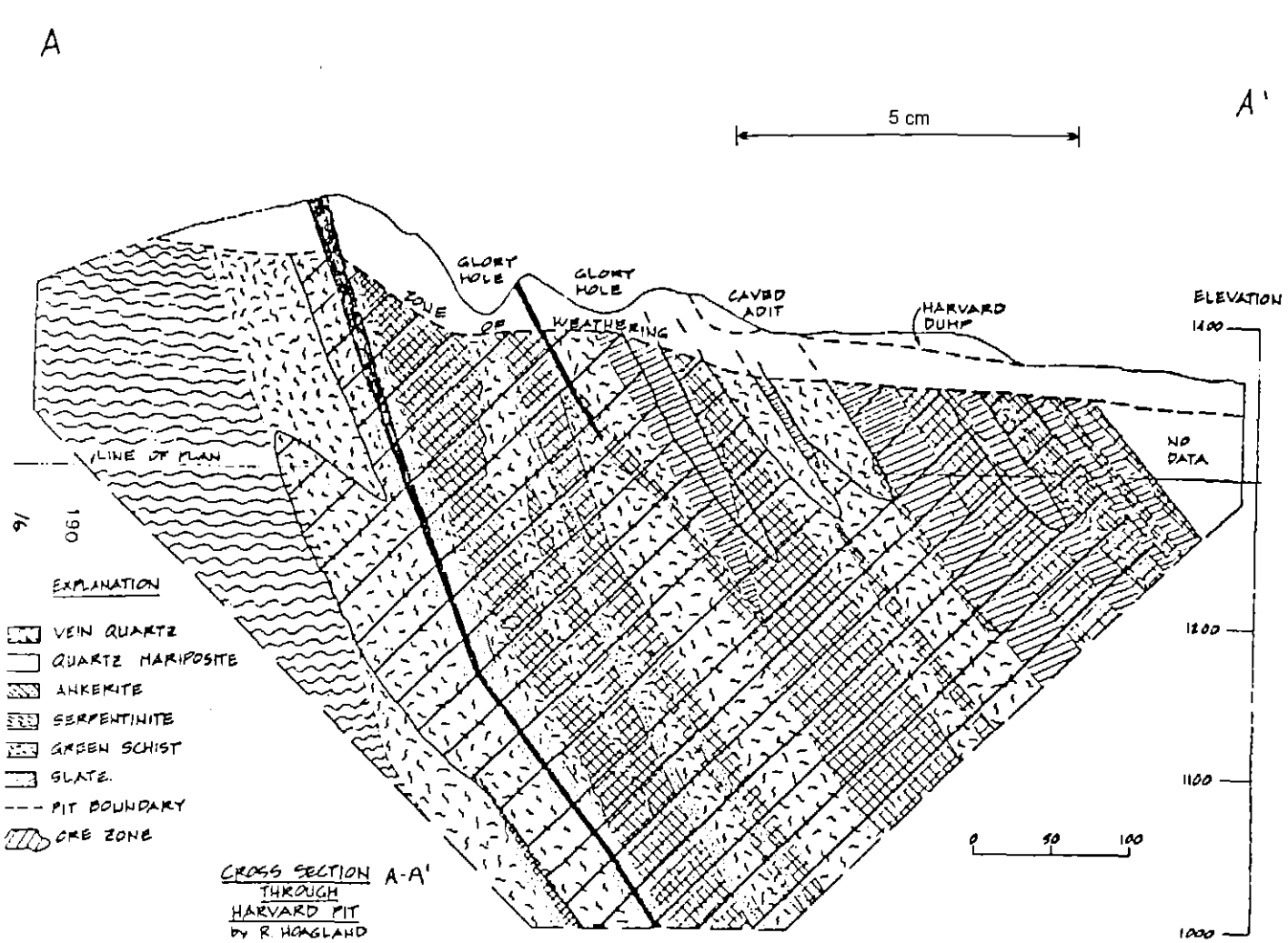


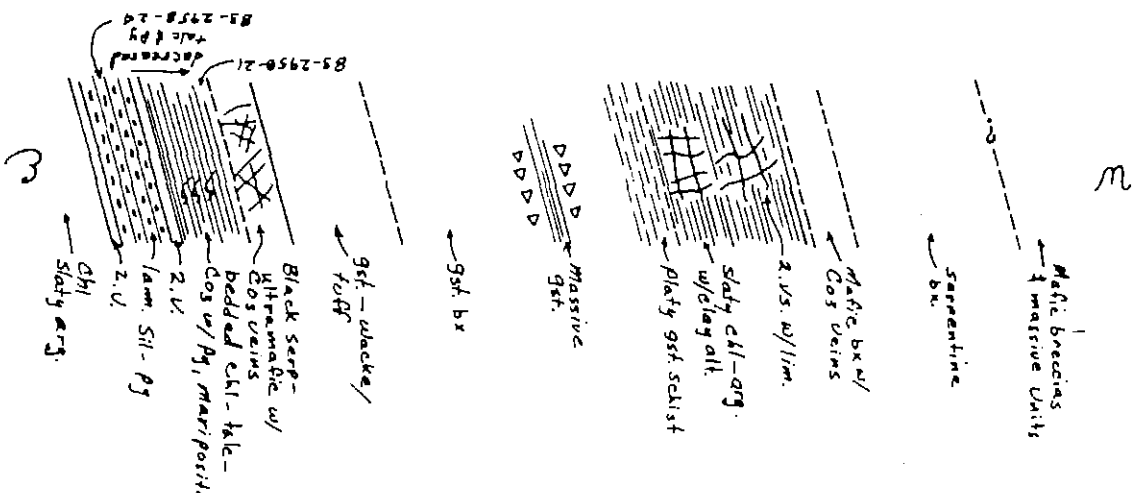
Moccasin Point Section - Jacksonville Road, Tuolumne Co. Calif

Scale approx. 1" = 100'



Sample assay results are listed with Coulterville section samples (STOP # 5)





"Mother Lode Structure" Traverse 1000' South of Harvard Mine Hwy. 120. 1"= 100'

Sample assay results are listed with Coulterville section sample (srop #5)

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the footwall and hanging wall. Within these zones, the gold occurs mainly as 5-25 micron blebs of native gold associated with pyrite along with a small percentage of free milling gold. The overall ore zone strikes northerly and dips about 60 degrees to the east. It varies in width from 20 to 220 feet over a length of several thousand feet. The ultimate pit depth could extend to about 500 feet below Woods Creek. Output is expected to exceed 130,000 ounces of gold per year from the 6000 tons per day operation. Under current reserves, the project is expected to have a 14-year life.

After mine tour return to Hwy 49/108 and reset odometer.

0.0 0.0 Turn left onto Hwy 49/108 from High School Road back toward Jamestown.

1.8 1.8 Turn left onto Rawhide Road (north).

3.2 1.4 Table Mountain andesite exposed in road and railroad cuts. Table Mountain is a sinuous ridge formed from late Tertiary lava which filled a meandering river channel. Resistance to erosion has caused an inverted valley geomorphic feature.

3.9 0.7 Rawhide mine site to left.

5.8 1.9 Turn left onto State Hwy 49 North. Entering Tuttletown gold mining district.

9.7 3.9 Melones Reservoir bridge - Calaveras County line. Entering Carson Hill gold mining district.

10.8 1.1 STOP 10. ROADCUT EXPOSURE OF MOTHER LODE SECTION. Silicified conglomerate on edge is exposed on west side of Hwy 49 while fine-grained sediments are exposed on the east side. Exposed along the old route of Hwy 49 to the east is a thick section of fine-grained felsic and mafic volcanics. The Carson Hill mine is situated within this section of rock about 2000 feet to the east. Refer to the geologic map of the Carson Hill mine (STOP 11).

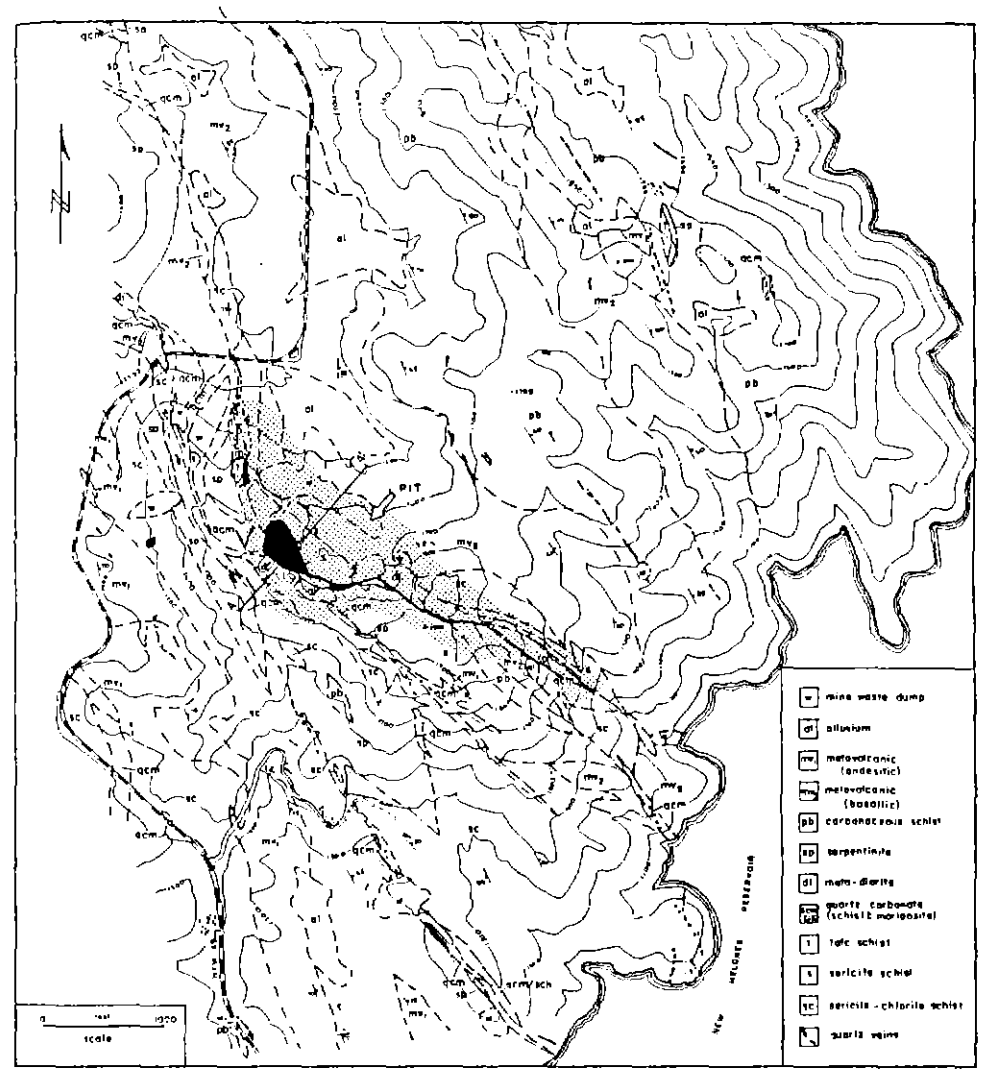
12.0 1.2 STOP 11. CARSON HILL MINE, Carson Hill Gold Mining Corporation.

The Carson Hill mine site includes about 550 acres of land located along the Mother Lode gold belt just south of the historic mining community of Carson Hill, Calaveras County. Here, gold mineralization has occurred along and in close proximity to a splay of the Melones fault which cuts metavolcanic and metasedimentary rock (see geologic map and cross section). Traditionally, rock units exposed west of this mineralized fault have been considered to be Jurassic in age while those exposed to the east have been considered to be of Paleozoic age. Recently, however, it has been suggested that all layered rocks in this area are Late Jurassic in age with those exposed on the east being more highly deformed and recrystallized correlatives of those to the west.

Stratigraphic units exposed on the property generally strike northwesterly and dip steeply to the east. Foliation trends vary from N10W to N40W with steep dips to the east. Major rock units include hornblende andesite, metavolcanic rock of a more mafic composition, carbonaceous schist, talc schist, sericite schist, sericite chlorite schist, serpentinite, quartz-carbonate rock, including mariposite, and massive milky white quartz vein. In addition to the massive vein exposures, there are a number of economically significant, gently dipping quartz veins "flat veins" that occupy a series of thrust faults exposed on the property and numerous northeast striking, northwest dipping veins. It has been observed at the Carson Hill mine that the richer ore zones are present in rocks cut by numerous quartz stringers and that the ore grade in these zones tend to increase nearer the mineralized fault splay occupied by the massive quartz vein. Within these ore zones, gold occurs in disseminated form, both in association with iron sulfide and in microscopic native form.

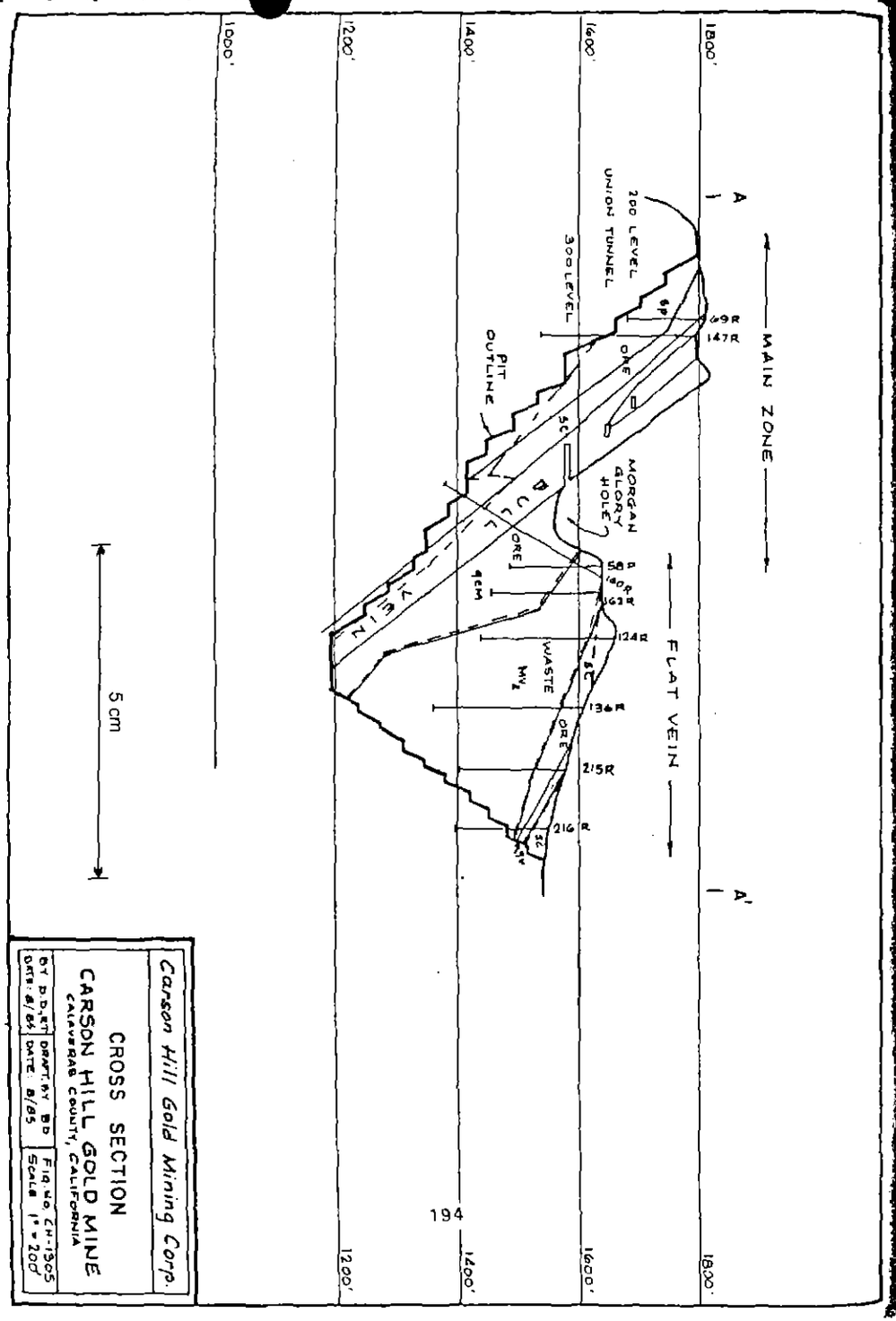
Carson Hill Gold Mining Corporation has mineable ore reserves of about 16 million tons grading at 0.046 ounces of gold per ton. 30,000 tons of rock per day are being mined by private contractor. The ore is processed using cyanide heap leach with a 75% recovery rate.

After mine tour return to Hwy 49 and reset odometer.



GEOLOGIC MAP - CARSON HILL MINE

5 cm



Carson Hill Gold Mining Corp.

CROSS SECTION
CARSON HILL GOLD MINE
CALAVERAS COUNTY, CALIFORNIA

BY D.J.RT	DRAFTSMAN BD	FIG.NO CH-1505
DATE: 8/85	DATE: 8/85	SCALE 1" = 200'

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GS

0.0	0.0	Turn right onto Hwy 49 North toward Angels Camp.
1.5	1.5	Entering Angels Camp gold mining district.
3.4	1.9	Entering Angels Camp.
4.0	0.6	Utica and Lightner mine sites on left. Depression due to mine workings collapse.
10.0	6.0	Entering San Andreas gold mining district.
15.1	5.1	Entering San Andreas.
17.0	1.9	Junction of State Hwys 49 and 12. Keep right at Y intersection and continue north to Mokelumne Hill.
17.6	0.6	Serpentinite marking trace of Melones fault zone exposed in roadcut.
20.2	2.6	Fluvial deposits of ancient Mokelumne River channel overlain by tuffs and gravels of the Valley Springs and Mehrten Formations exposed in road cut.
23.0	2.8	Chili Gulch placer diggings. During World Wars I and II, optical grade quartz was recovered here. Entering Mokelumne Hill gold mining district.
24.3	1.3	Entering Mokelumne Hill.
27.3	3.0	Mokelumne River bridge -- Amador County line.
28.8	1.5	Entering the Jackson-Plymouth gold mining district, the most productive district along the Mother Lode belt.
30.4	1.6	Entering Jackson.
31.0	0.6	Turn right into the Amador Inn.

END OF DAY 3

DAY 4 - Sunday, April 5

0.0	0.0	Junction of State Hwys 49 North and 88. Proceed north on Hwy 49 toward Sutter Creek.
1.2	1.2	Kennedy mine on right, Argonaut mine on left.
3.0	1.8	Sutter Hill. View of headframes and dumps of the Central and South Eureka mines to right. The Central Hill was the last major mine operating along the Mother Lode, closing in 1953.
4.1	1.1	Old Eureka mine dump on right.
4.4	0.3	Entering Sutter Creek.
5.1	0.7	Lincoln Mine on left. Exploration work is currently being conducted in a joint venture between Callahan Mining and Pancana on this property.
6.4	1.3	Entering Amador City.
6.7	0.3	Headframe, foundations, and mine dumps of the Keystone mine on left.
6.8	0.1	Turn right onto Water Street.
6.85	0.05	Turn left onto East School Road.
6.9	0.05	Original Amador mine site on right.
7.1	0.2	Turn right at T intersection.
7.2	0.1	Keep left at Y intersection. Bunker Hill mine on right.
7.8	0.6	Treasure mine site on right.
8.2	0.4	Headframe of the Fremont mine on right.
8.4	0.2	Gover mine site ahead. Turn left at T intersection heading west to Drytown.

9.7	1.3	Drytown, once the home of 26 saloons. Turn right on Hwy 49 North.
10.9	1.2	Junction of State Hwys 49 and 16. Turn right and continue on Hwy 49 to Plymouth.
12.5	1.6	Plymouth City limits.
13.0	0.5	Eureka shaft headframe of Plymouth Consolidated Mines on right.
18.3	5.3	Cosumnes River bridge — El Dorado County line.
20.3	2.0	Entering the Nashville gold mining district.
25.0	4.7	Entering El Dorado gold mining district. Main quartz vein system of the Mother Lode belt is located about a mile east of here. The Ophir, Minihaha and Pocahantos mine sites are located along the ridge on left side of road.
25.4	0.4	Church-Union mine sites are located about one mile east of here. Parts of these properties are now occupied by the county refuse disposal site.
28.4	3.0	Entering the community of El Dorado. Turn right following Hwy 49.
30.3	1.9	Entering Diamond Springs.
30.5	0.2	Turn left to continue on Hwy 49.
32.7	2.2	Entering Placerville.
33.4	0.7	Turn right on main street.
33.6	0.2	Turn left on Bedford Avenue. Note vertically dipping, highly foliated and sheared rocks exposed behind the pizza parlor on the right. The rocks, composed mainly of talc-ankerite schists, mark the trace of the Melones fault zone.
33.7	0.1	Cross Interstate Hwy 50 and continue north on Bedford Avenue.
34.5	0.8	STOP 12. MELONES FAULT ZONE TRAVERSE. Turn right into entrance of Bedford Park.

We will first tour the adit of the Goldbug mine and then cross the street to make a traverse of the Melones fault zone. The fault zone is exceptionally well exposed here and shows almost all the typical alteration features found associated with Mother Lode gold mineralization.

After Stop 12 is complete, return to Hwy 50 and travel to Reno.

END OF FIELD TRIP

Reprinted from Nevada Bureau of Mines and Geology Report 41.

THE McLAUGHLIN MINE NAPA AND YOLO COUNTIES, CALIFORNIA

708243 CS

by Norman J. Lehrman
Chief Geologist, Homestake Mining Co., Lower Lake, California

INTRODUCTION

The McLaughlin gold mine, discovered by Homestake Mining Company in 1978, is a preeminent example of a hot-springs type epithermal precious metals deposit. Utilizing a cutoff grade of 0.06 oz gold per ton, ore reserves of approximately 19,300,000 tons at 0.152 oz gold per ton are indicated. The present operation began producing dore bullion in March, 1985, after a capital outlay of about 280 million dollars. Known reserves will sustain the 3,000 ton per day processing facility for 15 to 20 years.

The deposit was discovered at the site of the historic Manhattan quicksilver mine as a result of a concept-oriented exploration program focused on a hot-spring model. Prominent exposures of chalcedonic hot-spring sinter and numerous chalcedony-quartz veins containing gold in quantities of up to several ounces per ton were present in natural outcroppings and old mine workings over a strike-length of nearly one mile and a width of about 300 ft.

GEOLOGICAL SETTING

The McLaughlin system was localized within the major regional fault boundary which divides the Franciscan ophiolite melange of the Coast Ranges accretionary prism from the upper Jurassic marine sedimentary rocks of the Great Valley forearc basin. This complex northwest trending structure, probably the Stony Creek fault, is interpreted as the oldest and easternmost of the Coast Ranges subduction faults. Because of progressive underwedging by younger accretionary packets to the west, the fault has been rotated into a steeper dip orientation, ranging from about 45° northeastward in the mine area to near-vertical or overturned a few miles farther to the northwest.

In the immediate mine area, the footwall lithology is an ophiolite melange, consisting dominantly of serpentinite with scattered large knockers of greenstone and Franciscan graywacke. The hanging wall is made up of mudstone, siltstone, and minor conglomerate of the Great Valley Group Knoxville Formation. The fault consists of a 300- to 800-ft-wide zone of cataclasite and slickentite derived from both hanging wall and footwall lithologies. Included within the cataclasite are relatively coherent rootless lithons of pillowed sea-floor basalt with maximum dimensions of thousands of feet.

Beginning about 20 m.y. ago in the San Francisco Bay area, and stepping northward through time, a wave of volcanism affected the region roughly synchronous with the northward transit of the Mendocino triple junction along the coast. At about the time when the triple junction is thought to have been at the latitude of the McLaughlin Mine, a cluster of small andesitic basalt plugs was emplaced in and near the fault zone, probably in response to dilation triggered by strike-slip reactivation of the old subduction thrust.

FORMATION AND CHARACTER OF THE McLAUGHLIN DEPOSIT

The initial manifestation of this magmatic activity in the mine area was a period of phreatomagmatic eruptions that excavated a series of small maar-like craters typically a few hundred feet in diameter and of similar depth. Surrounding ejecta blankets contain angular clasts of all underlying rock types plus basalt (sometimes milled (?) into subangular to rounded forms) and volumetrically minor amounts of pumice, none of which is welded. Significantly, a few auriferous chalcedony vein fragments have been observed in these volcanoclastics, suggesting that the initiation of the hydrothermal system at least slightly predates the earliest eruptive phenomena. The mine area basalts have been K-Ar dated at 2.2 m.y. Basaltic magmas invaded the craters, forming mushroom shaped domes squatting directly above the vents. Gold mineralization is spatially coincident with the diatreme complex.

By far the most intense phase of hydrothermal activity occurred following lithification of these extrusive olivine-pyroxene basalts and was probably driven by the heat of the retreating magma at depth. Hypogene alunite found within the basalts and underlying agglomerate yields K-Ar dates as recent as 750,000 years. The agglomerate is typically pervasively silica-flooded, and auriferous veins cut both the silicified agglomerate and the overlying basalts.

At the ground surface, two or more siliceous sinter terrances formed. These consist of porcelaneous, porous, white chalcedony showing unmistakable features of subaerial deposition, such as fossil filamentous bacteria, algae, rimstone terracettes, geyserite "pearls", and syneresis polygons. The preserved sinter pile in the main central terrace (the San Quentin sinter) was about 400 ft in diameter, and locally was at least 100 ft thick. Interbedded with the sinter are numerous hydrothermal explosion breccias containing blocks of sinter up to 15 ft in diameter together with clasts of all underlying rock types. The sinters are generally not anomalous with respect to epithermal elements with the exception of mercury, which is present both as diffuse cinnabar pigmentation pervading the chalcedony and as cinnabar "paint" on crosscutting fractures. Most historical Manhattan Mine quicksilver production (about 17,000 flasks) was derived from such material located within 60 ft of the ground surface.

The mineralized zone beneath the sinters consists of a multiple stage chalcedony-quartz vein stockwork together with pervasively silica-flooded cataclasite, agglomerate, and breccia lithologies. The veins strike transverse to the overall orebody trend, which is essentially conformable with the fault. This ladder-vein configuration suggests continued dilation by strike-slip reactivation of the older thrust zone. Locally, sheeted veins up to 100 ft wide made up of 1-inch to 2-ft wide bilaterally symmetrical vein components reinforce the idea that conduits were opened and repeatedly reopened by episodic fault movement. Gold mineralization is closely tied to silicification, and in particular to multiple stage veining. All rock types in the deposit area locally host ore-grade concentrations, although rheological properties of the various rock types are reflected in vein size, geometry, and abundance.

The orebody is wedge-shaped in sectional view, and dips conformably with the host fault to the northeast. As presently defined, the mineralization dies out at a depth of slightly less that 1,000 ft. In plan view, the deposit trends

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AMIRA
NQ GOLD PROJECT

ONTARIO GEOLOGICAL SURVEY

Open File Report 5524

An Integrated Model for the Origin of Archean Lode Gold Deposits

by

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1984

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ABSTRACT

Archean gold deposits occur in many forms, including discrete quartz veins, pervasive microveining, sulphidic haloes to veins and tabular sulphide disseminations. Host lithologies include virtually every rock type of greenstone terrains. These differences are superceded in importance by other aspects of the geology of the deposits, described below, which are generally consistent from one deposit to another, thereby indicating the involvement of a single fundamental genetic process.

In many documented examples, we can define the sequence of events which affected areas of mineralization, prior to, during and following the mineralizing event. It is critical to note that the episode of mineralization and wallrock alteration is relatively late, post-dating volcanism, sedimentation, some metamorphism, episodes of intrusion and at least one episode of tilting or folding. In most instances only minor deformation and limited intrusive activity post-dates mineralization and alteration. The alteration temporally associated with the mineralizing event required introduction of large volumes of hydrothermal fluid, in excess of the volume of the altered rock. Structurally induced permeability provided the main access for the hydrothermal fluids which were derived from a source external to the immediate environment of deposition.

Gold deposits occur within linear tectonic zones in which relatively high strain magnitudes and available kinematic indicators attest to shearing in transcurrent or thrust systems. These zones contain fault rocks and discrete ductile shears as well as relatively undeformed megalithons; they are also marked by transposition of stratigraphy into rough parallelism with the deformation zone. Within the zones, many conduits for fluid flow were generated, dependent on variable competency response to prevailing strain. The systems were dynamic and evolved to produce several forms of permeability and styles of mineralization in any one location.

Alteration varies considerably in extent and expression primarily as a function of host lithology. Carbonatization is most prominent. Preceding and synchronous with gold deposition, it is best developed in more mafic lithologies where the reactivity of precursor mineral assemblages is high. Silicification, sulphidation and alkali metasomatism are more directly associated with gold deposition and for the most part do not form broad alteration haloes. The zonation of alteration is consistent between most deposits, but variable in scale.

Intravolcanic felsic intrusions are present close to most deposits, but have variable compostion. This spatial association does not necessarily imply a genetic association; however these intrusions are temporally related to the late plutonic event which terminated the Archean. Furthermore deformational response and metamorphic-alteration relationships show that gold concentration took place during this event.

Fluid inclusion and light stable isotope data, compiled from Archean gold deposits throughout the world, show a remarkable degree of internal consistency; they indicate the involvement of a unique fluid, distinct from those involved in the formation of other deposit types. The mechanism of gold deposition from the hydrothermal fluid involved a combination of factors including: (i) supersaturation caused by changing intensive variables, (ii) supersaturation through fluid evolution resulting from wall rock interaction, (iii) extraction by pre-existing and introduced sulphide and carbon species.

The fundamental requirements leading to the generation of an Archean gold deposit are (i) source of fluid and gold, (ii) a conduit to permit focussed transportation; (iii) a mechanism to induce localized deposition and concentration of gold. In the depositional environment lithology exerted a primary control in the siting of mineralization and the expression of alteration; most variability results from variable mechanical response to deformation of host lithologies and their heterogeneous mineralogy. Transportation of fluid and gold was achieved through major crustal structures which focussed fluid ascent. The source of the unique fluid has not, yet, been conclusively established. The major crustal structures represent a change in tectonic style temporally related to the major event of batholith emplacement which represents the termination of the Archean. Fluids and gold were most probably derived from either large areas of lower crust (undergoing granulitization) or upper mantle as an integral part of this period of crustal stabilization.

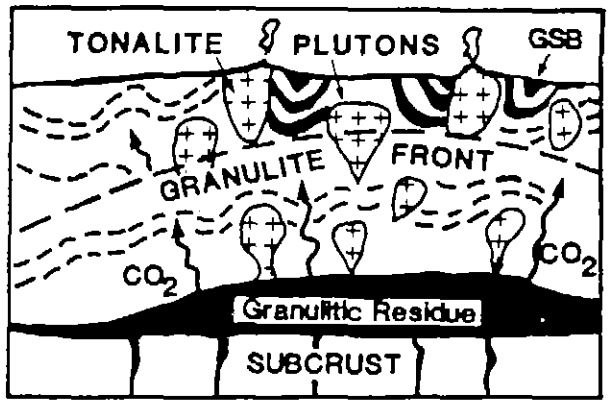


Figure 52: Model of crustal growth and granulite metamorphism - A granulite front develops from carbonic metamorphism caused by CO_2 influx. Granulitic residue and tonalitic plutons invade the upper crust including greenstone belts (GSB)(Newton et al. 1980).

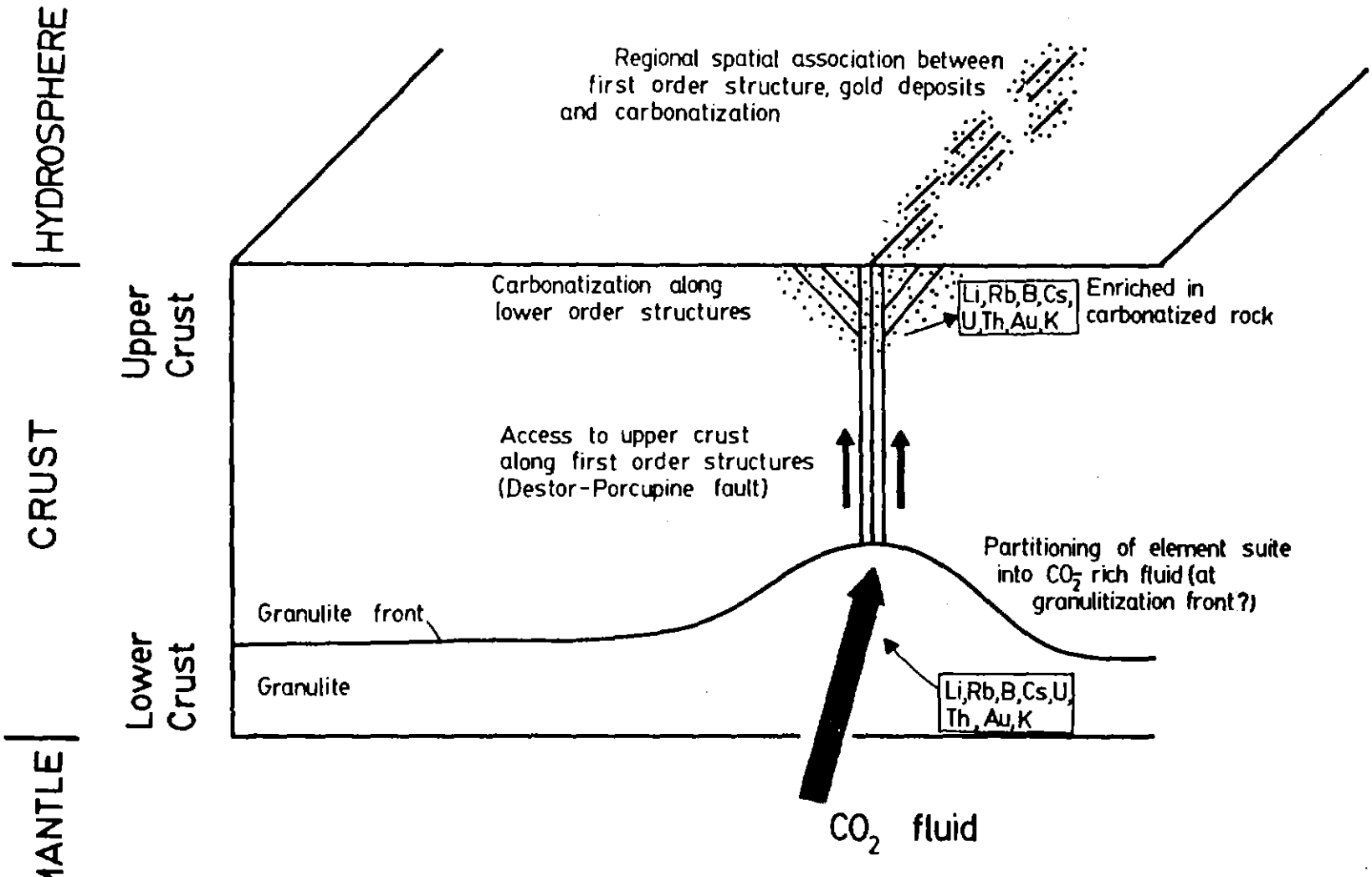


Figure 53: Influx of CO_2 into lower crust promoting upward progression of granulite front, extraction of species such as Li, B, Au, K, chanelling of fluids in first order carbonatization and mineralization in the upper crust.

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Appendix 5

Assessment of Gold Variability in Three High Energy Streams, Tasmania.

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ASSESSMENT OF GOLD VARIABILITY IN THREE HIGH ENERGY STREAMS, TASMANIA.

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October, 1988.



Report No: Cr/88/10/4

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1. RECOMMENDATIONS

1.1 Future Western Tasmanian Surveys

Sample 50gms of wet field sieved -200# sediment from active sediment for 'moderate' not 'strong' trap sites. Analyse by Neutron activation for:

Au (2-5ppb) As (2ppm) Sb(0.1) Mo(5) W(5) Fe(500) Ba(100) Hf(1) and in a separate sample (20-30gms) by perchloric acid AAS for: Ag(0.1) Cu(2) Pb(2) Zn(2). No preparation is required.

Analabs are agents for this service however if de-watering and encapsulating were done in the field it would minimize potential handling problems and contamination.

Consideration should be given to panning the oversize, retaining the last 50gms of material and conducting whole sample aqua regia Au assay.

1.2 Existing Lake Lea Survey For Which Samples Are Still Available

Retrieve -150# pulps. Reanalyse, by the above technique, all samples above 20ppb gold and those considered for reasons of proximality or geology to warrant reassessment.

2. SUMMARY

Current bulk cyanide sampling and analytical techniques failed to reliably detect significant gold in Tasmanian streams. Low level pre-roast aqua-regia attack is marginally less efficient than new-pot low level fire assay techniques using fine grained stream sediments.

Nugget and hydraulic effects in streams remain a limitation to high quality reproducable data. There is strong evidence to suggest that fine sediment sampling of high energy sections of streams may increase the reliability of sampling. This has good and bad effects:

- It potentially increases gold concentration by trap effects thus reducing sampling nugget problems.
- It increases the variability of sampling through variable trap site quality.

To achieve an increase in quality an index of trap site efficiency is required. Analysis of Zr will provide such an index given that:

- Source variability of Zr is either measured or known to be less than hydraulic variability.

  and
- Source variability of Zr is less than source variability of gold.

Both are considered to be reasonable assumptions.

Even given 'better' methods of allowing for nugget and hydraulic variability of gold they may remain the dominent variability in a survey. Analysis of associate trace elements at low levels should be undertaken to build element patterns which relate to styles of mineralization in much the same way as is currently being done in N.S.W. Given modern analytical techniques this is not expensive. For example, a neutron activation analysis giving the following simultaneous analyses could be conducted for around $10.00/sample, excluding preparation.

Au (2-5ppb), Sb(0.2ppm) As(2ppm) W(5ppm) Mo(5ppm) Fe(500ppm) Ba(100ppm), Hf(Zr replacement) (1ppm). Normal AAS would be required for base metals at additional cost of around $3.00/ sample.

Alternative low level Aqua Regia Au digests with ICP trace metals as conducted in NSW would give lower detection limits at $25.00/sample excluding both preparation and Zr, or equivalent, analyses.

Given the possible styles of mineralisation in Tasmania combined NAA and AAS would appear to be the most cost effective technique available. Bi at a sufficiently low detection level is lacking in the NAA/AAS technique proposed. Due to 'cooling' periods required for the analyses, NAA results would generally take 2-3 weeks to be returned.

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3. CONCLUSIONS

i) Nugget, and to a lesser extent hydraulic, effects will continue to cause difficulties in the interpretation of stream sediment analyses if gold alone is analysed. They will be accentuated if low level anomalism ultimately warrants follow-up.

ii) Analysis of ubiquitous heavy mineral elements such as Zr, Hf, Ti and Fe will assist in resolving some in-stream complexities.

iii) Gold contents of fine grained fractions (-200#) from more active stream locations are less subject to combined nugget and hydraulic effects than coarser fractions.

iv) Gold contents of -200# samples are depleted with reference to coarser material. It is not known whether this observation is general for W. Tasmania.

v) Associate trace elements should be used more extensively than is currently the case. They should be used to assess both gold and base metal source characteristics as well as stream characteristics.

vi) Simple stream size fraction measurements do not give significant information about the degree of heavy mineral concentration which may or may not exist in particular samples in a survey. Consequently, they will not assist in interpreting gold analyses in stream sediments.

vii) Bulk cyanide digestion techniques are currently inadequate for Tasmanian stream sediment surveys. Further work is required before any bulk analytical technique will be acceptable.

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4. INTRODUCTION

In high energy streams, such as those in Western Tasmania and S.E. Asia, the effectiveness of stream sediment surveys for gold exploration are restricted by accumulated errors due to sampling, preparation and analysis and stream hydraulic effects.

Severe errors are induced if insufficient material is sampled at the stream site. It is has been demonstrated that sampling of 50gms of -80# in high energy PNG streams frequently fails to detect highly significant gold in those streams. In a similar manner, severe error is induced if a sufficient mass of -80# is in-adequately pulped prior to sub-sampling of 25-50gms for assay.

Experience in analytical laboratories has shown that Au contamination, to levels of anomalous significance in stream sediments (0.05ppm), is not uncommon. Other analytical effects, such as not pre-roasting samples destined for aqua-regia digestion, can cause highly misleading values to be reported, particularly at low levels.

Gold, with other detritus, either accumulates or depletes in different stream sites due to the action of hydraulics on sediment particles. The nature of this interaction is poorly understood for gold but less so for other heavy minerals such as monazite, zircon, magnetite, ilmenite, cassiterite, scheelite etc.

The additive effect of these problems can be that:

- Significant gold in a stream will not be seen with a given technique.
- Insignificant gold levels will report anomalously (hopefully a rare event).
- Allocation of efficient followup priorities will be difficult.

To address these problems a literature survey, synthesis, and test sampling of three high energy mountain streams in northern and western Tasmania was conducted during 1988. This document reports the findings

and makes recommendations for future gold stream sediment geochemistry in Tasmania. The findings have application to all areas containing hydraulically active stream sediments.

5. SOURCES OF GOLD ERRORS AND VARIABILITY

5.1 Field Sampling

Much has been written on this subject in relation to sampling. The definitive work is by Gy (1979). Work specific to stream sediment sampling for gold has been done by Day and Fletcher (1986) and Harrison (1982), amongst others. In summary, all conclude that insufficient sampling will cause severe and variable under-estimation of true sediment gold contents. This effect is accentuated at coarse grainsizes and low anomalous levels. When sampling streams for gold exploration either, or both, may apply.

In the absence of hydraulic and analytical problems gold concentration in a sample is determined by nearness to source i.e. sampling density. The availability of sediment sites in first order streams is a limit to sampling density. In practice, density is largely controlled by other factors such as allocation of scarce resource in consideration with perceived economic and geological potential and logistics. Decreasing sampling density causes, on average, sites to be further from potential significant targets. Not only does this result in dilution of gold by barren host sediment, it also progressively exacerbates under-estimation through the sampling nugget effect. Significant anomalies may report as background.

5.2 Laboratory

Gold analysis by Aqua Regia digestion (AR) or Fire Assay (FA) may require a field sample to be reduced to 25-50gms prior to analysis. In order to be representative, the gold present in the field sample must be proportionately dispersed into the smaller analytical sample. If the required fine grinding is inadequate then nugget effects will lead to severe under-estimation or apparent absence of gold in the original sample. It is not reasonable, given available grinding technology, to expect any laboratory to adequately grind more than 500gms of sample and be

sure that the contained gold will be dispersed into 50gm sub-samples. To achieve this preparation 2 to 3 times the normal grinding is required in a nominal 2kg Labtec mill, or equivalent. Sub-sampling for low-level gold is a hazardous proposition, even under these conditions.

The requirement for such rigorous preparation is itself hazardous. Contamination of 50ppb gold is not uncommon in laboratories. Lower orders of contamination are more frequent and comensurately less easy to detect. Depending on sampling densities and other factors, levels such as these can have anomalous significance.

There is great potential for error reduction if the steps of sample preparation could be eliminated entirely from gold stream sediment surveys. This could be achieved by analysing the whole sample, irrespective of size. Although sample sizes up to 10kg can be analysed by cyanide digestions, and possibly other techniques, this benefit can only be achieved if the analytical technique is reliable. Often it is not. For example ,incomplete release of gold in Aqua Regia digests is common in clay or organic bearing materials particularly in low level samples.

5.3 Stream Hydraulics

5.3.1 Steady State Model

In high energy mountain streams it can be assumed that a nett steady state equilibrium is achieved in sediment transport. That is, the rate at which detritus enters a stream section is the same as the rate at which it departs that section and is the same for all stream sections. In both spacial and temporal detail, say during the waining stages of flood, this may not be strictly true. However, given time and assuming no 'permanent' sediment deposition this represents a reasonable model on which to base an hydraulic analysis.

Further, the rate at which a mass of heavy mineral enters that same stream section must equal the rate at which it departs. To be otherwise would cause continual upgrading or downgrading of heavy mineral which, by definition, is limited to 0 or 100%. This is impossible as it implies no heavy detritus transport or no light transport which is in contravention of the no permanent sediment deposition assumption. The amounts of heavy and light phases that initially enter a stream in a given time period are controlled only by source lithology characteristics. The proportions in which these minerals pass down the stream system are determined only by the proportions in which they enter the stream and are the same proportions in which they exit the stream system. That is, the rate of movement of light to heavy (flux proportions) remains constant, on average, throughout the stream system and is equal to the source proportions.

A consequence of this constant flux proportions model is that the ratio of heavy to light minerals in a stream section must be inversely proportional to their nett relative transportation velocities through that section. Any stream regime which causes light mineral to move faster than heavy must cause an upgrading of heavies in proportion to the velocities of transport of the two minerals through that regime. This phenomenon explains the empirically recognized dependance of concentrations on both source abundances and hydraulic effects. In streams of similar topographic and bed character HM contents will reflect differences in source composition. In streams of dissimilar topography and bed character and similar source proportions, HM contents will reflect sediment transport phenomena.

This model suggests nothing about the physical mechanism by which nett particle velocities may be different, it merely states that a mathematical consequence of different particle velocities is a change in sediment composition. This unifies

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into a single concept the source and hydraulic dependance of changing compositions in a variety of stream regimes. Trap-sites and depleted zones may be viewed as areas of high or low differential nett transport velocity between light and heavy particles of a given size. This concept may be represented by:

$$\frac{M_h}{t} = S_{dh} * V_{dh}$$

where:-

$\frac{M_h}{t}$ = Total mass of mineral or detritus h passing through a section d in time t i.e. flux

S_{dh} = Mass of mineral h contained within small section d.

V_{dh} = Velocity of mineral h over a small section d.

For the flux of two different particle types to remain in proportion and constant throughout the stream system then

$$\frac{M_h}{t} * \frac{1}{S_{dh} * V_{dh}} = \frac{M_l}{t} * \frac{1}{S_{dl} * V_{dl}}$$

Subscripts l : light mineral

h : heavy mineral

If we are examining the same section d in the same time t it follows:

$$\frac{M_h}{M_l} = \frac{S_{hd}}{S_{ld}} * \frac{V_{hd}}{V_{ld}}$$

where:-

$\frac{M_h}{M_l} = C_{hs}$ The source mass ratio of h to l mineral of a given grainsize which enter the system. i.e. source concentration of h.

$\frac{S_{hd}}{S_{ld}} = C_{hd}$ The measured concentration of h mineral of a given grainsize at a location d with reference to the l mineral concentration.

$\frac{V_{hd}}{V_{ld}}$ Velocity ratio of heavy to light at location d and can be considered an hydraulic factor at the measured location.

As it is desirable to estimate the source concentration of a heavy mineral it follows:-

$$C_{hs} = C_{hd} * \frac{V_{hd}}{V_{ld}}$$

This equation indicates that the source concentrations represented by samples at particular sites can be ranked if the velocity ratio variability at those sites can be measured. Consideration of a second mineral k of the same grainsize as h and of known source concentration, when combined with the above equation, gives

$$C_{hs} = \underset{(1)}{\frac{C_{hd}}{C_{kd}}} * \underset{(2)}{C_{ks}} * \underset{(3)}{\frac{V_{hd}}{V_{kd}}} \quad \text{EQN1}$$

where:-

(1) Measured ratio of concentrations of k & h at site d.

(2) Source concentration of k.

(3) Velocity ratio of k & h at site d.

The advantage of EQN1 is that is likely that the velocity ratio of two heavy minerals will be less variable over different stream sites than the velocity ratio of a light versus heavy mineral pair. For the purpose of efficient ranking of the source concentrations of mineral h it is desirable for the velocity ratios be close to constant over

the variety of hydraulic sites in a stream survey. To assess the conditions under which velocity between two heavy minerals might have least variability the subject of hydraulic equivalence and its relationship to velocity ratio is addressed.

5.3.2 Velocity Ratio Variability

The term hydraulic equivalence, as used in much of the geological literature; and sediment transport functions as used in much of the hydrological and engineering literature (e.g. Ackers & White (1973)); both stem from examinations of water/sediment phenomena from slightly different perspectives and with different objectives in mind. The former attempts to explain why minerals of different grainsize and density occupy the same sediment beds and why (HM) placers occur. The latter addresses land, canal and hydro storage degradation by siltation and erosion. The above concept of velocity ratio is parochial in a similar manner. Its objective is to maximize information about the HM composition of sediment source areas. Both bodies of literature have been used in an assessment of velocity ratio variability as used in this context.

A number of obvious points can be assumed.

1) The maximum velocity of a mineral irrespective of grainsize is less than, or equal to, the velocity of water.
2) All other factors being equal, including grainsize, heavy minerals travel more slowly than light minerals: except during 100% suspension in which case the velocities of all particles and the fluid will be equal. (Steidtmann (1982)).

Brady and Jobson (1973) discuss the relative transport velocities of minerals under alluvial flow conditions as a

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function of density, grainsize and bed friction. An acknowledged assumption of their work is that the differences in grain velocities can be attributed to the interaction of grains with the firm sediment surface beneath a flowing body of water. ie. the suspension and saltation loads. The velocity differences of grains which are entirely within a moving fluidized bed are not addressed. Nor are the buoyancy aspects of a particle sinking into a moving fluidized bed. Despite these conceptual problems, limitations on differential mineral velocities can be deduced. Brady and Jobson's geometric analysis of particle movement gives the following relationships between particle spheres of the same size and different densities.

$$\frac{V_f - V_h}{V_f - V_l} = \frac{(P_h - P_f)^{\frac{1}{2}}}{(P_l - P_f)^{\frac{1}{2}}}$$

where V_f = velocity of fluid
V_h = velocity of heavy
V_l = velocity of light
P_{fhl} = densities, as above

Other authors discuss behaviour in terms of hydraulic equivalence. To utilize this body of information in terms of the velocity ratio concept, a conversion is needed. Generally, the relationships are expressed in terms of grainsize versus density; all other parameters being constant. For example Yalin's (1972) equation for equal fall velocity expresses the size relationships between spheres of different density which fall with the same velocity in a still (laminar) unbound fluid. Obviously, grainsize can be kept constant and the relationship between velocity and density determined in that same fluid.

viz. $$\frac{D_l}{D_h} = \frac{P_l - P_f}{P_h - P_f}$$

(Yalin (1972)) for $V_l = V_h$ and D is diameter

From Stoke's law the velocity of a sphere falling in a

viscous fluid is inversely proportional to its radius. Thus the equivalent velocity equation is:-

$$\frac{V_h}{V_l} = \frac{P_h - P_f}{P_l - P_f} \qquad \text{for } D_l = D_h$$

A number of authors have proposed other hydraulic equivalence relationships. Assuming Stoke's law is obeyed equivalent velocity equations can be deduced. These equations are given Table 1.

TABLE 1

Hydraulic Equiv.	Velocity Ratio	Hydraulic Model Author
$\frac{D_l}{D_h} = \frac{P_h - P_f}{P_l - P_f}$,	$\frac{V_h}{V_l} = \frac{P_h - P_f}{P_l - P_f}$	Laminar Fall Yalin (1972)
$\frac{D_l}{D_h} = \frac{(P_h - P_f)^{\frac{1}{2}}}{(P_l - P_f)^{\frac{1}{2}}}$,	$\frac{V_h}{V_l} = \frac{(P_h - P_f)^{\frac{1}{2}}}{(P_l - P_f)^{\frac{1}{2}}}$	Turbulent Fall Yalin (1972) Impact law: Ruby (1933)
$\frac{D_l}{D_h} = \frac{(P_h)^{\frac{1}{2}}}{(P_l)^{\frac{1}{2}}}$,	$\frac{V_h}{V_l} = \frac{(P_h)^{\frac{1}{2}}}{(P_l)^{\frac{1}{2}}}$	Sub-Aerial Dispersive Pressure: Sallenger (1979)
$\frac{D_l}{D_h} = \frac{(P_h - P_f)^{\frac{1}{2}}}{(P_l - P_f)^{\frac{1}{2}}}$,	$\frac{V_h}{V_l} = \frac{(P_h - P_f)^{\frac{1}{2}}}{(P_l - P_f)^{\frac{1}{2}}}$	Sub-Aqueous Dispersive Pressure inferred from Sallenger (1979) Flow velocity Yang (1988)
	$\frac{V_f - V_h}{V_f - V_l} = \frac{(P_l - P_f)^{\frac{1}{2}}}{(P_h - P_f)}$	Geometrical Entrainment and viscous drag Brady & Jobson (1973)
	$\frac{V_h}{v_l} = \frac{(P_h - P_f)0}{(P_l - P_f)0}$	Conceptual: $V_h=V_l=V_f$ for grains in a falling body of water.

All equations are of a similar form and show the dependance of velocity on density for grains of similar size. The type of dependance is a function of hydraulic regime. Conceptually a generalized version of the Brady and Jobson equation which fits all other equations can be formulated.

$$\frac{V_f - V_l}{V_f - V_h} = \frac{(P_l - P_f)^a}{(P_h - P_f)^a} \qquad \text{EQN 2}$$

where a is an hydraulic regime coefficient and is likely to range among

a = 0 Grains enclosed in falling water.

a = 1/2 Grains falling in stationary turbulent water or dispersive pressure in a fluidized bed.

a = 1 Grains falling in stationary still water.

A coefficient of greater than 1 is not conceptually satisfying as one or both of the following is implied:

- Stoke's law is violated.
- The velocity of a particle increases with density beyond a proportionate increase. eg. Double the density, then quadruple velocity if a = 2.

5.3.3 Application

As our target mineral is gold (density 18) and easily measured heavy minerals such as zircon, ilmenite, magnetite have a density of 4.5 we may substitute into, and examine, the sensitivity of the various parameters in EQN 1. i.e.

$$C_{aus} = C_{aud} * \frac{C_{zrs}}{C_{zrd}} * \frac{V_{aud}}{V_{zrd}} \qquad \text{EQN 3}$$

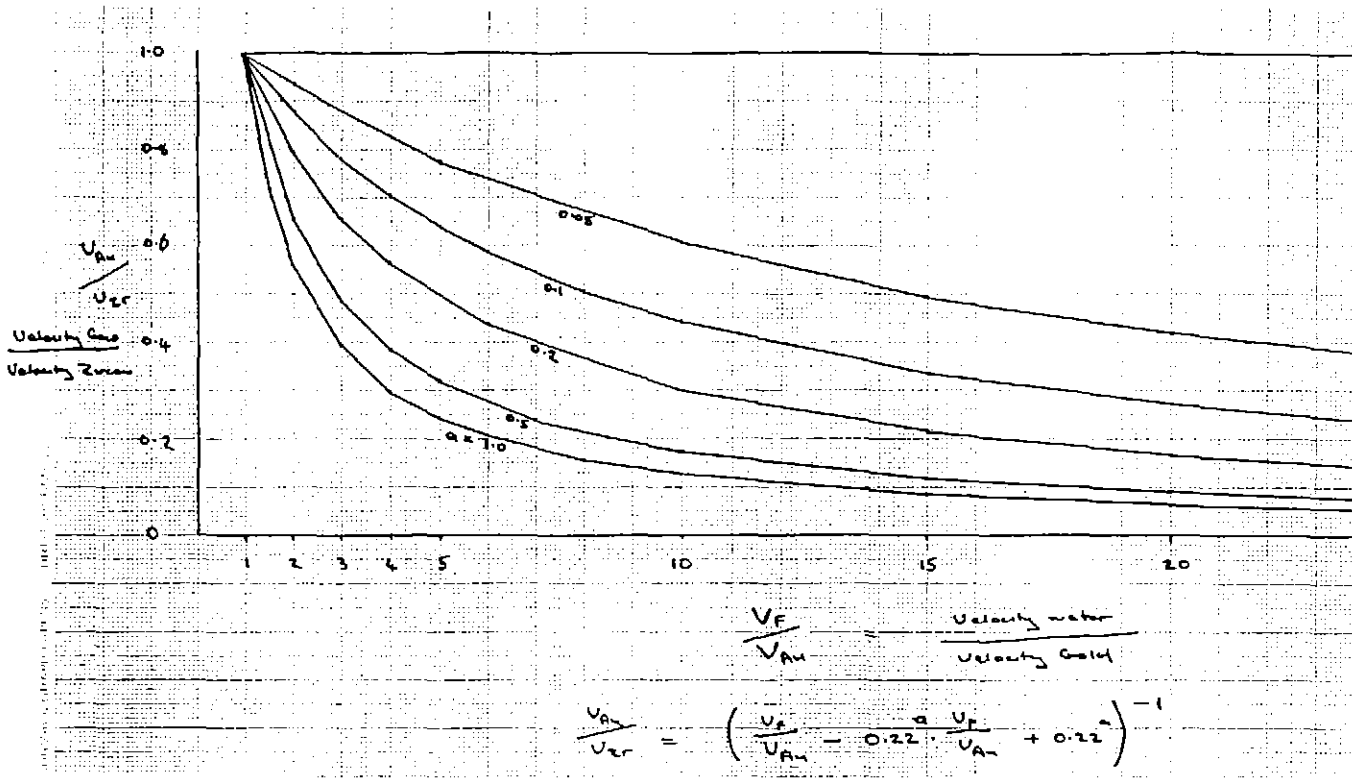
(1) (2) (3)

For this to be a better predictor of source gold than measured gold alone we must either measure the parameters or minimize their variability with reference to gold source variability.

Parameter 1: Measured by assaying an appropriate grainsize fraction. This is the value obtained during sampling in a mesh size based stream sediment sampling program.

Parameter 2: Given a consistent rock type within a drainage basin C_{zrs} may be known or it may be estimated from a representative coarse (+ 1cm) fraction from the stream being sampled. Irrespective of which technique is used the source variability of Zr amongst different drainages is likely to be much smaller than the variability of gold itself. C_{zrd} is measured on the same material as C_{aud}.

Parameter 3: Currently there is no appropriate way that parameter 3 can be measured. The best that can be done is to sample sediments which give the most stable ratio under conditions of flow and turbulence. It can be seen from graphs of EQN 2 (below) that minimum variability of the velocity ratio for changes in flow and turbulence occur in the bottom right of the graph. In a stream this would occur in areas of fast, minimum turbulence flow. Ideally, sediments should be sampled from such sites.



5.3.4 Limitations

The foregoing analysis is a simplification of a very complex subject. It is an attempt to rationally improve the predicability of stream sediment programs for gold. A number of factors of possibly high, but indeterminate importance, have been ommitted for simplicity. For completeness these are now addressed.

i) The shapes of zircon and gold grains may differ. It is probable that zircon will be, on average, more equant and less flattened than gold. The difference may be extreme in some cases. This would result in gold of a given grainsize travelling faster than its density would suggest; perhaps lessening or reversing the apparent hydraulic disparity with zircon.

ii) Given a fine stream fraction and a micron gold source it is probable that Zr will be hydraulically active due its liberated nature while Au will not. If used as a hydraulic index, the enrichment of liberated zircon would cause a down grading of the gold anomalism in high energy streams draining micron gold sources.

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iii) A contrast in the surface properties of liberated Au and Zr may cause flotation of one or other of the phases. Flotation with sterate (soap) is used for enhancing Zr recoveries in some beach sand gravity plants (Subramanya (1960)). Flotation of Au flakes is a common observation. The relative importance of Au or Zr flotation in somewhat foaming Tasmanian streams has not been assessed.

iv) The particular model of velocity ratio variability, largely derived from observations in sorted sand materials, may not be optimum for high energy turbulent streams where transport may be dominently within a fluidized stream bed. There seems to be some application of the Boltzmann distribution law as applied to sedimentation of heavy particles in a fluidized bed (Wehr and Richards (1974) p.26) which may ultimately give better predicability of these ratios and consequently a better indication of where to sample.

v) There remains doubt about whether a stream sediment sample is truely representative of drainage basin's mineralogical or lithological mix. Sediment supply to streams in some areas of PNG is largely as a result of rare, irregular landslip and, as a consequence, samples taken may represent point sources and not the entire drainage basin. Although this is not likely to be so in Western Tasmania, the problems arising from differential weathering as a function of time or lithology must always be considered in the final analysis.

It is of significant interest that Lanckneus (1988) reports the local correlation of gold is by far best with zircon in a Peruvian gold river placer. He suggested that Zr determination may be a good method of defining local gold

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prospectivity areas using small samples. Other heavy minerals assessed were ilmenite, limonite, andalusite pyroxene, garnet, monazite.

6. ORIENTATION

6.1 Locations

Three streams were selected in Northern and Western Tasmania to determine ways of correcting for the hydraulic partitioning of gold. Sample locations are given in figure 1.

These were selected on the basis of:

- Ease of access.
- Best knowledge of gold source characteristics at the time.
- Represented a small variety of stream character.

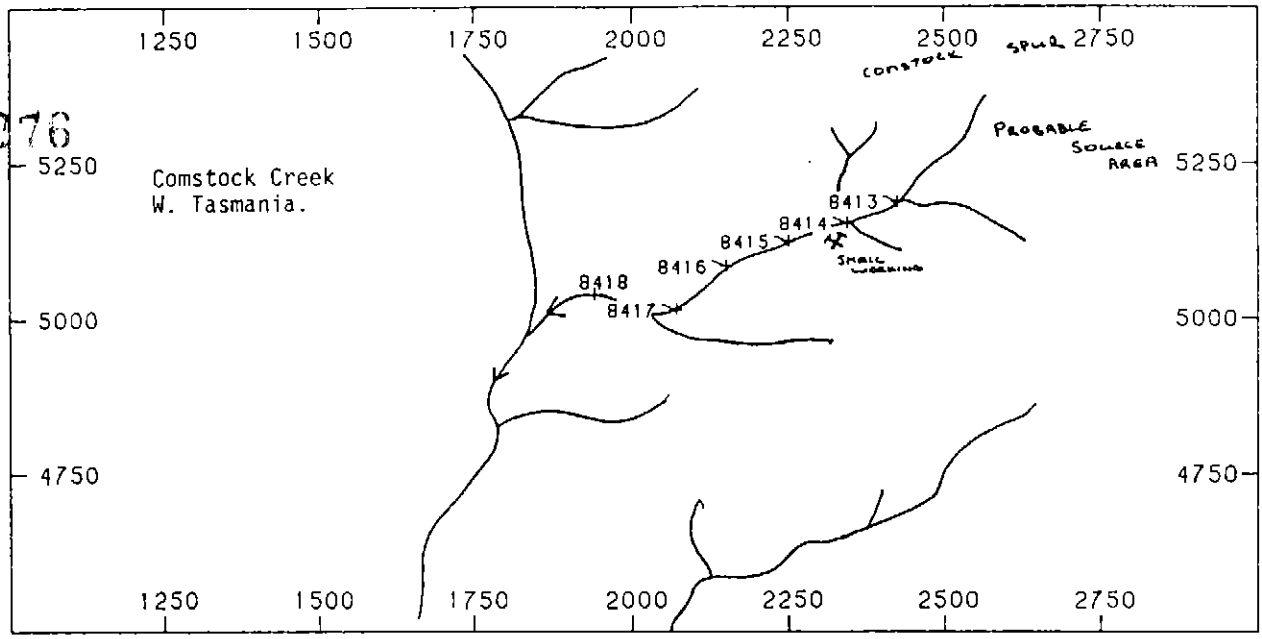
These were:

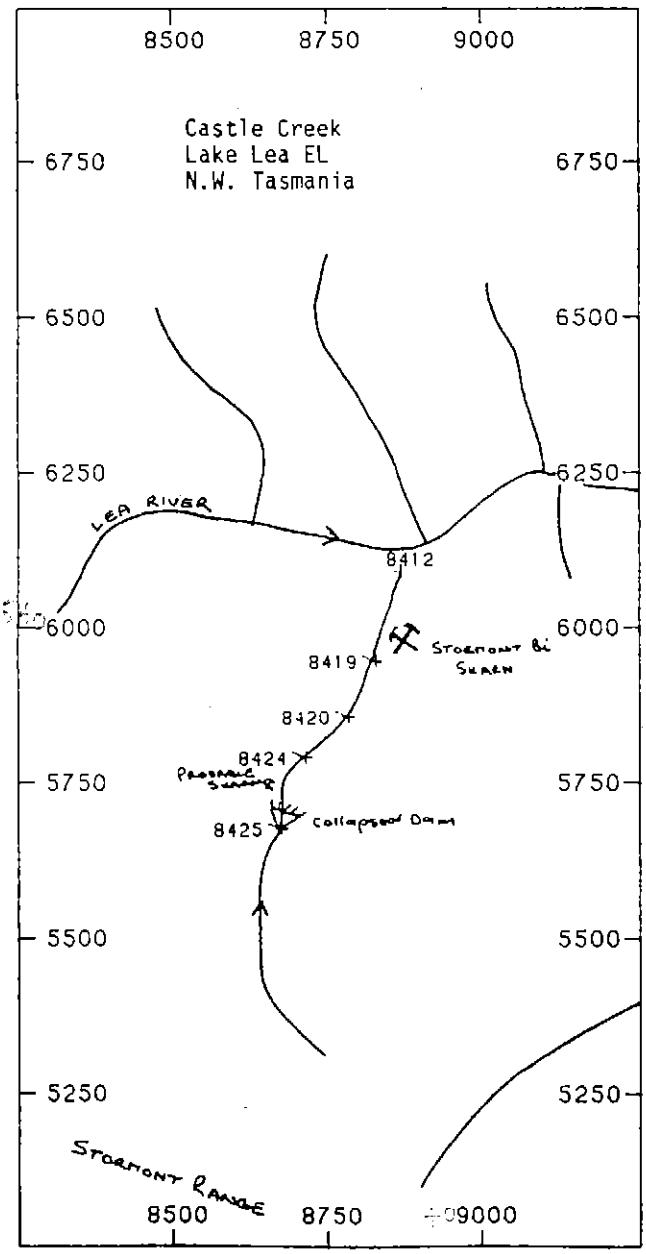
i) Devonport Creek. NW Tasmania

5407000N 9407000E AMG. Drainage area approx. 1.7km^2. Open boulder to gravel sediment draining principally Ordovician conglomerates of the Moina sandstone. A probable single gold source was thought to be the Devonport Mine. Previous sampling and orientation indicated gold values of 0.7, 0.2, 0.1ppm in various parts of this stream below the Devonport Mine. Tungsten was also reported in the previous orientation. (Fitzgerald (1985)).

ii) Castle Creek. NW Tasmania

5406000N 409000E AMG. Drainage area 0.5km^2. Boulder - silt sediment draining mixed lithologies of Basal Moina Sandstone and limestone associated with Au Bi magnetite bearing skarns





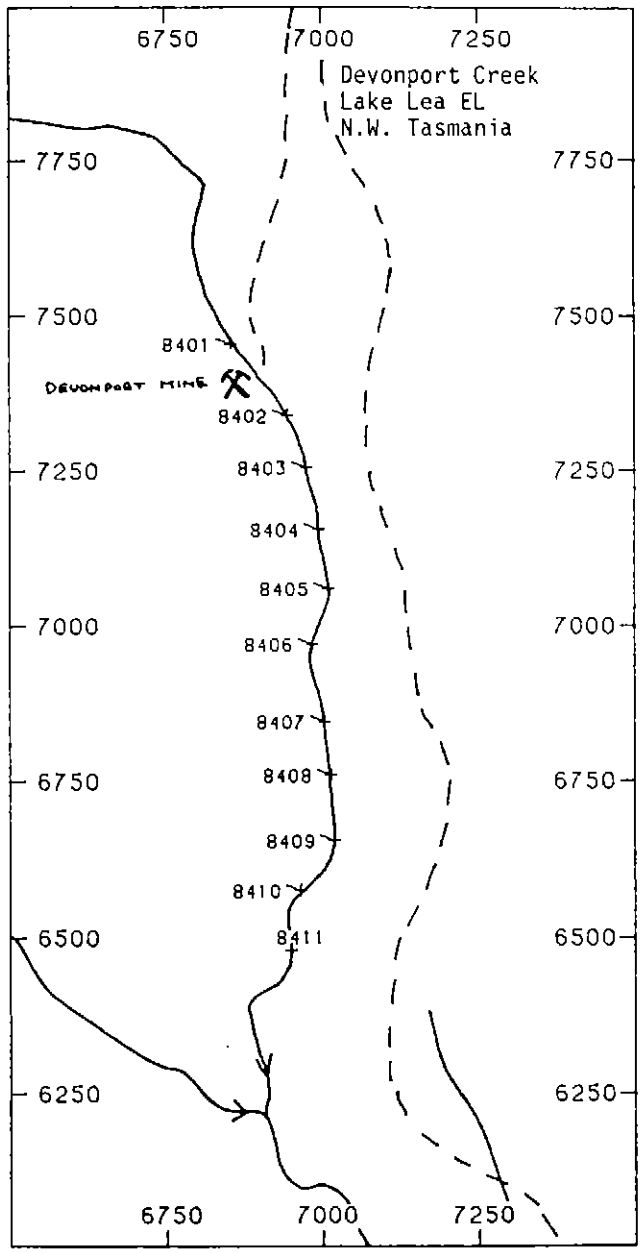


Figure 1. Stream Sediment Sample Locations.

in addition to high level tertiary alluvial sediment containing a silicified unit. Multiple gold sources are expected:

- Au from Stormont Bi skarn dumps near the Lea River confluence.
- Au from skarn outcrop up stream from the Stormont dumps.
- Au from Tertiary units.
- Au from veins in siltstones in the Stormont Range headwaters.

Previous analyses have been: 0.7, 1.0, 0.3g/t Au in -80#.

iii) South Comstock stream (true name uncertain) W. Tasmania

5344000E 382000E AMG. Drainage area approx. 1.0km^2. Drains west along southern flank of Comstock spur. Lithologies drained are Comstock Chert to north and pyritized silicified sheared acid volcanics of the Mount Read Volcanics to the north and south. The source of gold is likely to be from the area west of the Comstock Mine. In the head waters of this creek a small working near sample T8414 indicates the possibility of multiple gold sources. Previous -80# samples yielded 0.46, 0.63 ppm.

Unlike the other streams, considerable FeO cementation of the stream bottom sediment was evident. This was probably due to oxidation of ferrous iron released from pervasive pyritization of the volcanics.

6.2 Sampling Techniques

6.2.1 Field

Where possible none-trap sand to gravel bank sites were chosen. Sufficient material was sieved to obtain approximately 10kg of wet - 1mm sediment. During this process estimates of -10+2mm, -2+1mm and -1mm wet weights were recorded.

6.2.2 Laboratory

Comlabs, Adelaide, were instructed to wet sieve, dry and weigh the following fractions:

Mesh	Grainsize
-20+36#	-0.55+0.42mm
-36+52#	-0.42+0.30mm
-52+60#	-0.30+0.25mm
-60+85#	-0.25+0.18mm
-85+100#	-0.18+0.15mm
-100+200#	-0.15+0.075mm
-200#	-0.075 mm

Reasonable correlation was found between wet -1mm field weight and dry total -0.85mm (-20#) laboratory weight. Thus, the purposes of testing correlations wet masses were treated in the same manner as dry.

6.3 Analytical Techniques

All samples were prepared and analysed as below.

SIZE	PREPARATION AND ANALYSIS
-20 +36 #	Pulp to -150# ; ICP4 ; GEN 5/1 ; AAS1 ; XRF1
-36 +52 #	Ditto
-52 +60 #	Ditto
-60 +85 #	Ditto
-85 +100 #	BLEG 1 ; AAS1 ; XRF ; GEN 5/1 ; ICP4
-100 +200 #	BLEG 1 ; AAS1 ; AAS1 ; XRF1 ; GEN 5/1 ; ICP4
-200 #	FA3 ; AAS9 ; XRF1 ; AAS1 ; OCP4

XRF1	Sn Zr W
AAS	Pb Zn
ICP4	Ti Fe
GEN5/1	F
AAS9	Au Pre-roast Aqua Regia digest. AAS on MIBK Extract
FA3	50gm New pot low level Au by fire assay.
BLEG1	Low level bulk cyanide gold.

In addition some check analyses using 50gm (-100 +200#) fraction were conducted using H_2O_2 and 600°C/air preoxidation BLEG1.

7. RESULTS

7.1 Raw Data and Error Correction

Raw laboratory results are included as Appendix 1. On inspection a number of results were considered either erroneous through decimal point error, or at least suspicious. When questioned, Comlabs considered all results to be accurate.

The considerable difference between the raw sieve weights of the first sample 8401 when compared with all other samples suggested laboratory error. Fraction weights in sample 8401 are erroneous and reasonable values could not be recovered. In sample 8402 converting Wt.4 from 47 to 470gms effectively made the character of this sample fit all others. Where weights were required for interpretations the data from sample 8401 were excluded while the corrected version of 8402 was accepted.

The titanium analysis in sample 8416 (-36+52#) was inconsistent with the overall pattern in the adjacent fractions and in the adjacent samples. A value of 3100ppm has been been used in place of the reported 5100ppm. A transcription error was assummed.

7.2 Grainsize Analyses

FeO cementation in the sediments of the Comstock Creek suggested that grain liberation, even with wet sieving, would have been incomplete and intermediate size fraction weights and analyses would not be truely representative of grainsize distributions. In addition, poor liberation and increased field effort would mean that intermediate size fractions could not be used during future field surveys. Data were recalculated to a -mesh basis in place of the intermediate mesh basis as measured.

The appropriate recalculated results with field location and descriptions are given in Appendix 2.

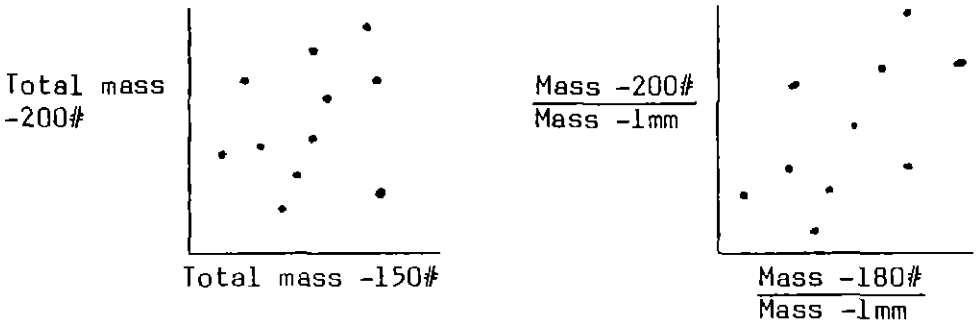
Pb, Zn, F, Sn, W were not recalculated as it was considered that their lack of variability and probable multiple sources did not make them suitable for hydraulic assessment.

