022001

801504

D of M | CC & M | D.S.M.E.
RECEIVED 2 - DEC 1980
ANSWERED
DEPT OF MINES
REF. No. 9370/80
Registrar
E & IL
MG

MICROFILMED

VOLUME 1

PROGRESS REPORT

QUEEN HILL JOINT VENTURE

E.L. 47/71 TASMANIA

QUARTER TO JUNE 30, 1980

80-1504

OPEN FILE

This report covers the
Aberfoyle quarter (to period 6)
ending June 2, 1980.

C.H. Young,
Project Geologist,
Tasmania.

August 1980.

TABLE OF CONTENTS

	Page No.
INTRODUCTION	1
QUEEN HILL ORE RESERVE AND EXPLORATION DRILLING PROGRAMME	2
SEVERN, MONTANA AND GOLF COURSE LODES	2
QUEEN HILL GEOLOGICAL MAPPING	3 - 4 - 5 - 6 - 7 - 8
ST. DIZIER AREA REGIONAL GEOLOGICAL MAPPING	8 - 9 - 10
ST. DIZIER SKARN HORIZON	10 - 11 - 12
DIGHEM SURVEY	13
12 MILE CREEK DIGHEM ANOMALY	14
QUEEN HILL BULK SAMPLE	14
WORK PLANNED	15
EXPENDITURE	15 - 16
REFERENCE	16

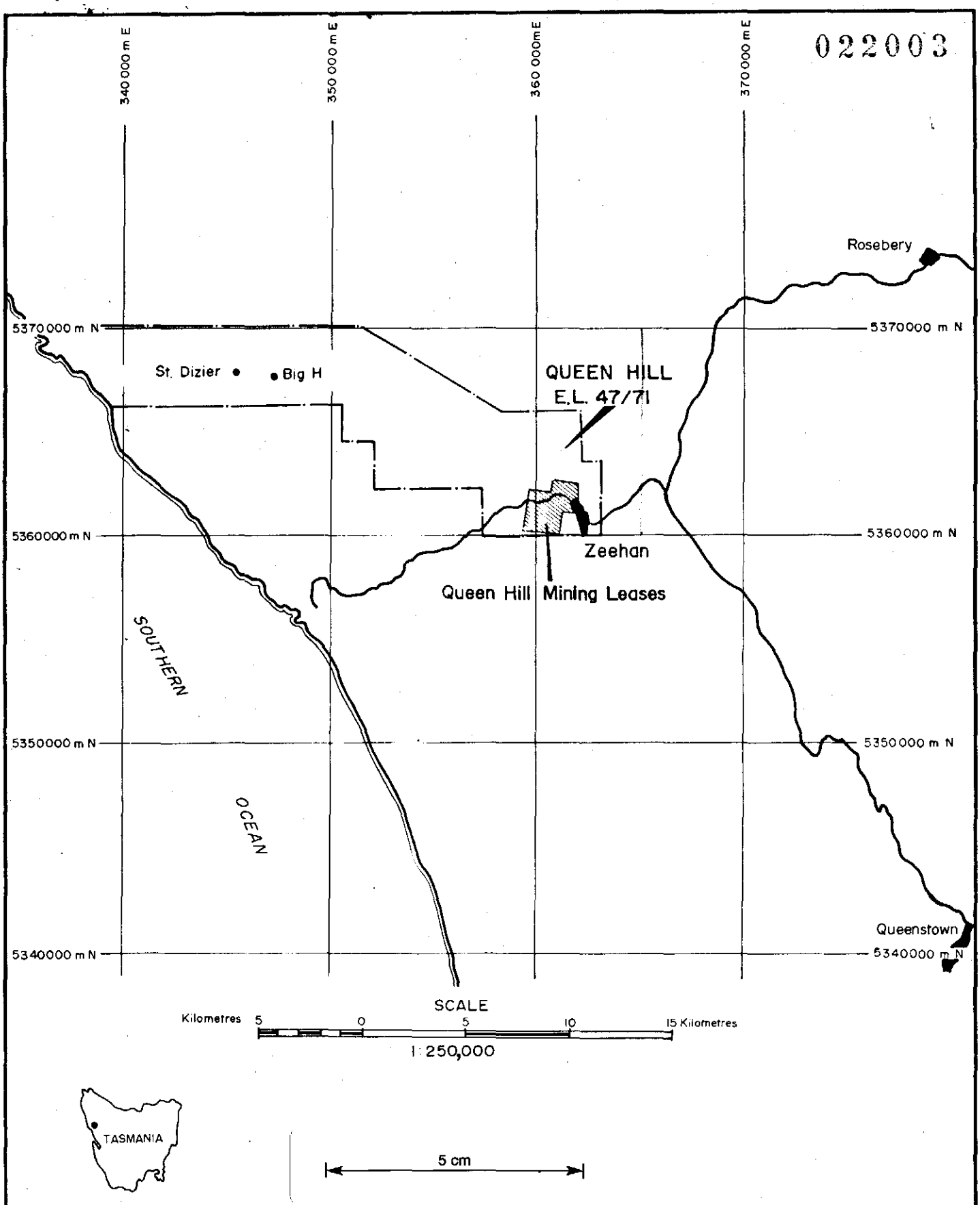
APPENDICES

APPENDIX A	-	Queen Hill Diamond Drill Logs and Assay Data G60, 61, 62.
APPENDIX B	-	Queen Hill Grid Mapping Programme. Petrography and Rock Chip Geochemistry.
APPENDIX C	-	St. Dizier Regional 1:10,000 Mapping Programme Petrology and Assay Data.
APPENDIX D	-	DIGHEM Survey Queen Hill and St. Dizier.
APPENDIX E	-	12 Mile Creek DIGHEM Anomaly Follow-up.

LIST OF PLATES

Plate No. (In Text)	Title	Scale
NWTIN 14	Location of Tenements	1:250,000
QH 147	Summary Longitudinal Projection	1:2,500
QH 62A	Locality Plan	1:5000
QH 158	Montana Summary Longitudinal Projection	1:2500
QH 83	Severn Summary Longitudinal Projection	1:2500
QH 159	Golf Course Lease. Plan and Section.	1:500
St.D 38	St. Dizier Area Location Plan	As shown
QH 148	DIGHEM Flight Lines	1:125,000

022003



Aberfoyle Exploration Pty Ltd

Drawn RKY	NORTH WEST TASMANIA	Location code
Traced	ST. DIZIER - QUEEN HILL AREA	Date September 1977
Checked	LOCATION OF TENEMENTS	Scale 1:250,000
Revised by Date		Plate No NW TIN 14

022004

INTRODUCTION

This report summarises work completed in the quarter ending June 2, 1980 and includes preparation and drafting through to June 20, 1980. Reported expenditure is for the Aberfoyle quarter ending June 2, 1980.

During the quarter, the ore reserve and exploration drilling programme continued and 3 ore reserve holes were completed for 872.9 m. Ore reserve hole G63 and exploration hole G64 are both in progress.

Assessment of the pre-existing data for Montana and the Golf Course lode was completed. Structurally controlled, possibly steeply plunging fault/ fissure controlled mineralisation is interpreted for each area and drill testing is proposed.

Detailed geological mapping of the Queen Hill grid area is complete. The 1:2500 scale plan is presented in this report.

Regional geological plans of the St. Dizier area at 1:10,000 scale are now drafted and are included in this report.

Bedrock geochemical sampling of the magnetite skarn horizon, between the St. Dizier mineral leases and the "Big H" prospect, was completed, all results are presented in this report.

Flight line recovery and digitial processing of the DIGHEM data from Queen Hill and St. Dizier was completed and this data, together with a report by DIGHEM Limited, is presented in this report.

Evaluation of the DIGHEM anomaly at 12 Mile Creek was completed by a means of a SIROTEM ground EM survey, followed by bedrock geochemical sampling. Carbonaceous slates were found to be the source of the anomaly.

Excavation of the Queen Hill bench area is in progress to provide a bulk sample for the Matte Fuming pilot plant at Kalgoorlie.

022005

QUEEN HILL — Diamond Drilling Summary

Commence Work Proposal A80/19

D.H. No.	Co-ordinates North	East	Elev-ation	Mag Brg	Angle	Commence	Complete	Depth m	Cumulative metres	Section	GEOLOGY/MINERALISATION	RL of Intersection	Intersection
G60	1858.9	552.6	208.3	102.7	-50.5	22.2.80	23.3.80	301.0	301.0	3080	228.15-228.85 Pyritic fissure lode, pyrite 70%.	32	No significant Sn.
											269.0-271.65 Sideritic fissure lode with minor sphalerite and galena, 5% overall.	1	270.3-271.65 m 0.76% Sn.
G60W	Wedge off G60 at 128.0 m						Abandoned 14.5.80	136.0	309.0	3080			
G61	1777.5	854.47	246.78	284.0	-64.1	2.4.80	29.4.80	307.7	616.7	3100	222.7-225.9 m. Coarse grained veins and disseminations of pyrite, av. 25% (Clarkes Lode).	51	222.7-225.9 m. 0.27% Sn.
											226.2-239.8 m. Coarse grained veins and disseminations of pyrite 25% and pyritic fissure lode, Py. 50%. (Queen Hill Lode).	45	226.2-239.85 m. 1.2% Sn, includes 226.2-232.6, 2.245% Sn.
G62	Same collar as G61 1777.5	854.47	246.78	284.0	-55.0	30.4.80	15.5.80	256.2	872.9	3100	203.0 -207.65 m Coarse grained veins and disseminations of pyrite, average 25% (Clarks Lode).	88	203.0-207.65 m 0.3% Sn.
											207.65-210.9 m Pyritic fissure lode, pyrite 20%.	85	207.65-232.3 m 1.14% Sn.
											216.25-232.3 m Replacement and vein network pyrite and pyrrhotite in dolomite and volcanics, average 35%. (Queen Hill Lode).	75	

022006

2640 2800 2920 2980 3000 3040 3060 3080 3100 3120 3150 3160 3180 3200 3240 3360 3440 3480 3600

RL 200
100
00
-100
-200

No.1 QUEEN 44 L QUEEN No.1 L QUEEN No.2 L
No.2 No.3 No.4 No.6 No.7
G1 G2 G3 G4 G5 G6 G7 G8 G10 G11 G12 G13 G14 G15 G16 G18 G22 G23 G24 G25 G26 G28 G33
W1 W2
INTERSECTION OF CLARKES & DUNKLEYS
G45 G46 G47 G48 G49 G50 G51B G52 G53 G54 G55 G56 G57 G58 G59 G60 G61 G62 G63
EXP 1 (G64) in progress
EXP 2
EXP 3
OR 1

- LEGEND -

- Hole completed
- Ore Reserve hole proposed
- Exploration hole proposed
- Queen Hill Lode (Interpreted outline only)
- Inner Lode (Interpreted outline only)

5 cm

Week Ending

80-1504 1/2

Aberfoyle Exploration Pty Ltd

Geology:	
Drawn:	R.J.E
Traced:	R.J.E
Checked:	
Revised by: R.J.E Date: APRIL, 80	

NORTH WEST TASMANIA

QUEEN HILL

SUMMARY LONGITUDINAL PROJECTION

1980 DRILL PROGRAMME

Location code:	
Date:	April, 1980
Scale:	1 : 2,500
Plate No	QH 147

022007

QUEEN HILL ORE RESERVE AND EXPLORATION DRILLING PROGRAMME

During the quarter, three ore reserve holes were completed for 872.9 m. These holes, G60 - G62, were designed to establish gross ore potential in the Queen Hill area. The final ore reserve hole of this programme, G63 is now in progress.

Exploration hole G46 intersected coarse grained >50% pyrite mineralisation over an interval of 10.8 m. Within this interval there is replacement mineralisation with some cassiterite. Three exploration holes are planned to investigate ore potential adjacent to and below G46 and the first of these holes, G64 in now in progress.

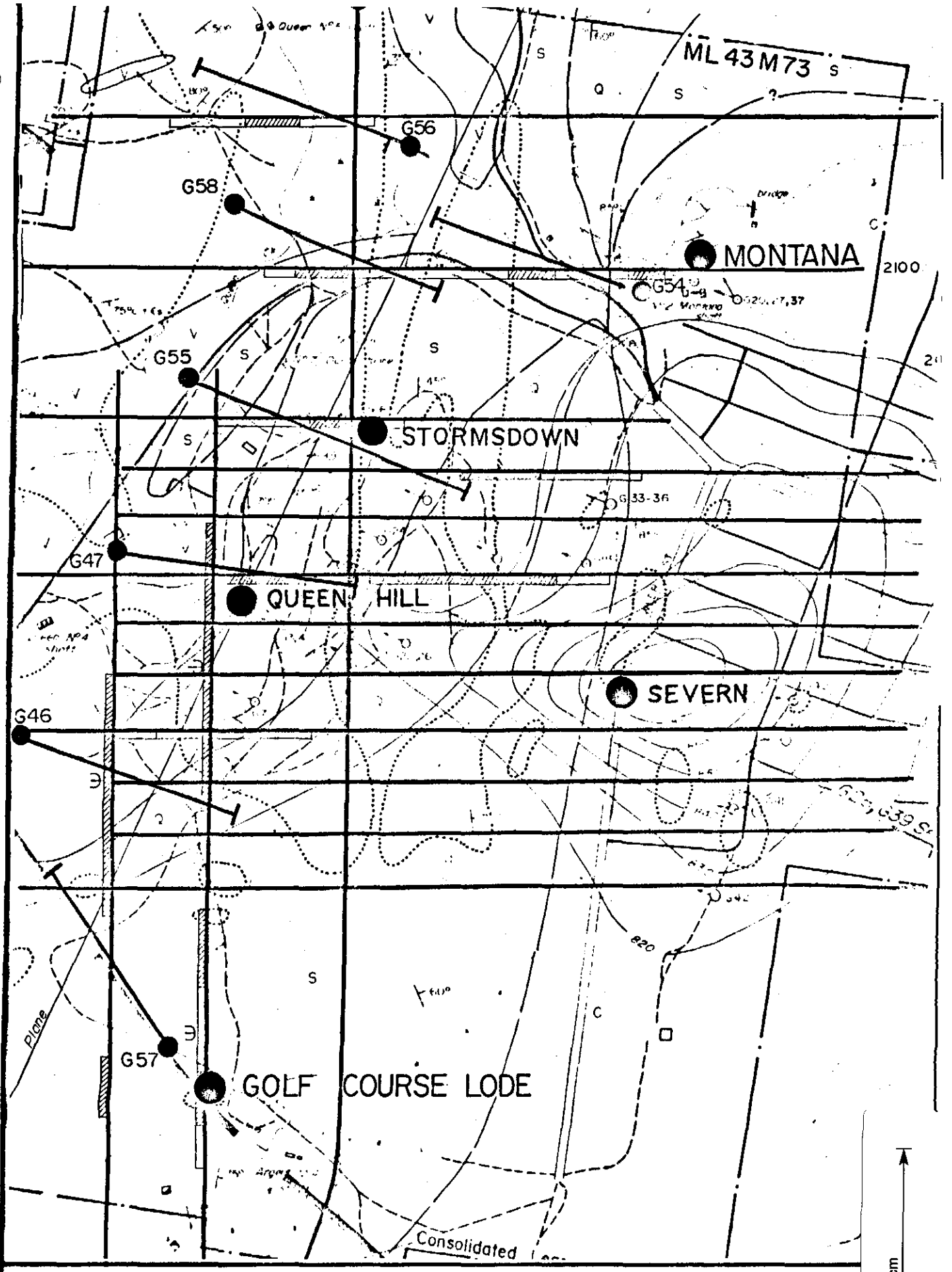
To provide a more representative sample for XRF analysis, all ore reserve holes are being completed in NQ core size and 3/4 of the core is being submitted for assay.

A summary of the ore reserve drilling programme is included together with a summary longitudinal section (Plate QH 147). All drill logs are appended, together with drill hole assay data in a preliminary form, (Appendix A). Cross sections at 1:500 scale are attached.

SEVERN, MONTANA AND GOLF COURSE LODES

As noted in the March 1980 report, the Severn dill core was re-logged. Tin mineralisation is related to a pyrite-pyrrhotite vein network in zones of fractured ground and does not appear to favour any particular lithology. The Montana drill core was re-logged during the last quarter and is of a similar style to that at Queen Hill and Severn.

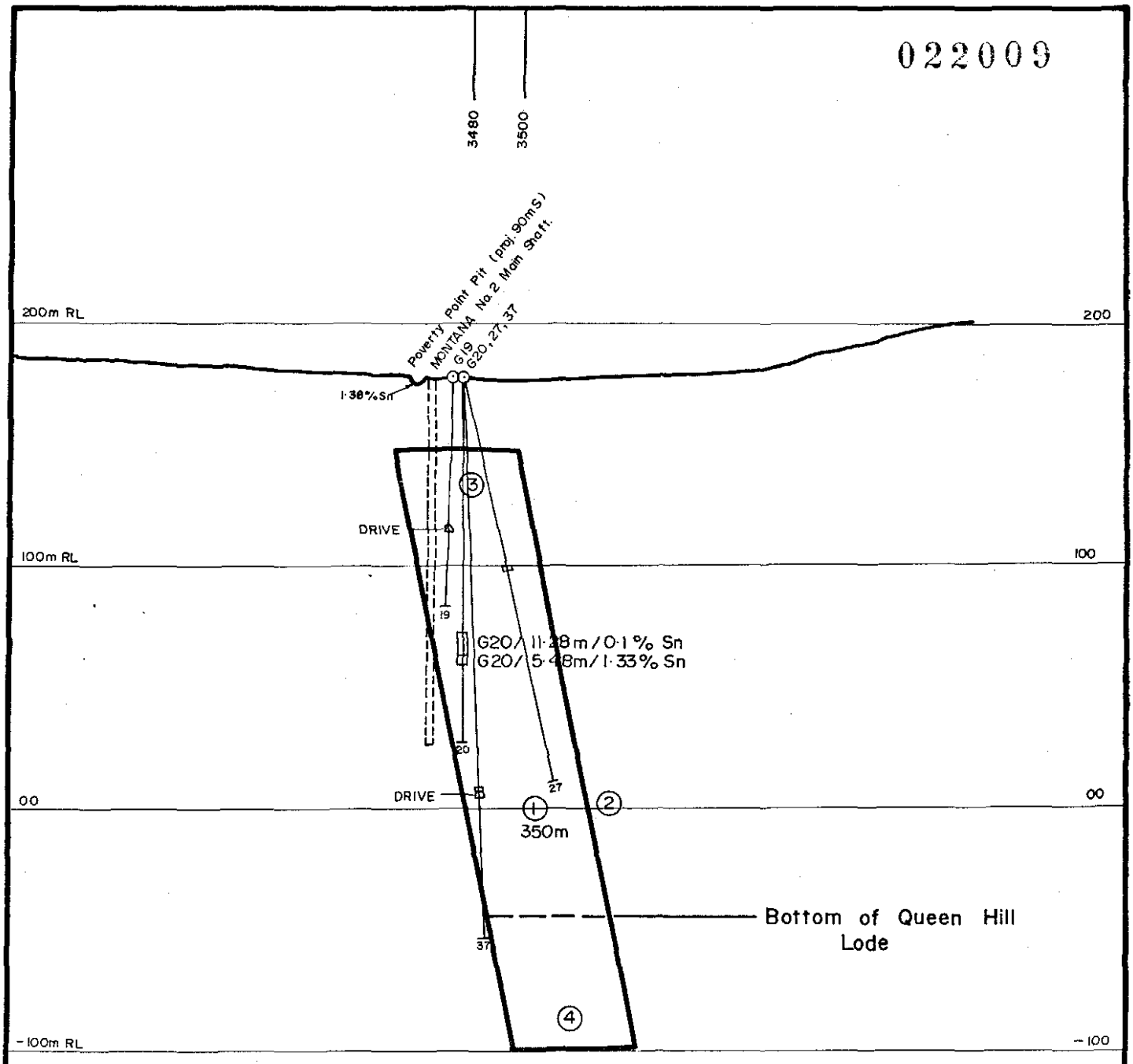
The controls of mineralisation at Queen Hill are now reasonably well understood and it is recognised that the ore body has a pipe like shape and a predictable plunge direction. It is interpreted that there is potential for similar structurally controlled plunging bodies at both Severn and Montana, each with the potential for 500,000 tonnes at greater than 1% Sn. At each prospect one drill hole is proposed to confirm the presence of a plunging ore body (Plates QH 83, 158). Cross sections of the Severn and Montana drill core at 1:500 scale are attached.



Aberfoyle Exploration Pty Ltd

Drawn:	QUEEN HILL LOCALITY PLAN	Location code:
Traced: R. J. E.		Date: July, 1980
Checked:		Scale: 1:5,000
Revised by: Date:		Plate No QH 62/A

022009



Cassiterite - Sulphide bearing fissure lode strikes at 070° mag. ie at 60° to this projection.

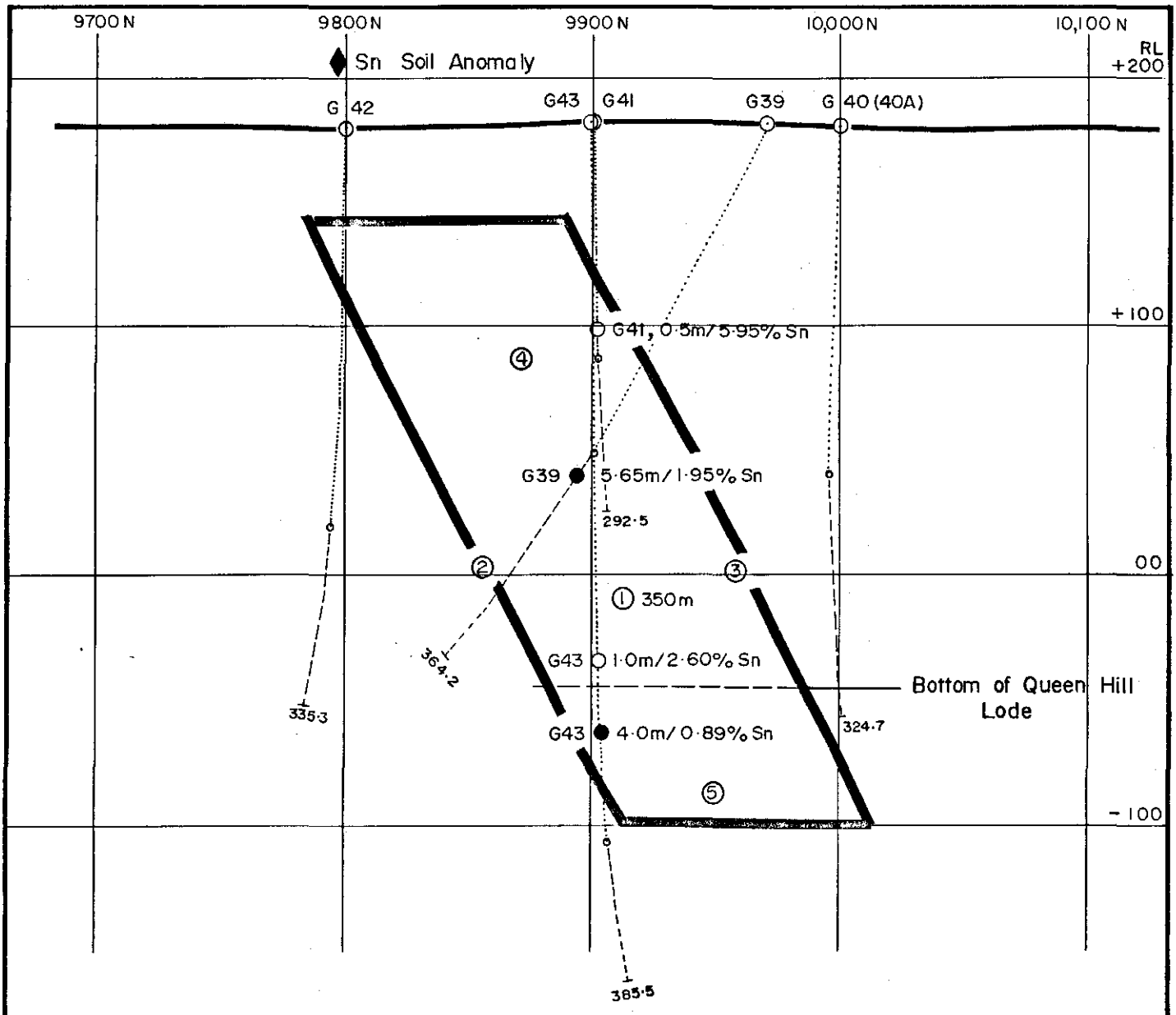
Potential for 500,000 Tonnes at >1% Sn, strike length 100m, width 5m, depth 250m

③ Proposed exploration holes in order of priority. Assuming No. 1 is successful

5 cm

Aberfoyle Exploration Pty Ltd

Drawn: R. J. E.	NORTH WEST TASMANIA	Location code:
Traced:	MONTANA	Date: June, 1980
Checked:	Summary Longitudinal Projection (along Eastern Ref Plane)	Scale: 1:2,500
Revised by: Date:		Plate No QH 158



● Fissure Lode Cassiterite sulphide intersection

Potential for 500,000 Tonnes at >1% Sn, strike length 100m, width 5m, depth 250m.

③ Proposed exploration holes in order of Priority. Assuming No.1 is successful.

