

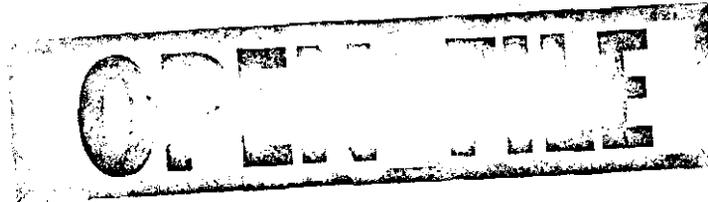
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EL 9/84 LYNCHFORD - TASMANIA



TRIKON INTERNATIONAL

THE HARVEY'S CREEK MAGNETIC ANOMALY

COMPILATION OF GEOLOGY AND MINERAL POTENTIAL

By Roger Poltock Geological Pty. Ltd.

June-July 1986

For Trikon International



PHOTOGRAPHS

1. View North along Queen River Valley from 367,700E 33,300N
2. View SW across Harvey's Creek area from 376,700E 33,300N
3. Line 500N 720E, Teatree, banksia regrowth typical of Harvey Creek area
4. Cambrian volcanoclastic 200N 700-720E
5. Ordovician Rinadeena Mudstone 100N 600E calcareous siltstone with calcite veins.
6. Siluro-Devonian quartzite 250N 800E
7. View NW along Sulphide Creek from 376700E 33300N

APPENDICES

- i) Magnetic data - Harvey's Creek
- ii) Interpretation of the Harvey's Creek Magnetic Anomaly EL 9/84 Mitre Geophysics Pty. Ltd.

REFERENCES

McDonald, 1983

Electrolytic Zinc Company of Australasia Ltd., SPL806, Report on Exploration Activities for the 12 Months, March 1982 - 1983.

Mines Dept., Tas., Strahan, 1:50,000 Geology.

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Nye, 1941

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Poltock, 1985

EL 9/84 Lynchford, Stream Sediments and Reconnaissance Geology

SUMMARY

Ground follow up of an aeromagnetic anomaly in the S.E. corner of EL 9/84, the source of this anomaly is a fault wedge of slightly magnetic Cambrian volcanoclastics.

The volcanics are unaltered, the magnetite occurring as detrital grains and/or veinlets. Geochemistry in this area is limited to Cu/Pb/Zn/Au stream sediments, none of which are anomalous.

The wedge of volcanics is associated with a major N-NW trending fault, consisting of two southern branches which coalesce in Sulphide Creek.

This structure controlled sedimentation in late Cambrian-Ordovician and is interpreted to be related to gold, antimony, silver lead mineralization within the licence i.e. Rinadeena P.A., Sulphide Creek and Starting Creek/Tully River. To north and south of the licence the faults are associated with the Macquarie Woody Hill, Flannigan's Flats and Harris' Reward prospects.

It is recommended that this structure and the associated magnetic anomaly be further investigated along its entire strike within the licence by bedrock geochemical traverses.

Gold mineralization associated with carbonates and silicified quartzites is primary exploration target.

CONCLUSIONS - RECOMMENDATIONS

Potential exists in the eastern part of EL 9/84 for gold-antimony-silver-lead-zinc mineralisation associated with the intersection of the major fault system and favourable host horizons (see Fig. 1 and 2); i.e. Gordon Limestone, silicified Crotty and Florence quartzite and Bell Shale.

It is recommended that the next phase of exploration is the systematic bedrock sampling of the fault zone and these favourable host horizons. The aim to delineate areas warranting more detailed work and ultimately define diamond drill targets. At this stage it is premature to drill the magnetic anomaly located at Harvey's Creek.

An additional recommendation is that reconnaissance geological and geochemical work be carried out in the Starting Creek area to assess the style and extent of silver lead mineralization.

INTRODUCTION

This report details all activities in EL 9/84 for the period July 1985 - June 1986. Work includes the investigation of the Harvey's Creek magnetic anomaly and compilation of geology and mineral potential of the entire E.L. (see Fig. 1).

The magnetic anomaly is located at the headwaters of Harvey's Creek approximately 2 km SW of the Lynchford H.E.C. camp (Photos 1 and 2). Current access is via the ABT Railway, then south along a cut base line. Three E-W traverses 300 m apart have been made across the anomaly (see Fig. 2, 3). Geophysical interpretation and modelling of this anomaly has been carried out by Dr. John Bishop, Mitre Geophysics (Appendices i and ii).

Stratigraphy consists of Upper Cambrian-Devonian volcanoclastics, sandstone, limestones and shales. The main structural feature is a broad North trending syncline, most of the licence lies within the eastern limb, the axis in Starting Creek area. The fold is complicated by a major N-NW trending fault in the Harvey's Creek - Sulphide Creek area. This fault can be traced 10 km south to Flannigan's Flats (pers com, Clive Calver Mines Dept.).