7.2.1 Limitations of the Grainsize Data

Measured weights of particular grainsizes are insufficient to adequately characterize sediments. They are more dependant on collection amounts or methods than on stream conditions. Grainsize ratios, proportions or percentages are at least necessary to place data in a more useable form.

Unfortunately, when assessing the relationships between grainsizes, proportions or ratios, the comparisons and correlations are mildy to severely distorted due to the possible high variability in their common denominator. This is so whether the denominator is the mass of another grainsize interval or total mass of sediment collected. Accumulated data such as grainsize -mesh fractions are particularly susceptable to such 'constant sum effect' distortions. As a result patterns in grainsize distributions should be treated with some caution (See Davis (1986, p41)).The approach used in this study has been to examine grainsize relationships using all grainsizes in the denominator alternately and examining the results for 'robust' effects which appear stronger than those that may be induced by the common denominator. The normal effect of a highly variable common denominator is to cause an increase in apparent correlation between the grainsizes being examined.

Two uncorrelated grainsizes can have a very high correlation induced between them if their common denominator is highly variable eg.



Despite a multiplicity of grainsize relationship inspections no 'robust' correlation was found which may have assisted in reconciling hydraulic effects on gold. The best result in Devonport Creek was mildly indicative of -200# Au relating to the proportion of -200# in -50 to -60# sediment. Given the complexities of stream bed cementation, as will be discussed later, it is not considered that grainsize measurements could consistently assist in normalizing hydraulic effects on gold concentrations.

7.3 Gold Analyses

7.3.1 Cyanide (CN)

Conventional bulk cyanide analyses fail to identify gold in any consistent manner. This survey confirms a previous orientation in the Comstock Spur area where gold up to 445ppb in some -80# samples similarly failed to yield gold above 0.05ppb with cyanide. At that time, analyses were conducted by Analabs using a different bulk cyanide technique.

In the current program, analysis of sample residues confirmed gold was not being released during normal cyanidation. (T. Francis, Comlabs pers. comm.) The presence of sulphide or organics causing this problem was confirmed by gold being released by cyanide after a hydrogen peroxide pre-oxidation step was introduced. The results of this test in comparison with other assay types are given in Table 3.

Cyanide based analyses must be avoided. Until more work is done on pre-oxidation of samples.

TABLE 3

Comparison of gold results (all results ppb).

SAMPLE	FA 50gms -200#	AR 25g -100+200# roast	CYANIDE 100g -	CYANIDE 50g H_2O_2 oxid.	CYANIDE 50g 600°C roast
8404	22	20	-0.5	14	5
5	85	8	-0.5	17	53
7	14	24	-0.5	7	I.S.
8	12	20	-0.5	58	12
13	180	210	-0.5	20	38
18	10	130	-0.5	5	12
19	95	50	1.5	39	12
20	32	20	2.0	-0.5	-0.5
24	65	22	-0.5	-0.5	-0.5
25	8	6	4.5	-0.5	-0.5

7.3.2 Fire Assay (FA)

New pot, low level 50gm fire assay analyses were conducted on -200# fractions. Compared with aqua regia digests these results appear to have a lower effective detection limit. This is probably due to better analytical background corrections as a result of less suspended solid and perhaps iron in solution than would be the case in aqua regia digests.

The general tenor of both sets of results is that gold contents in -200# are lower than those in coarser grained AR digest, both in this survey and in previous surveys (-80#).

This lowness is interpreted as being due to high relative proportions of +200# gold in the streams being sampled.

7.3.3 Aqua Regia (AR)

50gm samples of -100+200# and -200# fractions were roasted between 400-600°C in order to oxidize sulphides and organics prior to analysis. Conventional low level gold Aqua Regia analyses were then conducted. The correlation between AR and FA (-200#) was relatively good despite the probable high detection limit and less efficient gold release of the AR technique.

The correlation between -100+200# and -200# is poor. The coarser fraction is higher and far more erratic no doubt reflecting more severe nugget effects arising from coarse gold combined with inadequate sample preparation.

7.3.4 Discussion

Bulk cyanide analyses, even if analytically correct, are subject to the same field sampling, hydraulic and nugget considerations as other techniques. The future of it and other bulk analytical techniques will depend partly on solving analytical problems, and partly on selection of appropriate grainsize to minimize nugget effects. Until the cyanide problem is resolved or other bulk techniques become available fine grainsize sampling followed by AR, FA or neutron activation appear the only reasonable options in Tasmania.

Whether the relative enrichment in -80# fractions is general in W. Tasmania is not known. There may be a currently unidentified phenomena which is either

- causing fine gold, if present in source, to coarsen quickly in the streams or during weathering or

- causing fine gold to move faster than its host fine sediment. This implies highly selective gold flotation.

Sampling of -200# would have the effect of enhancing
- Micron gold sources
- Strong coarse gold sources
- Sulphidic gold sources

with respect to weak coarse free gold sources.

Analysis of entire -200# samples, without preparation would minimize problems associated with sub-sampling nugget effects and contamination association with the preparation of larger volumes of coarser material. An additional advantage is that less sieving is required to yield 50gms of -200# than is required for the statistical equivalent of 700gms of -80#.

Values of 10-20ppb in -200# are likely to hold significance given current sampling densities. Pre-roast AR may be unreliable due to high analytical backgrounds. Newpot 50gm fire assay using carbon rod AAS detection would give superior results. An equal technique would be 30-50gm neutron activation analysis giving a conservative 5ppb detection limit.

7.4 Lead, Zinc and Iron

The intended use of base metals and iron in assisting to resolve hydraulic effects could not be realized during this survey. Pb and Zn are not strongly significant in Devonport Creek. Fe, as specular haematite, is dominently a detrital phase sourced from the Devonport Mine and to an unknown but proportional lesser extent from veination in host sandstones.

Pb and Zn are highly anomalous in Comstock Creek. Base metals are co-precipitating with iron oxide in bed sediments. It is difficult to apportion base metal concentration between co-precipitation and

source considerations. This has not been attempted as the objective of this report is to address variability in gold anomalism. There does not appear to be any compelling evidence linking gold and iron oxide co-precipitation effects. Analyses of 3 samples of stream precipitate gave less than <.008ppm gold in Comstock Creek. It appears the only effects precipitated iron oxides would have on gold is through mass dilution of the detrital bed-sediments.

In Castle Creek, the principle source of Fe is probably as magnetite from skarns. No obvious Fe cementation was evident in the stream bed. Levels of Pb and Zn are not significant, with the exception of sample 8412 directly below the Stormont Bi mine dumps.

7.4.1 Discussion

The origin of iron in stream sediments is varied. Significant enrichment over average source abundances can be expected through both hydraulic and precipitation processes. A very strong co-precipitation effect can be expected for Zn and As and some other base metals if their source areas have iron as sulphide. If iron is as magnetite, ilmenite etc then enrichment due to hydraulic effects can be expected.

As Zn, As and other metals may be associates of Au occurences in Tasmania the significance of stream anomalies in these metals will be related to iron contents in a complex manner. Iron should be analysed to assist in interpretation of gold-associate metal anomalism. Field observations should be made for the presence of stream precipitates.

7.5 Titanium, Zircon and (Iron)

7.5.1 Hydraulic Effects; (Devonport Creek)

The absence of bed cementation and the probability of a

single source configuration for gold meant Devonport Creek was a conceptually simple stream-source system from the aspect of hydraulics. Consequently, most interpretation was done on Devonport Creek.

Plots of grainsize as a proportion of -20#, zircon, titanium and iron are given in Figure 2. A number of comments can be made regarding Devonport Creek.

- Zr, Ti and Fe concentrations do not significantly correlate with any grainsize proportions.

- Zr, Ti and Fe concentrations decrease downstream in the coarsest grainsizes. Zircon varies least while Ti and Fe have similar behaviour.

- Intermediate grainsizes behave similarly to coarse grainsizes. Zr and Ti exhibit enrichment over the coarse grainsize while Fe does not.

- Enrichment of Ti and Zr increases into progressively finer grainsizes. Fe does not exhibit any significant enrichment until -200#.

- Enrichment of Ti into finer fractions is reasonably uniform at all sample sites; and is similar in character to the enrichment of Fe in -200#.

- Enrichment of Zr into fine fractions is not uniform over all sample sites. There is more contrast in Zr fine fraction to coarse fraction enrichments than either Ti or Fe.

- -200# Zr is occasionally lower than -100# Zr. If source zircon grainsizes have a lower size limit in the range 150-200# progressively finer fractions would be Zr depleted.

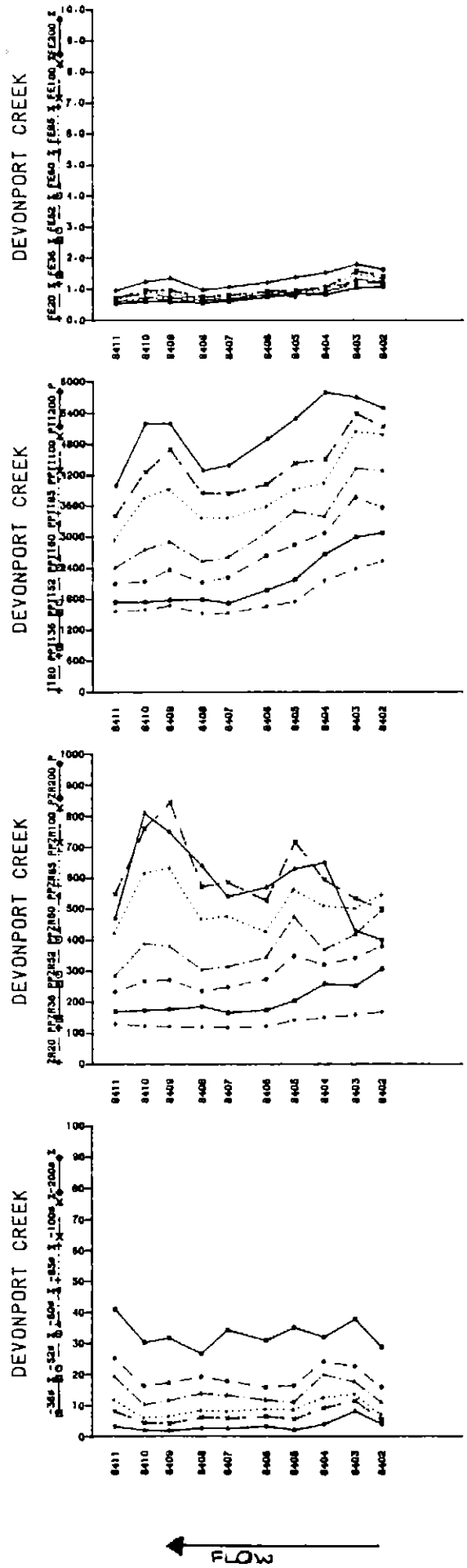


Figure 2. Variation of Grainsize, Fe, Ti and Zr Devonport Creek.

While both source and hydraulic character must be present in all grainsizes, it is considered that the enrichment of these metals into finer fractions is dominently an hydraulic effect. The mechanism envisaged is that as the mineral grains are liberated the hydraulic contrasts due to density and shape cause light and flat particles to move through the stream sections more swiftly resulting in upgrading of heavy and round particles.

Zr concentration in -20# is low and reasonably constant reflecting an even distribution of Zr in the catchment. The contrasts between the metals in -200# reflect either relative enrichment of source Fe concentrations in lithologies high in the drainage (above sample 8401) or higher transit velocities of coarse Ti and Fe than coarse Zr. There is insufficient information to distinguish between these possibilities, both may apply. If the latter is true then Ti is upgraded to a lesser degree which indicates its velocity is faster and it may be be considered less of an hydraulic index than zircon; particularly with reference to gold concentration.

Discussion

The objective of a hydraulic index is to reduce the variability of gold which is due solely to stream effects. Nugget effects are evident in Au -100+200# aqua regia results. -200# fire assay and aqua regia Au results correlate reasonably well. Therefore, though some errors are still evident, taking the mean of both results reduces variability due to sampling and analysis while retaining those due to stream site effects. The average of -200# gold values have been used to assess the applicability of an hydraulic index in Devonport Creek. The application of an effective hydraulic index to the gold value would reduce the

error of the log mean values of all samples. A comparison of various corrected with uncorrected results is:

	PARAMETER	PRECISION AT 95%
1	Log Au	33* uncorrected
2	$\text{Log}\left[\text{Au} * \frac{1}{\text{Zr } -200\#}\right]$	28
3	$\text{Log}\left[\text{Au} * \frac{1}{\text{Zr } -100\#}\right]$	28
4	$\text{Log}\left[\text{Au} * \frac{\text{Zr } -20\#}{\text{Zr } -100\#}\right]$	30
5	$\text{Log}\left[\text{Au} * \frac{1}{\text{Ti } -200\#}\right]$	32
6	$\text{Log}\left[\text{Au} * \frac{1}{\text{Ti } -100\#}\right]$	33
7	$\text{Log}\left[\text{Au} * \frac{\text{Ti } -20\#}{\text{Ti } -100\#}\right]$	29

It is evident that ratioing gold values to fine Zr lessens the variability of gold and must be considered as an effective hydraulic index in Devonport Creek.

7.5.2 Hydraulic Effects; (Castle and Comstock Creeks)

Plots of grainsize, Ti, Zr and Fe for Castle and Comstock Creeks are given in Figures 3 and 4. Some comments are:-

- Fe contents in Castle Creek are likely to reflect multiple

magnetite skarn sources rather than hydraulic effects. In Comstock Creek iron contents reflect precipitation of hydrous iron oxides in bed sediment and similarly cannot be considered an hydraulic measure.

- Coarse fraction Ti abundances in Comstock Creek are approximately 2200ppm while those in Castle Creek are 1000 - 1500. Evidently there are differences in the source concentrations of Ti.

- Coarse fraction Ti is similar to fine fraction Ti in Comstock Creek. Intermediate fractions show enrichment over both fine and coarse fractions. A possible explanation is there is little heavy mineral Ti being shed in fine grainsizes. Intermediate grainsizes are showing an hydraulic enrichment.

- In Castle Creek Ti in fine fraction shows a consistent enrichment over coarse fractions. Overall proportionate enrichment is about 2.5 and similar to that in Devonport Creek. The essential contrast to Devonport Creek appears to be in the source concentrations of Ti reflected in coarse fraction contents.

- A small amount of fine fraction enrichment over coarse is evident for Zr in Comstock Creek. A ratio of approximately 1.1 - 1.25 is apparent. Intermediate fractions are slightly more enriched. Overall, little hydraulic variability is evident.

- In Castle Creek a similar fine fraction enrichment of Zr to that in Devonport is evident. The amount of enrichment is approximately 3.5 which is higher than that for Ti.

- -100# Zr dominates coarse fraction contents. There does not appear to be much local hydraulic variability within Castle Creek. -200# Zr has much more variability and is

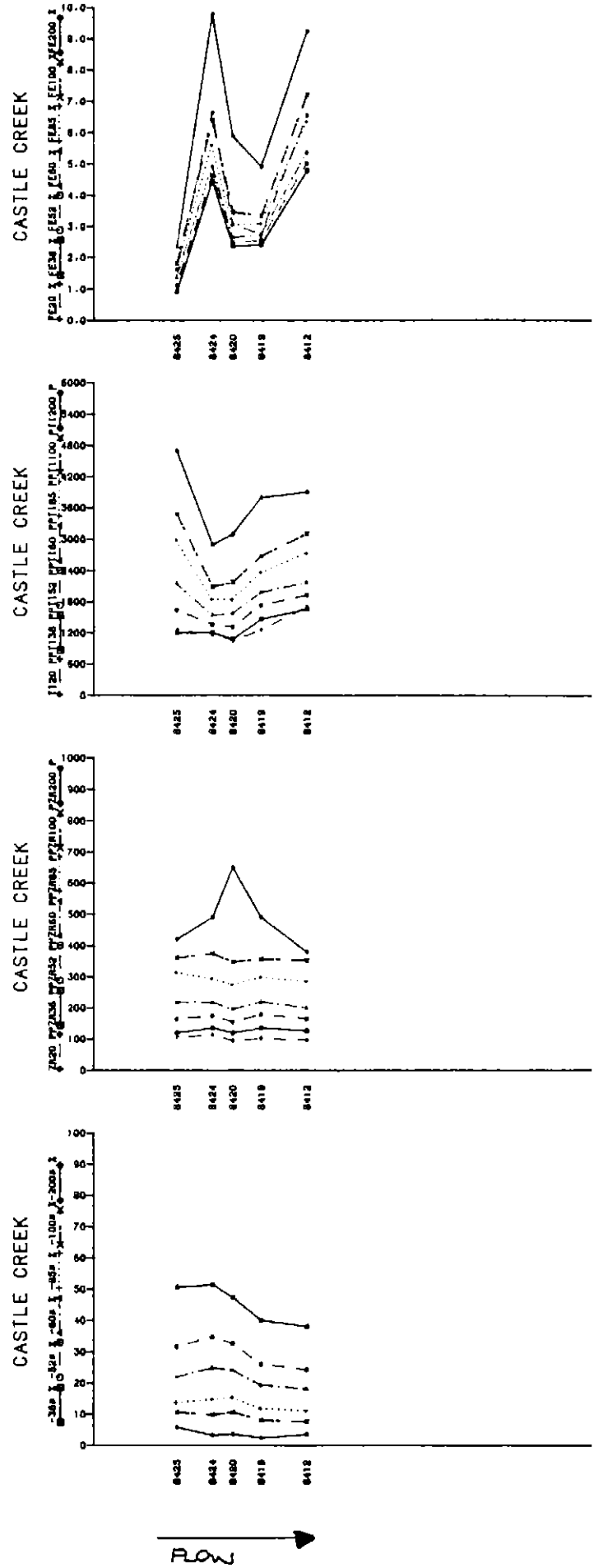


Figure 3. Variation of Grainsize Fe, Ti and Zr Castle Creek.

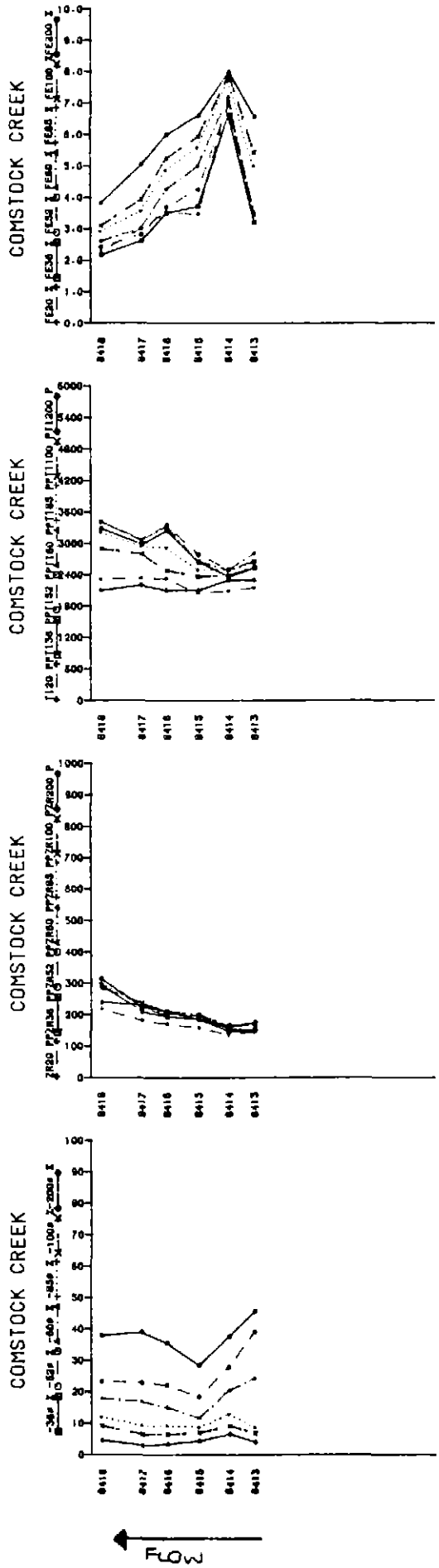


Figure 4. Variation of Grainsize Fe, Ti and Zr Comstock Creek.

similar in character to that in Devonport Creek. It is considered that the finer Zr is a better index of local hydraulic variability as it is less dependant on the source concentration as represented by coarse fraction Zr.

The above observations indicate that in Castle Creek ratioing Au contents by fine zircon should reduce gold variability. In Comstock Creek there should be little effect: However, given the few samples, it will probably degrade the result. Sample 8425 has been deleted from these calculations as it would dominate the results, due to its extremely high Au contents.

		PRECISION AT 95%		PRECISION AT 95%
Castle	log Au	45	log $\frac{Au}{Zr\ -200\#}$	56
Comstock	log Au	72	log $\frac{Au}{Zr\ -200\#}$	300

As only four samples were available at Castle Creek, the difference between the standard errors cannot be considered significant.

The poor result of corrected Au values in Comstock Creek is expected. If Zr is not behaving hydraulically then it is unlikely that gold will be. Under these circumstances Au and Zr are independant and dividing by zircon will add error to the gold results.

7.5.3 Discussion

In areas where it is expected that hydraulic activity of heavy minerals is variable then relating gold to fine zircon will improve the ranking of anomalies. In areas where

hydraulic variability is low, then relating gold to zircon will slightly degrade the effective ranking of anomalies. It is considered that in most circumstances on the W & NW coasts of Tasmania there are significant contrasts in the hydraulics between streams to warrant the collection of Zr data to assist in removing hydraulic variability from gold data.

7.6 Fluorine

In Castle and Devonport Creeks, it was hoped that fluorine could, provide an index of source controlled light mineral which, relative to bulk sediment, would not be affected by hydraulics. Unfortunately this could not be realized due to lack of detectable fluorine.

8. BIBLIOGRAPHY

Ackers., P.A., and White., R.W., (1973) 'Sediment Transport: New Approach and Analysis'. The Hydraulics Division, Research Station, England. 2041-2060.

Brady., L.L., and Jobson., H.E., (1973) 'An Experimental Study of Heavy-Mineral Segregation under Alluvial Flow Conditions' U.S. Geological Survey Prof. Paper 562-K.

Davis., J.C., (1986) 'Statistics and Data Analysis in Geology' 2 ed. John Wiley and Sons. New York.

Day., S., and Fletcher., (1986) 'Particle size and abundance of gold in selected stream sediments, southern British Columbia, Canada', J. Geochem. Explor., 26: 203-214.

Fitzgerald., F., (1985) 'E.L. 41/83 Lake Lea: Stream Sediment Orientation Survey', Goldfields Exploration Pty. Ltd Company Memorandum, Burnie Office FGF/9513/4.

Gatehouse., S.G., (1985) 'Lake Lea Stream Geochemical Orientation', Goldfields Exploration Pty. Ltd Company Memorandum, Canberra Office 27th Nov. 1985.

Gatehouse., S.G., (1984) 'Bulk Drainage Sampling for Gold' Goldfields Exploration Pty. Ltd Company Memorandum 20th July, 1984.

Gy., P.M., (1972) 'Sampling of Particulate Materials: Theory and Practice' Developments in Geomathematics 4 Elsevier, Amsterdam.

Harris., J.F., (1982) Sampling and Analytical Requirements for Effective use of Geochemistry in Exploration for Gold In: A.A. Levinson (Editor,), Precious Metals in the Northern Cordillera. Association of Exploration Geochemists, Rexdale, Ont., pp 53-67.

Lanckneus., J., (1988) 'The use of heavy minerals as pathfinders for placer gold in the department of Madre De Dios (Peru' in BICENTENNIAL GOLD '88. Extended abstracts Vol. 2 p. 547.

Ruby., W.W., 1933 'The Size Distribution of Heavy Minerals within a Water-Laid Sandstone', Jour. Sed. Petrology V3, p. 3-29.

Sallenger., A.H., (1979) 'Inverse Grading and Hydraulic Equivalence in Grain Flow Deposits', Jour. Sed. Petrology V49 p. 553-562.

Steidtmann (1982) 'Size-Density Sorting of Sand Size Spheres during Deposition from Bedload Transport and Implications Concerning Hydraulic Equivalence' SEDIMENTOLOGY, 29, 877-883

Subramanya., G.V., (1960) 'Selective Flotation of Zircon Beach Sands; Jour. Mines, Metals and Fuels, July p. 47-48.

Wehr., M.R., and Richards., J.A., (1974) 'Physics of the Atom' 2nd Edition, Addison-Wesley Publishing Company, Reading, Mass.

Yalin., M., (1972) 'Mechanics of Sediment Transport', Pergamon Press, New York, p. 290.

Yang., E.X., (1988) 'The Research of Placer Gold Deposit' in Bicentennial Gold '88 Extended Abstracts Vol. 2 p. 581.

APPENDIX 1

Raw Assay And Sample Weight Data

298

CLASSIC COMLABS LTD

Analytical Laboratories (INC. IN W.A.)

29 JUL 1988

708294

305 South Road, Mile End South, South Australia, 5031
Telephone: (08) 43 5722 Fax: (08) 234 0321 Telex: LABCOM AA89323

OUR REF. L5564_TF

YOUR REF.

26th July, 1988

Mr. Simon Gatehouse
R.G.C. Exploration
P.O. Box 590
Fyshwick
ACT 2609

Dear Simon,

Please find attached our completed report relating to hydraulic correction for gold in stream sediments.

With the exception of the results obtained by CN leach after preoxidation by peroxide or heating, (where possible) you should have all results already by fax. (The preoxidising work done is provided at our cost.)

I have not had opportunity to proceed further with the possible use of PbO as an oxidant but will do so in the near future.

I trust you gain useful information from the data presented. I will let you know if anything of interest is obtained by using litharge as preoxidant.

Yours sincerely,
CLASSIC COMLABS LTD.,

Mr. Trevor Francis
Chief Chemist and
Marketing Manager - Analytical

ATT.

CLASSIC COMLABS LTD
Analytical Laboratories (INC IN WA)

305 South Road, Mile End South, South Australia, 5031
Telephone: (08) 43 5722 Fax: (08) 234 0321 Telex: LABCOM AA89323

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708295

299

Mr. Simon Gatehouse
Goldfield Explorations
87 Wattle Valley Road,
CANTERBURY
VIC 3126

JOB NUMBER: 8AD1463

Your Reference: 0371

Date Received: 2-MAY-1988 Turnaround 85 days
Date Relayed: 26-JUL-1988
Date Reported: 19-JUL-1988

Number of Samples: 286

Report Analyte Codes
N.A. - Not Analysed.
L.N.R. - Listed But Not Received.
I.S. - Insufficent Sample for Analysis.

Report Comprising: Cover Sheet
Pages 1 to 16

Comments:

Please find enclosed an Amdel Report for Job No: 8AD1463 and a copy of Amdel's invoice for your reference.

Report Dist'n: Carbon Copies(CC),Electronic Media(EM),Magnetic Media(MM)

Type	Recipient	Location	Date	Copies

Approved Signature:

for

Harry Fishman
Managing Director.
CLASSIC COMLABS LTD
(Please address any enquiries to Mr. Trevor Francis)

This report relates specifically to the sample(s) tested in so far as that the sample(s) is truly representative of the sample source as supplied.

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Job: 8AD1463
O/N: 0371

300

ANALYTICAL REPORT

708296

SAMPLE	Au
8401 -85+100#	<0.5
8401 -100+200#	<0.5
8402 -85+100#	<0.5
8402 -100+200#	<0.5
8403 -85+100#	<0.5
8403 -100+200#	<0.5
8404 -85+100#	<0.5
8404 -100+200#	<0.5
8405 -85+100#	<0.5
8405 -100+200#	<0.5
8406 -85+100#	<0.5
8406 -100+200#	<0.5
8407 -85+100#	0.5
8407 -100+200#	0.5
8408 -85+100#	<0.5
8408 -100+200#	<0.5
8409 -85+100#	<0.5
8409 -100+200#	<0.5
8410 -85+100#	0.5
8410 -100+200#	5.5
8411 -85+100#	<0.5
8411 -100+200#	<0.5
8412 -85+100#	32
8412 -100+200#	38
8413 -85+100#	<0.5
UNITS	ppb
SCHEME	BLEG1

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Job: 8AD1463
O/N: 0371

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ANALYTICAL REPORT

708297

SAMPLE	Au
8413 -100+200#	<0.5
8414 -85+100#	<0.5
8414 -100+200#	10
8415 -85+100#	<0.5
8415 -100+200#	1.0
8416 -85+100#	<0.5
8416 -100+200#	<0.5
8417 -85+100#	<0.5
8417 -100+200#	<0.5
8418 -85+100#	<0.5
8418 -100+200#	<0.5
8419 -85+100#	1.0
8419 -100+200#	1.5
8420 -85+100#	<0.5
8420 -100+200#	2.0
8424 -85+100#	<0.5
8424 -100+200#	<0.5
8425 -85+100#	1.0
8425 -100+200#	4.5
UNITS	ppb
SCHEME	BLEG1

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Job: 8AD1463
O/N: 0371

ANALYTICAL REPORT

708298

SAMPLE	Au
8401-200#	20
8402-200#	36
8403-200#	10
8404-200#	22
8405-200#	85
8406-200#	70
8407-200#	14
8408-200#	12
8409-200#	80
8410-200#	55
8411-200#	15
8412-200#	4800
8413-200#	180
8414-200#	48
8415-200#	4
8416-200#	24
8417-200#	5
8418-200#	10
8419-200#	95
8420-200#	32
8424-200#	65
8425-200#	8
UNITS	ppb
SCHEME	FA3

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303

ANALYTICAL REPORT

708299

SAMPLE	Sn	W	Zr	Pb	Zn
8401 -20+36#	6	<10	98	8	4
8401 -36+52#	6	<10	125	14	11
8401 -52+60#	10	<10	96	34	12
8401 -60+85#	6	<10	105	14	24
8401 -85+100#	6	20	92	12	6
8401 -100+200#	6	<10	195	66	12
8402 -20+36#	<4	<10	110	6	6
8402 -36+52#	<4	<10	220	6	7
8402 -52+60#	10	<10	130	8	7
8402 -60+85#	8	15	410	8	9
8402 -85+100#	6	10	720	8	5
8402 -100+200#	8	15	780	16	11
8403 -20+36#	<4	10	100	12	5
8403 -36+52#	6	<10	120	18	3
8403 -52+60#	4	<10	88	14	5
8403 -60+85#	6	20	130	12	6
8403 -85+100#	4	15	300	16	7
8403 -100+200#	6	<10	790	20	7
8404 -20+36#	<4	<10	96	8	5
8404 -36+52#	4	<10	74	6	3
8404 -52+60#	<4	10	94	8	5
8404 -60+85#	6	<10	140	10	6
8404 -85+100#	8	15	250	10	7
8404 -100+200#	4	<10	550	8	7
8405 -20+36#	6	<10	105	10	6
UNITS	ppm	ppm	ppm	ppm	ppm
SCHEME	XRF1	XRF1	XRF1	AAS1	AAS1

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Job: 8AD1463
O/N: 0371

708300

ANALYTICAL REPORT

SAMPLE	Sn	W	Zr	Pb	Zn
8405 -36+52#	12	<10	80	6	3
8405 -52+60#	8	<10	105	8	4
8405 -60+85#	8	<10	160	10	4
8405 -85+100#	<4	<10	240	10	7
8405 -100+200#	<4	10	770	10	8
8406 -20+36#	6	<10	96	6	4
8406 -36+52#	<4	<10	72	8	4
8406 -52+60#	<4	15	78	8	9
8406 -60+85#	4	<10	105	10	5
8406 -85+100#	6	<10	135	8	10
8406 -100+200#	8	<10	480	8	7
8407 -20+36#	<4	<10	90	6	5
8407 -36+52#	<4	10	80	6	4
8407 -52+60#	12	<10	58	8	<2
8407 -60+85#	8	15	74	8	6
8407 -85+100#	<4	<10	145	10	6
8407 -100+200#	6	<10	620	12	5
8408 -20+36#	6	<10	92	8	6
8408 -36+52#	8	<10	66	6	<2
8408 -52+60#	<4	<10	58	6	5
8408 -60+85#	6	10	70	8	3
8408 -85+100#	10	10	125	8	5
8408 -100+200#	<4	<10	520	10	9
8409 -20+36#	6	<10	92	8	3
8409 -36+52#	4	<10	66	10	8
UNITS	ppm	ppm	ppm	ppm	ppm
SCHEME	XRF1	XRF1	XRF1	AAS1	AAS1

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ANALYTICAL REPORT

708301

SAMPLE	Sn	W	Zr	Pb	Zn
8409 -52+60#	8	<10	60	10	2
8409 -60+85#	4	<10	80	8	4
8409 -85+100#	6	<10	190	16	11
8409 -100+200#	6	<10	920	12	6
8410 -20+36#	8	<10	98	12	5
8410 -36+52#	4	<10	68	10	4
8410 -52+60#	<4	<10	62	10	4
8410 -60+85#	8	<10	76	10	2
8410 -85+100#	<4	<10	165	14	4
8410 -100+200#	10	<10	720	16	7
8411 -20+36#	<4	<10	98	12	4
8411 -36+52#	6	<10	72	8	3
8411 -52+60#	<4	<10	66	8	5
8411 -60+85#	<4	<10	78	10	4
8411 -85+100#	8	10	115	10	4
8411 -100+200#	6	<10	600	14	6
8412 -20+36#	24	<10	76	540	34
8412 -36+52#	22	15	62	400	22
8412 -52+60#	24	35	62	260	20
8412 -60+85#	28	20	70	200	19
8412 -85+100#	26	25	115	185	24
8412 -100+200#	26	20	330	240	30
8413 -20+36#	6	10	140	130	60
8413 -36+52#	10	<10	140	150	60
8413 -52+60#	6	15	150	170	54
UNITS	ppm	ppm	ppm	ppm	ppm
SCHEME	XRF1	XRF1	XRF1	AAS1	AAS1

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ANALYTICAL REPORT

708302

SAMPLE	Sn	W	Zr	Pb	Zn
8413 -60+85#	<4	<10	145	165	52
8413 -85+100#	10	10	150	210	60
8413 -100+200#	4	<10	160	300	72
8414 -20+36#	6	<10	130	195	98
8414 -36+52#	4	<10	140	200	88
8414 -52+60#	6	15	140	220	92
8414 -60+85#	6	<10	135	240	100
8414 -85+100#	<4	<10	155	300	130
8414 -100+200#	6	10	160	320	120
8415 -20+36#	<4	<10	145	82	64
8415 -36+52#	14	<10	170	98	74
8415 -52+60#	8	<10	190	120	80
8415 -60+85#	6	<10	190	145	84
8415 -85+100#	<4	<10	195	165	86
8415 -100+200#	<4	<10	220	230	110
8416 -20+36#	4	<10	155	110	80
8416 -36+52#	4	25	185	130	80
8416 -52+60#	6	<10	190	130	86
8416 -60+85#	12	<10	195	155	90
8416 -85+100#	<4	<10	195	170	86
8416 -100+200#	<4	<10	210	230	120
8417 -20+36#	<4	<10	160	115	62
8417 -36+52#	8	<10	195	105	50
8417 -52+60#	4	<10	210	105	52
8417 -60+85#	<4	<10	220	135	58
UNITS	ppm	ppm	ppm	ppm	ppm
SCHEME	XRF1	XRF1	XRF1	AAS1	AAS1

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Job: 8AD1463
O/N: 0371

307

ANALYTICAL REPORT

708303

SAMPLE	Sn	W	Zr	Pb	Zn
8417 -85+100#	14	<10	210	130	54
8417 -100+200#	10	<10	240	155	62
8418 -20+36#	6	<10	170	100	44
8418 -36+52#	8	<10	260	70	40
8418 -52+60#	4	<10	320	84	46
8418 -60+85#	4	<10	340	96	52
8418 -85+100#	4	10	340	100	62
8418 -100+200#	8	<10	330	110	66
8419 -20+36#	14	10	78	20	13
8419 -36+52#	30	<10	60	16	9
8419 -52+60#	20	20	62	12	11
8419 -60+85#	14	15	100	18	15
8419 -85+100#	22	25	160	20	15
8419 -100+200#	32	15	300	16	17
8420 -20+36#	20	10	70	16	15
8420 -36+52#	16	10	48	10	10
8420 -52+60#	14	20	46	8	10
8420 -60+85#	20	<10	60	10	12
8420 -85+100#	20	15	88	10	9
8420 -100+200#	24	<10	195	12	12
8424 -20+36#	20	80	86	34	38
8424 -36+52#	26	45	60	18	22
8424 -52+60#	20	35	68	18	20
8424 -60+85#	32	25	110	20	26
8424 -85+100#	30	40	115	18	22
UNITS	ppm	ppm	ppm	ppm	ppm
SCHEME	XRF1	XRF1	XRF1	AAS1	AAS1

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O/N: 0371

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ANALYTICAL REPORT

708304

SAMPLE	Sn	W	Zr	Pb	Zn
8424 -100+200#	36	<10	320	18	24
8425 -20+36#	6	<10	92	20	22
8425 -36+52#	14	<10	50	12	11
8425 -52+60#	4	<10	48	10	9
8425 -60+85#	4	<10	62	10	8
8425 -85+100#	8	15	130	12	11
8425 -100+200#	8	<10	290	16	13
UNITS	ppm	ppm	ppm	ppm	ppm
SCHEME	XRF1	XRF1	XRF1	AAS1	AAS1

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ANALYTICAL REPORT

708305

SAMPLE	Wt 1 +20#	Wt 2 -20#	Wt 3 -36#	Wt 4 -52#	Wt 5 -60#	Wt 6 -65#	Wt 7 -100#
8401	740	4410	82.0	28.00	49.00	29.00	108
8402	24.00	6780	1240	47.00	386	131	134
8403	55.0	4700	1160	379	300	145	250
8404	201	5080	597	318	560	230	385
8405	135	5580	1610	475	203	239	302
8406	520	5590	1230	338	238	183	252
8407	90.0	5480	1380	385	442	164	277
8408	97.0	5450	567	407	414	146	258
8409	387	5690	1210	490	432	169	195
8410	201	5800	1180	499	358	119	203
8411	162	5130	1380	515	662	297	423
8412	148	4110	924	407	467	215	269
8413	57.0	4140	510	1130	1200	124	206
8414	79.0	3610	573	438	438	201	149
8415	82.0	3850	550	368	163	73.0	141
8416	133	4310	897	478	400	166	202
8417	193	3850	1020	385	490	157	218
8418	184	4290	1020	378	408	184	313
8419	300	4530	1068	505	573	267	422
8420	529	4980	1420	814	832	417	666
8424	268	3550	1250	719	746	337	484
8425	163	3140	1220	625	527	182	301
UNITS	g	g	g	g	g	g	g
SCHEME	WEIGHT	WEIGHT	WEIGHT	WEIGHT	WEIGHT	WEIGHT	WEIGHT
UPPER SCHEME					WEIGHT		

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ANALYTICAL REPORT

708306

SAMPLE	Wt 8	Tot Wt
8401	400	5860
8402	382	9140
8403	620	7620
8404	303	7690
8405	185	8740
8406	267	8630
8407	213	8440
8408	202	7550
8409	152	8740
8410	165	8540
8411	283	8860
8412	238	6790
8413	304	7680
8414	379	5880
8415	236	5480
8416	223	6820
8417	186	6510
8418	316	7110
8419	179	7860
8420	339	10010
8424	230	7600
8425	365	6540
UNITS	g	g
SCHEME	WEIGHT	WEIGHT
UPPER SCHEME		WEIGHT

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Job: 8AD1463
O/N: 0371

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ANALYTICAL REPORT

708307

SAMPLE	Au
8401 -200#	28
8402 -200#	18
8403 -200#	14
8404 -200#	14
8405 -200#	44
8406 -200#	20
8407 -200#	24
8408 -200#	32
8409 -200#	16
8410 -200#	44
8411 -200#	12
8412 -200#	3100
8413 -200#	190
8414 -200#	18
8415 -200#	16
8416 -200#	70
8417 -200#	30
8418 -200#	12
8419 -200#	65
8420 -200#	32
8424 -200#	36
8425 -200#	18
8401 -100+200#	6
8402 -100+200#	140
8403 -100+200#	65
UNITS	ppb
SCHEME	AAS9

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708308

ANALYTICAL REPORT

SAMPLE	Au
8404 -100+200#	20
8405 -100+200#	8
8406 -100+200#	350
8407 -100+200#	24
8408 -100+200#	20
8409 -100+200#	50
8410 -100+200#	70
8411 -100+200#	450
8412 -100+200#	2200
8413 -100+200#	210
8414 -100+200#	100
8415 -100+200#	120
8416 -100+200#	120
8417 -100+200#	320
8418 -100+200#	130
8419 -100+200#	50
8420 -100+200#	20
8424 -100+200#	22
8425 -100+200#	6
UNITS	ppb
SCHEME	AAS9

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ANALYTICAL REPORT

708309

SAMPLE	Sn	W	Zr	Pb	Zn
8401 -200#	16	10	330	42	130
8402 -200#	10	<10	400	44	74
8403 -200#	12	<10	430	220	88
8404 -200#	8	<10	650	28	60
8405 -200#	8	<10	630	24	50
8406 -200#	12	<10	570	24	52
8407 -200#	10	15	540	26	150
8408 -200#	4	<10	640	24	80
8409 -200#	4	<10	750	18	100
8410 -200#	4	<10	810	16	90
8411 -200#	8	10	470	20	46
8412 -200#	34	<10	380	500	115
8413 -200#	8	<10	175	460	210
8414 -200#	10	<10	165	350	200
8415 -200#	6	<10	185	280	240
8416 -200#	10	<10	210	300	320
8417 -200#	6	<10	230	250	175
8418 -200#	8	<10	240	180	155
8419 -200#	34	10	490	48	140
8420 -200#	72	15	650	28	100
8424 -200#	56	35	490	46	165
8425 -200#	16	<10	420	26	90
UNITS	ppm	ppm	ppm	ppm	ppm
SCHEME	XRF1	XRF1	XRF1	AAS1	AAS1

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314

ANALYTICAL REPORT

708310

SAMPLE	Au1	Au2
8404 -100+200#	14	5
8405 -100+200#	17	53
8407 -100+200#	7	I.S.
8408 -100+200#	58	12
8413 -100+200#	20	38
8418 -100+200#	5	12
8419 -100+200#	39	12
8420 -100+200#	<0.5	<0.5
8424 -100+200#	<0.5	<0.5
8425 -100+200#	<0.5	<0.5
UNITS	ppb	ppb
SCHEME	BLEG1	BLEG1

Note : Au1 : Sample preoxidised using H2O2
Au2 : Sample oxidised by preroast at 600 deg. C.

: Results based on sample weights of 50 grams.

CLASSIC COMLABS LTD
Analytical Laboratories (INC. IN WA.)

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Job: 8AD1463
O/N: 0371

ANALYTICAL REPORT

708311

Mesh Identification List

Wt1 : +20#

Wt2 : -20+36#

Wt3 : -36+52#

Wt4 : -52+60#

Wt5 : -60+85#

Wt6 : -85+100#

Wt7 : -100+200#

Wt8 : -200#

316

amdel
technology and enterprise

Amdel Limited
(Incorporated in S.A.)
31 Flemington Street,
Frewville, S.A. 5063

Telephone: (08) 372 2700

P.O. Box 114,
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NATA CERTIFICATE

708312

19 July 1988

Mr T Francis
Classic Comlabs Ltd
305 South Road
MILE END SA 5031

REPORT AC 3664/88

YOUR REFERENCE:	8AD1463
REPORT COMPRISING:	Cover sheet Pages I1-I4 Pages K1-K4
DATE RECEIVED:	20 June 1988
Approved Signatory:	Don Patterson

Manager, Chemistry Services

for Dr William G. Spencer
General Manager
Applied Sciences Group

mk

The report relates specifically to the sample tested and also the entire batch in so far as the sample is truly representative of the sample source.

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Analysis code ICP4 Report AC 3664/88 Page 11

NATA Certificate Results in ppm

Sample	Ti	Fe
8401 -20+36#	1500	1.19%
8401 -36+52#	1700	9600
8401 -52+60#	1700	1.10%
8401 -60+85#	1900	1.01%
8401 -85+100#	1900	9600
8401 -100+200#	2900	9600
8401 -200#	5400	2.28%
8402 -20+36#	2300	1.30%
8402 -36+52#	2500	9700
8402 -52+60#	2000	1.12%
8402 -60+85#	3100	1.00%
8402 -85+100#	4300	9500
8402 -100+200#	4100	7800
8402 -200#	5500	1.62%
8403 -20+36#	2000	1.25%
8403 -36+52#	1900	8200
8403 -52+60#	1800	8200
8403 -60+85#	1900	7400
8403 -85+100#	2900	7400
8403 -100+200#	4600	1.05%
8403 -200#	5700	1.79%
8404 -20+36#	1900	1.18%
8404 -36+52#	1500	7600
8404 -52+60#	1600	7000
8404 -60+85#	2300	7200
8404 -85+100#	2600	6600
8404 -100+200#	3500	7000
8404 -200#	5800	1.53%
8405 -20+36#	1500	8500
8405 -36+52#	1600	9600
8405 -52+60#	1600	5800
8405 -60+85#	2000	6500
8405 -85+100#	2800	6800
8405 -100+200#	3900	7000
8405 -200#	5300	1.39%
8406 -20+36#	1500	9700
8406 -36+52#	1300	7200
8406 -52+6	1400	6700
8406 -60+85#	1600	6300
8406 -85+100#	2300	6600
Detn limit	(100)	(100)

Analysis code ICP4 Report AC 3664/88 Page I2

NATA Certificate Results in ppm

Sample	Ti	Fe
8406 -100+200#	3100	6300
8406 -200#	4900	1.22%
8407 -20+36#	1400	6400
8407 -36+52#	1200	6100
8407 -52+6	1100	5000
8407 -60+85#	1500	5000
8407 -85+100#	1900	6100
8407 -100+200#	3400	6100
8407 -200#	4400	1.07%
8408 -20+36#	1400	7800
8408 -36+52#	1000	5200
8408 -52+6	1100	4800
8408 -60+85#	1300	5400
8408 -85+100#	1800	5200
8408 -100+200#	3500	5800
8408 -200#	4300	9800
8409 -20+36#	1600	7900
8409 -36+52#	1100	5500
8409 -52+6	1300	5100
8409 -60+85#	1700	5500
8409 -85+100#	2300	5300
8409 -100+200#	4300	6600
8409 -200#	5200	1.35%
8410 -20+36#	1500	9400
8410 -36+52#	1300	5600
8410 -52+6	1100	5400
8410 -60+85#	1400	4800
8410 -85+100#	2100	6100
8410 -100+200#	3500	7500
8410 -200#	5200	1.24%
8411 -20+36#	1400	8200
8411 -36+52#	1200	5100
8411 -52+60#	1100	4900
8411 -60+85#	1600	4700
8411 -85+100#	1800	4800
8411 -100+200#	3000	5600
8411 -200#	4000	9600
8412 -20+36#	1700	7.60%
8412 -36+52#	1200	4.40%
8412 -52+60#	1200	3.98%
Detn limit	(100)	(100)

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Analysis code ICP4 Report AC 3664/88 Page 13

NATA Certificate Results in ppm

Sample	Ti	Fe
8412 -60+85#	1300	3.84%
8412 -85+100#	1800	4.20%
8412 -100+200#	2400	5.40%
8412 -200#	3900	9.25%
8413 -20+36#	1800	3.58%
8413 -36+52#	1900	3.34%
8413 -52+60#	2400	2.62%
8413 -60+85#	2900	2.74%
8413 -85+100#	2900	3.04%
8413 -100+200#	2900	3.78%
8413 -200#	2300	6.55%
8414 -20+36#	1900	7.25%
8414 -36+52#	2000	5.80%
8414 -52+60#	2500	6.25%
8414 -60+85#	2500	6.30%
8414 -85+100#	2700	7.10%
8414 -100+200#	2600	7.65%
8414 -200#	2300	8.00%
8415 -20+36#	1800	3.34%
8415 -36+52#	2400	2.80%
8415 -52+60#	3000	3.00%
8415 -60+85#	3100	3.32%
8415 -85+100#	3100	3.66%
8415 -100+200#	2800	4.82%
8415 -200#	2100	6.60%
8416 -20+36#	1800	3.48%
8416 -36+52#	5100	3.22%
8416 -52+60#	3400	2.52%
8416 -60+85#	3900	3.34%
8416 -85+100#	4000	3.78%
8416 -100+200#	2900	4.44%
8416 -200#	2100	6.00%
8417 -20+36#	1900	3.22%
8417 -36+52#	2900	2.36%
8417 -52+60#	3000	2.26%
8417 -60+85#	3200	2.38%
8417 -85+100#	3300	2.50%
8417 -100+200#	3300	2.98%
8417 -200#	2200	5.05%
8418 -20+36#	1700	2.28%
Detn limit	(100)	(100)

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Analysis code ICP4 Report AC 3664/88 Page 14

NATA Certificate Results in ppm

Sample	Ti	Fe
8418 -36+52#	3100	1.81%
8418 -52+60#	3400	1.78%
8418 -60+85#	3800	1.97%
8418 -85+100#	4200	2.16%
8418 -100+200#	3700	2.38%
8418 -200#	2100	3.82%
8419 -20+36#	1100	2.94%
8419 -36+52#	1000	2.16%
8419 -52+60#	1000	2.04%
8419 -60+85#	1400	2.16%
8419 -85+100#	1600	2.46%
8419 -100+200#	2200	2.66%
8419 -200#	3800	4.92%
8420 -20+36#	1000	3.66%
8420 -36+52#	600	2.18%
8420 -52+60#	600	1.83%
8420 -60+85#	1100	1.95%
8420 -85+100#	1000	2.02%
8420 -100+200#	1700	2.20%
8420 -200#	3100	5.90%
8424 -20+36#	1100	8.90%
8424 -36+52#	900	4.14%
8424 -52+60#	900	3.80%
8424 -60+85#	1100	4.00%
8424 -85+100#	1300	3.86%
8424 -100+200#	1700	4.76%
8424 -200#	2900	9.80%
8425 -20+36#	1300	2.34%
8425 -36+52#	500	6000
8425 -52+60#	500	5500
8425 -60+85#	800	9500
8425 -85+100#	1100	7900
8425 -100+200#	2000	1.16%
8425 -200#	4700	2.34%
Detn limit	(100)	(100)

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708317

321

Method: GEN 5/1 Report AC3664/88

Results in Percent

Sample ID	Size Fraction	F
8401	-20+36#	<0.02
	-36+52#	<0.02
	-52+60#	<0.02
	-60+85#	<0.02
	-85+100#	<0.02
	-100+200#	<0.02
	-200#	<0.02
8402	-20+36#	<0.02
	-36+52#	<0.02
	-52+60#	<0.02
	-60+85#	<0.02
	-85+100#	<0.02
	-100+200#	<0.02
	-200#	<0.02
8403	-20+36#	<0.02
	-36+52#	<0.02
	-52+60#	<0.02
	-60+85#	<0.02
	-85+100#	<0.02
	-100+200#	<0.02
	-200#	<0.02
8404	-20+36#	<0.02
	-36+52#	<0.02
	-52+60#	<0.02
	-60+85#	<0.02
	-85+100#	<0.02
	-100+200#	<0.02
	-200#	<0.02
8405	-20+36#	<0.02
	-36+52#	<0.02
	-52+60#	<0.02
	-60+85#	<0.02
	-85+100#	0.03
	-100+200#	<0.02
	-200#	<0.02
8406	-20+36#	<0.02
	-36+52#	<0.02
	-52+60#	<0.02
	-60+85#	0.02
	-85+100#	<0.02
	-100+200#	<0.02
	-200#	<0.02

amdel

708318

Method: GEN 5/1 Report AC3664/88

Results in Percent

Sample ID	Size Fraction	F
8407	-20+36#	<0.02
	-36+52#	<0.02
	-52+60#	<0.02
	-60+85#	<0.02
	-85+100#	<0.02
	-100+200#	<0.02
	-200#	<0.02
8408	-20+36#	0.04
	-36+52#	0.03
	-52+60#	0.03
	-60+85#	0.02
	-85+100#	0.02
	-100+200#	0.02
	-200#	<0.02
8409	-20+36#	0.02
	-36+52#	0.02
	-52+60#	0.02
	-60+85#	0.02
	-85+100#	0.02
	-100+200#	0.04
	-200#	<0.02
8410	-20+36#	<0.02
	-36+52#	<0.02
	-52+60#	<0.02
	-60+85#	<0.02
	-85+100#	<0.02
	-100+200#	<0.02
	-200#	<0.02
8411	-20+36#	<0.02
	-36+52#	<0.02
	-52+60#	<0.02
	-60+85#	<0.02
	-85+100#	<0.02
	-100+200#	<0.02
	-200#	<0.02
8412	-20+36#	<0.02
	-36+52#	<0.02
	-52+60#	<0.02
	-60+85#	<0.02
	-85+100#	<0.02
	-100+200#	<0.02
	-200#	<0.02

Method: GEN 5/1 Report AC3664/88

Results in Percent

Sample ID	Size Fraction	F
8413	-20+36#	<0.02
	-36+52#	<0.02
	-52+60#	<0.02
	-60+85#	<0.02
	-85+100#	<0.02
	-100+200#	<0.02
	-200#	<0.02
8414	-20+36#	<0.02
	-36+52#	<0.02
	-52+60#	<0.02
	-60+85#	<0.02
	-85+100#	<0.02
	-100+200#	<0.02
	-200#	<0.02
8415	-20+36#	<0.02
	-36+52#	<0.02
	-52+60#	<0.02
	-60+85#	<0.02
	-85+100#	<0.02
	-100+200#	<0.02
	-200#	<0.02
8416	-20+36#	<0.02
	-36+52#	<0.02
	-52+60#	<0.02
	-60+85#	<0.02
	-85+100#	<0.02
	-100+200#	<0.02
	-200#	<0.02
8417	-20+36#	<0.02
	-36+52#	<0.02
	-52+60#	<0.02
	-60+85#	0.03
	-85+100#	0.02
	-100+200#	<0.02
	-200#	<0.02
8418	-20+36#	<0.02
	-36+52#	<0.02
	-52+60#	<0.02
	-60+85#	<0.02
	-85+100#	<0.02
	-100+200#	<0.02
	-200#	<0.02

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708320

Method: GEN 5/1 Report AC3664/88

Results in Percent

Sample ID	Size Fraction	F
8419	-20+36#	<0.02
	-36+52#	<0.02
	-52+60#	<0.02
	-60+85#	<0.02
	-85+100#	<0.02
	-100+200#	<0.02
	-200#	0.03
8420	-20+36#	<0.02
	-36+52#	<0.02
	-52+60#	<0.02
	-60+85#	<0.02
	-85+100#	<0.02
	-100+200#	<0.02
	-200#	<0.02
8424	-20+36#	0.03
	-36+52#	0.02
	-52+60#	0.02
	-60+85#	0.02
	-85+100#	<0.02
	-100+200#	<0.02
	-200#	0.05
8425	-20+36#	<0.02
	-36+52#	<0.02
	-52+60#	<0.02
	-60+85#	<0.02
	-85+100#	<0.02
	-100+200#	<0.02
	-200#	<0.02

APPENDIX 2

Sample Descriptions And Gold, Titanium,
Iron, Zircon Assay Data And Grainsize Data:
Recalculated To A Minus Mesh Basis.
Grainsize Data is a % of -20#

GOLDFIELDS EXPLORATION PTY.LTD. DATA SHEET

PROJECT:LAKE LEA

Sample Masses and Gold Concentrations of Intermediate Grainsize Fraction eg. -20# is -20+36#.

SAMPLE IDENT.	+2mm GMS.	1-2mm GMS.	-1mm GMS.	-10# GMS.	-20# GMS.	-36# GMS.	-52# GMS.	-60# GMS.	-85# GMS.	-100# GMS.	-200# GMS.	IW-20# GMS.	AU25 PPB	AU100 PPB	AU200 PPB	AU100 PPB	AU200 PPB
T 8401	27000	10000	10500	740.0	4410.0	82.0	29.0	48.0	28.00	108.00	400.00	5106	-0.5	-0.5	28	6	20
T 8402	39000	9000	14000	84.0	6780.0	1240.0	470.0	386.0	131.00	134.00	392.00	9100	-0.5	-0.5	18	140	35
T 8403	51000	11000	11500	55.0	4700.0	1160.0	379.0	300.0	145.00	250.00	620.00	7554	0.5	-0.5	14	45	10
T 8404	44000	9000	11500	301.0	5080.0	597.0	218.0	560.0	230.00	385.00	703.00	7473	-0.5	-0.5	14	20	22
T 8405	40500	9000	13500	135.0	5580.0	1610.0	475.0	202.0	239.00	302.00	185.00	8594	-0.5	-0.5	44	8	85
T 8406	36500	10500	13500	520.0	5590.0	1230.0	339.0	279.0	187.00	252.00	267.00	8099	-0.5	-0.5	20	350	70
T 8407	30000	7500	12000	90.0	5490.0	1380.0	385.0	442.0	164.00	277.00	217.00	8741	0.5	0.5	24	24	14
T 8408	36500	10500	12000	97.0	5450.0	567.0	407.0	414.0	146.00	259.00	202.00	7444	-0.5	-0.5	32	20	12
T 8409	42000	9500	12500	287.0	5690.0	1210.0	490.0	432.0	169.00	195.00	152.00	8728	-0.5	-0.5	16	50	90
T 8410	40000	9500	12000	301.0	5800.0	1180.0	499.0	359.0	119.00	203.00	145.00	8324	0.5	5.5	44	70	55
T 8411	58500	9000	13500	162.0	5130.0	1380.0	515.0	662.0	297.00	423.00	287.00	8490	-0.5	-0.5	12	450	15
T 8412	39500	9500	13000	149.0	4110.0	924.0	407.0	447.0	215.00	269.00	238.00	6630	31.0	38.0	3100	2200	1800
T 8413	26000	6500	12000	57.0	4140.0	510.0	1130.0	1200.0	124.00	206.00	304.00	7614	-0.5	-0.5	190	210	175
T 8414	36000	7000	10000	79.0	3610.0	373.0	438.0	479.0	201.00	149.00	379.00	5709	-0.5	10.0	18	100	48
T 8415	42000	9500	9500	82.0	3850.0	550.0	368.0	167.0	77.00	141.00	234.00	5201	-0.5	1.0	16	120	4
T 8416	46500	8000	12000	133.0	4310.0	897.0	478.0	499.0	164.00	202.00	223.00	6675	-0.5	-0.5	70	120	24
T 8417	25500	6000	11500	193.0	3850.0	1020.0	385.0	490.0	157.00	218.00	186.00	4706	-0.5	-0.5	30	220	6
T 8418	42500	9000	11000	184.0	4280.0	1020.0	478.0	408.0	184.00	313.00	316.00	6909	-0.5	-0.5	12	170	10
T 8419	79500	8500	11000	300.0	4530.0	1068.0	505.0	573.0	267.00	422.00	179.00	7544	1.0	1.0	65	50	95
T 8420	76000	9500	13500	9.0	4980.0	1420.0	814.0	932.0	417.00	665.00	339.00	9460	-0.5	2.0	32	20	32
T 8424	40000	6500	10000	268.0	3550.0	1250.0	719.0	746.0	337.00	484.00	230.00	7716	-0.5	-0.5	36	22	45
T 8425	28000	4500	11000	163.0	3140.0	1220.0	625.0	527.0	192.00	301.00	365.00	6950	1.0	4.5	18	6	8

Laboratory:	RGCX	RGCX	RGCX	COMLAB	COMLAB	COMLAB	COMLAB	COMLAB	COMLAB	COMLAB	COMLAB	COMLAB	COMLAB	COMLAB	COMLAB	COMLAB	COMLAB
Instrument:	WET	WET	WET	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	CYAN	CYAN	AAS9	AAS9	FIRE
Det. Limit:	1.000	1.000	1.000	0.100	0.100	0.100	0.100	0.100	0.010	0.010	0.010	1.000	0.500	0.500	5.000	5.000	5.000

GOLDFIELDS EXPLORATION PTY.LTD. DATA SHEET

PROJECT:MINE LEASE

Sample Locations and Stream Descriptions. Locations are last 4 Digits of A.M.G. Coord.

SAMPLE IDENT.	NORTH	EAST	MAP-PHOTO
T 9401	7455	6950	DEVONPORT CK
	REMARKS:GRAVEL BANK AFTER BOULDER WATERFALL. 50M UPSTREAM FROM DEVONPORT MINE.		
T 9402	7340	6945	DEVONPORT CK
	REMARKS:GRAVEL BANK BEHIND BOULDERS. 150 M DOWN STREAM FROM T9401.		
T 9403	7255	6975	DEVONPORT CK
	REMARKS:COBBLE STREAM SECTION. 90M DOWNSTREAM FROM T9402		
T 9404	7155	6993	DEVONPORT CK
	REMARKS:COBBLE GRAVEL AMONGST BOULDERS. 100M DOWNSTREAM FROM T9403.		
T 9405	7060	7010	DEVONPORT CK
	REMARKS:GRAVEL COBBLE BED IN CENTRE OF STREAM. 100M UPSTREAM FROM T9406		
T 9406	6970	6985	DEVONPORT CK
	REMARKS:GRAVEL COBBLE BANK. 7M UPSTREAM FROM PREVIOUS SAMPLE T959		
T 9407	6845	7003	DEVONPORT CK
	REMARKS:GRAVEL PEBBLE BANK ON SIDE OF STEEP STREAM SECTION. WATERFALL AT 25M FROM T9406. 120M FROM T9404		
T 9408	6760	7015	DEVONPORT CK
	REMARKS:PEBBLE GRAVEL BANK BELOW 1.5M BOULDER WATERFALL. 95M DOWNSTREAM FROM T9407		
T 9409	6655	7030	DEVONPORT CK
	REMARKS:COBBLE GRAVEL BANK AFTER CLEAN ROCK STEEP SECTION. 100M DOWNSTREAM OF T9408		
T 9410	6575	6965	DEVONPORT CK
	REMARKS:GRAVEL COBBLE BANK IN MIDDLE OF STREAM. 100M DOWNSTREAM FROM T9409		
T 9411	6480	6950	DEVONPORT CK
	REMARKS:COBBLE DEPOSIT AFTER CLEAN STEEP ROCK SECTION. 104M DOWNSTREAM FROM T9410		
T 9412	6090	8870	CASTLE CK
	REMARKS:ANGULAR COBBLES AND SAND DEPOSIT. 20M UPSTREAM FROM LEA RIVER.		
T 9413	5190	2425 STH. CMSTK	
	REMARKS:GRAVEL DEEP IN BED OF CREEK BELOW ENCRUSTED STREAM BED. 5M BELOW NORTH STREAM CONFLUENCE.		
T 9414	5155	2345 STH. CMSTK	
	REMARKS:SAMPLE FROM BELOW MN ENCRUSTED STREAM BASE. 92M DOWNSTREAM FROM T9413. WORKING 30M DOWNSTREAM FROM THIS SAMPLE.		
T 9415	5125	2250 STH. CMSTK	
	REMARKS:ANGULAR GRAVEL. 102M DOWNSTREAM FROM T9414.		
T 9416	5085	2150 STH. CMSTK	
	REMARKS:ANGULAR COBBLE GRAVEL FROM BANK ON SIDE OF STREAM. 100M DOWNSTREAM FROM T9415.		
T 9417	5015	2070 STH. CMSTK	
	REMARKS:GRAVEL. 104M DOWNSTREAM FROM T9416.		
T 9418	5040	1940 STH. CMSTK	
	REMARKS:GRAVEL. 145M DOWNSTREAM FROM T9418. 106M FROM ROAD.		

Laboratory:
Instrument:
Det. Limit: 0.000

GOLDFIELDS EXPLORATION PTY.LTD. DATA SHEET

PROJECT:LAKE LEA

SAMPLE IDENT.	NORTH	EAST	MAP-PHOTO
T 9419	5845	9830	CASTLE CK
REMARKS:COBBLES. 190M UPSTREAM FROM LEA RIVER.			
T 9420	5855	9795	CASTLE CK
REMARKS:GRAVEL. 290M UPSTREM FROM LEA RIVER.			
T 9421	5125	2250	STN.CMSTK
REMARKS:MNO ENCRUSTATION FROM SAME SITE AS TB415			
T 9422	5095	2150	STN.CMSTK
REMARKS:MNO ENCRUSTATION. SAME SITE AS TB416			
T 9423	5015	2070	STN.CMSTK
REMARKS:MNO ENCRUSTATION. SAME SITE AS TB417.			
T 9424	5790	9715	CASTLE CK
REMARKS:GRAVEL BANK BEHIND BOULDER. 280M FROM LEA RIVER			
T 9425	5625	9675	CASTLE CK
REMARKS:LOW ENERGY ENTRANCE TO UPSTREAM SIDE OF COLLAPSED DAM. 500M FROM LEA RIVER			

Laboratory:
Instrument:
Det. Limit: 0.000

Recalculated Grainsize (As % of -20#) and Zr and Au Analyses.

SAMPLE IDENT.	-1#0 %	-2#0 %	-4#4 %	-8#8 %	-100# %	-200# %	ZR20 PPM	ZR24 PPM	ZR60 PPM	ZR40 PPM	ZR05 PPM	ZR100 PPM	ZR200 PPM	AU100 PPB	AU200 PPB	AU20(PPB
T 9402	29.50	15.79	10.85	4.79	5.10	4.01	144	207	272	193	242	190	190	45	19	25
T 9403	37.79	22.43	17.41	13.44	11.52	9.21	151	251	340	415	500	333	420	29	14	10
T 9404	32.63	24.03	19.78	12.28	9.21	4.06	119	258	319	368	507	594	650	17	11	22
T 9405	25.07	16.33	10.91	8.45	5.47	3.11	140	204	249	272	359	216	230	21	14	25
T 9406	30.97	15.79	11.61	8.67	6.41	3.39	120	124	273	343	424	526	570	190	20	70
T 9407	34.10	17.74	13.14	7.96	5.90	3.55	116	141	241	313	474	595	340	24	24	14
T 9408	26.79	19.17	13.79	9.14	6.15	3.71	117	196	231	294	464	572	640	25	32	10
T 9409	31.76	17.05	11.27	6.10	4.14	1.99	119	107	270	329	439	845	750	35	16	80
T 9410	30.22	16.15	10.15	5.85	1.42	1.90	120	173	266	306	611	760	810	59	44	55
T 9411	40.97	25.09	19.16	11.54	9.12	3.26	127	170	333	293	419	547	470	274	12	15
T 9412	38.01	24.07	17.93	10.89	7.65	3.59	85	125	164	199	282	253	380	2422	7100	4800
T 9413	45.61	28.93	24.09	9.33	6.79	3.99	144	149	151	151	165	160	175	190	190	175
T 9414	37.43	27.73	20.16	12.60	9.12	4.55	124	146	149	151	161	162	165	41	19	49
T 9415	29.45	19.23	11.79	8.36	7.01	4.39	154	195	193	193	197	190	195	54	11	4
T 9416	35.44	22.09	14.84	9.85	4.77	3.24	168	199	197	201	205	210	210	93	30	24
T 9417	39.95	22.77	16.47	8.90	6.41	2.95	170	206	220	224	229	235	230	194	30	5
T 9418	37.91	23.14	17.67	11.77	9.10	4.57	216	293	317	311	297	284	240	70	10	10
T 9419	39.95	25.90	19.10	11.51	7.97	3.17	101	175	177	219	296	356	490	54	45	95
T 9420	47.40	32.40	27.81	15.02	10.62	7.58	94	130	154	193	272	348	650	24	32	32
T 9424	51.49	34.19	24.56	14.37	9.78	3.14	111	176	171	216	291	374	490	26	36	65
T 9425	50.63	31.45	21.62	13.22	10.47	5.74	104	130	167	215	211	261	420	12	19	P

Laboratory:	COMLAB	COMLAB	COMLAB	COMLAB	COMLAB	COMLAB	COMLAB	COMLAB	COMLAB	COMLAB	COMLAB	COMLAB	COMLAB	COMLAB	COMLAB	COMLAB
Instrument:							XRF1	XRF1	XRF1	XRF1	XRF1	XRF1	XRF1	ACID	ACID	FIRE
Det. Limit:	0.010	0.010	0.010	0.010	0.010	0.010	10.000	10.000	10.000	10.000	10.000	10.000	10.000	5.000	5.000	5.000

GOLDFIELDS EXPLORATION PTY.LTD. DATA SHEET

PROJECT:LAKE LEA

Recalculated Ti, Fe Concentration -Mesh Basis.

SAMPLE IDENT.	TI20 PPM	TI14 PPM	TI52 PPM	TI60 PPM	TI85 PPM	TI100 PPM	TI200 PPM	FE20 %	FE14 %	FE52 %	FE60 %	FE85 %	FE100 %	FE200 %
T 9402	2524	3098	3559	4219	4947	5124	5500	1.24	1.09	1.17	1.29	1.31	1.49	1.62
T 9407	2347	2896	3752	4415	5029	5393	5700	1.17	1.01	1.19	1.38	1.46	1.58	1.79
T 9404	2117	2670	3042	3776	4032	4512	5000	1.07	0.82	0.84	0.97	0.97	1.07	1.57
T 9405	1778	2179	2844	3480	3884	4471	5200	0.85	0.84	0.74	0.82	0.87	0.96	1.29
T 9406	1618	1978	2432	3075	3576	4026	4900	0.80	0.70	0.77	0.80	0.86	0.93	1.22
T 9407	1511	1724	2213	2607	3349	3914	4400	0.61	0.61	0.62	0.66	0.76	0.81	1.07
T 9408	1506	1788	2116	2522	3257	3851	4300	0.72	0.57	0.59	0.64	0.78	0.78	0.99
T 9409	1457	1783	2156	2903	3618	4284	5200	0.73	0.60	0.62	0.70	0.83	0.96	1.35
T 9410	1574	1744	2124	2715	3733	4262	5200	0.84	0.61	0.65	0.71	0.89	0.97	1.34
T 9411	1541	1746	2009	2490	3024	3408	4000	0.71	0.54	0.56	0.58	0.65	0.72	0.94
T 9412	1682	1652	1914	2150	2715	3104	3900	4.52	4.78	4.98	5.74	6.31	7.21	9.25
T 9413	2136	2578	2647	2994	2412	2543	2300	2.40	2.20	2.17	1.51	1.96	1.43	1.75
T 9414	2072	2358	2487	2482	2471	2724	2700	2.01	1.62	1.93	2.36	2.68	2.90	3.00
T 9415	2079	2649	2728	2641	2481	2341	2100	1.20	1.20	1.07	1.07	1.57	1.94	1.60
T 9416	2513	2847	2377	2207	2007	2102	2100	1.49	1.50	1.68	1.84	1.94	2.24	2.00
T 9417	2720	2997	3042	2959	2435	2293	2200	1.99	1.62	1.80	1.90	1.93	1.93	1.95
T 9418	2289	2290	2305	2304	2191	2096	2100	2.21	1.17	1.29	1.58	1.89	1.10	1.92
T 9419	1345	1471	1717	1960	2745	3476	3900	2.73	1.40	1.57	1.71	1.67	1.33	1.92
T 9420	1038	1081	1304	1559	1939	2172	2100	1.84	1.26	1.45	1.42	1.83	1.45	1.90
T 9424	1151	1299	1349	1529	1934	2096	2900	4.41	1.45	1.66	1.82	1.89	1.78	1.80
T 9425	1249	1199	1625	2137	2949	3479	4700	1.62	0.91	1.10	1.34	1.59	1.81	2.34

Laboratory:	AMDEL	AMDEL	AMDEL	AMDEL	AMDEL	AMDEL	AMDEL	AMDEL	AMDEL	AMDEL	AMDEL	AMDEL	AMDEL	AMDEL
Instrument:	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP
Det. Limit:								0.010	0.010	0.010	0.010	0.010	0.010	0.010

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Appendix 6

Observations of Skarns in Western Tasmania

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Observations on skarns in Western Tasmania - with particular reference to gold

Submitted to Renison Goldfields Corporation

1 August, 1988

by

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Executive Summary

Skarns at Pine Hill, Moina, Fletcher's Adit, and Stormant are systematically zoned relative to their associated plutons. Highest gold grades occur in distal low temperature zones associated with high pyroxene:garnet ratios and distinctive garnet, pyroxene, and amphibole compositions. Stormant has the most potential and has some of the mineralogical features of large producing gold skarns. However, it appears to be limited in size by the composition of the associated pluton. More prospective skarns should be sought associated with more mafic, oxidized plutons.

Introduction

The skarn-associated plutons in Western Tasmania are high silica, leucocratic, "S-type" intrusions that appear to represent a range of intrusion depths of 2-8 km. Such intrusions are associated worldwide with skarns containing Sn, F, and other incompatible elements. The deeper examples tend to contain more tungsten. Skarns with this plutonic association are not known to contain large quantities of gold. The gold that does occur with these skarn systems should follow the general pattern of known gold skarns elsewhere in the world (Meinert, 1987). That is, gold-rich portions of Tasmanian skarn systems should occur in distal regions with low temperature retrograde alteration of high iron pyroxene-rich skarn. Bismuth and arsenic will likely be anomalous in high sulfide rocks. Skarns in four locations in Western Tasmania were examined during my visit, listed in approxiamate order of proximity to their respective igneous sources (and thus in inverse order of their gold potential): 1) Pine Hill near Renison Bell, 2) Moina, 3) Fletcher's Adit, and 4) Stormant.