Projected from behind section

Projected from in front of section

5 cm

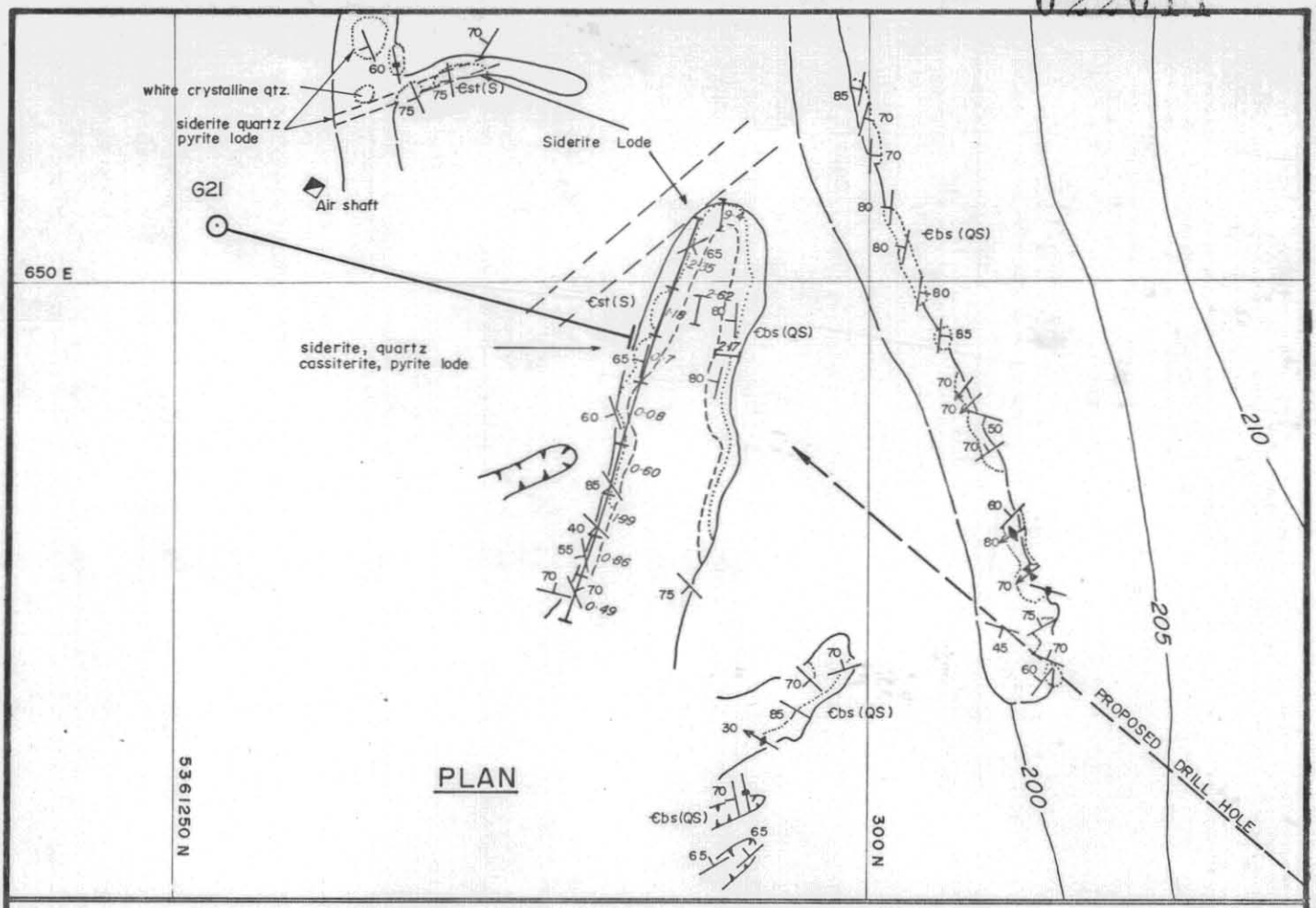
50 0 50 100 150

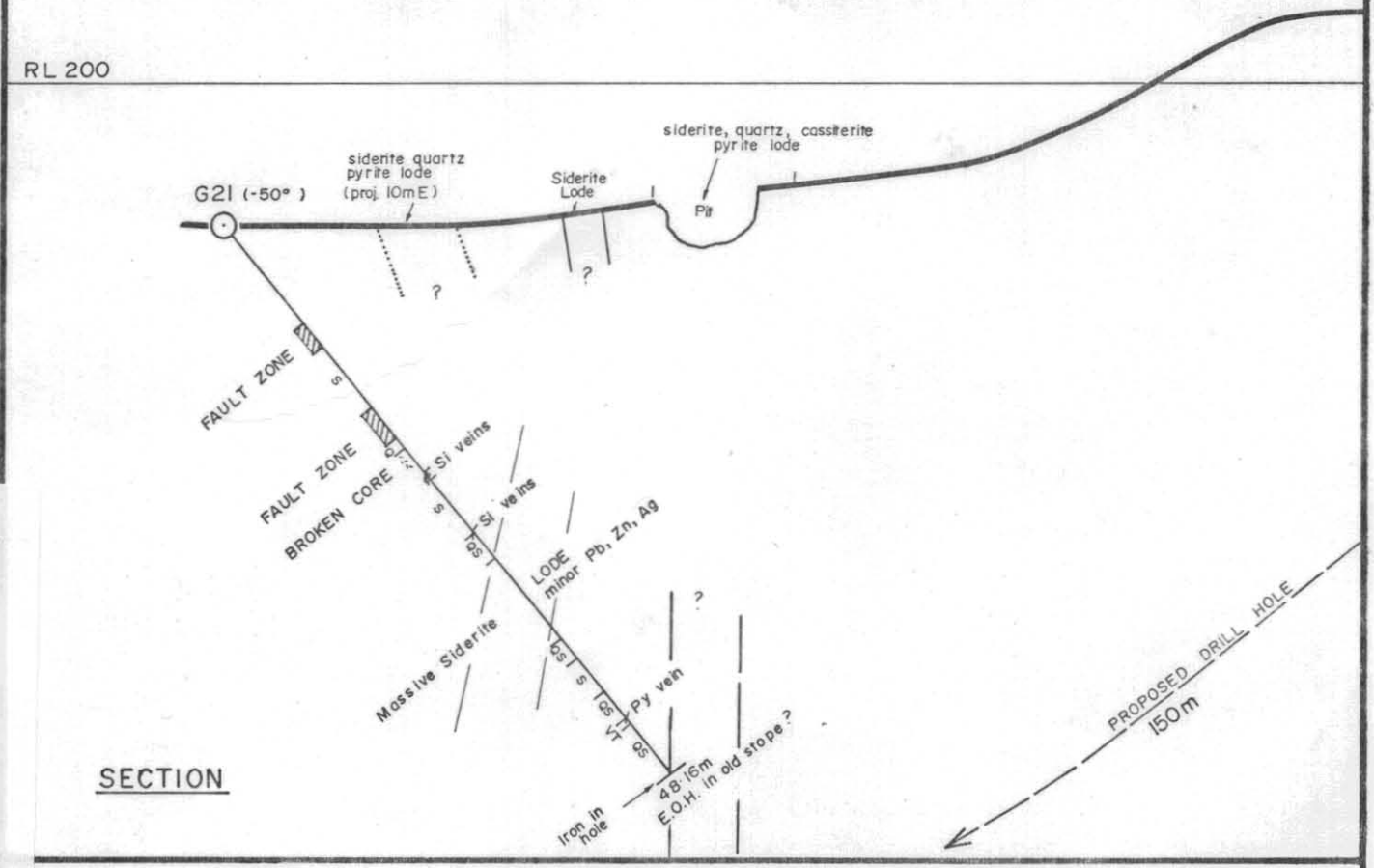
metres

Abminco Exploration

Drawn:		NORTH WEST TASMANIA	Location code: K55/5/50
Traced:	JJB	QUEEN HILL, SEVERN AREA	Date: Aug 1977
Checked:		**Longitudinal Projection**	Scale: 1:2500
Revised by:	Date:	Reference Plane 9850 E, Looking West	Plate No QH 83

022011





Aberfoyle Exploration Pty Ltd

Drawn:	NORTH WEST TASMANIA	Location code:
Traced: R.J.E.	GOLF COURSE LEASE	Date: May, 1980
Checked:	PLAN & SECTION SHOWING G 21	Scale: 1: 500
Revised by: Date:		Plate No QH 159

022012

The Golf Course lode is a siliceous cassiterite sulphide body. Surface chip sampling obtained values of up to 9.4% Sn (Plate QH 159). Previous testing of the lode was ineffectual and the original drill hole G21 was abandoned at 48.16 m, apparently when it encountered iron at the edge of an old stope. One exploration hole is proposed to determine if there is potential for significant tonneage of cassiterite-sulphide mineralisation.

QUEEN HILL GEOLOGICAL MAPPING

Mapping of the south-west grid extensions at 1:2500 scale was completed and geological plans are attached. Geological coverage of all grided areas at Queen Hill is now complete.

A conformable? progression from the Upper Proterozoic to the Cambrian was outlined by the mapping programme and the lithological and structural detail is summarised below.

Lithologies

Oonah and Queen Hill Quartzites

The Oonah and Queen Hill quartzites (Q), considered to be stratigraphic equivalents, are extremely clean, fine to coarse grained, often micaceous, saccharoidal, quartz-rich rocks. Generally massive to well bedded, these quartzites commonly display both macro and microscopic bedding and grading with minor cross lamination. The grainsize varies from fine silt to coarse sand and rare small siltstone fragments have been noted. Quartz, feldspar (often sericitised), muscovite and accessory biotite, zircon and leucoxinic opaques (sometimes occuring in heavy mineral laminations) comprise the majority of the psammitic fraction of the quartzite. Carbonaceous laminations (often pyritic), and argillaceous bands, although often microscopic, are common.

Although intraformational brecciation is obscure in outcrop it is readily, but infrequently observed in drill core. Microscopic soft sediment deformation features are rare and regional metamorphic affects are not pervasive.

022013

Thin (∿ 5 mm), barren, milky quartz veins are an inseparable concomitant of the quartzite in this area. Sporadic occurrences of very thin (1-2 mm) tourmaline veins, presumably associated with the Devonian Granite, are also common.

Quartzite Slate Group

The Quartzite-Slate (QS) group consists of generally fine grained, black, often graphitic slates with interbeds of more psammitic material (generally quartzite) and is thought to represent a conformable progression from intertidal to subtidal to an essentially supratidal sequence. Such a concept is not only consistent with the extensive intraformational brecciation, soft sediment deformation, diverse facies variations and (?) diagenetic pyrite mineralisation, but also satisfactorily explains the occurrence of very thin to thick discontinuous dolomite horizons.

Near the contact with the overlying volcanics are graphitic slates (often calcareous), bedded siltstones and quartzites (often calcareous), dolomites, pyritic slates, siltstones and mudstones and rare structureless and sometimes vuggy cherts. Rare, thin to thick piles of discontinuous scoriaceous pyroclastics and flows are observed within this sequence.

Montana Volcanics

Although the volcanics (Vt and Vb) represent a complete range of chemical compositions (basic to acidic), the predominant variety is interpreted as intermediate. Burial, regional and hydrothermal alteration processes have largely eradicated primary features and hence relict textures and rare feldspar compositions have provided the most reliable rock type estimate.

The volcanics consist predominantly of fine to coarse pyroclastic tuffs and agglomerates, flow breccias, (?) ash flow breccias and lava flows, all of predominantly intermediate composition. Rare basaltic flows and pyroclastic evidence for the existence of spheroidal and porphyritic rhyolite, provide minor compositional variations in the pile.

The intermediate units (presumably andesitic) are weakly vesiculated to scoriaceous and generally contain abundant microphenocrystal feldspar (sanidine-anorthoclase) and quartz in a partially to completely subvitric to vitric mesostasis. The glassy nature of the rock appears to depend on conditions of deposition. Skeletal crystallisation in a glassy matrix on fragment peripheries indicates marginal quench conditions, possibly subaqueous deposition.

Vesicles are almost invariably filled with a myriad of alteration products and rarely subvitric to vitric lava. Fe-Mg and Mg chlorite; sericite; quartz; amorphous silica; calcite, dolomite or ankeritic carbonate; and pyrite (or combinations of the above) are common amygdule compositions. Relict vesicles can often be recognised in thoroughly altered or mineralised rocks by the ghosting of leucoxene and other fine dusty opaques during primary crystallisation. Various relict textures within vesicles are suggestive of psuedomorphed zeolites, possible indicative of low temperature and pressure burial metamorphism.

Minor spillitic flows occur throughout the area. This lava is fine to medium grained and displays a basaltic fabric with rare chlorite psuedomorphs after olivine set in a matrix of random, felted chlorite/sericite altered albite laths in a chlorite stained mesostasis. Xenoliths of similar composition are common.

Chlorite, sericite, carbonate, silica, albite, adularia and kaolin-illite are the most common alteration minerals and occur to varying degrees throughout the entire volcanic pile.

Thin, laterally discontinuous, tuffaceous, arkosic and quartz rich sediment lenses occur infrequently throughout the pile and probably represent minor puddles, streams or small lakes. Their limited extent does not favour extensive subaqueous eruption or deposition.

022015

A negligible to intense manganese rich limonite staining is common in portions of the volcanic pile. It is uncertain whether this is an alteration or weathering response. Ferromagnesian minerals readily succumb to weathering processes providing the surface expression of the volcanic pile with a characteristic orange-brown clay.

Crimson Creek Sediments

The Crimson Creek (Cc) sediments are a very thick flysch-type facies which are essentially volcolithic in the vicinity of the prospect area.

Greywackes, sandstones, mudstones and siltstones, often with a tuffaceous component, and minor tuff layers, comprise the Crimson Creek formation in the south eastern side of Queen Hill.

(?) Devonian

Rare, small occurrences of porphyritic rhyolite intrusives within both the Precambrian and Siluro-Devonian sediments, have been observed. These rocks display some similarities with Devonian porphyries of N.W. Tasmania and are therefore interpreted as such. Their presence may indicate a proximal granitic source within the prospect area.

Refer to the report in Appendix B for a petrological description of one such dyke rock. (CMS 80/5/10 Page 8 - Sample 230566).

Structure

Deformation History

Two distinct styles of folding indicate that the Queen Hill area has undergone at least two stages of deformation. The first deformation, which produced a series of gently north-easterly plunging, tight to isoclinal folds, formed under a north-west/south-east compressional stress field. A penetrative, virtually bedding parallel, axial plane schistosity, which dips steeply to the south-west, accompanies this phase.

022016

Parasitic, F_2 folds are observed on both microscopic and macroscopic scale to a maximum amplitude of a few metres. It is possible these structures also occur on a far larger scale, thus allowing correlation of gross stratigraphic units by fold repetition over hundreds of metres. Although this first phase of folding is only sparsely evident in the immediate prospect area, the ensuing axial plane schistosity is very strong and pervasive.

The second deformation, subjecting the entire region to a north-east/south-west compressional stress field (approximately perpendicular to the first deformation), produced a series of open, moderately plunging, south-easterly trending cylindrical folds. Indeed the Queen Hill area lies in one such broad hinge zone. The first generation axial plane cleavage is folded around this major upright antiform which plunges at approximately 60° toward 140° (magnetic). This structure is expressed by both the form surface of the Montana Volcanics and the regional strike of the sediments which swing from E.N.E. in the vicinity of Clarke's lode, to N.N.W. around the Oonah and Montana areas.

The second generation of folds are far more readily observed in outcrop and occur on all scales. The axial plane crenulation cleavage, dipping very steeply to the south-west, is not strong, but registers on most of the sediments.

Deformation Features

Although generally structureless in outcrop, microscopic examination of the massive, competent quartzite, often exposes both of the tectonic cleavages. Alignment of muscovite flakes parallel to bedding reflects the first phase of folding, whereas a poorly defined fracture cleavage represents the second phase.

The Quartzite Slate Sequence provides the majority of the structural information. Each sedimentary facies of this sequence displays the deformation features to various extents. The black slate being particularly susceptible, exhibits both the penetrative slaty cleavage and tight to isoclinal folds of the first deformation, and the overprinting second deformation, open cylindral folds with accompanying crenulation cleavage. Microscopic examination of the black slate reveals folds within the crenulation cleavage

022017

and folds developed by slip along the crenulation cleavage. The competent, very fine grained dolomite appears immune to any deformation, whereas the pyritic mudstone and other carbonaceous and predominantly pelitic units show a complex combination of soft-sediment and tectonic deformation features.

The volcanics are generally always strongly foliated as a result of the tight to isoclinal phase of folding. Elongated fragments and flattened amygdules are the most common expression of this cleavage. Primary deposition and second deformation features are virtually absent.

Petrological reports and assay data of rock samples collected during the mapping programme are given in Appendix B.

ST. DIZIER AREA REGIONAL GEOLOGICAL MAPPING

Geological mapping of the exploration licence in the St. Dizier area was completed at 1:10,000 scale and geological plans are attached.

Rocks of the Precambrian Oonah Quartzite and Slate Formation are the oldest in the mapped area. Within this formation dolomite horizons are known to occur (St. Dizier). The Precambrian sediments have been metamorphosed and metasomatised by the Heemskirk Granite, a Devonian intrusive which underlies approximately 50% of the mapped area. Jurassic dolerite covers large areas to the north-east, and remnants of Tertiary basalt flows occur on topographic highs to the north-west. Large areas are covered by Tertiary quartz-rich gravels and unconsolidated sediments.

022018

Lithologies

Oonah Quartzite and Slate Formation

The predominant rock types are quartzite and slate with some siltstone. Dolomite horizons have been recorded at St. Dizier and "Big H". The rocks are highly deformed and have been affected by at least two major deformations. Close to the Heemskirk Granite, the sediments have been both metamorphosed and metasomatised. Metamorphic effects are most obvious in black carbonaceous slates, where abundant chiastolite porphyroblasts have nucleated, and carbon occurs as fine graphite. Metasomatic effects appear to post-date thermal metamorphic changes. Close to the granite, intense pyro-metasomatic effects occur, and are best observed in carbonate horizons. Magnetite skarn occurs as a result of metasomatic alteration of dolomite horizons at St. Dizier and "Big H".

At distances of greater than 200 m from the granite contact, metasomatic changes are indicated by the replacement of originally argillaceous layers by tourmaline - muscovite assemblages, giving rocks a banded appearance with alternating layers of tourmaline - muscovite and granular quartzite. Sericitisation of the contact metamorphic andalusite porphyroblasts in black slates is common.

Pervasive pyrite veining is common in the black slates adjacent to the St. Dizier skarn horizon and pyrite aggregates were also noted in cherty siltstones in the Rock Creek area.

Heemskirk Granite

The Heemskirk Granite is a large irregular stock, similar in age and composition to the Housetop, Pieman and Meredith Granites. The bulk of the intrusive is a porphyritic biotite granite/adamellite. The granite contains numerous narrow greisen veins (Montagu) and is also the source of the abundant alluvial Sn deposits in the St. Dizier area. Partial alteration and greisenisation is noted in the St. Dizier area.

Jurassic Dolerite

Large areas in the north-east of the licence area are covered by Jurassic Dolerite, thought to occur as sills. The dolerite has a strong magnetic signature and is also marked by a distinctive vegetation. Quaternary dolerite talus is common.

Tertiary Basalt

The remains of Tertiary Basalt flows occur on topographic highs within the Precambrian sediments, and like the dolerite sills, are marked by distinct vegetation changes.

Tertiary Conglomerates, Sediments and Gravels

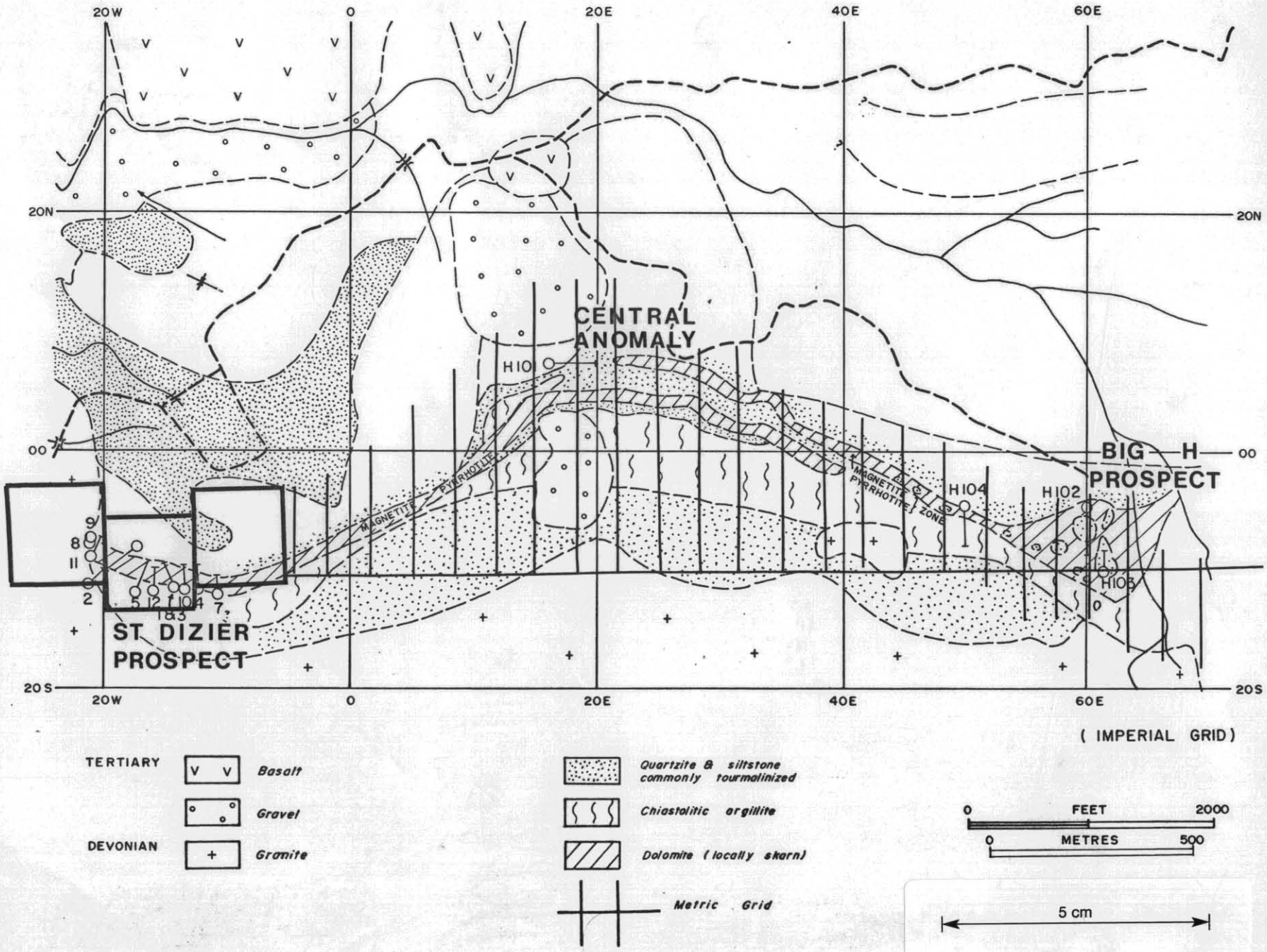
Poorly consolidated, Precambrian and granite derived sediments occur to thicknesses greater than 20 m in low lying areas within the Precambrian rocks. These Tertiary sediments commonly contain tin concentrations, and have been mined for alluvial Sn.

Petrological reports and rock chip geochemical data is given in Appendix C sample locations are shown on the geological plan.

ST. DIZIER SKARN HORIZON

Tin bearing magnetite skarn is known to occur at St. Dizier and to extend for at least 2.4 km eastwards along strike to the "Big H" prospect. (Plate St. Diz.38).

The St. Dizier prospect (142,000 tonnes of 0.96% Sn) is within ML's 13M/59, 16M/62 and 17M/62 optioned to Appolo International Minerals N.L. by Mr. R. Laffer, the leaseholder, and managed under a joint venture agreement by Renison Limited. The "Big H" prospect was originally drill tested (1967) by Pickands Mather Pty. Ltd. as a iron ore prospect (Plate St. D 41).



Aberfoyle Exploration Pty Ltd

NORTH WEST TASMANIA
QUEEN HILL E.L. 47/71
ST. DIZIER AREA
LOCATION PLAN

Drawn:
Traced: JJB
Checked:
Revised by: Date:

Location code: K55/5/50
Date: Feb 1979
Scale: as shown
Plate No StD 38

022020

022021

In 1973 a metric 100 m grid was established between St. Dizier and "Big H". Ground magnetics were completed on each line and these delineated the magnetite bearing skarn horizon. Aeromagnetics were completed over the area in 1975, and hand auger geochemical sampling was completed on only the western side of the grid. The skarn horizon tends to be recessively weathered and the eastern part of the grid is underlain by alluvial deposits which cover the skarn and also contain alluvial tin concentrations. It was considered hand auger sampling could not obtain uncontaminated samples from beneath the alluvials.

There is a possibility that remanence in the magnetite (c.f. Mt. Lindsay Skarn) has distorted the magnetic field and hence magnetic surveys may not adequately define the true shape or size of the skarn horizon. Remanence, and alluvial tin which covers parts of the skarn, makes definition of drill targets i.e. pyrrhotite-cassiterite segregations most difficult. The opportunity to use a reverse circulation drill rig to obtain uncontaminated bedrock geochemical samples was seen as a practical method of overcoming these problems.

In the vicinity of the skarn horizon the grid was re-established and Geopeko's JACKRO, BOMBADIER mounted, reverse circulation drill rig was contracted for the drilling. A total of 297 samples were taken on 23 lines at an average depth of 3.5 m. Samples were taken at 20 m intervals over country rock and this spacing was closed up to 10 m where sulphides or obvious skarn was recognised. (Plate St.Diz. 43).

The samples collected were generally of weathered bedrock, although where surface outcrop occurred fresh rock chip samples were collected. The samples were assayed by Cleveland Tin Ltd. Laboratories, for Sn, WO_3, Cu, Pb, Zn and As. All samples were completely pulverized before splitting.

The skarn (carbonate horizon) appears to lie in a stratigraphic position between interbedded buff quartzites and black andulusite slates to the south and tourmaline banded sediments to the north. At the western end of the grid, the skarn horizon is narrow (20 m) and steeply dipping, with a strike of approximately 070° magnetic. In the vicinity of the "Central Anomaly", (Plate St.Diz. 44) the horizon appears to widen, perhaps due to a flattening in dip and a similar widening is noted at "Big H". Black shales in close proximity to the skarn horizon are pervasively veined with

022022

pyrite. The skarn itself appears to be magnetite-rich in the "Big H" area, and more sulphide (pyrrhotite) rich at the "Central Anomaly".

In the vicinity of the "Central Anomaly", extensive Fe-rich lateritic material covers large areas and this may have contributed to the magnetic pattern called the "Central Anomaly". In this area, Tertiary gravels up to 20 m thick are often impenetrable.