Mineralization is Devonian age and is interpreted to have been controlled by the N-NW trending faults. Styles of mineralization within and adjacent to the E.L. include:

- a) Antimony, silver, lead, gold in carbonates and shales  
: Rinadeena Antimony, Starting Creek silver-lead.

b) Gold in silicified quartzites and quartz pyrite veins

: Sulphide Creek, Macquarie-Woody Hill, Harris' Reward, Flannigan's Flats.

c) Magnetite-pyrrhotite skarns with gold, tungsten, tin.

: Harvey's Creek magnetic anomaly This style of mineralization has been interpreted to be associated with this anomaly. (See Appendix ii Mitre Geophysics). However there is no known mineralization of this style in the Queenstown area.

All exploration work to date has been concentrated in the area east of Strahan Road and is reported on by:

McDonald, E.Z. Co. of Australasia, April 1983, SPL 806

- Geological reconnaissance and stream geochemistry.
- Geophoto study, Misery Flat Area, Hunting Geology, Geophysics.
- A preliminary Interpretation of Geomagnetic Survey, Leaman, Geophysics.

Poltock, 1985

- E.L. 9/84 Lynchford, Stream Sediments and Reconnaissance Geology.



PHOTO 1:

Looking north along Queen River Valley from  
376,700E; 33,300N

Lynchford H.E.C. camp and helipad (right foreground)  
Queenstown beneath thick valley fog (centre distance)  
Mt. Sedgwick, Mt. Lyell (horizon)



PHOTO 2:

View SW across Harvey's Creek area from 376,700E, 33,300N

The mist filled valley (centre right) 500N line,

fault and magnetic anomaly.



PHOTO 3:

Line 500N, 720E. Teatree, banksia regrowth typical of the Harvey's Creek area.

HARVEY'S CREEK MAGNETIC SURVEY

This report deals with the initial ground investigation of an aeromagnetic anomaly defined by the Mines Dept. Survey in Western Tasmania, 1981.

The anomaly is located in the SE corner of the E.L. at the headwaters of Harvey Creek (see Photo 2).

Access to the area is via the ABT Railway, then a cut line to south. Three traverse lines were cut across the anomaly at 300 m spacings, 200N, 500N, 800N, a total 1,780 metres (see Fig. 2 and 3).

Topography is steep, streams deeply incised. Vegetation cover is uniform teatree, banksia regrowth (Photo 3), with some myrtle, sassafras rainforest in stream gullies.

A Scintrex MP2 proton magnetometer was used for the survey, readings recorded each 20 m (see Appendix i). The data and interpretation is presented by Mitre Geophysics (Appendix ii).

STRATIGRAPHY

The following discussion of lithologies is primarily based on observations made in the Harvey's Creek area and data collected in conjunction with the stream sediment and reconnaissance mapping programme. Poltock 1985.

Cambrian Volcaniclastics

The only Cambrian outcrops are located in the Harvey's Creek area at 200N, 700-720E and 790N, 370E. Volcaniclastics occur as a steeply dipping fault wedge approximately 60 m wide within Ordovician-Devonian quartzites (see Drawings 2, 3 and Appendix ii, Fig. 1 and 2). Despite the fact that the volcanics are located within a major fault zone deformation and alteration is not significant (see Photo 4).

Exposure of this unit is poor, usually covered by quartzite scree, and is only known from rock fragments within clay soils.

The volcaniclastic is medium grained, composed of feldspar crystals and rock fragments of volcanics and chloritized glass (see Photo 4). Minor magnetite occurs, interpreted to be detrital grains and/or veinlets.



PHOTO 4:

Cambrian Volcaniclastic 200N, 700-720E

Ordovician Owen Conglomerate - Moina Sandstone

Quartzites outcrop between the Harvey's Creek grid and the Abt Railway. These pale micaceous quartzites aren't typical of the Owen Conglomerate - Moina Sandstone, and are difficult to differentiate from Siluro-Devonian quartzites in the area.

The quartzites are defined as Ordovician on the basis of Mines Dept. mapping, Strahan 1:50,000 and pers com Seymour and Calver.

On the Harvey's Creek grid the quartzite and some conglomerate beds outcrop on the western ends of lines 200 and 500N. The conglomerate at 200N, 680E may be a fault breccia.

This basal Ordovician sequence varies greatly in thickness; in the Queen River valley it is either absent or only the thin conglomeratic Pioneer Beds. West of Harvey's Creek it is a thick micaceous quartzite. This variation in style and thickness in sedimentation is interpreted to indicate structurally controlled deposition by the N-NW trending faults. A similar change in sedimentation exists across this fault structure at Flannigan's where it is associated with gold mineralization (pers com C. Calver Mines Dept).

Ordovician Gordon Limestone - Rinadeena Mudstone

This sequence of carbonates, shale and mudstone lie between the quartzose Owen Conglomerate-sandstone and overlying Crotty-Florence Quartzite.