Pine Hill - Renison Bell system

Skarn at Pine Hill was observed in drill hole #651 which intersected the Pine Hill granite at a depth of 602 meters. The pluton is a coarse-grained, equigranular, quartz-rich granite consistent with a lower crustal petrogenesis. Such plutons are typically associated with tin skarns (Meinert, 1983). At the granite contact the carbonate-poor sedimentary rocks have been converted to a biotite-pyroxene hornfels. From about 590 to 575 meters, this hornfels is overprinted by a pyrrhotite-magnetite-amphibole retrograde alteration. From about 562 to 556 meters, a more calcareous layer has been converted to pinkish-tan garnet skarn. The high garnet:pyroxene ratio and the garnet color are both consistent with a relatively high temperature, proximal skarn occurrence. The garnet is likely to be slightly sub-calcic with minor almandine-spessartine, although largely grossularite. This would be consistent with a tin-bearing skarn system (e.g. Einaudi et al., 1981). Such skarns are not known to contain much gold.

A sample of the retrograde alteration at 586 meters was selected for analysis to compare with the gold-bearing retrograde alteration at Stormant. In thin section, the sample consists of 0.01-0.5mm green pleochroic hornblende with associated pyrrhotite>arsenopyrite=chalcopyrite>cassiterite. The hornblende has probably replaced pyroxene and biotite grains but no remnants are left. Analysis of the hornblende with electron microprobe indicates a typical iron rich variety with high fluorine (0.47 wt. %) and high chlorine indicative of a proximal location in a tin skarn system (Table 1). Other features indicative of generally high temperatures are the high TiO_2, Al_2O_3, Na_2O, and K_2O contents. This is not the type of amphibole usually associated with economic gold grades and is in clear contrast to the more distal type of ampibole formed in the Stormant system. Based on igneous petrology, skarn mineralogy, and a single amphibole composition, little potential is indicated for either high gold grades or tonnage within the Pine Hill - Renison Bell system.

Skarns associated with the Dolcoath Granite

A series of skarns are associated with the shallow westernly dipping contact of the Dolcoath Granite. Like the Pine Hill granite, the Dolcoath pluton is a coarse-grained, equigranular, quartz-rich granite consistent with a lower crustal petrogenesis. The granite is locally greisenized and cut by quartz-tourmaline veins. Tin has been mined from such veins in the granite as well as surrounding altered sedimentary rocks. Total production appears to have been small. Nowhere does limestone come into direct contact with the granite, thus all the skarns in the district have formed at varying distances from the plutonic contact. The most proximal of these occurs at Moina where Kwak and Askins (1981) estimated 200 meters of unaltered (?) Moina sandstone separates skarn from granite. Skarns at Fletcher's Adit and Stormant are further west from the main Dolcoath contact than Moina and thus, presumably represent even more distal occurrences. From this relationship, one would predict progressively higher pyroxene:garnet ratios, pyroxene iron and manganese content, and gold grade. However, the total gold content is likely to be small due to the associated igneous rocks.

Moina

Surface exposures at Moina are small but descriptions of general geology and skarn mineralogy are reported by Kwak and Askins (1981) based upon limited drill core study (skarn mineral compositions are only reported in holes #5 and 12 west of the main Moina showing). Garnet from the Moina area contains 50-60 mole % andradite and up to 7 mole % almandine; the almandine content increases from core to rim indicating a general increase in sub-calcic component with time (Table 1). The composition and enrichment trend of this garnet is typical of tin skarns.

Pyroxene at Moina appears to be compositionally zoned, consistent with the apparent distance to the source intrusion. In hole #5 (interpretted as closest to the fluid conduit by Kwak and Askins, 1981), pyroxene is $Hd_{15}Jo_{0.5}$ whereas in hole #12 (interpretted as furthest from the fluid conduit by Kwak and Askins, 1981), pyroxene is $Hd_{62}Jo_{8}$ (Table 1). This is the typical enrichment trend which occurs as a hydrothermal fluid travels away from its source (e.g. Meinert, 1987). That such a pronounced enrichment trend is developed over a distance of about 100 meters indicates that the overall hydrothermal system is of limited size and that any potential for gold enrichment in distal zones is also likely to be of limited size.

Amphibole compositions at Moina are consistent with the garnet and pyroxene. Furthermore, amphibole at Moina is TiO_2 poor and MnO rich compared to that at Pine Hill. This indicates that skarn at Moina is lower temperature and further from the source than that at Pine Hill. However, the consistently high fluorine content (0.5-0.6 wt % F) of the amphibole at Moina indicates quite clearly that this is a tin skarn system and that it is related to the Dolcoath granite.

Fletcher's Adit

Skarn at Fletcher's Adit was observed briefly in drill core. The skarn is characterized by high garnet:pyroxene ratios relative to Stormant. The relative lack of pyroxene and amphibole alteration indicates that this skarn is very unlikely to contain significant gold mineralization. Because of this limited gold potential, no samples were taken for further study. It probably is not a productive exercise to mineralogically quantify this lack of gold potential.

Stormant

Skarn at Stormant is characterized by high pyroxene:garnet ratios with abundant amphibole alteration and visible bismuth minerals. All of these features are typical of gold-bearing skarns. The details of the skarn mineralogy are consistent with this being the most gold rich part of the skarn hydrothermal system related to the Dolcoath granite. However, even though locally high gold grades are predicted, size potential is still limited by the fundamental igneous petrogenesis.

Average garnet:pyroxene ratios range from a high of 3:1 in samples in the trench outside of the adit to a low of 1:4 in the samples from the face at the end of the adit, a distance estimated at about 50 meters. This indicates an overall fluid flow up the stratigraphic section, consistent with fluids feeding from underneath the limestone-sandstone contact. Garnet is present as veins cutting fine grained pyroxene skarn. Garnet veins contain quartz, amphibole, and native bismuth and typically have an envelope of coarser grained more iron rich pyroxene. The garnets are zoned with the rims more iron but less manganese rich than the cores (Table 1). Some of the cores contain a minor almandine component indicating that this is still part of tin skarn system.

The pyroxene at Stormant is consistently iron rich with minor manganese enrichment. Pyroxene compositions are similar to those of major gold skarn systems (Figure 1) but lack the high aluminum content characteristic of large tonnage gold skarn systems (Meinert,

1987). The relatively small manganese enrichment in samples spanning about 50 meters indicates that the gold mineralized part of this skarn system should extend for at least 2-3 times the length of the present exposures. However, the exposed stratigraphic thickness appears to be at most about 10 meters.

Gold and bismuth mineralization appears to be strongly associated with amphibole retrograde alteration of pyroxene. At the thin section level, amphibole-quartz veins contain native bismuth, gold, and minor arsenopyrite where they cut pyroxene skarn. Many of the amphibole veins contain euhedral garnets along the vein walls. It would appear that gold is being deposited during the crossover from pyroxene stability to garnet-amphibole stability and then continues on to lower temperature where only amphible is stable. Some of the amphibole alteration is quite massive and it is predicted that drilling will encounter rock in which no garnet or pyroxene remains and even some of the amphibole is being altered to chlorite and/or clay. The amphibole is compositionally distinct from that at either Pine Hill or Moina. Stormant amphibole has lower titanium and alkaliis but much higher manganese. All of these features are consistent with Stormant being the lowest temperature and most distal of the three skarn occurrences. However, the relatively high fluorine content (0.46 wt % F) clearly indicates that although Stormant is distal, it is the distal part of a tin skarn system.

Conclusions and Recommendations

All the skarns examined in western Tasmania are related to high silica, coarse grained granites which may be broadly characterized as "S-type". Such plutons are well known for their association with Sn and W systems, and associated skarn in carbonate rocks, but are not very prospective for gold. There are good petrologic reasons for this including the reduced nature of such plutons, their overall low water content, and the lack of large vertically zoned magma chambers. However, within a given petrologic province the occurrence of the highest gold grade within the available skarn is relatively predictable. The four skarn systems

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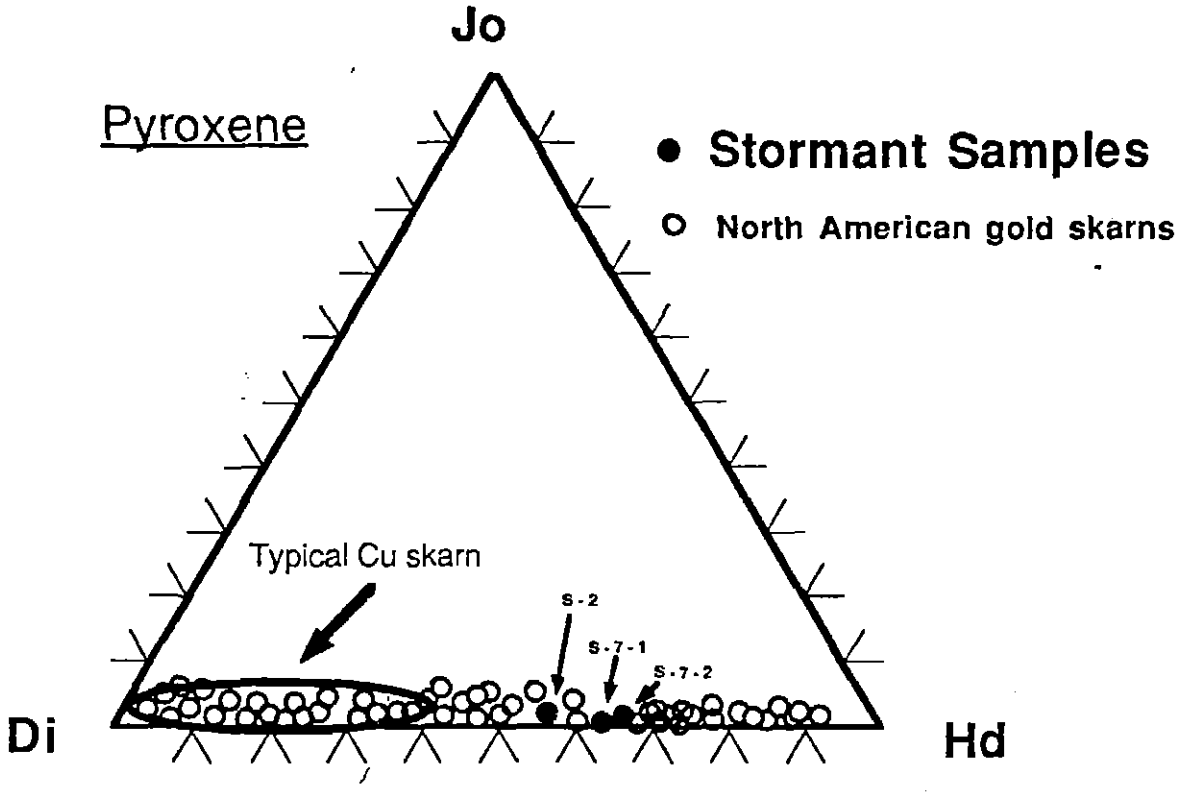
described in this report, Pine Hill, Moina, Fletcher's Adit, and Stormant represent a range of skarn environments, from most proximal to most distal, respectively. For each of these, I have described the characteristic skarn mineralogy and typical mineral compositions. Gold occurs with iron-rich pyroxene in distal zones of abundant amphibole alteration. Systematic changes in garnet:pyroxene ratio combined with the extent of iron and manganese enrichment in pyroxene are good indicators of distance from the source intrusion. The size of the pyroxene dominant zone is a good indicator of the potential size of gold mineralization. Based upon these criteria, Stormant is by far the most prospective of the skarns I observed in Tasmania. However, I would characterize Stormant as the most gold-rich part of a relatively gold poor system. It is probably worth testing Stormant as a potential small ore body, however I would not place the Dolcoath granite high on a list of plutons likely to form major gold deposits.

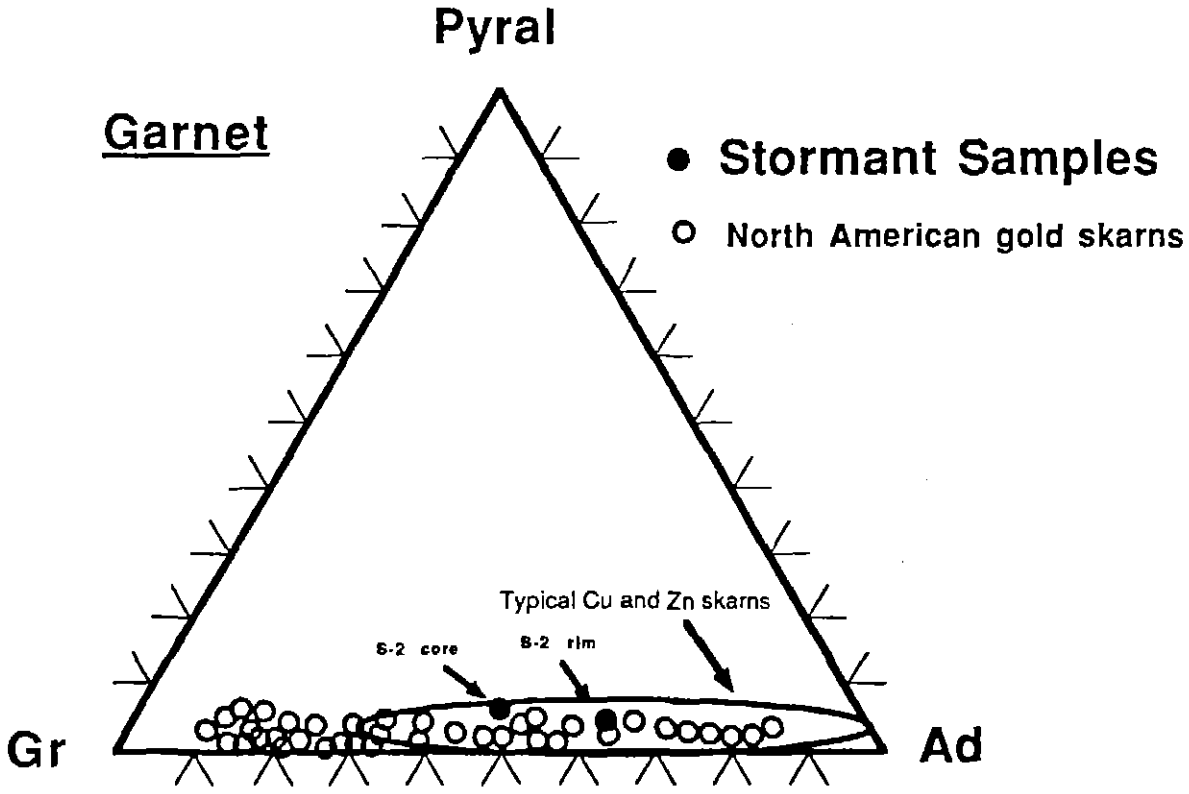
Tasmanian Skarn Electron Microprobe Data

Sample #	S-2	S-2	K&A 6	K&A 7	K&A 8	K&A 9	S-2	S-7	S-7	K&A 4	K&A 5	RB-651-586	S-2	K&A 10	K&A 11	K&A 12	S-7
Analysis	pt 2 core	pt 2 rim	wrig rim	wrig core	c.s. sk	u. cs sk	pt 1	pt 2	pt 1	c.s. sk	wrigglite	pt 1	pt 2	wrigglite	l. cs sk	u. cs sk	pt 2
Mineral	Gar	Gar	Gar	Gar	Gar	Gar	Pyx	Pyx	Pyx	Pyx	Pyx	Amph	Amph	Amph	Amph	Amph	Carb.
SiO2	36.64	35.70	37.62	37.21	36.89	37.01	49.75	48.33	49.56	53.07	48.94	44.30	48.36	36.80	36.55	39.14	0.00
TiO2	0.12	0.16	0.17	0.20	0.22	0.56	0.00	0.06	0.00	0.00	0.07	0.62	0.09	0.20	0.25	0.34	0.00
Al2O3	9.56	7.35	5.97	6.09	6.97	8.29	0.57	0.35	0.24	0.19	0.37	6.54	3.05	11.54	13.23	14.44	0.08
FeO*	19.06	21.52	22.02	21.12	22.29	20.64	17.85	19.55	19.15	4.97	18.33	28.19	27.19	27.14	26.16	23.83	0.72
MnO	2.71	1.66	1.79	1.00	1.86	2.41	2.58	3.08	1.57	0.27	2.83	0.90	3.01	0.83	1.42	1.26	1.42
MgO	0.06	0.00	0.09	0.08	0.00	0.01	5.73	3.53	5.16	15.01	4.74	3.81	4.71	3.39	2.62	2.00	0.15
CaO	31.56	32.16	31.78	32.51	31.35	31.25	23.71	23.16	23.90	24.86	22.68	10.15	11.10	11.22	9.64	11.05	54.18
Na2O	0.14	0.00	0.05	0.09	0.00	0.01	0.05	0.00	0.00	0.04	0.15	1.32	0.46	1.53	1.49	0.28	0.00
K2O			0.02	0.02	0.00	0.02	0.00			0.01	0.00	0.76	0.14	2.22	2.93	2.25	
F			0.23	0.31	0.31	0.32	0.40			0.11	0.22	0.47	0.46	0.60	0.45	0.29	
Cl			0.02	0.06	0.00	0.05	0.00			0.02	0.00	0.38	0.03	0.52	0.61	0.62	
P2O5							0.02					0.02	0.04				
Total	99.85	98.55	99.76	98.69	99.89	100.57	100.66	98.06	99.58	98.55	98.33	97.46	98.64	95.99	95.35	95.50	56.55
Cations	12	12	12	12	12	12	6	6	6	6	6	24	24	24	24	24	6
Si	2.966	2.958	5.987	6.104	5.992	5.943	1.886	1.98	1.98	1.986	1.976	7.086	7.563	6.288	6.268	6.608	0
Ti	0.008	0.01	0.02	0.025	0.027	0.068	0.000	0.002	0	0	0.002	0.074	0.01	0.026	0.032	0.026	0
Al	0.912	0.718	1.118	1.178	1.335	1.569	0.026	0.017	0.012	0.002	0.018	1.232	0.562	2.326	2.675	2.975	0.009
Fe	1.162	1.342	3.015	2.607	2.7525	2.491	0.566	0.67	0.64	0.156	0.619	3.771	3.557	3.878	3.752	3.878	0.06
Mn	0.186	0.116	0.241	0.139	0.256	0.312	0.083	0.107	0.053	0.009	0.097	0.122	0.399	0.12	0.206	0.12	0.12
Mg	0.006	0	0.021	0.02	0	0.002	0.324	0.216	0.307	0.837	0.285	0.909	1.098	0.863	0.67	0.863	0.022
Ca	2.738	2.856	5.411	5.714	5.457	5.377	0.963	1.017	1.023	0.997	0.981	1.74	1.86	2.054	1.771	2.054	5.784
Na	0.022	0	0.015	0.014	0	0.003	0.004	0	0	0.003	0.006	0.41	0.141	0.507	0.495	0.507	0
K			0.004	0.002	0	0.002	0.000			0.0	0	0.155	0.027	0.484	0.641	0.484	
Hd							58.2	67.5	64.0	15.6	61.8						
Di							23.6	16.1	22.2	45.4	20.9						
Jo							6.4	8.7	4.0	0.5	7.6						
Ad	49.8	61.7	61.8	60.6	56.9	51.2											
Gr	40.4	33.0	25.6	30.0	30.7	35.9											
Sp	8.2	5.3	5.5	3.5	5.9	7.1											
Alm	1.6	0.0	7.2	5.9	6.4	5.8											

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Jo
Pyroxene
Stormant Samples
North American gold skarns
Typical Cu skarn
S-2
S-7-1
S-7-2
Di
Hd


Pyral
Garnet
Stormant Samples
North American gold skarns
Typical Cu and Zn skarns
S-2 core
S-2 rim
Gr
Ad

708337

Appendix 7

Modelling of Some Lake Lea Aeromagnetic Anomalies

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708338

MODELLING OF SOME LAKE LEA AEROMAGNETIC ANOMALIES
(E.L. 41/83)

for

RGC Exploration Pty. Ltd.

by

Mitre Geophysics Pty. Ltd.

RGC/MG88/05
August, 1988

LAKE LEA (E.L. 41/83) AEROMAGNETIC ANOMALIES

RGC is actively exploring for gold in the Lake Lea licence and Mitre Geophysics was asked by RGC to identify any magnetic anomalies in the 'Moina' aeromagnetic data which might be prospective for gold (eg, skarns or 'ironstones'). The Moina survey does not cover all of the licence, but the uncovered portion, in the south-western corner, is considered the least prospective for gold. Those areas covered by basalt were also not examined for this report.

Twenty anomalies were picked from the magnetic contour plan including the response over the old Stormont mine, and some large responses almost certainly due to Cambrian volcanics. After consultation with RGC, two more anomalies were chosen and nine of the twenty two were picked for some preliminary modelling. The aim of the modelling was merely to obtain some idea of the size and depth of the source. Neither geology nor any physical property information was considered during the modelling (including Stormont) and it is emphasised that the resulting profiles are merely an (imperfect) guide for further exploration. Stormont was modelled so that the modelling 'accuracy' could be evaluated using a known source. It is stressed that much better modelling would be produced if more time were devoted and more realistic models would be obtained if I had used some geological input. For the Moina survey, the aircraft flew with a nominal terrain clearance of 100m towing the magnetometer on a 30m cable, thus ~75-80m should be subtracted from the sections to give depth below surface. Note that the scales of the flight line profiles and model sections are set automatically to optimise the data presentation on an A4 sized sheet. Thus the scales may vary from profile to profile and between models.

Figure 1 shows the locations of the 22 anomalies on the 1:25,000 contour plan. Figures 2 to 9 show the flight line profiles of the modelled anomalies, as well as some of the 'rejected' responses. It is instructive to note the relatively small response over the old Stormont mine (Figure 4). In fact a number of subtle anomalies are more noticeable on the profiles and it is clear that 'anomaly hunting' from the contour plan (contoured at a 10nt interval), is only a 'first-pass' exercise. Image processing of the data, using a series of narrow-band passes through the data, would be a more effective way of identifying the responses. It may also be instructive to model some of the picked anomalies initially rejected for being too small.

The model sections are given in Figures 10 to 18. The smaller sources such as #1 and #18 are considered to be the most prospective. However some of the larger bodies would of course be reduced in size if a higher susceptibility value were used. The accompanying table lists the chosen anomalies and gives a brief comment. The more prospective ones are indicated with a '*'.

RGC/MG88/05

August 88.

Comments on Lake Lea Anomalies

*	#1.	Small, prospective anomaly.
	#2.	Not modelled; already covered by ground survey.
	#3.	Large anomaly, probably caused by Cambrian volcanics.
	#4.	Along strike extension of #3.
	#5.	Stormont.
*	#6.	Shallow (<100m); probably too small for Cambrian volcs.
	#7.	Very low amplitude response; not modelled.
	#8.	Very low amplitude response; not modelled.
	#8A.	Low amplitude response; not modelled.
	#9.	Very low amplitude response; not modelled.
	#10.	Very low amplitude response; not modelled.
?	#11.	Similar to #6, but deeper.
	#12.	Low amplitude response; not modelled.
	#13.	Large source; Cambrian volcs likely source.
	#14.	Offset and deeper extension of Cambrian volcs beneath #3 & #4 (?).
	#15.	Possible edge effect of basalt.
*	#15A.	Small source indicated away from mapped edge of basalt.
*	#16.	Close to edge of basalt, but ground follow up recommended.
	#17.	Covered by earlier ground mag. survey (?).
*	#18.	Located over alluvial cover & possible limestones (ie, good potential for skarn mineralisation).
	#19.	Large, deep response; Cambrian volcs (?).
	#20.	On edge of survey, only partially defined. Similar source to #19.

* more prospective anomaly.

345

708341

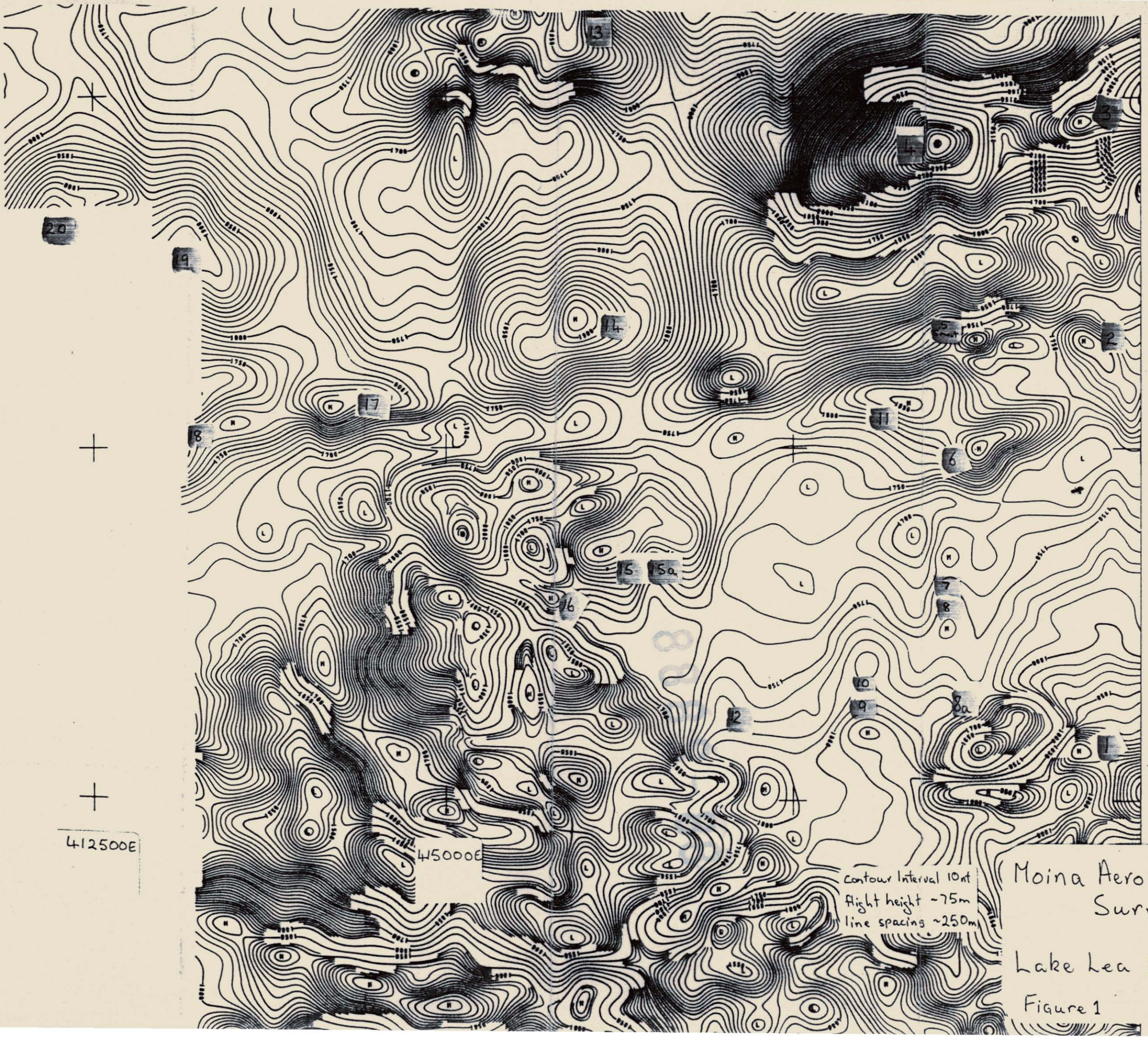
5,407,500n

5,405,000n

5,402,500n

412500E

415000E



Contour Interval 10nt
flight height ~75m
line spacing ~250m

Moina Aeromagnetic Survey

Lake Lea Anomalies

Figure 1

JRB
Aug. '88.

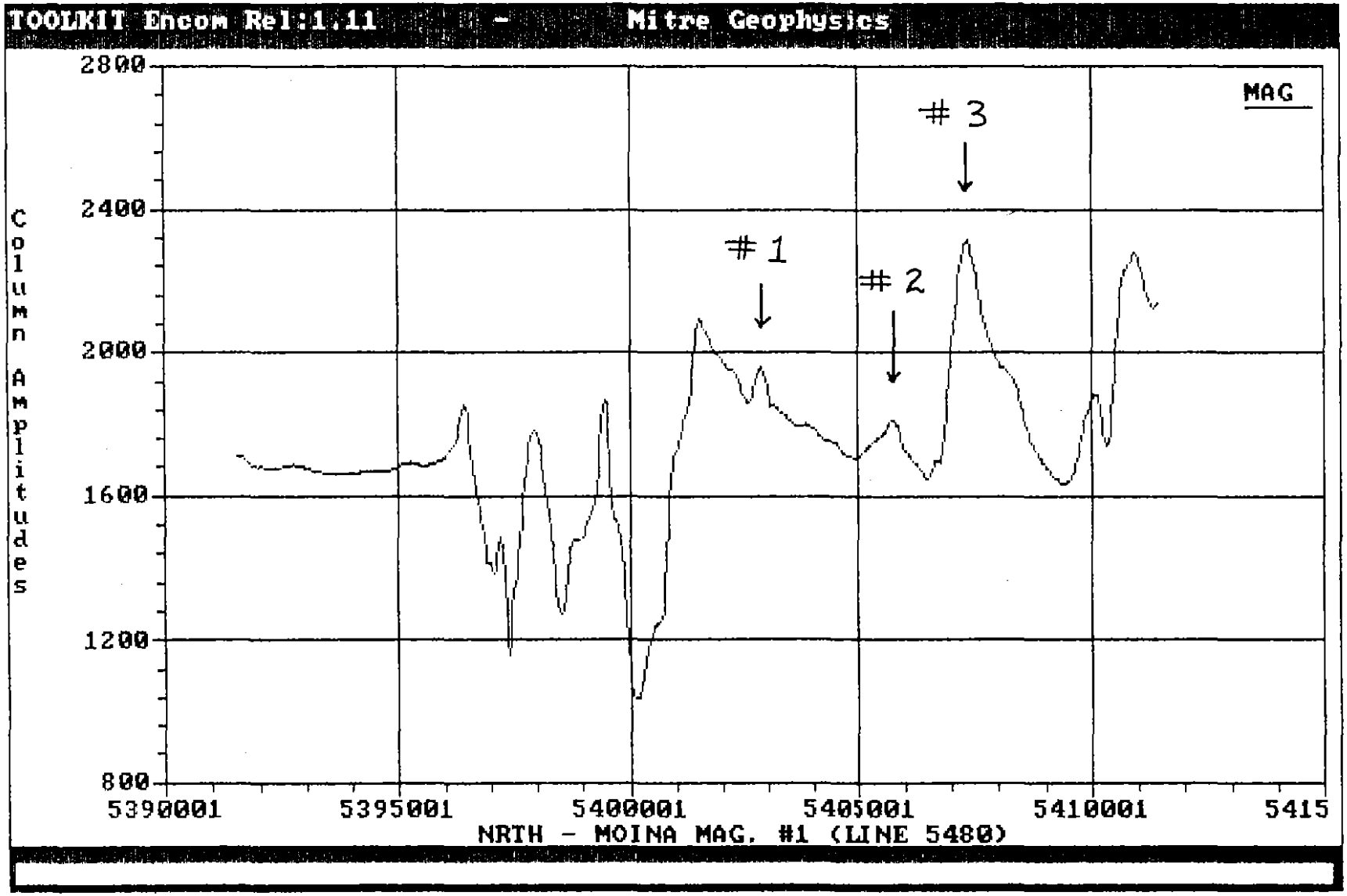

TOOLKIT Encom Rel:1.11 - Mitre Geophysics
MAG
#1
#2
#3
Column Amplitudes
2800
2400
2000
1600
1200
800
5390001
5395001
5400001
5405001
5410001
5415
NRTH - MOINA MAG. #1 (LINE 5480)

Figure 2.

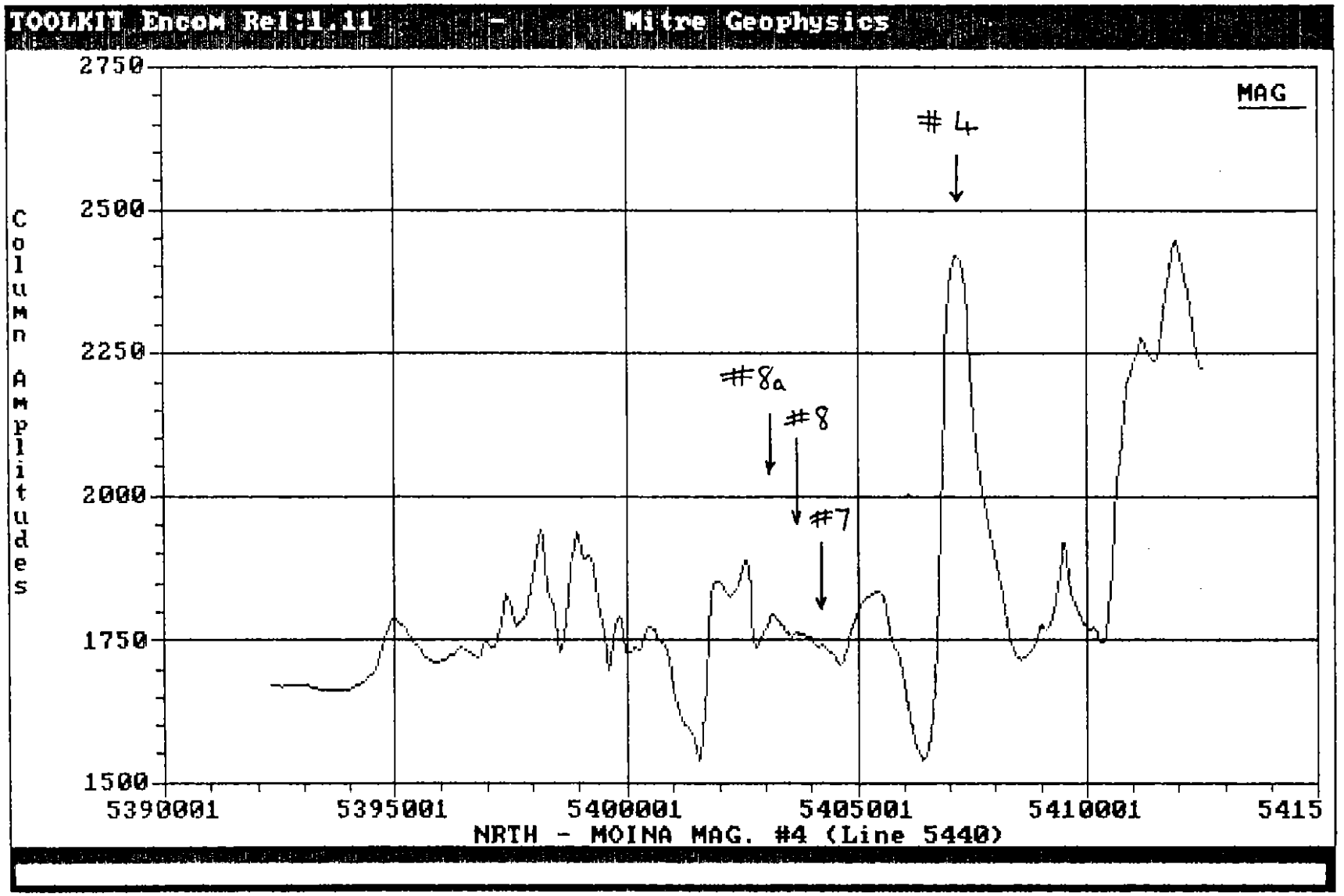

TOOLKIT EncoM Rel:1.11
Mitre Geophysics
MAG
#4
#8a
#8
#7
Column Amplitudes
2750
2500
2250
2000
1750
1500
5390001
5395001
5400001
5405001
5410001
5415
NRTH - MOINA MAG. #4 (Line 5440)

Figure 3

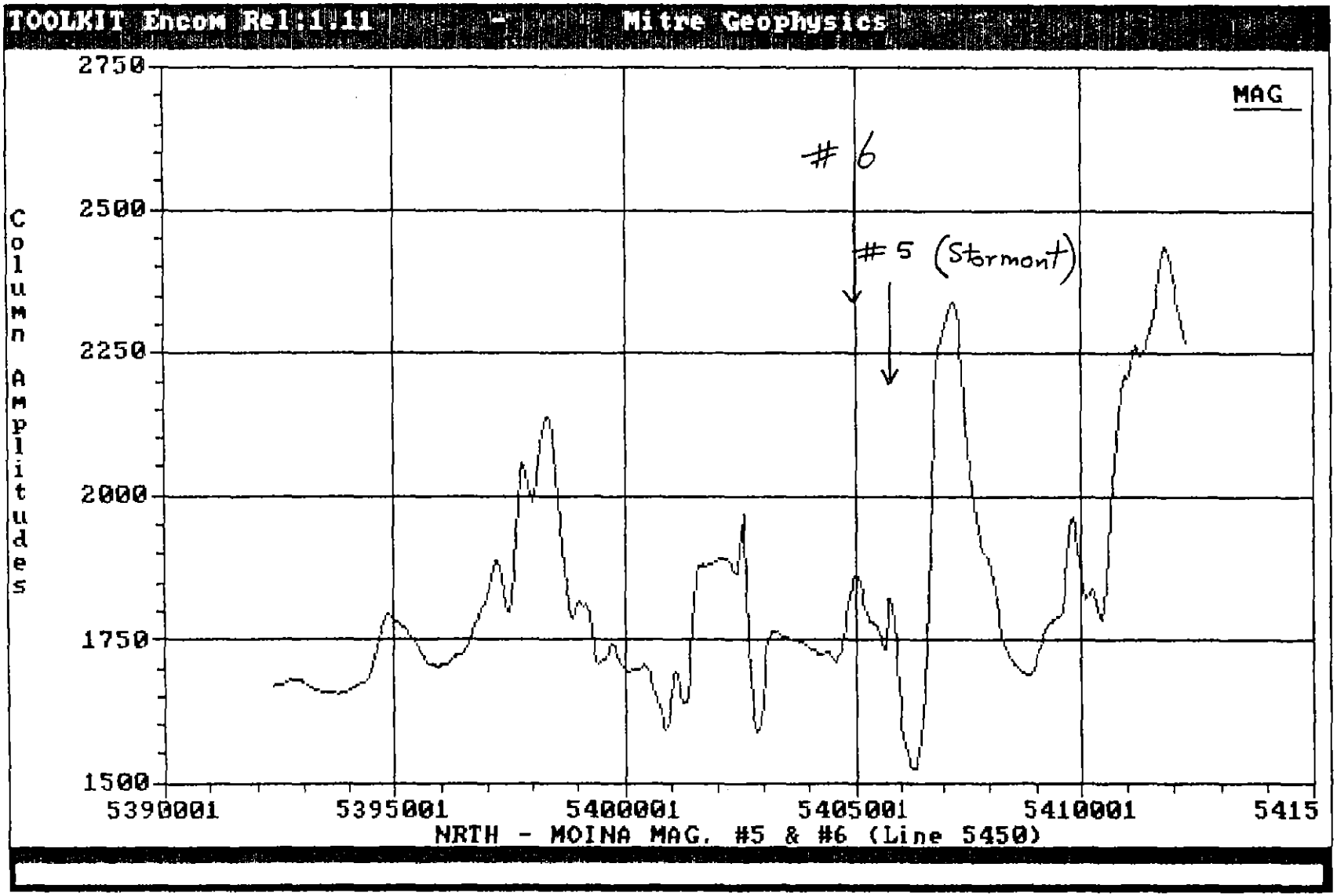

TOOLKIT Encom Rel:1.11
Mitre Geophysics
MAG
#6
#5 (Stormont)
Column Amplitudes
2750
2500
2250
2000
1750
1500
5390001
5395001
5400001
5405001
5410001
5415
NRTH - MOINA MAG. #5 & #6 (Line 5450)

Figure 4.

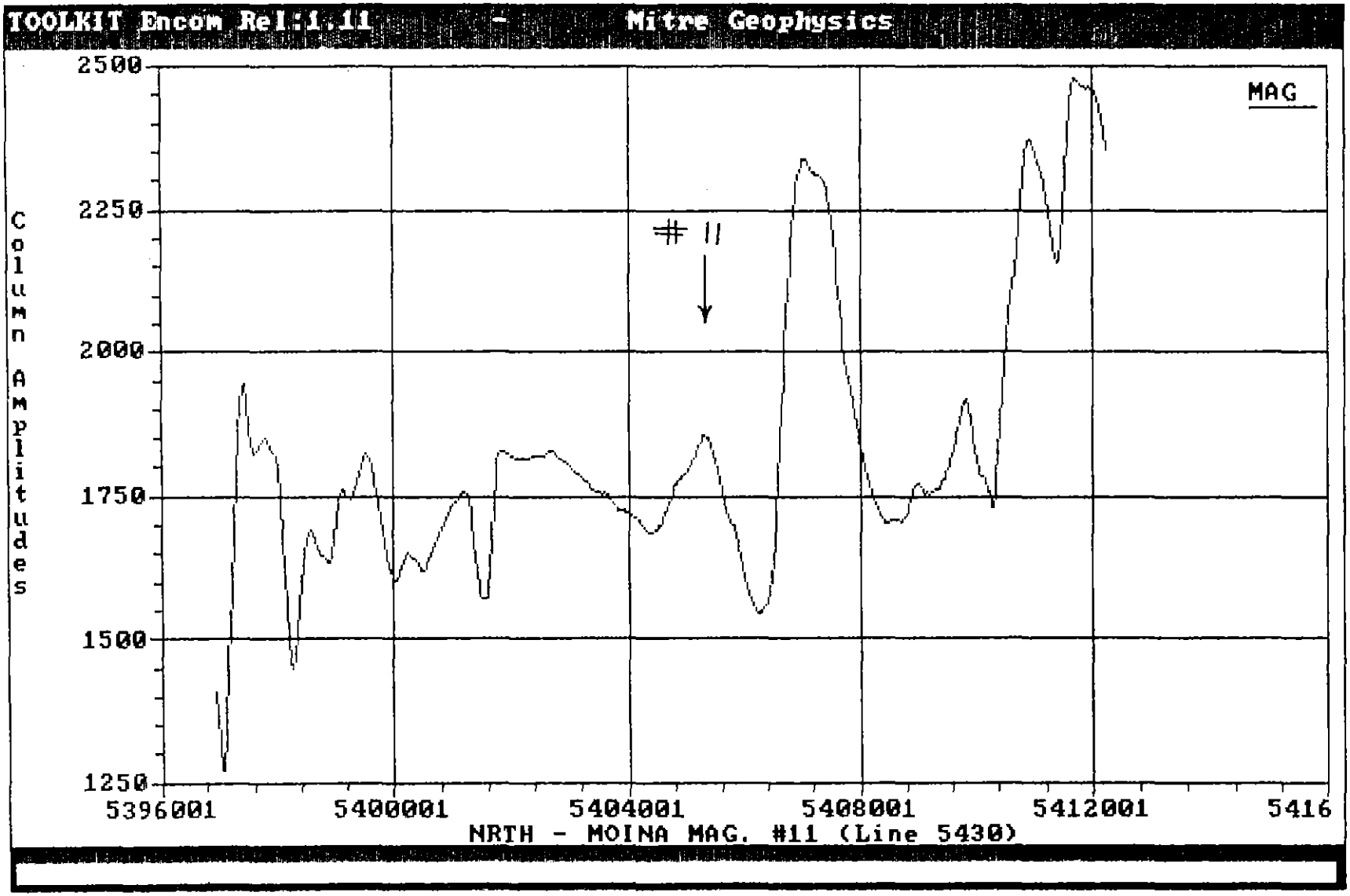

TOOLKIT Encom Rel:1.11 - Mitre Geophysics
MAG
11
Column Amplitudes
2500
2250
2000
1750
1500
1250
5396001
5400001
5404001
5408001
5412001
5416
NRTH - MOINA MAG. #11 (Line 5430)

Figure 5.

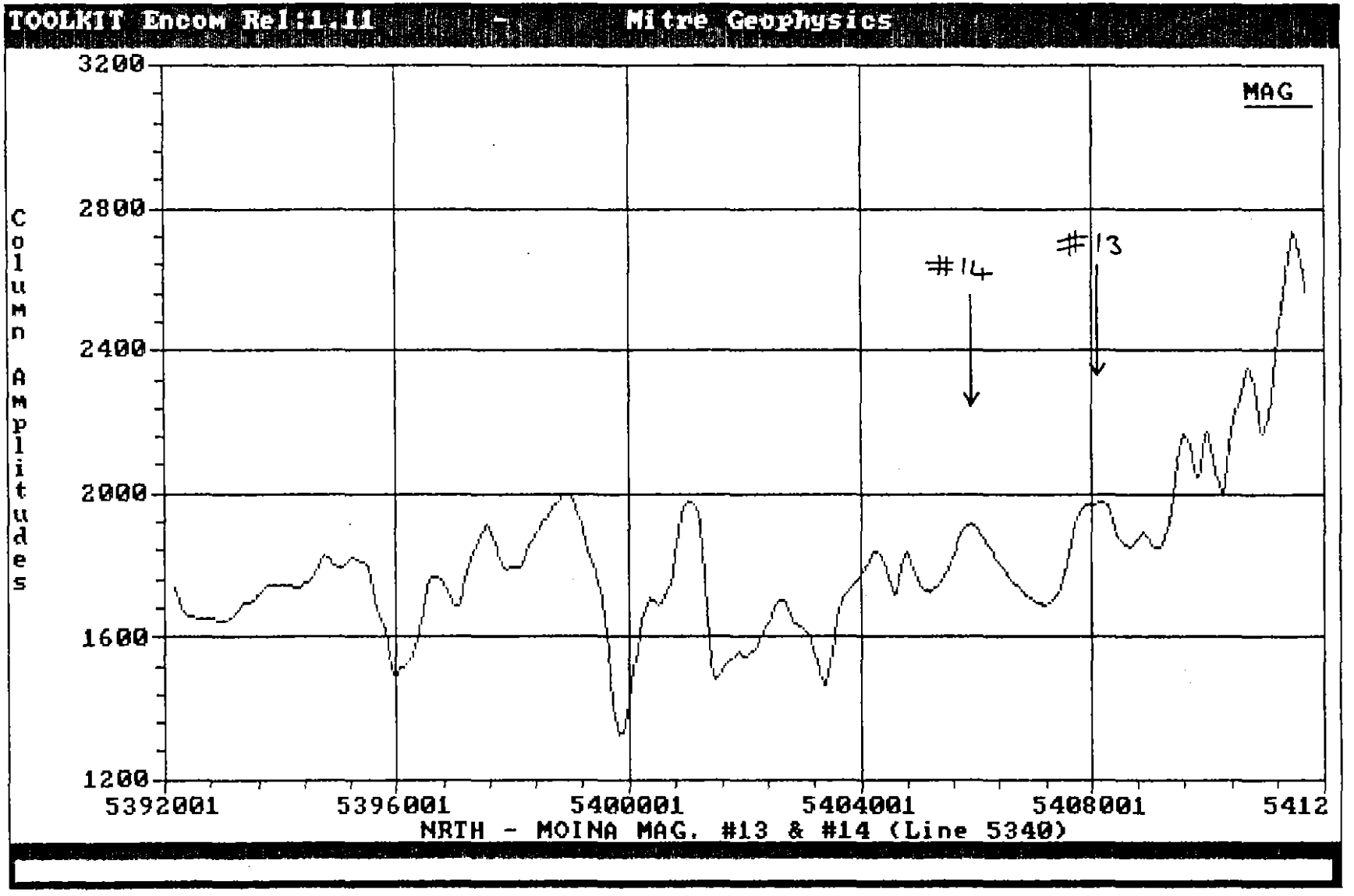

TOOLKIT Encom Rel:1.11 - Mitre Geophysics
MAG
Column Amplitudes
3200
2800
2400
2000
1600
1200
#14
#13
5392001
5396001
5400001
5404001
5408001
5412
NRTH - MOINA MAG. #13 & #14 (Line 5340)

Figure 6

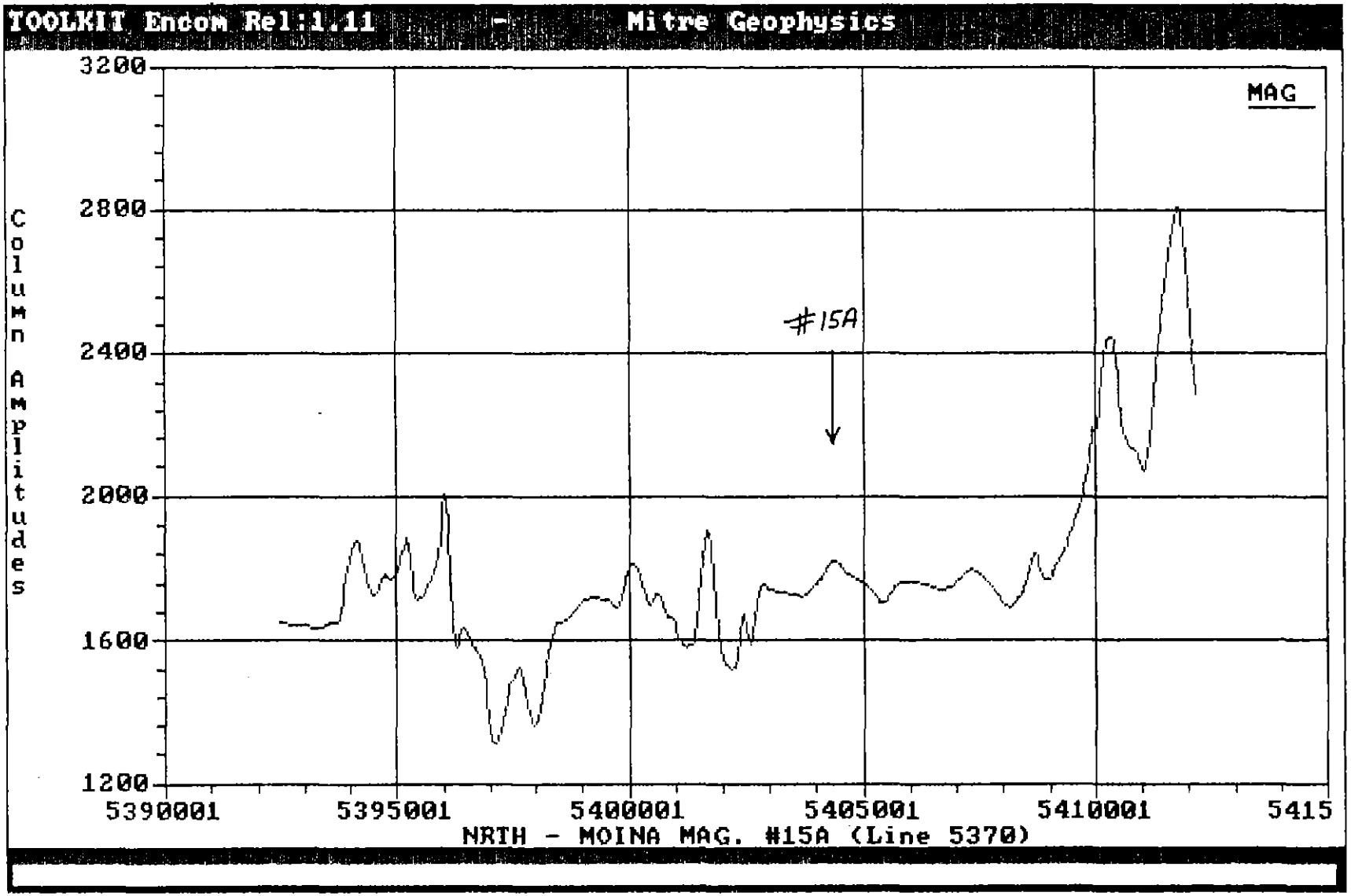


Figure 7.

7083472

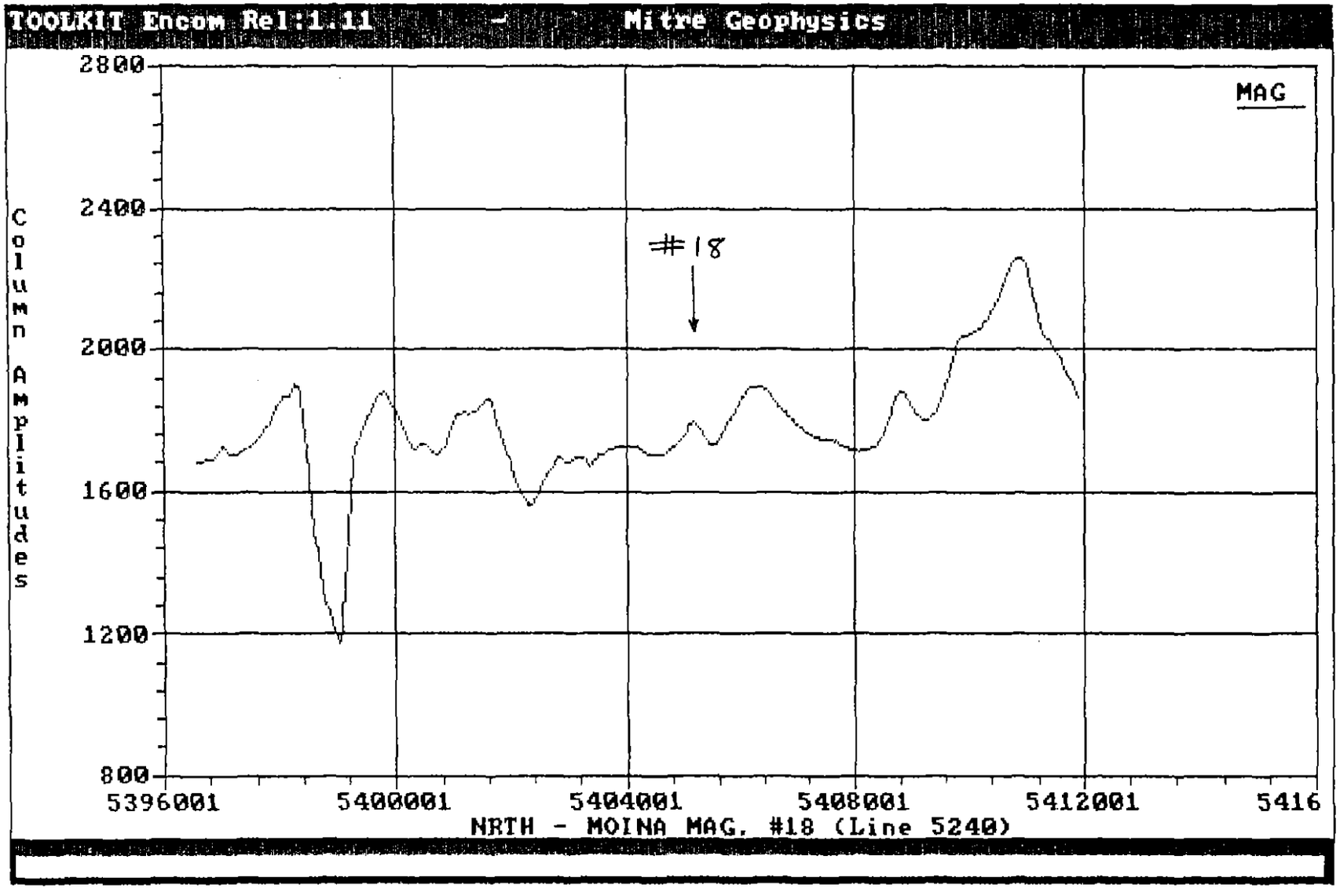


Figure 8.

2083348

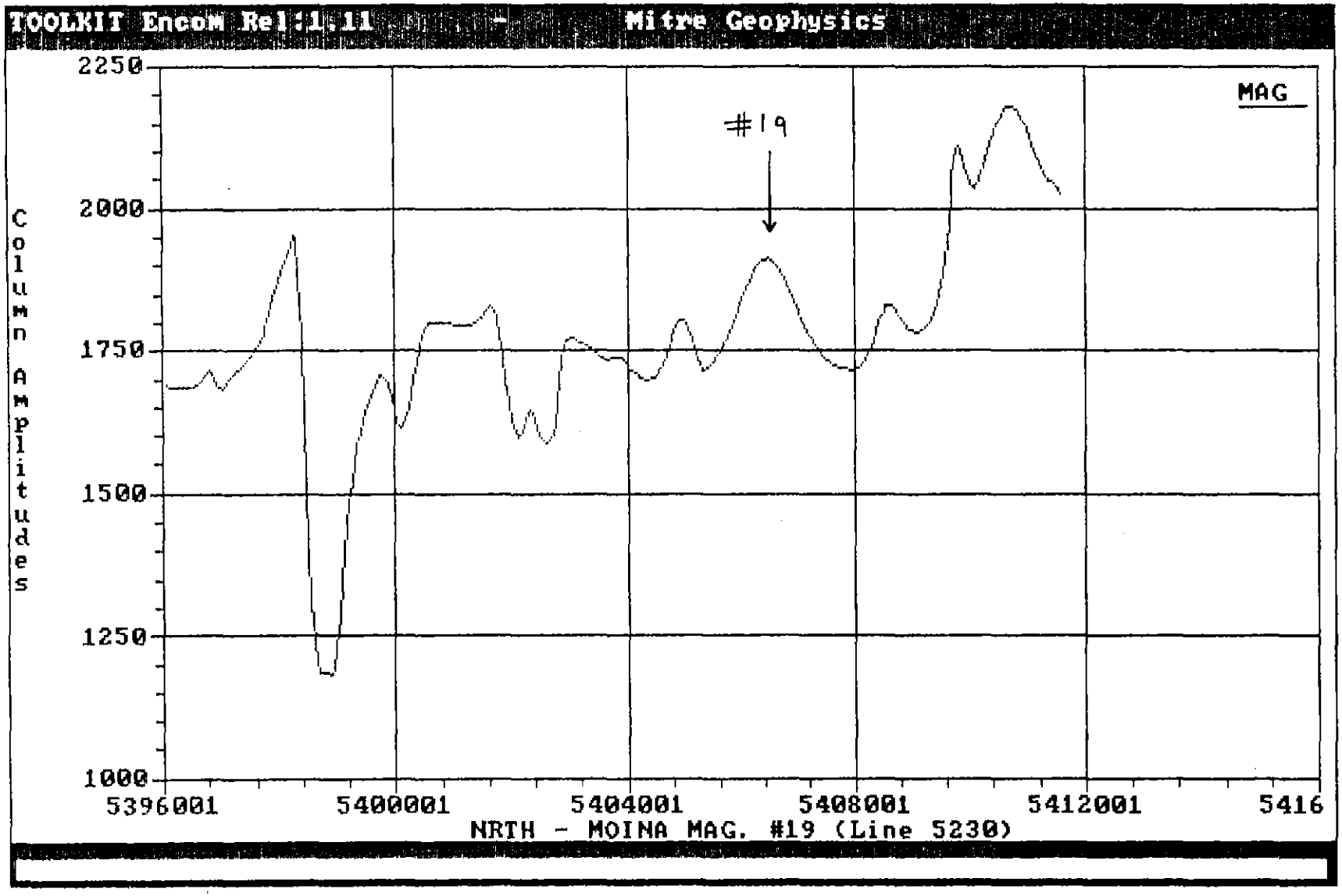
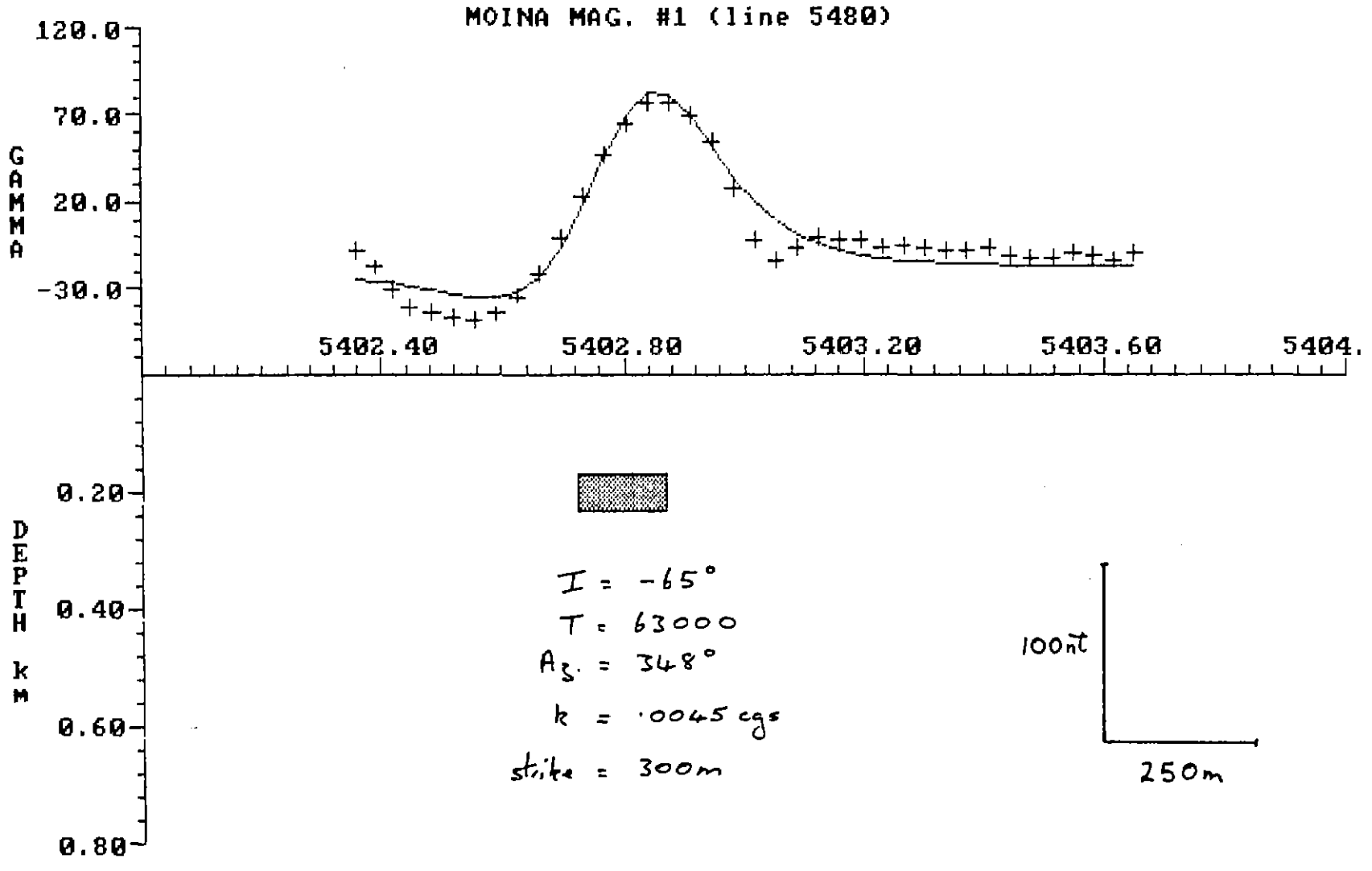

TOOLKIT Encom Rel:1.11
Mitre Geophysics
MAG
#19
Column Amplitudes
2250
2000
1750
1500
1250
1000
5396001
5400001
5404001
5408001
5412001
5416
NRTH - MOINA MAG. #19 (Line 5230)

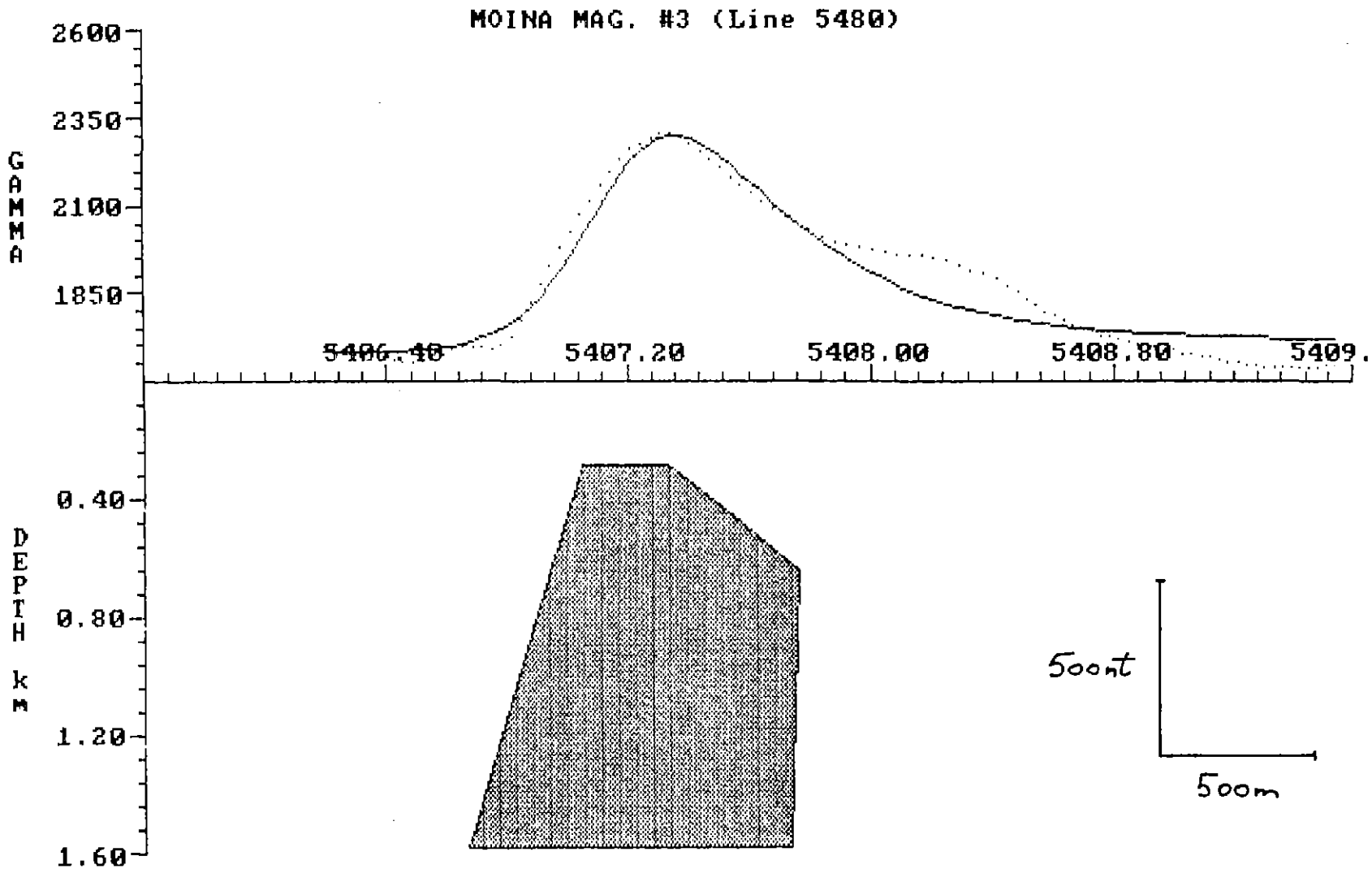
Figure 9.



708350

Lake Lea Anomaly #1.

Figure 10.



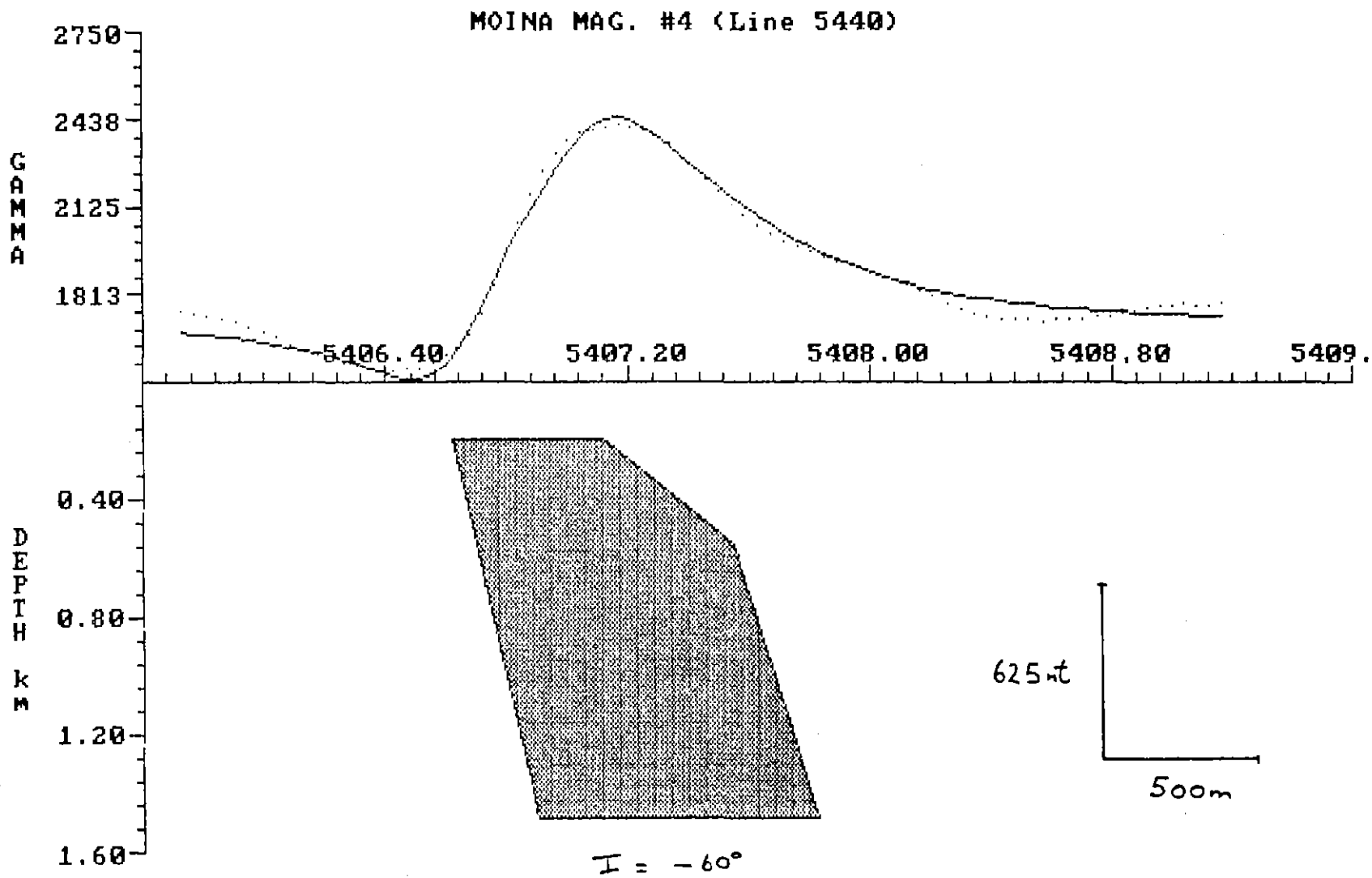
I = -72°
T = 61000
Az. = 348°
k = .005 cgs
strike = 600m

Lake Lea Anomaly
3

Figure 11.

70833S1

359

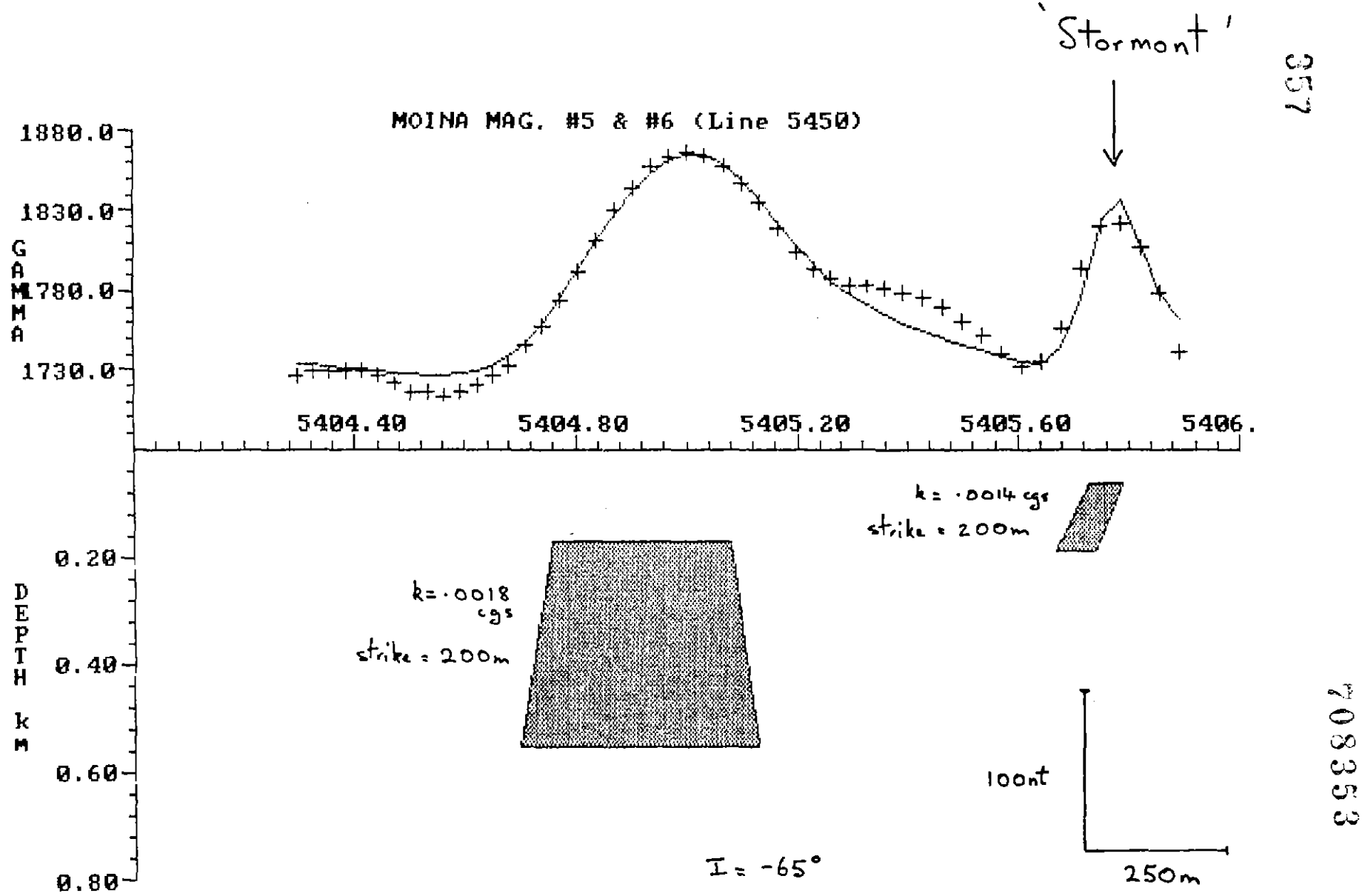


I = −60°
T = 61000
Az. = 348°
k = .005 cgs
strike = 600m

Lake Lea Anomaly
#4
Figure 12.