Pickands Mather drill hole DDH 101 was drilled parallel to strike, but steeply enough to cut stratigraphy and indicates the skarn horizon occurs at depth (approximately 100 m) below the laterites. Structural trends indicate a shallow northerly dip in this area (possible fold hinge).

It is possible the skarn horizon outcrops to the south of the area covered by the bedrock sampling programme, perhaps obscured by Tertiary gravels and/or laterite. Further sampling is proposed for this area.

DIGHEM data suggests the "Big H" skarn horizon is not continuous with that at St. Dizier and this is borne out by the apparent presence of two horizons in the "Central Anomaly" area. (Refer next section).

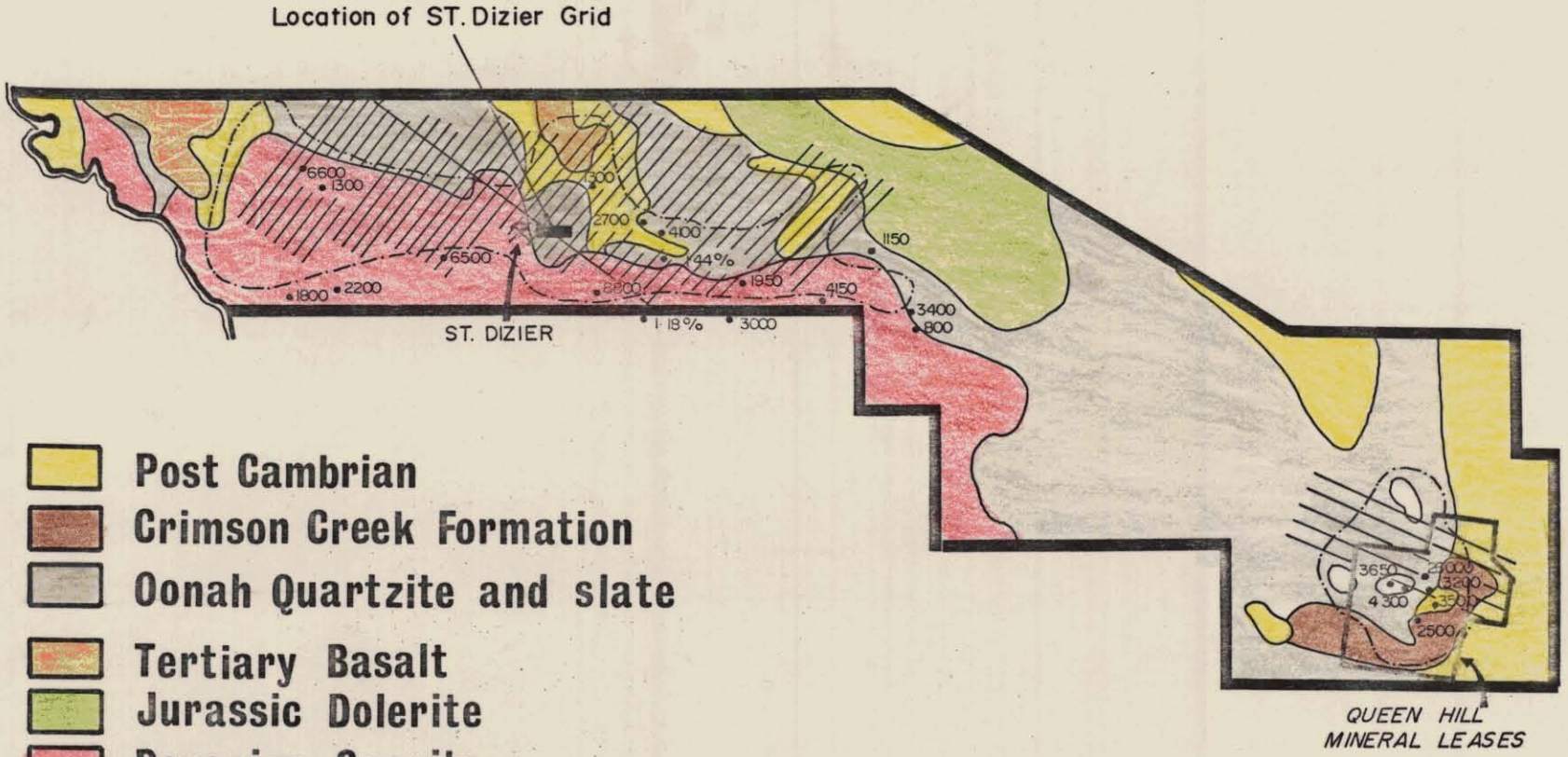
Mineralisation appears to be best developed in interpreted fold hinge zones at the St. Dizier, "Big H" and "Central Anomaly" areas. At these sites tectonic conditions may have provided favourable access for hydrothermal fluids. Proximity to the granite may also be important as St. Dizier and "Big H" are both within 100 m of the granite contact. Interpreted geological sections are given on Plates

Preliminary assessment of geological and geochemical data indicates significant tin mineralisation is restricted in occurrence to:

(i) areas less than 200 m from the granite contact, and
(ii) areas of shallow dip of strata (possible fold hinges).

E.L. 47/71

QUEEN HILL



Post Cambrian

Crimson Creek Formation

Oonah Quartzite and slate

Tertiary Basalt

Jurassic Dolerite

Devonian Granite

0 5 Km

Sn contour > 100 ppm

• 1800 Stream sediment anomaly

DIGHEM flight lines

5 cm

PLATE No. QH 148
Scale 1 : 125,000
Date : January, 1980

020023

022024

DIGHEM SURVEY

In the north-western part of the licence area, near the Heemskirk Granite contact, a tin bearing magnetite skarn occurs within Proterozoic sediments. Detailed exploration has been limited to a small area at the St. Dizier Prospect.

The DIGHEM system is the most modern helicopter-borne E.M. system, a vast improvement over the airborne E.M. flown in 1975. It was anticipated that DIGHEM would assist target definition in the skarn horizon and to help evaluate the potential of the prospective Proterozoic sediments.

The DIGHEM survey was flown in March 1980 by DIGHEM Limited and consisted of 40 lines totalling 161 line km with line spacing of 250 m. For orientation and case study purposes 5 short lines (12 line km of 250 m line spacing) were flown over the known mineralisation at Queen Hill. (Plate QH 148).

All results and full details of the DIGHEM system as presented to Aberfoyle by DIGHEM Limited are given in Appendix B. All plans are attached (Plates X ST.D 40-43 and X QH 22-25).

It is anticipated follow-up of all anomalies will be completed in the 1980-81 field season.

As noted in the March 1980,report analogue data (sighted by Aberfoyle immediately after the survey was flown) showed two conductors which were not related to the magnetite skarn. These are in the Rocky Creek and 12 Mile Creek areas. Follow-up of the Rocky Creek anomaly is not yet complete. Follow-up of the 12 Mile Creek anomaly was completed and is detailed in the section following.

12 MILE CREEK DIGHEM ANOMALY

As noted in the March 1980 report the 12 Mile Creek DIGHEM anomaly was located on the ground and two backhoe trenches were completed to evaluate the source of the anomaly. Assay results were low (Appendix C) and conductivity measurements on slate samples did not explain the source of the anomaly. It was decided to conduct a detailed ground E.M. survey to define the exact location of the anomaly.

A SIROTEM survey consisting of 3 lines, 100 m apart (Plate St. Diz. 44) was completed in May 1980 by GEOEX Pty. Ltd. The strike length of the conductor from the SIROTEM data appears about 100 m. The axis of the anomaly is shown to coincide with the eastern ends of the trenches. Seven bedrock geochemical samples were taken at 8 m intervals by reverse circulation drilling. The drilling commenced at the eastern end of the trenches and extended east for approximately 50 m. Only black carbonaceous slate was encountered and base metal values are low. The SIROTEM Profiles and Geochemical results for the drill hole bedrock samples are given in Appendix E.

It is concluded the source of the DIGHEM anomaly can only be carbonaceous slate and no further work will be conducted over this anomaly.

QUEEN HILL BULK SAMPLE

Excavation of the Queen Hill bench area is well under way. Mining operations commenced on June 16, 1980 with F.W. Groves Contracting Pty. Ltd. as operator. It is anticipated 1,000 - 1,500 tonnes of ore will be available by late August for the Matte Fuming pilot plant at Kalgoorlie, which is nearing completion.

The current mining plan is for all the sample to come from the Queen Hill pit and no mining of the Stormsdown mineralisation.

WORK PLANNED

- Ore reserve and exploration drilling at Queen Hill.
- Follow-up DIGHEM anomalies.
- Assess the St. Dizier magnetite skarn horizon for tin potential with the intention of defining drill targets.
- Follow-up ground magnetics over the north-west anomaly and rock chip sampling of the Silver Stream area.

EXPENDITURE

The joint venture statement of expenditure for the Aberfoyle quarter periods 4 - 6 (ending June 2, 1980) is split into two parts. One pertains to expenditure incurred on the Queen Hill mineral leases and the other expenditure incurred on the exploration licence and termed St. Dizier.

Queen Hill

Salaries and Wages	16,203	
Contract Drilling	49,928	
Petrology	1,422	
Geophysics	1,925	
Assay	1,356	
Materials	2,608	
Accommodation	3,335	
Vehicles	3,041	
Communication	1,243	
Tenure	1,046	
Sundries	418	
	82,525	
Overhead at 15%	12,380	$94,905

022027

St. Dizier

Salaries and Wages	1,930	
Contract	5,307	
Materials	587	
Plant	200	
Accommodation	611	
Vehicles	483	
Communication	777	
Sundries	8	
	9,903	
Overhead at 15%	1,485	$11,388

Special expenditure charged to the Matte Fuming project and not included in the Joint Venture Statement above:

Analytical	$560.00	
Salaries	$100.00	$660.00

REFERENCE

Young, C.H. (1979) Progress Report, Queen Hill Joint Venture E.L. 47/71 Tasmania, Quarter to March 31, 1980.

SIGNED: C.H. Young.

C.H. Young,
Project Geologist, Tasmania.

ENDORSED: K.R. Yates

K.R. Yates,
Manager - Outside Exploration.

022028

APPENDIX A

Queen Hill Diamond Drill Logs and
Assay data G60, 61, 62.

ABERFOYLE

DRILL HOLE RECORD

Location QUEEN HILL Property QUEEN HILL District ZEEHAN Bearing (M) 102·7° Hole No G.60

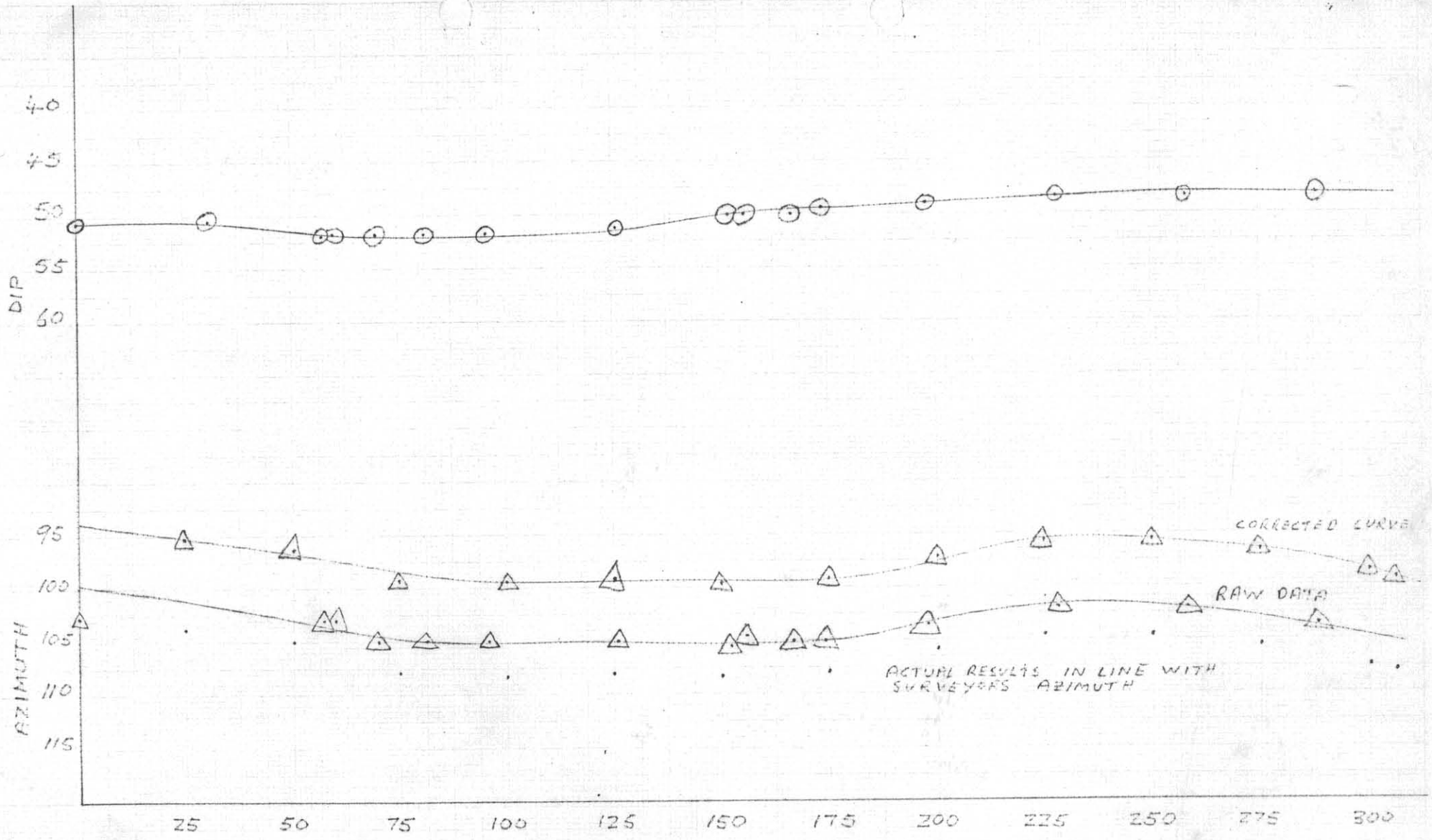
Commenced 22/2/80 Completed 21-3-80 % Recovery 88% Grid bearing (M) −11·25° Date 22-3-80

Objective ORE RESERVE Hole to test RL 45 Core size HW to 3, HQ-27, NQ to 301·0 Logged S. RICHARDSON

SECTION 3060 QUEEN HILL LODE. Co-ordinates 5361858·89N 360552·66E Dip 50·6° Alt./R.L. 208·28

SURVEY DATA				GRAPH DERIVED DATA			CALCULATED CO-ORDINATES			REMARKS
DEPTH	DIP	BEARING(M)	INSTRUMENT TYPE	DEPTH	DIP	BEARING(M)	NORTHING	EASTING	ALTITUDE	
31M	50·5°	CAMERA IN RODS	EASTMAN	OM	50·6°	102·7°	5361858·89	360552·66	208·28	
58M	52°	103°	"	25	50·5	103·9	1852.29	568.54	188·98	Hole designed for slight lift.
61M	51·75	103	"	50	51·5	105	1845·47	584.26	169·55	However between 31 & 58m a
70M	51·75	105	"	75	52	107·9	1838.28	599·68	149·91	steepening of almost 2° occured.
81M	51·75	105	"	100	52	108·2	1830.75	614·99	130.21	Attempts to lift the hole using
96M	51·75	105	"	125	51·5	108	1823.16	630.38	110.68	blunt bits and high drilling
126M	51·25	105	"	150	50	108·2	1815.41	646.11	91.22	pressures were unsuccessful. At
156M	50°	104·5	"	175	49·5	107·9	1807.50	662.17	72.14	148 m an attempt was made to
152M	50°	105·5	"	200	49	105·8	1799.82	678.43	53.20	lift the hole using a bull nose bit.
167M	50°	105	"	225	48·5	104·5	1792.49	694.88	34.41	After a total of 24 m using this
174M	49·5°	105°	"	250	48	104·5	1785.26	711.51	15.76	bit only 2° lift was obtained.
198M	49°	103·5°	"	275	48	105·5	1777.86	728.22	-2.82	
228M	48·5°	102°	"	300	48·25	107·6	1770.08	744.84	-21.44	It was decided to obtain an
258M	48·5	102°	"	305	48·25	107·9	1768.47	748.15	-25.18	intersection below the desired RL
288M	48·25	103·5°	"							and then wedge off at 130m
EOH	301M									to intersect the original target
										660W wedge commenced at 128·0m, but
										ABANDONED AT 136·0m. UNABLE TO
										ACHIEVE REQUIRED DEV.

022029



RESULT FOR AZIMUTH +8·7° ON CORRECTED CURVE

0280

Note : Intervals not analysed should be recorded such that a complete hole is itemised.
For any section not analysed, a value −5·00 should be entered in the relevant assay columns.
It is not necessary to record a zero.

PROGRAM | PROGRAMMER | DATE

HOLE IDENT.	DISTANCE FROM COLLAR TO BOTTOM OF SAMPLE (metres)	ASSAY ppm SNT	ASSAY ppm STANNITE	ASSAY ppm COPPER	ASSAY ppm ZINC	ASSAY ppm LEAD	ASSAY ppm TUNGSTEN	grammes per Tonne SILVER	grammes per Tonne GOLD	% SULPHUR	SAMPLE No.
G60	181·10	−5·00									
	181·35	220	180	45	100	120		5		9·80	2383511
	181·70	160	160	20	90	30		<5		1·40	2383512
	182·20	1800	200	15	100	60		5		6·50	2383513
	182·70	1600	180	15	160	20		<5		1·40	2383514
	183·00	1000	160	15	80	200		<5		17·1	2383515
	183·50	800	160	15	160	180		<5		1·65	2383516
	183·70	850	180	45	100	160		5		14·5	2383517
	184·00	240	120	15	140	180		<5		0·97	2383518
	186·90	−5·00									
	187·20	440	160	5	140	60		<5		0·15	2383519
	187·95	600	160	25	140	180		<5		4·45	2383520
	188·25	1000	120	60	950	800		<5		0·71	2383521

CLEVELAND TIN
XRF
COPPER, LEAD, ZINC
& SILVER - AAS.

XRF CTNL Sn
AAS others

Note: Intervals not analysed should be recorded such that a complete hole is itemised.
For any section not analysed, a value −5·00 should be entered in the relevant assay columns.
It is not necessary to record a zero.

PROGRAM PROGRAMMER DATE 12/5/80

HOLE IDENT.	DISTANCE FROM COLLAR TO BOTTOM OF SAMPLE (metres)	ASSAY ppm SNT	ASSAY ppm STANNITE	ASSAY ppm COPPER	ASSAY ppm ZINC	ASSAY ppm LEAD	ASSAY ppm TUNGSTEN	grammes per Tonne SILVER	grammes per Tonne GOLD	% S.	SAMPLE No.
G60	225·15	-5·00									
	225·70	<10	<50	100	300	100		<5		0·66	238362
	226·15	10	<50	80	200	200		<5		4·55	238363
	227·15	10	<50	100	150	100		5		4·65	238364
	227·20	<10	<50	100	100	200		5		9·85	238365
	228·15	1100	<50	40	800	300		<5		4·60	238366
	228·85	750	<50	60	100	300		5		11·7	238367
	229·15	160	100	40	100	100		<5		8·65	238368
	230·15	120	50	40	900	800		<5		1·95	238369
	230·20	40	<50	80	3400	2000		<5		2·35	238370
	230·60	10	<50	60	7200	4900		10		12·5	238371
	231·15	10	<50	20	1800	1500		5		4·55	238372
	232·00	-5·00									
	232·70	<10	<50	40	200	200		<5		4·35	238373
	233·00	25	<50	140	150	800		5		21·2	238374
	234·00	10	<50	40	300	500		<5		4·60	238375
	235·00	<10	<50	100	500	500		5		17·2	238376
	235·65	<10	<50	80	550	400				17·9	238377

022032

XRF CTNL Sn

AAS others

Note : Intervals not analysed should be recorded such that a complete hole is itemised.
For any section not analysed, a value −5·00 should be entered in the relevant assay columns.
It is not necessary to record a zero.

PROGRAM PROGRAMMER DATE 12/5/80

HOLE IDENT.	DISTANCE FROM COLLAR TO BOTTOM OF SAMPLE (metres)	ASSAY ppm SNT	ASSAY ppm STANNITE	ASSAY ppm COPPER	ASSAY ppm ZINC	ASSAY ppm LEAD	ASSAY ppm TUNGSTEN	grammes per Tonne SILVER	grammes per Tonne GOLD	% S	SAMPLE No.
G60	241·40	−5·00									
	241·70	10	<50	80	150	200		<5		0·48	238378
	242·60	<10	<50	80	300	600		20		15·5	238379
	242·90	<10	<50	80	260	200		10		7·70	238380
	263·30	−5·00									
	264·30	<10	<50	80	150	300		<5		11·9	238381
	265·30	<10	<50	80	100	400		<5		19·4	238382
	266·10	<10	<50	100	350	400		<5		16·5	238383
	266·80	<10	<50	100	300	900		<5		28·8	238384
	267·10	<10	<50	80	460	600		<5		12·5	238385
	268·00	<10	<50	100	300	100		<5		2·20	238386
	269·00	35	<50	140	1200	1800		<5		10·2	238387
	270·00	<10	<50	80	150	100		<5		3·15	238388
	270·30	70	<50	200	100	300		<5		5·66	238389
	271·00	9900	100	1140	27200	23400		40		<0·10	238390
	271·65	5200	<50	280	5800	6500		10		6·05	239391
	272·65	30	<50	45	60	100		<5		3·05	238392

022033

[redacted] CREEK [redacted]

Note: Intervals not analysed should be recorded such that a complete hole is itemised.
For any section not analysed, a value −5·00 should be entered in the relevant assay columns.
It is not necessary to record a zero.

PAGE 1 OF 1

PROGRAM

PROGRAMMER

DATE 22-5-80

HOLE IDENT.	DISTANCE FROM COLLAR TO BOTTOM OF SAMPLE (metres)	ASSAY ppm SNT	ASSAY ppm STANNITE	ASSAY ppm COPPER	ASSAY ppm ZINC	ASSAY ppm LEAD	ASSAY ppm TUNGSTEN	grammes per Tonne SILVER	grammes per Tonne, GOLD		SAMPLE No.
G60	228·15	1350		28	810	330	<10	4	<0·05		238366
	233·00	75		145	70	390	<10	5	<0·05		238374
	271·00	11000		510	17000	9300	<10	33	<0·05		238390

CHECK ASSAYS TO ADELAIDE.

Originals by C.T. Ltd.