Outcrop is usually poor, drainage channels and valleys following these less resistant horizons (see Fig. 2, Photo 7).

Thinly bedded black siltstone and limestone outcrop in streams at 100N, 600E, and 800N, 300E, Harvey's Creek (see Photo 5, Fig. 3).

A black decomposed pug formation described by Nye, 1941, at the Rinadeena Antimony prospect is probably weathered Gordon Limestone. At this location it is reported to contain nodules of stibnite.

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PHOTO 5:

Ordovician Rinadeena Mudstone 100N, 600E  
Calcareous siltstone with calcite veins

Siluro-Devonian

Correlates of the Crotty and Florence Quartzite haven't been differentiated. These quartzites form the major proportion of outcrop east of the Strahan Road, occurring as resistant strike ridges (Photo 7).

The dominant lithology is a pale grey micaceous sandstone which has undergone varying degree of silicification and quartz veining (photo 6).

PHOTO 6:

Siluro-Devonian Quartzite 250N, 800E  
Micaceous quartzite with quartz veining



STRUCTURAL GEOLOGY

The regional structure is a broad syncline striking N-NW, its axis located in the Starting Creek area. The more prospective part of the licence lies within the eastern limb, Cambrian-Devonian sediments dipping and facing west.

This fold is complicated by a set of N-NW trending faults, the two main branches coalescing in Sulphide Creek 1 km north of the Abt Railway (Photo 7). These faults have been active since the Cambrian, controlling deposition of late Cambrian - basal Ordovician sediments, and facilitating entry of mineralising fluids.

Displacement on the faults is marked south of the Abt Railway. The two faults are interpreted to bound a graben like block of Siluro-Devonian quartzite. At Harvey's Creek the quartzites are in "juxta position" with Cambrian sediments.

Further north in Sulphide Creek the faults coalesce, following shale and carbonate horizons, displacement primarily as bedding plane slip.



PHOTO 7:

View NW along Sulphide Creek from 376,700E, 33,300N  
Two faults coalescing in Sulphide Creek (patch of fog) - centre right  
Ridges are Siluro-Devonian quartzite, valleys shales and carbonates.

MINERALIZATION

All mineralization is considered to be Devonian age, controlled by N-NW trending fault structures.

Documented styles of mineralization include auriferous quartz pyrite veining in quartzites shales limestones, and antimony associated with limestone. There are no known magnetite, pyrrhotite skarn occurrences or associated Devonian granitic intrusives in the Queenstown area.

Magnetite - Harvey's Creek

This anomaly is in part caused by weakly magnetic Cambrian volcanic derived sediments which outcrop at 200N 700-720E, the magnetite occurring as fine detrital grains and/or veinlets.

The volcanics occur within a major fault zone, as a slither 60-80 m wide (see Drawing 3), despite this location lack any marked deformation or alteration (Photo 4).

The geophysical interpretation of the anomaly fits observed geology:

steep east dipping body, 50-60 m width, depth 10 m at 200N and plunging to the north (see Drawing 3 Appendix ii, Mitre Geophysics Figures 1 and 2).

On 500N a second part of the anomaly is interpreted, consisting of magnetite pyrrhotite veining. Mitre Geophysics recommends a drill hole test but this won't be carried out until the feature has been further substantiated by bedrock geochemistry.

Geochemical coverage of the magnetic anomaly is limited to stream sediments Poltock 1985, analyzed for Cu, Pb, Zn, Au, no anomalies were located.

The northern part of the anomaly is covered by old prospect leases, presumably for gold and antimony. One tunnel (<10 m long) was located at 790N 370E in weathered Cambrian sediments?

This area will be tested by bedrock geochemistry in the coming season, analyzing for Au, As and Sb.

#### Rinadeena Antimony

A cluster of old prospect leases are located in the Gorings-Harvey's Creeks area (see Fig. 1). Nye, 1941, is the only reference cited on these workings.

Prospecting was carried out in 1906-1907, a 41 m tunnel driven across a black decomposed pug formation, stibnite nodules occurring in similar material at the surface. Analysis of the nodules from the surface returned: gold nil, silver trace, lead 1.05%, copper nil, arsenic 0.02%, antimony 66.57%.

The stibnite nodules are interpreted to be eluvial concentrations from the weathering of Gordon Limestone. Nodules primarily formed by a low temperature Mississippi Valley style mineralizing event associated with the major N-NW faults. Similar silver lead zinc mineralization occurs in this limestone at Zeehan 20 km to the north.

This area in part overlaps with the Harvey's Creek magnetic anomaly; and will be assessed jointly for gold, antimony mineralization with bedrock geochemistry.