1083352

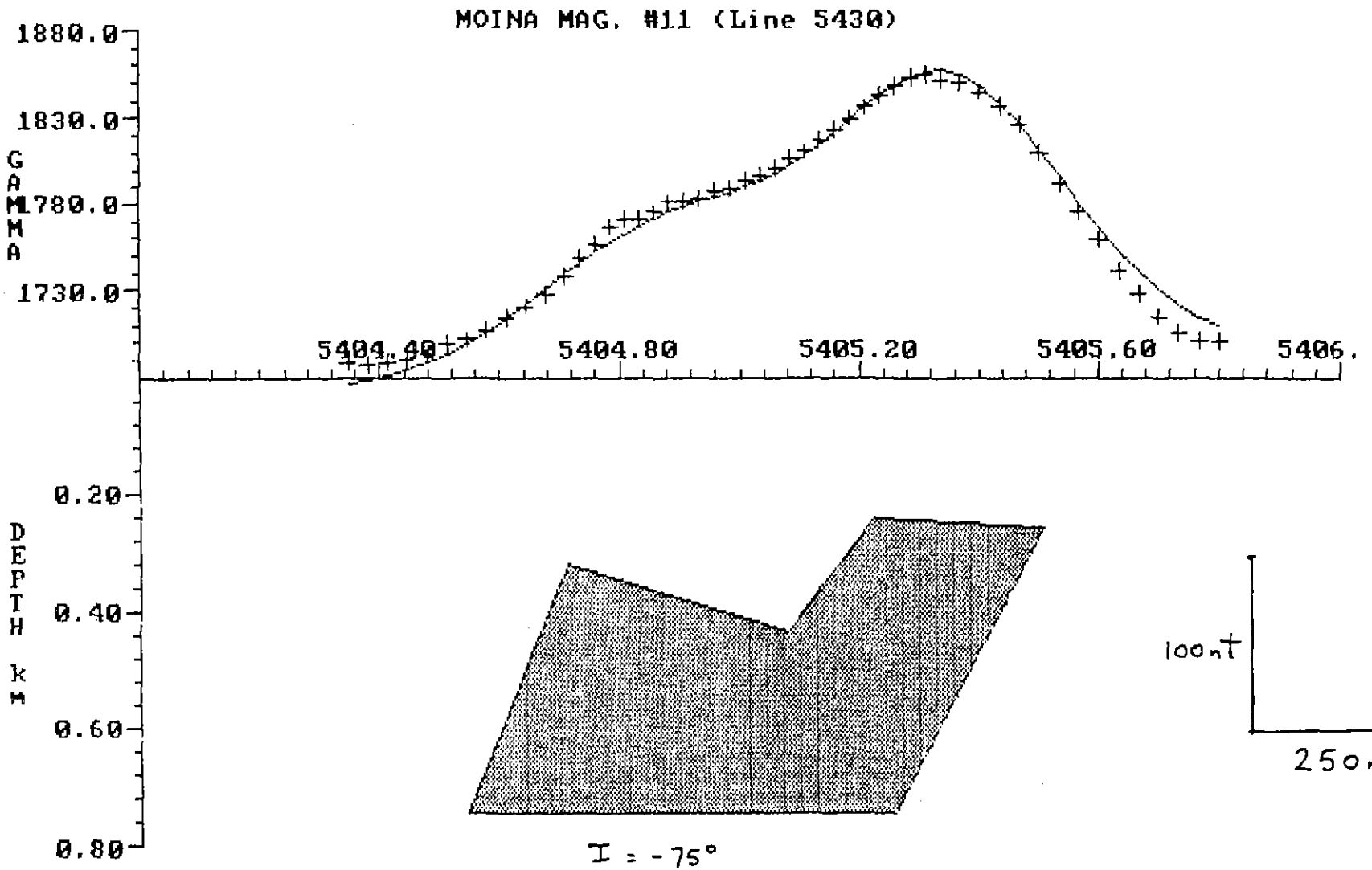
357



2083353

Lake Lea Anomalies
#5 & #6

Figure 13.



I = -75°

T = 61000

A_z. = 348°

k = .002 cgs

strike = 500m

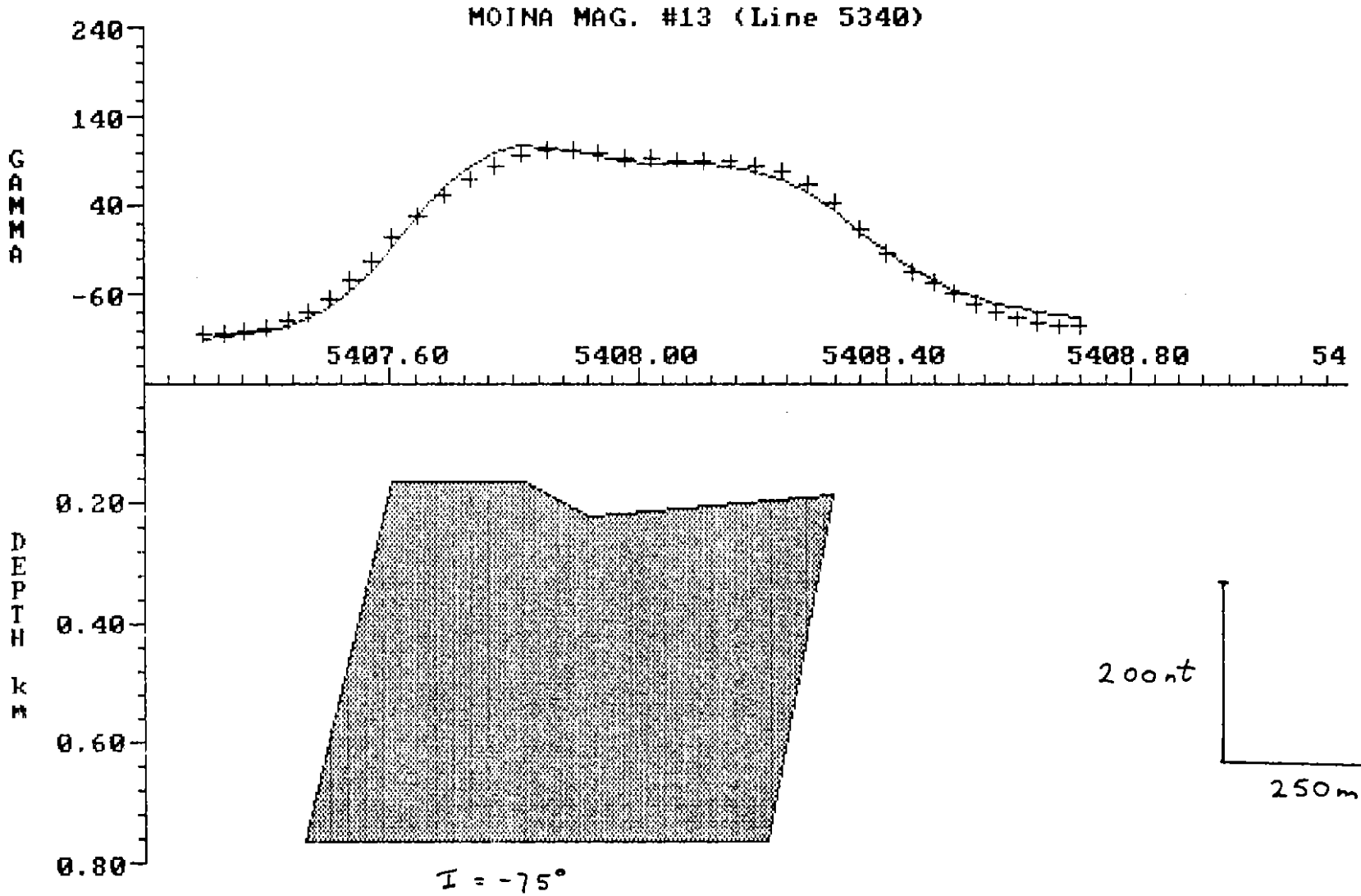
Lake Lea Anomaly

#11

Figure 14.

708354

359

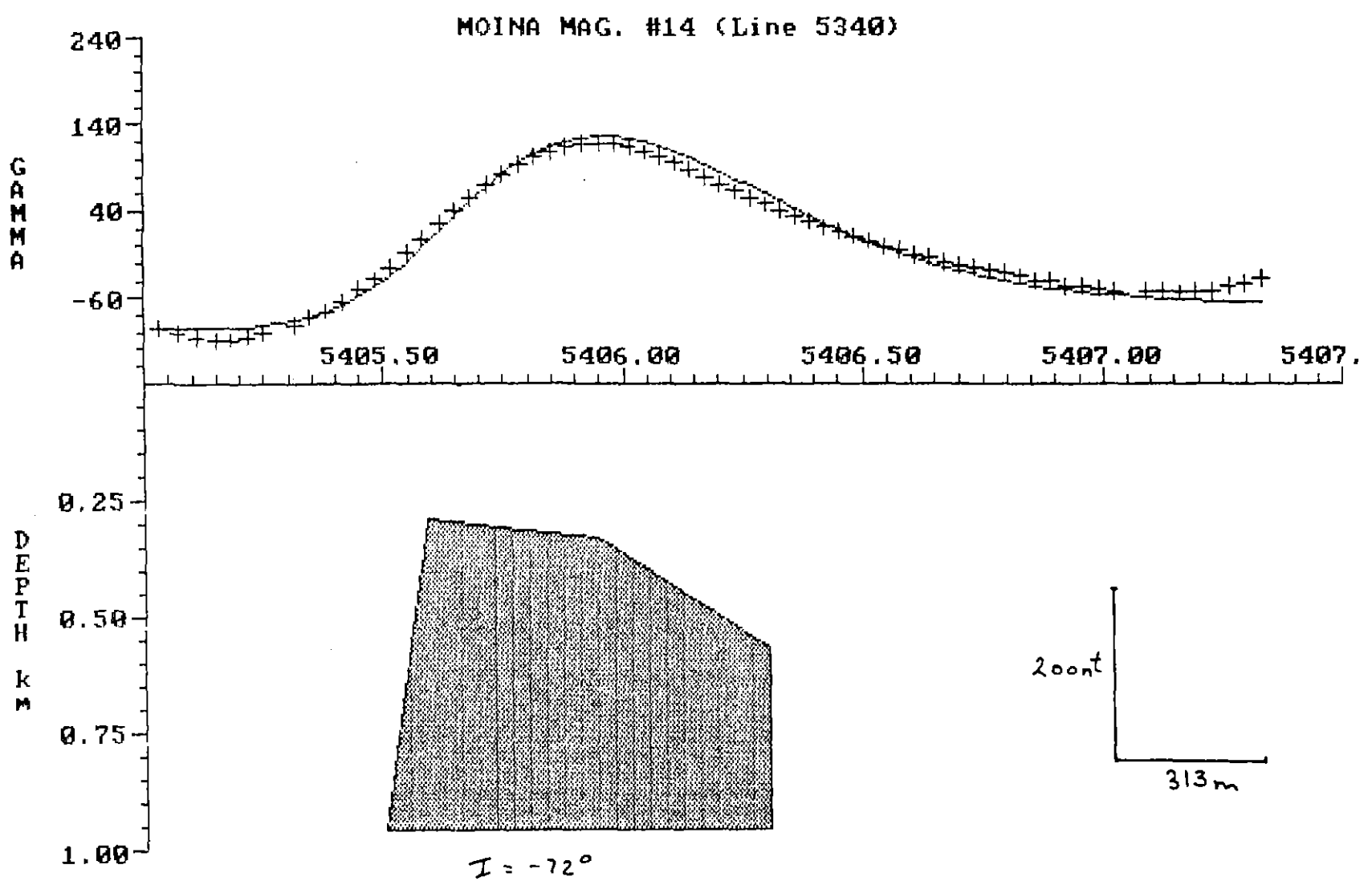


I = -75°
T = 61000
Az. = 348°
k = .002 cgs
strike = 250m

Lake Lea Anomaly
#13
Figure 15.

408355

360

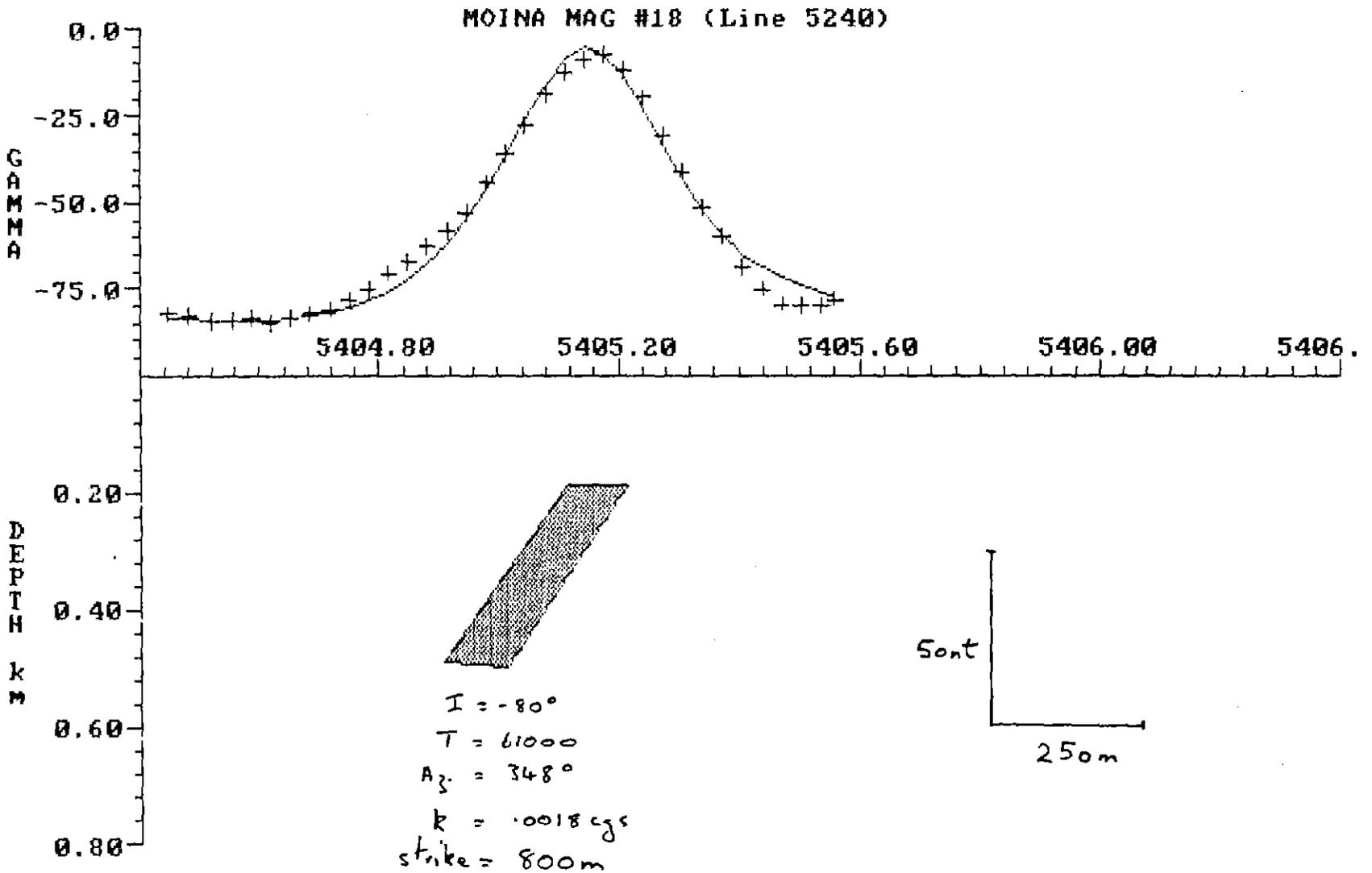


I = -72°
T = 61000
Az. = 348°
k = .0018 cgs
strike = 1000m

Lake Lea Anomaly
#14
Figure 16.

208356

193

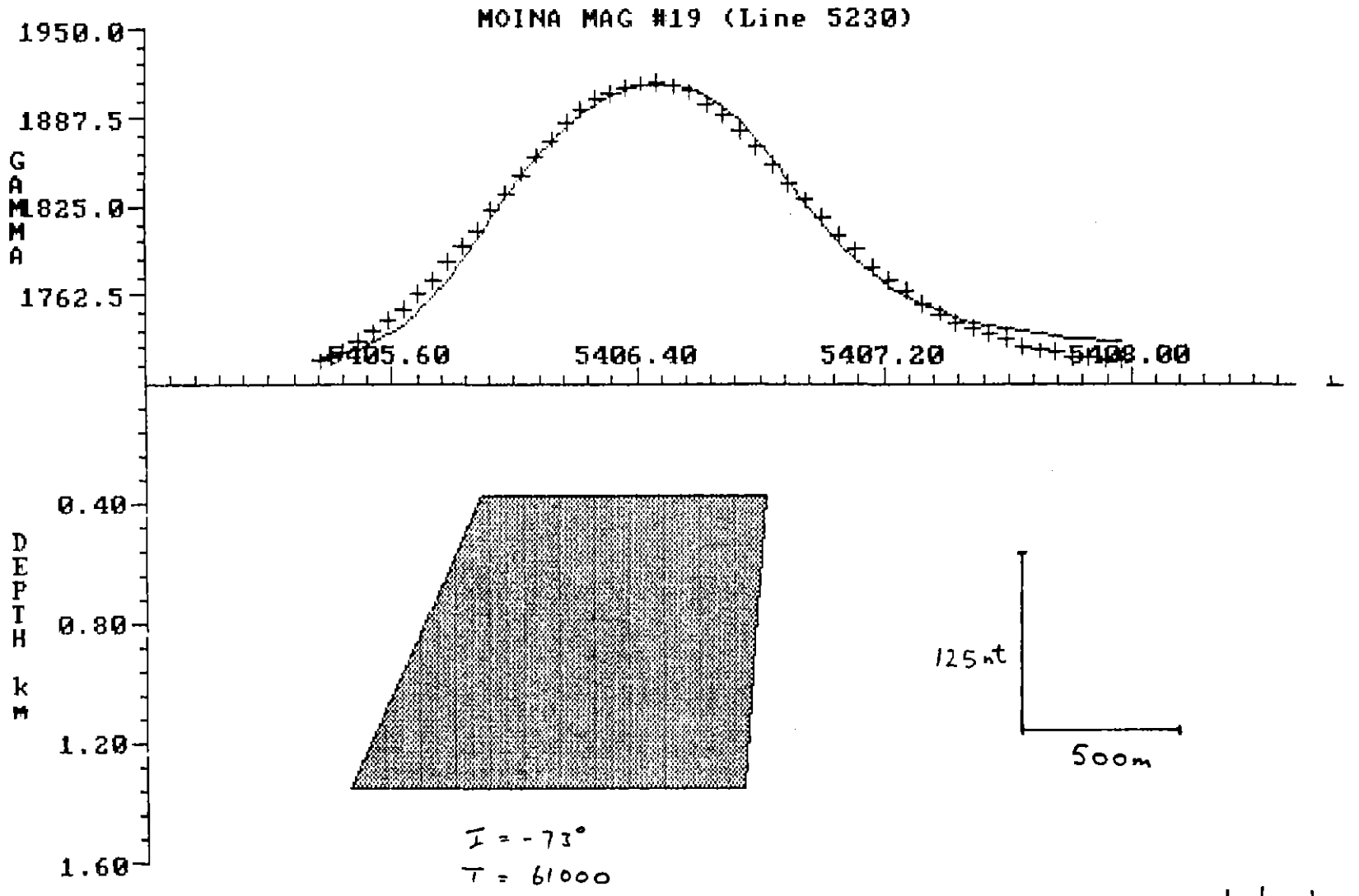


208337

Lake Lea Anomaly

18

Figure 17.



$I = -73°$
$T = 61000$
$Az. = 348°$
$k = .002$ cgs
strike = 500m

Lake Lea Anomaly #19

Figure 18.

203358

Appendix 8

Gravity and Magnetic Evaluation Moina Area.
1. Magnetic Data: Initial Review.

708360

364 LEAMAN GEOPHYSICS
Survey Review, Specification, Reduction, Interpretation
Wide Experience Most Methods
Specialities:- Gravity, Magnetics, Seismic Methods

Registered Office:
21 Zomay Ave, Dynnyrne, Tas 7005
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GRAVITY AND MAGNETIC EVALUATION MOINA REGION

1. MAGNETIC DATA: INITIAL REVIEW

for
RGC EXPLORATION PTY LTD

by
Dr. D.E. Leaman

August 1988

MOINA1

708361

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34. 1063

Note: transparent overlay for Figures 14 to 17 in pocket
Diagram original included as Figure 18

SUMMARY

Preliminary review of the available magnetic data for the Moina region of north west Tasmania indicates that most mineralised sites possess a recognisable response. That response may be clear cut or subtle depending on the style or mineralisation or, more importantly, on the changes induced in the host rocks. Recognition of any magnetic response or association of any feature inferred to be associated with new prospects as an exploration aid may be a tenuous exercise unless those factors which may modify the field responses are appreciated. Proper specification, observation and compensation of the survey are critical to the success of such direct exploration usage. The present review indicates that the Shell data is adequate for this purpose but that the Mines Department data probably is not. Many of the more subtle effects may be clarified by full drape correction which has not been undertaken.

The aeromagnetic data offer other forms of indirect exploration assistance. Although only a subset of the available data has been examined this is sufficient to define regional trends and gross elements of lithological continuity within the region. Units to be correlated with the Lorinna Greywacke are identifiable and quite widespread, if relatively thin. Substantial volumes of mafic rocks are present within the region north of Stormont and south of Oliver Hill and none of this material is exposed. The material is clearly folded and blocked, however, and is almost certainly truncated by base Ordovician unconformities.

Most major trends affecting pre-Ordovician rocks are NW-SE or NE-SW although some N-S elements can be recognised. One major and one minor belt of E-W structuring is also evident. Structures identified by surface mapping can be correlated with these features and there is little doubt that most are re-activations of various magnitudes. Some mineralised sites can be related to these features, for example the gold deposits at the headwaters of Devonport Creek. Most other mineralised sites in the Moina and Lorinna region are clustered within the volume enclosed by the northern aspect of the intersection of the conjugate trend pattern and lie either on or adjacent to an E-W axis.

Much of the structural information is only accessible after comprehensive compensation for terrain and flight path factors but it is now in a form which can be modelled and correlated with gravity data.

The issue of Tertiary basalt has also been assessed. Although there are some problems with definitive assessment in the absence of control drilling the cover appears to be very patchy and generally quite thin (<50 m) although some thick pockets which may comprise several flows are also present.

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INTRODUCTION

Aeromagnetic data from the mineralised Moina-Cethana region of NW Tasmania has been reviewed. The area examined, and relevant licence holdings, are shown in Figure 1. This diagram also indicates a provisional interpretation of the form of the Devonian Dolcoath Granite (after Leaman, 1988) based on gravity data. Refinement of this interpretation will be reported separately.

Figure 1 also displays many established mineralised sites and it appears likely that there is some fundamental relationship between the granite - or its form and structural control - and much of the mineralisation. The nature of basement or Cambrian controls are not obvious in surface mapping. Skarns and various vein style deposits occur in the region. The total value of recovered mineralisation has been substantial (see Bamford and Green, 1988).

Magnetite is associated with many prospects and the magnetic method is an obvious choice for exploration on this account but many of the local rocks, including Tertiary basalt, are also magnetic. Basalt cover, or derived material, is extensive and much exploration interest may be concealed.

The review of aeromagnetic data described in this report takes the form of a feasibility and regional assessment. The study was directed toward description of

1. relationships between magnetic field and particular lithologies in order to assess normal response patterns and identify abnormalities,
2. unit continuity and/or distribution beneath basalt or other cover,
3. basalt contributions to the field and estimates of thickness and flow forms,
4. mineralisation responses (including associated skarns),
5. gross structural features.

This initial work was not intended to be exhaustive or ultimately definitive with respect to the available data or the topics listed. The basic aims of the present study (reported here as stage 1) was provision of regional indications, method application potential and feasibility, and supply of feedstock information for an expansion and integration with gravity and geological data.

DATA USED

Two aeromagnetic surveys exist. Both are available in digital forms. Each was flown as a nominal drape and essentially N-S lines.

The first survey, by Shell (refer to Mines Department open file records 82/1728), is of higher quality but somewhat fragmental and does not offer complete coverage of the area of interest (see Figure 1). The important Cethana area, for example, was not flown. The nominal line spacing was 250 m with a specified clearance of 100 m. The actual clearance varies within a general envelope of 80 to 160 m with important exceptions. The effective sample interval was about 40 m.

The second survey, by the Mines Department in 1985, was flown with a line spacing of 500 m and a specified clearance of 150 m. It covers the entire area of interest with a comparable sample spacing but the clearance condition was rarely approached across those parts of the area where the Shell coverage was broken.

For this review the more resolving Shell survey was used wherever possible in order to avoid loss of spectral information. In order to mate surveys and provide a reasonable feasibility evaluation promptly each second line was used. Considerable data thus remains for evaluation in those areas which may be deemed of interest from present work. A single compilation was generated from the two surveys by matching positions and continuation to equivalent levels. Lines wholly sourced from the Shell survey retain their 5xxx number code while those that included Mines Department data are numbered 106x. Lines east of Oliver Hill which carry the Shell designator do not cover the area north of the Round Mt. escarpment. In this area it was not feasible to combine the Mines Department data without an effort which could not be justified for such preliminary study.

The raw profile data as used from either source is presented in Figures 2 to 8. The contour presentation given in Figures 9 and 10 (9A and 10A with geology) is the contractor's compilation for the Mines Department.

METHODS

In order to provide basic evaluation of the data with respect to the several topics and objectives defined in the Introduction, the aeromagnetic data has been considered in both raw and various processed forms.

The raw data (Figures 2 to 8) are potentially deceptive due to an array of terrain effects but carry the highest resolution of local features - especially the Shell source data with nominal clearance of 100 m. Source and prospect signatures have been reviewed using this data.

In order,however, to obtain a broader perspective on structure, lithological units (continuity, characteristics) and minimise misleading terrain aspects the data have been continued from the approximate drape as observed to a fixed level. Such presentation improves definition of deep or gross sources, allows reliable modelling but excludes small or shallow sources.

Terrain compensation and continuation was undertaken by first matching the level of surface topography at the located sampling positions with the recorded height difference to obtain the spatial location of the magnetometer. An observed file relating position, magnetic field (IGRF residual value) and absolute elevation was constructed. (This file can be used to calculate the magnetic field on any surface - terrain parallel/drape or fixed level) Due to the quantity of data involved and the limited, essentially regional and feasibility objectives of this phase of the project only each second line was used. (This means that ample scope exists for superdetailing where this is judged necessary)
Some problems were encountered in this process which reflect survey location errors. Fiducial markers used for position control are, erratically distributed and it was evident that the aircraft position, as defined by the stated coordinates and clearance information, could not always have been recovered correctly. The flight path was often too irregular or too elevated and not consistent with a flight trajectory. In such cases a smooth function based on reliable segments and trends in the flight path was used instead but it would be possible to fully and accurately recover the actual flight path from the indicated flight trajectory and height difference (radar altimeter) records. This was not warranted by the present study which emphasized upward continuation processing but it would be essential if a low level drape correction was to be made.

Due to the gappy nature of the Shell survey near Lake Cethana infill using the Mines Department survey was attempted. This was essential across the Lake and near Lorinna but north and east of Cethana it was not generally justified due to the magnitude of

the problems and the quality of the Mines Department data immediately north of the Round Mt. escarpment. The two surveys involve different specification and produce a step in raw profile form (see 1060 at 403500, Figure 6 for example). Proper justification can only occur when the two surveys are adjusted to the same spatial position. A smooth function then results. The continuation procedure based on absolute height corrected records (above) effects this. Mating the Shell survey was, however, awkward since the pilot had begun manoevres for the next line well before data recording ceased and, in a region with extreme topography, large anomalies and imperfect position control, some mismatches are inevitable unless precise location is recovered and the profiles of each survey are in the same vertical plane. This does not occur.

An elevation of 1200 m was required for a regional presentation of the magnetic field and this level will form the basis for modelling and reference. Assembly of the transfer calculations from the observed levels (500 to 1300 m ASL) to 1200 m involved some nasty juxtapositions between the observed gradients and the terrain and some blemishes have persisted (e.g., line 1063 - Figure 13 and plot - Figure 14). Each spike reflects a critical terrain or position condition. Most were checked and the flight path corrected, edited or compensated where such a problem had affected the stability of the continuation process. This selective, manual filtering yielded Figure 15 and a data set for derivative calculation. Note that it still contains some apparent imperfections which may or may not be real; further and more detailed evaluation would be required to establish the reasons.

First and second vertical derivatives are shown in Figures 16 and 17. There is some suggestion of line bias but most large features are independent and several N-S effects are certainly real.

The magnetic field south of Moina and across the Daisy Dell - Middlesex Plains area has been especially examined in order to provide some assessment of the Tertiary basalt. An original tuned, auto-correlated spectral analysis followed by weighted adjustment of the energy spectrum has been used. All such methods require at least one or two control points but none exist here. Figures 19 to 30 present output from this procedure with some interpretation. An indication of the scaling problem can be obtained from comparison of Figures 28 and 30 using quite different property/spectral functions. Until at least one hole has been drilled in a substantial patch of basalt fine tuning and depth description must remain formal rather than definitive; the shape of sources is suggested but their depth is only crudely estimated.

All presentations of the field from either data set have been reduced by 1750 nT from the stated IGRF plus constant generated by the contractors.

DISCUSSION OF OBSERVATIONS AND RESULTS

The following comments are grouped in terms of the first order objectives of the evaluation. Since the present study has extracted only the fundamental implications of the magnetic data, implications which may be refined by further work or varied after correlation with gravity data or model study, the notes must be considered interim.

The implications and observations are, however, elemental to further evaluation and many may possess exploration significance.

UNIT CHARACTER AND RESPONSES

Indications of the magnetic character of rock units can be derived from the contour maps (e.g. Figures 9 and 10) or, more reliably from the observed profiles and modelling studies (e.g., Figures 2 to 8 and 33 to 34). Detailed modelling has been beyond the brief for this first phase of data review.
The possible distortions induced by terrain or flight path effects must be considered separately where any deviation from implied patterns has been inferred. This has not yet been done and would involve precise conversion of the profiles to pure drape form.

Limited deductions are possible from the contour maps.
The Dove Schist is not sufficiently sampled but appears non magnetic.
The Lorinna Greywacke presents no reliable pattern but limited modelling shows it to possess a significant magnetic contrast (e.g., Figures 30 and 34).
The felsic Cambrian rocks also do not offer a consistent pattern. The unit, as mapped, is clearly variable and may consist of at least two gross members. See the profile discussion below. One of these is non magnetic, as north of Oliver Hill but south of Oliver Hill part appears strongly magnetic. (This may be due to a mafic unit at shallow depth - see models, Figures 33 and 34)
The Dove Granite offers ambiguous indicators. It is relatively uniform in properties but apparently non magnetic. Modelling indicates that its surface skin or metamorphic aureole may be reverse magnetised and that this contrast generates the negative field in the region of the Dove Granite.
The Ordovician rocks offer no pattern and it is clear that variations in the field across Ordovician exposures are produced by concealed Cambrian units. Some minor anomalies may be related to faults. Note that even the Gordon Limestone at Lorinna is

associated with a large anomaly. This reflects an intense source at shallow depth since the limestone is non magnetic.
The Dolcoath Granite is also non magnetic and generates a subtraction in field intensity although the response is modified by the combined effects of thermal alteration at the contacts and the intruded Cambrian rocks.
The Tertiary basalt is strongly but variably magnetised and the response pattern is modified by sizeable geometric terrain effects.

The profiles demonstrate that many responses are overprinted. The dominant character is that of the Tertiary basalt due to its extensive exposure. Yet, it is not the most magnetic material. Basalt effects tend to be relatively low amplitude but high frequency and more significant deeper sources control the magnetic field (e.g., line 5480 and 5500 - Figure 4). In many cases the basalt response is very subtle or absent. Most basalt features are suggestive of either multiple flows nearly equally magnetised in normal and reverse senses or very thin (<<50 to 100 m) cover. (see also discussion on basalt thickness below)
The Precambrian rocks generate smooth anomaly tails from other sources and these are slightly negative overall with respect to the reference field (5320 to 5480; 5620 to 1064). The controlling regional influence of the basement is best seen in the line groups of Figures 5 to 7.
The response due to the Dove Granite is not markedly different unless the Lorinna Greywacke is present (lines 5460 to 5540).
The Lorinna Greywacke , however, is shown to be a significant magnetic unit although outcrop limitations and contouring approximations limit display of this character in plan. Relatively subtle expressions on major gradients illustrate this property. For example, the bulge on the gradient at 5399 N on lines 5660 to 1060 and 5401 N on 1062 and 1063 near Lorinna.

The major increase in field intensity north of 5409 N on lines 5240 to 5480 is directly related to Cambrian rocks. Although it would be easy to relate this to the felsic rocks this is simply impossible. The magnitude of the response exceeds 500 to 600 nT but carries a superimposed sub-effect with amplitude of 50 to 100 nT. These values may be contrasted with the Tertiary basalt which induces amplitudes of 50 to 200 nT generally and rarely up to 500 nT. The response noted north of 5409 N and west of 419500 E is due to Cambrian mafic rocks which are not exposed and that the subsidiary anomalies are due to felsic tuffs and volcanics.

The large anomaly at about 5407 N (lines 5420 to 5540 especially), but which trails ENE north of Lake Gairdner, is of comparable amplitude and certainly of the same origin. Its regional extent and scale implies a major mafic unit and is not related in any way to the exposed Ordovician rocks.
Anomalies of comparable magnitude and scale occur near 5401 N (lines 5640 to 5660) and 5401-2 N (lines 1063 to 5900) with the effect increasing but persistent to the ENE south of Oliver Hill

(to line 5820). Much smaller (200 to 300 nT) anomalies of comparable type can be recognised on lines 5700 (5403400 N) and 1061 (5404200 N) which are not due to basalt and are larger than any mineralisation response (see section on prospect signatures) due to contact metamorphism around the crest of the Dolcoath Granite. This form of alteration may account for the local variation from the normal subdued response due to felsic rocks and is restricted to the Oliver Hill, SW Dolcoath Hill region where these rocks are in contact with the granite. There is no other direct evidence of contact metamorphic effects in the surveyed area and if this inference is correct then the anomaly/unit is terminated unconformably to both east and west near the granite roof.
No consistent patterns have been recorded for the Ordovician rocks although shallow-sourced anomalies can be associated with fold axes (near 5404 N on lines 5340 to 5360), a fold limb (5405 N lines 5520 to 5580) and contact anomalies between Cambrian and Ordovician rocks at 54028 N (line 1060) and 54018 N (line 1061).
Some topographic anomalies may also be listed; e.g., 5405 N (line 5380) and south of 5402 N on lines 5820 to 5840.

Property contrast perspective is best summarised by line 5820. The low field region from 5405 to 5407 N represents Devonian granite and a neutral response. The surrounding rocks are more magnetic but the effect is localised and this scales the possible metamorphic effect. It will be noted that the response due to Gordon Limestone and Dove Granite is positive and signficantly negative with respect to this pattern. These properties suggest penetration responses for underlying materials and/or negative magnetisation for the granite. The latter option is not generally acceptable and gross geometric effects due to a deeply buried unit are implied. The contact of the Dove Granite is evident to both north and south and the response is not markedly different from that of the Dolcoath Granite. No stabilised level is available for the Precambrian rocks but lines 1062 to 5820 would indicate levels comparable with the Dolcoath Granite. Underlying mafics must generate the very large anomaly on the line while the covering basalts are best seen in lines 5880 and 5900 and are inconsequential by comparison. This implies either lower contrasts or smaller volumes for the Tertiary pile.

Inspection of Figures 2 to 8 indicates that much of the character of either exploration interest or nuisance is low-moderate amplitude and relatively high frequence and super-imposed on larger, longer wavelength features.
It is instructive to compare Figures 11 to 13 since these present the primary structural units. The profiles, as would be seen at 1200 m, are generally at least 400 m clear of the terrain and free of major terrain effects. Tertiary basalts do not contribute significantly indicating that these are quite thin (below) and the balance of gross contrasts is more reliably recognised.

Reversely magnetised units occur adjacent to basement or beneath basalt on lines 5260, 5380, 5400, 5480 and 5500. The contrast is of similar intensity to that producing the positive responses in the Mt Jacob or north Tiger Plains regions. A mafic suite is implied. The effect is generally too wide to be due to thermal or boundary conditions. The form of profiles 1060 to 1064 suggest a thick wedge of mafic rocks adjacent to the basement margin, enclosing the Dove Granite, but none are exposed unless components of the Lorinna Greywacke are outer members.

TERTIARY BASALT

Reference has been made throughout the previous qualitative discussion that the basalt cover in this region is either thin or patchy or both. Several profiles across the basalt area from Moina to Daisy Dell and Middlesex Plains were analysed. The examined profiles were selected to provide a general sampling but also allow a lower (than 1200 m) reference level to be used. Each profile analysed was recalculated to a level of either 900 or 1000 m from the absolute height observations (see methods). The results are presented in Figures 19 to 30. Most lines were calculated for the region south of Stormont but three lines extend across the entire area (5600, 5620, 5640 - Figures 27 to 29) and line 5620 has been recalculated using an extreme property conditioner.

In the absence of any control on the thickness of basalt in the region studied the reliability of the interpretation is unknown. Problems were experienced in definition of an appropriate scale for the analysis or even selecting which estimates represent the base of the basalt. Once some control exists a more comprehensive analysis will be possible but the present provisional outline does suggest flow forms and that the basalt is very patchy. Comparison of the 15 km profiles for line 5620 (Figures 28 and 30) using differing parameters illustrate the difficulty although there is sufficient consistency to suggest and interpretation. The operator designated 128/3 more satisfactorily outlines the source skin (land surface) form and is more believable with respect to outcrop limits and landform relationships. This presumes, of cours, that mapping is accurate and it is apparent that this is not the case in many areas; talus has been included in the basalt distribution. This may also be the case on line 5620.

Irrespective of current scaling problems due to absence of control the analysis suggests the form of the magnetic sources and in all cases basalt cover would appear to be generally less than 50 to 70 m thick and often absent.

SIGNATURES FOR MINERALISED SITES

The subset of available data examined in this review has been inspected for suggestions of any patterns associated with known mineralisation. Note that the entire data set has been used between 425500 and 427500 mE since on 500 m spaced Mines Department data exists in this zone but at greater clearance than the Shell data.

If patterns can be recognised, with or without full drape correction, and other like effects can be noted then the entire data set should be comparably processed and re-examined. The data has been considered as an observed implied drape. The effect of this assumption is discussed at the end of this sub-section.
It must also be recognised that the mineralised zones contain many prospects and it is unlikely that many have been adequately sampled or defined. The family response, however, may be of value. The data has been reviewed within these admitted constraints and in full appreciation that changes in the host rock volume are more likely to produce recognisable effects in the magnetic field at 100 to 200 m than any changes which directly mirror ore.

Examination of plots of the contoured magnetic field (e.g., Figures 9 or 10) and geology/prospects reveals that a particular wedge immediately west of the Dolcoath Granite displays an odd high frequency E-W lamination (see also structural blocks) but no individual character is identifiable. Comparable character is not evident at other clusters of prospects. It must be concluded that the contoured forms offer few indications of magnetic signatures in this terrain. It is not clear whether the effort of full drape correction would make a difference. I suspect not.

The profiles, however, offer a different view. Virtually every site sampled by a profile offers a characteristic and comparable response. Prospect/site numbers refer to Bamford and Green (1988) and Figures 9A and 10A.

Line	Prospect number	comment	amplitude	element
5380	007	on broad rise crest		Au
5400	097	local spike	100 nT	Au
5460	009	sharp spike	50-70	Au
5480	076	beside basalt crest		
	010	confused by basalt	25	Au
5500	083	small local spike	40	Au
5540	014	step on gradient	30	
	077/078	bulge near crest peak	30 on 180	
5580	095	not recognised		
5600	061	small rise	20	Au
	054	nick point on profile	30	Au
5620	011/012	large spike	600	
5640	094	very subtle		

Line	Prospect number	comment	amplitude	element
5640	011/012/013/098	spike	300 nT	
	003	crest		
	006	suggested on 5620/5640		
5660	062/089	not recognised		
	086	spike	150	
	015?	small peak	50	
5680	090	small bulge	20	Au
	019/020/028	spike	>100	
	015		50	
5700	055/056	gradient bulges	20-30	Au
	021	peak	100	
1060	027/029	spike	50+	Au+
	023/024/026	gradient bulge	20	Au
1061	058	very subtle	<20	Au
	030	small local peak	30	
1062	059	very subtle evidence of alteration		Au
	057	not recognised		
	038/034	resolution too low		
1063	060	step in gradient	100	
	064	small gradient variation	25	Au
	040/090	resolution too low		
1064	096	spike	700	
	064	spike	100	Au
	093/039	resolution too low		
5820	042/043	small peak	50	
	072	no data		
5840	044/088	not recognised		
5860	044	small gradient change	30	
	008/063	no data		
5880	050/043	small ill-defined crest		
	048	no data		

These notes indicate that identifiable responses exist in real and imperfect data but whether many would be reviewed without the known association is a moot point. All gold-bearing sites generate relatively small deviations at 100 m clearance but the gradient or peak changes are consistently present. Note that a comparable response appears to be present in the region of 097 - an alluvial deposit. This would imply a source nearby, or that the magnetic response is mapping a structure nearby. It is unfortunate that clearances around the northern part of Lake Cethana are extreme and survey patching and compensation cannot recover what has been lost. Comparison of observed and 1200 m level profiles illustrates the importance of highly resolving data at low elevations.

An attempt has been made, based on the implied nature of the responses listed above, to infer other possibly mineralised sites. Some extraneous sources, such as minor basalt contacts, may be confused but all are considered abnormal in some way.

Sites of poosible exploration interest

Line	Easting	Northing	comment
5380	417000	5408500	compare 097 (even if alluvial)
5400		check 097 and headwaters of Devonport Creek	
5480	4195	54025	mineralised fault zone?
		54017	check Paddock Creek
5520	4205	54064	basalt??
5540	421	54035	inferred fault axis
5560	4215	5407	other than edge of basalt at Iris River?
5580	422	54055	peak unlikely to be Tb
		54062	Tb?
		54085	review fault zone
5600	4225	5406	Tb effect?
		54076	fault zone beneath L Gairdner
		5408	fault zone on shore
5660	424	5408	check not basalt contact
		54088	along fault in Bell Creek
		5410	in felsic volcanics
5700	425	54069	
		54075	?
		54097	
1060	4255	53993	
		53996	gold style?
1061	426	5403	contact zone above mafics
		5404	contact with mafics
		54072	?
1063	427	54032	?in felsics
1064	4275	54034	fault zone/contact
5820	428	54045	near granite in felsics
		54025	? large spike
		54074	fold axis
5840	4285	54001	Tb contact?
5880	4295	5403	possible fault contact/edge Tb?

The discussion above has presumed a drape relationship with the geology, i.e., an equal representation with respect to the surface at least. Where this assumption fails due to landform or clearance conditions, or the sources are more deeply buried or located, then the response may be modified. The Shell data carries a typical clearance of 80 to 150 m but may exceed 300 m locally. The Mines Department clearances are greater. Figure 31 shows the effect of changing sensor - source range. The green profile is as observed (and may be misleading) while the others show the smoothing effect of increasing distance. Note that an extra 100 m beyond observed levels reduces many distinct features to the gradient "bumps" so often seen in other profiles. Such distortions may be important. Note also that the observed profile may not have been obtained at a regular clearance and many described features may already have been modified by this process.

STRUCTURAL NOTES

Structural features determined at the present level of analysis have been summarised in Figure 32.

Some N-S features are indicated and are unrelated to any aspects of line bias. Some features have been mapped, as near Tiger Plain, west of the Dove River and along the Mersey River. More persistent structures are either NW-SE or NE-SW. E-W elements are also present but less obvious. The NW-SE set is presumably related to the Claude-Roland thrust sheets but there is little surface evidence for the NE-SW set. Several E-W features are evident in surface mapping (including the alignment of mineralisation west of the Dolcoath Granite).

While there is no obvious relationship between magnetic field and mineralisation at low levels (100 to 150 m nominal) there is at high level. All sites from Mt Claude to the Lea River lie on a single trend evident at 1200 m. It is a band of perhaps two structures about 1 km wide. Other groups have loci on comparable E-W (actually EENE trends). This possible relationship does not account for all sites. Inspection of identified trend relationships, inferred section composition and known sites suggests that mafic rocks are either thick or relatively shallow beneath mineralised areas, especially gold-bearing areas, and that most lie in the extensional stress field in the northern face of the intersection of the conjugate set. Most mineralisation appears to be related to this "V" corner where it is in an E-W band. Several other such features exist.

Surface mapping has indicated an array of apparently minor or relatively discontinuous faults and structures. Most can be directly correlated with underlying implied gross fractures. This would indicate Tabberabberan re-activation at least.

Figure 32 attempts to show the distribution of thick accumulations of mafic rocks within the Cambrian sequences. These appear to be close to basement and may be generally present but thin due to form, folding or truncation. The greatest accumulation lies east of Lake Cethana. The Dolcoath Granite may have removed much of this material.

Two profiles have been modelled to test some of the implications of this interpretation (Figures 33 and 34). It is not claimed that this simple assessment is adequate but Figure 33 does prove that thick mafic units are present; that near the Dove Schists in the south being either overturned or reversely magnetised. Line 1063 presented more problems and these have not been resolved. It is possible to obtain a solution of the type shown for line 5500 but the shift differentials are not consistent. The option shown accounts for the salient features and implies thick, fault-sliced, compound mafic sources. These issues will be examined in later study in association with gravity data.

CONCLUSIONS

As this is a stage or progress report, and further work is in train, the conclusions offered are general and interim but do summarise present achievements.

1. Magnetic data offer much structural information relevant to understanding of the area and its history. This topic to be studied in association with gravity data.

2. Cambrian mafic suites are concealed and appear block bounded. Many marginal structures have been re-activated and surface expressions exist.

3. Mineralisation is concentrated on such re-activated boundaries or along major crustal trend systems and stress release corner. The northern side of the conjugate appears frequently and most sites occur when this is close to E-W features.

4. Many deposit styles have expression in magnetic data at about 100 m clearance. Gold deposits display very subtle expressions while tin or tungsten deposits are more definitive. Effects are modified by clearance variations and exploration appraisal may well require checking of the clearance envelope.

5. Many regional/signature features or controls are not identified in low level contour maps and a best seen in profile forms. High level presentations able to yield structural settings and controls can be modelled.

6. Tertiary basalts are variable in character but may be resolved. There is need for some control. The basalts are generally thin but several flows are indicated in some areas.

7. A number of unexplained signature style features have been noted and are worthy of immediate review. Exploration may need to be based on presumptions of major structures and alteration of materials above boundaries of underlying mafic rocks.

8. Little evidence for alteration effects has been noted but this may be due to the erratic nature of the magnetic field and poor definition of rock properties in this area. Another key element is the dominance of the mafic suites on the magnetic field. Virtually every feature in the northeastern two thirds of the area studied contains a significant contribution from this source.

RECOMMENDATIONS

1. Some discussion and review of the implications of this early work is required. Are mineralisation concepts implied feasible and useful? What roles could the granite and the mafic suite have? Are there major internal thrust boundaries and do these control loci for mineralisation? Are these reflected in some E-W features?

2. The anomalous sites should be reviewed and visited. The coordinates offered may carry a precision of +/- 200 m so an area of 400 x 400 m should be checked. Geochemistry is advised for independent checking. In each case the effects of basalt boundaries, previously unmapped pods of basalt or fault oxidation effects need to be assessed.

3. Some drilling control on the thickness of basalt is required in order to finally remove this variable. Magnetic analysis can provide the regional stripping once this is done.

4. Magnetic property analysis is recommended for all units but special attention should be directed at Dove Granite, Lorinna Greywacke contents and the felsic rocks since there are suggestions that these contain a range of lithologies. Some remanence determinations will be essential but I suggest all determinations use field magnetometer methods. This is cheaper, more representative and permits more samples to be measured.

5. Second stage work should review the known or suspected mineralised zones for drape imperfections. It may be that some aspects of mineralisation signatures have already been modified by the survey and its relation to the land surface.

6. Where structures appear favourable, or other information indicates interest the alternate lines not used in this study should be reviewed. These areas may be advised.

7. More comprehensive structural analysis using both gravity and 1200 m data sets can be constrained by the implications of this work.

Note that the compensations and corrections for the lines examined do not need to be repeated unless line position problems are to be removed completely. Most parts of most lines are free of this problem and the corrected data sets can be used to calculate or examine the field on any surface.

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REFERENCES

Bamford, A.L., and Green, G.R., 1988. Cethana. Metallic mineral deposits map 8114(1V)-8115(III). Mines Department Tasmania.

Leaman, D.E., 1988. Granites of W and NW Tasmania. Part 9. The Dolcoath Granite. Mt Read Volcanics Project Report, Mines Department Tasmania.

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Report submitted on behalf of
Leaman Geophysics
by

D. Leaman

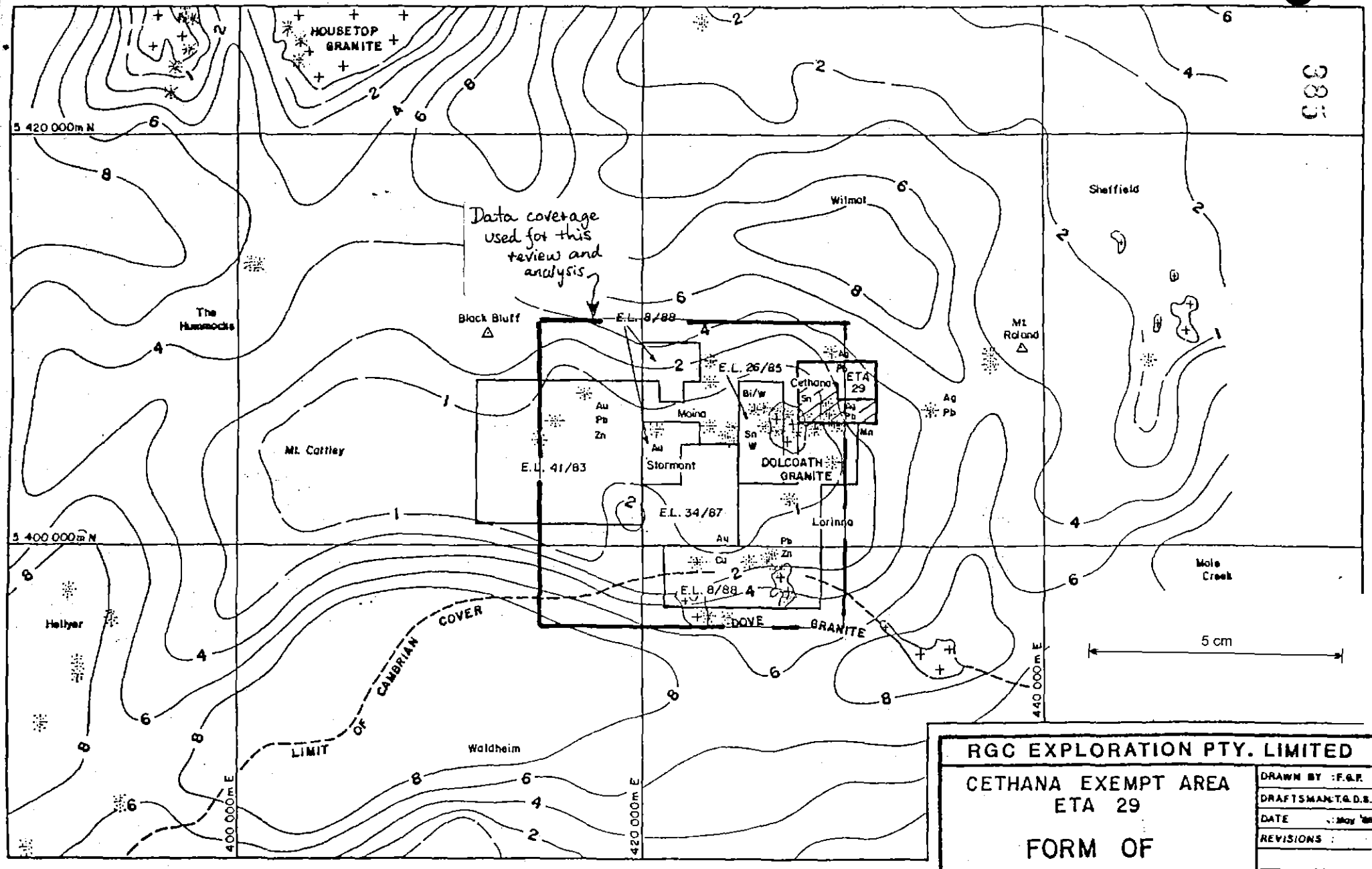
Dr. D.E. Leaman, B.Sc., Ph.D
M.Aus.I.M.M., M.M.I.C.A

22-8-88

FIGURES

1. Licence area, locality map
2. Observed magnetic profiles 5240 to 5340
3. 5340 to 5440
4. 5440 to 5540
5. 5540 to 5640
6. 5640 to 1061
7. 1061 to 5840
8. 5840 to 5900
9. Contours of magnetic field, Moina west, Mines Dept survey
10. Moina east
9a,10a Magnetic field with geological basemap
11. Magnetic profiles at 1200 m 5340 to 5440
12. 5540 to 5640
13. 1061 to 5840
14. Magnetic field at 1200 m, unfiltered
15. filtered
16. First vertical derivative at 1200 m
17. Second vertical derivative at 1200 m
18. Overlay basemap for Figures 14 to 17 (film in pocket)
19. Magnetic depth estimate plot line 5360 7.5 km
20. 5400
21. 5440
22. 5480
23. 5520
24. 5560
25. 5600
26. 5640
27. Magnetic depth estimate plot line 5600 15 km
28. 5620
29. 5640
30. Magnetic depth estimate plot line 5620 15km spec operator
31. Effect of observation height on resolution line 5640
32. Regional trend and source summary
33. Model implications for line 5500
34. 1063

Note: transparent overlay for Figures 14 to 17 in pocket
Diagram original included as Figure 18



MINERALISED SITES

Provisional Interpretation : contours showing top of granite below surface in km. (Leaman, Jan. 1988)

RGC EXPLORATION PTY. LIMITED

CETHANA EXEMPT AREA
ETA 29

FORM OF
DOLCOATH GRANITE

DRAWN BY : F.G.P.
DRAFTSMAN: T.G.D.S.
DATE : May '88
REVISIONS :

FILE NO.

SCALE 1:250,000 2.5 0 2.5 5.0 Kilometres

FIG. 1

CS3
2083381

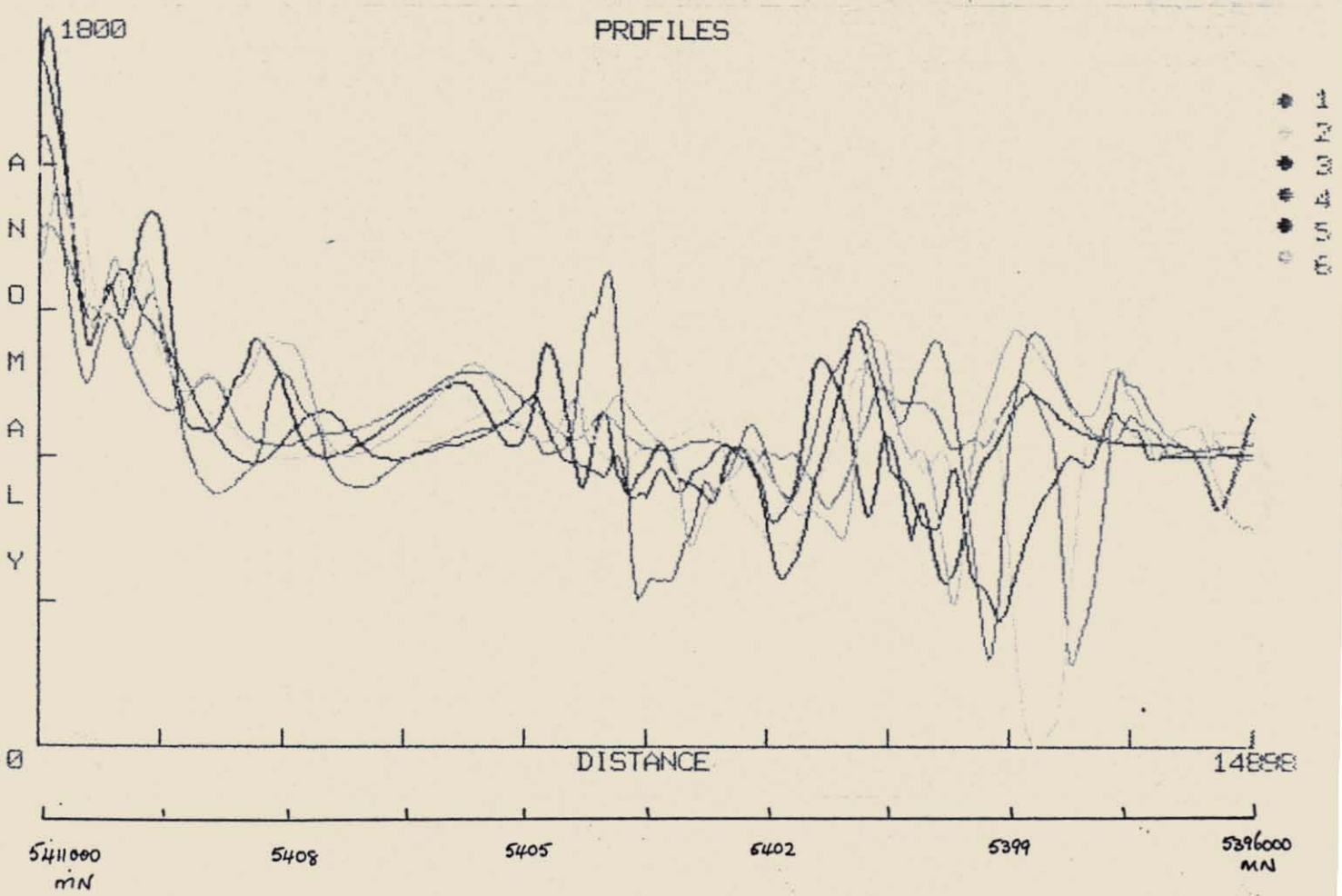
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			nominal easting
1	B:M5240	MOINA PROJECT LINE 5240	413 500
2	B:M5260	MOINA PROJECT LINE 5260	414 000 mE
3	B:M5280	MOINA PROJECT LINE 5280	414 500
4	B:M5300	MOINA PROJECT LINE 5300	415 000
5	B:M5320	MOINA PROJECT LINE 5320	415 500
6	B:M5340	MOINA PROJECT LINE 5340	416 000

ZERO SHIFT : 780.2

AEROMAGNETIC PROFILES nominal clearance 100m

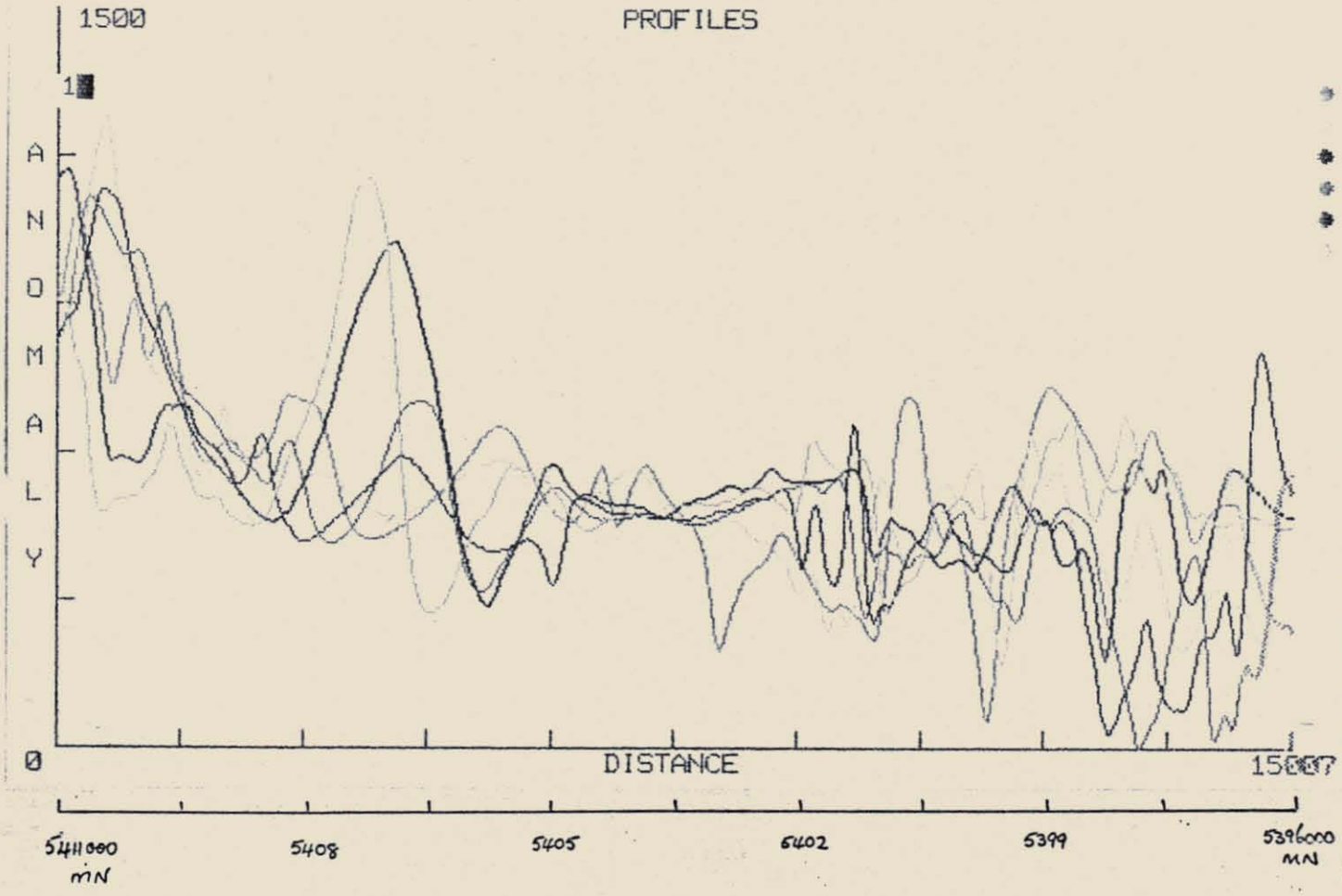
FIGURE 2

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			nominal easting
1	B:M5340	MOINA PROJECT LINE 5340	416 000 mE
2	B:M5360	MOINA PROJECT LINE 5360	416500
3	B:M5380	MOINA PROJECT LINE 5380	417000
4	B:M5400	MOINA PROJECT LINE 5400	417500
5	B:M5420	MOINA PROJECT LINE 5420	418000
6	B:M5440	MOINA PROJECT LINE 5440	418500

ZERO SHIFT : 483

AEROMAGNETIC PROFILES nominal clearance 100m

FIGURE 3

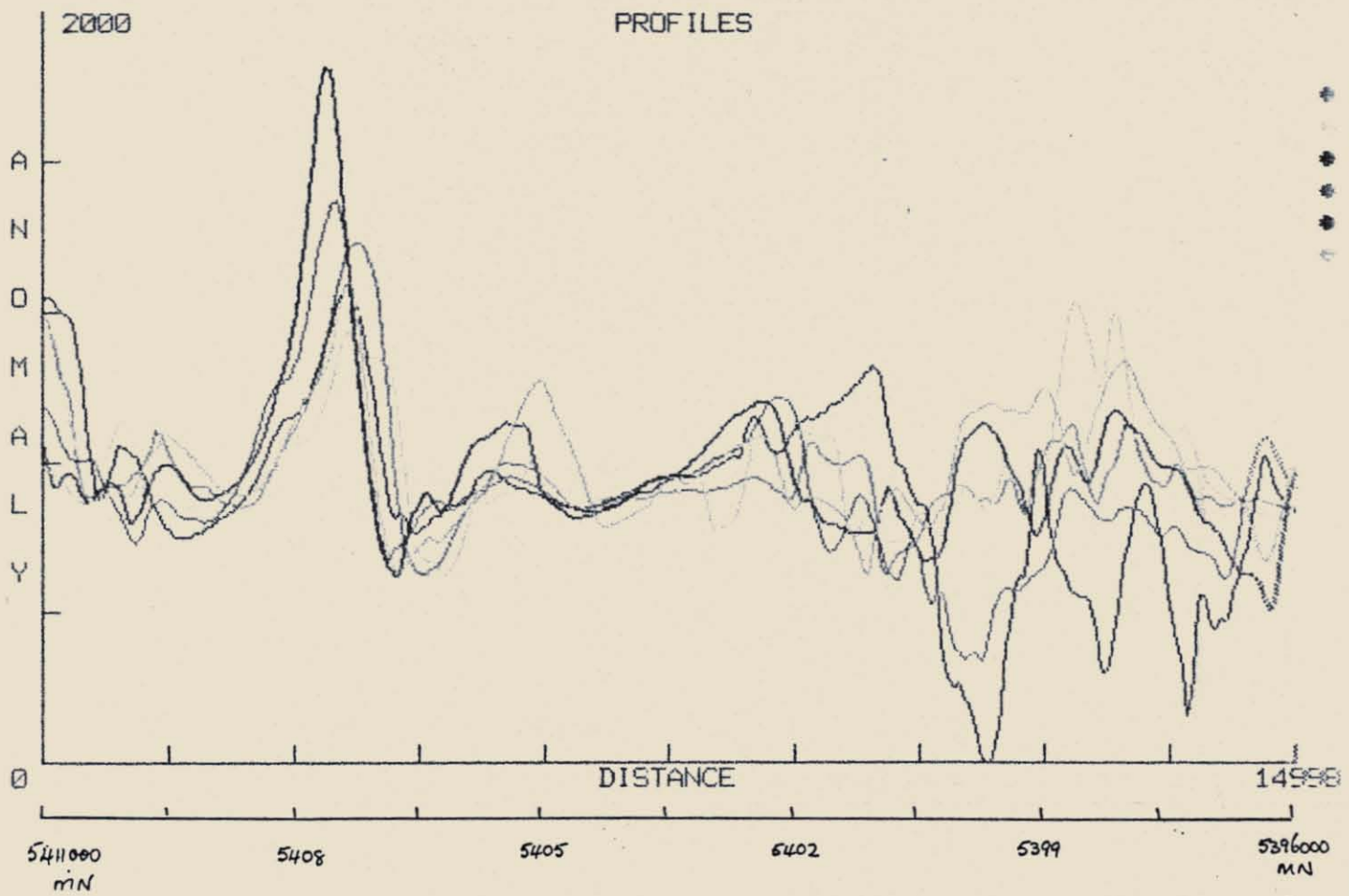
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			nominal easting
1	B:M5440	MOINA PROJECT LINE 5440	418500 mE
2	B:M5460	MOINA PROJECT LINE 5460	419000
3	B:M5480	MOINA PROJECT LINE 5480	419500
4	B:M5500	MOINA PROJECT LINE 5500	420000
5	B:M5520	MOINA PROJECT LINE 5520	420500
6	B:M5540	MOINA PROJECT LINE 5540	421000

ZERO SHIFT : 713.4

AEROMAGNETIC PROFILES nominal clearance 100m

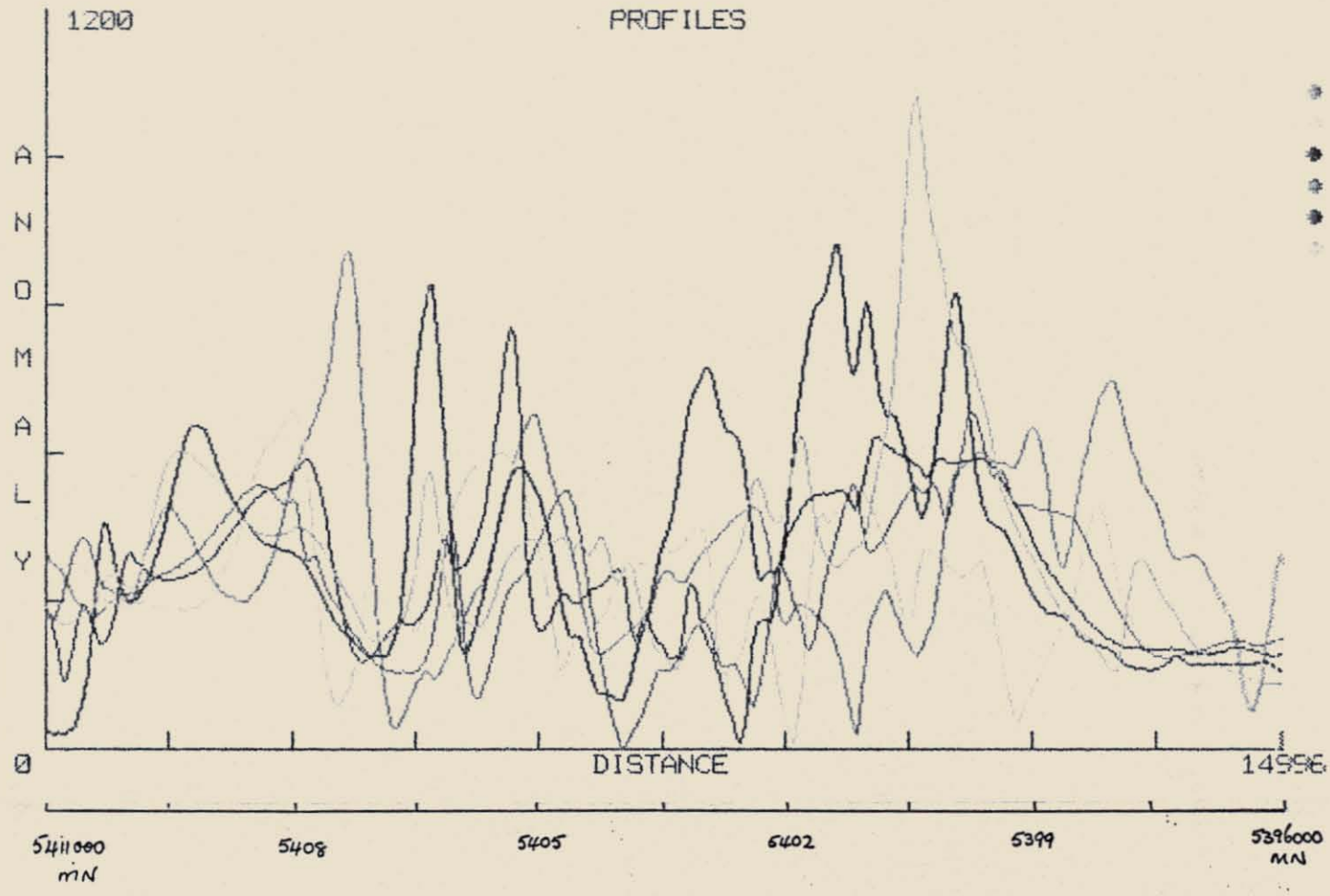
FIGURE 4

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			Nominal easting
1	B:M5540	MOINA PROJECT LINE 5540	421 000 mE
2	B:M5560	MOINA PROJECT LINE 5560	421 500
3	B:M5580	MOINA PROJECT LINE 5580	422 000
4	B:M5600	MOINA PROJECT LINE 5600	422 500
5	B:M5620	MOINA PROJECT LINE 5620	423 000
6	B:M5640	MOINA PROJECT LINE 5640	423 500