022034

ABERFOYLE

DIAMOND DRILL LOG

HOLE Nº G60 Page Nº 1

Feature Bedding, Foliation, Fragment size & shape; Shearing, Fault, Vein (c carbonate, q quartz)

Mineralization Trace 1-5% Common 5-15% Abundant 15-60% Massive > 60%

022035

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
.7		Brown to brown-green oxidized E volcs. Weathering does not allow the differentiation of lithology.							
.9									
.7									
1.5	5							5	
.8									
.5									
.6									
.8									
.7	10							10	
.9									
1.5									
1.0	15							15	
.7									
1.0									
.6									
1.2	20							20	
1.0									
1.4	22.8	APPROXIMATE BASE OF WEATHERING Lt. gray green sericitic & carbonate rich lithic tuff & fine agglomerate. A grey green rock composed predominantly (80-90%) of vesicular lava fragments. These are gen. irregular and angular (cusps) and often elongate, ranging in size from							
1.5	25							25	

5 cm

5 cm

Feature Bedding, Foliation, Fragment (size & shape), Shearing, Fault, Vein (c carbonate, q quartz)

Mineralization 022036

Trace 1-5%
Common 5-15%
Abundant 15-60%
Massive >60%

HQ
NQ

CORE REC'D	DEPTH m	GEOLOGY
1·3		<1mm to >30 cm. (av. ·5-1 cm). Locally fragments may be purple in colour (less altered?) Vesicles are generally filled with siderite or sericite/chlorite and occ. q/tz.
1·4		The matrix is identical in colour and composition to the fragments - sericite, carbonate chlorite - q/tz?. It often contains flecks & blebs of carbonate (siderite?) to 1-2cm. which form 3-5% (est%) of the rock.
1·5	30	Numerous thin unoriented often discont. sid. veins.
1·5		A local gen. weak foliation is present defined by the p.o. of inequant fragments and vesicles. This may be primary compaction or a deformation foliation.
2·8	35	
3·0		
3·0	40	
3·0		
3·0	45	
3·0	48·0	From 48-55m fragments within the tuff - mainly the larger sizes are generally purple in colour. This feature is coincident with an interval of calcite veining. Calcite replaces siderite as the carbonate present.
	50	

VISUAL LOG | TRACE | COMMON | ABUNDANT | MASSIVE

DEPTH m: 30, 35, 40, 45, 50

MINERALIZATION

5 cm

5 cm

ABERFOYLE

DIAMOND DRILL LOG

HOLE Nº G60

Feature Bedding, Foliation, Fragment size & shape; Shearing, Fault, Vein; c carbonate, q quartz

Mineralization 022037

Trace 1-5%
Common 5-15%
Abundant 15-60%
Massive > 60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
3.0									
3.0		1cm calcite vein 25° to c.A.						53.0	
		3cm bleby calcite vein 10° to c.A.						53.6	
	55							55	
.8									
	56.5								
2.4		Lr. grey green sericitic & carbonate rich lithic-tuff. From 56.5 m. the agglomerate component is virtually absent. though rare large fragments and blocks still occur.							
3.0									
	60							60	
		1cm sid vein. 20° to c.A.						60.7	
.6		5cm thin qtz veins. 30° to c.A.						61.2	
2.5									
								64.7	
	65	3cm thin sid veins 25° to c.A.						65	
3.0									
		1cm sid vein. 45° to c.A.						67.35	
3.0									
	70							70	
.5									
1.8									
		Fault - broken core						72.6	
2.8									
		1cm sid vein 30° to c.A.						74.4	
	75							75	

5 cm

ABERFOYLE **DIAMOND DRILL LOG** **HOLE Nº** G60 Page Nº 4

Feature Bedding, Foliation, Fragment (size & shape), Shearing, Fault, Vein; c carbonate, q quartz

Mineralization 022038

Trace 1-5%
Common 5-15%
Abundant 15-60%
Massive >60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
.5		Lithology - as above - lt. grey green sericitic lithic tuff.							
2.3									
.4		1cm c vein -30° to c.A.						79.0	
		Fault - broken core	F					79.2	
3.0	80							80	
		3cm qtz vein, -15° c.A.						81.3	Py1 - in qtz vein 3cm.
3.0	82.9	Lt. grey green sericitic tuff-agglomerate							
		Lithology as above except for 20% by vol. of frag. av. 20 cm. in size.							
	84.8	1cm qtz vein 20° to c.A.						84.5	
	85	Lt. grey green sericitic lithic tuff.						85	
3.0		Description as above.							
3.0	90							90	
3.0		Fault - broken core	F					92.4	
		2cm qtz-c. vein 20° to c.A.						94.5	
3.0	95							95	
3.0								99.1	
		1cm qtz vein 20° to c.A.						99.4	
		1cm qtz vein 40° to c.A.							
	100							100	

5 cm

Feature Bedding, Foliation, Fragment (size & shape), Shearing, Fault, Vein (c carbonate, q quartz)

Mineralization Trace 1-5% Common 5-15% Abundant 15-60% Massive >60%

022039

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
3.0		Lithology - as above.							
		1cm sid. vein 60° to c.A.						101.6	
3.0	104.3	Lt. grey carbonate rich lithic tuff - agglomerate.							
	105	Rock contains lt. grey irreg frag. to >10cm. in this interval. Frag & vesicles are carb. rich. -dol??.						105	
3.0	107.2	Grey green sericitic lithic tuff. (as above)							
		Description as for 56.5-82.9m.							
3.0	110							110	
		1cm sid vei.. 45° c.A						110.8	
		1cm sid vein - 45° c.A.						110.9	
3.0		1cm sid vei -30° to c.A.						112.8	
	115							115	
2.5								116.4	
		1cm. g-sid vei - 60° to c.A.						116.7	
		1cm sid vein - 30° to c.A.							
.5	117.7	Fault? - broken core						117.4	
		Lt. to med. grey sericitic & carbonate rich lithic tuff. - agglomerate.							
.0		The bulk of the interval is composed of grey irregular vesic. blk. fragments. >5cm. in a carbonate rich (siderite?) matrix containing finer lithic material.							
	120	The interval is (extensively) veined by carbonate veinlets av. .5cm thick which have a poor p.o. of 45° to c.A.						120	
		The matrix of the rock locally approaches 100% cream c. xtaline siderite?							
1.0									
	122.9	Lt. grey green locally very carbonate rich lithic tuff and rare agglomerate.							
		3cm c vei -45° c.A.						124.6	
	125							125	

5 cm

Feature Bedding, Foliation, Fragment (size & shape), Shearing, Fault, Vein (c carbonate, q quartz)

Mineralization 022040 — Trace 1-5% Common 5-15% Abundant 15-60% Massive >60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
3.0		Lithology as above.						126.0	
		1cm c vein 25° to c.A.						126.4	
		2cm sid vein 70° to c.A.							
3.0									
	130							130	
3.0		3cm c xtal sid vein w. 2cm fg-gkz vein on upper side. 60° c.A.						131.2	
		1cm sid. vein 10° to c.A.						133.5	
3.0									
	135							135	
3.0									
3.0								140	
	140								
		1cm q/c. vein 45° to c.A.						142.6	
3.0									
		FAULT - broken core. 70° c.A.						144.4	
	145	1cm sid vein 60° to c.A.						145.0	
		1cm sid vein 45° to c.A.						145.4	
3.0									
	148.0	148.0 - 154.0 NO CORE - BULL NOSE BIT USED.							
NO CORE	150							150	

5 cm

ABERFOYLE

DIAMOND DRILL LOG

HOLE Nº G60

Feature — Bedding, Foliation, Fragment (size & shape), Shearing, Fault, Vein (c carbonate, q quartz)

Mineralization — Trace 1–5%, Common 5–15%, Abundant 15–60%, Massive > 60%

022011

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
NO CORE – BULL NOSE BIT		148·0 – 154·0 NO CORE – BULL NOSE BIT USED							
3·0	154·0	Lithology – Lt. grey green sericitic lithic tuff as previously. 20cm sid. veinlets av. 40° c.A. 80cm s.d. veins to 1cm from 30 to 60° to c. A.						154·4 154·8 155 155·6	
	157·0	157·0 – 167·60 NO CORE – BULL NOSE BIT USED							
NO CORE – BULL NOSE BIT USED FOR LIFT	160							160	
	165							165	
2·0		cream sideritic lithic tuff grading down to lt. grey green sericitic lithic tuff = description as previously.							
	167·6	167·6 – 173·6 NO CORE – BULL NOSE BIT USED							
NO CORE – BULL NOSE BIT.	170							170	
1·5	173·6								
	175							175	

5 cm

ABERFOYLE

DIAMOND DRILL LOG

HOLE Nº G60 Page Nº 8

Feature: Bedding, Foliation, Fragment (size & shape), Shearing, Fault, Vein (c carbonate, q quartz)

Mineralization: Trace 1–5%, Common 5–15%, Abundant 15–60%, Massive > 60%

022042

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE / COMMON / ABUNDANT / MASSIVE	DEPTH m	MINERALIZATION
.5						
2.5		15cm c.xtal sid. w minor py & qtz. in vein w country rock frag 45° to c.A.			175.5	175.5 – 15 cm py 15 at top of 15cm sid vein. py as f.g. diss. in volc.
					176.6	
					177.3	Trace cpy. in siderite blebs
		Lithology – as above – grey green to cream sericitic to locally very carbonate rich lithic tuff. Also locally pyritic.				py v. rare.
3.0	180				180	
					181.1	py 15 f.g. diss + stockwork of veinlets. (assoc. w. sid. vein loc.)
					181.35	py rare.
					181.7	py 15 as vein stockwork locally assoc. with sid. in vein. av. 20° c.A.
					182.2	py rare
3.0					182.7	py 20 veins 35° to c.A.
					183.0	
					183.5	py rare
					183.7	py 30-40 as stockwork of veinlets
	185				185	py rare
3.0		2cm c.xtal sid. vein 45° to c.A.			186.15	186.25 – 5cm py 15 stockwork assoc. w. sid. alt. of volc.
					186.25	py rare
		Between 187 and 199.6 m numerous carbonate veinlets of at least 2 generations (cont 1) Early pink siderite and 2) later white unknown carbonate. Veins of at least the earlier gen. are associated with local intense siderite alteration of the volc.			187.2	py 5-7 (10) as diss, blebs + veinlets assoc. w. carbonate.
3.0					187.95	
					189.5	
	190	Zone of extensive veining by white coarse xtalline carbonate. Not siderite.			190	
					191.0	
		1cm c vein. 30° to c.A.			193.2	
3.0						
	195				195	
3.0						
					199.7	py 10 over 5cm. diss. in volc.
	200				200	

5 cm

ABERFOYLE

DIAMOND DRILL LOG

HOLE Nº G60 Page Nº 9

Feature

Bedding
Foliation
Fragment size & shape
Shearing
Fault
Vein
c carbonate
q quartz

Mineralization

022043

Trace 1-5%
Common 5-15%
Abundant 15-60%
Massive >60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
3·0		Lithology – as above – lt. grey green sericitic and (very) carbonate rich lithic tuff with rare fine agglomerate.						201·2	10 cm Py 15 as blebs & diss.
									Py trace.
3·0								203·05 203·25	Py 10 blebs, diss + veins assoc w. sid
		10 cm sid, gave 60° c.A						203·8	10cm CaS, Sp. trace in c.xtall. sid vein
	205	Fault – slickensides 45° c.A.						egg 204·9 205	
3·0									Py rare
								208·05 202·2	Py 15 blebs assoc. w ·5cm sid vein 40° to c.A.
3·0	210							210	
3·0									Py trace
3·0	215	2cm. sid vein. 40° to c.A.						215 215·65	
3·0	220							219·6 220	10cm Py + blebs
3·0		From 224·6 to 225·1 the tuff is flooded with lt. to dk grey cryptoxtalline silica. mainly affecting the buff matrix rather than the fragments.							
	224·6 225							225	

5 cm

ABERFOYLE

DIAMOND DRILL LOG

HOLE Nº G60 Page Nº 10

Feature

Bedding
Foliation
Fragment size & shape
Shearing
Fault
Vein
c carbonate
q quartz

Mineralization

022044

Trace 1-5%
Common 5-15%
Abundant 15-60%
Massive > 60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
	225.1	Lithology – as above.							
	225.7	Interbedded lt. grey (tuffaceous) mudstone and cream grey (pyritic) fine lithic tuff. – Interbeds of tuff av 10cm and mudstone av. 20-30cm. Tuff contains fine often pyritized frag. in a v.f.g. mudstone? matrix. Well bedded unit So av 45° to c.A. Minor aggl.						225.7	Py 5-10 (25) diss. & blebs & veins & fine pyritic lithic frag. in tuff. bands.
3.0	227.2	Black carbonaceous siltstone – gen. massive w. rare med grey siltstone interbeds to 10cm. Minor sym. Py. fragments.						227.2	Py trace → 1% as blebs & veinlets
	228.15	Sulphide-siderite-qtz. rock – py. av. 60% as diss., blebs and network. Py. overprints local. breccia textures. Sid – 30% and qtz 10% as diss. Replaced brecciated carbonate?						227.8 / 228.15	Py 1-2, sp trace in 12cm sid vein.
	228.85	Cream grey rextallized sideritic dolomite – A gen. massive rock w m. grained carb. xtals. Assoc. w. stockwork of (rext.) carb. veins.						228.85 / 228.95	Py 60 as diss. blebs & veinlets
	230							230	Py 3-5 veins. Py rare
3.0	230.2	Interbedded polymictic (sed?) breccia and well bedded to slumped and brecciated pyritic siltstone and dolomite. Dolomite is dominant in the top of the interval and py. siltstone in the bottom. Characteristic feature of the interval is polymictic breccia bands gen. ∥ to bedding w. frag. from < 1mm. to 30cm. av 1cm. Frag. consist. of py. siltstone, dol. & carb. veins?? Bands of breccia from 2cm to 1m. Bulk of the interval is dolomitic (including the breccia) but the basal 2m is mainly pyritic mudstone which is locally extensively slumped and broken. Interval appears to represent quiescent conditions punctuated by periods of uppheaval and breccia deposition. Si/So av. 40-45° to c.A.						230.2 / 230.6	Py 10-15 v.f.g. bedded py. Py ≈ 1 as v.f.g. py. beds to 1-2cm and py. frag. in sed? breccia.
	231.5							232.7	Py 20 v.f.g. bed. py. in py. mudstone lam. to 15cm.
3.0								233.0	Py rare – dol. bedded – 45° to c.A.
								234.0	Py 20-30 (50) – v.f.g. bedded (slumped & breciated) py.
	235							235	
	235.65	Lt. grey massive dolomite. A gen. massive interval with no recognisable bedding. Rock is weakly to moderately veined by a stock work of cream coloured carbonate veinlets. These overprint an earlier generation of veinlets (white). 235.9 – 236.4 – Lt. grey siltstone & py. mudstone band 2cm. ∥ to c.A.						235.65 / 235.9	Py rare
3.0								236.4	Py 5-10 v.f.g. bedded ∥ to c.A. Py rare
3.0	240	Med grey to dk. grey locally brecciated dolomite. Gen. massive dolomite with patches of brecciation. Intraclast breccia ??						240	
	241.7	Sed. breccia and brecciated py. siltstone & dol. 15cm. top polymictic breccia underlain by sed. def. py. siltstone & brecciated dol. Dol brecciated by c. veining.						241.7 / 241.85	Py 1-2 v.f.g. py. mudstone frag. Py 7-10 – v.f.g. bedded py. – (slumped)
3.0	242.6	Med grey dolomite breccia. Med grey massive dolomite fragments av 5cm; angular, in a dolomite matrix. The matrix is off white in colour. Brecciation appears to be post depositional and assoc. w. carb. veining in part.						242.6	
	244.8 / 245	Cream to lt. grey dolomite – contains angular med grey dol. frag to 10cm as isolated sed. clasts						245	
3.0	246.3	Lt. grey to med grey locally brecciated gen. massive dolomite. Bulk of the interval is composed of a med. grey massive to weakly bedded dolomite which is weakly to extensively veined by a stockwork of dol? veinlets. In addition the rock contains local breccia zones to 30cm composed of frag. to 5cm in a lighter coloured dol. matrix.							
3.0								248.9 / 249.4	
	250							250	

5 cm

Feature Bedding, Foliation, Fragment (size & shape), Shearing, Fault, Vein (c carbonate, q quartz)

Mineralization Trace 1-5% Common 5-15% Abundant 15-60% Massive >60%

022045

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
3·0		These may be intraclast breccias or due to brecciation assoc. with the veining by carbonate. 248·9 - 249·4 , 258·65 - 258·85 - coarse xtal. sid. rock = recrt. dol? Intra clast breccias are prob. the cause of the brecciation as isolated frag. to 10 cm od poss. much larger are present in otherwise homog. dol. indicating sed. activity							
3·0									
	255							255	
3·0									
2·0	260							260	
3·0									
	263·3	Interbedded well laminated grey brown pyritic mudstone & dolomite, grey dolomite & minor f.g. tuff. & sed. breccia. A complexly interbedded mixture the above rock types. S1/S0 - 30-45° to c.A. pyritic sed. breccia bands to 5 cm ; Dolomite is ext. veined by cream carbonate & to S1. Veining causes local brecciation of all rock types.						263·3	Py 3-5 as v.f.g. bedded py. in thin laminations amongst other rock types.
1·0									
	265							265	Py 30-40 v.f.g. bedded py. in py. mudstone & py. dol.
2·2									
	267·1	Dk grey bedded chert - 50 - 30° c.A. f.g. cubic xtals diss.?						266·8 / 267·1	Py 2-3 v.f.g. bedded.
	267·9	Lt. to med grey brecciated dol. - brecciated by c.veining?						267·85	
	267·85	Lt. green grey carb. rich tuff - grading downwards to carb. altered lithic? tuff. Lower fault contact?							Py rare
3·0	269·0	Grey silicified dolomite? A highly silicic rock ext. veined by a stockwork of qtz. veins. weakly pyritic. Interval grades into unit below.						269·0	Py 1-2 v.f.g. in blebs.
	270							270	
	270·3	Sideritic - siliceous - pyritic breccia? - Fissure lode? siderite ≈ 65% silica 25% Py to 5% sp, Ga - trace. Coarse xtal. sid. assoc. w. silica. Rare country rock frag. internally but numerous on lower margin - sharp lower contact						270·3 / 270·8	Py 3-5, Sp 1-2 Ga trace - all as diss. & blebs.
	271·65							271·65	
2·5		271·65 - 276·1 Black carbonaceous shale - contains sig. amount (≈ 15%) broken & contorted white ver qtz? frag. as well as minor contorted py. bands. - due to proximity to fault zone? S1 av. 30-40° to c.A.							
	273·7	FAULT ZONE - Broken core & pug to 275·3m.							
	275							275	

5 cm

ABERFOYLE

DIAMOND DRILL LOG

HOLE Nº G60

Feature

Bedding
Foliation
Fragment size & shape
Shearing
Fault
Vein
c carbonate
q quartz

Mineralization

022046

Trace 1-5%
Common 5-15%
Abundant 15-60%
Massive > 60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
	275.3								
2.5	276.1	5cm sid ven 40° c.A.						275.8	Ga 1-2 cpy trace 5cm sid ven.
		Lt. grey siltstone – weakly bedded at low angle to c.A. Minor sed. rafting of beds? sid. vein w/ breccia 40 cm rext. dol?? // c.A at contact. 1cm sid ven – 70° c.A.						276.6	
								277.0	
	277.3	Black carbonaceous shale – uniform rock containing minor soln? cavities and def. qtz veins.						277.3	277.3 – Py 2-3 as blebs in rext. dol? //c.A
3.0	279.1	Contorted interbedded black carbonaceous siltstone & lt. grey siltstone							Py 1 v.f.g. diss.
	280	Rock is interbedded on the scale of 1-2 cm's and shows much sed. defm. in form of slumping rafting & brecciation of beds. S varies from // to ⊥ to c.A.						280	
3.0		281.8 – 5cm sid ven 45° c.A.						281.8	Ga & cpy trace in 5cm sid ven.
		283.2 5cm sid. ven. 25° c.A 283.4 Fault – broke core						283.2	
	283.4	Lt. grey siltstone						283.4	Py 1-2 v.f.g. diss.
2.8	285	Rock is very weakly pyritic. Uniform well laminated rock showing evidence of minor sed. defm.? in form of brecc. of beds? 2cm qtz-py ven 20° to c.A.						285.0	
		1cm sid ven. 40° to c.A.						286.4	
3.0		287.1 – dol. fragments to 5cm							
1.5	290.0	2cm qtz. vein & stockwork 5° c.A.						290	Py 5-7 veins
	290.4	FAULT ZONE – Broken core & pug.						290.2	
.4		Interbedded lt. grey to black siltstone + mudstone							
		Well cleaved rock sills at low angle, gen 15° to c.A.							
1.5		vein qtz.						293.3	Py trace v.f.g.
1.0	294.8 295							295	
3.0	297.1	VT Dk. grey green sericitic fine lithic tuff.						297.1	
		Rock begins as layered fine grained tuff and grades into a fine lithic tuff by about 298 m. The layering in the top of the unit is enhanced by the cleavage.							Py v. rare
3.0		The bulk of the rock (95%) is fine lithic							
	300	1cm py ven 18° c.A.						300.0	

5 cm

ABERFOYLE

DIAMOND DRILL LOG

HOLE Nº G60

Feature

Bedding
Foliation
Fragment — size & shape
Shearing
Fault
Vein — c carbonate, q quartz

Mineralization

022047

Trace 1-5%
Common 5-15%
Abundant 15-60%
Massive > 60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
		but a small coarser component - vesicular frag. as 3-5cm is present. Fine component as ½-5 and cannot be seen to be vesicular in gen.							
	301·0	END OF HOLE AT 301·00 M.							

305 310 315 320 325

5 cm

ABERFOYLE

DRILL HOLE RECORD

022048

Location QUEEN HILL Property QUEEN HILL District ZEEHAN Bearing (M) 283·9° Hole No G61

Commenced 2/4/80 Completed 29/4/80 % Recovery 93% Grid bearing (M) −11·25° Date 5-5-80

Objective ORE RESERVE HOLE TO TEST QUEEN HILL LODE SECTION 3100, 35 RL. Core size HQ to 51m, NQ to 307·7m Logged S. RICHARDSON

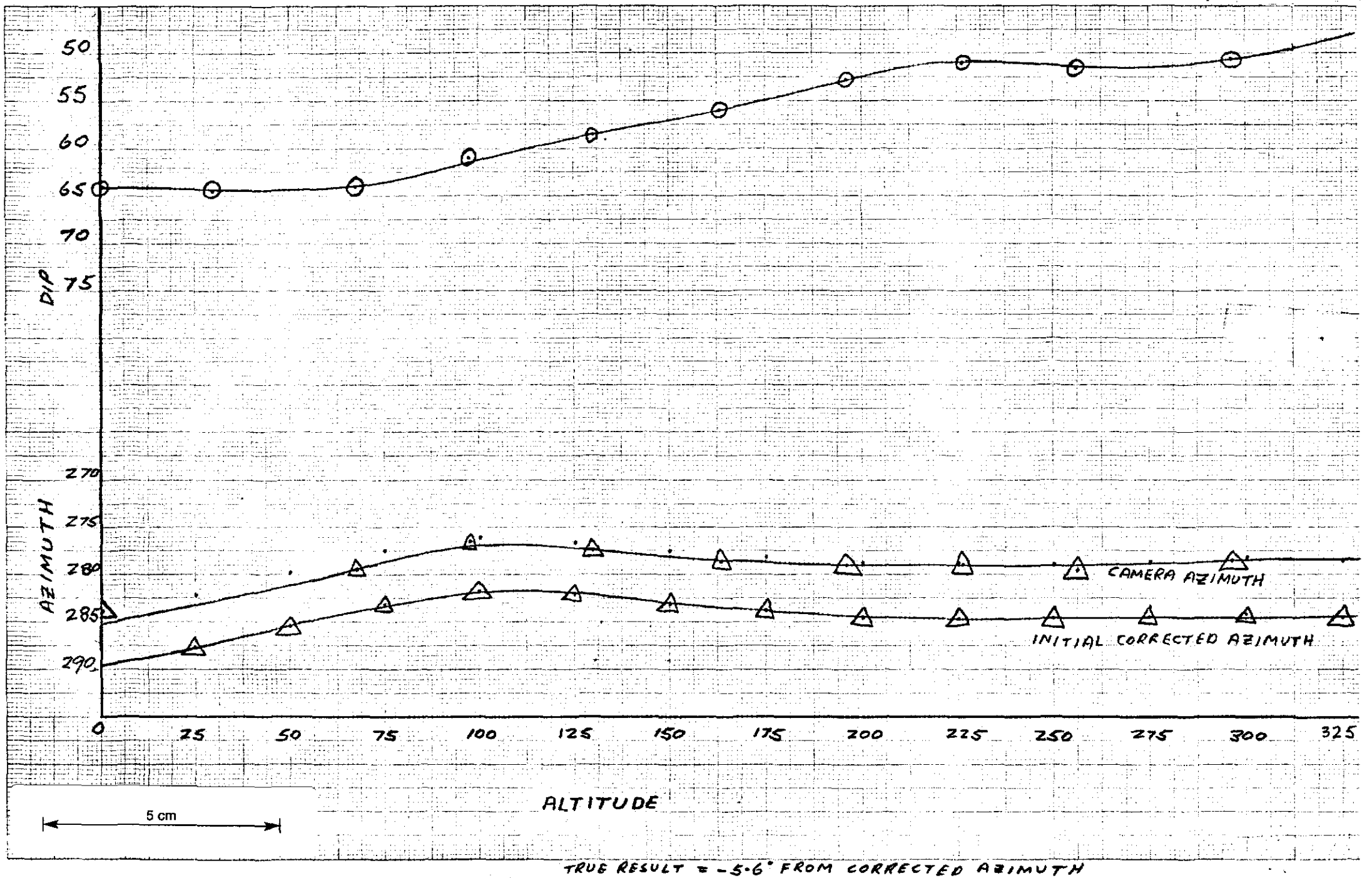
Co-ordinates 5361777·5N 360854·5E Dip 64·1° Alt./R.L. 246·78

SURVEY DATA			
DEPTH	DIP	BEARING(M)	INSTRUMENT TYPE
30M	64·5°	in rods	EASTMAN
67M	64°	279·5°	"
97M	61°	276·5°	"
130M	58·75	277·5°	"
163M	56°	278·5°	"
196M	52·75°	279°	"
226M	51°	279°	"
256M	51·5°	279·5°	"
296M	50·5°	278·5°	"
EOH	307·7M		

GRAPH DERIVED DATA			CALCULATED CO-ORDINATES			REMARKS
DEPTH	DIP	BEARING(M)	NORTHING	EASTING	ALTITUDE	
0M	64·1°	283·9°	5361777·5	360854·5	246·78	
25	64·25°	282·1	1781.97	843.62	224.28	Ground was very badly broken from top of hole to about 60 m.
50	64·5°	279·9	1786.07	832.82	201.74	
75	63·5°	277·5	1789.80	821.89	179.27	
100	61·25°	276·1	1793.39	810.35	157.12	
125	59°	276·6	1797.15	797.97	135.45	
150	57°	277·6	1801.33	784.78	114.25	
175	55°	278·3	1805.93	770.83	93.53	
200	52·5°	279	1810.96	756.08	73.37	
225	51°	279·1	1816.33	740.62	53.74	
250	51·25°	279·1	1821.78	724.96	34.28	
275	51·5°	278·9	1827.19	709.39	14.74	
300	50·5°	278·6	1832.57	693.68	−4.68	
325	48·25°	278·9	1838.13	677.44	−23.65	
EOH	307·7M					

022049

GAF A4 1mm



TRUE RESULT = -5·6° FROM CORRECTED AZIMUTH

Note: Intervals not analysed should be recorded such that a complete hole is itemised.
For any section not analysed, a value −5·00 should be entered in the relevant assay columns.
It is not necessary to record a zero.

022050

PAGE 1 OF .....

PROGRAM | PROGRAMMER | DATE

HOLE IDENT.	DISTANCE FROM COLLAR TO BOTTOM OF SAMPLE (metres)	ASSAY ppm SNT	ASSAY ppm STANNITE	ASSAY ppm COPPER	ASSAY ppm ZINC	ASSAY ppm LEAD	ASSAY ppm TUNGSTEN	~~grammes per Tonne~~ SILVER ppm	grammes per Tonne GOLD		SAMPLE No.
G61	53·50	−5·00									
	53·80	100		38	55	620	10	1	<0·05		238732
	54·10	1350		42	50	1200	15	11	<0·05		238733
	54·40	3000		60	100	1500	<10	7	<0·05		238734
	55·10	−5·00									
	55·40	330		42	60	370	20	6	<0·05		238735
	55·60	55		50	42	1100	10	10	<0·05		238736
	55·90	230		46	36	290	25	7	<0·05		238737
	104·80	−5·00									
	105·40	1350		50	135	370	<10	2	<0·05		238719
	105·80	260		55	55	340	10	3	<0·05		238720
	106·20	180		32	18	80	15	3	<0·05		238721
	106·80	5150		110	55	580	<10	9	<0·05		238722
	107·80	370		50	18	85	10	2	<0·05		238723
	108·30	40		26	14	70	<10	1	<0·05		238724
	108·80	32		26	10	45	35	5	<0·05		238725
	109·30	120		48	14	40	25	3	<0·05		238726

TIN – XRF – COMLABS
COPPER, LEAD, ZINC & SILVER – AAS – ADELAIDE OFFICE

AU – AAS 5

Note: Intervals not analysed should be recorded such that a complete hole is itemised.
For any section not analysed, a value −5·00 should be entered in the relevant assay columns.
It is not necessary to record a zero.

022051

PAGE 2 OF .....