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Silicification, quartz limonite/pyrite veining Sulphide Creek

Within the fault zone in Sulphide Creek several old leases presumably for gold coincide with silicified Siluro-Devonian quartzites. The only working located to date is a collapsed adit at 375,500E, 36,700N at the northern extent of the fault zone near the Strahan Road, here highly jointed silicified quartzites with quartz limonite joint faces have been prospected. Woody Hill

Weak stream gold anomalies (max. 0.015 ppm) may be shed from this style of mineralization. No rocks have been assayed, but the area will be covered by bedrock sampling in the proposed programme for 1986-87 (see Drawing 1).

To the north and south of the E.L. small amounts of gold have been won from quartz veining and associated alluvials. These are reported on by Montgomery, 1894, and Nye, 1941, and include the Macquarie-Woody Hill, Harris' Reward, Flannigan's Flats and Princess River.

With the exception of Princess River, all these prospects are located on or adjacent to the N-NW trending fault system which has been mapped in Harvey's - Sulphide Creeks.

Alluvial gold 1 km SW of Lynchford in Hall's Creek which was previously interpreted to have been derived from the Lynchford Queenstown area via the Queen River. Alternatively, a local source is proposed, gold being shed from the same fault structure which is associated with the Harris' Reward mineralization 2.5 km to the S.E. (see Fig. 1).

Silver lead Starting Creek/Tully River

In this area a N-NW trending cluster of old mining leases occur (see Fig. 1), including a reward claim for silver lead.

The leases coincide with the axis of a regional syncline in the Devonian Bell Shale, the trend of which is sub-parallel to the Harvey's Creek - Sulphide Creek fault system.

It is recommended that the area be covered by reconnaissance geological mapping in conjunction with stream and rock geochemistry to assess the style and extent of mineralization.

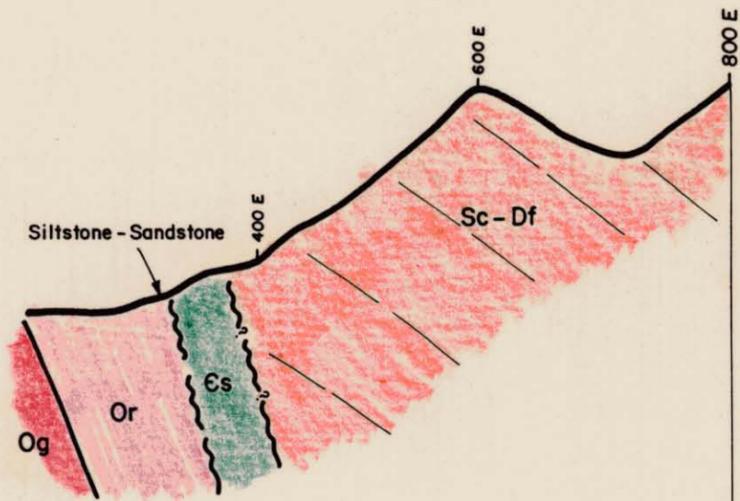
R. Poltock

July 1986





240m A.S.L.



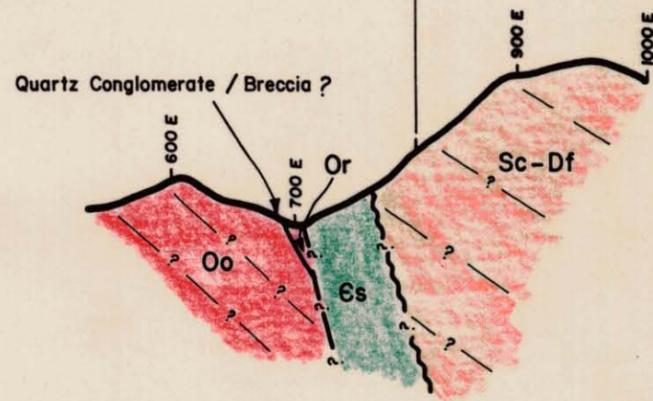
LINE 800N

240m A.S.L.



LINE 500N

240m A.S.L.



LINE 200N

**KEY**

SILURO - DEVONIAN

Db Bell Shale

Sc-Df Crotty Quartzite - Florence Quartzite

ORDOVICIAN

Or Rinadeena Mudstone

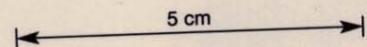
Og Gordon Limestone

Oo Owen Conglomerate

CAMBRIAN

Es Fine-medium grained volcanics

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TRIKON INTERNATIONAL	
E.L. 9/84	DRAWN BY: R.P.
HARVEY'S CREEK GRID	DRAFTSMAN T.G.D.S.
	DATE July '86
	REVISIONS:
	FILE NO.
SCALE 1:5000	FIG.3

Appendix i) Magnetic Data - Harvey's Creek

Appendix 1

Magnetic Data

Harveys CK

LINE 200N

LINE 500N

1000 E

1200 E

62420 f

62426 f

62440

62428

62420

62422

62425

62426

62430

62424

900 E

62433

1100 E

62426

62456

62428

62457

62427

62491

62428

62515

62428

800 E

62568

1000 E

62434

62756

62428

62775

62431

62730

62435

62406

62436

700 E

62309

900 E

62436

62363

62435

62378

62437

62397

62444

62399

62445

600 E

62404

800 E

62442

62399

62448

62453

62459

62464

700 E

62468

62477

62482

62498

62503

600 E

62526

02.