ZERO SHIFT : 239.3001

AEROMAGNETIC PROFILES nominal clearance 100m

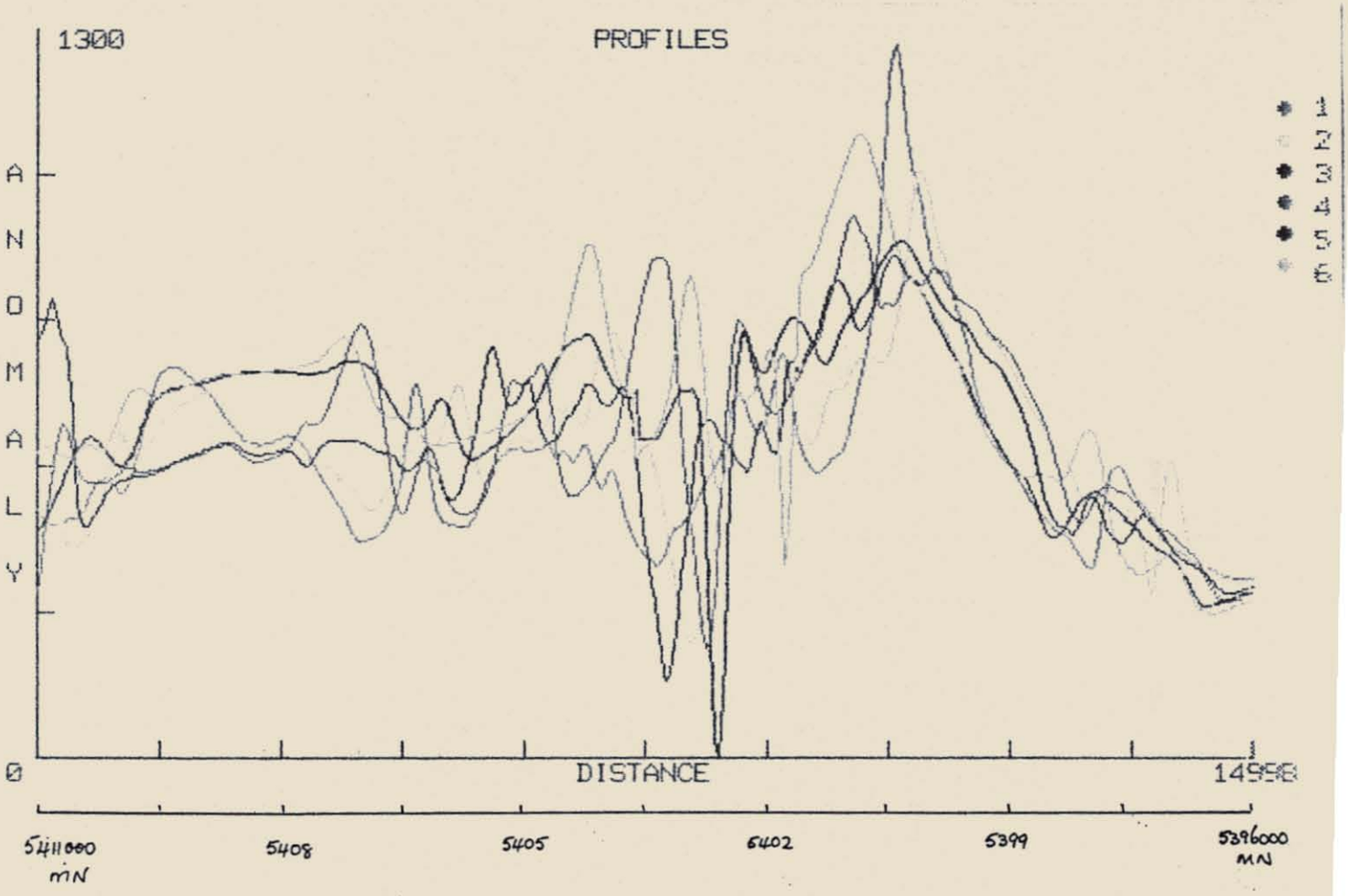
FIGURE 5

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			nominal easting
1	B:M5640	MOINA PROJECT LINE 5640	423500
2	B:M5660	MOINA PROJECT LINE 5660	424000
3	B:M5680	MOINA PROJECT LINE 5680	424500
4	B:M5700	MOINA PROJECT LINE 5700	425000
5	B:M1060	MOINA PROJECT LINE 1060	425500
6	B:M1061	MOINA PROJECT LINE 1061	426000

ZERO SHIFT : 452.3001

AEROMAGNETIC PROFILES nominal clearance 100m (150m for 1060-1061)

FIGURE 6

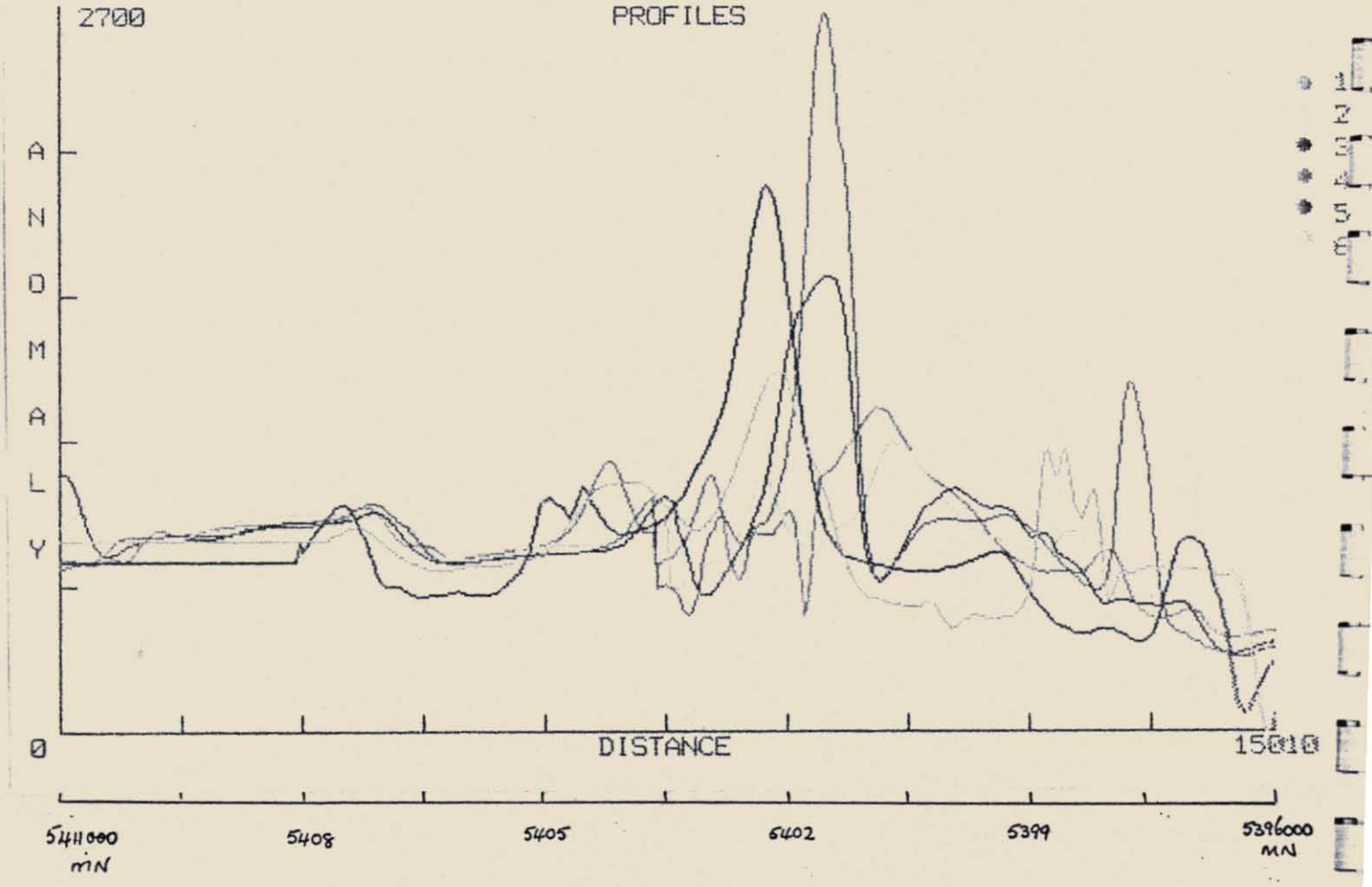
391

708387

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			nominal easting
1	B:M1061	MOINA PROJECT LINE 1061	426 000 mE
2	B:M1062	MOINA PROJECT LINE 1062	426 500
3	B:M1063	MOINA PROJECT LINE 1063	427 000
4	B:M1064	MOINA PROJECT LINE 1064	427 500
5	B:M5820	MOINA PROJECT LINE 5820	428 000
6	B:M5840	MOINA PROJECT LINE 5840	428 500

ZERO SHIFT : 541.7

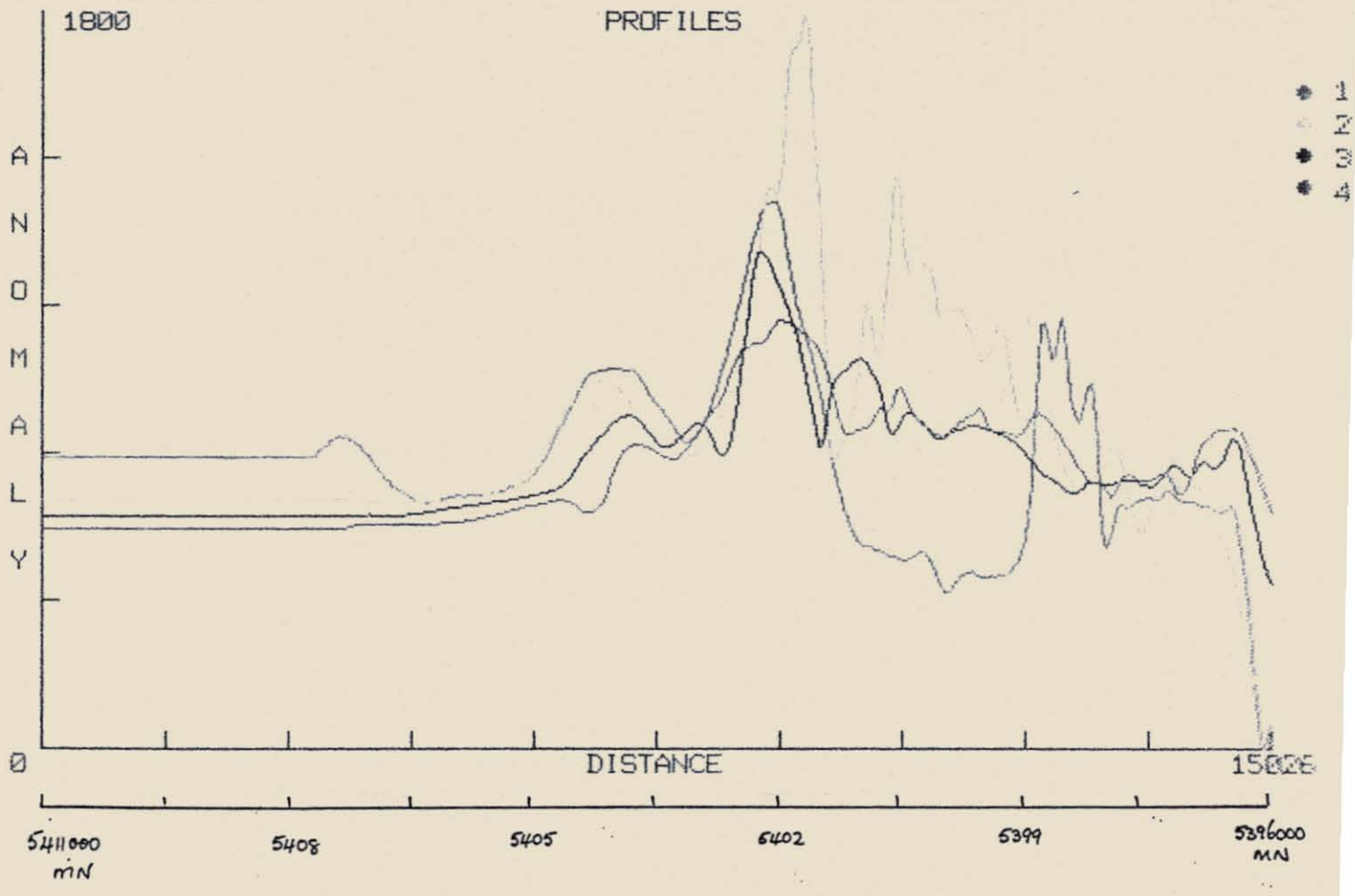
AEROMAGNETIC PROFILES nominal clearance 100m (150m for 1061-1064)

FIGURE 7

708388

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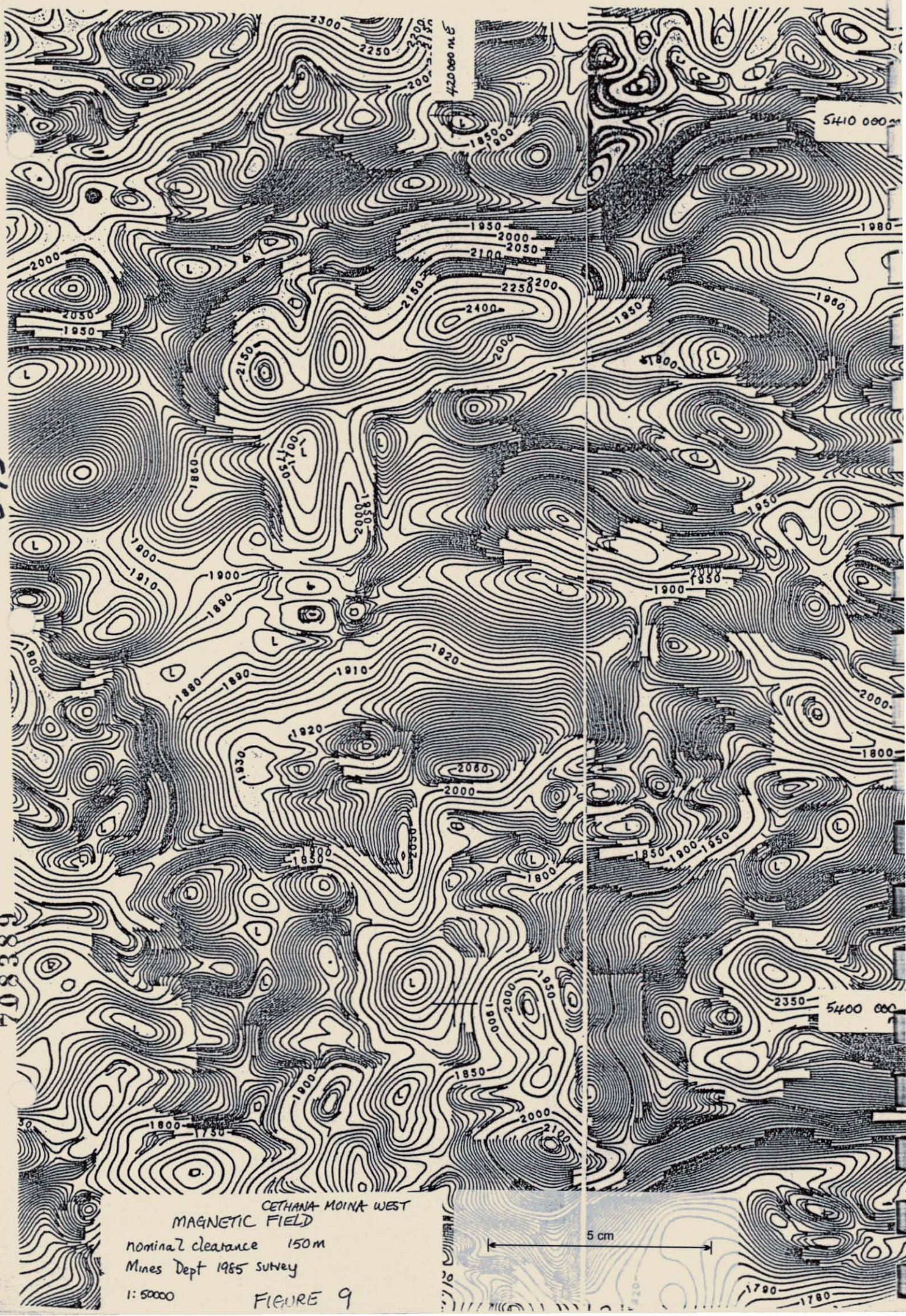


1	B:M5840	MOINA PROJECT LINE 5840	428500 mE
2	B:M5860	MOINA PROJECT LINE 5860	429000
3	B:M5880	MOINA PROJECT LINE 5880	429500
4	B:M5900	MOINA PROJECT LINE 5900	430000

ZERO SHIFT : 541.7

AEROMAGNETIC PROFILES nominal clearance 100m

FIGURE 8



CETHANA - MOINA WEST

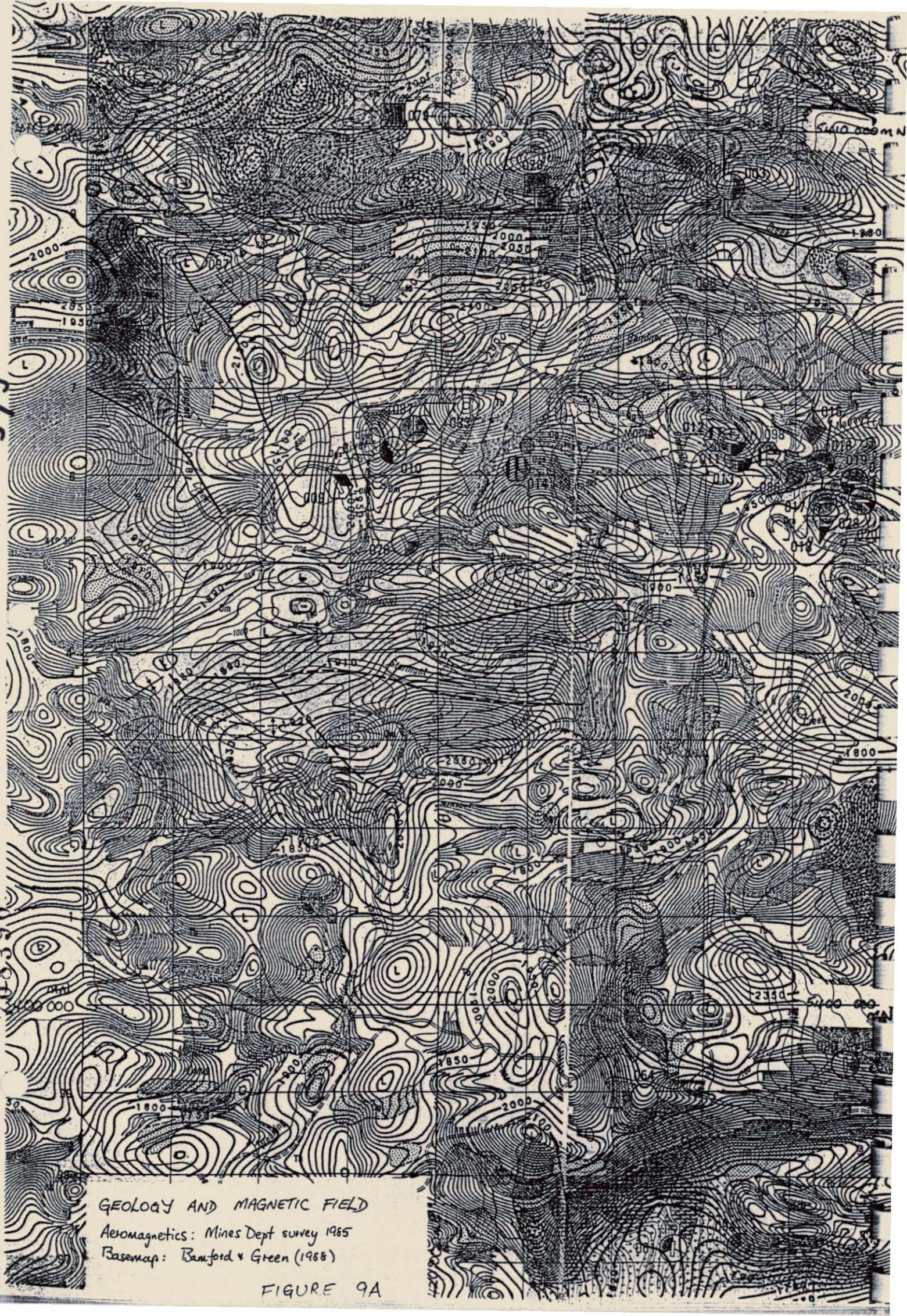
MAGNETIC FIELD

nominal clearance 150 m

Mines Dept 1985 survey

1: 50000

FIGURE 9



GEOLOGY AND MAGNETIC FIELD

Aeromagnetics: Mines Dept survey 1985

Basemap: Bamford & Green (1988)

FIGURE 9A

395

20839

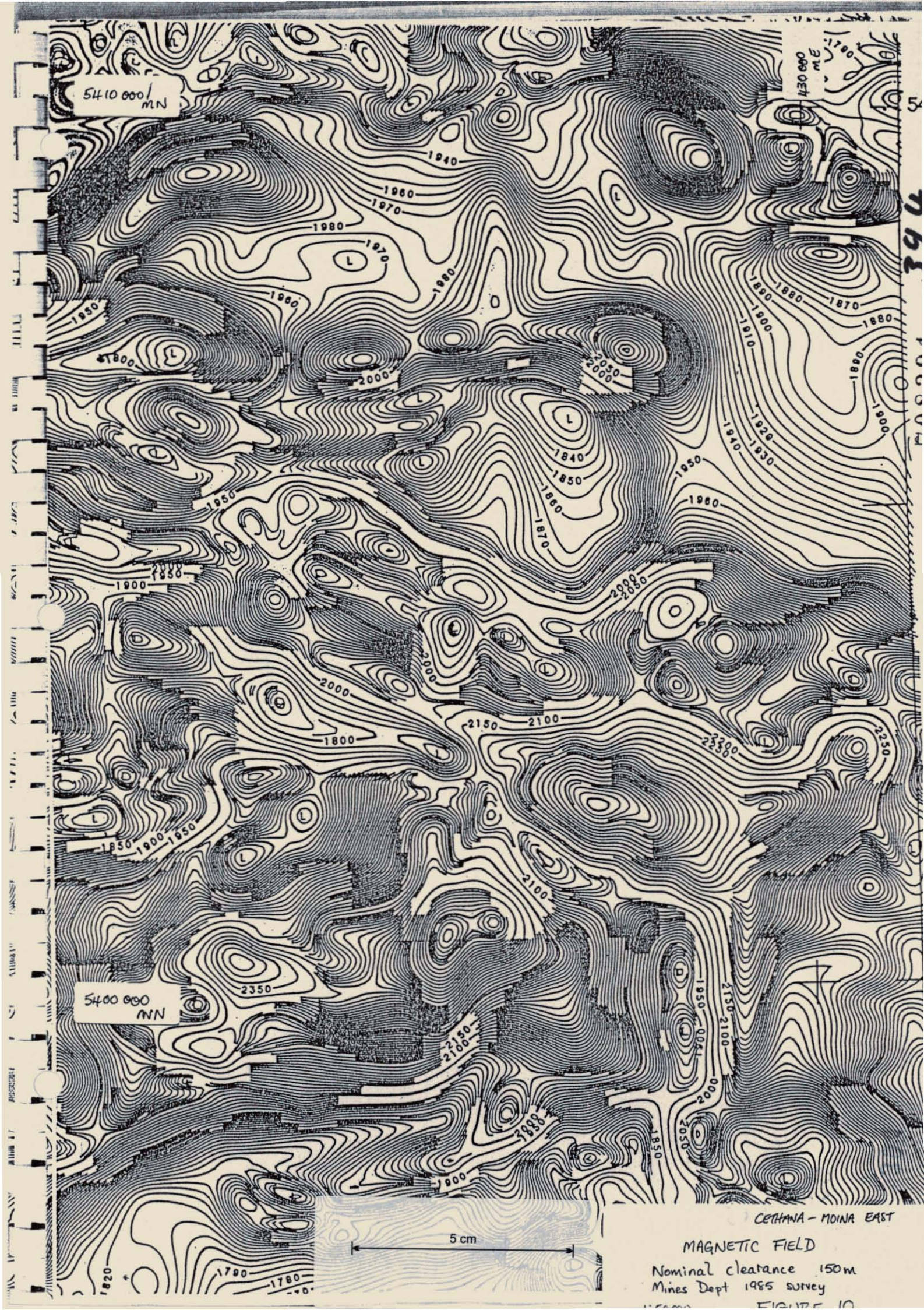
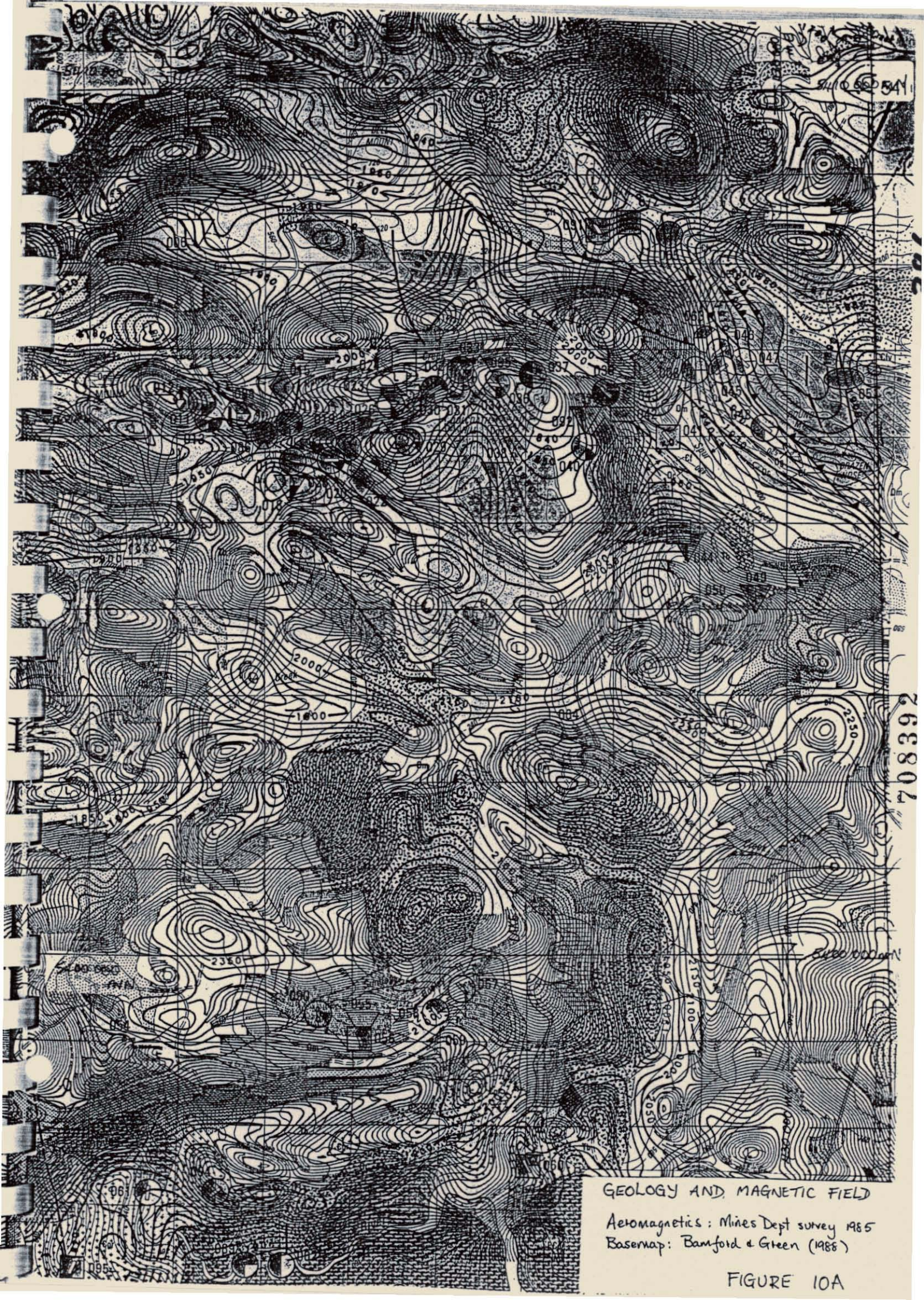

5410 000 mN
5400 000 mN
430 000 mE
1940
1960
1970
1980
1970
1980
1960
1950
1800
2000
2030
2000
1840
1850
1860
1870
1950
1960
1900
1850
2000
2000
2000
1800
2150
2100
2250
2350
1850
1900
1850
2100
2150
2100
1900
1850
2000
1850
1900
1820
1790
1780
5 cm
CETHANA - MOINA EAST
MAGNETIC FIELD
Nominal clearance 150m
Mines Dept 1985 survey

FIGURE 10



GEOLOGY AND MAGNETIC FIELD

Aeromagnetics: Mines Dept survey 1985
Basemap: Bamford & Green (1988)

FIGURE 10A

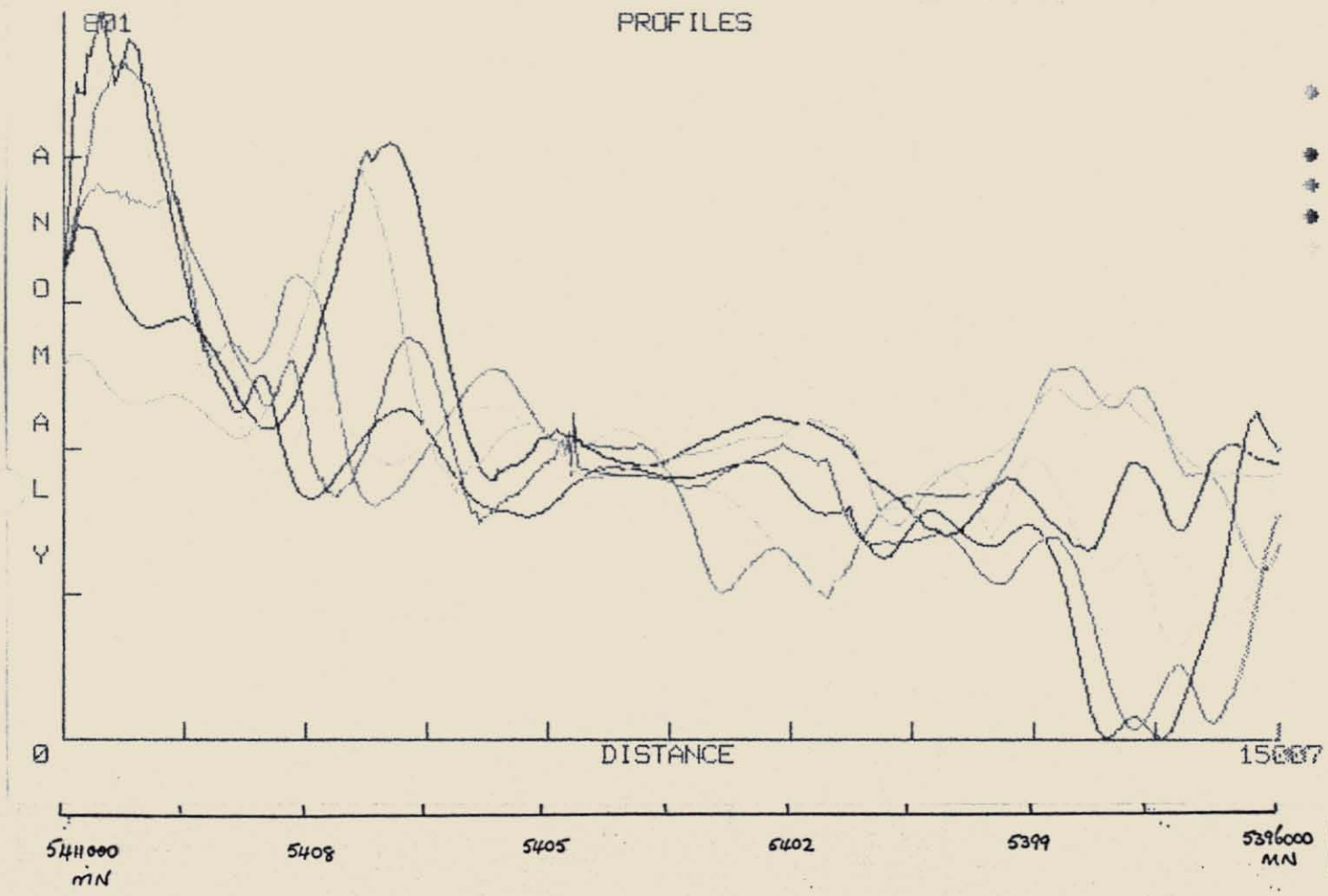
397

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1	B:M12L5340	MOINA MAGNETICS 5340 AT 1200 M	416000 mE
2	B:M12L5360	MOINA MAGNETICS 5360 AT 1200M	416500
3	B:M12L5380	MOINA MAGNETICS 5380 AT 1200M	417000
4	B:M12L5400	MOINA MAGNETICS 5400 AT 1200 M	417500
5	B:M12L5420	MOINA MAGNETICS 5420 AT 1200 M	418000
6	B:M12L5440	MOINA MAGNETICS 5440 AT 1200 M	418500

ZERO SHIFT : 300.9977

COMPENSATED AEROMAGNETIC PROFILES : CALCULATION FOR 1200m LEVEL ASL

FIGURE 11

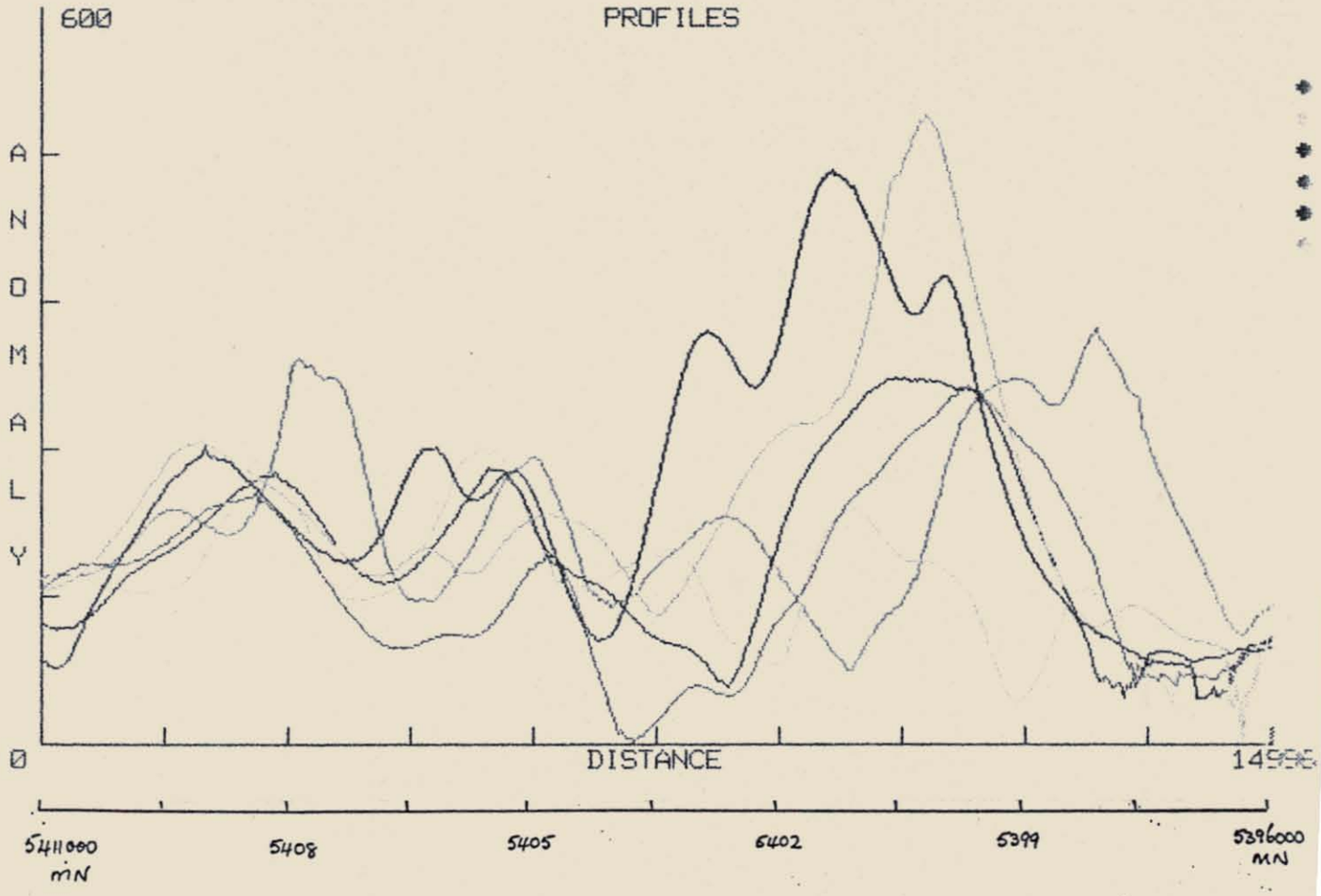
398

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			nominal easting
1	B:M12L5540	MOINA MAGNETICS 5540 AT 1200 M	421 000 mE
2	B:M12L5560	MOINA MAGNETICS 5560 AT 1200 M	421 500
3	B:M12L5580	MOINA MAGNETICS 5580 AT 1200 M	422 000
4	B:M12L5600	MOINA MAGNETICS 5600 AT 1200 M	422 500
5	B:M12L5620	MOINA MAGNETICS 5620 AT 1200 M	423 000
6	B:M12L5640	MOINA MAGNETICS 5640 AT 1200 M	423 500

ZERO SHIFT : 110.4018

COMPENSATED AEROMAGNETIC PROFILES : CALCULATION FOR 1200 m LEVEL ASL

FIGURE 12

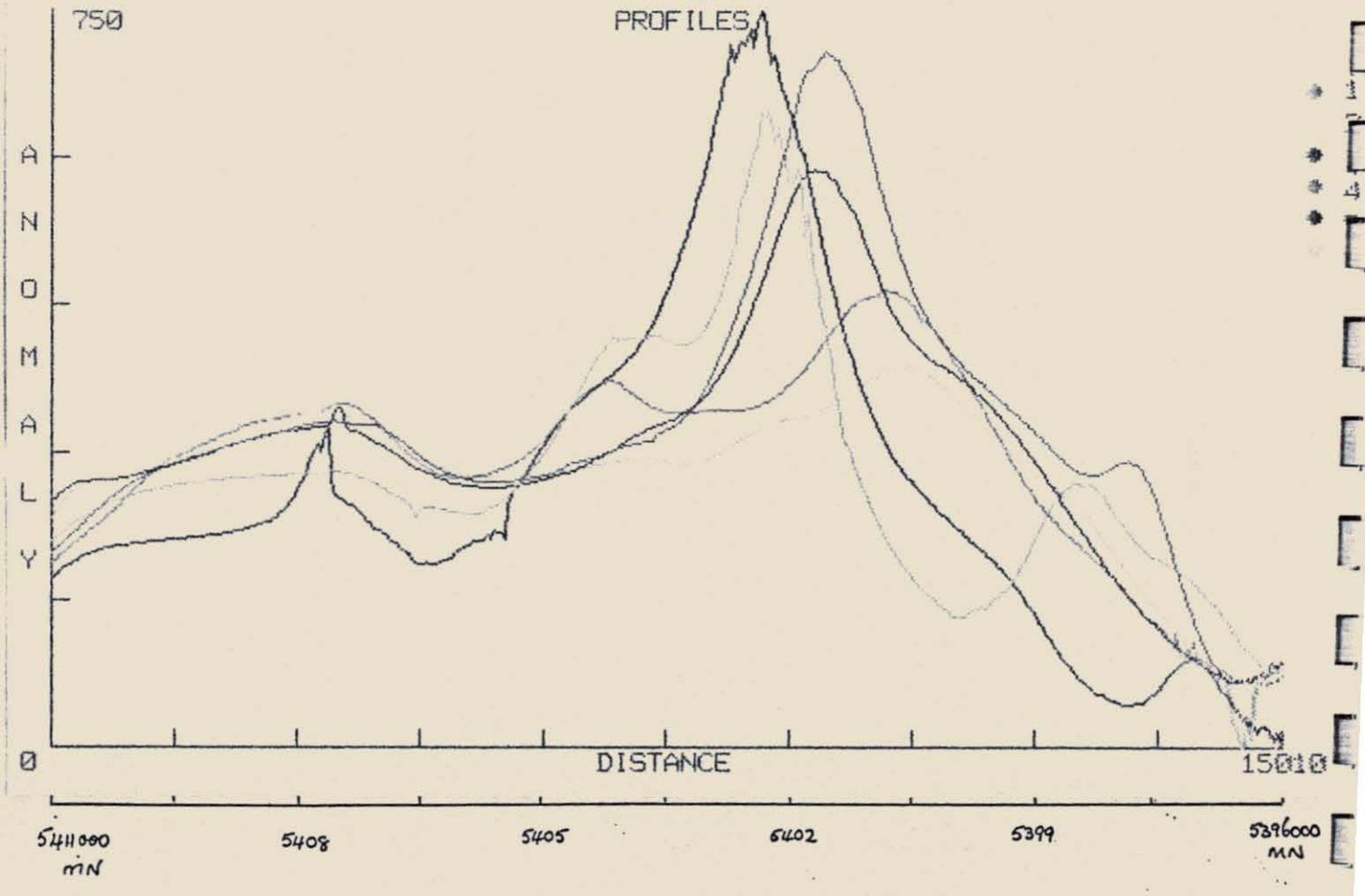
708395

399

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TELEPHONE: (002) 24 0319



			Nominal easting
1	B:M12L1061	MOINA MAGNETICS 1061 AT 1200 M	426000 mE
2	B:M12L1062	MOINA MAGNETICS 1062 AT 1200 M	426500
3	B:M12L1063	MOINA MAGNETICS 1063 AT 1200 M	427000
4	B:M12L1064	MOINA MAGNETICS 1064 AT 1200 M	427500
5	B:M12L5820	MOINA MAGNETICS 5820 AT 1200 M	428000
6	B:M12L5840	MOINA MAGNETICS 5840 AT 1200 M	428500

ZERO SHIFT : 120.744

COMPENSATED AEROMAGNETIC PROFILES : CALCULATION FOR 1200m LEVEL ASL

FIGURE 13

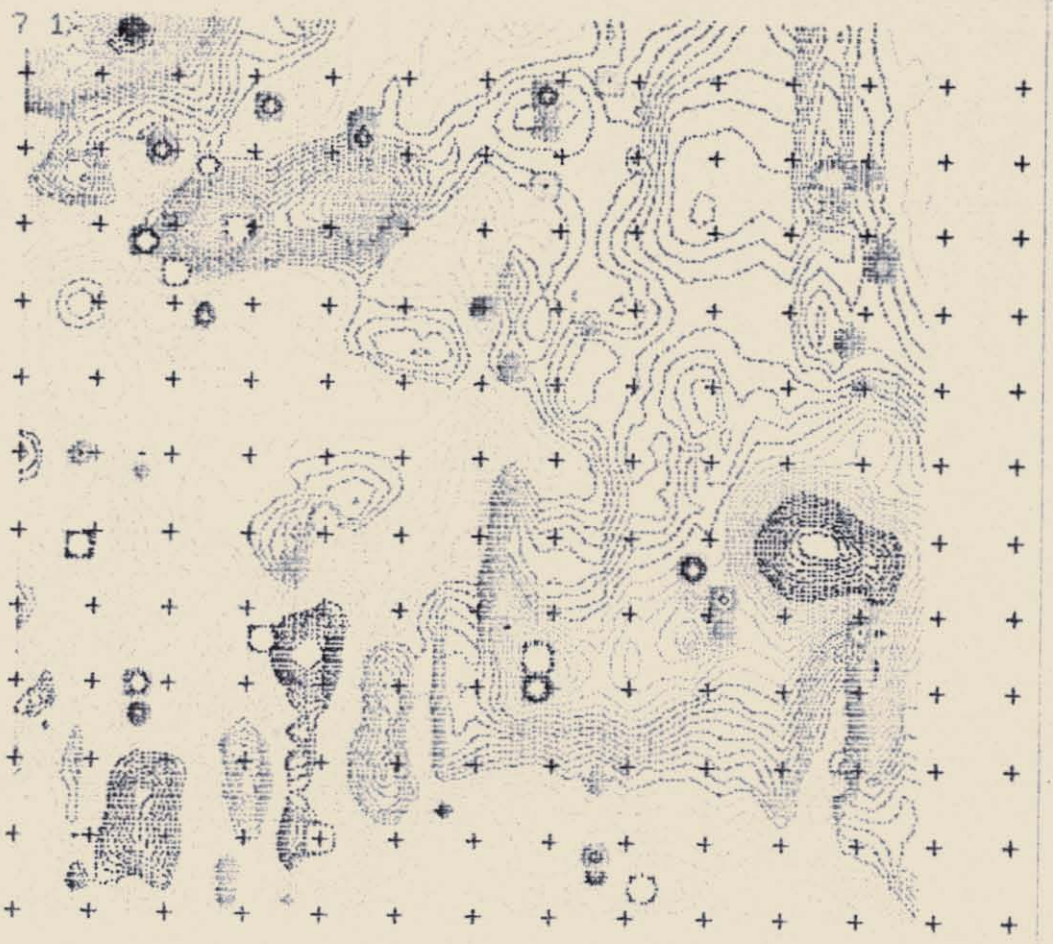
708396

400

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5396 000mN

415000 mE

MOINA MAGNETICS 1200 M
MOINA MAGNETICS COMPENSATED DATA LEVEL 1200 M
SCALE 125000
SAMPLE SPACING 250

(UNFILTERED)

Aug 88

Use geographic overlay (Fig 18 – in pocket)

Colour code : nT

−300 to −140	mauve	
−140 to 40	blue	
40 to 220	green	20nT interval
220 to 400	yellow	
400 to 580	red	
580 to 700	pink	

Figure 14

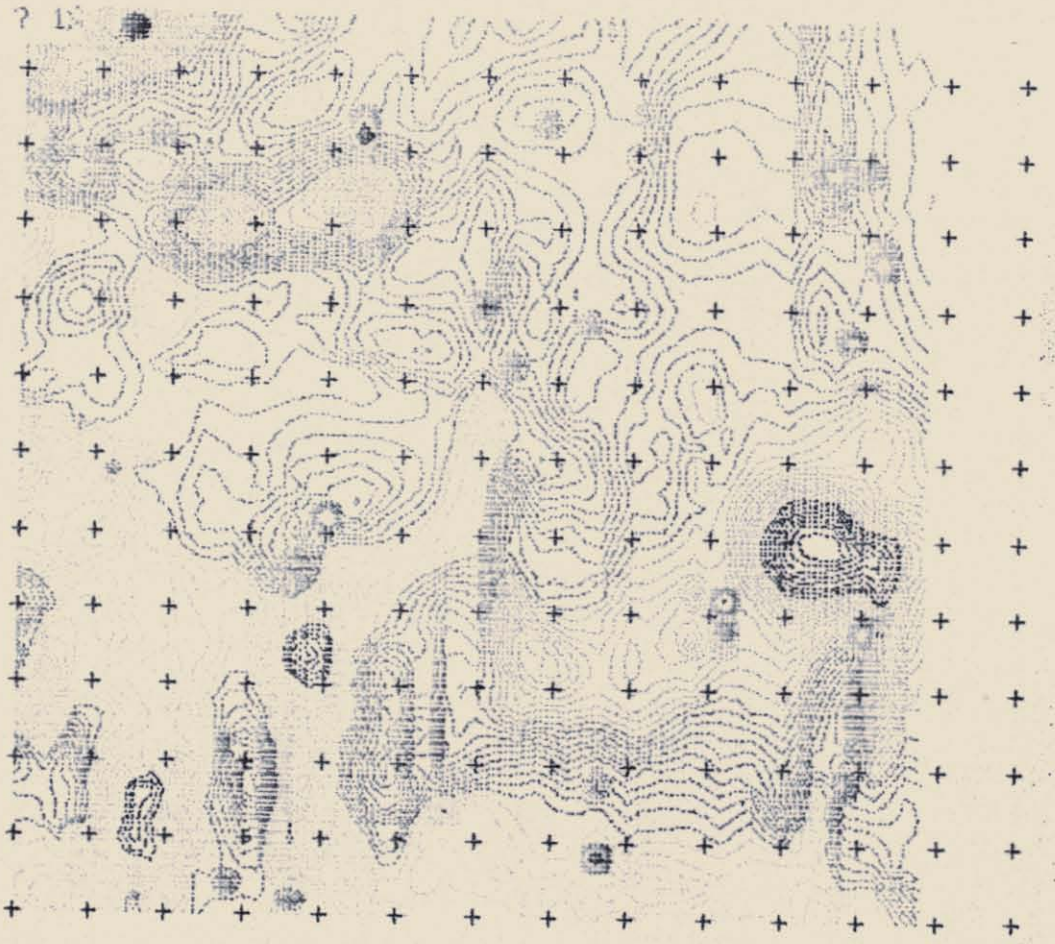
708397

401

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TELEPHONE: (002) 24 0319



5396 000mN

415000 mE

MOINA MAGNETICS 1200 M
MOINA MAGNETICS COMPENSATED DATA LEVEL 1200 M
SCALE 125000
SAMPLE SPACING 250

(FILTERED VERSION) Aug 88

Use geographic overlay (Fig 18 – in pocket)
Colour code : -440 to -240 purple
to -20 blue
to 200 green
to 420 yellow
to 640 red
to 820 pink

20nT interval

Figure 15

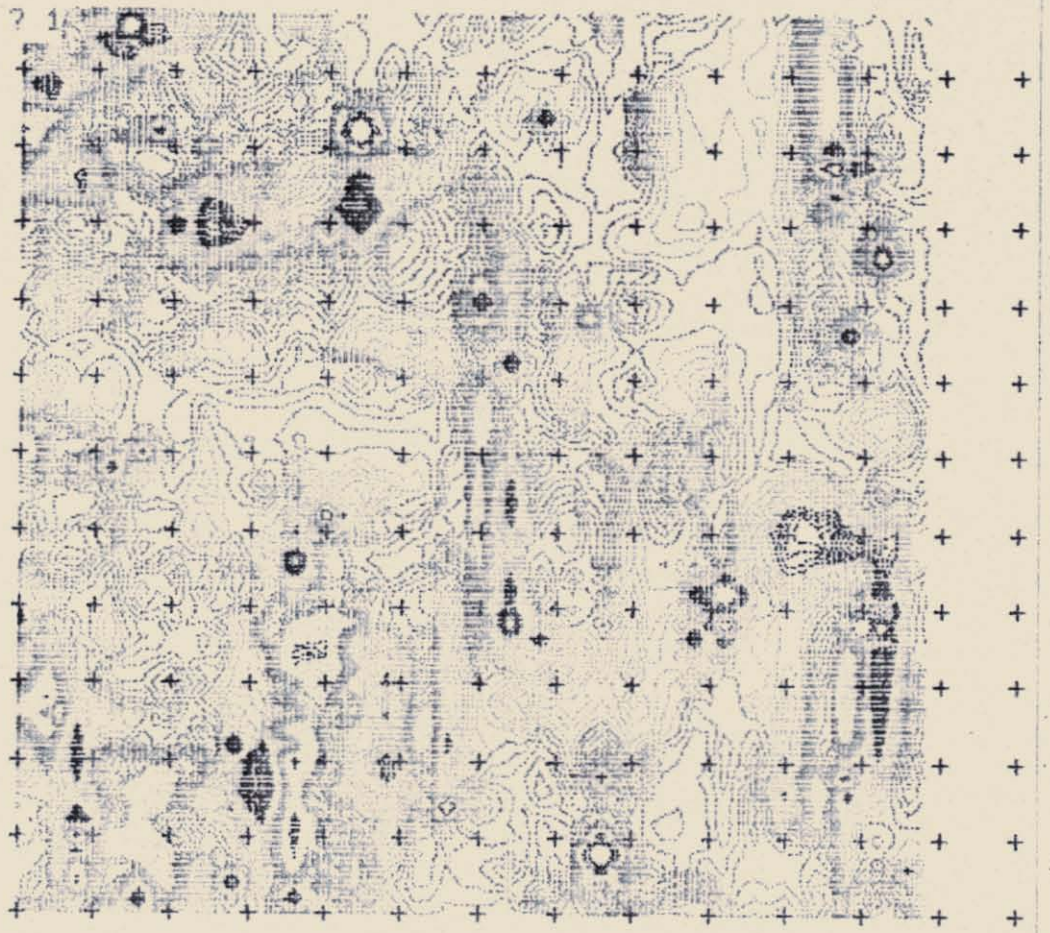
708398

402

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TELEPHONE: (002) 24 0319



5396 000mN

415000 mE

MOINA MAGNETICS 1200 M
MOINA MAGNETICS COMPENSATED 1200M FIRST DERIVATIVE
SCALE 125000
SAMPLE SPACING 250

Colour code: −250 to −170 nT/m purple
to −80 blue
to 10 green
to 100 yellow
to 190 red
> 190 pink

10 unit contour interval

Use geographic overlay (Fig 18 – in packet)

* Aug 88

Figure 16

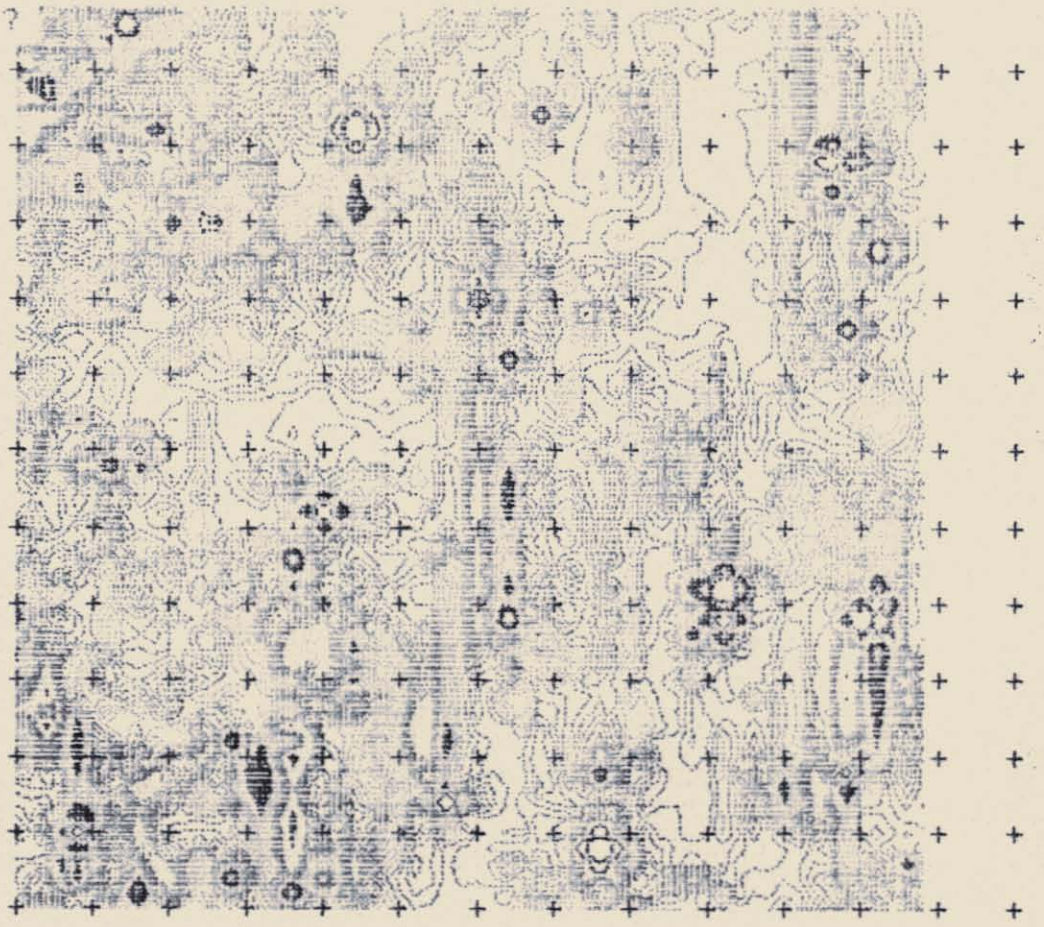
403

708399

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5396 000mN

415000mE

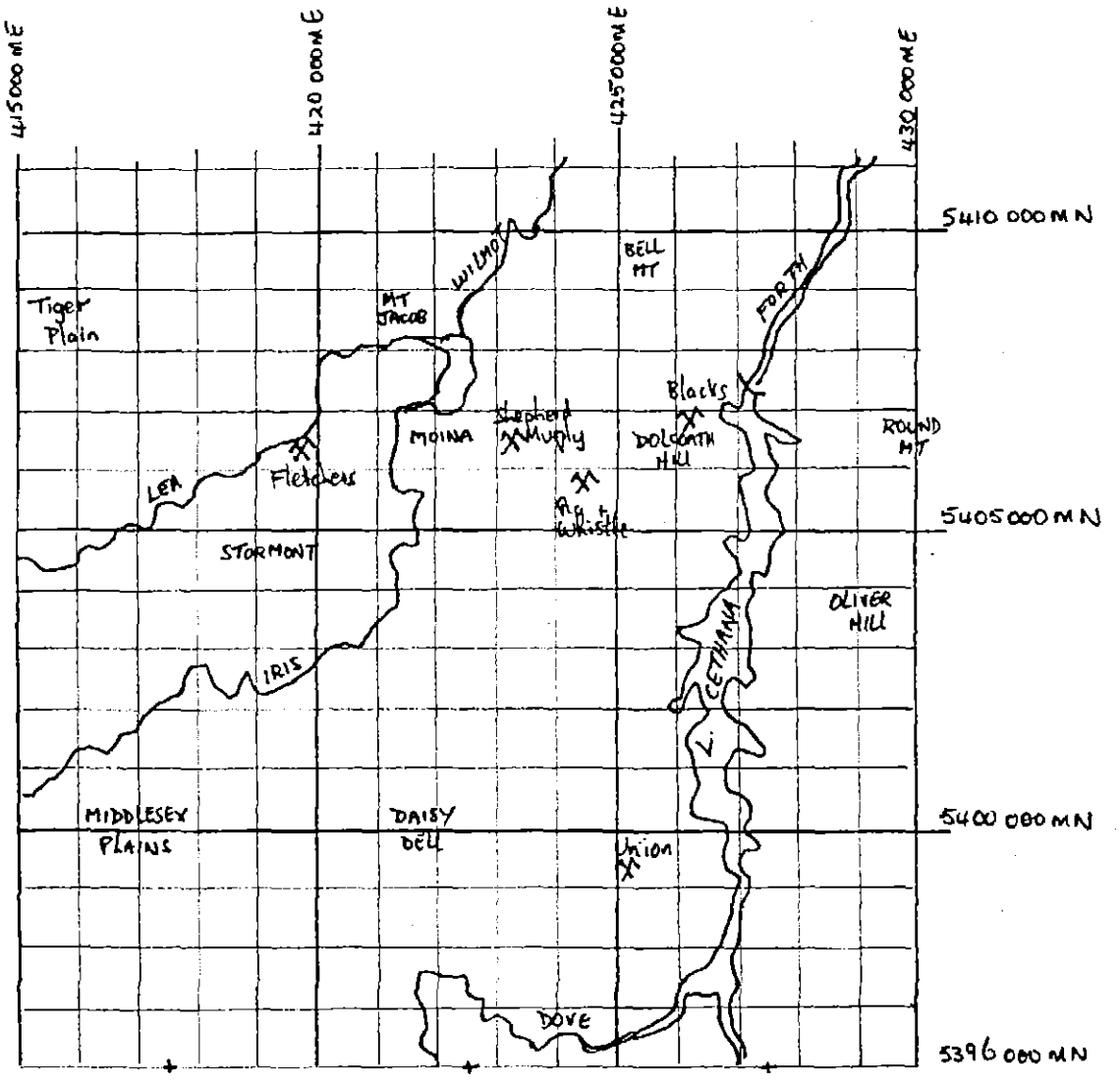
MOINA MAGNETICS 1200 M
MOINA MAGNETICS COMPENSATED 1200M SECOND DERIVATIVE
SCALE 125000
SAMPLE SPACING 250

Colour code: -250 to -170 purple nT/m²
to -80 blue
to 10 green
to 100 yellow
to 190 red
>190 pink
10 unit contour interval

Use geographic overlay (Fig 18 – in pocket)

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Figure 17



OVERLAY

MOINA MAGNETICS – COMPENSATED FIEL

Intensity at 1200m

For diagrams : First, Second detivatives at 1200m.

5 cm

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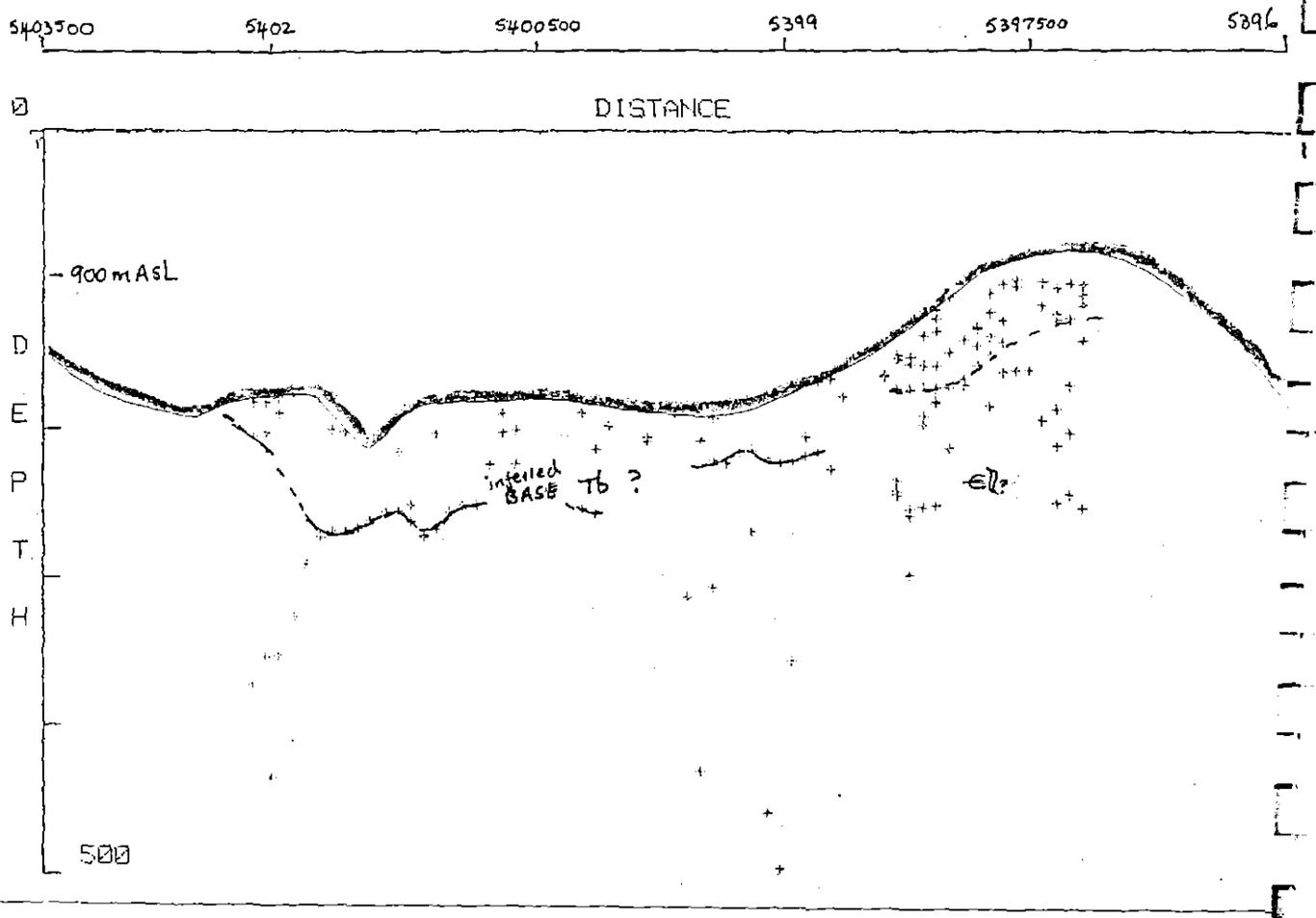
FIGURE 18

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708401

Nominal easting : 416500 mE



MAGNETIC DEPTH ESTIMATE PLOT

B:D5360H64
BASALT DEPTH ESTIMATES LONG PROPERTY OPERATOR (64) 5360

Aug 88

FIGURE 19

406

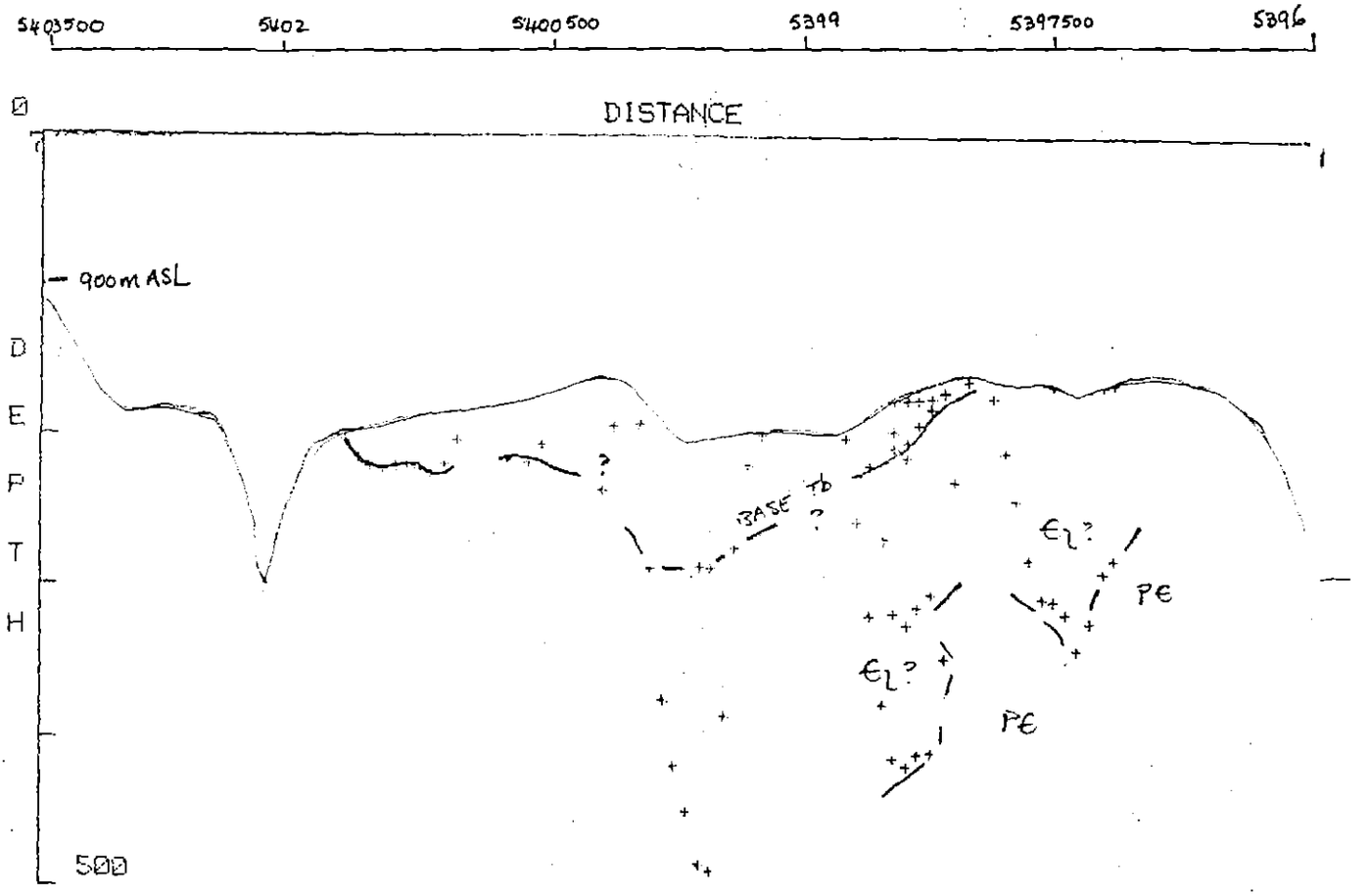
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Nominal easting : 417500 mE



MAGNETIC DEPTH ESTIMATE PLOT

B:D5400H64
BASALT DEPTH ESTIMATES LONG PROPERTY OPERATOR (64) 5400

Aug 88

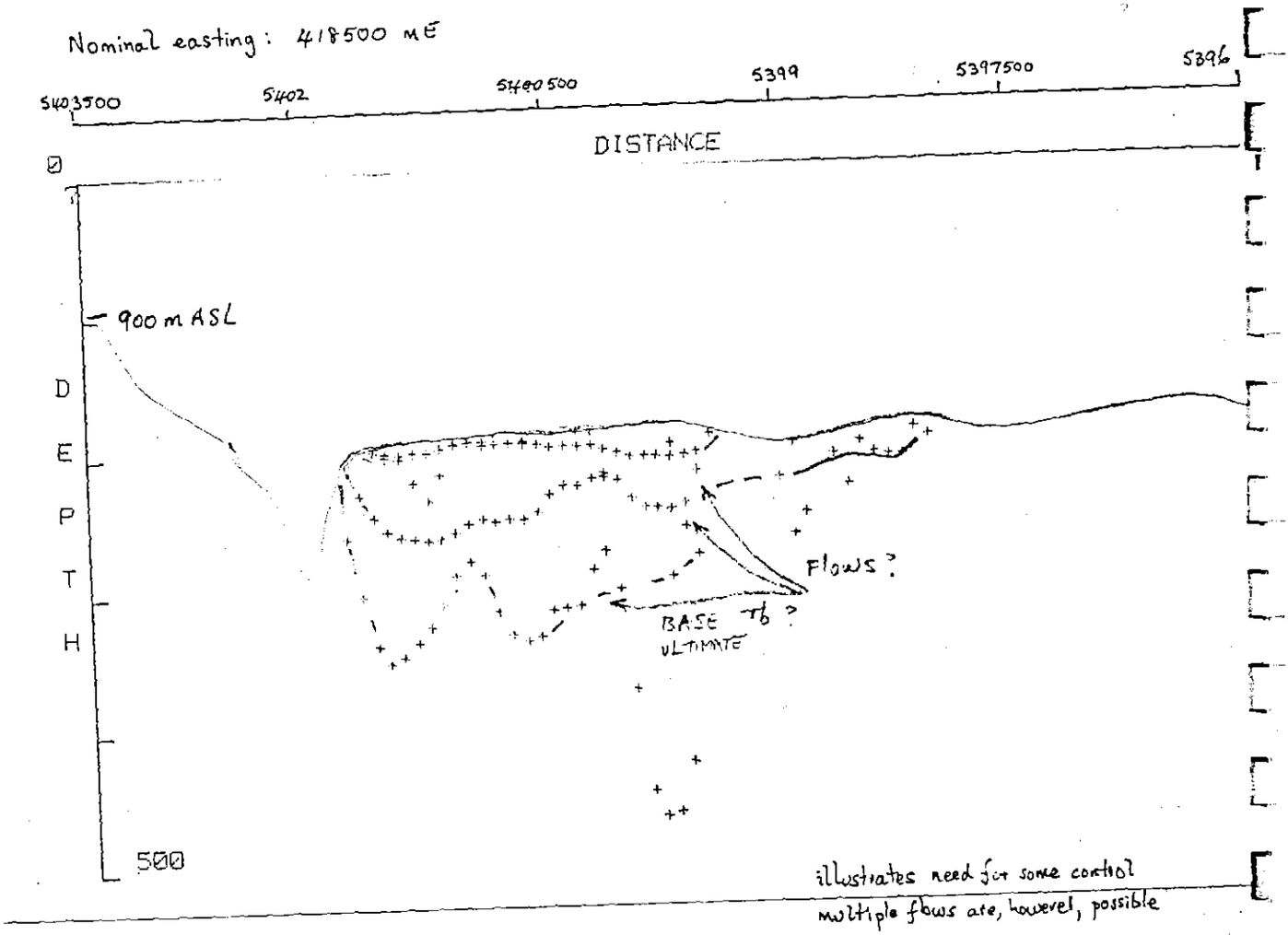
FIGURE 20

708403

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MAGNETIC DEPTH ESTIMATE PLOT

B:D5440H64
BASALT DEPTH ESTIMATES LONG PROPERTY OPERATOR (64)