PROGRAM | PROGRAMMER | DATE

HOLE IDENT.	DISTANCE FROM COLLAR TO BOTTOM OF SAMPLE (metres)	ASSAY ppm SNT	ASSAY ppm STANNITE	ASSAY ppm COPPER	ASSAY ppm ZINC	ASSAY ppm LEAD	ASSAY ppm TUNGSTEN	~~grammes per Tonne~~ SILVER ppm	grammes per Tonne GOLD		SAMPLE No.
G61	117·40	−5·00									
	118·40	340		34	18	55	15	3	<0·05		238727
	118·85	29000		43000	2600	2750	10	510	<0·05		238728
	119·40	1100		750	48	180	35	10	<0·05		238729
	119·70	9000		5550	560	7200	75	430	0·10		238730
	120·40	320		46	12	55	15	5	<0·05		238731
	217·20	−5·00									
	218·20	160		28	16	36	30	1	<0·05		238738
	219·20	270		160	85	50	20	2	<0·05		238739
	220·20	110		18	120	115	20	1	0·05		238740
	221·20	85		8	6	24	30	1	0·05		238741
	222·20	420		28	8	75	30	2	0·05		238742
	222·70	550		22	6	70	30	3	<0·05		238743
	223·05	8700		9500	370	280	110	10	0·05		238744
	223·20	370		68	8	28	40	2	<0·05		238745
	224·20	1250		30	34	32	40	3	<0·05		238746
	225·20	2150		18	14	60	45	3	<0·05		238747
	225·30	1200		40	28	40	30	2	<0·05		238748
	225·90	1100		900	500	670	2900	20	0·15		238749

TIN – XRF – COMLABS
COPPER, LEAD, ZINC
& SILVER – AAS – ADELAIDE OFFICE

Tug [illegible] 1·26 [illegible]
from 118·4 to 119·70

[redacted]

022052

Note: Intervals not analysed should be recorded such that a complete hole is itemised.
For any section not analysed, a value −5·00 should be entered in the relevant assay columns.
It is not necessary to record a zero.

PAGE 3 OF .....

PROGRAM | PROGRAMMER | DATE

HOLE IDENT.	DISTANCE FROM COLLAR TO BOTTOM OF SAMPLE (metres)	ASSAY ppm SNT	ASSAY ppm STANNITE	ASSAY ppm COPPER	ASSAY ppm Pb.	ASSAY ppm Zn.	ASSAY ppm TUNGSTEN	grammes per Tonne SILVER	grammes per Tonne GOLD		SAMPLE No.
661	226·20	510		18	175	12	70	3·00	<0·05		238750
	227·20	21,000	30	20	220	50		1·00			238751
	228·20	14,000	60	20	60	15		<1·00			238752
	228·60	5,250	30	45	130	40		4·50			238753
	228·85	56000	100	20	430	10		2·00			238754
	229·20	9800	70	45	265	40		2·00			238755
	230·10	8400	40	30	150	15		2·00			238756
	230·20	6500	20	10	35	10		<1·00			238757
	231·20	600	Check assay 100	5	45	5		<1·00			238758
	232·20	6700	80	30	50	30		<1·00			238759
	232·40	2500	300	830	1150	270		20·50			238760
	232·60	14100	140	420	470	90		<1·00			238761
	233·20	2300	80	40	130	30		<1·00			238762
	234·20	560	80	35	130	140		3·00			238763
	235·20	2250	40	30	140	80		2·00			238764
	235·85	1600	30	40	110	35		11·50			238765
	236·20	830	<20	10	55	15		<1·00			238766
	237·20	1450	20	15	45	10		<1·00			238767
	235·20	1000	20	25	100	30		1·50			238768
	238·85	4300	30	20	40	10		8·00			238769

TIN - XRF COMLABS
Cu, Pb, Zn & Ag AAS ADEL-OFFICE
Clarke Lode 222·7 – 225·9. 0·27% Sn.

2·24% Sn 6·4 m
226·2 – 232·6 m Qtz Lode.

Note: Intervals not analysed should be recorded such that a complete hole is itemised.
For any section not analysed, a value -5·00 should be entered in the relevant assay columns.
It is not necessary to record a zero.

022053

PAGE 4 OF

PROGRAM | PROGRAMMER | DATE

HOLE IDENT.	DISTANCE FROM COLLAR TO BOTTOM OF SAMPLE (metres)	ASSAY ppm SNT	ASSAY ppm STANNITE	ASSAY ppm COPPER	ASSAY ppm ZINC	ASSAY ppm LEAD	ASSAY ppm TUNGSTEN	grammes per Tonne SILVER	grammes per Tonne GOLD		SAMPLE No.
G61	239·15	2·60%	25	30	25	150		5·50			238770
	239·20	1·94%	50	35	25	85		4·50			238771
	239·85	1150	50	20	20	20		<1·00			238772
	240·20	340	<20	10	20	20		<1·00			238773
	253·70	-5·00									
	254·00	65	<20	10	40	85		1·50			238774
	254·95	28	<20	30	825	740		5·00			238775
	255·25	18	<20	15	15450	1185		<1·00			238776
	260·20	-5·00									
	260·75	8	<20	10	85	60		4·50			238777
	261·20	36	<20	35	4200	760		4·50			238778
	262·00	320	<20	30	200	520		3·00			238779
	262·20	6	25	5	55	35		<1·00			238780
	262·60	18	25	10	215	85		<1·00			238781
	263·20	<4	25	30	2060	1060		<1·00			238782
	264·20	<4	<20	20	95	165		1·50			238783
	264·60	10	<20	20	85	210		5·50			238784
	265·20	4	<20	30	240	245		1·50			238785

TIN - XRF COMLABS
Cu, Pb, Zn Ag - AAS ADELAIDE OFFICE

226·2 - 239·85 1·2%
12·65 m

Note: Intervals not analysed should be recorded such that a complete hole is itemised.
For any section not analysed, a value −5·00 should be entered in the relevant assay columns.
It is not necessary to record a zero.

022054

PAGE 5 OF .....

PROGRAM | PROGRAMMER | DATE

HOLE IDENT.	DISTANCE FROM COLLAR TO BOTTOM OF SAMPLE (metres)	ASSAY ppm SNT	ASSAY ppm STANNITE	ASSAY ppm COPPER	ASSAY ppm ZINC	ASSAY ppm LEAD	ASSAY ppm TUNGSTEN	grammes per Tonne SILVER	grammes per Tonne GOLD	SAMPLE No.
G61	265·70	8	25	35	50	325		<1·00		238786
	265·90	4	<20	70	15	300		<1·00		238787
	266·20	<4	<20	15	180	60		<1·00		238788
	280·10									
	281·10	150	25	5	95	105		2·50		238789
	282·10	110	<20	5	85	75		<1·00		238790
	291·40	-5·00								
	291·80	14	<20	25	45	115		3·50		238791
	292·40	<4	<20	30	30	60		1·50		238792
	293·40	4	<20	20	10	15		<1·00		238793
	294·40	<4	<20	15	70	35		<1·00		238794
	295·00	4	<20	20	45	45		<1·00		238795
	295·40	<4	<20	35	30	35		<1·00		238796
	295·70	<4	<20	25	20	20		<1·00		238797
	296·40	<4	<20	30	15	20		<1·00		238798
	297·40	6	<20	30	30	25		<1·00		238799
	298·40	<4	<20	20	10	25		<1·00		238800
	299·40	<4	<20	20	40	35		<1·00		233201

Tin – XRF COMLABS

Cu, Pb, Zn, Ag – AAS ADELAIDE OFFICE

Note : Intervals not analysed should be recorded such that a complete hole is itemised.
For any section not analysed, a value −5·00 should be entered in the relevant assay columns.
It is not necessary to record a zero.

022055

PROGRAM PROGRAMMER DATE

HOLE IDENT.	DISTANCE FROM COLLAR TO BOTTOM OF SAMPLE (metres)	ASSAY ppm SNT	ASSAY ppm STANNITE	ASSAY ppm COPPER	ASSAY ppm ZINC	ASSAY ppm LEAD	ASSAY ppm TUNGSTEN	grammes per Tonne SILVER	grammes per Tonne GOLD		SAMPLE No.
661	300·40		10	<20	30	290	265	<1·00			233202
	301·40		10	<20	30	25	35	<1·00			233203
	302·40		6	<20	25	40	30	<1·00			233204
	303·40		<4	<20	30	50	25	<1·00			233205
	304·40		<4	<20	30	45	25	<1·00			233206

Ti – XRF COMLABS
Cu, Pb, Zn, Ag – AAS ADELAIDE OFFICE

ABERFOYLE

DIAMOND DRILL LOG

HOLE Nº G61 Page Nº 1

Feature Bedding, Foliation, Fragment (size & shape); Shearing, Fault, Vein (c carbonate, q quartz)

Mineralization 022056 — Trace 1-5%, Common 5-15%, Abundant 15-60%, Massive >60%

CORE REC'D	DEPTH m	GEOLOGY
0.0		No core - HW used.
HW		
HQ 2.5	5	Lt. to med. grey f.g. micaceous quartzite. A gen. massive to weakly bedded ? rock. It contains silty interbeds in the form of lt grey sericitic shale to 10-25cm av. 1-2cm. Cleavage is only poorly developed in the quartzose intervals defined by P.O. of the mica component. In the pelitic bands cleavage is well developed 30-50° to c.A. A strong lineation is often developed. The rock is weakly to extensively veined by a stockwork of white quartz veinlets, best developed in the quartzite component. The core is very broken and locally puggy to about m this may be due to faulting s/or weathering along joints.
2.5	10	
2.8	15	
2.3		
	18.8 to	FAULT ZONE ?? Core is extremely broken in this interval which covers the boundary between Q + QS. In the quartzite the core is generally puggy. Zone may represent shearing during deformation between the competent Q and ductile QS.
.4	20	
1.8	25	

VISUAL LOG: TRACE | COMMON | ABUNDANT | MASSIVE

DEPTH m: 5, 10, 15, 20, 25

MINERALIZATION

5 cm

ABERFOYLE

DIAMOND DRILL LOG

HOLE Nº G61 Page Nº 2

Feature Bedding, Foliation, Fragment (size & shape); Shearing, Fault, Vein (c carbonate, q quartz)

Mineralization 022057 — Trace 1–5%, Common 5–15%, Abundant 15–60%, Massive > 60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG (TRACE / COMMON / ABUNDANT / MASSIVE)	DEPTH m	MINERALIZATION
	25.7				
1.2		Black carbonaceous shale containing lt. grey qtzite. fragments and contorted qtz. blebs & veinlets. Black shale matrix w. flattened qtzite clasts & def. qtz. veins?			
	27.5				
1.0		Locally a black shale w. thin lt. grey shale interbeds. Rock is generally very well cleaved S1 from 0 to 45° to c.A. Core is mainly broken.			
3.0	30			30	
		15cm qz. vein 35° to c.A			
	32.3			32.15	
2.5		Lt. grey f.g. to m.g. (micaceous) quartzite. Lt. grey massive quartzite weakly veined by qtz. veinlets. Very weak cleavage at ≈ 45° to c.A. Very few shaly bands. Core is locally very broken.			
	35			35	
2.5					
		Fault - pug - 45° c.A.	F	37.9	
2.3					
	40			40	
3.0					
	44.2	core is broken & puggy to 45.4m			
	44.8			45	
2.0	45				
	45.4			45.9	
		Dk. grey to black carbonaceous shale w. thin grey micaceous quartzite interbeds & fragments (contorted and broken). Black carb. shale matrix w. (very) contorted grey f.g to m.g. micaceous quartzite beds & frag. Beds of qtzite. are usually fractured and def. prob by a combination of S. sed & tect. def.			
5 cm		5cm py vein 60° to c.A.		49.25	5cm py. vein. py 1-2 veins
3.0		48.9 - 100cm grey f.g. qtzite.			
	50			50	

ABERFOYLE

DIAMOND DRILL LOG

HOLE NO G61

Feature

Bedding
Foliation
Fragment (size & shape) 0%
Shearing
Fault
Vein
c carbonate
q quartz

Mineralization 022058

Trace 1-5%
Common 5-15%
Abundant 15-60%
Massive >60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	DEPTH m	MINERALIZATION
3.0		2cm py vein 65° c.A. 1cm py vein 45° c.A	Py	50.9 51.1	2cm py vein tr. gn. 1cm py vein
				52.0	Py 1-2 veins & minor py. clasts. (resp. qtzite frag?)
		FAULT - pug - 60° or 20° to c.A.	F		
3.0		core in general is very broken to about 50.0 m. Rock is also mod. to ext. veined by white qtz. veinlets which are also deformed. Cleavage is gen. // to bedding (S1/S0) and these are gen. constant around 45° to c.A.		53.8 54.1 55 55.4 55.6 55.9	Py 20 veins. Py 1-2 (5) veinlets Py 15 veins Py 2-3 veins
1.3	55				
HQ / NQ					
1.0	57.0				
3.0		15cm py veins 40° c.A 2cm py vein 50° c.A.		58.3 59.0 59.4	Py 60, numerous veins 2cm py vein Py 2-3 veins 3cm py-sid vein
	60			60	
3.0		FAULT - Pug. ?° to c.A.	F	62.7	Py rare
3.0	65			65	
				67.0 67.3	Py 2-3 veinlets
3.0				70	Py rare
	70	FAULT - Pug - 45° to c.A.	F	71.2	
3.0				74.5	8cm Py 3-5 veins
	75			75	

5 cm

ABERFOYLE

DIAMOND DRILL LOG

HOLE Nº G61 Page Nº 4

Feature

Bedding
Foliation
Fragment size & shape

Shearing
Fault
Vein

c carbonate
q quartz

Mineralization

022059

Trace 1-5%
Common 5-15%
Abundant 15-60%
Massive >60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
		Lithology - as above - Q3 - Interbedded Dk. grey to black carbonaceous shale & grey f.g. (micaceous) quartzite, (fractured & contorted).							Py rare
3.0									
		3cm py. vein 45° c.A.						79.6	3cm py vein
	80							80	
3.0	81.2								
		Med grey f.g. micaceous quartzite; ess. thick interbed.							
	81.9								
3.0								84.3	5cm py 40 py-sid veins
		FAULT - Pug - 45° to c.A.						84.55	
	85							85	
		Little def, well laminated						85.2	
								85.7	
3.0		Little def, well laminated							
		Little def, well laminated						89.7	
3.0	90							90	
2.1									
3.1	95	FAULT - Pug - 60° to c.A.						95	
		80cm FAULT ZONE - 45-60° to c.A						95.4 95.5 95.7	
	97.45								
	97.85	med grey massive siltstone							
3.1		FAULT - Pug ?° to c.A.						98.4	
		FAULT - Pug - 50° to c.A.						98.8	
	100							100	

5 cm

ABERFOYLE **DIAMOND DRILL LOG** **HOLE Nº** G61 Page Nº5

Feature Bedding, Foliation, Fragment size & shape; Shearing, Fault, Vein; c carbonate, q quartz

Mineralization 022060

Trace 1-5%
Common 5-15%
Abundant 15-60%
Massive > 60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	DEPTH m	MINERALIZATION
3.1		Lithology - as above - QS.			Py rare.
2.9	105.0	FAULT ZONE - Broken core & pug - 60° to c.A.		105	
	105.4			105.4	
	105.8	Vein pyrite assoc. w c.g. sideritе & silicified shale - fissure?		105.8	Py 20 flecks & vein.
	106.2	FAULT ZONE - Broken core & pug - in black shale & qtzite		106.2	Py rare 106.2 - 2cm py vein 25° to c.A.
3.0	106.8	Dk grey silicified QS w c. sideritе & blebs of f. to c.g. pyrite.		106.8	Py 5-7 flecks & veinlets
		Broken & puggy QS w. flecks & blebs of pyrite			Py 3-5 f.g to c.g flecks & veinlets
	108.3			108.3	
	108.8	Silicified & qtz. veined QS w. f. to c.g. py. blebs		108.8	Py 10 - f.g. to c.g. & veinlets.
3.0	110	Interbedded dk. grey to black shale & lt. grey f.g. (micaceous) quartzite - locally contorted & fractured. - QS		110	
		Si / So 0-40° to c.A			
					Py approx 1 as py ± qtz, sid or sericite veinlets. unoriented.
		FAULT - Pug - 50° to c.A			
		112.2 - 112.25 - sil. healed fault breccia.		112.2	
		FAULT - Broken core - ?° to c.A		113.2	
2.2		FAULT - Broken core - ?° to c.A.		114.0	
	115			115	
3.0	116.65	FAULT ZONE - Pug & broken core - 60° to c.A		116.65	
	116.85	FAULT - Broken core - 60° c.A.		117.35	
	117.9	FAULT ZONE ? - Broken core - ?° to c.A.			
	118.4	Fissure Lode? - Stanniite pyrite lode with qtz. healed brecciated lower margin. Strongly pyrite & younger sericite veined QS in less mineralized part of lode.		118.4 118.85	Py 20 c.g. Snt 30-40 as massive aggregates. Py 25-30 flecks, blebs & veins
3.1	119.7			119.7	
	120	Interbedded dk. grey to black shale & lt. grey quartzite (contorted & broken). QS. Description as previously.		120	
				121.3	3cm Py vein 70° c.A.
3.1					
	125			125	

5 cm

ABERFOYLE

DIAMOND DRILL LOG

HOLE Nº G61 Page Nº 6

Feature Bedding, Foliation, Fragment size & shape; Shearing, Fault, Vein; c carbonate, q quartz

Mineralization 022061

Trace 1-5%
Common 5-15%
Abundant 15-60%
Massive > 60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
3.1		Lithology - as above - interbedded dk. grey to black shale & lt. grey f.g. qtzite - locally contorted & broken.							
3.1									
3.1	130	From about 120 m there is an overall decrease in volume of quartzite interbeds; ie the rock is finer grained in general. Contorted & broken f.g. quartzite interbeds still occur but they are gen. thinner and further apart.						130 130.2	
		130.2 qtz vein mass.							
	133.3								
		Lt. grey f.g. quartzite - numerous qtz. veins.							
	134.6								
3.1	135							134.6 135	1cm py vein 55° to c.A.
3.0		5 cm							
3.0	140							140	
3.0	145							145	
	145.6							145.8	3cm py vein, tr. Ca 45° c.A.
		FAULT ZONE? - Broken core							
3.0	146.1								
	148.3								
		Lt. to Dk grey shale - quartzite interbeds and fragments absent.							
	150							149.9 150	3cm py vein 50° to c.A.

ABERFOYLE **DIAMOND DRILL LOG** **HOLE Nº** C61 Page Nº 7

Feature Bedding, Foliation, Fragment (size & shape); Shearing, Fault, Vein (c carbonate, q quartz)

Mineralization Trace 1-5% Common 5-15% Abundant 15-60% Massive >60%

022062

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG (TRACE / COMMON / ABUNDANT / MASSIVE)	DEPTH m	MINERALIZATION
3·0		Lithology – as above – lt. grey to dk. grey shale w. rare qtzite interbeds. Rock is QS minus quartzite. Bedding defined locally by varis in colour of shale. Rock is still locally contorted.	Py	150·15 150·18	Py. 3cm vein – tr Snt. 60° c.A Py 1 cm vein – tr Snt 60° c.A.
3·0		S_1/S_0 – 20 – 45° to c.A.	Py	152·7	1cm Py vein 40° c.A.
3·0	155		Py Py Py Py	154·4 154·6 154·7 155 155·2	1 cm py 40, q vein 30° c.A. 1 cm Py vein. 45° c.A. 2 cm Py vein. 25° c.A. 1 cm Py vein 60° c.A.
3·0	160			160	
3·0	161	Typical QS – Dk. grey to black shale w. broken & contorted qtzite interbeds.			
	163·7		Py	163·1	3cm Py 50 – vein. 50° c.A.
3·0	165	Dk. grey to black shale w. minor thin lt. grey qtzite interbeds QS w. only small amount of quartzite	Py	164·0 165	1cm Py 50 – vein. 50° c.A.
3·0	168·1	Dk. grey to black shale w. interbedded lt. grey quartzite & quartzite fragments (contorted) QS – description as previously. 168·1 marks dramatic increase in quartzite component. S_1/S_0 40 – 70° to c.A.			
3·0	170		Py	170	
			Py	170·6	3cm Py 50, q vein 80° c.A.
3·0			Py	172·4 172·6 172·7	Py 1-2 veinlets & pyritic frag. – qtzite? Py 70 c.g. q-sid vein 70° c.A.
				173·5 173·7	Py 1-2 veinlets & pyritic qtzite? frag. Py 80 c.g. – vein – 45° c.A.
3·0	175			175	

5 cm

ABERFOYLE

DIAMOND DRILL LOG

HOLE NO Q61 Page No 8

Feature Bedding, Foliation, Fragment size & shape; Shearing, Fault, Vein; c carbonate, q quartz

Mineralization Trace 1-5% Common 5-15% Abundant 15-60% Massive >60%

022063

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG (TRACE / COMMON / ABUNDANT / MASSIVE)	DEPTH m	MINERALIZATION
		Lithology - as above - Blacks to dk. grey shale containing interbeds & fragments of lt. grey f.g. quartzite. - QS		175.55	1 cm Py vein 15° c.A.
				176.1	2 cm Py vein 60° c.A.
				176.2	1 cm Py vein 50° c.A.
3.0				177.0	2 cm Py vein 55° c.A.
				178.05	1 cm Py vein 50° c.A.
3.0	180			180	
				180.4	1 cm py vein 45° c.A.
3.0					
	185			185.0	1 cm Py vein 60° c.A.
				185.3	1 cm Py vein 50° c.A.
				185.7	1 cm Py vein 50° c.A.
3.0				186.3	1 cm Py vein 60° c.A.
		5 cm			
3.0				189.6	Py 5. vein
	190			189.8	Py 60 vein, tr. cpy.
				190	Py 5-7 veins
				190.6	
					Py 1-2 veins
3.0				191.9	
				192.4	2cm Py vein 50° c.A.
					Py trace, veins
				194.25	Py 7-10 veins assoc. w. qtz.
				194.65	
3.0	195			195	
		FAULT - sil. healed breccia - 60°? c.A.		195.7	Py trace, veins
		1 cm sid vein 10° c.A		196.4	15cm Py 10% c vein tr. ga.
		1 cm sid vein 20° c.A.		196.8	
		1 in sid vein 20° c.A		197.7	Py trace, veins
3.0	197.7	Lt. grey f.g. quartzite - large interbed in QS.			tr. ga in sid vein.
	199.7	QS - as above			
	199.5	FAULT ZONE Broken core & pug to 200.7m			
	200			200	

ABERFOYLE

DIAMOND DRILL LOG

HOLE Nº G61 Page Nº 9

Feature Bedding, Foliation, Fragment (size & shape), Shearing, Fault, Vein (c carbonate, q quartz)

Mineralization Trace 1-5% Common 5-15% Abundant 15-60% Massive >60%

022064

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	DEPTH m	MINERALIZATION
3.0		Lithology - as above - dk. grey to black shale w. fragments & (contorted & broken) interbeds of lt. grey f.g. (micaceous) quartzite - Qs description as previously.			Py trace veins
3.0	205		Py	204.7 205	2cm py vein 40° c.A.
3.0			Py	207.1	1 cm py vein 50° c.A.
			Py	207.8	2 cm py vein 45° c.A.
3.0	210	5 cm		210	
2.9			Py	212.0	5cm py vein 45° ? c.A.
					Py 1-5 (10) veins & tr. f.g. py. rep? qtzite.
	214.2	FAULT ZONE ?? - Broken core & pug		214.0 214.2	Py 10-15 f.g. & veins
	214.8 215			215	Py 2-3 f.g. & vein.
3.0				215.2 215.4	Py 50 thick veins. 60° c.A.
					Py 1-2 veins
	217.0				
		Black carbonaceous conglomeratic shale This lithology is locally developed throughout Qs. Black shale matrix with only sub - to rounded f.g. grey qtzite frag. from <1mm to 10cm (avg)		218.3 218.45	Py vein 15cm 45° c.A.
	218.8				Py 1-2 veins to 1cm 45° c.A.
2.7		FAULT ZONE ?? - Broken core & pug.		219.0 219.2	Py 30 veins
	219.3	clay developed on fracture surfaces.			Py 1-2 veins
	220 220.2			220 220.2	
3.0		219.3 - 226.4 Silicified Interbedded dk. grey to black shale & lt. grey f.g. qtzite. (contorted) & locally conglomeratic Qs - now ext. silicified & veined by py ± qtz ± sid.		221.5 222.7 223.05	220.2 - 220.7 Py 10-15 (40) as 1) c.g. unoriented py ± sid ± qtz veins & 2) v.f.g. mainly strata bound but 3cm q/Py vein locally crosscutting pyrite bands gen. assoc. w. qtzite. bands. Poss. replaced qtzite? - folded. Py 90, 5nt tr. qtz 10 in vein. 45° c.A. 223.05 - 225.3 py 20-30 (60) as 1) c.g. vein & stock work. & 2) v.f.g. dep. py. or rep. of qtzite bands ? 1) >> 2)
		223.9 - 4 cm Sid. Flood; qtz. vein 30° c.A.	Sid	223.9	
2.0	225			225	

Feature Bedding, Foliation, Fragment (size & shape), Shearing, Fault, Vein, F, c carbonate, q quartz

Mineralization 022065

Trace 1-5%
Common 5-15%
Abundant 15-60%
Massive > 60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE / COMMON / ABUNDANT / MASSIVE	DEPTH m	MINERALIZATION
	225.9	Litholog - QS as above to 226.4m.			225.9	Py 80-90 c.g. assoc. w. qtz. Lge vein.
.6	226.4	FAULT ZONE - Puggy broken core				
2.8	226.8	Med grey silicified mudstone or siltstone. Homogeneous siliceous rock cont. ext. pyrite veins & diss.				Py 20-50 (70) c.g. in veins & vein networks.
	227.8	FAULT ZONE - Puggy broken core			228.2	Py 2-5 v.f.g. diss & tr. veinlets
	228.25	Black silicic pyritic mudstone - A very hard (silicified?) variably pyritic mudstone - shale with minor pyrite veining. A generally homogeneous rock.			228.6 228.85	Py 50-60 v.f.g. tr. veinlet. Py 5 v.f.g. diss & minor veinlets
2.5	230 230.1	Med grey silicified mudstone or chert. - rock consists ess. of ultrafine silica. Contains much diss. & vein pyrite.			230.1	Py 20-40 (70) f.g. to c.g. diss & aggregates of c.g. & veins
	231.3	FAULT ZONE - Broken core & pyritic pug - Basal 20cm sid. qtz vein.			232.2	
	232.4				232.4	Py 10-15 f. to c.g. in sid. vein
.7		Black pyritic silicic conglomeratic mudstone			232.6	Py 20 veins to 1cm assoc. w. qtz.
2.3	235	Rock consists of a homogeneous silicic matrix w. trace v.f.g. diss py. containing pyritic clasts to 3cm. aw. <.5cm. Clasts to 10% are well to subrounded. Bedding is rare - 25° c.A. Very few pyrite veins. Most pyrite clasts appear to be pyritic mudstone some appear to be replaced			235 235.4	Py 2-5 mainly as v.f.g. diss & pyrid clasts (some replaced?) also rare veinlets. Py 10-15 veins 40° c.A. & py. clasts to 3cm
	235.55				235.55	
3.0	238.2	Pyritic-siliceous feeder? f.g. to c.g. pyrite replacing? lt. grey green fine tuff? in the upper part of the interval & veining minor black pyritic conglomeratic mudstone at the base. Py. is associated w. white to lt. grey chalcedonic silica as veins & blebs. Rock is locally a breccia.			238.2	Py 40-50 f.g. to c.g. rep? fine tuff. & veining minor black mudstone at base.
	238.85	Brown-black pyritic conglomeratic mudstone - well bedded 0-10° to c.A. Frag. to 3mm aw 1cm. Frag - mst (py)			238.85	Py 5-10 v.f.g. bedded & v.f.g. diss.
	239.15	Replaced quartzite? - f.g. py rep clastic rock			239.15	Py 50 - f.g. diss out from fractures.
	239.85	Blue grey silicic siltstone - massive to bedded So 25° c.A. v. weakly veined by Py.			239.85	Py 2-3 f.g. & vein. tr flourite in veins.
3.0	240	Cream grey well bedded siltstone - So 30° c.A. Pred. well laminated cream sist. w minor thin (av. 3cm) dk. brown (Py) mudstone interlaminations.			240	Py rare
	241.05	Dk. grey brown conglomeratic pyritic mudstone Mudstone matrix containing subrounded frag. (≈40%) of rextal. carb. siltstone & py. mudstone frag. <1mm to 25cm. aw 2-3cm. Grades downwards to mudstone			241.05	Py. 10-15 (30) v.f.g. (bedded) tr. vein & c.g. dissem.
	242.5	Lt. grey well laminated locally dolomitic siltstone Si/So 50° c.A. Well bedded interval laminated on scale of few m.m's to few cm's. Sed is a weakly carbonated silt.			242.5	Py. rare
	243.9	Grey brown pyritic mudstone - well bedded w. trace rext? Py & Cn. 30 - 50° c.A.			243.9	Py 40-50 V.f.g. bedded tr. rext. Cn & Py.
	244.3				244.3	
3.0	245	Lt. grey massive to bedded weakly rextalized dolomitic siltstone w. minor pyritic dolomite & pyritic mudstone Angle of bedding to c.A. varies from 0° to 30° Rext. of the rock is weak to moderate; gen weak. and appears to be related to carbonate content. Brown pyritic dolomites are also weakly rext. V. weak carbonate veining.			245 246.8 246.1 246.5	Py rare (as veins) except in thin py dol. & mudstones. 10 cm Py 10-15 v.f.g. bedded. 10 cm Py 10-15 v.f.g. bedded. 30 cm Py 10-15 v.f.g. bedded. Py rare
	248.5	5 cm			248.5	
3.0	249.8 250	Grey brown pyritic mudstone - bedded at v. low & to c.A. 0-10°. Matrix gen weakly rext. dolomite.			249.8 250	Py 15-20 v.f.g. bedded.