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LINE 500N

LINE 800N

580E

62543 Y

800E

62440 Y

62512

62426

62471

62428

62445

62424

500E

62430

62422

62422

700E

62425

62416

62425

62411

62425

62406

62427

400E

62410

62427

600E

62436

62428

62433

62433

62438

500E

62445

62437

62450

62465

62469

400E

62475

62447

62420

62417

62412

300E

62404

62408

200E

62414

62416

NE 800E

BASE LINE

200N

62549

62525

62508

62487

62483

300E

62467

62472

62457

62452

62459

400E

62451

62441

62442

62440

62428

500E

62460

62433

62426

62437

62437

600E

62420

62434

62428

62422

62411

700E

62419

62432

62420

62432

62418

800E

62428

Appendix ii) Interpretation of the Harvey's Creek Magnetic  
Anomaly E.L. 9/84. Mitre Geophysics Pty. Ltd.



# MITRE GEOPHYSICS PTY LTD

MINERAL EXPLORATION AND ENGINEERING CONSULTANTS

BUGGS LANE ELLIOTT TASMANIA 7325 PHONE 004-363143

INTERPRETATION OF THE HARVEY'S CREEK MAGNETIC ANOMALY

(E.L. 9/84).

for

Roger Pollock Geological Pty Ltd

by

Dr J.R. Bishop

RP/MG86/06  
June, 1986.



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FIGURES

- Figure 1. Harvey's Creek magnetic modelling: line 200N.
- Figure 2. Harvey's Creek magnetic modelling: line 500N.
- Figure 3. Harvey's Creek magnetic modelling: line 500N  
(extended data set).

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-SUMMARY

Follow up of an aeromagnetic anomaly in the southeast corner of E.L. 9/84 has located the response coincident with a prominent shear zone. Integrating the magnetic interpretation with the known geology, indicates that most, if not all, of the anomaly is caused by a wedge of Cambrian volcanics which dip steeply to the east and plunge to the north.

Since the shear zone has gold associated with it elsewhere along its strike length, a drill-hole is recommended to test this magnetic anomaly.



## INTRODUCTION

The Harvey's Creek magnetic anomaly lies in the southeast corner of E.L. 9/84 which is held by Tricon Corporation S.A. Pty Ltd. It is the more northerly of two isolated and adjacent anomalies defined by the 1981 aeromagnetic survey of Western Tasmania carried out for the Tasmanian Dept of Mines.

The anomaly overlies a northwest trending shear zone, which extends well to the north and south of the anomaly and which has some gold associations (Poltock, pers. comm.). In the region of the anomaly, the shear zone is structurally complex and brings into "juxtaposition Cambrian volcanics, Owen Conglomerate and Siluro-Devonian quartzite-shale" (Poltock, 1985).

Three magnetic traverses 300m apart plus a base-line traverse, define the magnetic anomaly. The total field was measured at 20m intervals using a Scintrex MP2 proton precession magnetometer and diurnal corrections were made by repeated readings at regular intervals. The data, with the geology referred to below, is included in the main body of the report by Poltock (1986), to which this interpretation is appended.

The prime target is gold. Type deposits for the Harvey's Creek area include a volcanic-hosted deposit, possibly structurally controlled; or, since there are calcareous units within the sediments, a carbonate replacement or skarn deposit.

## INTERPRETATION

The three ground traverses confirm the location of the northern aeromagnetic anomaly but have not fully outlined its extent\*. The southernmost line, 200N, recorded a sharp anomaly with an amplitude of more than 350nt. The peak of the response overlies Cambrian volcanics with Siluro-Devonian sediments on either side. The anomaly on line 500N, which has an amplitude of about 125nt, overlies only sediments (although outcrop is poor) and the broader shape indicates a deeper source. The northernmost line, 800N, has an amplitude of about 75nt and this also suggests a buried source. Line 800N overlies volcanics, offset to the east of the peak, with sediments on either side. The data from lines 200N and 500N have been quantitatively interpreted.

The modelling confirms a shallow source beneath line 200N (Figure 1). A body nearly 60m wide, at a depth of 10m provides an adequate fit to the data.

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\* The southern anomaly and possibly part of the northern response lie to the south of the E.L. boundary. Both anomalies are recognised in the summary of the 1981 aeromagnetic survey by Corbett et al (1982), where they are numbered (no. 21) and described as 50nt anomalies consisting of "two small circular features on a N-S trend". No possible sources are suggested.