Aug 88

FIGURE 21

408

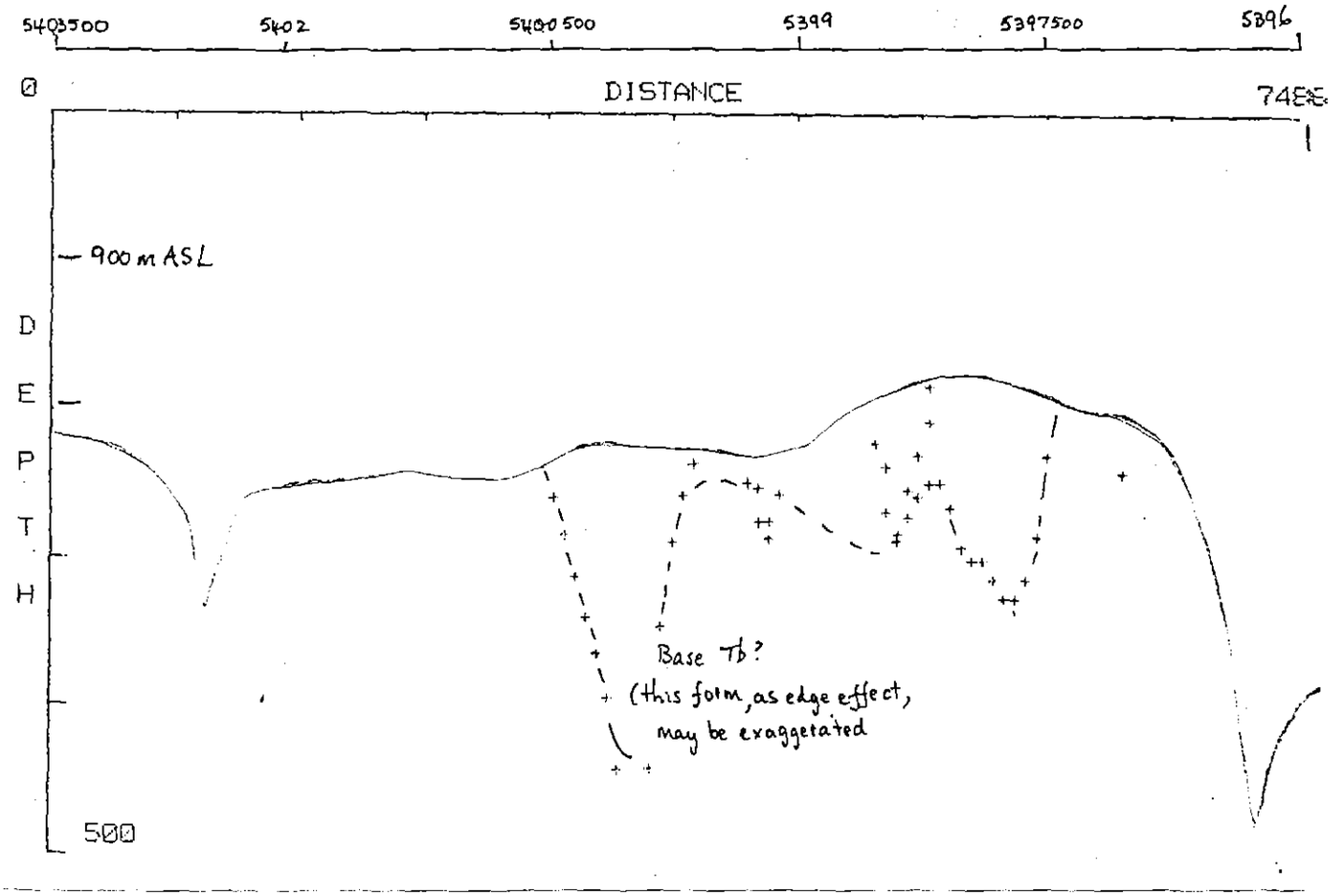
708404

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Nominal easting : 419500 mE



MAGNETIC DEPTH ESTIMATE PLOT

B:D5480H64
BASALT DEPTH ESTIMATES LONG PROPERTY OPERATOR (64) 5480

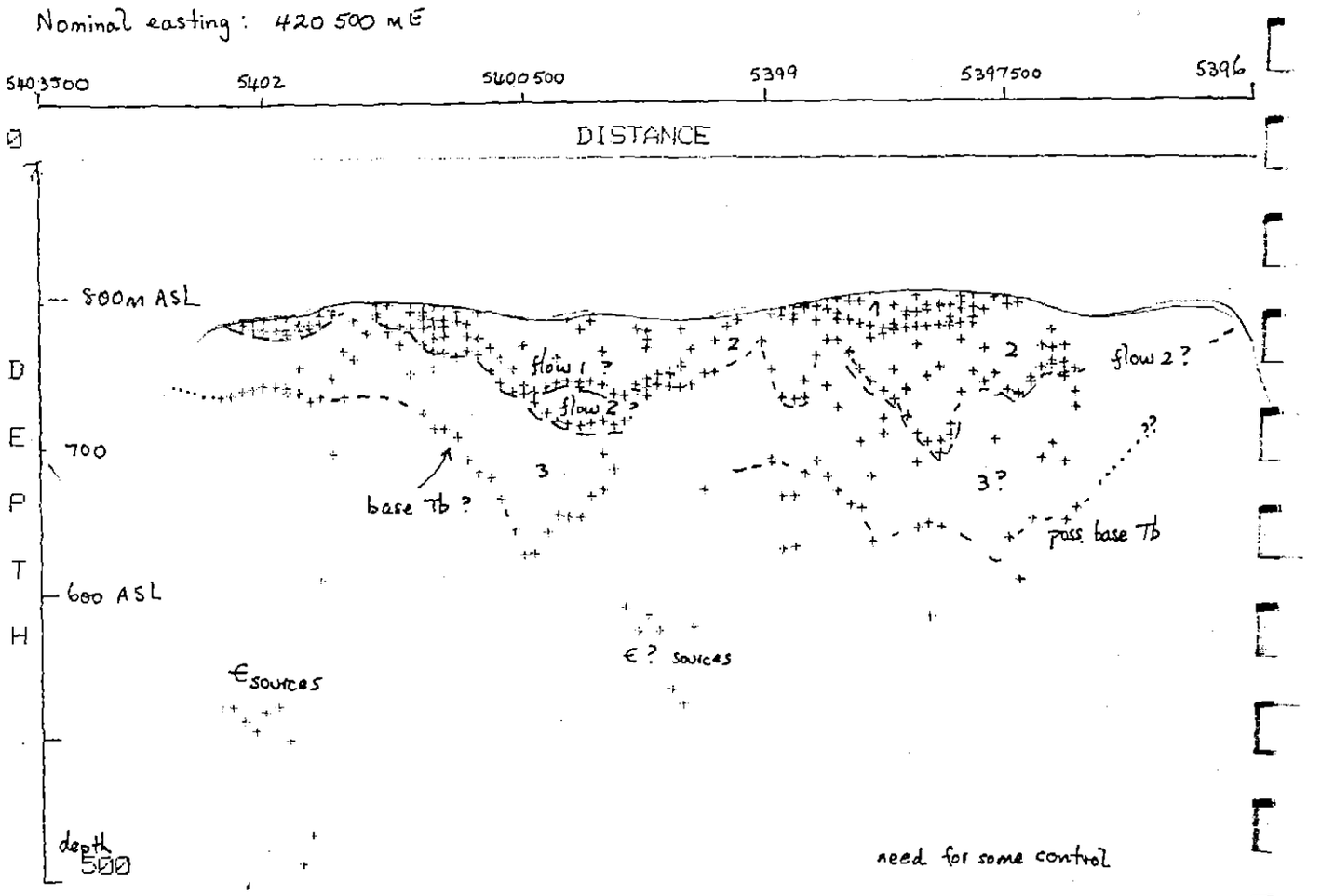
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FIGURE 22

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708405

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MAGNETIC DEPTH ESTIMATE PLOT

B:D5520H64
BASALT DEPTH ESTIMATES LONG PROPERTY OPERATOR (64) 5520

Aug 88

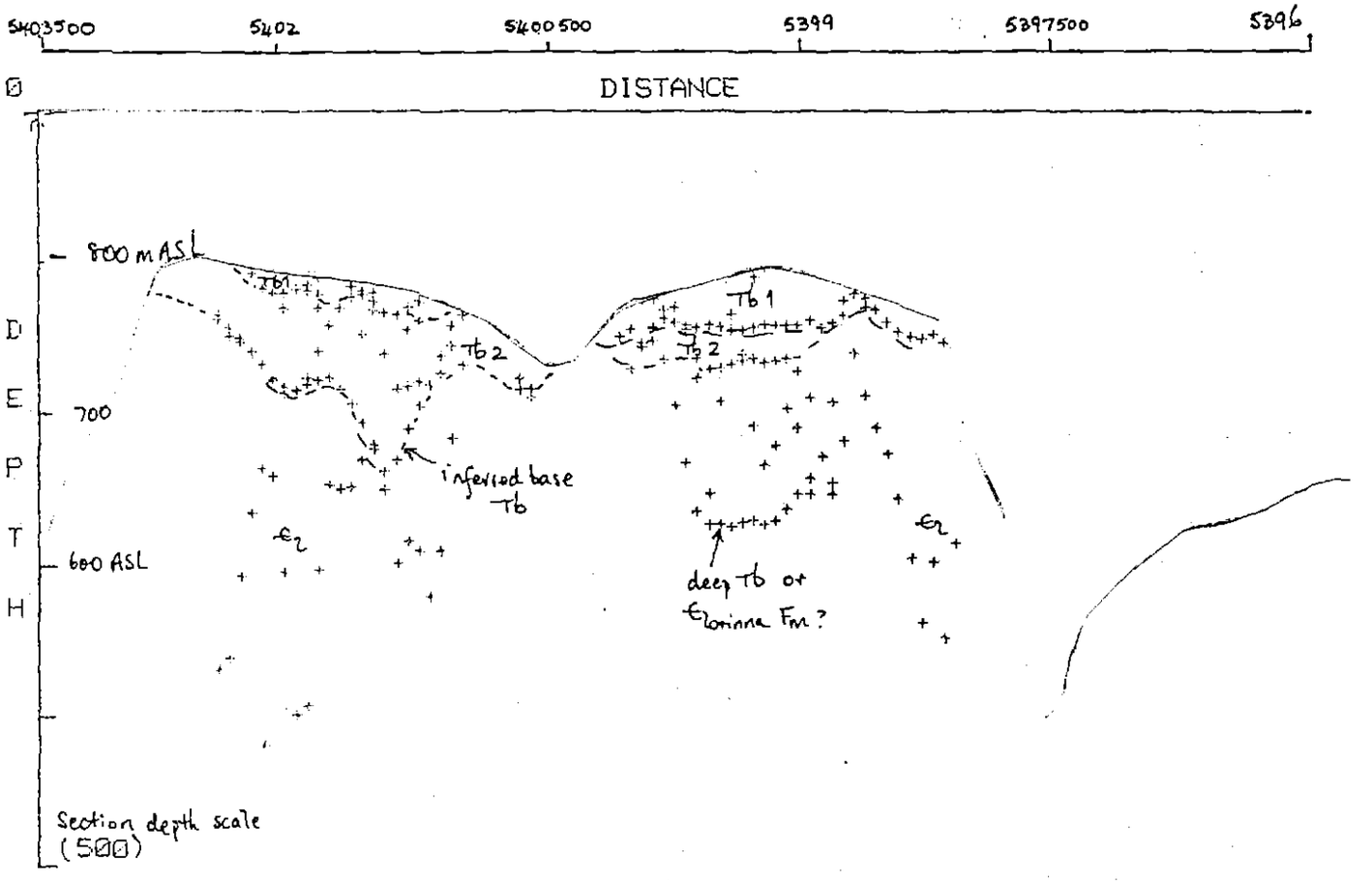
FIGURE 23

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Nominal easting : 421500 mE



MAGNETIC DEPTH ESTIMATE PLOT

B:D5560H64
BASALT DEPTH ESTIMATES LONG PROPERTY OPERATOR (64)

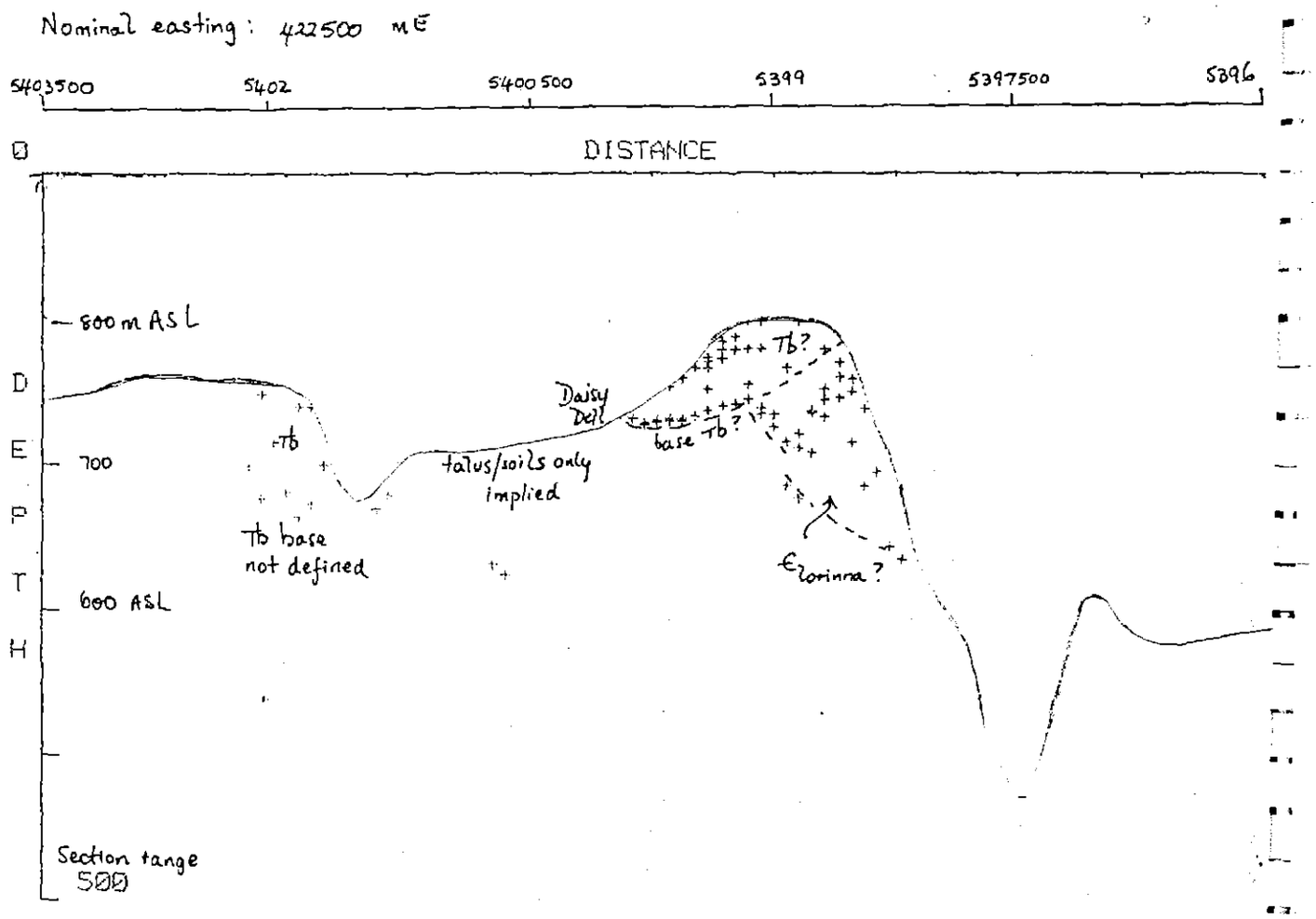
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FIGURE 24

708407

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MAGNETIC DEPTH ESTIMATE PLOT

B:D5600H64
BASALT DEPTH ESTIMATES LONG PROPERTY OPERATOR (64) 5600

Aug 88

FIGURE 25

412

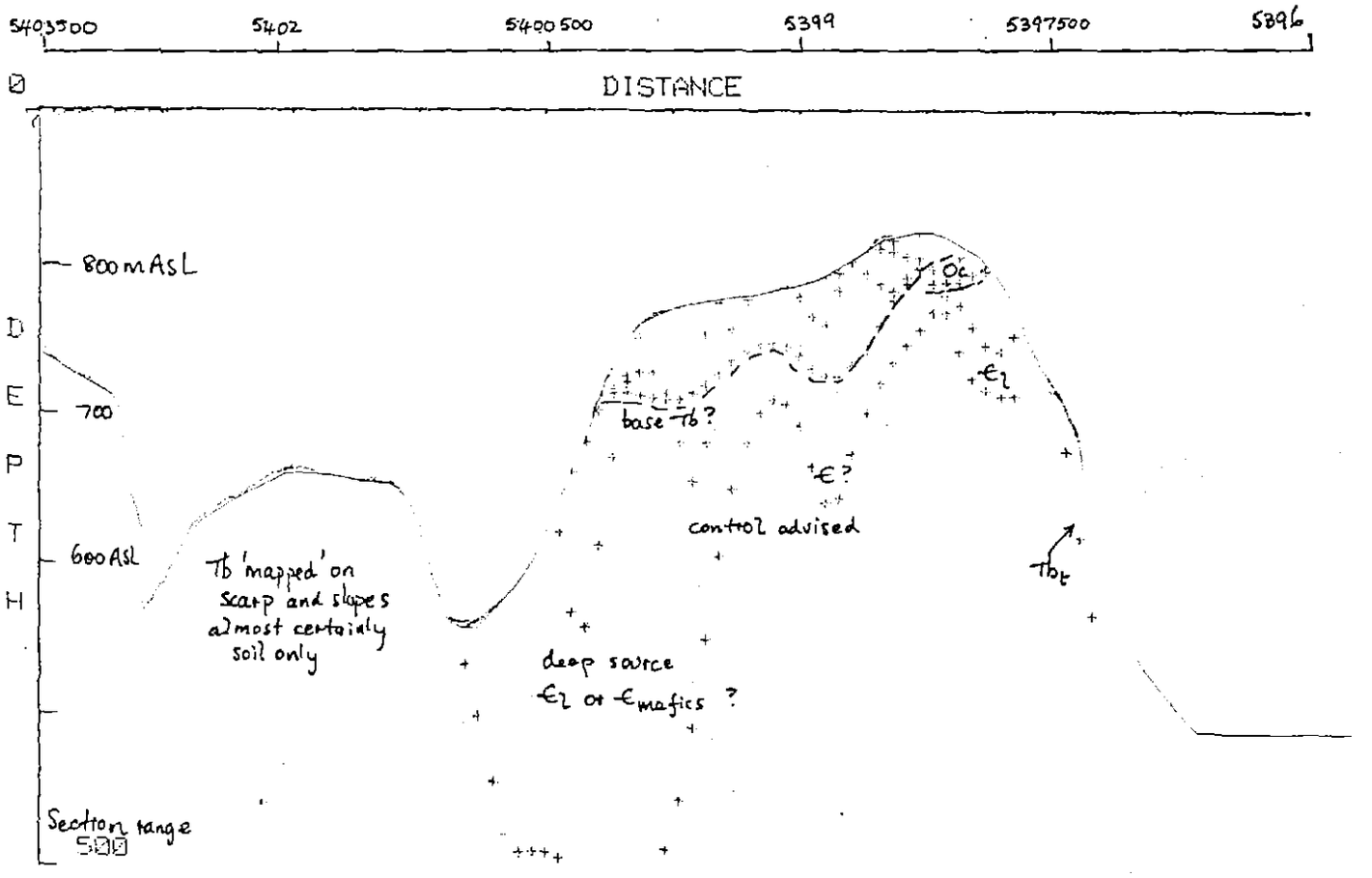
708408

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TELEPHONE: (002) 24 0319

Nominal easting : 423500 mE



MAGNETIC DEPTH ESTIMATE PLOT

B:D5640H64
BASALT DEPTH ESTIMATES LONG PROPERTY OPERATOR (64) 5640

Aug 88

FIGURE 26

708409

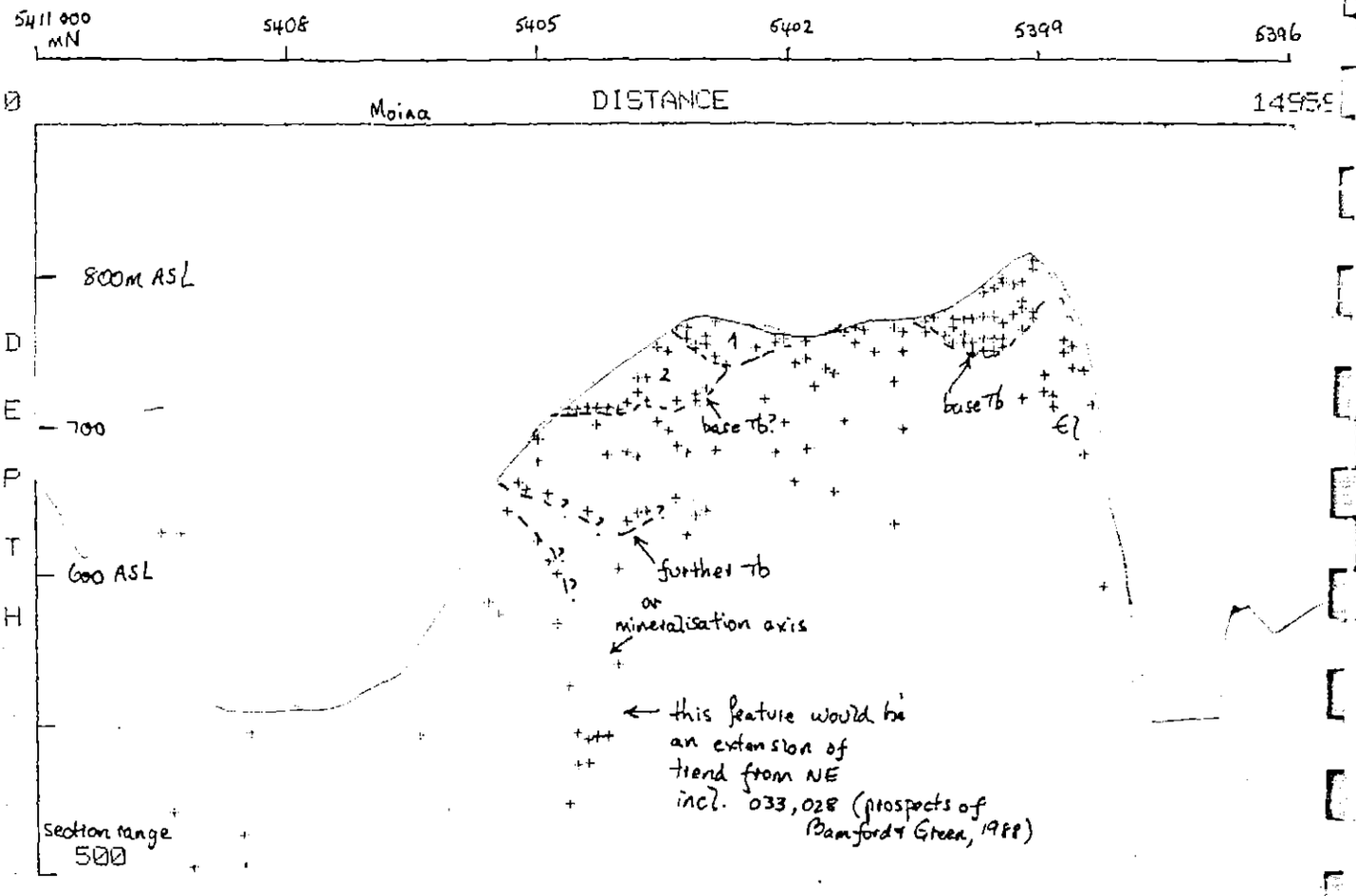
413

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TELEPHONE: (002) 24 0319

Nominal easting: 422500 mE



MAGNETIC DEPTH ESTIMATE PLOT

B:BD9L5600
BASALT DEPTH ESTIMATES 5600 LONG OPERATOR 64BY3

Aug 88

FIGURE 2

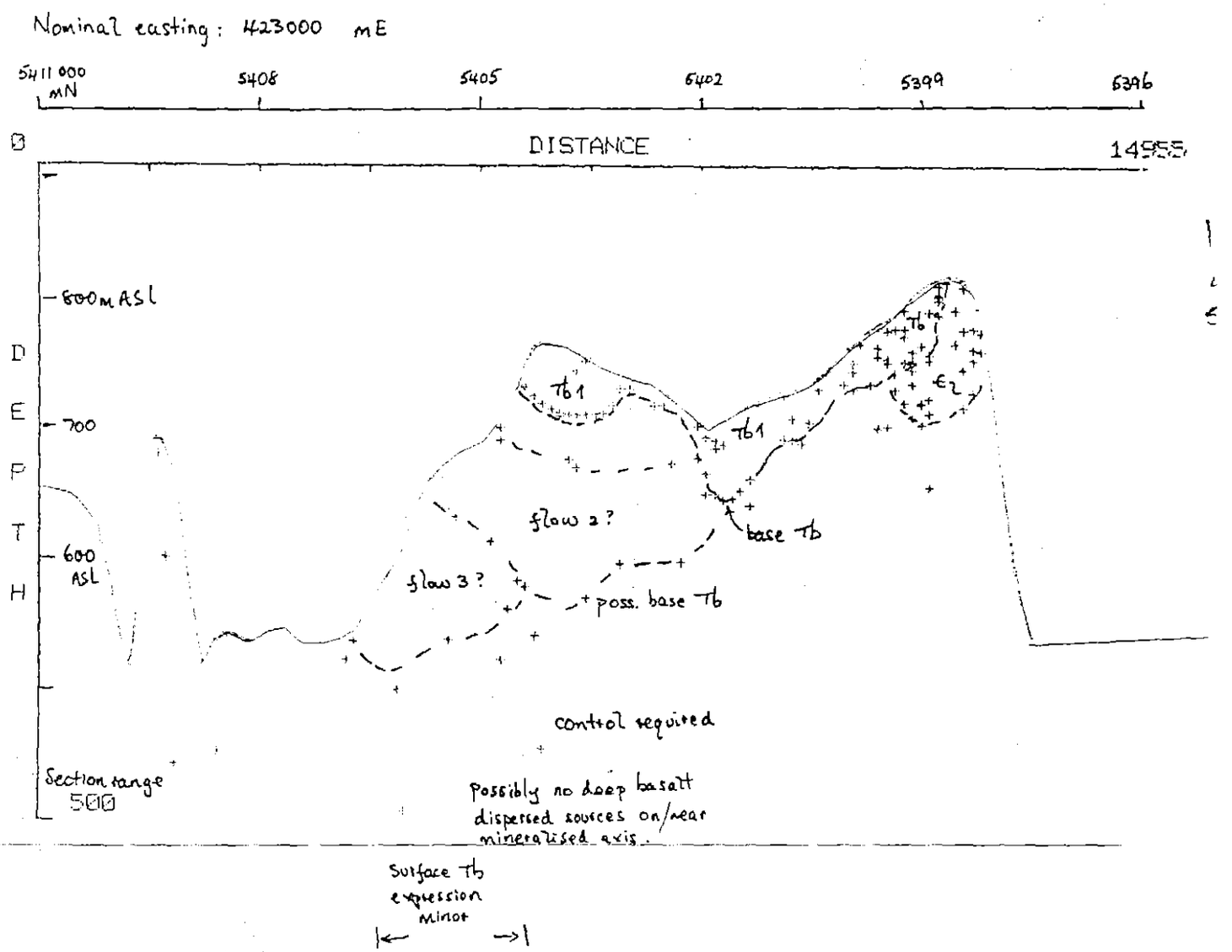
414

708410

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MAGNETIC DEPTH ESTIMATE PLOT

B:BD9L5620
BASALT DEPTH ESTIMATES 5620 LONG OPERATOR 64/3

Aug 88

FIGURE 28

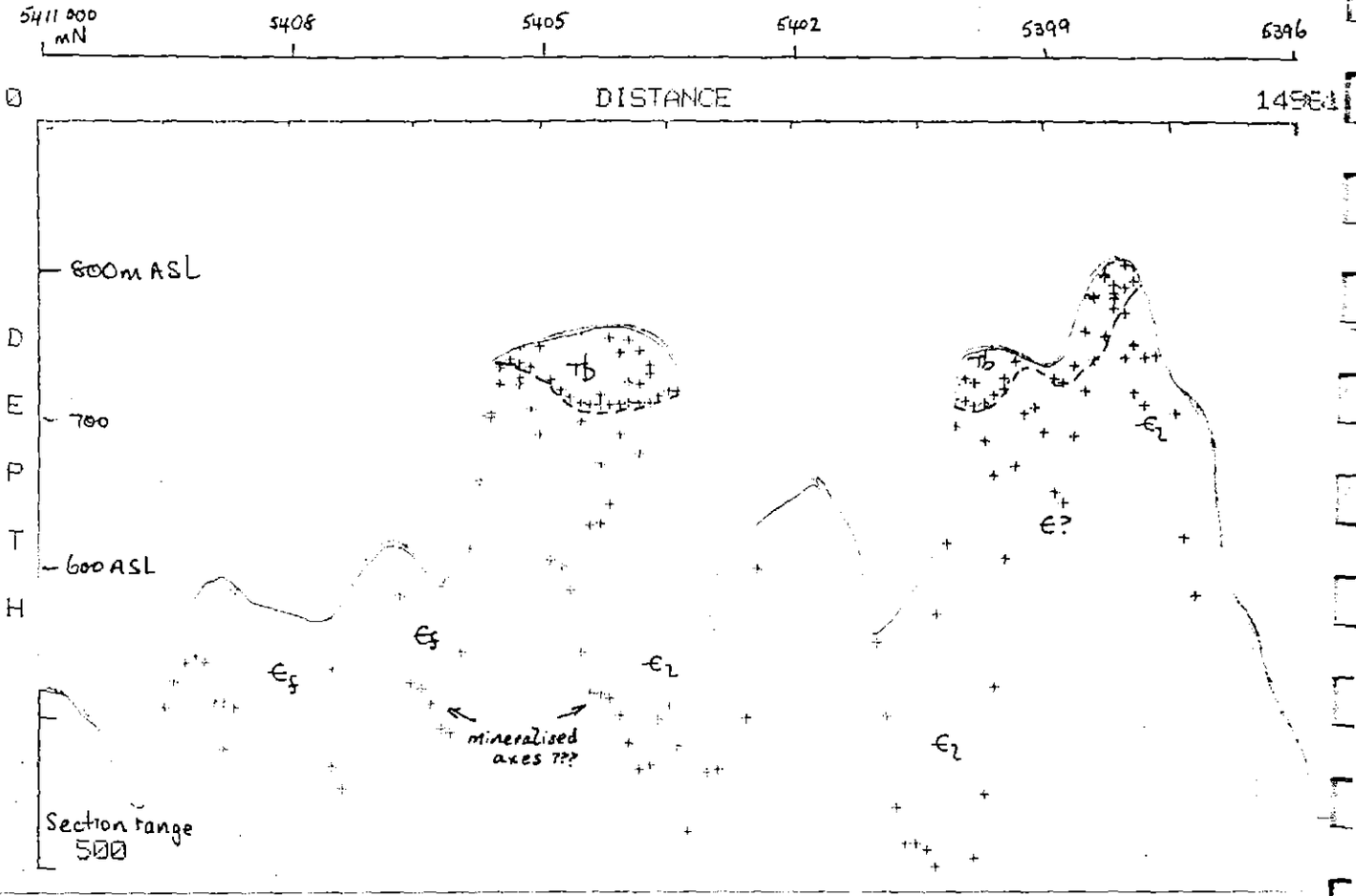
708411

415 LEAMAN GEOPHYSICS

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Specialties:- Gravity, Magnetics, Seismic Methods

Registered Office:
21 Zomay Ave, Dynnyrne, Tas 7005
All Correspondence to:
G.P.O. BOX 320 D, HOBART, TAS. 7001.
TELEPHONE: (002) 24 0319

Nominal easting: 423500 mE



MAGNETIC DEPTH ESTIMATE PLOT

B:BD9L5640
BASALT DEPTH ESTIMATES 5640 LONG OPERATOR 64/3

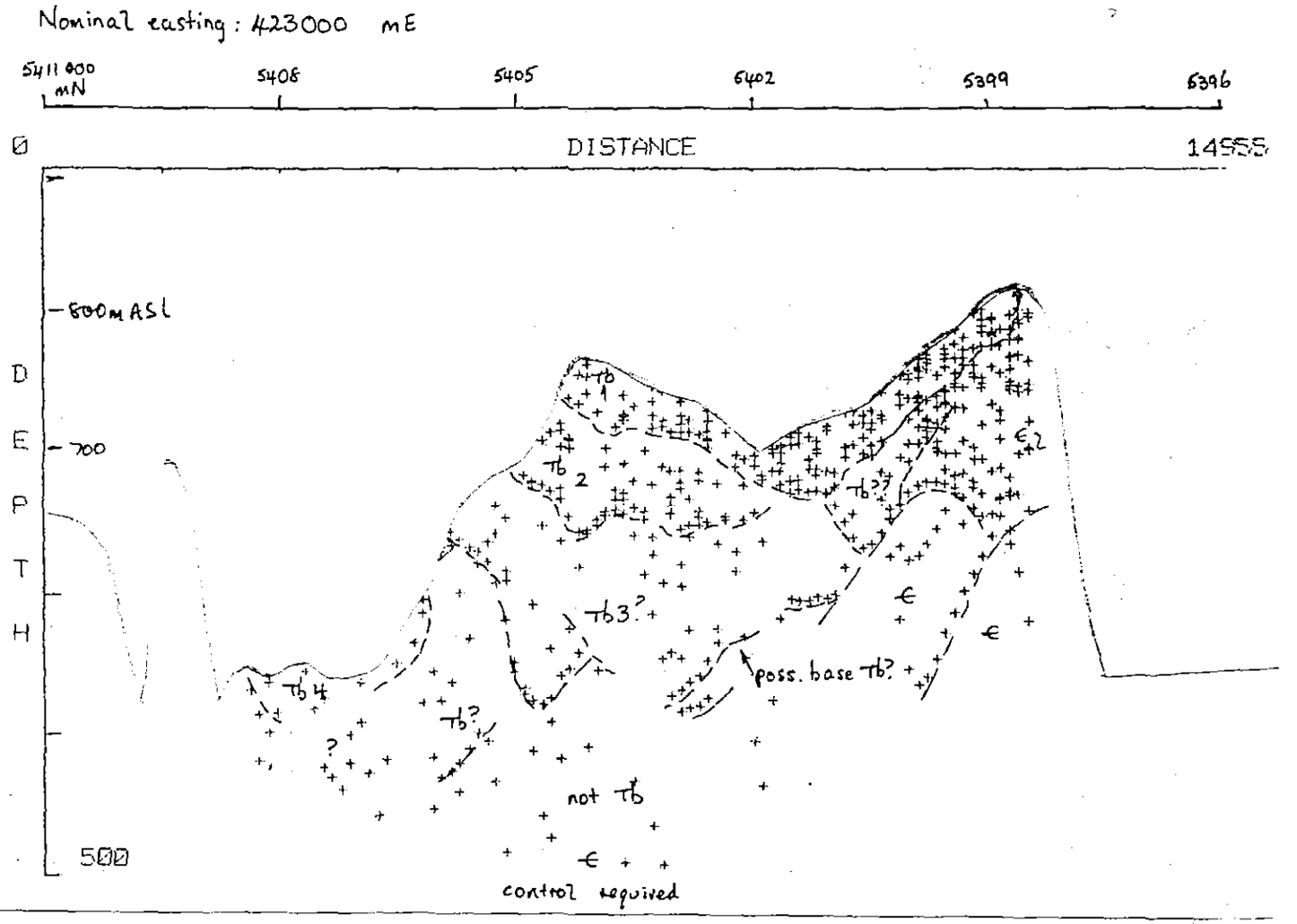
Aug 88

FIGURE 29

416 LEAMAN GEOPHYSICS
Survey Review, Specification, Reduction, Interpretation
Wide Experience Most Methods
Specialties:- Gravity, Magnetics, Seismic Methods

Registered Office:
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All Correspondence to:
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708412



MAGNETIC DEPTH ESTIMATE PLOT

B:BD9L5620
BASALT DEPTH ESTIMATES 5620 VERY LONG OPERATOR 128/3

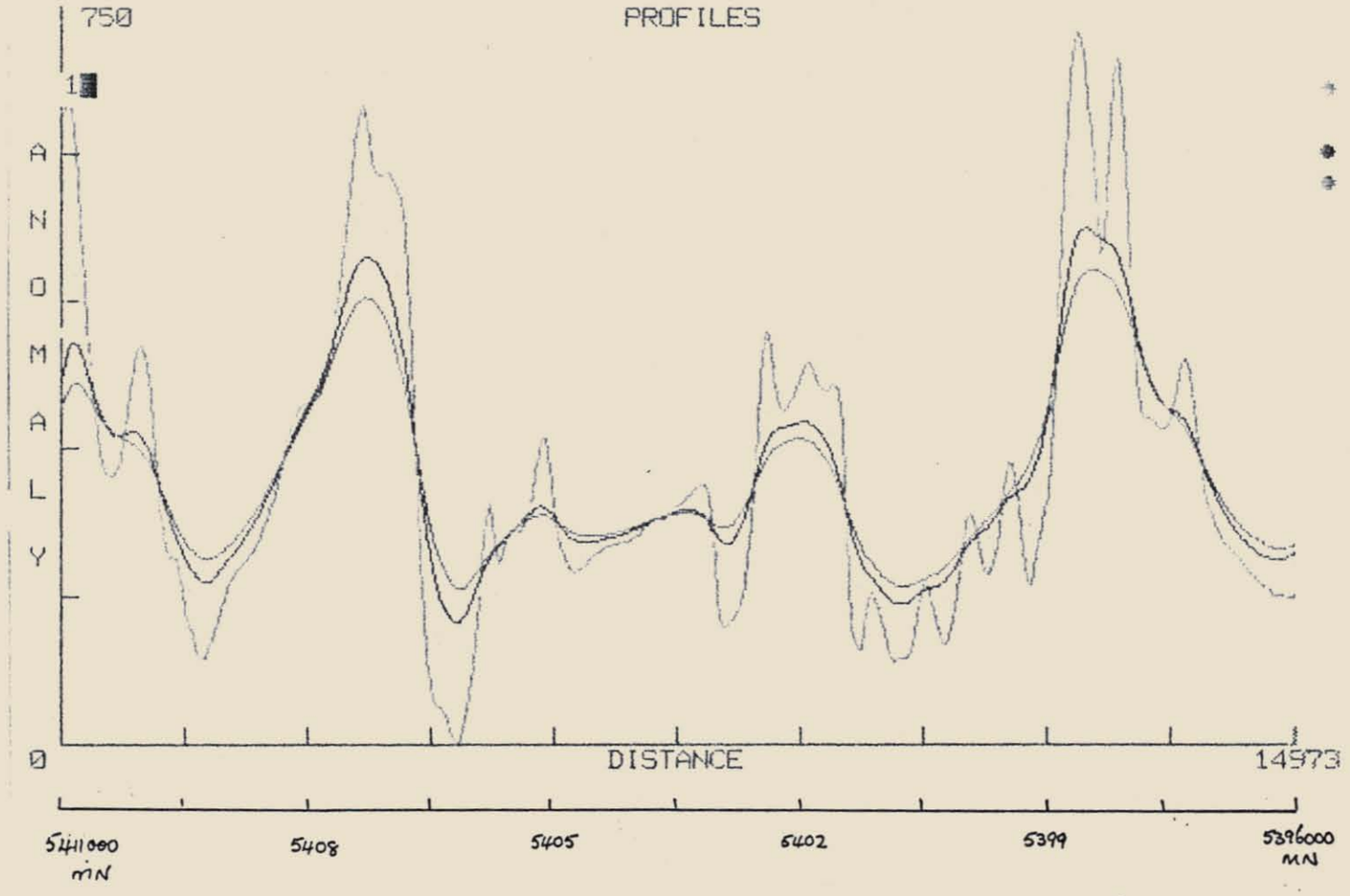
Aug 88

FIGURE 30

417 LEAMAN GEOPHYSICS
Survey Review, Specification, Reduction, Interpretation
Wide Experience Most Methods
Specialties:- Gravity, Magnetics, Seismic Methods

Registered Office:
21 Zomay Ave, Dynnytne, Tas 7005
All Correspondence to:
G.P.O. BOX 320 D, HOBART, TAS. 7001.
TELEPHONE: (002) 24 0319

708413



1	B:M5460	MOINA PROJECT LINE 5460
2	B:M5460C1	MOINA MAGNETICS 5460 CONTINUED 100 M
3	B:M5460C2	MOINA MAGNETICS 5460 CONTINUED 200 M
4	B:M5460C3	MOINA MAGNETICS 5460 CONTINUED 300 M

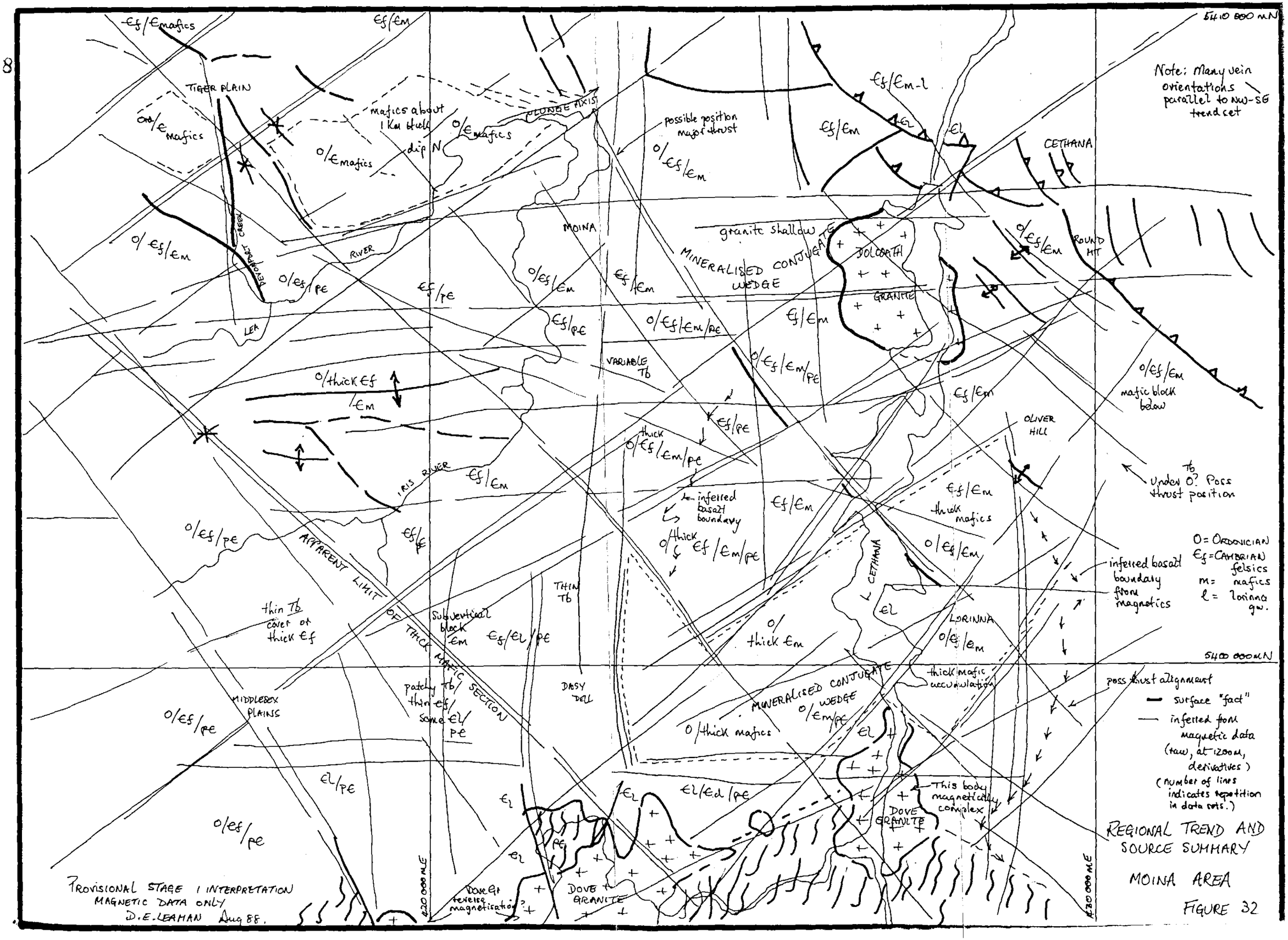
ZERO SHIFT : 211.3001

Aug 88

5460 : nominal easting 419000 mE

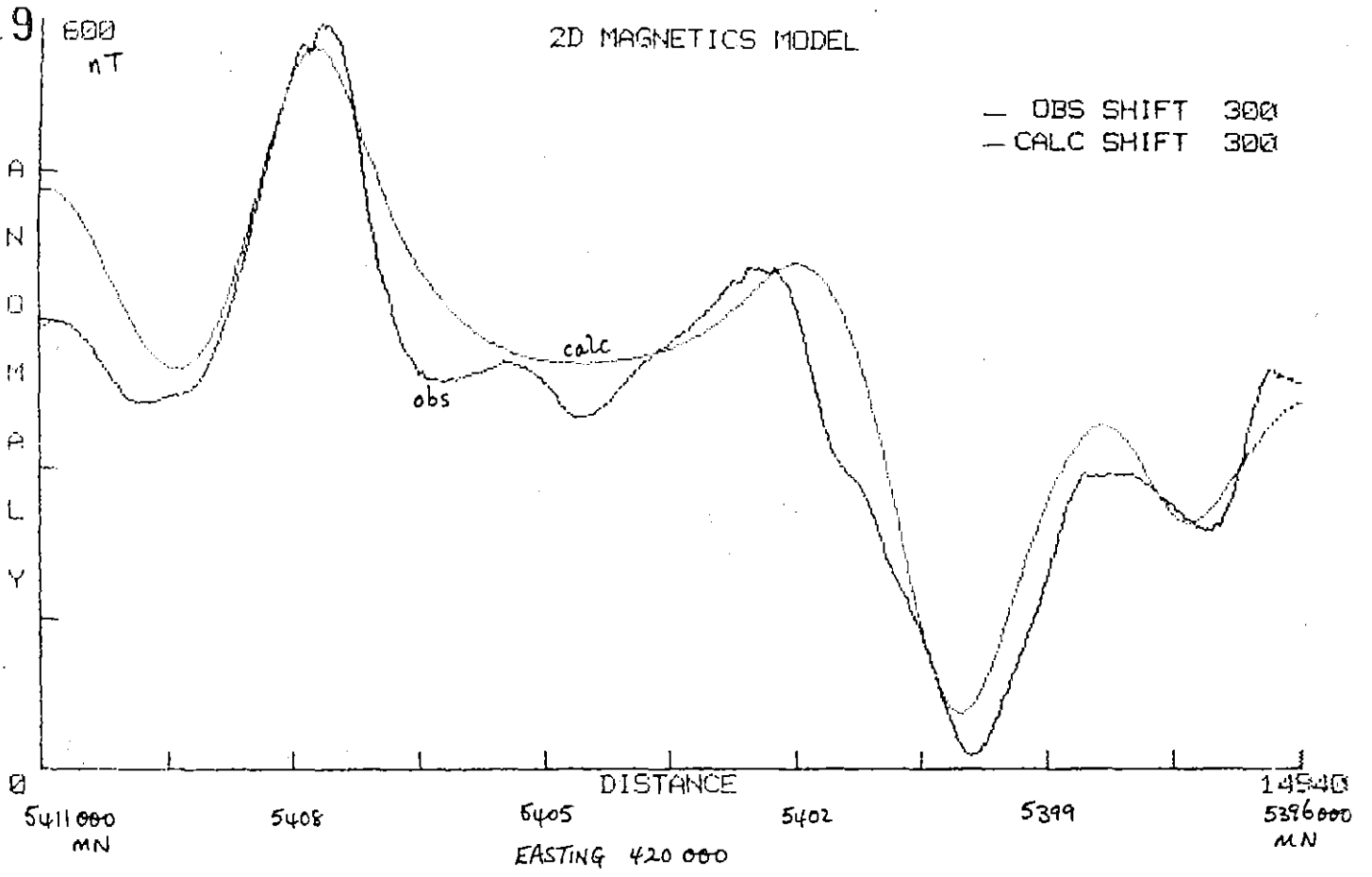
AEROMAGNETIC PROFILES based on 5460 with nominal clearance 100m

FIGURE 31

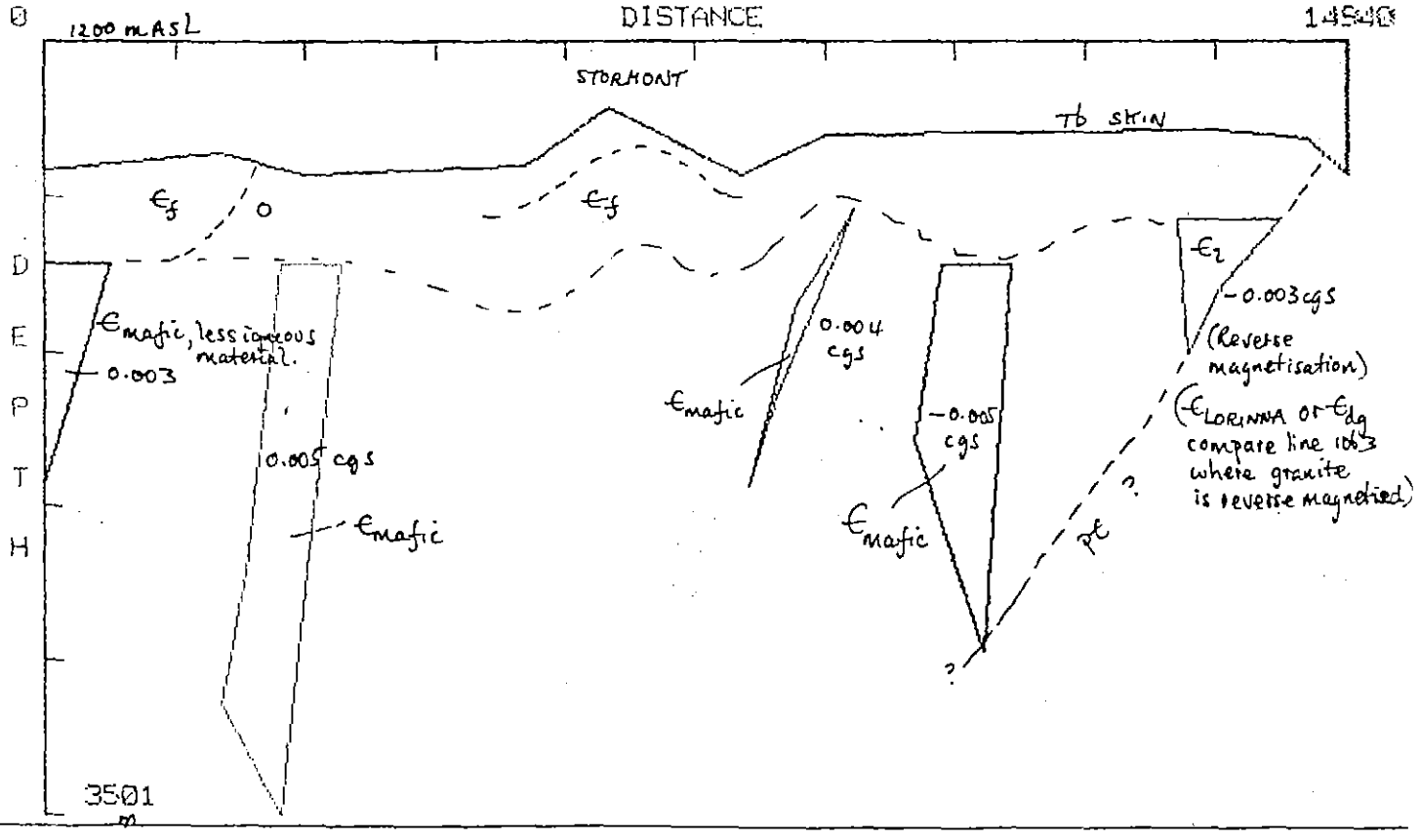

Ef/Emafics
Ef/Em
TIGER PLAIN
Om/Emafics
mafics about 1 Km thick
dip N
O/Emafics
CLONGE AXIS
possible position major thrust
O/Ef/Em
Ef/Em-l
Ef/Em
El
CETHANA
Note: Many vein orientations parallel to NW-SE trend set
BECKWART CREEK
RIVER
MOINA
granite shallow
MINERALISED CONJUGATE WEDGE
JOLGOPATH GRANITE
O/Ef/Em
ROUND HIT
O/Ef/Em
LEK
O/Ef/PE
Ef/PE
O/Ef/Em
Ef/Em
Ef/PE
O/Ef/Em/PE
Ef/Em
VARIABLE Tb
O/thick Ef /Em
O/Ef/Em/PE
Ef/Em
O/Ef/Em mafic block below
IRIS RIVER
Ef/Em
Ef/PE
thick O/Ef/Em/pe
Tb Under O? Poss thrust position
OLIVER HILL
inferred basalt boundary
Ef/Em thick mafics
Ef/Em
O/Ef/PE
APPARENT LIMIT OF THICK MAFICS SECTION
O/thick Ef/Em/PE
O/Ef/Em
CETHANA
inferred basalt boundary from magnetics
O= Ordovician
Ef=Cambrian felsics
m= mafics
l= Lorinna gp.
thin Tb cover of thick Ef
Subvertical block Em
Ef/El/PE
THIN Tb
El
LORINNA
O/ thick Em
O/Em
5400 000mN
thick mafic accumulation
MIDDLESEX PLAINS
patchy Tb/ thin Ef/ some El/ PE
DASY DELL
MINERALISED CONJUGATE WEDGE
O/Em/PE
poss thrust alignment
surface "fact"
inferred from magnetic data (raw, at 1200m, derivatives)
(number of lines indicates repetition in data sets.)
O/Ef/PE
O/thick mafics
El
El/PE
El/Ed/PE
This body magnetically complex
El
El
DOVE GRANITE
PE
El
DOVE GRANITE
Dove Gr reverse magnetisation?
4200 000 mE
4300 000 mE
PROVISIONAL STAGE 1 INTERPRETATION
MAGNETIC DATA ONLY
D.E. LEAMAN Aug 88.
REGIONAL TREND AND SOURCE SUMMARY
MOINA AREA
FIGURE 32

LINE PARAMETERS - ORIGIN,LIMIT,INCR : 0 14940 35.65633

708415



MOINA 1200 M MAGNETICS LINE 5500 420E
ADJ K4=003 ADJ K6=-003 VAR 3 500M S



LEAMAN GEOPHYSICS
G.P.O. Box 320 D,
Hobart, Tasmania 7001

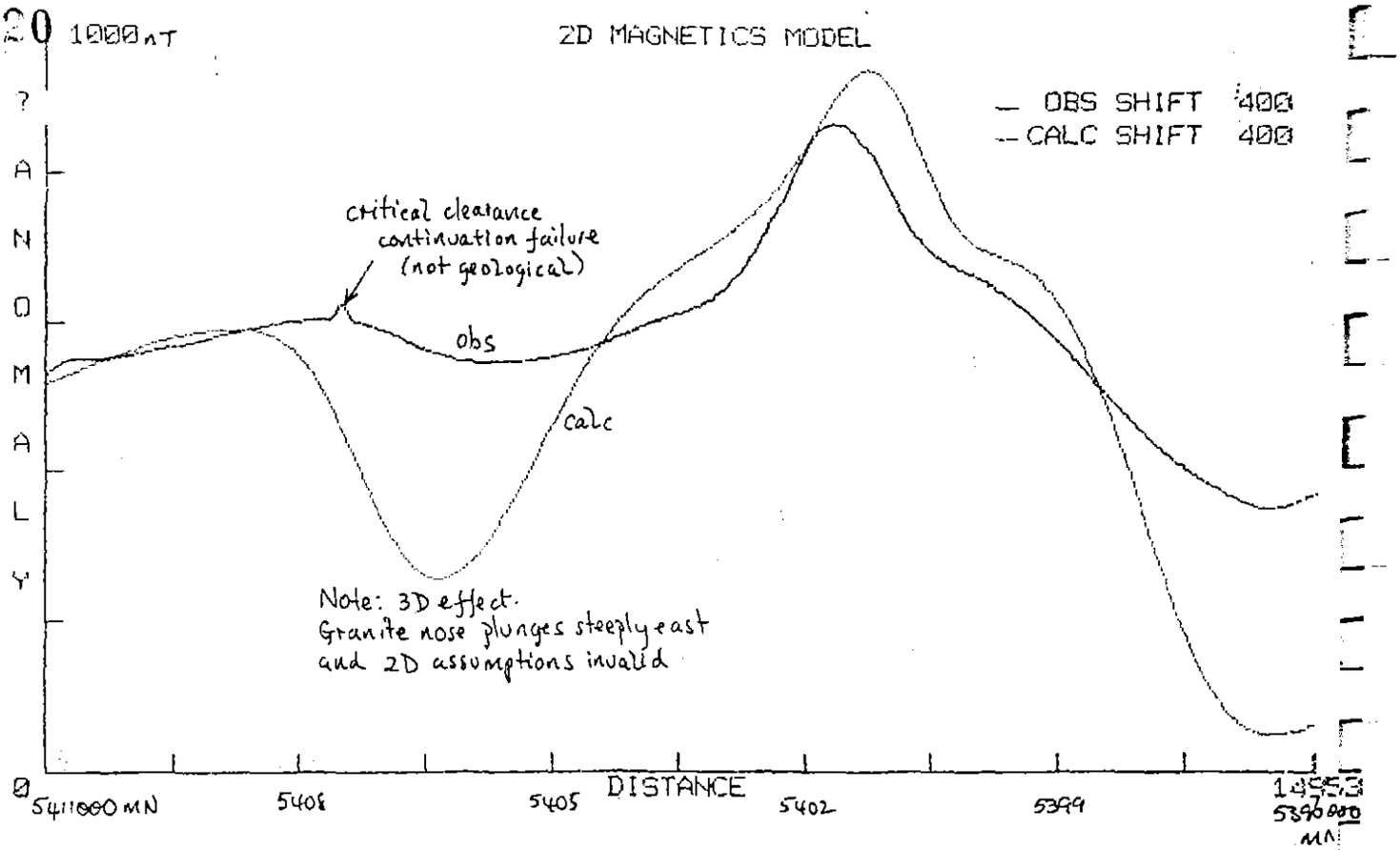
Aug 88

TEST MODEL : LINE 5500

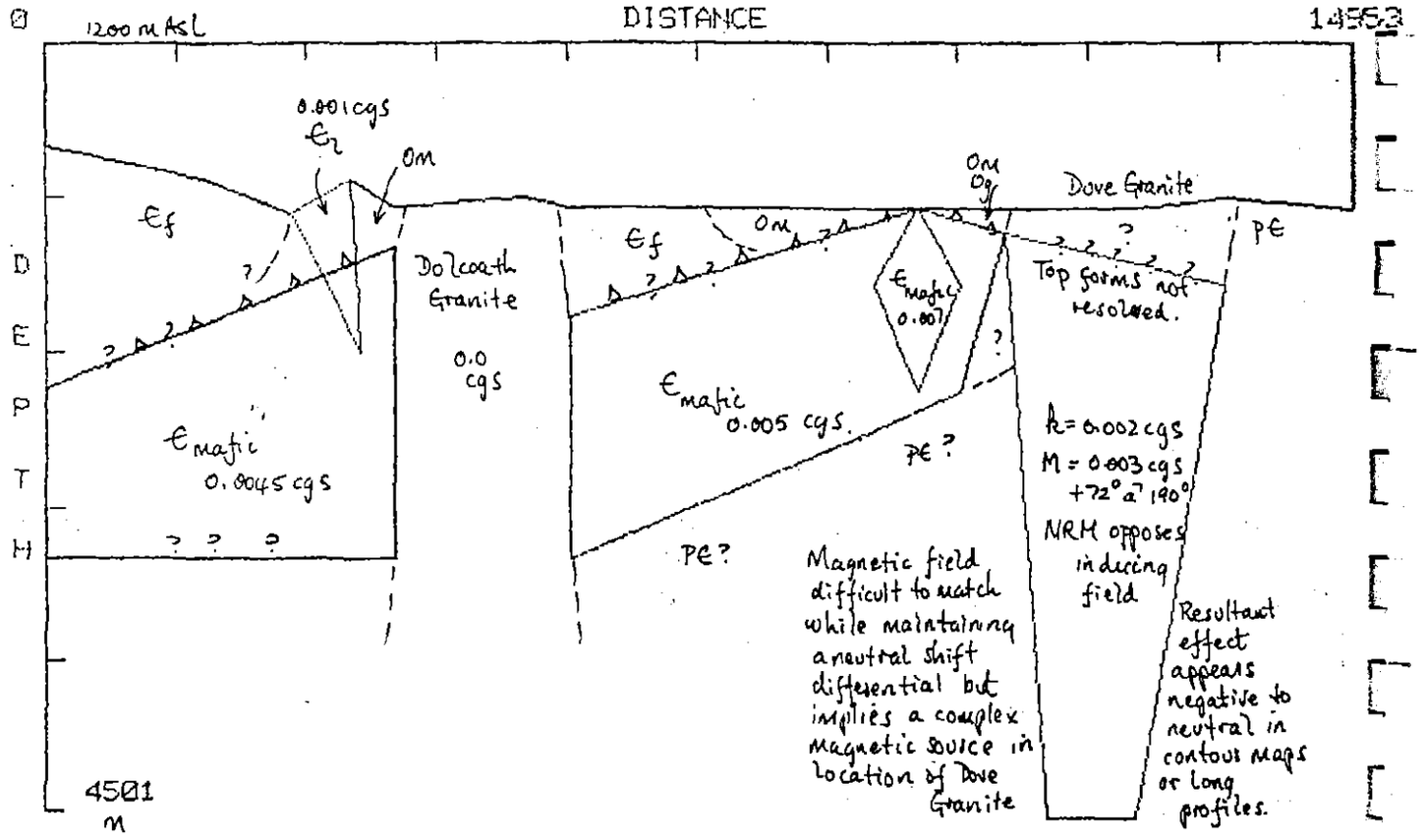
FIGURE 33

LINE PARAMETERS - ORIGIN,LIMIT,INCR : 0 14953 37.7601

708416



MOINA 1200 M MAGNETICS LINE 1063 427E
NRM7=0025



Aug 88

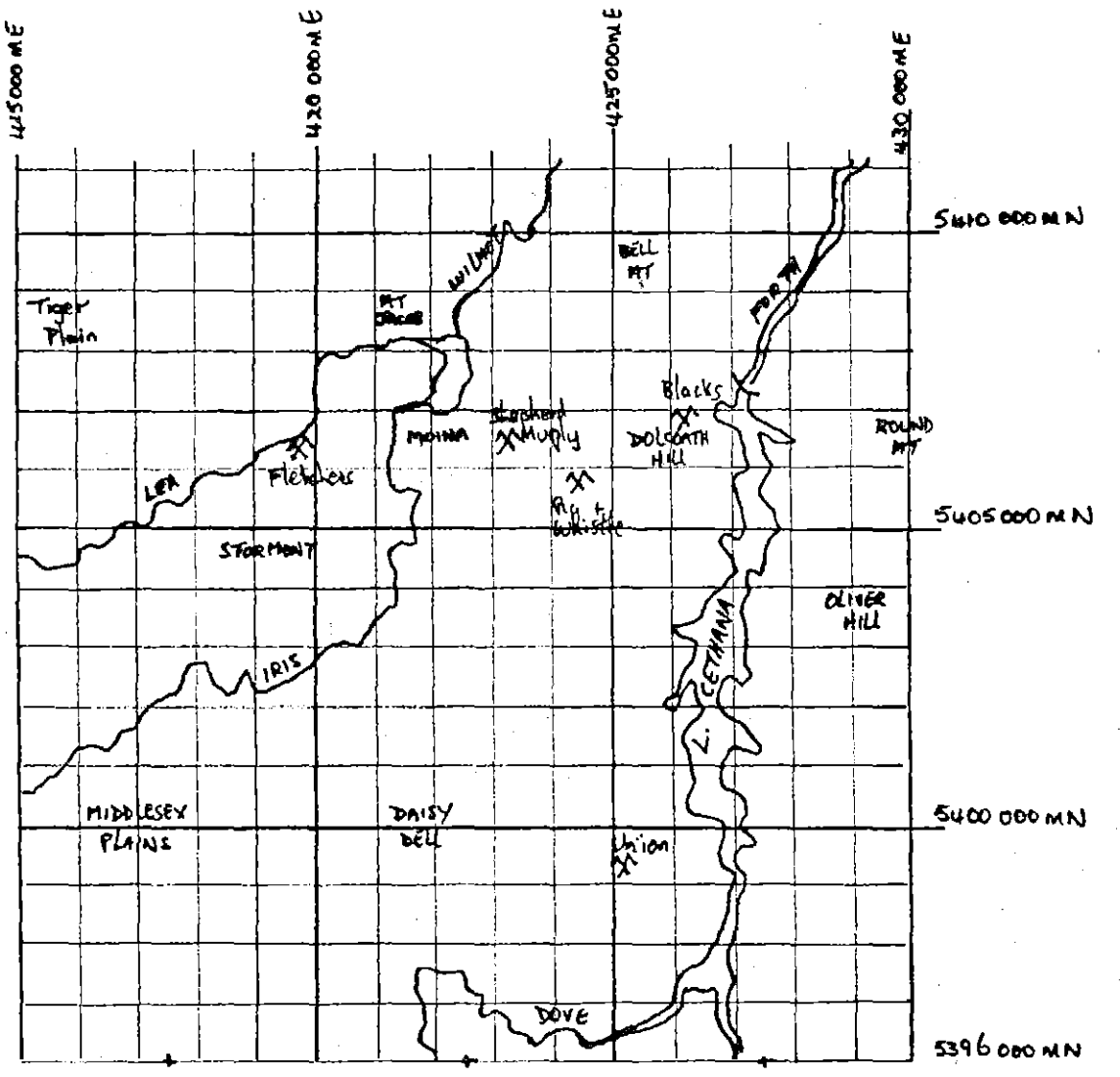
STRUCTURAL STYLE : LAKE CETHANA

TEST MODEL : LINE 1063

LEAMAN GEOPHYSICS
G.P.O. Box 320 D,
Hobart, Tasmania 7001

FIGURE 34

421



OVERLAY

MOINA MAGNETICS – COMPENSATED FIELD

For diagrams : Intensity at 1200m
First, Second derivatives at 1200m.

LEAMAN GEOPHYSICS
G.P.O. Box 320 D,
Hobart, Tasmania 7001

422

RGC EXPLORATION PTY. LIMITED

708418

E.L. 41/83 - LAKE LEA

ANNUAL REPORT - 1988

Volume 2 of 2

MINES
File Ref. E.L. 41/83
- 8 DEC 1988
Doc. Ref.
Action Officer | Initials
Refer to letter
Dated 6.12.88
Resubmit

OPEN FILE

By: M.J. Fleming
Senior Geologist
1988.

November, 1988.

Distribution: Department of Mines
RGC Exploration Pty. Ltd. (2)

RGC EXPLORATION PTY. LIMITED

423

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3.	Areas for Follow-up	1:25,000
4.	Land Tenure Map	1:25,000
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6.	E.L. 8/65 - Geophysical Compilation	1:25,000
7.	Lea 2-5 Lea River Grid - Interpretive & Factual Geology	1:5,000
8.	Lea 3-5 Lea River Grid - Interpretive & Factual Geology	1:5,000
9.	Stormont Bismuth Mine Area - Factual Geology	1:500
10.	Stormont Bismuth Mine Area - Factual Geology	1:1,000
11.	Lea 3-5 C4 Fletchers Adit Area - Factual Geology	1:1,000
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13.	Lea 2-5 Lea River Grid-Assays Au,Cu,Pb,Zn,Ag	1:5,000
14.	Lea 2-5 Lea River Grid-Assays Bi,Mo,As,Sn,W	1:5,000
15.	Lea 3-5 Lea River Grid-Assays Au,Cu,Pb,Zn,Ag	1:5,000
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20.	Lea River Total Field Line 3000W - Truncated	
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23.	Lea River Line 3100W (Detailed - Truncated) 1450S-1650S	
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RGC EXPLORATION PTY. LIMITED

FIGURES

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RGC EXPLORATION PTY. LIMITED

FIGURES

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52.	FD7 Drill Hole Plot (Appendix 3)	1:500
53.	FD8 Drill Hole Plot (Appendix 3)	1:500
54.	FD9 Drill Hole Plot (Appendix 3)	1:500
55.	SD1 Drill Hole Plot (Appendix 3)	1:500
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RGC EXPLORATION PTY. LIMITED
(INC. IN N.S.W.)

LAKE LEA - E.L.41/83
FACTUAL AND INTERPRETIVE REGIONAL GEOLOGY

426	COMPILED	M.F.
	DRAWN	T.G.D.S.
	DATE	Oct. 1988
	CHECKED	
	1:25,000 REFERENCE	LEA

BASE PLAN No.

OVERLAY PLAN No.

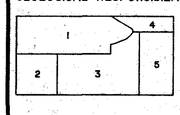
SCALE 1:25000 (100 50 0 50 100 150 200 METRES)

FIG. 2

708422

LEGEND

GEOLOGICAL RESPONSIBILITY DIAGRAM



1. Burnie 1:250,000 sheet :D.B.Seymourm, R.P. unpublished mapping
2. Mackintosh 1 mile sheet
3. Geopeko mapping (1978-1982)
4. Comalco mapping (Weste, 1978)
5. R.Poltock and R.Roberts

5 cm

TERTIARY

- Tb — Basalt, locally underlain by greyblly
- Tb/Og — Basalt over interpreted Gordon Limestone

ORDOVICIAN

- Og — Gordon Limestone
- Om/Oo — Moina Sandstone/Owen Conglomerate undifferentiated. Predominantly bioturbated sandstone

CAMBRIAN

- €j — Volcanoclastic Conglomerate - Jukes equivalent(?)
- €q — Quartz phyric volcanics
- €t — Fine-medium grained volcaniclastics, clastics
- €l — Rhyolite - dacite volcanics, probably lavas
- €a — Andesite lavas
- €p — Quartz - feldspar - biotite porphyry, partly intrusive, local sericitic alteration
- €u — Undifferentiated volcanics and sediments

CULTURE

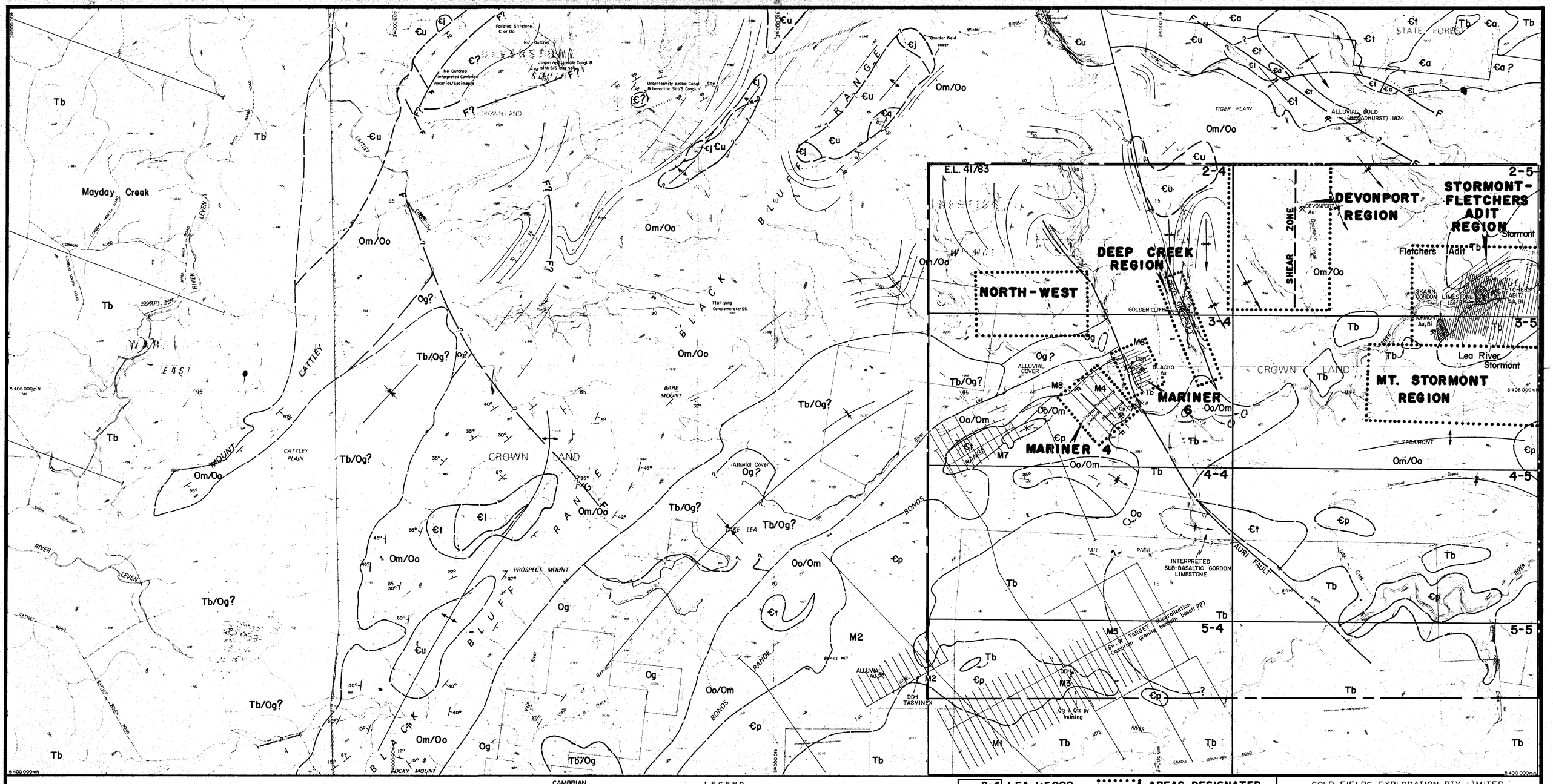
- Diamond drill hole
- 30 — Strike with dip of bedding
- Bedding trend line
- Anticline
- Syncline

GRID CONVERGENCE 1.0°

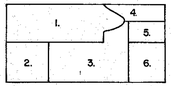
GRID/MAGNETIC 11.6°

INDEX TO ADJOINING SHEETS

GUILDFORD	LOONGANA	WILMONT
PEARSE	LEA	CETHANA
CHARTER	PENCIL PINE	LIENA



GEOLOGICAL RESPONSIBILITY DIAGRAM



1. Burnie 1:250,000 sheet ; D.B. Seymour, R.P. unpublished mapping
2. Mackintosh 1 mile sheet
3. Geopeko mapping (1978-1982)
4. Comalco mapping (Weste, 1978)
5. Sheffield 1 mile sheet, R.P. unpublished mapping
6. Middlesex 1 mile sheet, R.P. unpublished mapping

LEGEND

TERTIARY

- Tb — Basalt, locally underlain by greybilly
- Tb/Og — Basalt over interpreted Gordon Limestone

ORDOVICIAN

- Og — Gordon Limestone
- Om/Oo — Moina Sandstone/Owen Conglomerate undifferentiated. Predominantly bioturbated sandstone

CAMBRIAN

- €j — Volcanoclastic Conglomerate – Jukes Equivalent(?)
- €q — Quartz phyric volcanics
- €t — Fine-medium grained volcaniclastics, clastics
- €l — Rhyolite-dacite volcanics, probably lavas
- €a — Andesite lavas
- €p — Quartz-feldspar-biotite porphyry, partly intrusive, local sericitic alteration
- €u — Undifferentiated volcanics and sediments

ALTERATION

- Magnetite, garnet skarns
- Silicification with corundum sericite-specularite alteration

5 cm

CULTURE

- Grid Lines
- M1 : Mariner 1 (Geopeko grid)
- Diamond drill hole
- 30° Strike with dip of bedding
- Bedding trend line
- Anticline — Syncline
- BLACKS Au — Old mines and prospects, name and contained metals
- Fault with movement shown
- Possible margin of concealed granite cupola

2-4 LEA 1:5000 SHEETS

AREAS DESIGNATED FOR FOLLOW-UP

708423

427

GOLD FIELDS EXPLORATION PTY. LIMITED

E.L. 41/83

LAKE LEA AREA

FACTUAL AND INTERPRETIVE GEOLOGY WITH AREAS FOR FOLLOW-UP

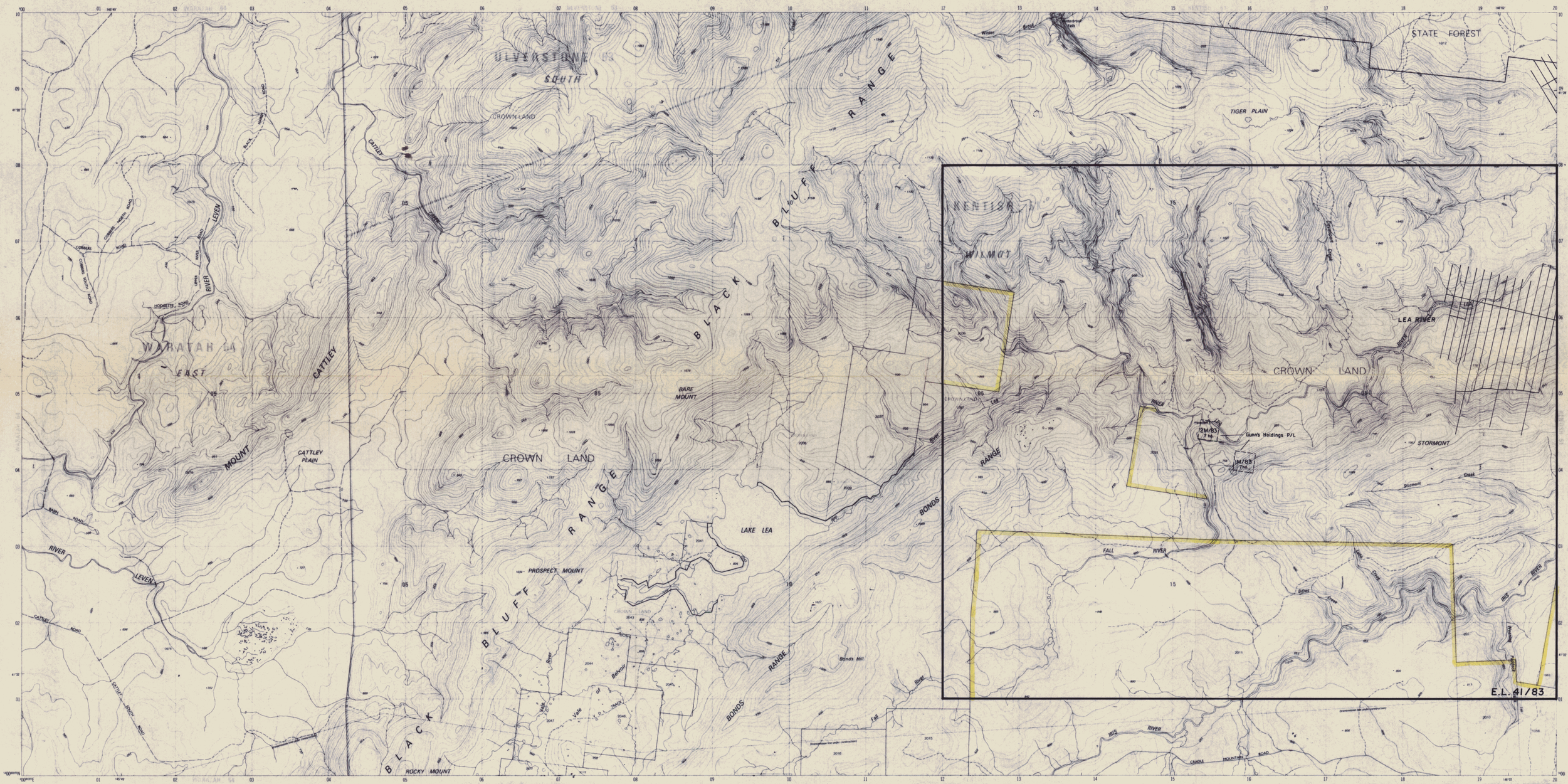
SCALE 1:25000 (500 0 500 1000 METRES)

DRAWN BY	R.P.
DRAFTSMAN TGDS/S.F	
DATE	Nov. 1988
REVISIONS	
R.P/D.S.-Oct.85	
R.R. - DEC. 86	
FILE NO.	
FIG.	3

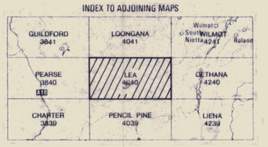
TASMANIA 1:25 000 SERIES

LEA

SHEET 4040 EDITION 1 1984



INDEX TO ADJOINING MAPS



5 cm

88-2888

RGC EXPLORATION PTY. LIMITED

708424

LAKE LEA - E.L.41/83

LAND TENURE

428 MAP

DRAWN BY	P.R.
DRAFTSMAN	S.F.
DATE	Nov. '88
REVISIONS	Sept.'85
FILE NO.	
FIG.	4

SCALE 1:25000 500 0 500 1000 METRES

Fletchers Adit - Stormont Mine Area (Westerly Extension Sheet)
Grid lines cut to extend coverage. B horizon soil sampling with basalt having a Cu,Zn signature. Bi anomalies around Stormont Mine. Grid extensions recommended (Reid:69).
Fletchers Adit grid : Two Bi anomalies from soil traverse. Main gossany (max. 680ppm) coincident with AIBA3 I.P. trends.
Rock sampling at workings and dozed areas gave anomalous Bi. Recommends trenching to bedrock in dozed areas for percussion drilling (Dandy'70).
Grid cut over Stormont area. Soil sampling returned anomalous Bi. Recommended no further work as indicated tonnages are too small (McKibben'71).