Feature Bedding, Foliation, Fragment (size & shape); Shearing, Fault, Vein (c carbonate, q quartz)

Mineralization 022066 — Trace 1–5%, Common 5–15%, Abundant 15–60%, Massive > 60%

CORE REC'D	DEPTH m	GEOLOGY	MINERALIZATION
3·0	249·8 – 254·95	Grey weakly to extensively recrystallized dolomite & dolomite conglomerate Bulk of the interval is a lt. grey moderately recrystallized bedded dolomite. So av. 25–30° to c.A. Intervals to 30 cm of recr. dolomitic conglomerate with recr. matrix & fragments occur sporadically	Py 1–2 veins & c.g. dissem.
	254·0		Py 5–7 v.f.g. bedded & c.g. & veins?
3·0	254·95 / 255	Lt. grey bedded dolomite So – 0–45° to c.A. Rock is locally – sed. breccia – intraclast w frag.	Py rare.
	256·0	FAULT ZONE Upper 20 cm c. healed breccia. Lower 30cm sheared core. 30° to c.A.	
	256·5	from <1 mm to 2–3 cm.	
3·0	257·4	Lt. grey to dk. grey massive dolomite & minor pyritic mudstone (& conglomeratic)	Py rare
	258·9	Py mudstones are conglomeratic containing dol. fragments to sev. cm's av. 1–2. Dolomite intervals have irregular crosscutting boundaries to the mudstone & may be lge. blocks within a mudstone matrix.	
	260		Py 3–5 v.f.g. bedded.
3·0	260·75	Grey brown conglomeratic pyritic mudstone Slumped? mudstone containing slumped fragments of dol & siltstone. Locall c. veinlets.	Py 10–15 v.f.g. bedded.
	262·0	Cream grey coarsely recrystallized ? sidaritic? dolomite recr. c. bed of vein! No relict bedding.	Py rare
	262·6	Grey brown conglomeratic pyritic mudstone w. minor lt. to dk. grey massive dolomite & py. mudstone	
3·0	263·7	? FAULT – c healed breccia Typical py. cong. mudstone w. lt. to dk. grey dol. & siltstone? fragments to sev. cms av. 1–2 cms. So/s1 at 0–20° to c.A. Discordant relns between bedding in mudstone & dol. ⇒ slumping of blocks.	Py 10–15 v.f.g. bedded.
	264·2		Py 50–60 v.f.g. bedded
	264·6	264·2 – 264·6 m – unusual py mudstone – lighter in colour – poss > in Py content than normal.	
	265		Py 10–15 v.f.g. bedded
	265·7		Py 30 v.f.g bedded.
	265·9		Py rare
3·0	266·45	Lt. grey massive (brecciated) dolomite w. minor grey brown py. dolomite & py. mudstone (conglom.) Bulk. of the interval is lt. grey dolomite which is locally conglomeratic & which has been veined & brecciated to varying degrees by white carbonate veinlets which invade the rock.	Py 20 10 cm. v.f.g. bedded
	266·9		3 cm. py 70 c. vein 30° c.A.
			Py rare
	268·85	Next in abundance is dk. grey brown pyritic dolomite which is bedded at a low & to c.A. ≈ 20°. Minor py. mudstone as beds assoc. w. the py. dolomite.	Py 1–2. v.f.g. bedded.
	270	Basal 80 cm. of the interval is a dk. grey well bedded dolomite 25° to c.A.	
	270·1		Py rare
3·0	271·9	Lt. to dk. grey variably recrystallized dolomite Bedded dolomite patchy recr. Recr. is extensive in patches; nil elsewhere. FAULT – c. healed breccia – 0° c.A.	
	272·7	Dusty pyrite exsolved around c. xtals. Sev. side veins 272·5 & 272·7 – side vn 2 cm. FAULT – c healed breccia – 10° c.A.	2 cm py vn. 25° c.A.
	273·7		
	274·3	Lt. to dk grey locally silicified dolomite & dolomitic breccia. Variably coloured fragments. Silicification locally intense. FAULT – broken core – ? ° to c.A.	Py 3–5 (10) tr resinous sp. F.g. & Cm f.g.
	275·0		

5 cm

ABERFOYLE **DIAMOND DRILL LOG** **HOLE No** G61

Feature

Bedding, Foliation, Fragment (size & shape), Shearing, Fault, Vein (c carbonate, q quartz)

Mineralization

022067

Trace 1-5%
Common 5-15%
Abundant 15-60%
Massive > 60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
3.0		Med. grey rextallized dolomite & dolomitic sed. breccia. Rextallization is extensive leaving only remnant sed textures such as bedding & fragments. Pyritic (mudstone?) fragments & laminae are evident. Dusty pyrite is exsolved around most of the m.g. fibrous carbonate xtals. which form the rock.							
3.0	278.1	Cream to cream grey rextallized dolomite & minor dolomitic sed. breccia at base. Bulk of interval is a cream coarsely crystalline carbonate containing relict bedding & less rextallized patches. So - 25-30° to c.A. Sed breccia w. carb. frag. for basal 60 cm of interval. Frag to 3cm av. 5cm?						280	
	280							280.8	2cm Py ven. 70° c.A.
3.0								283.0	2cm Cu 1-2 f.g.
3.0	284.1	Black carbonaceous shale. Black locally graphitic shale. From 285.2m to 286.7 the shale contains grey qtzite frag & contorted beds & discont. veins & blebs of white qtz. So/S1 - 45-10° to c.A. av 25°.						285	
	286.7	FAULT ZONE - Pug - broken core & c. veins 15° to c.A. 287.2 - 2cm c. vein 15° c.A.						287.2	
3.0	287.4								
	290	Rock becomes more pelitic toward the base & contains minor bedded pyrite.						290	
3.0	291.8	Lt. grey foliated lithic tuff w. lt. grey mudstone interbeds - S1/So 15° to c.A.						291.8	Py 2-3 v.f.g. dusting around fragments & tr. c.g. pre. O1 grains.
	292.4	Lt. grey sericitic carbonate rich lithic tuff. Massive to foliated rock. Carbonate rich apparently non-vesicular angular fragments av. 1cm in size in a lt. grey sericitic groundmass. Foliated when rock is flattened ie elongate fragments.						292.4	Py 3-5 (10) f.g. to c.g. dissem.
2.6	295.0	Lt to dk. grey chert - non bedded sed def chert containing volc. fragments at the base.						295.0	Py 1-2 f.g. to c.g. dissem.
	295.7	Lt. grey carbonate rich lithic tuff w local agglomerate. Rock is very carbonate rich - +ve reaction to acid. Fragment outlines are often masked by this alteration. Lt. grey to lt green sericite is the other major component of the rock. Fragments from 1mm to >10 cm. av 1-2 cm. Agglom size fragments may be brecciated - auto? Numerous white carb. veins <1cm. at various						295.7	Py 3-5 (10) f.g. to c.g. dissem.
3.1	300							300	

5 cm

ABERFOYLE

DIAMOND DRILL LOG

HOLE NO G61

Feature

Bedding
Foliation
Fragment size & shape
Shearing
Fault
Vein
c carbonate
q quartz

Mineralization

022068

Trace 1-5%
Common 5-15%
Abundant 15-60%
Massive >60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
3.1		angles to c.a. Agglomerate size fragments become more common toward the base of the hole.							
3.1								303.4	
	305							305	Py rare
3.1		END OF HOLE 307.7 M.							
	310							310	
	315							315	
	320							320	
	325							325	

5 cm

ABERFOYLE

DRILL HOLE RECORD

022069

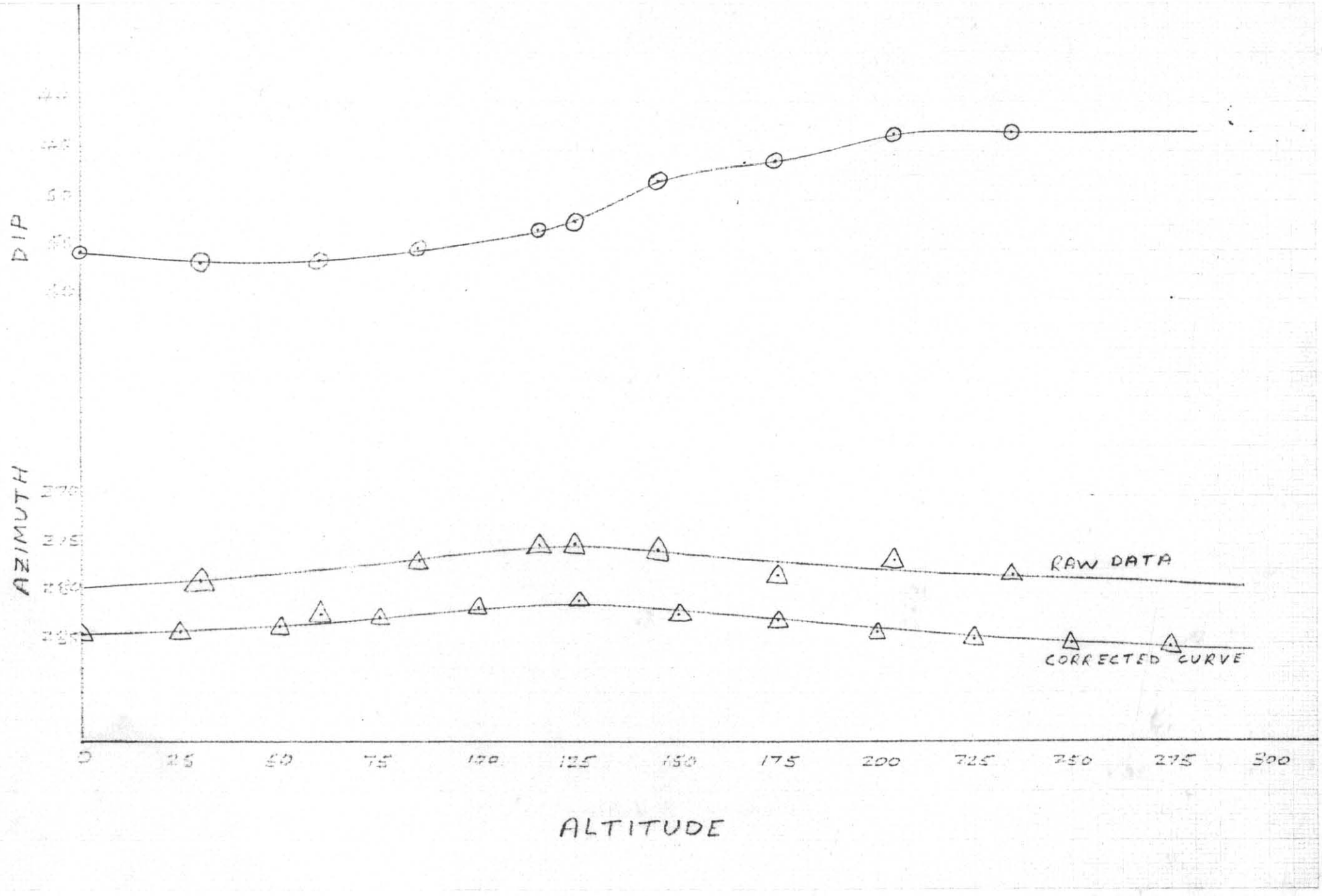
Location QUEEN HILL Property QUEEN HILL District ZEEHAN Bearing (M) 284° Hole No G62

Commenced 30/4/80 Completed 15/5/80 % Recovery 92% Grid bearing (M) −11.25° Date 21-5-80

Objective To test QUEEN HILL LODE −15 RL. SECTION 3130 (ORE RESERVE HOLE) Core size HQ→34M NQ→115.2M BQ→145.2M NQ→256.2M Logged S. RICHARDSON

Co-ordinates 5361777.65N 360854.17E Dip 55.1° Alt./R.L. 246.78

SURVEY DATA				GRAPH DERIVED DATA			CALCULATED CO-ORDINATES			REMARKS
DEPTH	DIP	BEARING(M)	INSTRUMENT TYPE	DEPTH	DIP	BEARING(M)	NORTHING	EASTING	ALTITUDE	
29M	56.25°	278.5°	EASTMAN	0M	55.1°	284°	5361777.65	360854.17	246.78	
60M	56°	282°	"	25	56°	283.75	1783.65	840.04	226.17	Hole droops 1.25° in HQ − 60m of broken ground. NQ does not give expected and previously attained lift of 3°/30m. Corrective flattening procedures instigated at 145m. 30m of BQ placed in front of NQ string. Lift of 5° in this 30m is attained. Hole reamed out and normal drilling resumed.
85.2M	54.75	276.5°	"	50	56.25	283.25	1789.49	826.12	205.41	
115M	53°	275°	"	75	55.5	282.3	1795.20	812.10	184.71	
124M	52°	275°	"	100	54.25	281.25	1800.82	797.73	164.27	
145M	48°	275.5°	"	125	52	280.7	1806.49	782.74	144.27	
175M	46°	278°	"	150	47.5	282	1812.70	766.60	125.21	
205M	43.25°	276.5°	"	175	46	282.6	1819.55	749.47	107.00	
235M	43°	278°	"	200	43.75	283.8	1826.88	731.77	89.36	
				225	43	284.5	1834.68	713.62	72.19	
				250	43	285	1842.69	695.36	55.14	
				275	43	285.25	1850.81	677.10	38.09	


DIP
AZIMUTH
RAW DATA
CORRECTED CURVE
0
25
50
75
100
125
150
175
200
225
250
275
300
ALTITUDE

Note : Intervals not analysed should be recorded such that a complete hole is itemised.
For any section not analysed, a value −5·00 should be entered in the relevant assay columns.
It is not necessary to record a zero.

PAGE 1 OF 1

PROGRAM | PROGRAMMER | DATE

HOLE IDENT.	DISTANCE FROM COLLAR TO BOTTOM OF SAMPLE (metres)	ASSAY ppm SNT	ASSAY ppm STANNITE	ASSAY ppm COPPER	ASSAY ppm ZINC	ASSAY ppm LEAD	ASSAY ppm TUNGSTEN	grammes per Tonne SILVER	grammes per Tonne GOLD	SAMPLE No.
G62	100·90	-5·00								
	101·30	2450								233207
	101·50	145								233208
	101·90	60								233209
	102·90	360								233210
	103·90	480								233211
	104·90	170								233212
	105·90	360								233213
	106·90	490								233214
	107·90	810								233215
	108·90	200								233216
	109·90	2500								233217
	110·15	330								233218
	110·60	20000								233219
	110·90	430								233220
	111·90	200								233221
	199·00	-5·00								
	200·00	230								233222
	201·00	2150								233223

0220711

Note : Intervals not analysed should be recorded such that a complete hole is itemised.
For any section not analysed, a value −5·00 should be entered in the relevant assay columns.
It is not necessary to record a zero.

PROGRAM | PROGRAMMER | DATE

HOLE IDENT.	DISTANCE FROM COLLAR TO BOTTOM OF SAMPLE (metres)	ASSAY ppm SNT	ASSAY ppm STANNITE	ASSAY ppm COPPER	ASSAY ppm ZINC	ASSAY ppm LEAD	ASSAY ppm TUNGSTEN	grammes per Tonne SILVER	grammes per Tonne GOLD		SAMPLE No.
G62	201·10	1200									233224
	202·00	1200									233225
	203·00	1350									233226
	203·50	13300									233227
	204·00	2800									233228
	205·00	3250									233229
	206·00	240									233230
	207·00	1350									233231
	207·65	1500									233232
	208·00	980									233233
	209·00	550									233234
	210·00	500									233235
	210·25	10800									233236
	210·65	2200									233237
	211·00	1850									233238
	212·00	1750									233239
	213·00	2600									233240
	214·00	960									233241
	215·00	620									233242
	216·00	1500									233243

27 0220

Note : Intervals not analysed should be recorded such that a complete hole is itemised.
For any section not analysed, a value −5·00 should be entered in the relevant assay columns.
It is not necessary to record a zero.

PROGRAM | PROGRAMMER | DATE

HOLE IDENT.	DISTANCE FROM COLLAR TO BOTTOM OF SAMPLE (metres)	ASSAY ppm SNT	ASSAY ppm STANNITE	ASSAY ppm COPPER	ASSAY ppm ZINC	ASSAY ppm LEAD	ASSAY ppm TUNGSTEN	grammes per Tonne SILVER	grammes per Tonne GOLD	SAMPLE No.
G62	216·25	1000								233244
	217·00	590								238626
	217·60	250								238627
	217·80	2750								238628
	218·00	220								238629
	218·60	1450								238630
	219·00	600								238631
	220·00	440								238632
	221·00	650								238633
	222·00	8600								238634
	223·00	38500								238635
	224·00	385000								238636
	224·80	47000								238637
	225·00	100000								238638
	225·60	37000								238639
	226·00	9300								238640
	226·60	230000								238641
	227·00	53500								238642
	227·15	8550								238643
	227·55	37000								238644

022073

Note : Intervals not analysed should be recorded such that a complete hole is itemised.
For any section not analysed, a value −5·00 should be entered in the relevant assay columns.
It is not necessary to record a zero.

PROGRAM | PROGRAMMER | DATE

HOLE IDENT.	DISTANCE FROM COLLAR TO BOTTOM OF SAMPLE (metres)	ASSAY ppm SNT	ASSAY ppm STANNITE	ASSAY ppm COPPER	ASSAY ppm ZINC	ASSAY ppm LEAD	ASSAY ppm TUNGSTEN	grammes per Tonne SILVER	grammes per Tonne GOLD		SAMPLE No.
GGZ	228·00	10400									238645
	229·00	19000									238646
	230·00	10600									238647
	230·35	8900									238648
	231·00	10400									238649
	232·00	14200									238650
	232·30	8760									238667
	233·00	2750									238668
	234·00	4650									238669
	235·00	4450									238670
	236·00	4200									238671
	236·50	1200									238672
	237·00	1200									238673
	238·00	2700									238674
	240·00	−5·00									
	240·85	170									
	241·00	3250									238293
	241·50	11400									238294
	242·00	200									238295
											238296

203.0 − 207.65 m 0.3 Z
207.65 − 232.3 m 1.14 Z

022074

Note: Intervals not analysed should be recorded such that a complete hole is itemised.
For any section not analysed, a value −5·00 should be entered in the relevant assay columns.
It is not necessary to record a zero.

PROGRAM PROGRAMMER DATE

HOLE IDENT.	DISTANCE FROM COLLAR TO BOTTOM OF SAMPLE (metres)	ASSAY ppm SNT	ASSAY ppm STANNITE	ASSAY ppm COPPER	ASSAY ppm ZINC	ASSAY ppm LEAD	ASSAY ppm TUNGSTEN	grammes per Tonne SILVER	grammes per Tonne GOLD		SAMPLE No.
G62	242·20	1250									238297
	242·55	3500									238298
	243·00	250									238299
	244·10	1450									238300
	244·60	1700									233286
	245·00	1150									233287
	246·20	−5·00									
	246·50	1400									233288
	246·70	4400									233289
	247·00	120									233290
	247·75	320									233291
	248·15	2150									233292
	249·00	280									233293
	249·20	1350									233294
	249·40	780									233295
	249·70	2450									233296

0220 76

ABERFOYLE

DIAMOND DRILL LOG

HOLE Nº Q62 Page Nº 1

Feature Bedding, Foliation, Fragment (size & shape); Shearing, Fault, Vein (c carbonate, q quartz)

Mineralization 022076

Trace 1-5%
Common 5-15%
Abundant 15-60%
Massive > 60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
NO CORE		No Core - Non coring bit used.							
HW HQ	4.0								
1.2	5	Lt. grey F.g. (micaceous) quartzite A massive rock containing numerous qtz. veins, av 2mm thick locally preferred orientation. Core very broken.						5	Py rare.
.9	7.2								
1.5		Lt. grey siltstone to sericitic shale. A massive to foliated rock ranging from the finer grained equivalent of the quartzite to a well foliated v.f.g. shale consisting of v.f.g. lt. grey sericite. Bedding not evident Core is very broken & locally puggy & weathered.							
1.1	10							10	
.5									
2.5	15							15	
	15.9	Lt. grey F.g. weakly micaceous quartzite A massive rock containing numerous thin quartz veins which are generally unoriented and locally form a stock-work. Core is very broken.							
3.0									
1.2	20							20	
	≈21	Lt. grey siltstone to sericitic shale Description as for 7.2-15.9 m. Core very broken and puggy.							
.6	25							25	

5 cm

Feature Bedding, Foliation, Fragment (size & shape); Shearing, Fault (F), Vein (c carbonate, q quartz)

Mineralization 022077

Trace 1-5%
Common 5-15%
Abundant 15-60%
Massive >60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
·9	25·3	Dk. grey to black shale w. fragments & contorted interbeds of lt. grey f.g. quartzite Typical QS. core is very broken & locally puggy. Rock is locally graphitic. Black shale matrix w. interbeds to 3-4 cm of lt. grey bedded quartzite (contorted) & fragments to 1-2 cm.							
1·3									
1·5									
	30							30	
1·5									
HQ/NQ	33·6	Lt. grey f.g. micaceous quartzite A f.g. generally unbedded rock with minor thin (<5mm) q/z. veins often ≈ 45° to c.A.						34·0	10 cm @ 30 c.g.
	35	Rock is very strongly fractured & contains numerous soln. cavities. Fracture planes gen 40-50° c.A.						35	
2·5									
2·0									Py rare
·9	40							40	
2·5		5 cm							
3·0	45							45	
2·0	46·4	QS Dk grey to black (carbonaceous) shales w. interbedded lt. grey f.g. quartzite bands & fragments. Locally graphitic shale contains beds to 30 cm. gen 3-5, or up to 2-3m, of finely laminated to locally massive quartzite. Cleavage is // to bedding in general ie S1/S0.						46·4	Py 1-2 veins.
2·0	50							48·7 48·9 49·15 49·35 50	Py 25-30 veins & F.g. Py 1-2 veins Py 20-30 c.g. & veins.