Since the volcanics are magnetic, it seems likely that they are largely, if not solely, responsible for the magnetic anomaly on line 200N. The value of .0015cgs units used for the magnetic susceptibility is within the expected range for this rock type\*.

On line 500N, three bodies have been used to produce a close fit to the observed data. However, the eastern body, modelling a lithological unit, is only weakly magnetic and accounts for the gradual increasing gradient to the east. Simple removal of a regional would serve the same role as body 1 in Figures 2 & 3†.

Body no. 2 has a similar width and a comparable susceptibility to the model used for line 200N. They are likely to be the same source; probably volcanics, but on line 500N the causative body is buried to a greater depth; 55 to 60m is indicated.

Body no. 3 has a very similar susceptibility to no. 2 and they may in fact be one body. Alternatively, a narrow vein of magnetic material is suggested; eg, magnetite (or pyrrhotite) or a narrow basic intrusive within the fault zone.

Bodies with strike length 1000m long were used for the modelling, but any elongate bodies would give the same result for these relatively shallow sources@. The strike direction of 332° is the approximate direction of the shear zone indicated on the geological map (Follock, 1985) and the peaks of the magnetic responses are sub-parallel to this direction.

#### CONCLUSIONS AND RECOMMENDATIONS

Modelling of two lines over the Harvey's Creek magnetic anomaly has produced similar results; namely a moderately magnetic, broad (50 to 60m) body, dipping steeply to the east and plunging to the north. On line 200N, the peak of the response overlies magnetic Cambrian volcanics and it is suggested that these are the source of most of the anomaly. On line 500N a second body (no. 3 in the

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\* A partially weathered sample of volcanoclastic rock taken from this area responds to a magnet; ie, it is slightly magnetic. No unweathered samples are available and thus a true or representative susceptibility of the volcanics has not been obtained.

† Figures 2 & 3 are both of line 500N. The former is at the same horizontal scale as Figure 1. The latter shows a profile of the extended data set from this line.

@ The modelling program used, assumes that the profile is taken at right angles across the centre of the source. In this case, the shallow depth to the source means that the profile's position is not critical. The grid lines are not orthogonal to the magnetic anomaly, but the difference, ~30°, will not significantly alter the parameters of the interpreted sources. Induced magnetism only (ie, no remanence), was assumed for the models.



figures) has been invoked to provide a better fit. Its presence is by no means certain (and nor is it necessarily the target).

Although this anomaly has not been thoroughly defined, the existing data is probably adequate to define a drill target. The proposed drill-hole is indicated in Figures 2 & 3. It is collared at 680E/500N, at a bearing of grid west and with a dip of  $60^{\circ}$ . The position of this hole does not take into account topography or any possible access difficulties.

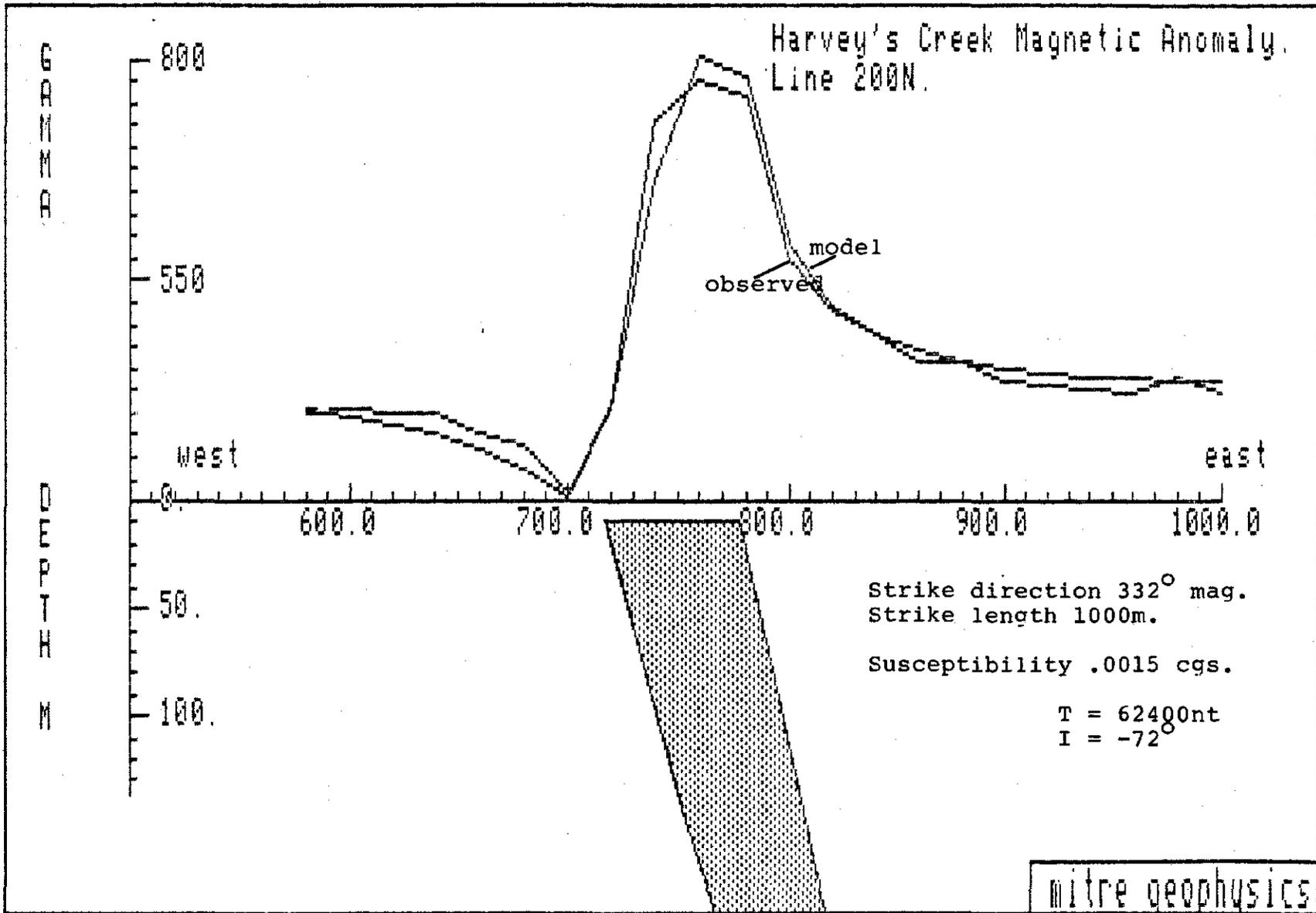
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June, 1986.