Followup "B" horizon soil sampling for Bi (Reid'67) suggested resampling at 100' intervals

Bi <100

Lea River area requires additional investigation (Reid'67)
?Zn&Cu anomalies

③ Cu,Zn&Sn anomalies

KEY

S279 Sample No.
>140 Zinc
>28 Copper
>25 Tin

② Areas designated for follow-up work.
½ mile (~400m) sample interval.

PROGRESS REPORT TO JUNE 1967
K.O. REID

Follow-up sampling of the "B" horizon.
Pitting at depths up to 4ft.
Fletchers Adit area - AAS analysis for Bi.
Visible Bi in workings above Fletchers Adit initiated follow-up soil sampling.

5 cm

PROGRESS REPORT TO MARCH 1969
M.J. FOSTER

New grid cut with soil sampling of "B" horizon for Cu, Zn and Bi - uninformative.
800ft trenches over K. Reids Bi anomaly - not yet sampled.
Bismuthinite observed in skarn and quartzite?
Recommends sampling of trenches and then cutting them down to bedrock.

ANNUAL REPORT MOINA AREA 1969 - 70
B.C. DANDY

New grid cut over Fletchers Adit area, recommended by Compagnie General De Geophysique (G. Omnes C.G.G.)
Stormont Bismuth Mine - existing grid should be extended with soil and mag. surveys.

GRID CONVERGENCE 1.0°
GN TN MN
GRID/MAGNETIC 11.6°

INDEX TO ADJOINING SHEETS

GUILDFORD	LOONGANA	WILMONT
PEARSE	LEA	CETHANA
CHARTER	PENCIL PINE	LIENA

7084425

RGC EXPLORATION PTY. LIMITED
(INC. IN N.S.W.)

COMPILED	M.F.
DRAWN	T.G.D.S.
DATE	Oct. 1988
CHECKED	
1:25,000 REFERENCE	LEA

LAKE LEA - E.L. 41/83
E.L. 8/65 * 7847
GEOCHEMICAL COMPILATION

BASE PLAN No.
OVERLAY PLAN No.

SCALE 1:25000 100 50 0 50 100 150 200 METRES

FIG. 5

Fletchers Adit - Stormont Mine Area
(Western Extension Sheet)
Grid cut to extend soil geochem with groundmag & VHEM coverage - not ensuring.
Recommended extensions to the grid (Foster '69)
Blue Grid - resistivity - conductive axis SE-NW maybe due to shear zones (I.P. - 3 anomalous zones (chargeability zones trend SE-NW with no correlation with mag. or resistivity. Weak I.P. anomaly correlates with BI anomaly. SP and radiometrics no response.
No further geophysics recommended (Dondy '70).
Grid cut over Stormont Area. Ground mag. gave major response from Stormont West (on Castle Ck.). No further work recommended - indicated tonnages too small (McKibben '71).

Electromag survey over the BI anomaly recommended (Reid '67)

TREND T

34 At the end of trend T to the east which is surrounded by Sn, Cu&Zn anomalism (Reid '67)

KEY

•36 Magnetic anomaly high

Magnetic trends

PROGRESS REPORT TO MARCH 1969
M.J. FOSTER

Cut grid. Considers a positive distortion of EM at line 17W/4250S related to the Fletchers Adit Fault(?). Stormont fault expressed on VHEM profile. VHEM (Vertical loop — in — line method with separation of 300ft).

ANNUAL REPORT MOINA AREA 1969 – 70
B.C. DANDY

New grid cut, recommended by CGG.

88-2888

5 cm

GRID CONVERGENCE 1.0°

TN GN MN

GRID/MAGNETIC 11.6°

INDEX TO ADJOINING SHEETS

GUILDFORD	LOONGANA	WILMONT
PEARSE	LEA	CETHANA
CHARTER	PENCIL PINE	LIENA

7084426

RGC EXPLORATION PTY. LIMITED
(INC. IN N.S.W.)

7848	COMPILED	M.F.
	DRAWN	T.G.D.S.
	DATE	Oct. 1988
	CHECKED	
	1:25,000 REFERENCE	LEA

LAKE LEA - E.L. 41/83
E.L. 8/65
GEOPHYSICAL COMPILATION

BASE PLAN No.
OVERLAY PLAN No.

SCALE 1:25000 100 50 0 50 100 150 200 METRES

FIG. 6

s 408 000mN

416 000mE

417 000mE

418 000mE

419 000mE

420 000mE

DEVONPORT MINE

s 407 000mN

s 406 000mN

3900W 3400W 3300W 3200W 3100W 3000W 2900W 2800W 2700W 2600W 2500W 2400W 2300W

1000S 1200S 1400S 600S 800S

FLETCHERS ADIT

Abandoned White Qtz

LEA

LEA RIVER

TRACK

ACCESS

5 cm

88-2888

LEGEND

RECENT
- Alluvium
- Basalt Soil

TERTIARY
- Tb - basalt outcrop
- Tg - greybitly

ORDOVICIAN
- Osk - skarn
- Ohf - hornfels/shale/calc-silicates
- Ost - sandstone/quartzite/greywacke - often tubicoler
- Ocg - conglomerate/pink sandstone

CAMBRIAN
- € Undifferentiated volcanics

Interpretation compiled from mapping by R. Pollock, R.H. Roberts and M.J. Fleming.

INDEX TO ADJOINING MAPS

1-4	1-5	1-1
2-4	LEA 2-5	CETHANA 2-1
3-4	3-5	3-1

708427

RGC EXPLORATION PTY. LIMITED

LAKE LEA - E.L. 41/83

7849 LEA RIVER GRID

INTERPRETIVE AND FACTUAL GEOLOGY

SCALE 1:5000 100 50 0 100 200 METRES

DRAWN BY : M.J.F.

DRAFTSMAN :

DATE Nov. '88

REVISIONS

FILE NO.

FIG. 7

5 406 000 mN

5 405 000 mN

5 404 000 mN

416 000 mE

417 000 mE

418 000 mE

419 000 mE

420 000 mE

RIVER

LEA

Overspur

Creek

STORMONT MINE

UPPER STORMONT GOLD MINE

Abundant White Qtz.

ACCESS TRACK

Creek

1600S

1800S

2000S

2200S

2400S

2600S

2800S

3400W

3300W

3200W

3100W

2900W

2800W

2700W

2600W

2500W

2400W

2300W

2200W

2100W

1400S

1600S

1800S

2000S

2200S

2400S

2600S

E1085

EG

€

88-2888

708428

LEGEND

RECENT
- Alluvium
- Basalt Soil

TERTIARY
- Tb - basalt outcrop
- Tg - greybilly

ORDOVICIAN
- Osk - skarn
- Ohf - hornfels/shale/calc-silicates
- Ost - sandstone/quartzite/greywacke - often tubicolor
- Ocg - conglomerate/pink sandstone

CAMBRIAN
- € Undifferentiated volcanics

5 cm

Interpretation compiled from mapping by R.Pollock, R.H.Roberts and M.J.Fleming.

INDEX TO ADJOINING MAPS

2-4	2-5	2-1
3-4	LEA 3-5	CETHANA 3-1
4-4	4-5	4-1

RGC EXPLORATION PTY. LIMITED

7850 LAKE LEA - E.L. 41/83
LEA RIVER GRID

INTERPRETIVE AND FACTUAL GEOLOGY

SCALE 1:5000

100 50 0 100 200 METRES

DRAWN BY

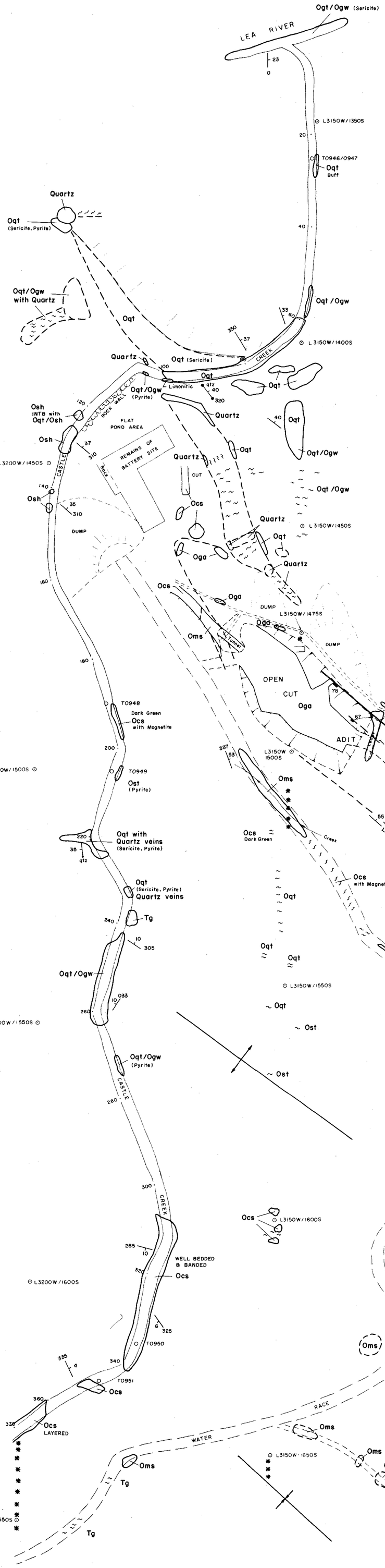
DRAFTSMAN

DATE

REVISIONS

FILE NO.

FIG. 8



LEGEND

TERTIARY

- Tb — Tertiary Basalt
- Tg — Tertiary Greybilty

ORDOVICIAN

- Oms — Magnetite Skarn
- Oga — Garnet - Actinolite Skarn
- Ogp — Garnet - Pyroxene Skarn
- Ost — Sandstone
- Oqt — Quartzite
- Ohf — Hornfels
- Ocs — Calc-silicate Hornfels
- Osh — Shale
- Ogw — Greywacke
- Ots — Tubicolar Sandstone

- ⊙ Grid Peg
- ○ Stream Sediment Sample
- ✱ Magnetic Anomaly

708429 **88-2888**

RGC EXPLORATION PTY. LIMITED
INCORPORATED IN NEW SOUTH WALES

7851	COMPILED	
	DRAWN	
	DATE	
	CHECKED	
	1:250,000 REFERENCE	

LAKE LEA - E.L. 41/83

STORMONT BISMUTH MINE AREA

FACTUAL GEOLOGY

BASE PLAN No.

OVERLAY PLAN No.

SCALE 1:500 (5 0 10 20)

FIGURE 9

418 600mE
418 800mE
419 000mE
419 200mE
406 200mN
406 000mN
405 800mN
405 600mN
1400S
1450S
1500S
1550S
1600S
1650S
1700S
1750S
1800S
1850S
1900S
1950S
2000S
2050S
3400W
3350W
3300W
3200W
3150W
3100W
3050W
3000W
2950W
2900W
2850W
2750W
N
N
N
N
N
N
Tb Scree
CREEK
Tb Scree
Tb
CREEK
Tb
CREEK
Ogt/Ogw (Sericite)
LEA RIVER
23
0
Oqt Buff
093
48
Ocs BANDED
BANDED Green/Brown Ocs/Ost
Ocs Pale Green
Ocs (Pyrite)
Oms
Oga
TRENCH
Ocs/Ost Green/Cream
CREEK
Tb
Quartz
Oqt (Sericite, Pyrite)
Oqt/Ogw
33
Oqt/Ogw with Quartz
Oqt
330
37
Quartz
Oqt Sericite
Oqt
40
Oqt/Ogw (Pyrite)
Limonitic
qtz
40
320
Osh INTB with Oqt/Osh
Osh
Quartz
Oqt
35
310
Dump
Ocs
Oga
Quartz
Quartz
Oqt
BANDED Ocs/Ost
Quartz
Oqt/Ogw with Quartz veins
Ocs Dark Green with Magnetite
Ost (Pyrite)
CASTLE
Dump
OPEN CUT
Oga
78
Oqt
337
53
Oqt with Quartz veins (Sericite, Pyrite)
35
qtz
Oqt (Sericite Pyrite) Qtz vns
Ocs
Oms
Ocs Dk Green
67
Adit
Oga Dark Green
80
66
55
Tg
10
305
Ocs/Ost
Oqt/Ogw
033
10
70
75
66
64
312
65
Ocs with Magnetite
Oqt
Oqt
Oqt
Oqt
Oqt/Ogw
SD1
Oqt
Oqt
Ocs/Ost
Ost
Ocs
Osh
Tg
280
285
10
WELL BEDDED & BANDED
Tg
Tg
Ocs Limonitic
Ocs
Ocs/Ogw
320
14
335
Ocs/Ost
Ocs Limonitic
Ocs Limonitic Minor Pyrite
Ocs Limonitic
093
Oms
271
21
Oms
Oms
Oms
Oms
Oms
Tg
Tg
Tg

s 407 000 m N

419 000 m E

419 200 m E

419 400 m E

419 600 m E

419 800 m E

420 000 m E

s 406 800 m N

s 406 600 m N

G'

F'

E'

D'

C'

B'

A

3150 W

3100 W

3050 W

3000 W

2950 W

2900 W

2850

2800 W

2750 W

2700 W

2450 W

2400 W

2350 W

2300 W

2250 W

900 S

700 S

600 S

FD8

FD7

≈ 7m

≈ 7m

≈ 65m

Qtz Tree Roots

5 cm

FD7 Proposed drillhole

768431

7853

RGC EXPLORATION PTY. LIMITED

LAKE LEA - E.L. 41/83

FLETCHERS ADIT AREA

GEOLOGY FACT

88-2888

DRAWN BY: M.J.F.

DRAFTSMAN: T.G.D.S.

DATE: Feb '88

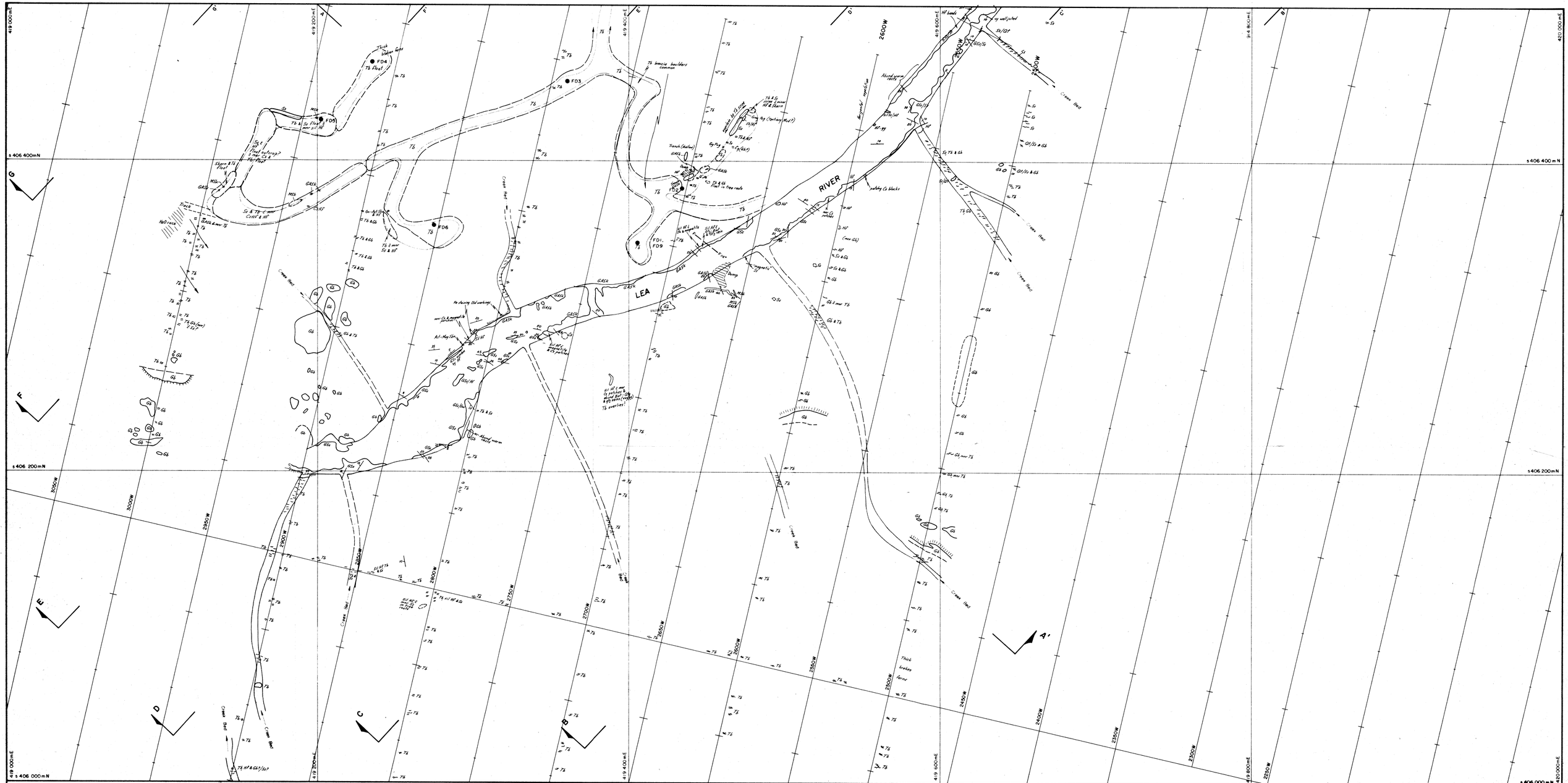
REVISIONS:

FILE NO.

SCALE 1:1000

METRES

FIG. 11



RGC EXPLORATION PTY. LIMITED

LAKE LEA E.L. 41/83

FLETCHERS ADIT AREA

GEOLOGY FACT

7854

DRAWN BY	M.J.F.
DRAFTSMAN:	T.G.D.S.
DATE	Feb. '88
REVISIONS	
FILE NO.	

SCALE 1:1000 — 20 40 0 20 40 METRES

FIG. 12

88-2888

708432

s 408 000mN

416 000mE

417 000mE

418 000mE

419 000mE

420 000mE

DEVONPORT MINE

DEVONPORT

CREEK

s 407 000mN

s 406 000mN

T6894|0.040
10|0
20|<0.5

T6895|0.020
10|17|20
35|0.5

T6896|<0.008
30|25
135|<0.5

T10255|<0.01
30|<5
55|0.5

T10256|<0.01
25|85
135|5.0

T6879|<0.008
185|325
95|<0.5

T6876|<0.008
165|720
220|<0.5

T6877|0.020
315|4525
9325|45

T6878|0.030
24500|1850
1600|43

T10289|<0.01
245|5
140|<0.5

T10288|<0.01
15|<5
145|0.5

T10287|0.01
10|5
1401.0

T10286|<0.01
10|<5
300|<0.5

T10285|<0.1
10|<5
310|<0.5

T10277|<0.01
25|<5
155|<0.5

T10284|<0.01
15|<5
151|<0.5

T10283|<0.01
50|<5
4001|0.5

T10276|0.02
15|15
230|1.5

4850|<0.008

3500 W

3400 W

3300 W

3200 W

3100 W

3000 W

2900 W

2800 W

2700 W

2600 W

2500 W

2400 W

2300 W

1000S

1200S

1400S

900S

RIVER

FLETCHERS ADIT

LEA

ACCESS TRACK

Dump

KEY:

5 cm

SNO|AU
CU|PB
ZN|AG

⊙ OUTCROP

× FLOAT

INDEX TO ADJOINING MAPS

1-4	1-5	1-1
2-4	LEA 2-5	CETHANA 2-1
3-4	3-5	3-1

708433

7855

RGC EXPLORATION PTY. LIMITED

LAKE LEA - E.L. 41/83

LEA RIVER GRID

ROCK GEOCHEMISTRY

AU, CU, PB, ZN and AG

DRAWN BY : M.J.F.

DRAFTSMAN :

DATE : JULY '88

REVISIONS :

FILE NO.

SCALE 1:5000

100 50 0 100 200

METRES

FIG. 13

5 408 000mN

416 000mE

417 000mE

418 000mE

419 000mE

420 000mE

DEVONPORT MINE

Devonport

CREEK

5 407 000mN

5 406 000mN

T6895|100
93

T6898|70
11

T6894|100
11

T10255|10
20|2
82|12

T10256|20
40|4
33|18

T6879|40
18

T6878|60
19

T6877|190
11

T6878|240
18

T10289|850
10|4
2660|454

T10288|170
20|2
951|406

T10286|<10
20|19
44|<10

T10287|390
20|9
826|91

T10285|<10
10|5
239|<10

T10277|<10
40|4
7|<10

T10283|10
30|7
17|<10

T10284|<10
50|20
41|<10

T10278|10
30|7
12|<10

3500W

3400W

3300W

3200W

3100W

3000W

2900W

2800W

2700W

2600W

2500W

2400W

2300W

1000S

1200S

1400S

800S

RIVER

FLETCHERS ADIT

LEA

Dump

TRACK

ACCESS

KEY:

SN|0|BI
MO|AS
SN|W

O OUTCROP
× FLOAT

5 cm

88-2888

INDEX TO ADJOINING MAPS

1-4	1-5	1-1
2-4	LEA 2-5	CETHANA 2-1
3-4	3-5	3-1

708434

7856

RGC EXPLORATION PTY. LIMITED

LAKE LEA - E L 41/83

LEA RIVER GRID

ROCK GEOCHEMISTRY

BI, MO, AS, SN and W

DRAWN BY	M.J.F.
DRAFTSMAN	
DATE	JULY '88
REVISIONS	
FILE NO.	

SCALE 1:5000

-100 -50 0 100 200 METRES

FIG. 14

s 406 000 mN

s 405 000 mN

s 404 000 mN

416 000 mE

417 000 mE

418 000 mE

419 000 mE

420 000 mE

RIVER

LEA

Downstream

CAMP

STORMONT MINE

TRACK

ACCESS

CUTLINE

T10285|0.07 5|5 10|0.5 35|0.5

4850|<0.008

4849|0.090

4852|<0.008

4851|<0.008

4855|<0.008

T10274|<0.01 5|5 15|1.5 150|1.5

T10272|<0.01 5|5 5|1.5

T10267|<0.01 5|5 5|1.5

T10275|<0.01 5|5 35|0.5

T10278|<0.01 5|5 5|0.5

T10227|0.08 5|5 5|0.5

T10268|<0.01 5|5 40|0.5

T10228|0.15 20|5 20|1.0

T10270|<0.01 10|5 10|0.5

T10280|<0.01 5|5 30|1.0

T10279|IS 10|165 110|2.0

4854|0.090

T10269|<0.01 5|5 5|<0.5

T10266|<0.01 15|5 85|5.0

T10265|<0.01 25|5 10|<0.5

T688|0.010 5|5 10|<0.5

T10225|<0.008 5|20 10|1.0

T10264|<0.01 20|5 5|<0.5

T10263|<0.01 5|5 15|0.5

T10257|<0.01 5|5 10|0.5

T10262|<0.01 5|5 20|<0.5

T10226|<0.01 10|5 10|1.0

T10256|<0.01 5|5 10|<0.5

T10252|0.008 5|15 20|<0.5

T10259|<0.01 5|5 65|4.5

T10260|<0.01 5|5 5|0.5

1400S

1600S

1800S

2000S

2200S

2400S

2600S

2800S

3400W

3300W

3200W

3100W

2900W

2800W

2700W

2500W

2400W

2300W

2200W

2100W

E1083

E0

708435

5 cm

88-2888

KEY:

SNO|AU
CU|PB
ZN|AG

O OUTCROP
X FLOAT

INDEX TO ADJOINING MAPS

2-4	2-5	2-1
3-4	LEA 3-5	CETHANA 3-1
4-4	4-5	4-1

RGC EXPLORATION PTY. LIMITED

LAKE LEA - E.L. 41/83

LEA RIVER GRID

ROCK GEOCHEMISTRY

AU, CU, PB, ZN and AG

DRAWN BY : M.J.F.

DRAFTSMAN :

DATE : JULY '88

REVISIONS :

FILE NO.

SCALE 1:5000 100 50 0 100 200 METRES

FIG. 15



KEY:

5 cm

SN 0 BI
MO AS
SN W

⊙ OUTCROP
✕ FLOAT

88-2888

INDEX TO ADJOINING MAPS

2-4	2-5	2-1
3-4	LEA 3-5	CETHANA 3-1
4-4	4-5	4-1

RGC EXPLORATION PTY. LIMITED

7058 LAKE LEA - E.L. 41/83
LEA RIVER GRID

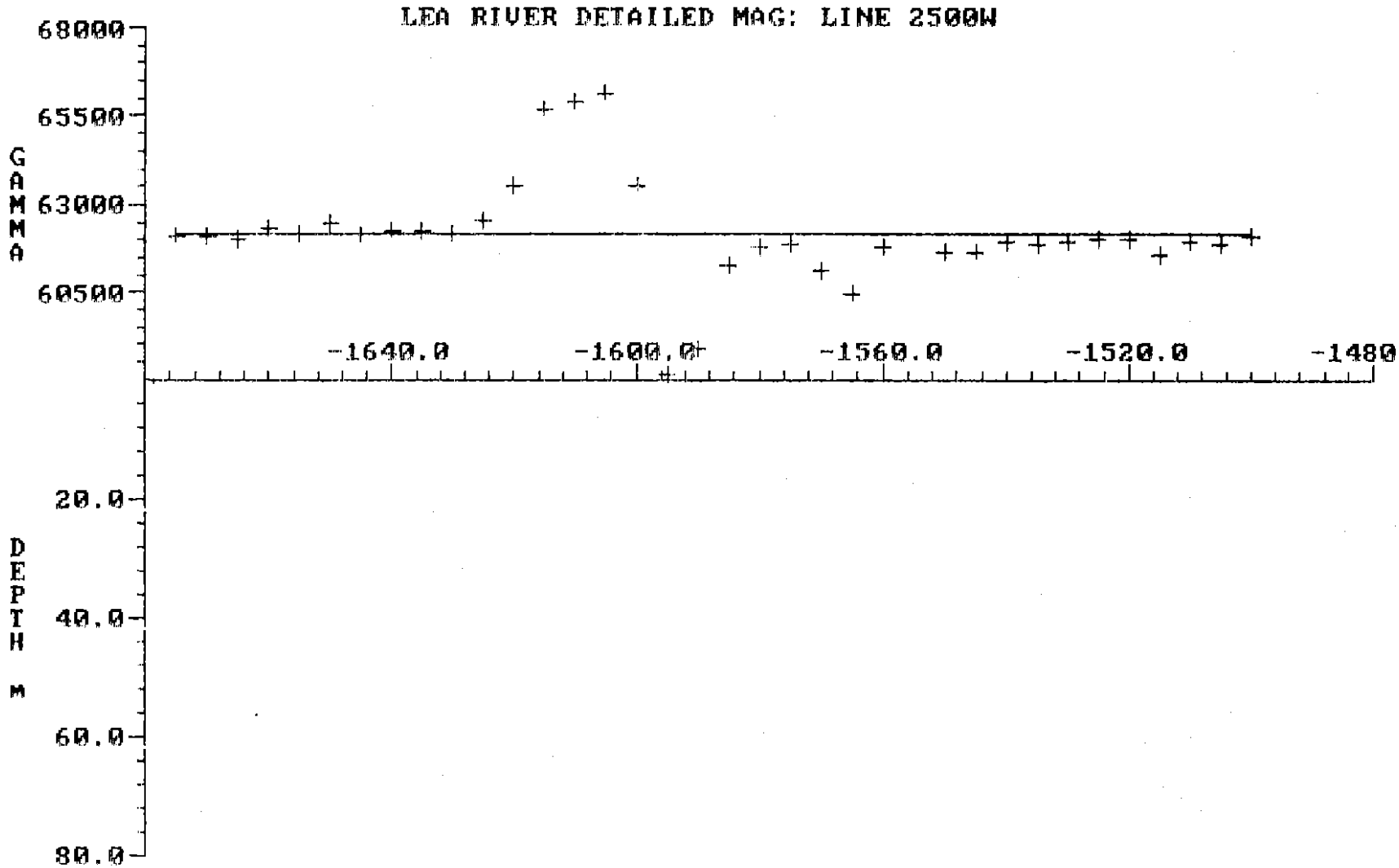
ROCK GEOCHEMISTRY

BI, MO, AS, SN and W

DRAWN BY	M.J.F.
DRAFTSMAN	
DATE	JULY '88
REVISIONS	
FILE NO.	

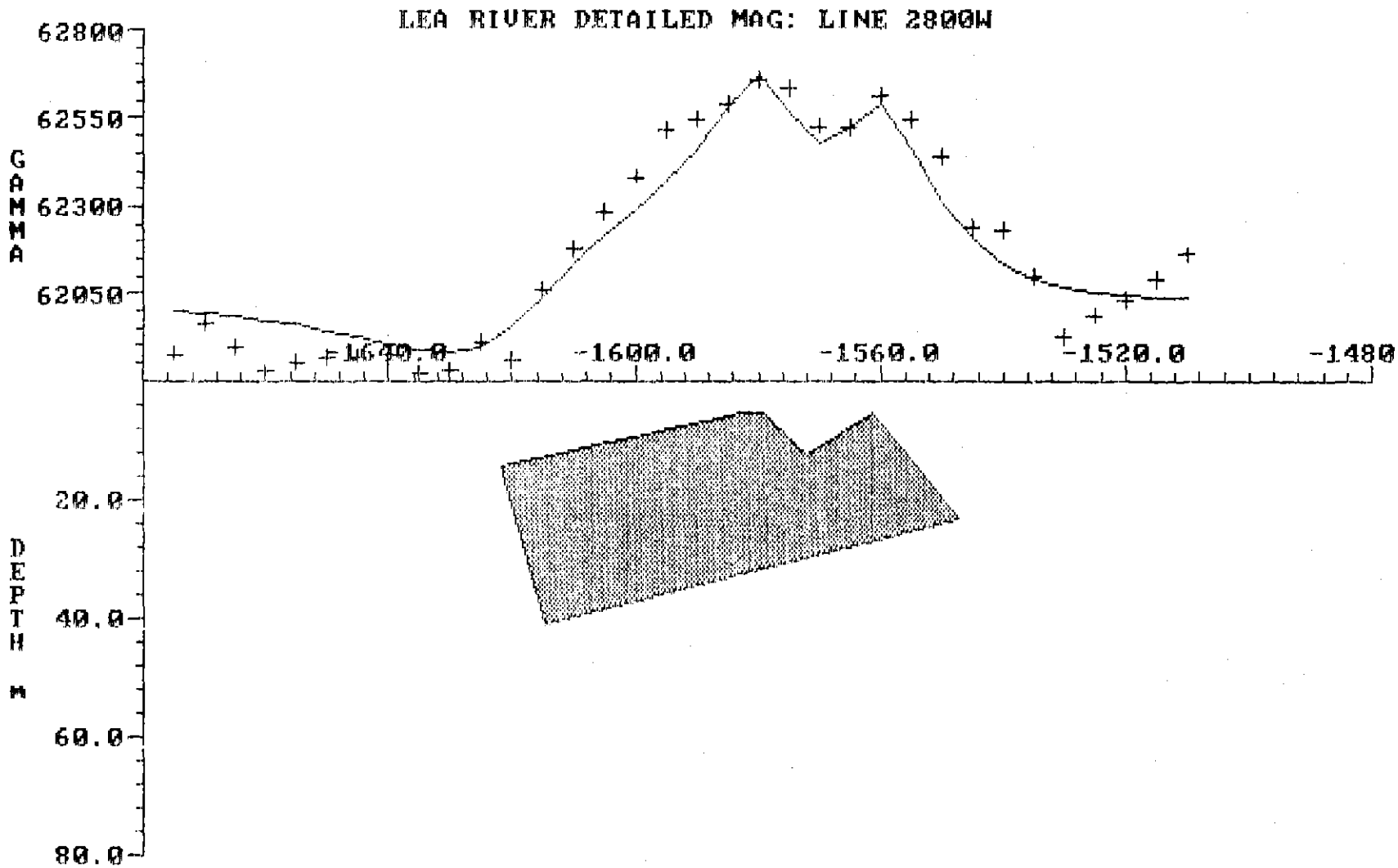
SCALE 1:5000 — 100 50 0 100 200 METRES

FIG. 16



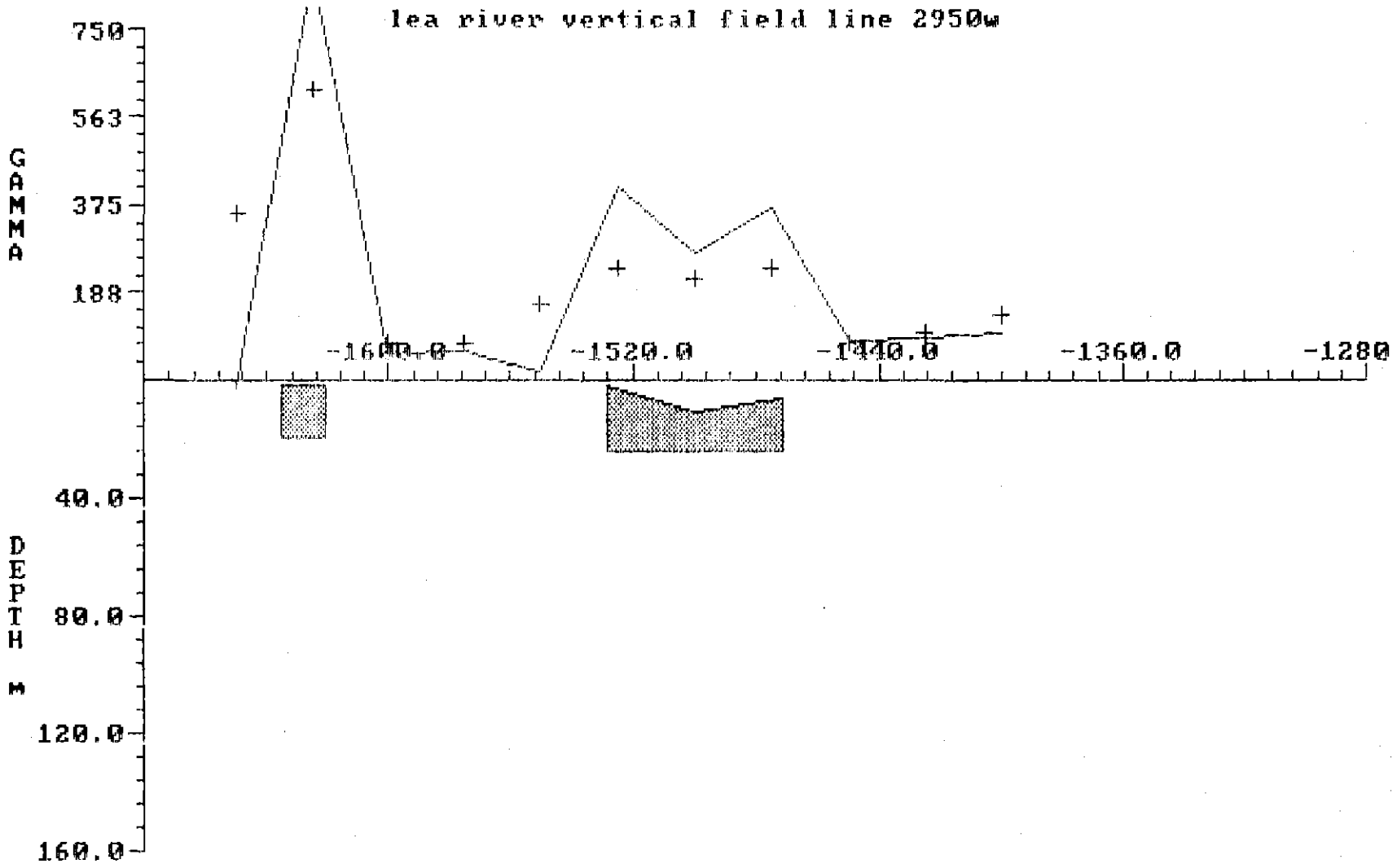
88-2888

Figure 17



88-2888

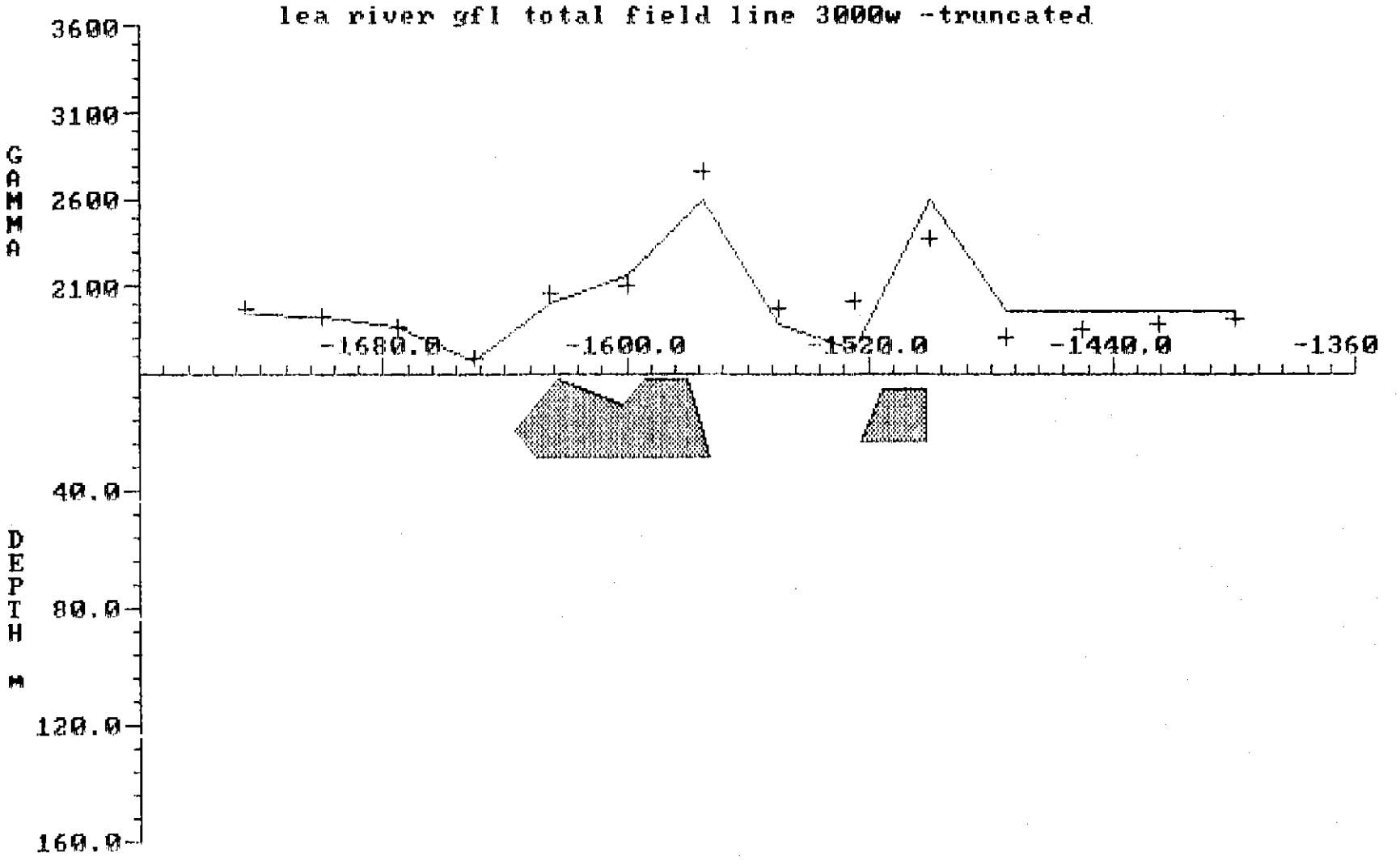
Figure 18



708439

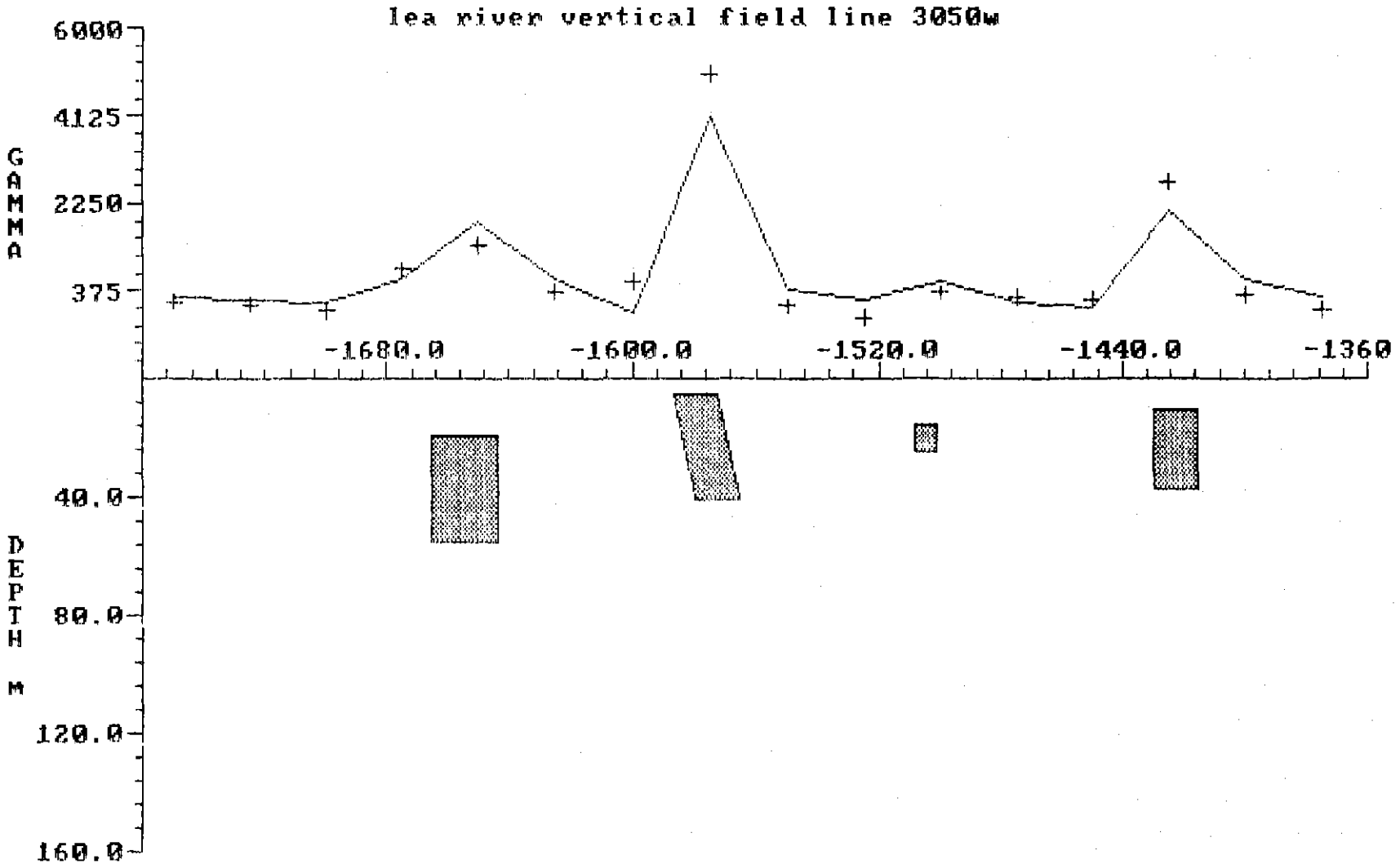
88-2888

Figure 19



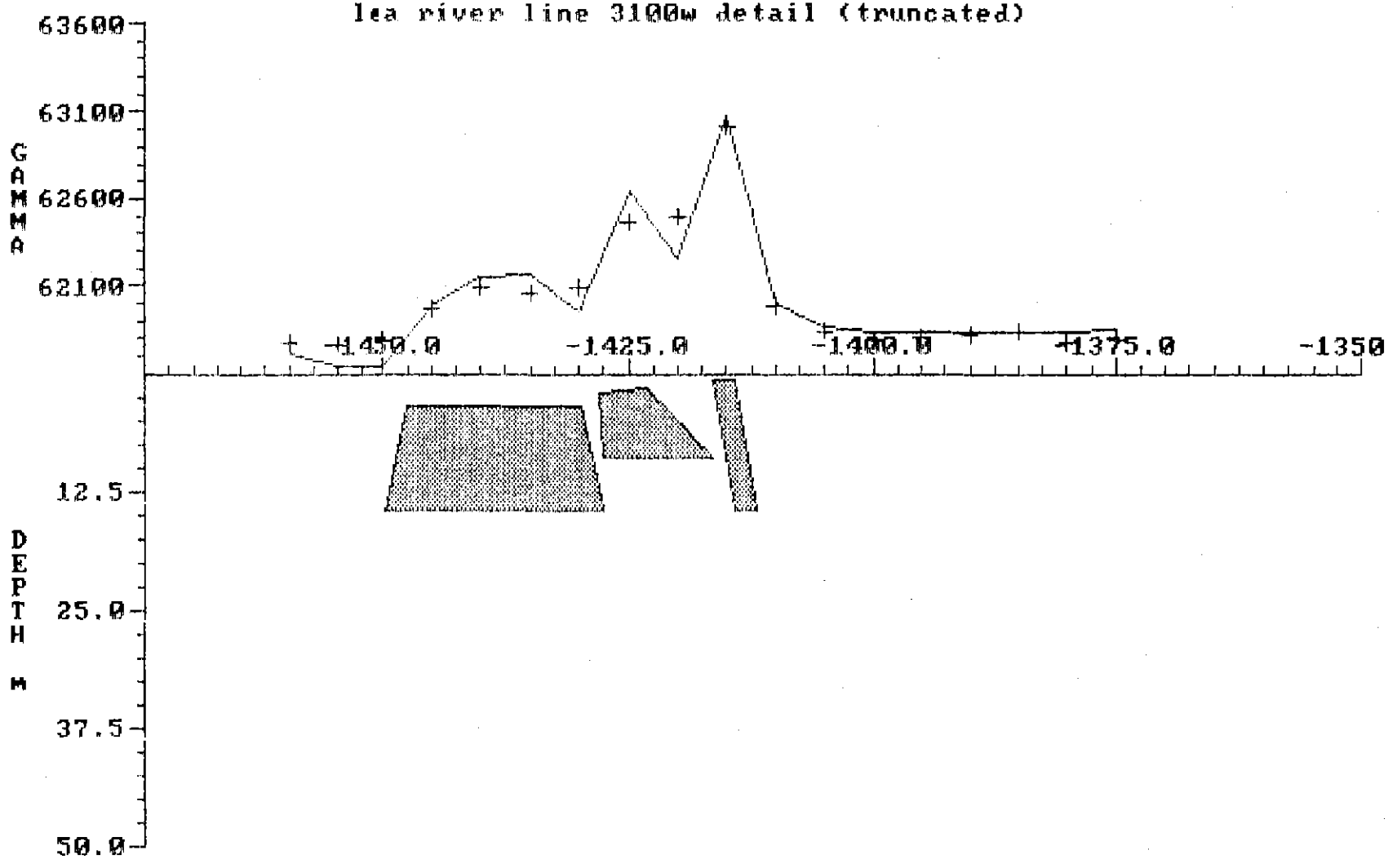
88-2888

Figure 20



88-2888

Figure 21



88-2888

Figure 22

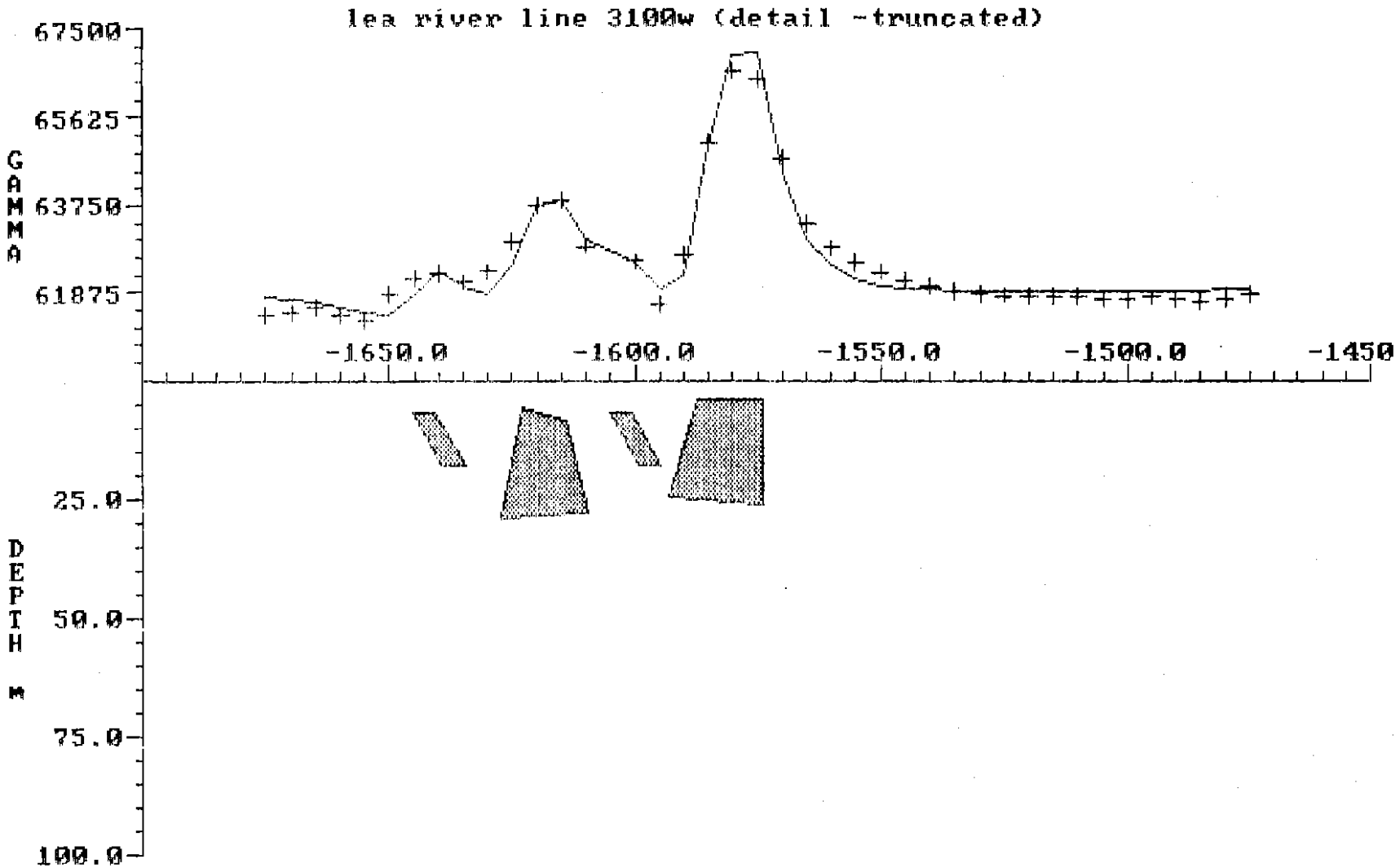
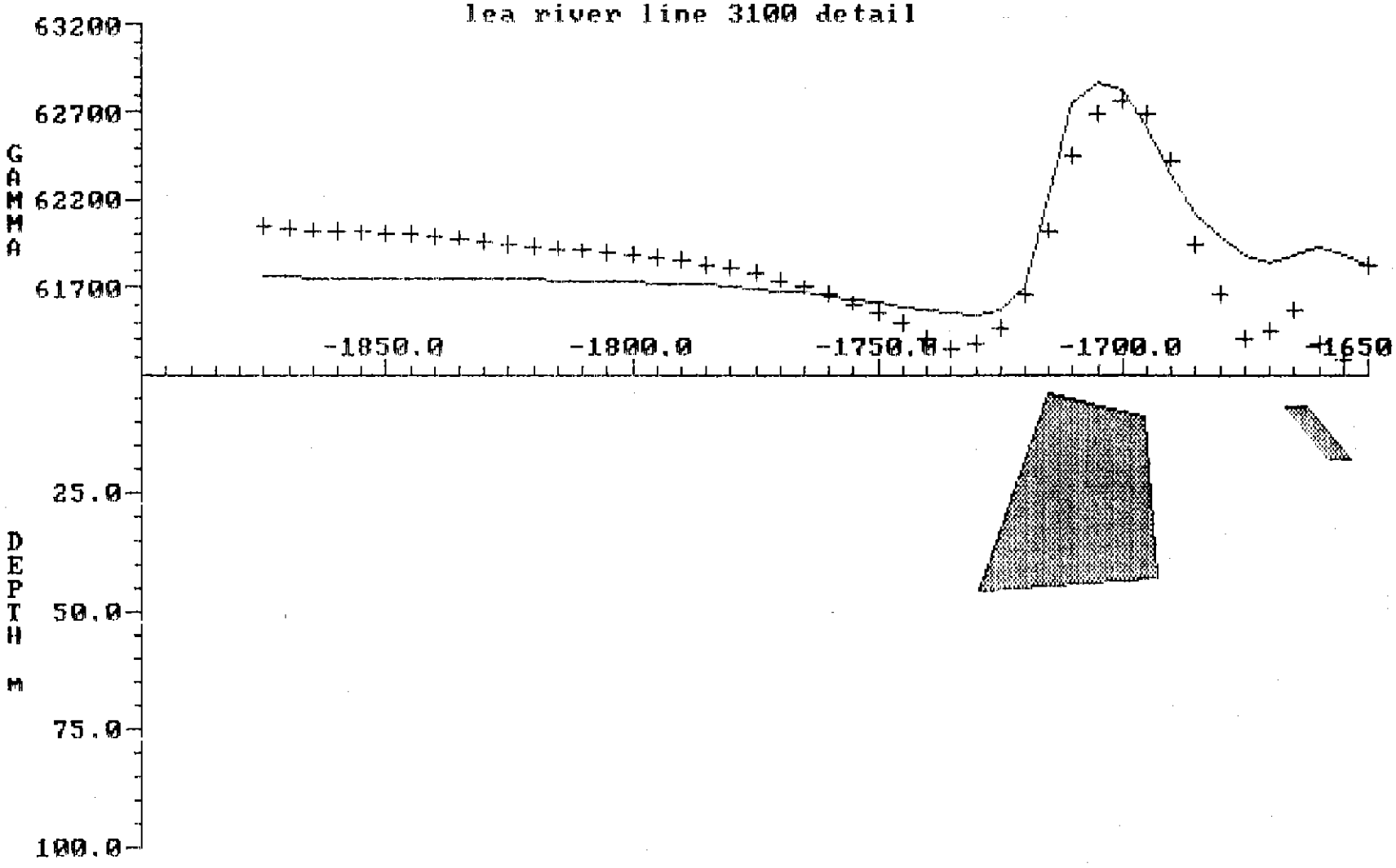
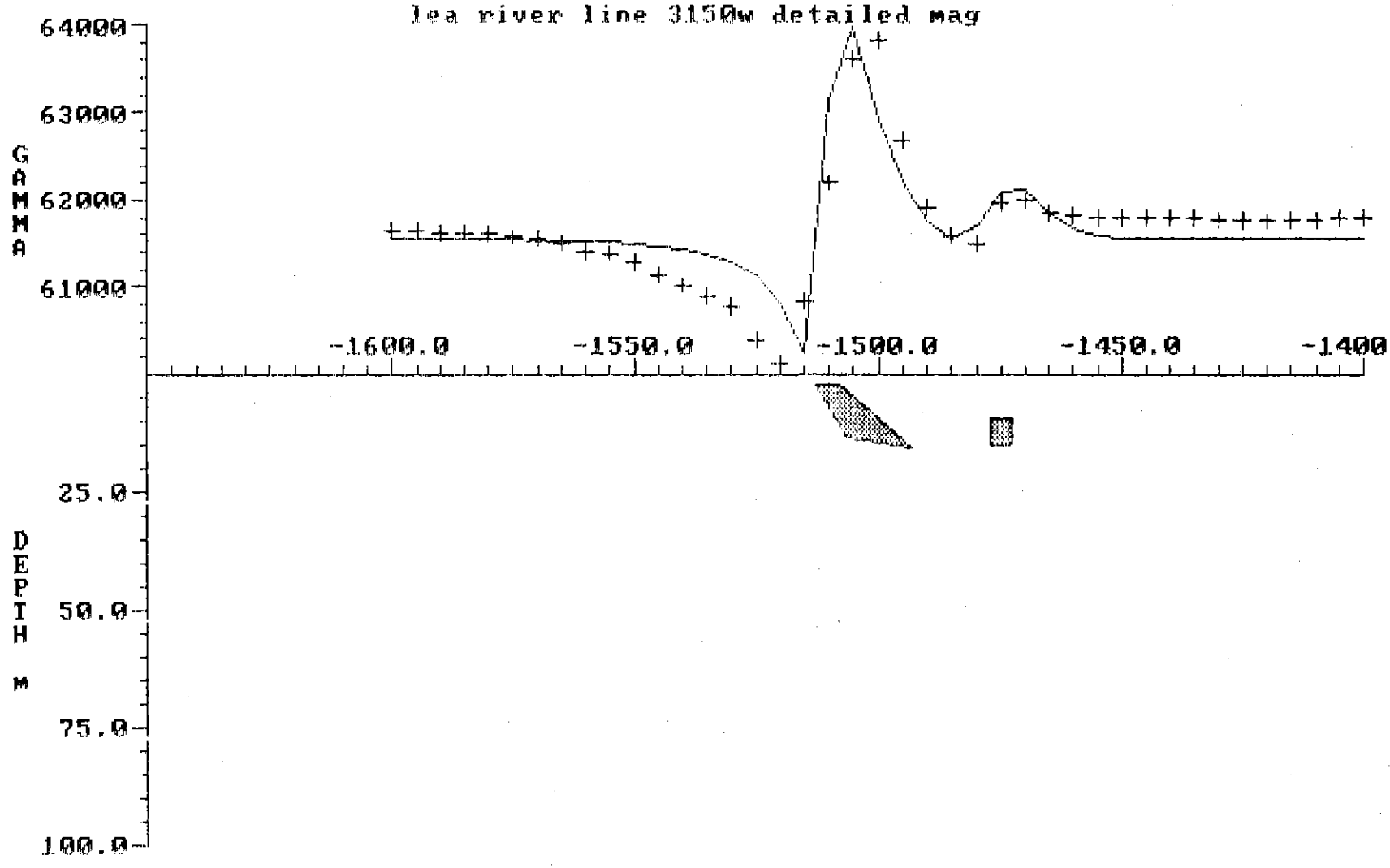

lea river line 3100w (detail -truncated)
67500
65625
63750
61875
GAMMA
-1650.0
-1600.0
-1550.0
-1500.0
-1450
25.0
50.0
75.0
100.0
DEPTH M

Figure 23



88-2888

Figure 24



88-2888 437

Figure 25

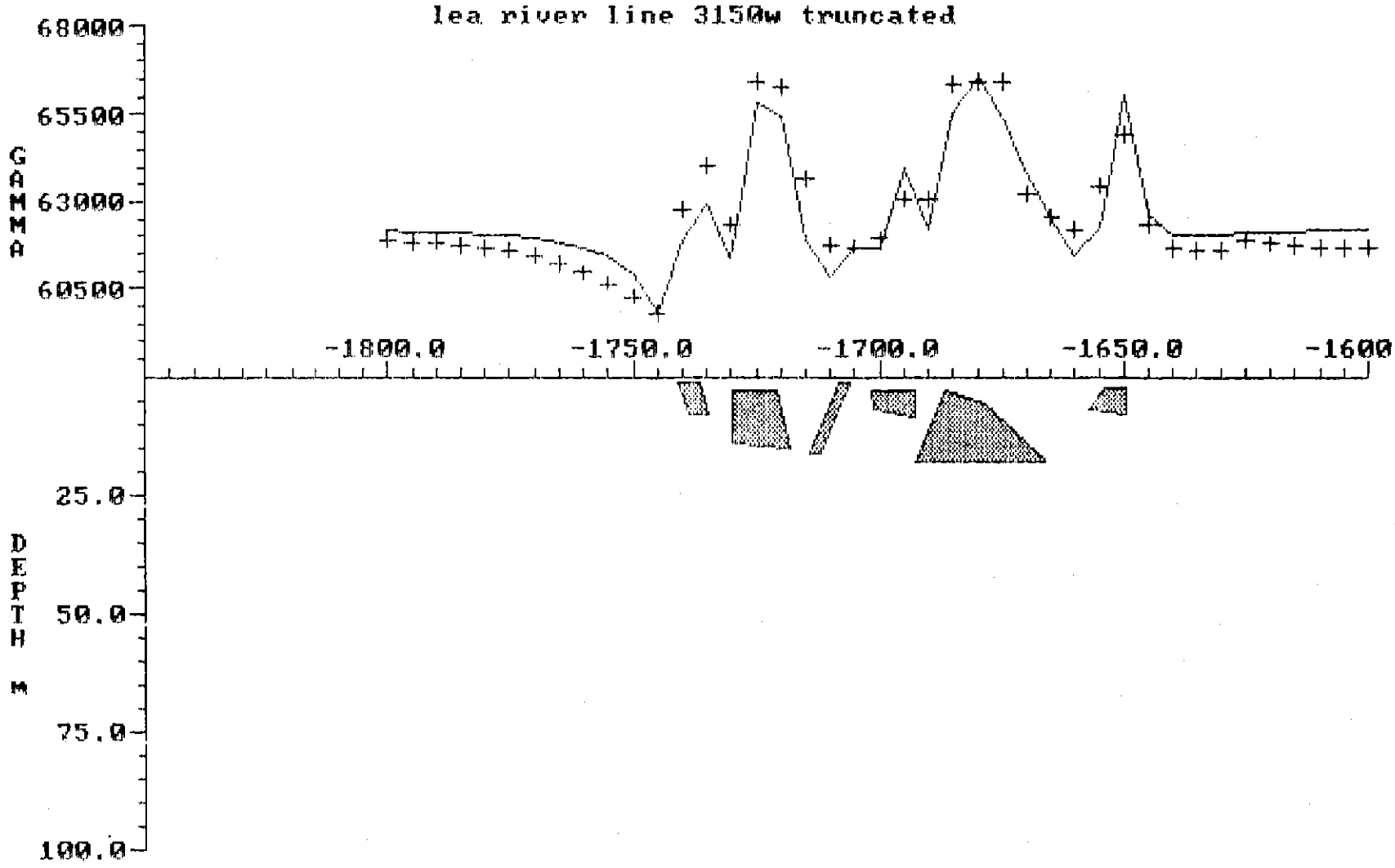
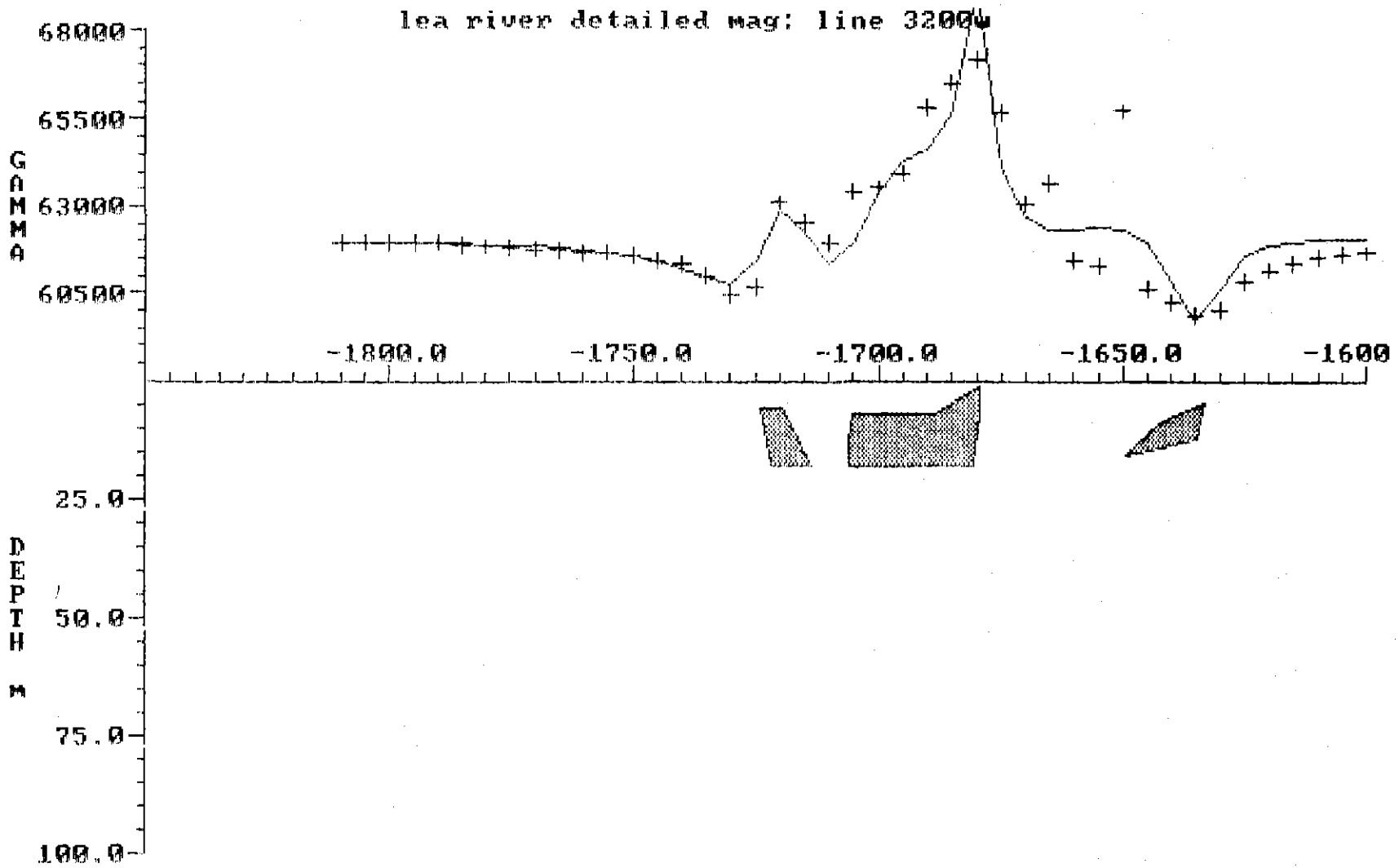
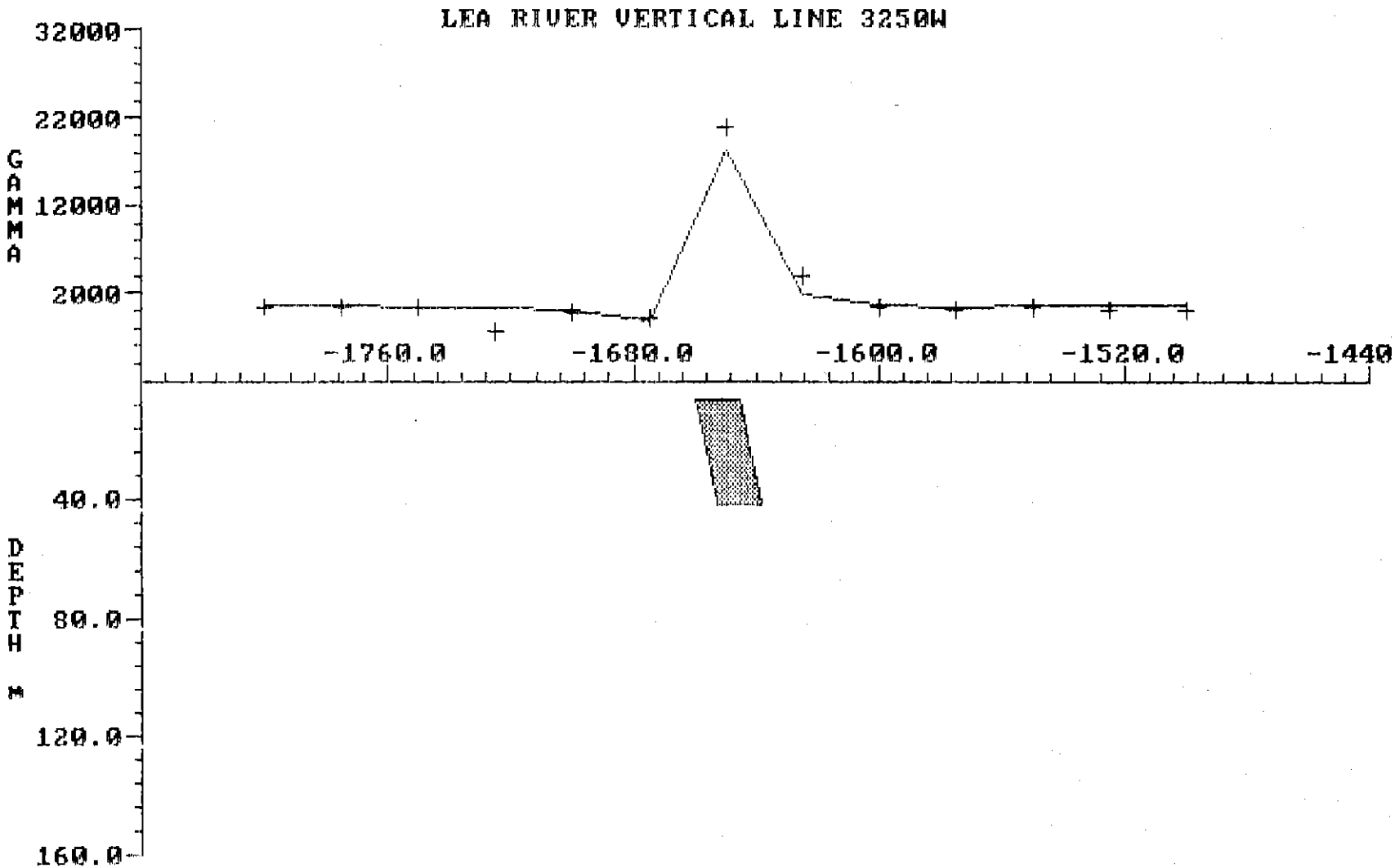

lea river line 3150w truncated
68000
65500
63000
60500
GAMMA
-1800.0
-1750.0
-1700.0
-1650.0
-1600
25.0
50.0
75.0
100.0
DEPTH M