ABERFOYLE

DIAMOND DRILL LOG

HOLE Nº 962 Page Nº 3

Feature — Bedding, Foliation, Fragment (size & shape); Shearing, Fault, Vein (c carbonate, q quartz)

Mineralization — Trace 1-5%, Common 5-15%, Abundant 15-60%, Massive >60%

022078

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG (TRACE / COMMON / ABUNDANT / MASSIVE)	DEPTH m	MINERALIZATION
	50.3	FAULT ZONE? - Broken core & pug.			Py 1-2 F.g. & veins
.5	51.5				
3.0		The grey quartzite laminae which reflect bedding are generally strongly contorted & broken. Due to 1) soft sed deformation and/or 2) transposition during isoclinal D_1 or breaking up during later deformation.	Py	52.4	1cm py vein 60° c.A.
				53.0	5cm py 20 veins // s 50° c.A.
					Py trace.
				54.0 / 54.1	10cm py 40 veins 60° c.A.
.5	55			55	Py rare.
				55.65 / 55.85	Py 30 veins assoc. w. breec. 70° c.A.
3.0					
3.0	60	S_1/S_0 - 45° to c.A.		60	Py rare
2.6					
	63.8	FAULT ZONE Broken core & pug.			
.1					
.8	65 / 65.1			65	
2.0				66.4	1cm Gn 60 py 40 vein 60° c.A.
3.0	68.4	Lt. grey F.g. quartzite - Massive qtzite; ess. lge interbed in QS.			
	69.2				
	70			70	
3.0		5 cm			
		FAULT - pug 45° c.A.	F	73.9 / 74.0	10cm Py 10 Gn 15 vein assoc. w. sid.
3.0	75			75	

Feature Bedding, Foliation, Fragment size & shape; Shearing, Fault, Vein; c carbonate, q quartz

Mineralization 022079

Trace 1-5%
Common 5-15%
Abundant 15-60%
Massive > 60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
		Lithology - as above - med grey to black shale with fragments & (contorted) beds of lt. grey f.g. quartzite. - Qs.							
3.0									
3.0	80	S1/S0 in this 25m interval is commonly 45-60° to c.A.						80	Py rare
3.0		FAULT - broken core - 70° c.A?	F					82.3	
	85							85	
3.0		FAULT - broken core - 60° c.A	F					86.0	
		5 cm							
3.0	90							90	
	90.8	Lt. grey massive f.g. micaceous quartzite essentially a thick interbed in Qs							
	91.45	Qs - as previously							
3.0									
		FAULT - pug - 80° to c.A.	F					94.5	3cm Py 99 Cm tr. vein assoc. w. sid.
	95							94.8 95	
3.0								95.8 96.0	Py 5. cg. assoc. w. sid veins.
		FAULT - pug - 60° to c.A.	F					96.6	
								97.4	10cm py vein 60° c.A. Tr. lt. green sericite.
2.7									Py 1-2 (10) f.g. & veinlet.
	100							100	

ABERFOYLE **DIAMOND DRILL LOG** **HOLE Nº** G62 Page Nº 5

Feature

Bedding
Foliation
Fragment size & shape
Shearing
Fault
Vein
c carbonate
q quartz

Mineralization

022080

Trace 1-5%
Common 5-15%
Abundant 15-60%
Massive > 60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE / COMMON / ABUNDANT / MASSIVE	DEPTH m	MINERALIZATION
.9	100.1	FAULT ZONE – Broken core & pug.				Py as above
	101.2				101.3 101.5	Py 40 vein
2.0	102.35 102.65	FAULT ZONE – Pug 70° to c.A. Lithology – as above – Lt. grey to black shale w. (contorted) interbeds and fragments of lt. grey (micaceous) quartzite.				Py 2-3 (10) f.g. & veins
3.0	105		Py		105 105.3	10 cm py vein. 50° c.A.
						Py 1-2 f.g. & veins
2.8		FAULT – pug – 60° to c.A.	F		108.0	
	108.4 108.7	FAULT ZONE – broken core – ?° to c.A.			108.9	Py 20-30 f.g. & veinlets oriented roughly 30-35° to c.A. Earlier qtz. veining episode? Minor veins > 1cm thick.
3.0	110				110 110.15 110.6 110.9	Py 30-40 f.g. & c.g. in veins av. 2-3cm 60° to c.A. Stn 5-10% c.g. in massive Py. Tr. Marcasite? or Arspy? Py 20-30 veinlets & f.g. in QS!
		FAULT – pug – 70° to c.A.	F		111.4 111.7	Py 1-2 veinlets & f.g.
	112.9 113.2	Lt. grey f.g. quartzite – thick interbed.				
3.0		Lithology – as above – QS.				Py rare
NQ BQ	115				115	
3.0						
			Py		118.7 119.0	2cm py vein 45° to c.A. 10cm py 40 veins Gn 5 c.g. in py.
3.0	120				120	Py 1-2 f.g. & veinlets tr Gn. in py veinlets.
					121.7	
3.0						Py rare.
	124.4 124.9 125	Lt. grey f.g. micaceous quartzite			125	

5 cm

ABERFOYLE

DIAMOND DRILL LOG

HOLE Nº 962

Feature — Bedding, Foliation, Fragment (size & shape); Shearing, Fault, Vein (c carbonate, q quartz)

Mineralization 022081 — Trace 1-5%, Common 5-15%, Abundant 15-60%, Massive >60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG (TRACE / COMMON / ABUNDANT / MASSIVE)	DEPTH m	MINERALIZATION
3·0		Lithology – as above – med grey to black siltstone-shale with interbeds (contorted) & fragments of lt. grey f.g. (micaceous) quartzite.			Py rare
		Rock is gen. well layered & laminated in this interval. Si/So aw 45-50° to c.A.			
3·0	130			130	
3·0					
3·0			Py	134·2	1cm Py vein 40° c.A.
	135			135	
3·0					
	138·3	Lt. grey f.g. to m.g. micaceous quartzite – a massive rock w. thin shale bands ⇒ bedding 10 to 30° to A. Numerous qtz. patches and veins.			
	140			140	
3·0	140·5	Lithology – QS – as above.			
	142·7	Lt. grey f.g. micaceous quartzite – a massive rock containing discont. shale patches. Numerous qtz. blebs & veins.			
3·0	145			145	
BQ / NQ 1·1	145·2	Lithology – QS – as above.			
1·9		Si/So has a very low angle to c.A ≈ 0-10° aw.			
3·0					
	150			150	

5 cm

ABERFOYLE **DIAMOND DRILL LOG** **HOLE Nº** 962 Page Nº 7

Feature Bedding, Foliation, Fragment size & shape; Shearing, Fault, Vein; c carbonate, q quartz

Mineralization 022082

Trace 1-5% Common 5-15% Abundant 15-60% Massive > 60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	DEPTH m	MINERALIZATION
		Lithology – as above – med grey to black siltstone-shale with (contorted & def.) lt. grey f.g. qtzite interbeds & fragments. – QS.		150.2	
				150.7	1cm Py vein 30° c.A.
				151.4	1cm Py vein 45° c.A.
				151.5	1cm Py " " "
		FAULT? – broken core – ?° c.A.	F	151.9	
3.0	152.0	Lt. grey f.g. micaceous quartzite – a massive rock. essentially thick qtzite interbed.			Py 3-5 (10) f.g. & blebs & veinlets
				153.1	
	153.6	FAULT ZONE – broken core ?° to c.A.			
	154.0	Lithology – typical QS to 157.5m			
3.0	155			155	
					Py trace as rare thin veinlets.
	157.5	Med grey weakly bedded siltstone w. minor lt. grey f.g. qtzite. laminae			
3.0		Interval is far more uniform than typical QS. – essentially a homogeneous siltstone. Only local development of the interbedded shale & qtzite occur.			
	160			160	
3.0					
				162.55	Py 40-50 veins to 5cm assoc. w. sid
				162.85	Py 3-5 veinlets
				163.3	
				163.7	2cm py vein 50° c.A.
3.0	165			165	
		166.2 – D_1 fold pair.			
3.0		5 cm			
	169.7				
	170	Lt. grey f.g. micaceous quartzite – interval contains minor shale bands ⇒ bedding ≈ 50° to c.A.		170	
3.0	171.3				
		Lithology – typical QS as above.			
	172.95				
2.3		FAULT ZONE – Pug & broken core 60° to 90° to c.A.			
	174.5				
.8	175			175	

ABERFOYLE

DIAMOND DRILL LOG

HOLE No G62

Feature

Bedding
Foliation
Fragment size & shape
Shearing
Fault
Vein
c carbonate
q quartz

Mineralization

022083

Trace 1-5%
Common 5-15%
Abundant 15-60%
Massive > 60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
3.0		Lithology - as above - dk. grey to black shale w. fragments & (contorted) interbeds of lt. grey f.g. micaceous quartzite.							
	177.2	FAULT - pug in fault // to c.A.	F						
	178.2								
3.0	180	FAULT - Pug 25° to c.A.	F					179.7 180	
			F					180.9	
2.4		FAULT - Pug - ?° to c.A.	F					182.3	
3.1	185	FAULT - Pug - 55° to c.A.	F					184.4 185	
3.1									
	189.6 190	FAULT ZONE Pug & broken core - ?° to c.A.						190	
	190.3								
3.2									
3.0	195							195	
3.0		FAULT - Pug - 50° to c.A. FAULT - Pug - 50° to c.A.	F F					196.6 196.75	
				■				198.1 198.4	2 cm py vein 45° to c.A. py 2-3 veinlets flecks & blebs.
		FAULT - Pug 60° to c.A. FAULT - Pug 65° to c.A. FAULT - Pug 60° to c.A.	F F F					199.3 199.5 199.7	
	200							200	

5 cm

Feature Bedding, Foliation, Fragment (size & shape), Shearing, Fault, Vein (c carbonate, q quartz)

Mineralization 022084

Trace 1-5%
Common 5-15%
Abundant 15-60%
Massive > 60%

CORE REC'D	DEPTH m	GEOLOGY	MINERALIZATION
3.0	201.1	Lithology - QS as above	2cm py-ser. veins - 45° c.A. Py 3-5 veinlets 45° to c.A 15/cm py sid q veins. py 30 cm 2-3. Py 2-3 veinlet, f.g. & bedded?
3.0	203.5	Lt. grey green to med. grey fine lithic tuff & minor agglomerate. Conformable contact w. QS above. Rock has strong fabric def. by p.o. of flattened frag. Interval shows evidence of rep. by pyrite locally. Vesicles may be filled by py. & the rock may contain f.g. flecks & blebs of py. 203.15- FAULT- Pug 80° to c.A.	Py 3-5 (30) F.g. flecks & blebs & filling vesicles - replacing vol/c? Py 15-20 (50) f.g.-blebs & veinlets (stockwork)
3.0	205	Dk. grey to black silicic & pyritic mudstone - extensively veined. A dark (bedded) mudstone with wisps bands and clots of bedded? v.f.g. py. The upper ½ of the interval is strongly veined by py veins. Bedding where evident is 45-60° to c.A.	Py 50 (90-100) f.g. flecks but mainly vein. Locally veins are py/qtz. Py 5-10 veins - gen unoriented.
2.9	205.4	From 205.4 - 207.65 the core is strongly fractured with very irregular fracture surfaces. This fracturing corresponds with a decrease in veining.	
2.8	207.65	Pyritic siliceous rock - An extensively silicified and locally much qtz veined rock - originally a siltstone? Veining is extensive enough locally to form a breccia. Pyrite is not intimately associated with the silica but occurs as f.g. to c.g. diss & aggregates of xtals & as veinlets gen not assoc w. qtz. Feeder??	Py 15 f.g. & veinlet. Py 30-40 f.g. to c.g. diss. but more common as aggregates of c.g. Minor veinlet. Py 90-100 massive f.g. (8cm cm 50 Cpy 15 sid. 35) Replaced rock?
2.8	210		
2.3	210.65	FAULT ZONE? - Zone of pug & very broken core. Interval contains m.to c. xtal py. - rextal. bedded?	Py 40-50 m.g. rext? in py. mudstone.
3.0	212.4	Interbedded lt. grey chert & brown silicic. pyritic mudstone. Extremely well bedded interval. So constant at 20° to c.A. Interlaminated chert & mudstone on the scale of 1-10 cm. 216.0m younging up hole from dropped pebble. Minor component of siltstone & pyritic fragments. Framboidal pyrite common in py. mudstone.	Py 10-15 v.f.g. bedded. Py 30-40 v.f.g. bedded & framboids
younging ↑	215		
	216.25	216.25 - 227.0m Pyrite - Qtz - Siderite rock - replacement min. f.g to c.g. pyrite (pyro) replacing originally dolomitic? rocks with minor unmineralised pyritic mudstone. Bulk of the interval is c. xtalline pyrite (av. >60%) with white to black chalcedonic silica and gen. c. xtalline cream to grey siderite. In gen. sid > qtz. Relict bedding is common esp. in areas of less c. xtalline pyrite. Locally v.f.g. unmineralised py. mudstone occurs conformably next to c. xtalline py-qtz-sid rock with relict bedding. Rare blebs of lt. green sericite occur.	Py 40-50 f.g. to c.g. replacement min. & minor v.f.g. bedded. Py 35-40 v.f.g. bedded - tr. f.g. rep? Py 45-50 of c.g. f.g. to c.g. diss & clusters Py 50-70 f.g. to c.g. diss. relict bedding & stylolites?
3.0	220		
3.0	221.0		Py 20 c.g. in silicic rock - trace flour. Py 60-70 (100) f.g. to c.g. c.g. gen. as clusters of xtals 80-100%. f.g. gen. as diss. of <80% in dk. grey silicic rock.
3.0	223.85	223.9 - 10cm qtz veins. - 70° c.A. Solution cavities common from 223.8 to 225.0m. Esp 224.0 - 224.8 (20%)	Py 20 f.g. - c.g. diss & flecks & blebs. Py 75 massive f.g. aggreg. qtz 5% as blebs & veins & soln. cavities 20% Py 70-80 f.g. diss & aggreg & c.g.
	225		

5 cm

Feature Bedding, Foliation, Fragment (size & shape); Shearing, Fault, Vein (c carbonate, q quartz)

Mineralization Trace 1-5% Common 5-15% Abundant 15-60% Massive >60%

022085

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	DEPTH m	MINERALIZATION
		Lithology – as above – replaced carbonate rock – dolomite?		225·4	aggreg. pyroh. – 1-2 f.g. masses. tr. cassiterite.
					Py 20-30 f.g. to c.g. diss. & aggreg. in highly siliceous rock. 1-2 pyroh.
				226·0	
				226·6	Py 70-80 f.g. to c.g. diss aggreg in siderite qtz rock. tr. soln cavities.
				227·0	Pyroh 30-40 Py 30-40 f.g. to c.g. diss & aggreg. 2–3% soln. cavities.
	227·0	Dk. grey to black shale – bedded 70° to c.A.		227·15	Py 20 – f.g. diss & vein.
2·2	227·15	Replaced tuffaceous shale? – pyritic & pyrrhotite rich silicic			Py 50-60 f.g. & aggreg. Pyroh. 3-5 aggreg. Tr. cass?
	227·55	replaced + fossiliferous calc. –		227·55	
		Pyritic Volcanics – Lt. grey sericitic lithic tuff containing f.g. diss. to massive pyrite & pyrrhotite. The rock is strongly silicified to approx 229 m. For the remainder of the interval voles. are very carbonate (siderite?) rich.			Py 10-20 f.g. diss & f.g. aggreg. Pyroh 15-30 (40) gen more common than py. as f.g. diss & f.g. aggreg. Tot. sulphide gen. 0-50%. Tr. Flourite observable as V.f.g.
·9		Extremely pyritic zones gen. containing soln. cavities with sharp margins at 40-45° to c.A. occur. These may be small feeders for the more gen. replacement min. Occur at 230·4 – 5cm 230·7 – 10cm 230·9 – 25cm.		230	
				230·35	Py 60-70 as Py 80, cavity 20 "feeders" Py w.s. 10 pyroh. rep. voles as f.g. bet "feeders" 10% soln cavities over interval.
3·0				231·05	
		Rich mineralization ends sharply at 232·3 possibly against a fracture 5° to c.A			Py 30-40 f.g. diss, f.g. aggreg.) flecks & blebs. Tr. pyroh. as F.g. Tr. Flour.
		230·6 – 231·05m – 20% soln. cavities			
	232·3	Lt. grey green sericitic		232·3	
		Pyrite – pyrrhotite is no longer a major component of the rock. The volcanics to 236·8 m are extremely carbonate rich (siderite?). The carbonate is mainly assoc. w. the matrix of the volcs. (see below) whilst the frag. are more sericitic (locally carbonate rich) and a darker green than the mainly cream matrix.			Py 2-3 (15) f.g. diss. & rare veinlets. Pyroh. 2-5 (10) f.g. dissem. Total sulphide 3-5 (15).
3·0				235	
	236·8			236·5	
		Below 236·8 the voles become typical tuff.			Py & Pyroh. – trace. (<1%)
				238·3	1 cm. py vein 45° c.A.
		5 cm			
3·0				240	
				240·85	Py 1-2 f.g. to c.g. (rep vesicles) tr. vein. Pyroh. 1-2 f.g. to c.g. (rep. vesicles)
				241·5	Py trace (ie <1%)
				242·2	
				242·55	
3·0				243·0	5cm Py 40 blebs & veinlets 15° to c.A.
				243·25	10 cm Py 30 blebs & veinlets 30° to c.A.
				243·75	Py trace (<1%) 1 cm py vein 60° c.A.
				244·1	
		1 cm. q. vein 50° to c.A.		244·6	Py 2-3 (10) f.g. flecks & blebs & veinlets gen 15° to c.A.
				244·8	
	245			245	
3·0					Py trace (ie <1%)
		246·65 – 1 cm. Std. vein 60° c.A.		246·5	
				246·65	Py 1-2 f.g., flecks, veinlets 50°? c.A.
				246·7	
					Py trace (ie <1%)
				247·75	
				248·15	Py 15-20 f.g. assoc. w. c. vein 45° to c.A diss in tuff?
					Py rare
3·0				249·2	
				249·4	Py 15 veinlets 20° to c.A.
					Py rare
	250			250	

ABERFOYLE

DIAMOND DRILL LOG

HOLE Nº 962

Feature

Bedding
Foliation
Fragment (size & shape)
Shearing
Fault
Vein
c carbonate
q quartz

Mineralization

022086

Trace 1-5%
Common 5-15%
Abundant 15-60%
Massive > 60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
3·0		Lithology - as above - Lt. grey green sericitic lithic tuff.							fy rare
3·0	255	FAULT - 5cm vein 60° c.A 1cm.						253·85 / 255	
	256·2	END OF HOLE							
	260							260	
	265							265	
	270							270	
	275							275	

5 cm

022087

APPENDIX B

Queen Hill Grid Mapping Programme
Petrography and Rock Chip Geochemistry

022088

211 764 (T.S. 31699) K-stain negative.
This is a pyritic, carbonaceous pelite, weakly turbidite-like, finely laminated and essentially unmetamorphosed.

Bedding is on a sub- to millimetric scale with an alternation of relatively thin (150μ - 1.2 mm) argillaceous siltstone and wider (250μ - 2.5 mm) silty shale bands which may be subtly laminated in the distribution of clastic particles. These are evenly sized in the fine silt range (mean 20μ), with splintery to angular quartz accompanied by subordinate muscovite flakes, minor, partly degraded (sericitised) feldspar, traces of chloritised biotite and a minor heavy mineral component (leucoxenic semi-opaques, rare tourmaline, zircon).

The argillaceous fraction consists of random to weakly orientated sericite. Carbonaceous matter is pervasive, tends to be concentrated into the shale bands, and is partly re-organised into crude microscopic flakes and films in response to the incipient (load- or burial-) metamorphism.

Fine to ultrafine pyrite (<10-75μ) is thinly disseminated throughout and tendsto be concentrated into isolated silt bands. Microtextures are indicative of weakly recrystallized framboidal sulphide. Distribution is distinctly bedded.

A few bands are weakly slumped. Clastic grains, carbonaceous matter and, to a minor degree, pyrite may exhibit a weakly graded distribution. Sparse, late microfractures locally displace bedding (and the concordant, incipient slaty cleavage).

211 768 (T.S. 31700) K-stain weakly positive (sericite).
This rock is a pervasively altered and mildly sheared scoriaceous breccia or pumiceous lithic tuff. The distinction is academic in that finer primary details are obscured, and the rock may represent a flow-marginal breccia or, alternately, a lithic pyroclastic phase.

The rock consists essentially of angular to irregular, randomly sorted, altered pumice clasts, generally closely packed and partly moulded onto one another. These features are somewhat drawn out and flattened along a penetrative slaty cleavage and consist of variably leucoxene-stained, sericitic hydromuscovite with the lenticular, flattened amygdales (mean 100μ) outlined by leucoxene films and infilled with sericite, with minor cherty quartz. Sizing is in the <1 - 6 mm range. Interclast areas similarly consist of microschistose sericite.

There are no relict crystalline components apart from rare vague quartz-sericite semi-pseudomorphs of microphenocrystal feldspar. Shapes are reminiscent of sanidine-anorthoclase and, on this basis, the rock appears to be of felsic-intermediate affinities. There are no tangible non-volcanic components.

230 252 (T.S. 31701) K-stain negative.
This is a quartz-sericite rock and, on relict textural evidence, represents a thoroughly altered scoriaceous breccia, essentially similar to 211768, but somewhat coarser-grained and slightly more crystalline.

Much of the area sectioned consists of weakly sericite-stained, microgranular to slightly coarser, an- to subhedral quartz of low temperature hydrothermal character. Sparse fine-scale cavities are partly infilled with aggregates of sericite and ankeritic carbonate. Much of this zone is featureless, although there are sporadic sericitised relics of the pre-existing rock.

022089

Elsewhere, these can be identified as a scoria. In contrast to 211768, this phase carried fairly frequent feldspar microphenocrysts (mean 100μ, quartz-, or elsewhere sericite-pseudomorphed ?sanidine-anorthoclase) in a slaggy-textured felsic groundmass now represented by densely leucoxene-stained sericite. Frequent randomly sized, but semi-orientated amygdales consist of quartz with accessory sericite and carbonate. Few contacts are seen, but the relict fabric appears analogous to that of the previous specimen on a coarser scale. The slaggy microtextures and relatively abundant altered phenocrysts indicate this scoria was chilled, but only partly glassy.

This rock is weakly mineralised with disseminated blades of pyrrhotite (replaced by late secondary pyrite) throughout the secondary quartz. Tectonic effects are essentially absent.

230 262 (T.S. 31702) K-stain negative.
This is an extensively oxidised semi-massive sulphide ore. Relict features indicate a banded to irregular alternation of coarse pyrrhotite, and more or less massive granular Fe-sphalerite. The sparse relict intergranular gangue comprises fine-grained to microcrystalline quartz and sericite in varying proportions, with patchy carbonate. The carbonate has been leached, forming irregular limonite- and Mn-oxide-lined cavities, and was probably a manganiferous "brownspar".

Pyrrhotite is represented by secondary, fine-grained pyrite, in part pseudomorphous after bladed to granular intergrowths. There are occasional relics of variably sized (< 100μ to a few millimetres diameter) pyrite euhedra of "primary" habit.

Sphalerite persists as corroded relics overgrown with pale yellow to dense red microcolloform secondary sphalerite of supergene character. The red colouration possibly reflects included goethite in part, but this cannot be verified optically.

Secondary metal salts are absent apart from rare, very fine, partly degraded, semi-fibrous cerussite. There is minor development of secondary calcite and quartz as cavity linings. The rock appears to have been Zn-Fe rich to the virtual exclusion of other basemetals. Assay for Sn, Ag, Bi, Au, etc. would be warranted.

230 410 (T.S. 31703) K-stain negative.
This rock can be classified as a ferruginised breccia and is interpreted as a fault or shear gouge.

The rock consists largely of optically dense goethite, generally massive and structureless, but locally colloform and elsewhere with crudely formed carbonate boxworks. Late fracture- and cavity-fillings of colloform goethite occur sporadically. In places, limonite has replaced discontinuous "foliae" of mica (?chlorite) and, generally, it reflects a late-stage phase of active ferruginisation, partly replacive and partly cavity-filling.

Poorly sorted, variably Fe-stained rock fragments and quartz grains are common throughout, with a random to crudely layered distribution and a weak dimensional preferred orientation. Rock fragments are partly indeterminate, but there are frequent angular, marginally corroded fragments of chert, impure (argillaceous) chert, and silicified felsitic "rhyolite". The remainder appear to have been relatively argillaceous sedimentary types (sandy pelite, pelite, slate phyllite). Sizing is in the < 100μ to 3 mm range.

Some of the ferruginised rock fragments include disseminated goethite pseudomorphs after fine pyrite euhedra. Minor traces of oxidised, granulated pyrite are evident in the ferruginised matrix. Rare crude, sphalerite-like boxworks are associated with the carbonate boxworks and seem to reflect a minor brecciated sulphide-ore component (?sim. 230262).

230 426 (T.S. 31704) K-stain negative.
This is a texturally complex and somewhat genetically problematical rock, best termed a sideritic breccia.

The rock consists essentially of a randomly sized assortment of clasts cemented and replaced by microcrystalline siderite. The bulk of clasts are fairly homogeneous and recognisable as strongly pyritic, finely laminated sediments. These now consist typically of ultrafine relict syngenetic pyrite and microcrystalline siderite in varying proportions, with microscale bedding laminations defined by pyrite distribution. On the basis of an essential absence of relict clastic features and sparse corroded relics of paler carbonate (?ankerite), this rock represents a sideritised, impure, microcrystalline dolomite.

Accessory rock types, represented as rare clasts, comprise a weakly carbonaceous sericite slate and an altered (carbonated, sericitised) basalt. These are generally angular, but the pyritic (and variably carbonaceous) sediment clasts reflect semi-brittle deformation which appears to have been repetitive (possibly intraformational in part).

The core of the area sectioned comprises an irregularly shaped zone of microcrystalline to coarser-grained, sparry siderite rock. This appears to represent a cavity filling, is finely laminated in part, and includes frequent sphalerite crystals (mean 500μ, clusters to 2mm) with intricate growth-zoning. However, it is doubtfully in situ. There is evidence of siderite-healed granulation in some marginal zones and contacts are typically demarcated by microscopic films of cherty quartz, microscopic carbonaceous stylolites or weakly carbonate-healed microfractures which locally transect zoned sphalerite crystals.

Textural relationships are further confused by sporadic late intersecting veinlets of quartz and pale carbonate (dolomite-ankerite). These features include occasional microscale discontinuous films of galena.