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FIG. 1.

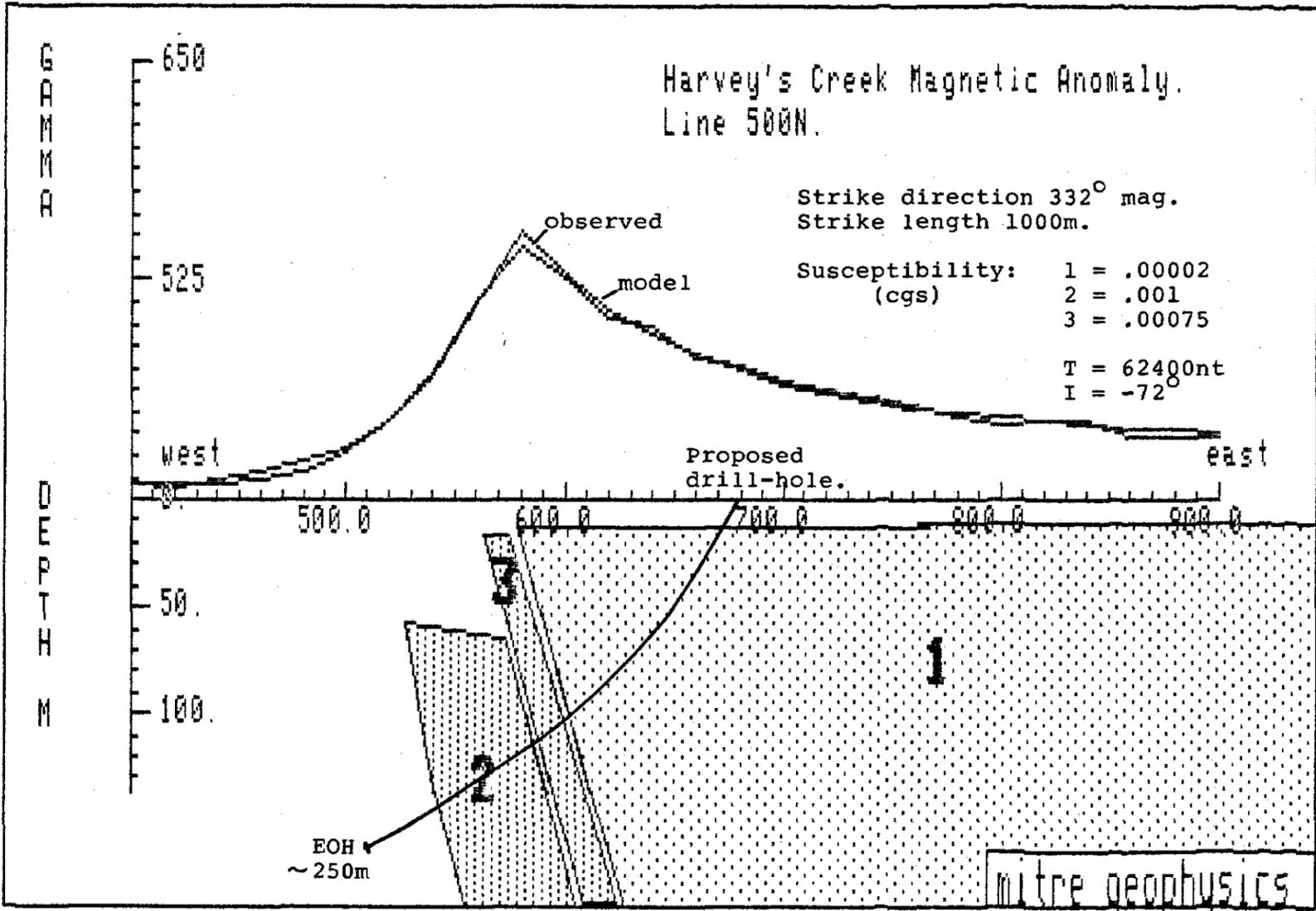