Figure 26



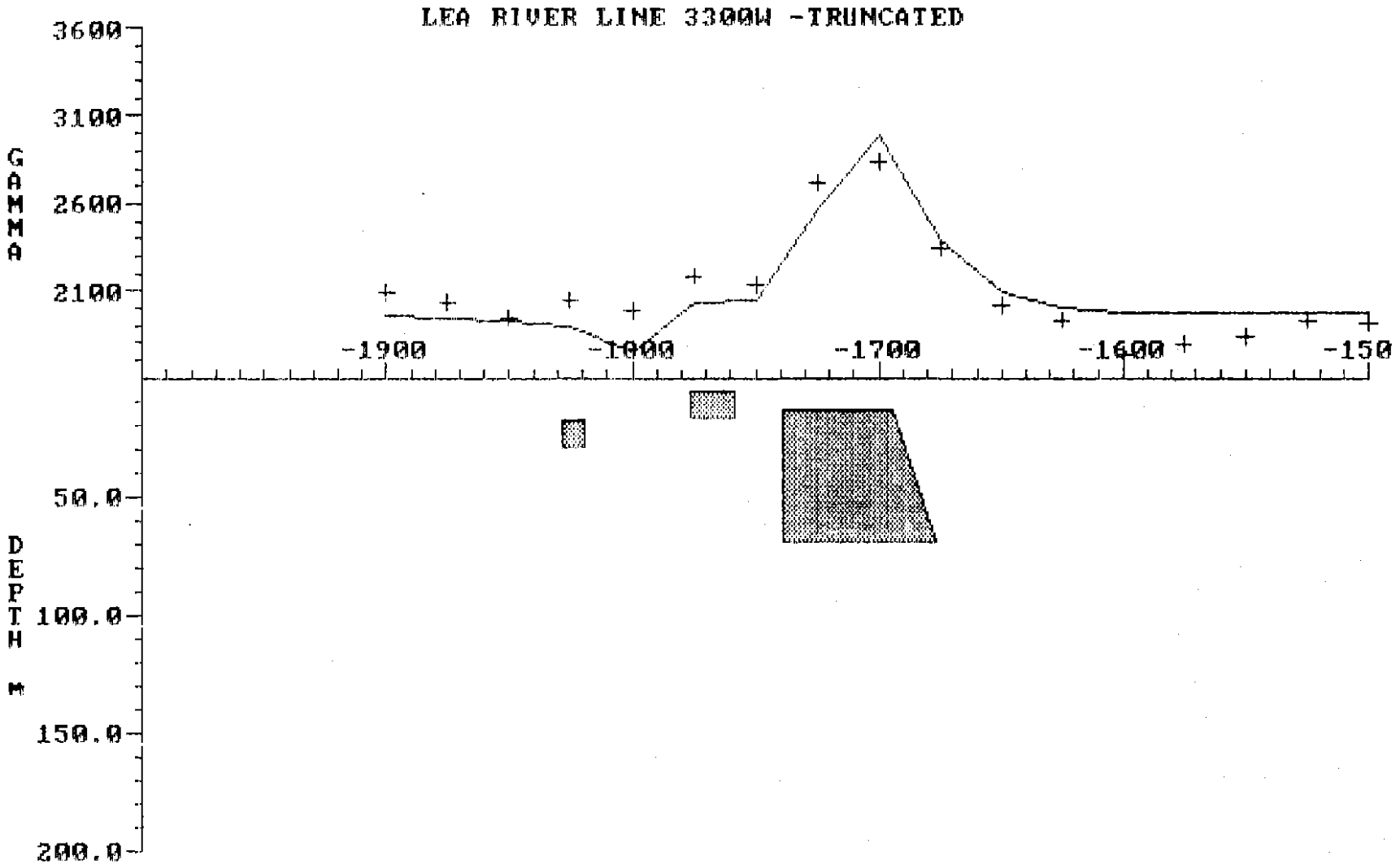
88-2888

Figure 27



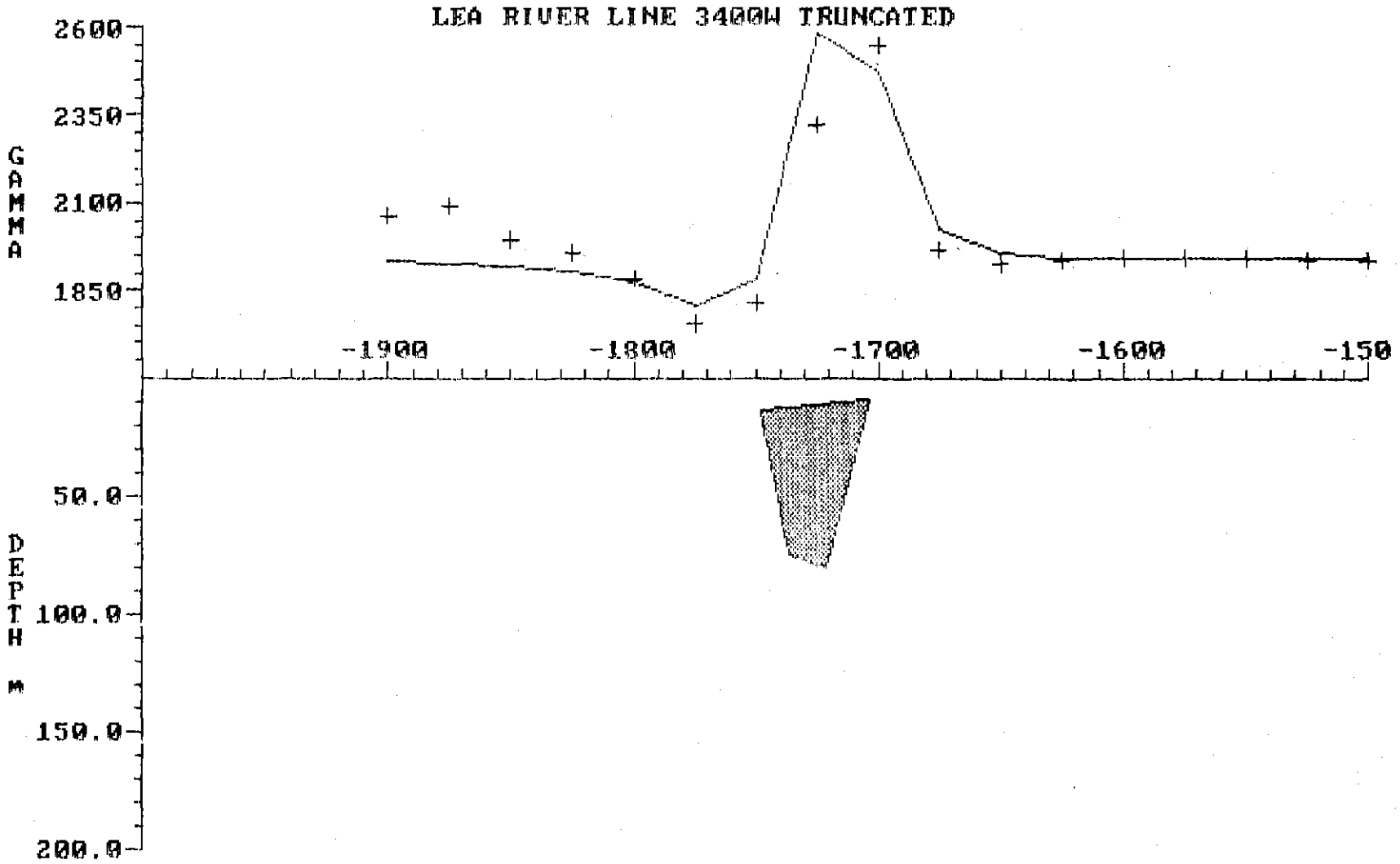
88-2888

Figure 28



88-2888

Figure 29

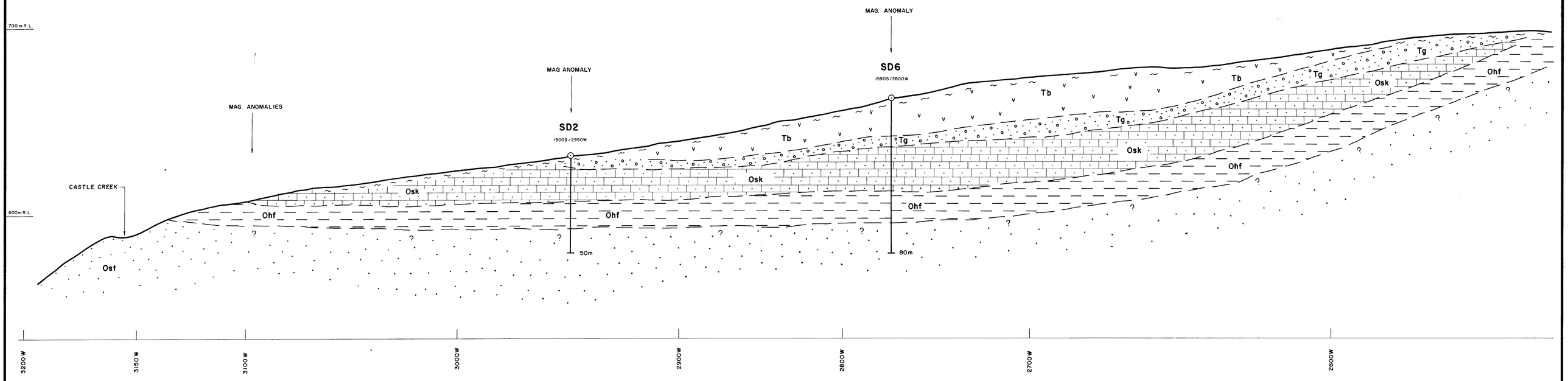


88-2888

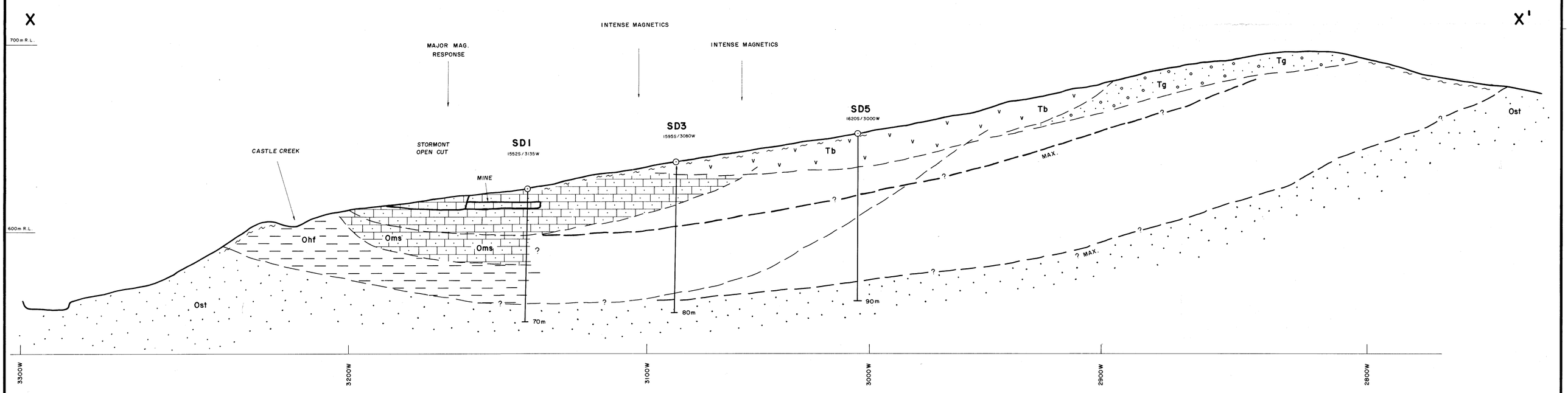
442

708450

SECTION Y-Y'



SECTION X-X'



LEGEND

TERTIARY

- Tb — Basalt
- Tg — Greybilly

ORDOVICIAN

- Osk — Skarn
- Oms — Magnetite Skarn
- Ohf — Hornfels
- Ost — Sandstone
- Ocg — Conglomerate

~~ Alluvium

5 cm

708451

88-2888

RGC EXPLORATION PTY. LIMITED
INCORPORATED IN NEW SOUTH WALES

443

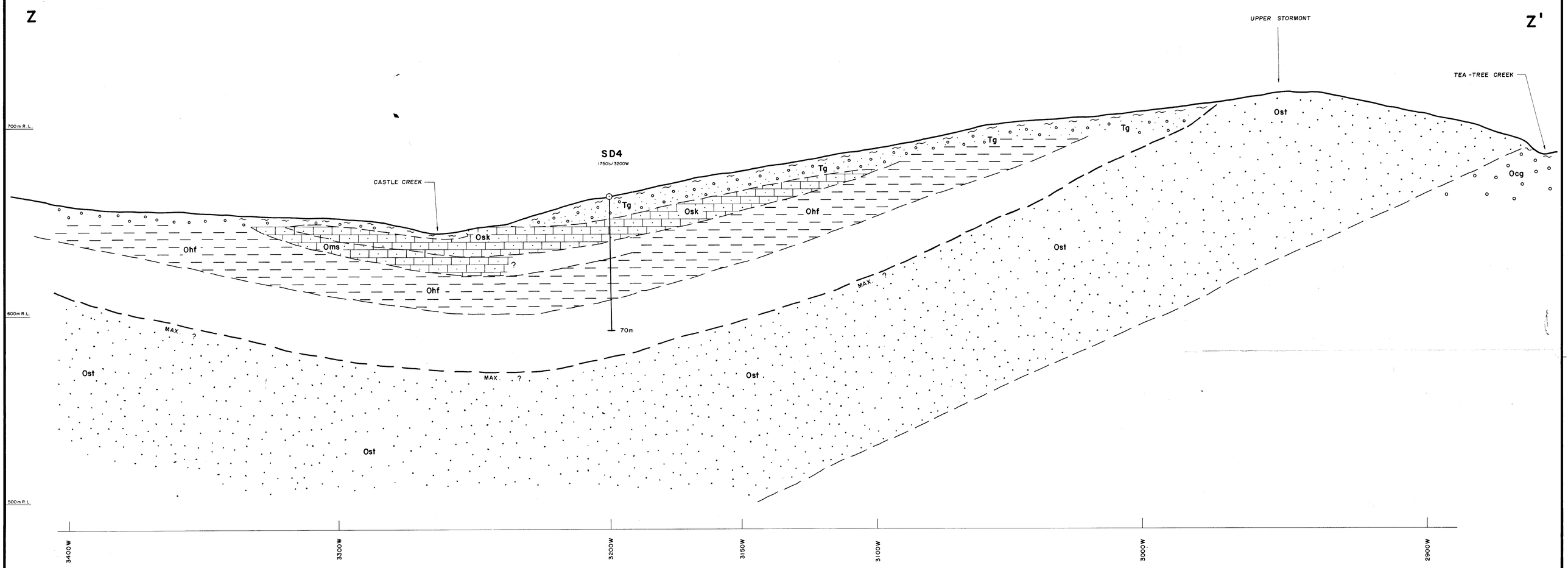
COMPILED	RHR/MJF	LAKE LEA - E.L. 41/83
DRAWN	G.B.	STORMONT BISMUTH MINE AREA
DATE	NOV. 1988	INTERPRETIVE SECTIONS
CHECKED		WITH PROPOSED DRILLING
1:250,000 REFERENCE		

BASE PLAN No.
OVERLAY PLAN No.

SCALE 1:1000 (10 0 10 20 40)

FIGURE 31

SECTION Z - Z'



LEGEND

TERTIARY

- Tb — Basalt
- Tg — Greybilly

ORDOVICIAN

- Osk — Skarn
- Oms — Magnetite Skarn
- Ohf — Hornfels
- Ost — Sandstone
- Ocg — Conglomerate

~~ Alluvium

5 cm

708452

88 - 2888

RGC EXPLORATION PTY. LIMITED
INCORPORATED IN NEW SOUTH WALES

444

COMPILED	RHR/MJF
DRAWN	G.B.
DATE	NOV. 1988
CHECKED	
1:250,000 REFERENCE	

LAKE LEA - E.L. 41/83
STORMONT BISMUTH MINE AREA
INTERPRETIVE SECTIONS WITH PROPOSED DRILLING

BASE PLAN No.
OVERLAY PLAN No.

SCALE 1:1000 (10 0 10 20 40)

FIG. 32

418 600mE
418 800mE
419 000mE
419 200mE
6 406 200mN
6 406 000mN
6 405 800mN
6 405 600mN
1400S
1450S
1500S
1550S
1600S
1650S
1700S
1750S
1800S
1850S
1900S
1950S
2000S
2050S
3400W
3350W
3300W
3200W
3150W
3100W
3050W
3000W
2950W
2900W
2850W
2750W
LEA RIVER
CREEK
CREEK
CREEK
CREEK
CREEK
CASTLE
Dump
Dump
Dump
OPEN CUT
ADIT
TRENCH
TRENCH
"ROSS" SHAFT
TRENCH
MINOR TRACK
TRACK
ACCESS
TRACK
WATER RACE
MINOR ACCESS
TRACK
DAM
T8676 <0.008 / 15 <5 / 20 <0.5
T8677 <0.008 / 10 <5 / 30 <0.5
T8674 <0.008 / 60 35 / 45 <0.5
T8683 <0.008 / 5 <5 / 25 <0.5
T8682 <0.008 / 5 <5 / 90 <0.5
T8686 <0.008 / 40 30 / 105 <0.5
T8685 <0.008 / 90 20 / 165 <0.5
T8681 <0.008 / 10 20 / 80 <0.5
T8673 <0.008 / 20 <5 / 15 <0.5
T8675 <0.008 / 65 20 / 60 <0.5
T8687 <0.008 / 90 20 / 165 <0.5
T8684 0.010 / 5 <5 / 135 <0.5
T8679 0.170 / 5 60 / 115 <0.5
T8671 <0.008 / 5 15 / 125 <0.5
T8672 0.010 / 20 25 / 165 <0.5
T8670 <0.008 / 5 <5 / 10 0.5
T8665 0.150 / 10 165 / 125 <0.5
T8664 0.020 / 15 5 / 15 <0.5
T8666 <0.008 / 10 30 / 100 <0.5
T8678 <0.008 / 25 <5 / 15 <0.5
T8657 <0.008 / 10 25 / 80 <0.5
T8658 0.670 / 15 805 / 100 2.0
T8659 0.010 / 5 55 / 75 <0.5
T8656 0.-<0.01 / 20 <5 / 25 0.5
T8662 0.020 / 45 35 / 95 <0.5
T8663 <0.008 / 25 75 / 85 <0.5
T8669 0.010 / 35 30 / 80 <0.5
T8693 0.010 / 40 25 / 85 <0.5
T8661 0.040 / 45 25 / 70 <0.5
T8655 <0.008 / 10 20 / 95 <0.5
T8691 0.020 / 5 25 / 85 0.5
T8692 0.010 / 10 10 / 90 <0.5
SD1
SD2
SD3
SD4
SD5
SD6

● SD1 Proposed Drillhole
⊗ SD1 Actual Drillhole

KEY:
SAMP.NO. | AU
CU | PB
ZN | AG
⊙ OUTCROP
× FLOAT

5 cm

708453

88-2888

RGC EXPLORATION PTY. LIMITED
INCORPORATED IN NEW SOUTH WALES

445

COMPILED	M.J.F.	
DRAWN		
DATE	FEB. '88	
CHECKED		
1:250,000 REFERENCE		

LAKE LEA - E.L. 41/83
STORMONT BISMUTH MINE AREA
ROCK GEOCHEMISTRY
AU, CU, PB, ZN and AG

BASE PLAN No.
OVERLAY PLAN No.
SCALE 1:1000 (10 0 20 40)
FIGURE 33

418 600 mE
418 800 mE
419 000 mE
419 200 mE
5 406 200 mN
5 406 000 mN
5 405 800 mN
5 405 600 mN
1400S
1450S
1500S
1550S
1600S
1650S
1700S
1750S
1800S
1850S
1900S
1950S
2000S
2050S
3400W
3350W
3300W
3200W
3150W
3100W
3050W
3000W
2950W
2900W
2850W
2750W

LEA RIVER
CREEK
CREEK
CREEK
CREEK
CREEK
CASTLE
TRENCH
Dump
Dump
Dump
OPEN CUT
Adit
"ROSS" SHAFT
TRENCH
MINOR TRACK
TRACK
ACCESS
WATER RACE
MINOR ACCESS
TRACK
TRACK
DAM

T8676 <10 / 5
T8677 20 / 6
T8674 <10 / 17
T8673 <10 / 18
T8686 40 / 6
T8685 <10 / 9
T8675 40 / 33
T8671 10 / 15
T8672 <10 / 8
T8687 10 / 10
T8684 <10 / 4
T8679 470 / 2
T8682 <10 / 6
T8681 90 / 6
T8683 10 / 5
T8657 110 / 5
T8670 <10 / 1
T8665 510 / 12
T8664 60 / 5
T8666 180 / 6
T8678 10 / 24
T8658 2500 / 2
T8659 130 / 2
T8656 <10 / 30 6 / 3 <10
T8662 660 / 11
T8663 60 / 17
T8669 440 / 6
T8893 700 / 5
T8661 220 / 10
T8655 70 / 62
T8891 50 / 9
T8892 80 / 92

SD1
SD2
SD3
SD4
SD5
SD6

● SD1 Proposed Drillhole
⊗ SD1 Actual Drillhole

KEY:
SAMP.NO. | BI
MO | AS
SN | W
⊙ OUTCROP
× FLOAT

5 cm

88-2888
708454

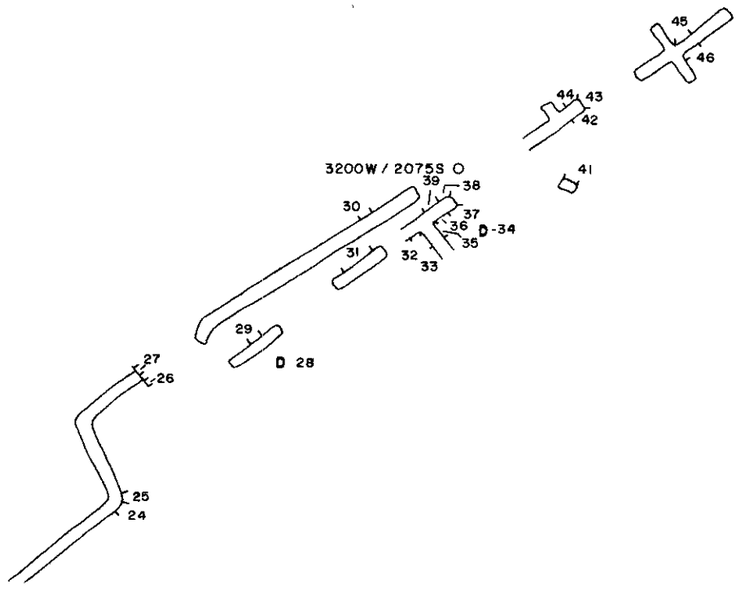
RGC EXPLORATION PTY. LIMITED
INCORPORATED IN NEW SOUTH WALES

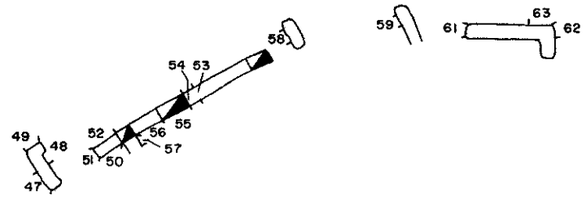
5 7859	COMPILED	M.J.F.
	DRAWN	
	DATE	FEB. '88
	CHECKED	
	1:250,000 REFERENCE	

LAKE LEA - E.L. 41/83
STORMONT BISMUTH MINE AREA
ROCK GEOCHEMISTRY
BI, MO, AS, SN and W

BASE PLAN No.
OVERLAY PLAN No.
SCALE 1:1000 (10 0 20 40)
FIGURE 34

7860





UPPER STORMONT WORKINGS

5 cm

LEGEND

Trench

Sample Interval

Shaft

D Dump Sample

MN

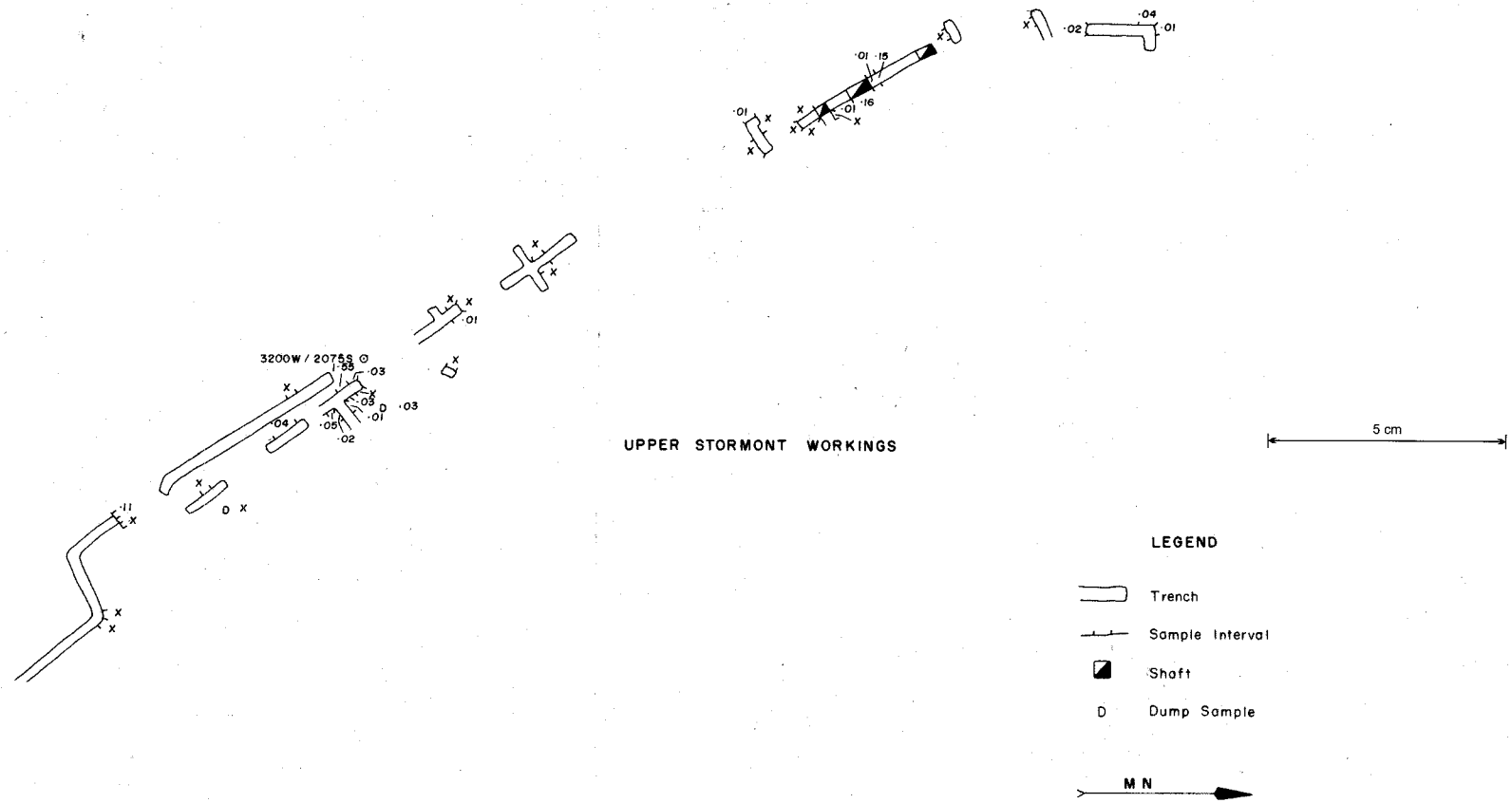
NOTE – *All sample no's are prefixed by T94*

708455

88-2888

RGC EXPLORATION PTY. LIMITED INCORPORATED IN NEW SOUTH WALES		
GEOLOGIST	R H R	E L. 41/83
DRAWN	G B	UPPER STORMONT
DATE		SAMPLE
CHECKED		LOCATIONS
1 250000 REF		
SCALE 1 | 500	10 5 0 10	FIG 35

7861



UPPER STORMONT WORKINGS

NOTE – X = < 0·008 ppm

708456

88-2888

RGC EXPLORATION PTY. LIMITED
INCORPORATED IN NEW SOUTH WALES

GEOLOGIST	R.H.R.
DRAWN	G.B.
DATE	
CHECKED	
1:250000 REF	

E.L. 41/83

UPPER STORMONT
GOLD
GEOCHEMISTRY

SCALE 1:500 10 5 0 10

FIG. 36

419 200mE

419 400mE

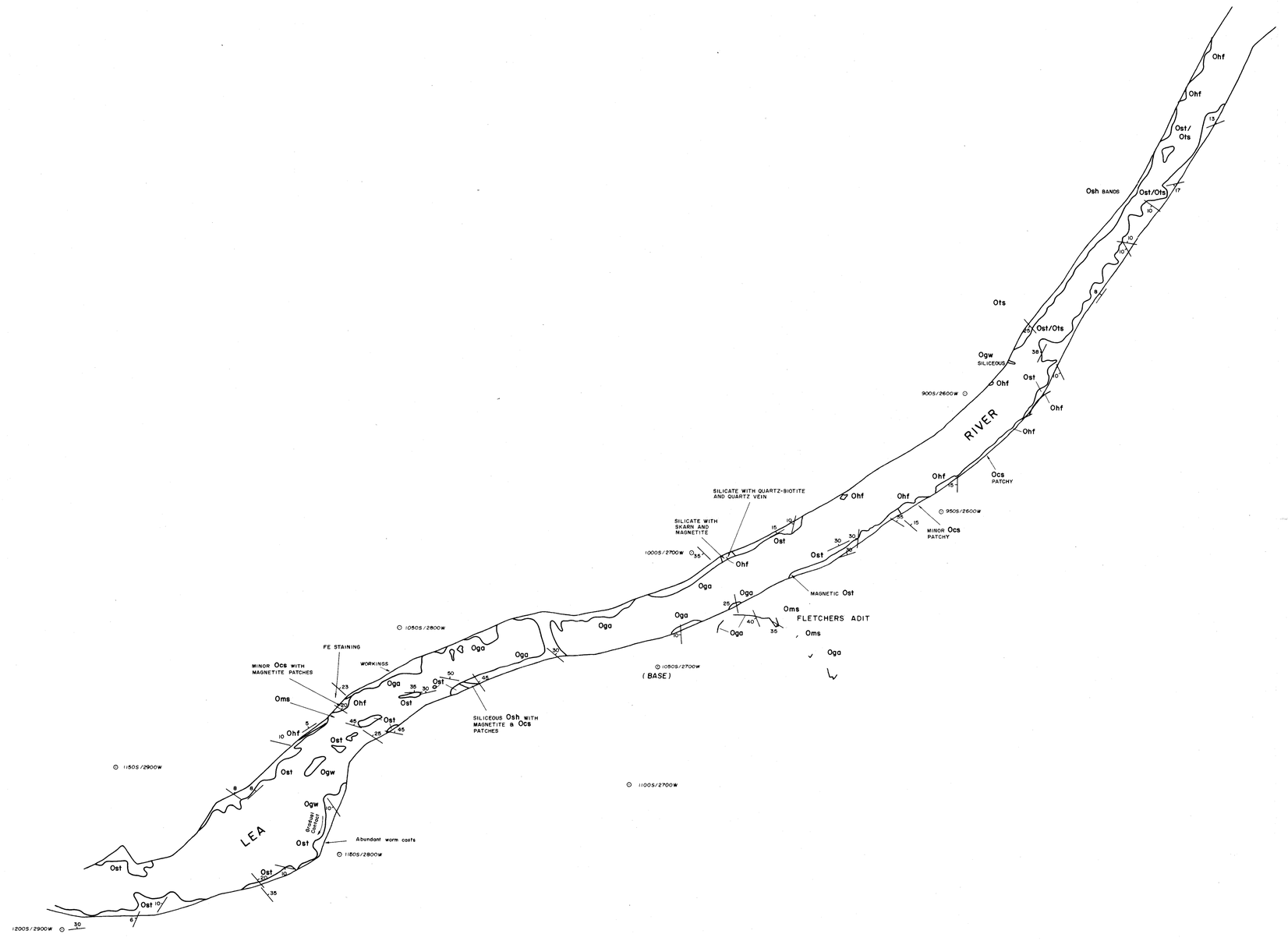
419 600mE

419 800mE

5 406 600mN

5 406 400mN

5 406 200mN



N

5 cm

LEGEND

TERTIARY

- Tb — Tertiary Basalt
- Tg — Tertiary Greybilly

ORDOVICIAN

- Oms — Magnetite Skarn
- Oga — Garnet - Actinolite Skarn
- Ogp — Garnet - Pyroxene Skarn
- Ost — Sandstone
- Oqt — Quartzite
- Ohf — Hornfels
- Ocs — Calc-silicate Hornfels
- Osh — Shale
- Ogw — Greywacke
- Ots — Tubicolar Sandstone

708457

88-2888

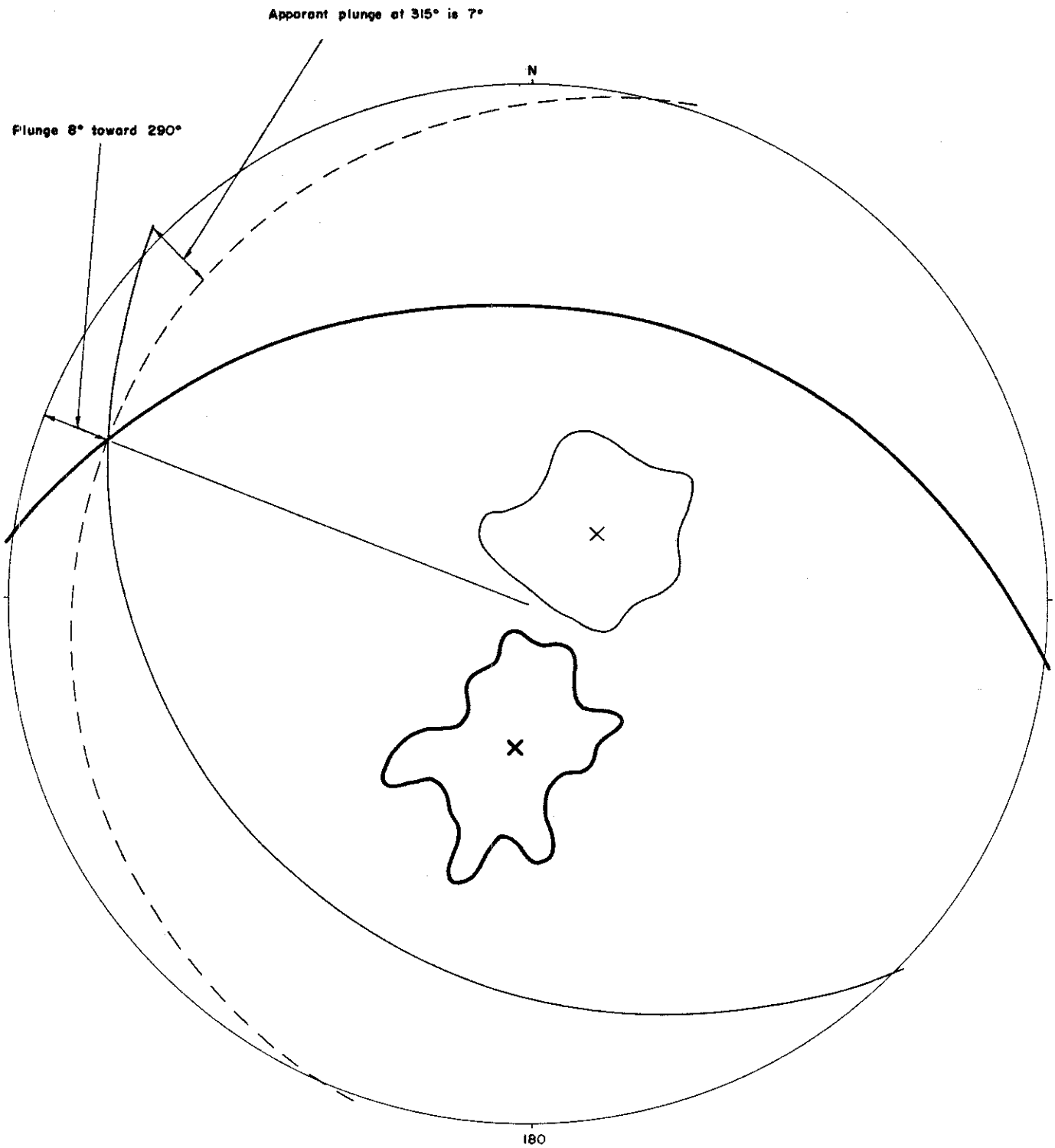
RGC EXPLORATION PTY. LIMITED
INCORPORATED IN NEW SOUTH WALES

7862	COMPILED	M.J.F.
	DRAWN	G.B.
	DATE	FEB. 1988
	CHECKED	
	1:25,000 REFERENCE	LEA

E.L. 41/83
LAKE LEA
TAPE & COMPASS OF LEA RIVER WITH FACTUAL GEOLOGY
TIED INTO GRID STATION 10505/2700W

BASE PLAN No.
OVERLAY PLAN No.
SCALE 1:1000
10 5 0 10 20 40
FIGURE 37

7863



88-2888

WULFF NET

708458

—— NORTH LIMB OF SYNCLINE (DIPS SOUTH)

—— SOUTH LIMB OF SYNCLINE (DIPS NORTH)

× LOCUS POLE OF SOUTH DIPS

× LOCUS POLE OF NORTH DIPS

RGC EXPLORATION PTY. LIMITED

INCORPORATED IN NEW SOUTH WALES

COMPILED	M.J.F.
DRAWN	G.B.
DATE	Mar.'88
CHECKED	
1:250 000 Reference	

POLES OF BEDDING IN LEA RIVER DETERMINATION OF STRIKE & DIP OF PLUNGE

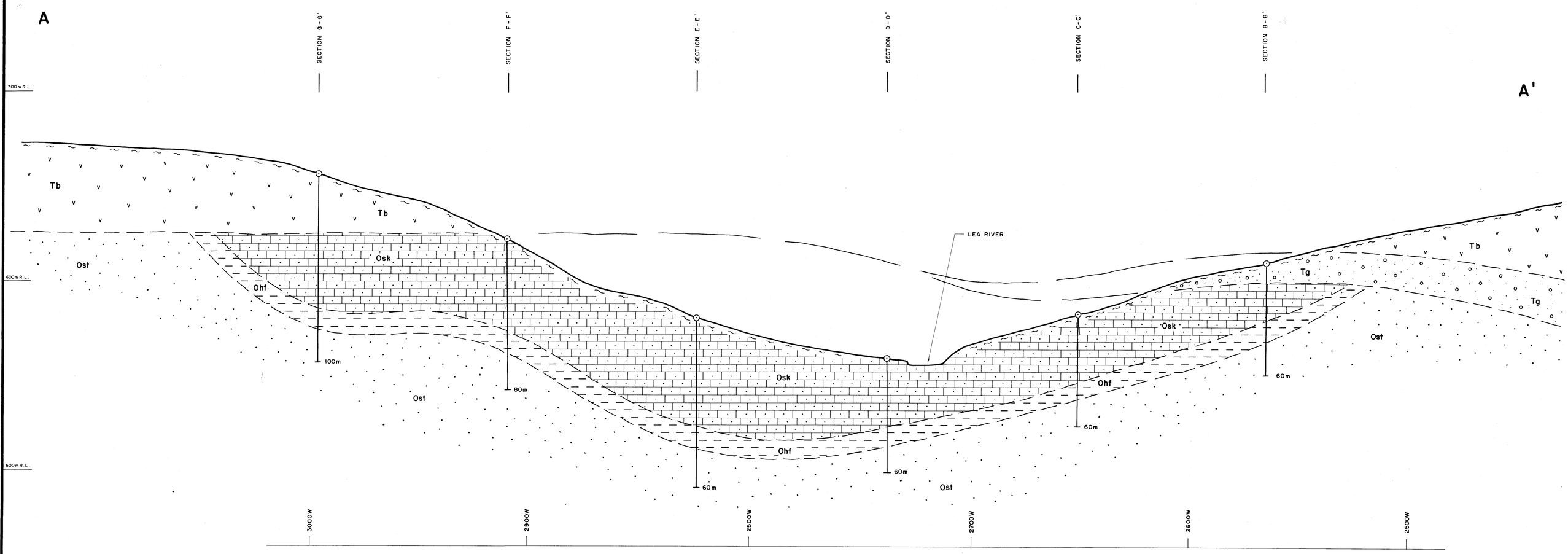
BASE PLAN No

OVERLAY PLAN No

SCALE

FIG. 38

LONG. SECTION A-A'



5 cm

LEGEND

TERTIARY

- Tb — Basalt
- Tg — Greybilly

ORDOVICIAN

- Osk — Skarn
- Ohf — Hornfels
- Ost — Sandstone

~ ~ Alluvium

708459

88-2888

RGC EXPLORATION PTY. LIMITED
INCORPORATED IN NEW SOUTH WALES

7864	COMPILED	M.J.F.
	DRAWN	G.B.
	DATE	NOV. 1988
	CHECKED	
	1:250,000 REFERENCE	

LAKE LEA - E.L. 41/83

FLETCHERS ADIT AREA

INTERPRETIVE SECTION

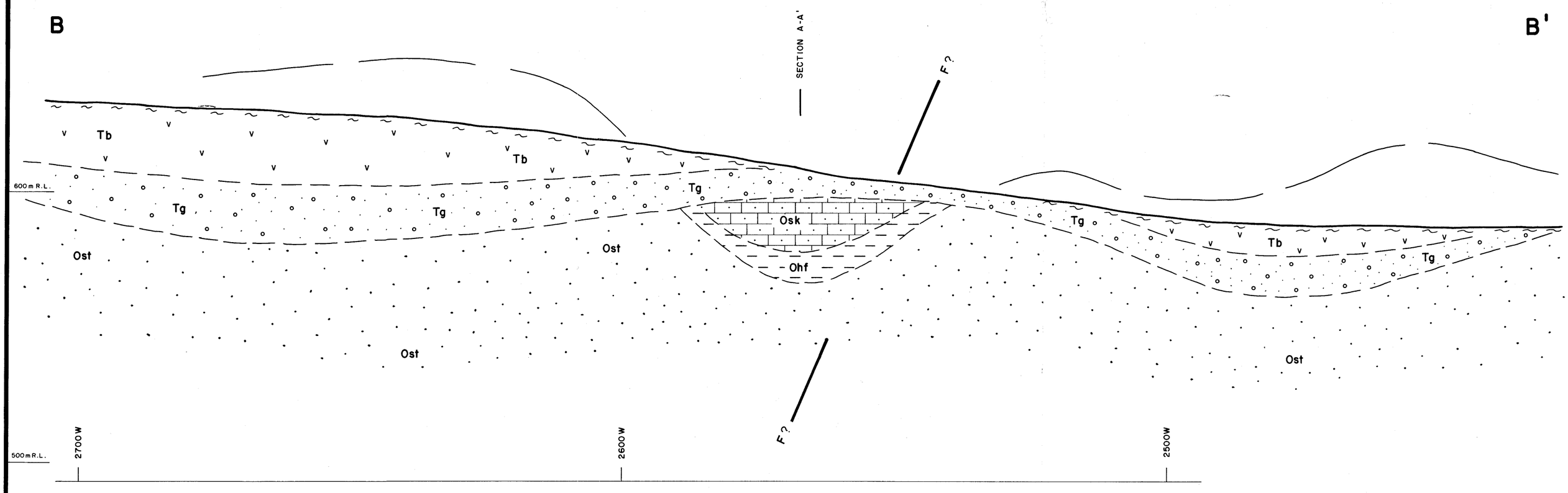
BASE PLAN No.

OVERLAY PLAN No.

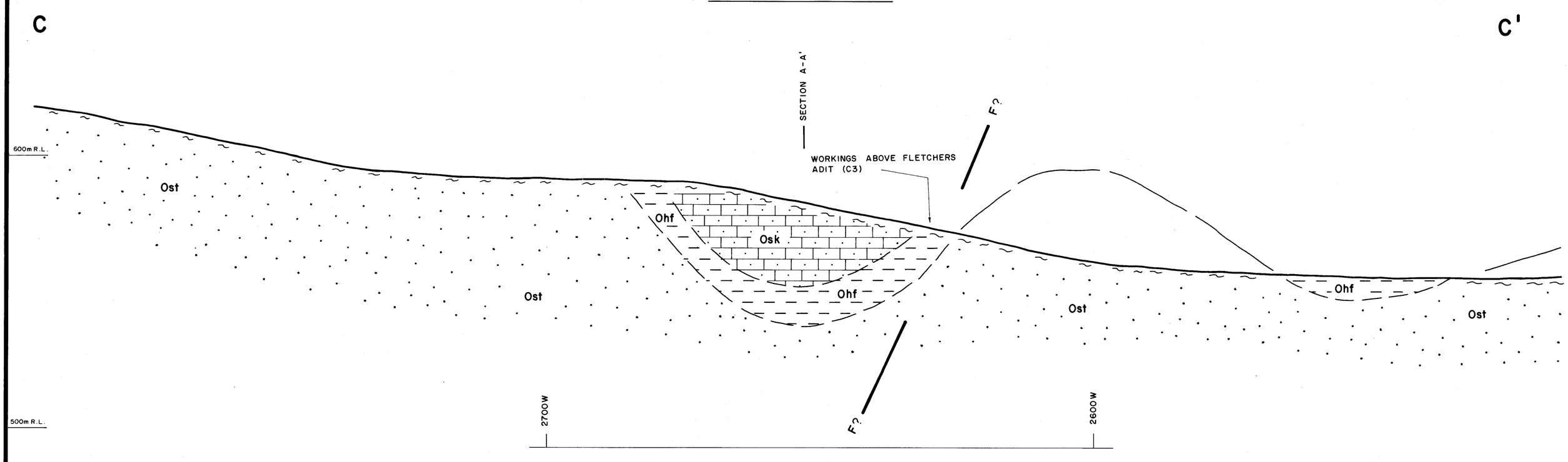
SCALE 1:1000 (10 0 20 40)

FIG. 39

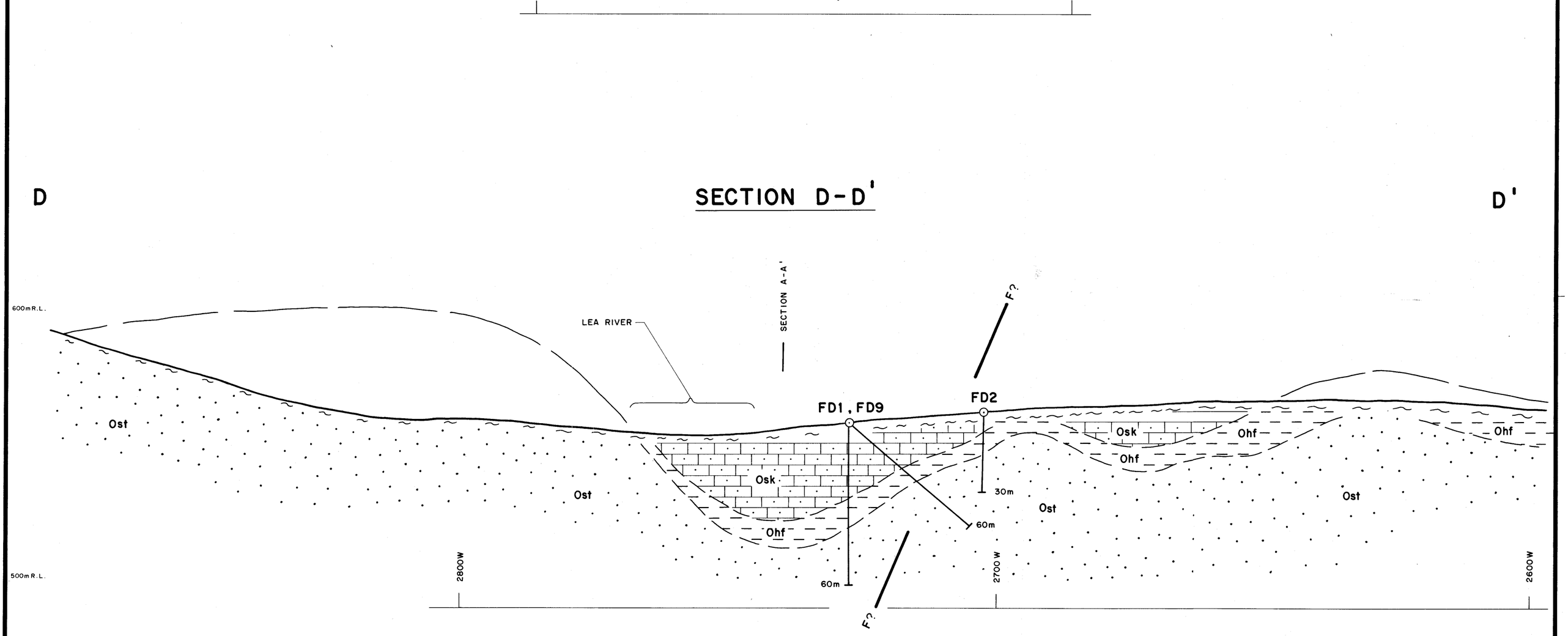
SECTION B-B'



SECTION C-C'



SECTION D-D'



708460

5 cm

88-2888

LEGEND

TERTIARY

- Tb — Basalt
- Tg — Greybilly

ORDOVICIAN

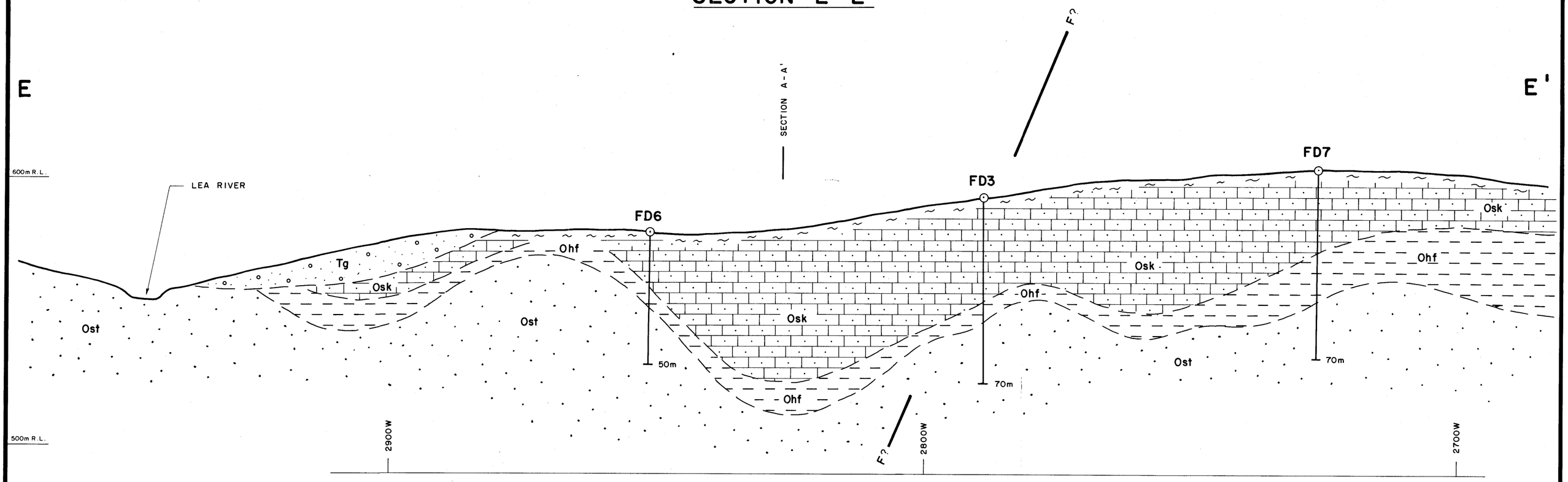
- Osk — Skarn
- Ohf — Hornfels
- Ost — Sandstone

~ ~ Alluvium

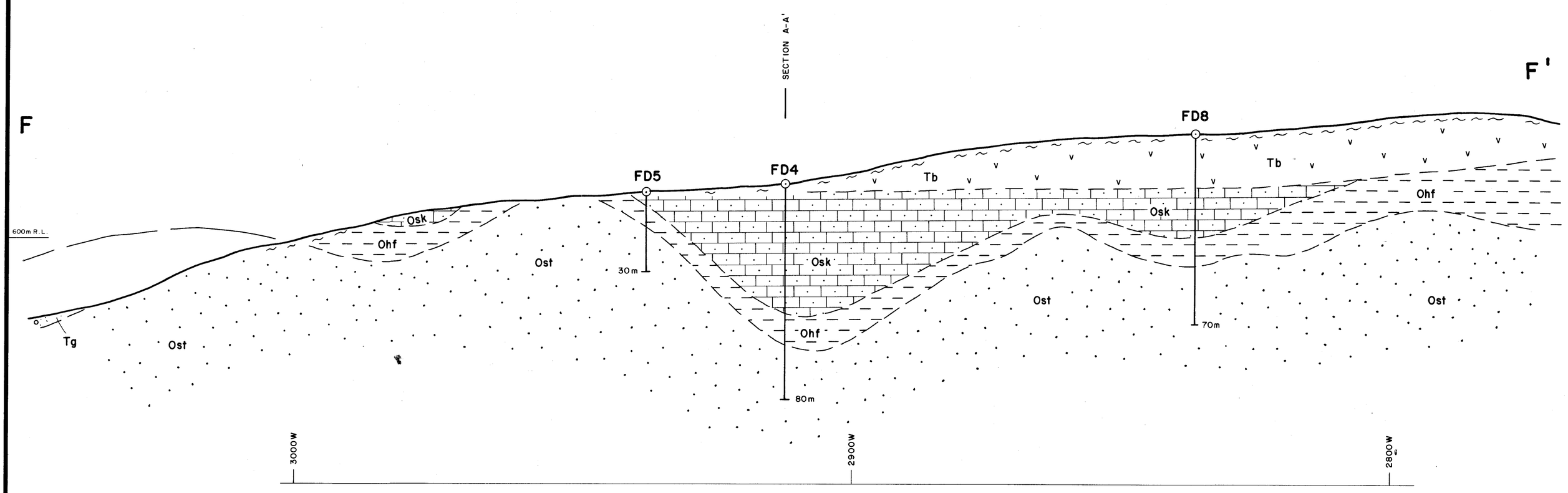
RGC EXPLORATION PTY. LIMITED INCORPORATED IN NEW SOUTH WALES			
7865	COMPILED	M.J.F.	LAKE LEA - E.L. 41/83 FLETCHERS ADIT AREA INTERPRETIVE SECTIONS WITH PROPOSED DRILLING
	DRAWN	G.B.	
	DATE	NOV. 1988	
	CHECKED		
	1:250,000 REFERENCE		
BASE PLAN No.	SCALE 1:1000	10 0 20 40	FIG. 40
OVERLAY PLAN No.			

7866

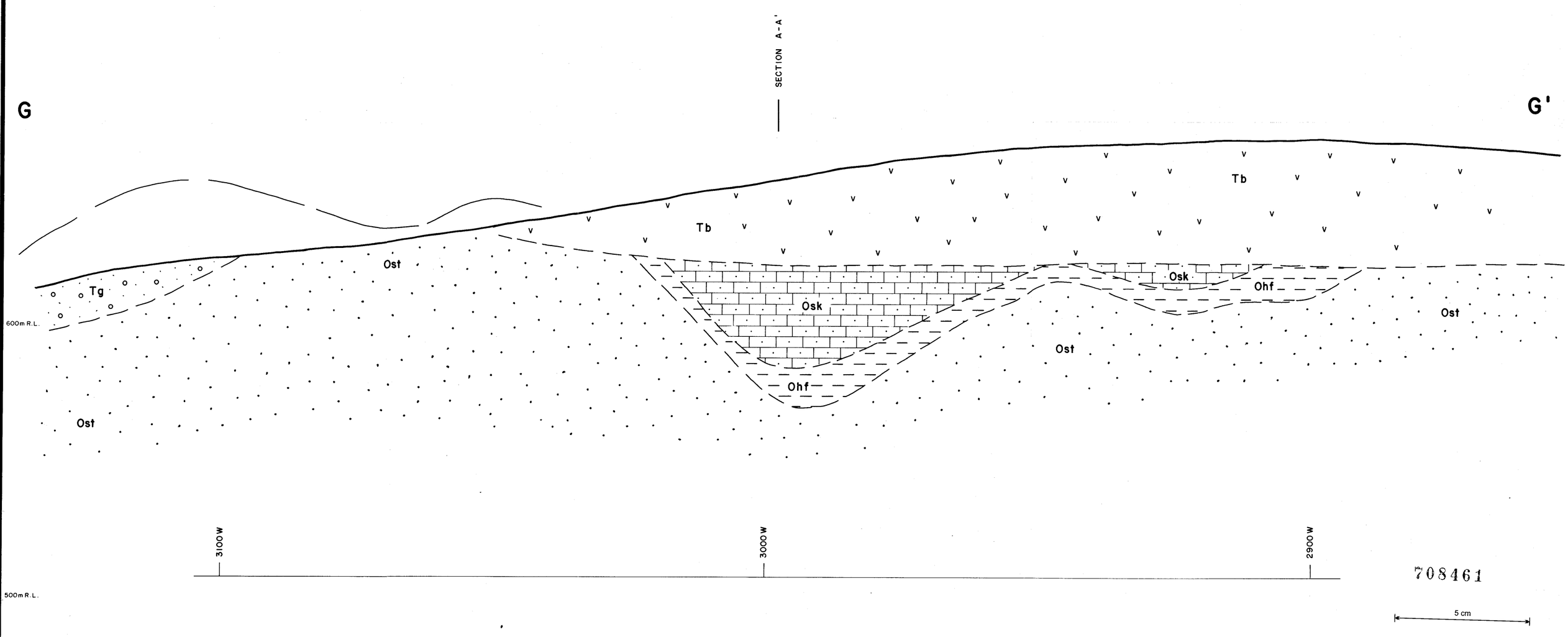
SECTION E-E'



SECTION F-F'



SECTION G-G'



708461

5 cm

88-2888

LEGEND

TERTIARY

- Tb — Basalt
- Tg — Greybilly

ORDOVICIAN

- Osk — Skarn
- Ohf — Hornfels
- Ost — Sandstone

~ ~ Alluvium

RGC EXPLORATION PTY. LIMITED
INCORPORATED IN NEW SOUTH WALES

7866	COMPILED	M.J.F.
	DRAWN	G.B.
	DATE	NOV. 1988
	CHECKED	
	1:250,000 REFERENCE	

LAKE LEA - E.L. 41/83
FLETCHERS ADIT AREA
INTERPRETIVE SECTIONS WITH PROPOSED DRILLING

BASE PLAN No.
OVERLAY PLAN No.
SCALE 1:1000 (10 5 0 20 40)
FIG. 41

419 000mE

419 200mE

419 400mE

419 600mE

419 800mE

420 000mE

5 406 400mN

5 406 200mN

5 406 000mN

FD4

FD3

FD5

FD6

FD8

FD1
FD9

T10254 | 0.02
10 | <5
165 | 4.0

T10249 | <0.008
30 | 10
95 | 0.5

T6897 | 0.010
25 | 50
340 | <0.5

T6898 | 0.020
100 | 45
100 | <0.5

T10241 | <0.008
20 | 15
90 | <0.5

T10240 | 0.010
60 | 20
180 | <0.5

T10242 | 0.030
30 | 20
270 | <0.5

T10247 | 0.030
10 | 30
130 | <0.5

T10245 | <0.008
30 | 10
50 | <0.5

T10237 | 0.010
30 | 20
110 | 0.5

T10238 | 0.010
20 | 15
60 | <0.5

T10244 | 1.680
35 | 130
110 | 0.5

T10243 | 0.010
30 | 25
220 | <0.5

T10239 | 0.010
55 | 20
120 | <0.5

T6899 | <0.008
90 | 260
690 | 1.0

T10250 | <0.008
30 | 25
35 | 0.5

T10248 | 0.010
20 | 25
75 | 1.0

LEA RIVER

3050W 3000W 2950W 2900W 2850W 2800W 2750W 2700W 2650W 2600W 2550W 2500W 2450W 2400W 2350W 2300W 2250W

KEY:

SAMP.NO. | AU
CU | PB
ZN | AG

⊙ OUTCROP
× FLOAT

5 cm

708462

● FD7 Proposed drill hole

7867

88 - 2888

RGC EXPLORATION PTY. LIMITED

LAKE LEA E.L. 41/83

FLETCHERS ADIT AREA

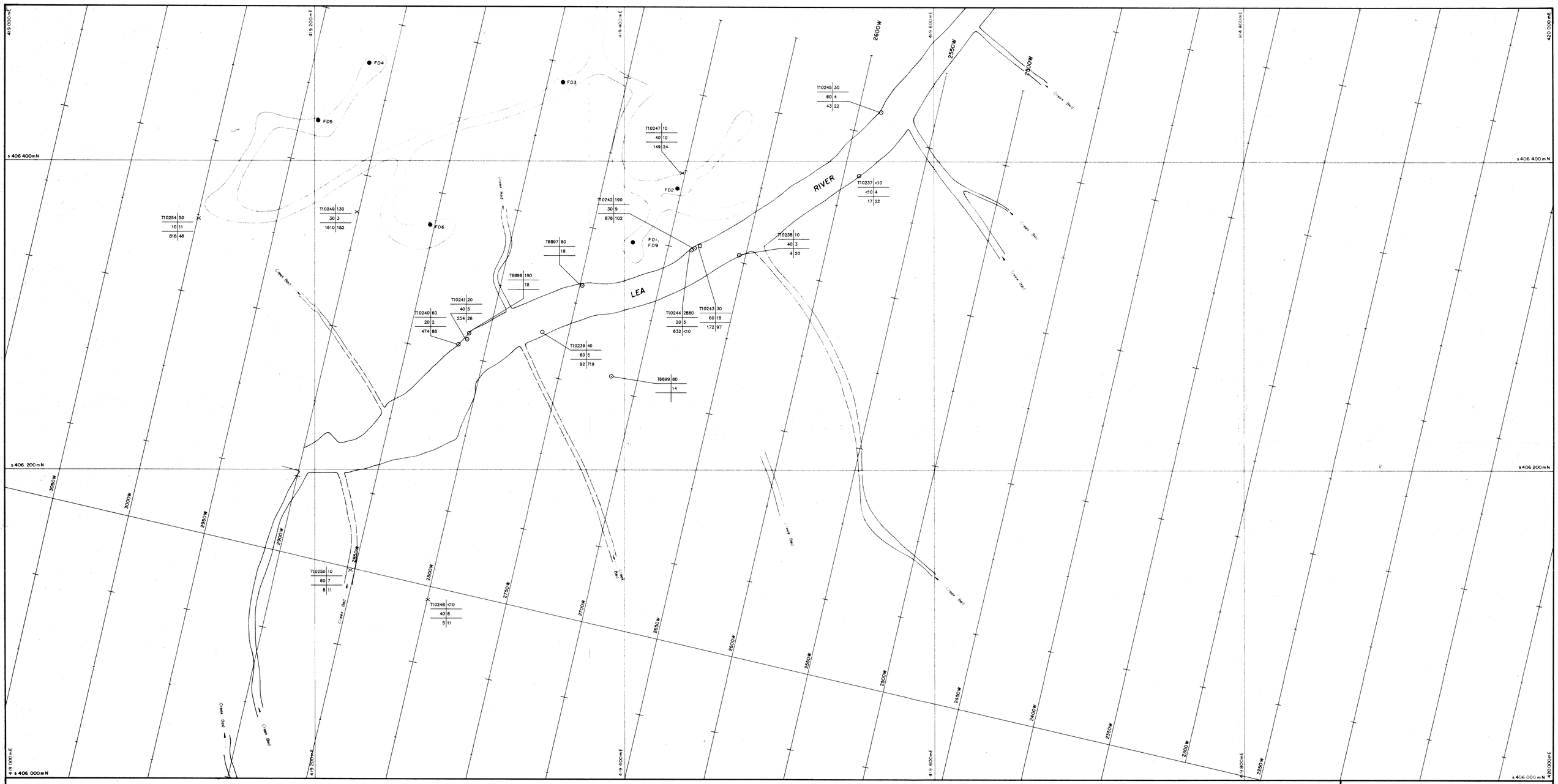
ROCK GEOCHEMISTRY

AU, CU, PB, ZN and AG

SCALE 1:1000 20 10 0 20 40 METRES

DRAWN BY M.J.F.
DRAFTSMAN
DATE FEB. '88
REVISIONS
FILE NO.

FIG 42



708463

7868

88-2888

KEY:

SAMP.NO. | BI
MO | AS
SN | W

⊙ OUTCROP
✕ FLOAT

● FD7 Proposed drill hole

5 cm

RGC EXPLORATION PTY. LIMITED

LAKE LEA E.L. 41/83

FLETCHERS ADIT AREA

ROCK GEOCHEMISTRY

BI, MO, AS, SN and W

DRAWN BY	M.J.F.
DRAFTSMAN	
DATE	FEB. '88
REVISIONS	
FILE NO.	

SCALE 1:1000 — 20 10 0 20 40 METRES

FIG. 43

C6 Cutting 10215 14 16 12 13 17 C7 Trench

C8 18 Trench

L2600W/9505

FLETCHERS ADIT

04 03 02 10201 9999 [90 91 92 93 94 95 96 97 98 99 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89] C1

C2 88 89 90 91 92

C3 81 82 83 84 85

L2700W/10505

9464 65 66 67 68 69 70 71 72 73 74 75 76 77 78

RIVER LEA
Bed Outcrop Sampling

10202 08 09 10

M.N. 708464

5 cm

88-2888

REVISIONS	RGC EXPLORATION PTY. LIMITED INCORPORATED IN NEW SOUTH WALES		
7869	GEOLOGIST	M. J. F.	E.L. 41/83 FLETCHERS ADIT AREA SAMPLE LOCATIONS
	DRAWN	G. B.	
	DATE	Feb. 1988	
	CHECKED		
	1:250000 REF.		
	SCALE 1:500	10 5 0 10 20	FIG. 44

C6 Cutting

C7 Trench

C8 Trench

L2600W/9505

FLETCHERS ADIT

C1

C2

C3

L2700W/10505

RIVER LEA
Bed Outcrop Sampling

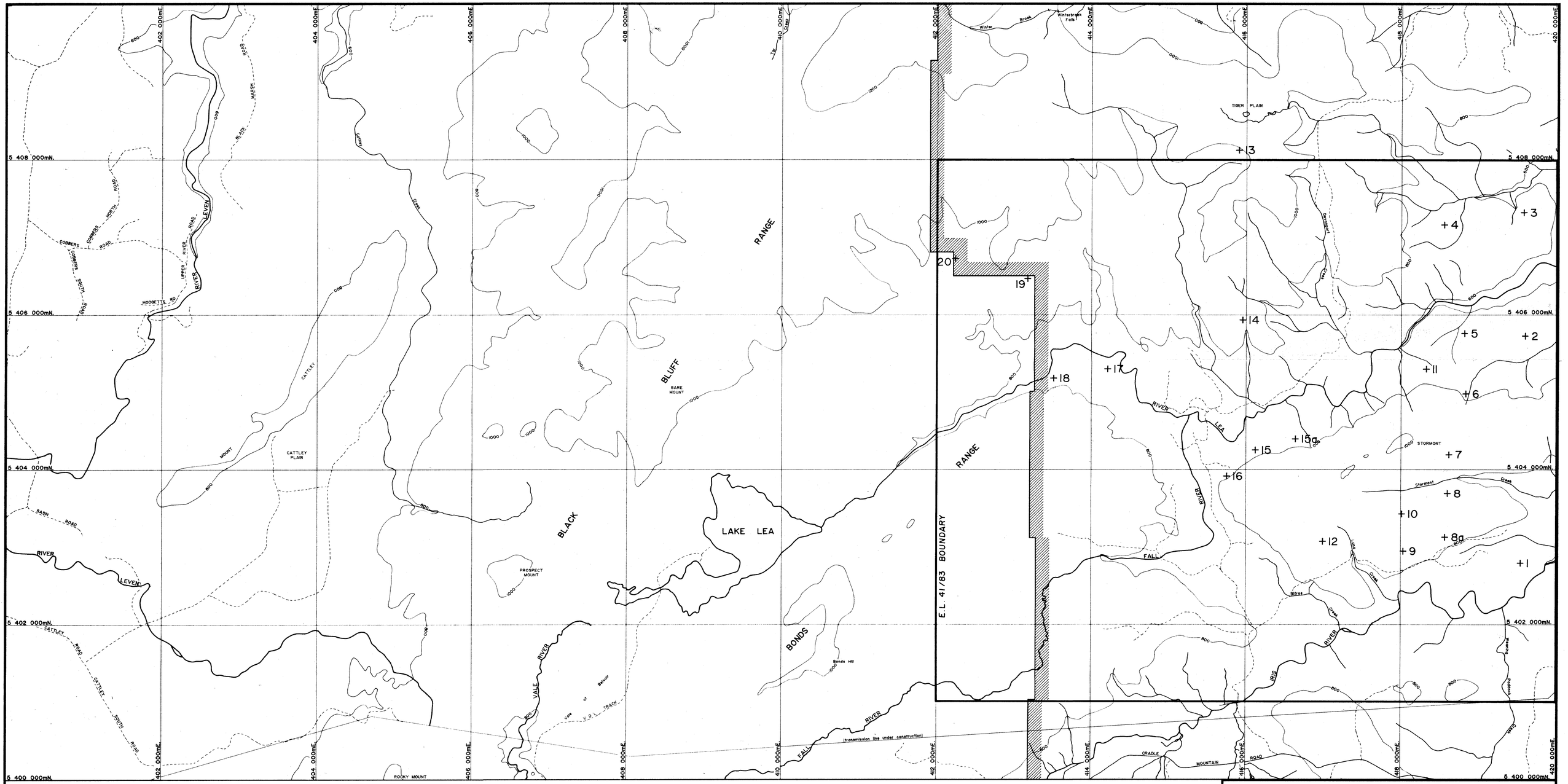
M.N. 708465

5 cm

NOTE - X = <0·008 ppm

88-2888

REVISIONS	RGC EXPLORATION PTY. LIMITED INCORPORATED IN NEW SOUTH WALES		
7870	GEOLOGIST	M J F	E.L. 41/83 FLETCHERS ADIT AREA GOLD GEOCHEMISTRY P.P.M.
	DRAWN	G.B.	
	DATE	Feb 1988	
	CHECKED		
	1:250000 REF		
	SCALE 1:500	10 5 0 10 20	FIG. 45



5 cm

GRID CONVERGENCE 1.0°

GN TN MN

GRID/MAGNETIC 11.6°

INDEX TO ADJOINING SHEETS

GUILDFORD	LOONGANA	WILMONT
PEARSE	LEA	GETHANA
CHARTER	PENCIL PINE	LIENA

7084 66

88-2888

RGC EXPLORATION PTY. LIMITED
(INC. IN N.S.W.)

7871

COMPILED	M.F.	
DRAWN	T.G.D.S.	
DATE	Oct. 1988	
CHECKED		
1:25,000 REFERENCE	LEA	

LAKE LEA - E.L. 41/83

E.L. 41/83

SHELL AEROMAGNETIC SURVEY

"BULLSEYE" ANOMALIES

(J.R.B. Aug. '88)

BASE PLAN No.

OVERLAY PLAN No.

SCALE 1:25000 100 50 0 50 100 150 200 METRES

FIG. 63