FIG. 2.

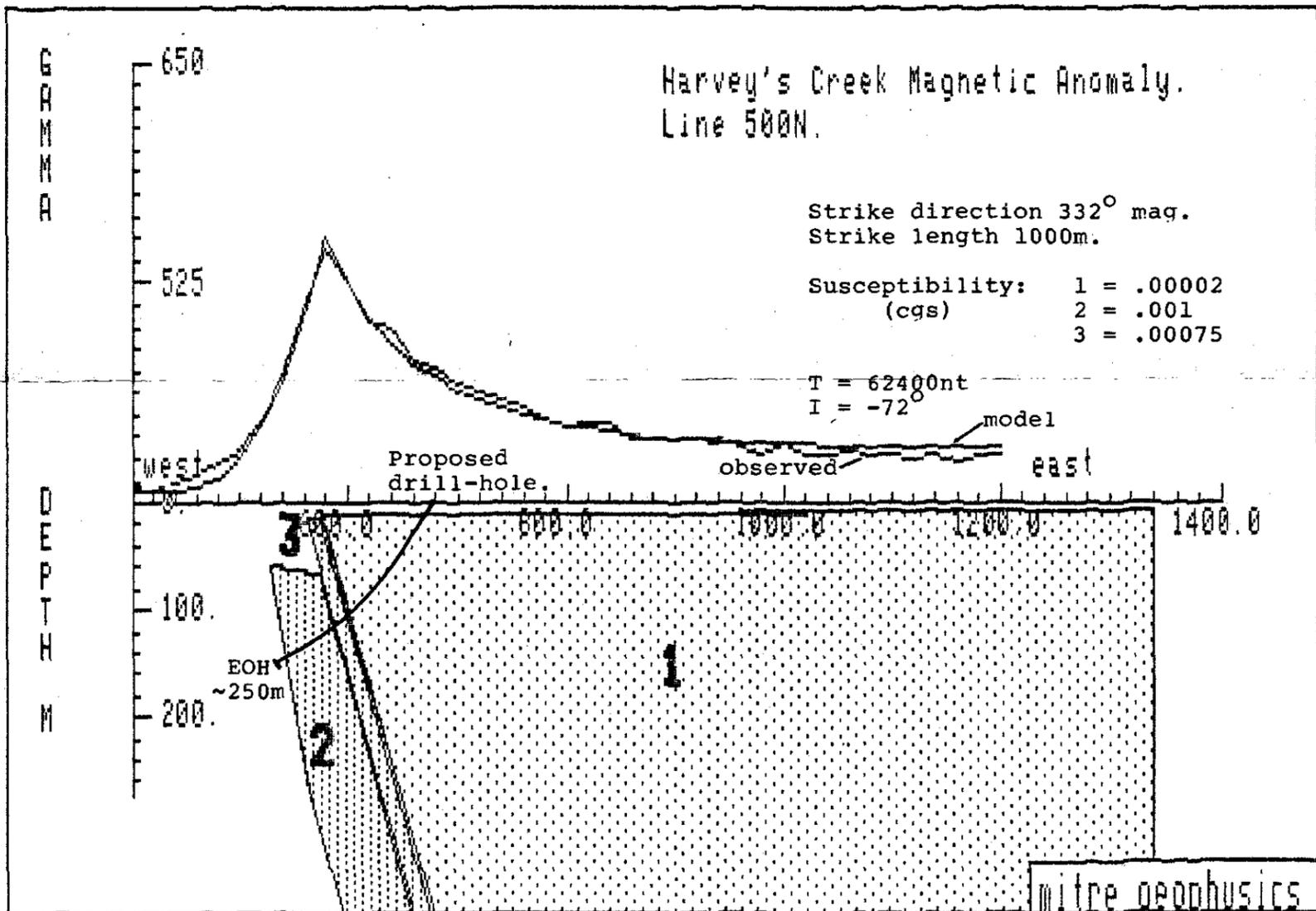


FIG. 3.