230 427 (T.S. 31705) K-stain weakly positive.
This is a thoroughly altered scoria with similarities to 211768 and 230252. In comparison, the rock is relatively homogeneous on a microscopic (hand specimen) scale and is thus interpreted as a strongly amygdaloidal lava. Patchy fragmental zones are secondary and reflect deformation.

Where relatively fresh, the rock consists of abundant ovoid to lenticular amygdales (mean 500μ diameter) of Mg-chlorite with subordinate calcite-dolomite, sericite and weakly recrystallized chalcedonic quartz in a semi-opaque, subvitric lava. This phase is slaggy-microtextured (reflecting chilling, skeletal crystallization) and contains sporadic albitised feldspar microlites in a heavily leucoxene-stained, subvitric mesostasis. Compositional affinities are obscure, although general features are consistent with a felsic-intermediate phase.

022091

Elsewhere the rock is transected and fragmented by crudely vein-like zones of chalcedony and progressively replaced by sericite and chlorite. These relatively altered micaceous zones are schistose-textured in response to mild shearing, but the original fabric is "ghosted" in the distribution of Fe-stained chalcedonic amygdales.

Minor traces of fine to ultrafine sulphide (pyrite and ?chalcopyrite) are disseminated throughout the more massive chloritised zones.

230 429 (T.S. 31706) K-stain negative.
This is a pervasively altered basic lava or "spilite". The fabric is basaltic and trends to medium grainsizing, such that the rock probably represents the core of a flow.

The rock consists essentially of random, slightly felted feldspar laths and a carbonate-stained chloritic mesostasis with abundant leucoxenised primary opaques. Sparse chloritised pyroxene laths and rare, similarly altered, phenocrysts (to 1.2 mm) are evident, and there are rare, thoroughly altered xenoliths (to 1 cm) of picritic character (bastite-like carbonate-chlorite aggregates including saussuritised feldspar grains and minor chloritised olivine).

Feldspar laths are altered to thoroughly saussurite-stained albite pseudomorphs and are sized in the 10-100μ range with a mean about 30-40μ. The fabric is homogeneous apart from the thinly dispersed altered phenocrysts and xenoliths. There is no real evidence of shearing.

230 432 (T.S. 31707) K-stain weakly positive.
This rock can be classified as an altered and moderately stressed scoria and can be compared with the previous examples. The fabric is consistent with a flow-marginal breccia.

The bulk of the area sectioned comprises a single slaggy-microtextured, strongly amygdaloidal lava fragment of rather nebulous shape. This clast is partly replaced by leucoxene-stained chlorite, albite and quartz, but has a relict fabric essentially similar to that of 230252 and 230427, and similarly reflecting skeletal crystallization under marginal "quench" conditions. Amygdales are relatively coarse with a weak flow-orientation slightly enhanced by shearing, and consist largely of Mg-chlorite with patchy impure calcite, granular and weakly recrystallized chalcedonic quartz.

In marginal zonesthis clast is moulded onto, and partly includes, more thoroughly altered (chloritised) angular clasts with a finer amygdaloidal (pumiceous) structure. This zone grades into a breccia which is closely analogous, texturally, to 211768, but with interclast areas pervaded by carbonate-chlorite-albite aggregates with minor accessory adularia. Feldspars show (stressed) radiating microtextures and are possibly pseudomorphous after zeolites.

230 556 (T.S. 31708) K-stain negative.
This is a distinctly turbiditic altered pelite with similarities to 211764.

Bedding is planar and distinctly cyclic with evenly spaced (mean 1.5 mm), distinctly graded units of argillaceous siltstone passing subtly into silty shale and capped by thin shaly partings. Clastic material is essentially arkosic with extensively sericitised and variably carbonated silt-sized indeterminate feldspar, accompanied by subordinate

splintery to angular quartz, accessory muscovite flakes and a minor heavy mineral assemblage (sim. 211764). The clay fraction is random to incipiently orientated sericitic white mica. The splintery shapes in the clastic, quartzofeldspathic material are consistent, in part, with reworked microshard fragments and give the rock a certain tuffaceous character. This sediment is weakly pyritic and incipiently carbonaceous.

Silty zones are weakly, but pervasively, stained with partly degraded, extremely fine-grained siderite. This developed by partial replacement of clastic feldspar and the sericitic matrix, and was introduced, in part, on discontinuous to semi-continuous intersecting microfractures. These features are intersected by sporadic later quartz veinlets. Siderite veinlets are generally subnormal to, and displace, bedding. Quartz veinlets transect bedding at lower angles and are only slightly displacive.

230 566 (T.S. 31709) K-stain positive.
This rock is a moderately altered, but unstressed, porphyritic rhyolite. The fabric is not inconsistent with a minor intrusive and there are some similarities with the younger (Devonian) porphyries of N.W. Tasmania.

Phenocrysts are evenly disseminated and moderately flow-orientated, with marginally resorbed quartz (to 5 mm), weakly kaolinised albite and thoroughly argillised ?sanidine in roughly equal proportions. These are enclosed in pervasively phlogopite-stained groundmass of random/slightly felted alkali feldspar microlaths (mean 25μ) with disseminated, phlogopitised ?pyroxene microphenocrysts (mean 150μ) and abundant fine leucoxenised accessory opaques. There are occasional quartz-clay amygdales (mean 300μ), but no definite extrusive textural features.

The alteration phlogopitic mica is of deuteric character and partly degraded in response to weathering.

230 568 (T.S. 31710) K-stain weakly positive.
This is a typical altered and mildly sheared scoria very similar, texturally, to 211768. As in the associated specimens (211768, 230252, 230427, 230432) there are no definite pyroclastic features and this tends to confirm these rocks as flow-brecciated lavas.

Alteration is pervasive, with the lava completely replaced by random to incipiently orientated, ultrafine-grained clay (kaolin-illite). The pervasive fine amygdales (mean 75μ) are outlined by microscopic films of leucoxenic TiO_2 and are infilled with microschistose sericite.

The gross fabric is fragmental, with angular to irregular clasts ($\lesssim$1-5 mm+) moulded onto one another and somewhat flattened along the weak slaty cleavage.

Interclast zones consist of sericite and weakly stressed quartz in varying proportions. Much of this specimen is pervaded by late secondary manganiferous limonite. There is no evidence of sulphide.

230 575 (T.S. 31711) K-stain negative.
This rock is a thoroughly altered and extensively deformed lava. The fabric is confused by marked fracturing which imparts a distinct fragmental appearance in hand specimen. There is evidence, however, thatthe rock was essentially homogeneous (i.e. non-clastic) originally, although gradational from weakly vesicular to scoriaceous.

The primary composition is obscured by marked and pervasive chloritisation, but the relict microtexture is analogous to that of 230252, 230427 and 230432, with more or less pervasive slaggy microstructures outlined by leucoxene-staining. Frequent amygdales consist of Fe-Mg chlorite and weakly recrystallized chalcedony with accessory carbonate. These features are sized in the 200 μ - 2 mm range and are progressively more abundant across the area sectioned (from 5-10 % to greater than 50 %). This trend is confused by fracturing, but suggests the specimen is representative of a flow marginal zone.

Fracturing is repetitive with frequent discontinuous films and veinlets of cherty quartz, albite and carbonate (dolomite-ankerite) displaced by later, more or less pervasive chloritic microfractures. Sparse disseminations of Fe-sulphide (pyrrhotite), rare blebs of galena (to 2 mm) and thinly disseminated ultrafine sphalerite particles are associated with the quartz-albite-carbonate veinlets. These locally grade into wider veins (to 1 mm) and cavity fillings in localised brecciated areas.

233 477 (T.S. 31712) K-stain weakly positive.
This is an unmetamorphosed feldspathic sandstone with a certain reworked tuffaceous character.

The rock is weakly bedded, with a dimensional orientation of clastic particles parallelled by very incipient variations in grainsizing. Framework particles are moderately well sorted in the coarse silt/fine sand range and comprise roughly 75 % of the rock.Main components are splintery to subangular quartz and slightly subordinate, thoroughly kaolinised feldspar (albite in part, but largely indeterminate). Rare, similarly altered, microcrystalline lava clasts

are present along with a minor heavy mineral assemblage (leucoxenic semi-opaques, rare opaques, zircon), and thinly disseminated graphite flakes.

The matrix consists of random kaolin-illite, completely unrecrystallized, and generally poorly resolved againstthe degraded clastic feldspar. The more splintery clastic quartz and feldspar clearly represent abraded shard fragments in part, but no close association with volcanism is inferred.

022094

233 478 (T.S. 31713) K-stain negative.
This is a carbonated and weakly mineralised breccia with similarities to 230426.

Textural relationships are somewhat confused by a late phase of stress and fracturing. However, the rock consists essentially of variably carbonated, angular to platy, poorly sorted (250μ - 3 mm diameter) rock fragments and irregular to vein-like zones of quartz and siderite.

Clasts are of two main types, with carbonaceous pelitic sediments (shale, silty shale) accompanied by scoriaceous lava fragments in roughly equal proportions. Accessory types include non-carbonaceous pelites, argillaceous chert/cherty argillite and occasional fragments of vein-type quartz. Some of the lava clasts are xenolithic, with included pelite fragments, and the rock conceivably represents a strongly xenolithic flow-breccia, although this is rather speculative. In contrast to 230426, the sediment clasts are only very incipiently pyritic.

Sideritic carbonate replaces the fragments to varying degrees. The scoria are somewhat preferentially replaced, initially with development of siderite amygdales and this grades into more or less complete replacement.

Stressed and variably displaced, medium- to coarse-grained siderite-quartz veins range up to 1 cm in thickness. These features include disseminated sphalerite crystals (mean 200μ), occasional blebs of galena and minor, extremely fine-grained Fe-sulphide. The stress reflects a late phase of shearing with related microfracturing healed with discontinuous films of carbonate and quartz.

Abminco Exploration GEOCHEMICAL SAMPLE LEDGER

F_R_ _ _ _ _ _

PROJECT: Queen Hill.

BSS SIEVE SIZE CODE - MESH NUMBER: A 200, B 150, C 100, D 80, E 60, F 40, G 30, H 20, T = TOTAL

SAMPLE TYPE CODE: ☐ OXIDIZED PRODUCTS O; ☑ FRESH ROCK R; ☐ STREAM SEDIMENTS S; ☐ WEATHERED BEDROCK W; ☐ SURFACE TRANSPORTED T; ☐ RESIDUAL SOIL E; ☐ MINE DUMP M

CARD PUNCH PRINT: YES ☐ NO ☐ VERIFY: YES ☐ NO ☐

DATE: 10·8·79 SHEET: 1

EASTINGS	NORTHINGS	SAMPLE NUMBER	DEPTH CMS	SIZE FRACTION	Sample Type	Sn	Ag	Cu	Pb	Zn	GEOLOGICAL LOG
TRENCH North East QH		230251				8	<1	115	100	45	Sedimentary Fault Breccia
		230252	PETROLOGY								Siliceous medium grained Evt.
359100	1400	230253				4	1·0	60	30	325	Medium Evt.
359100	1375	230254				6	<1·0	15	25	235	Siliceous rock
359100	1275	230255				6	<1·0	15	25	65	Fine grained, black, pyritic qtzite.
		230256				<4	<1·0	15	40	85	Black strongly pyritic qtzite
In Creek east		230257				4	<1·0	50	56	220	Medium Evt fragments in vfg black mat
of 359100		230258									Black Shale
approx 1300 N		230259				6	<1·0	80	256	135	Fine – Medium Evt.
		(230260)				6	<1·0	30	275	55	
360600	1975	230261									Black shale fragment within Ev.
Poverty Point		230262				10	137	35	1220	150000	Pyritic samples taken
" "		230262									from small open cut operation
" "		230262									– possibly mineralized Evolcs
" "		230262									(± (?) Heamatite)
Poverty Point		230262	PETROLOGY								
360600	1050	230263				6	4·0	20	250	7200	Poorly consolidated, Fe-rich secondary mate
360600	950	230264					NOT	ASSAYED			Black pyritic shale.
360600	950	230265					"	"			Pyrite / Haematite (?) / PbS – Ore.
Stormsdown Pit		230552					NOT	ASSAYED			Cherty material
Stormsdown Pit		230552					"	"			Cherty material
359200	1400	230553					"	"			Strongly vesic Ev.
359200	1275	230554				18	2·0	15	674	1350	Evolc – tuffaceous (erratic textur
359150	1250	230555				<4	1·0	205	360	320	Siliceous (?) Fault Breccia

OPERATOR JRT + GM COMPUTER CHECK PLOTTER DATE

022055

Abminco Exploration — **GEOCHEMICAL SAMPLE LEDGER**

PROJECT: Queen Hill

BSS SIEVE SIZE CODE - MESH NUMBER: A 200 D 80 G 30; B 150 E 60 H 20; C 100 F 40 T = TOTAL

SAMPLE TYPE CODE: ☐ OXIDIZED PRODUCTS O; ☒ FRESH ROCK R; ☐ STREAM SEDIMENTS S; ☐ WEATHERED BEDROCK W; ☐ SURFACE TRANSPORTED T; ☐ RESIDUAL SOIL E; ☐ MINE DUMP M

CARD PUNCH PRINT: YES ☐ NO ☐ VERIFY: YES ☐ NO ☐

DATE: 10·9·79

SHEET: 2

EASTINGS	NORTHINGS	SAMPLE NUMBER	DEPTH in CMS	SIZE FRACTION	Sample Type	Sn	Ag	Cu	Pb	Zn	GEOLOGICAL LOG
359150	1250	230555				6	1·5	20	125	260	Red-brown cherty medium
359200	1220	230555	a			12	12·0	600	830	26500	Black pyritic qtzite.
359200	1220	230556	b			<4	<1·0	25	225	300	Well bedded, black pyritic sts.
359200	1220	230556	c			10	<1·0	25	30	55	Fault breccia of primary pyroclastic
359200	1220	230556	D				NOT ASSAYED				Grey-brown mg. ms.
359200	1220	230556	E				"	"			Grey-brown fg ms
359200	1100	230557				20	<1·0	55	700	190	Fe-stained, porous; vein qtz material
359200	1075	230558					NOT ASSAYED				Grey-brown f+mg. polymictic ms
359200	900	230559				6	3·0	35	45	105	Siliceous material + probably fault breccia
359200	1850	230560				110	8·0	90	840	3020	Strongly chloritised Fe-rich sil. rock.
Regional	work.	230561				6	1·0	20	145	640	Strongly chloritised Fe-rich sil rock
359300	1725	230562					NOT ASSAYED				Orange-brown laminated fg. ms.
Regional	work.	230563					"	"			Subvolcanic Dolerite to po.
Regional	work	230564					"	"			Weathered, qtz rich Pub.
Regional	work St D2	230565					"	"			Forsterite - silica metasomatised rock is equivalent to
Regional	work St D2	230565					"	"			Magnetite + Heamatite rock.
Regional	work St D2	230565					"	"			Limonitic rock (Hm) ⇄ v.large mus
359050	1275	230566		PETROLOGY		4	<1·0	40	60	155	∈ Porph. Intrusive - K feld. + qtz phe
359700	1780	230567					NOT ASSAYED				∈ vole. — appears spilitic (∈v
Oonah Mine Dump		230575		PETROLOGY			NOT ASSAYED				Deformed ∈vt ⇄ dissem. Cu.
Montana mine Dump		230424		PETROLOGY			NOT ASSAYED				Pyritic, polymictic pyroclastic.
Oonah mine Dump		230427		"			"	"			∈v ⇄ flattened vesic. + feld. phyro
Oonah Mine Dump		230429		"			"	"			Medium + coarse ∈vt → fine ∈v

OPERATOR: JRT + GM — COMPUTER — CHECK — PLOTTER — DATE

022050

Abminco Exploration GEOCHEMICAL SAMPLE LEDGER PETROLOGY

PROJECT: Queen Hill.

BSS SIEVE SIZE CODE - MESH NUMBER: A 200, B 150, C 100, D 80, E 60, F 40, G 30, H 20, T = TOTAL

SAMPLE TYPE CODE: OXIDIZED PRODUCTS O; FRESH ROCK R; STREAM SEDIMENTS S; WEATHERED BEDROCK W; SURFACE TRANSPORTED T; RESIDUAL SOIL E; MINE DUMP M

CARD PUNCH PRINT: YES / NO — VERIFY: YES / NO

DATE: 10-8-79 — SHEET: 3

EASTINGS	NORTHINGS	SAMPLE NUMBER	DEPTH in CMS	SIZE FRACTION	Sample Type	Sn	Ag	Cu	Pb	Zn	GEOLOGICAL LOG
Bradshaw open cut		230429	PETROLOGY				NOT	ASSAYED			Altered (?) intermediate Ɛ Volc
Montana mine dump		230430									Ɛv. (possibly spillitic)
Oonah mine Dump		230431									Medium Ɛvt frags in vfg black mat
Montana mine Dump		230432	PETROLOGY								Medium-coarse Ɛvt.
Montana mine Dump		230433	" "								Alt pyritic m-c Ɛvt.
Montana mine Dump		230434									Fissure Lode Material ⊼ minor sp.
Montana mine Dump		230435									Fissure Lode Material ⊼ py. sid. ± ga.
Montana mine Dump		230436									Fissure Lode Material ⊼ Ga. + Spl
Oonah mine Dump		230437									Ɛv.
Oonah mine Dump		230433									Ɛv.
359525	900	230401				<4	1.0	5	80	2330	Oxidised, porous Fe-rich siliceous rock
359575	900	230402				170	2.0	105	1350	2250	
359900	1690	230403				130	75.0	365	20100	42500	Pyritic ore sample - mine dump
359900	1690	230403				600	100.0	730	5050	112000	" " " "
359900	1690	230403				38	203.0	105	2100	7350	" " " "
359900	1690	230403				26	19.5	70	690	11800	" " " "
359500	1385	230568	PETROLOGY			80	<1.0	20	155	770	Ɛvolc. (?) Spillitic lava
359500	1315	230569				24	33.0	210	4100	2850	Oxidised, Fe-rich siliceous, porous rock
359500	1290	230570				4	<1.0	20	300	225	Siliceous rock - (?) Fault Breccia
359500	1215	230571				12	<1.0	30	115	85	Strongly vesic. Ɛv.
359500	900	230572				<4	<1.0	35	80	215	Vein qtz material.
359500	900	230573				16	<1.0	95	65	810	Oxidised, porous, Fe-rich sil. rock
359525	900	230574				150	235.0	150	102000	11000	Black shale ⊼ disseminated Ga. ve

OPERATOR: JRT + GM — COMPUTER — CHECK — PLOTTER — DATE

022097

Abminco Exploration

GEOCHEMICAL SAMPLE LEDGER

PROJECT	BSS SIEVE SIZE CODE - MESH NUMBER	SAMPLE TYPE CODE	CARD PUNCH PRINT	VERIFY	DATE	SHEET
Queen Hill	A 200 D 80 G 30 B 150 E 60 H 20 C 100 F 40 T = TOTAL	☐ OXIDIZED PRODUCTS O ☐ FRESH ROCK R ☐ STREAM SEDIMENTS S ☐ WEATHERED BEDROCK W ☐ SURFACE TRANSPORTED T ☐ RESIDUAL SOIL E ☐ MINE DUMP M	YES ☐ NO ☐	YES ☐ NO ☐	2·7·80	

EASTINGS	NORTHINGS	SAMPLE NUMBER	DEPTH in CMS	SIZE FRACTION	Sample Type	METAL VALUES PPM	GEOLOGICAL LOG
359 600	536 1010	230410		Petrology		Only	Ferruginised breccia fault gouge.
359 1330	536 1720	211764		"		"	Pyritic carbonaceous pelite
		211768		"		"	Pumiceous lithic tuff.
359 870	536 0980	233478		"		"	Carbonated and Weakly
						similar to 230426.	mineralised breccia.
360 380	536 1720	233477		"		"	Unmetamorphosed feldspathic sandstone. tuffaceous character

OPERATOR J.T. COMPUTER CHECK PLOTTER DATE

022098

022099

APPENDIX C

St. Dizier Regional 1:10,000 Mapping Programme.
Petrology and Assay Data.

REPORT CMS 80/3/13

Queen Hill Rocks

Eight samples were received for thin-section preparation and petrological description. Because of their straightforward lithology and general similarity (for the most part), they were only briefly described, in the accompanying table.

Summary

The rocks are all metasediments, and originated as laminated argillaceous sandstones/siltstones; some were carbonaceous. Four of the eight rocks were selectively metasomatised and the argillaceous layers were replaced by tourmaline and muscovite. Two rocks are andalusite-bearing schists (236055, 236064) with abundant graphite and are products of thermal rather than regional metamorphism. A further rock, 236062, is tourmalinised and muscovitised, with a mineral assemblage similar to that of the other tourmalinised metasediments, but with relict textures suggesting metasomatism of a pre-existing metamorphic rock (possibly similar to 236055); this implies that metasomatism postdated contact-metamorphism and that a series of sediments was first intruded and thermally metamorphosed, then metasomatised. 236064 provides further evidence of this interpretation, where dravite has developed at a late stage.

Sample 236072 is more in the nature of a skarn, with higher-grade and much more intense pyrometasomatism operating, implying closer proximity to an intrusion.

H.W. Fander, M. Sc.

Central Mineralogical Services

Sample No.	Rock Type - Composition	Fabric	Minor Minerals	Comments
233 167 (T.S. 31121)	Metasomatised Sediment. Thin bands of granular quartz alternating with bands of random muscovite and matted tourmaline needles.	Medium-grained. Banding due to selective replacement. Not schistose.	Scattered small rutile crystals, semi-opaque leucoxene.	Originally a banded siltstone in which argillaceous bands were replaced by tourmaline, muscovite.
233 168	Metasomatised Sediment. Very thin laminations of random, radiating muscovite, patches of fine tourmaline, granular quartz bands.	Relict sedimentary banding. Medium-grained.	Leucoxene, rutile. Iron-staining, oxidised ?sulphides.	Similar to 233167, but more muscovite, less tourmaline; selective metasomatism.
236 055	Graphite-Andalusite Schist. Random, porphyroblastic, prismatic andalusite in matrix of fine graphite, quartz, sericite schist.	Quite well banded, but schistosity poor. Fine-grained except for andalusite.	Argillic replacement of andalusite.	Originally a carbonaceous, laminated siltstone, thermally metamorphosed. Some chiastolite occurs.
236 062	Metasomatised ?Metasediment. Pseudomorphous aggregates of coarse muscovite, patches of dravite tourmaline, microgranular quartz.	Vague pseudomorphs, but rather confused fabric; medium/coarse-grained.	Irregular crystals of very dark rutile. Fine ?carbon.	Could be muscovitised, tourmalinised schist, perhaps similar to 236055, i.e. porphyroblastic.
236 064	Graphitic Schist. Fairly evenly distributed fine graphite, sericite flakes and fine quartz; sericite aggregates after ?andalusite porphyroblasts.	Fine-grained, with good schistosity. Scattered pseudomorphs.	Small, poorly-defined dravite crystals throughout.	Believed to have been very similar to 236055, but subsequently sericitised, weakly tourmalinised.
236 072	Metasomatised Sediment. Mainly microcrystalline K-feldspar, poikiloblastic tremolite, minor diopside, abundant fine pyrite.	Relict fine sedimentary banding. Fine-grained, compact.	Fine granular sphene, possible ultrafine carbonaceous matter.	Thorough replacement of original sediment. Pyrometasomatic mineral assemblage. ?Skarn.
236 073	Tourmalinised Sediment. Alternating bands of matted, pale green/brown tourmaline and granular/interlocking quartz.	Relict sedimentary banding; thoroughly recrystallized; medium-grained.	Irregular patches of pyrite, traces of chalcopyrite; leucoxene.	Similar to 233167-8, but tourmaline only, replacing argillaceous layers in sediment.
236 074 (T.S. 31128)	Metasomatised Sediment. Folded bands of granular quartz alternating with bands of matted tourmaline/muscovite intergrowths.	Relict banding is gently folded. Medium-grained.	Irregular patches of dark leucoxenic rutile. Fine pyrite.	Closely resembles 233167-8 and 236073, and is a selectively metasomatised layered sediment.

COMINCO EXPLORATION PTY. LTD.

GEOCHEMICAL POINT SAMPLE LETTER

PROJECT: ST DIZIER AREA Queen Ext. NT/11

BSS SIEVE SIZE CODE—MESH NUMBER: A 200 D 80 G 32 B 150 E 60 H 20 C 100 F 48 T=TOTAL

SAMPLE TYPE CODE: ☐ OXIDIZED PRODUCTS O ☒ FRESH ROCK R ☐ STREAM SEDIMENTS S ☐ WEATHERED BED. ROCK W ☐ SURFACE TRANSPORTED T ☐ RESIDUAL SOIL E ☐ MINE DUMP M

CARD PUNCH PRINT: Yes ☐ No. ☐ VERIFY: Yes ☐ No. ☐

DATE: 20·1·80 SHEET: 1

EASTINGS	NORTHINGS	SAMPLE NUMBER	DEPTH TENTHS OF FEET	Source Direction Grid Azimuth	SIZE FRACTION	Sample Type	Sn	W	Cu	Pb	Zn	GEOLOGICAL LOG
							METAL VALUES PPM					
		236025					55	20	<5	5	<5	qtz-alb feldsp. quartzgranite + minor amt qtz phenocrysts. Feldspars partially altered/sericitised.
		236028					22	10	<5	10	<5	med gr. adam. consisting of qtz-kspar and plag (albitised) Biotite/ musc. content low.
		236030					32	25	5	<5	30	banded qtz-tourm. rock with minor qtz veining rimd with tourmaline fairly fine.
		236031					210	55	<5	10	<5	qtzite with minor fg. musc + tourm. abundant kaolinite + minor tourmaline limonite vein erratic (lim. after sulph ophthalic?)
							1					
		236032					16	15	<5	5	<5	qtz-alb feldsp-biot granite Feldspars appear altered (albitised?) - sulphur large lined with qtz crystals
		236033					22	20	<5	5	<5	coarse gr. qtz-alb pegmatite vein in qtz kspar > plag-biot med gr adam.
		236034					55	130	5	<5	<5	banded qtz-tourm rock
		236036					270	5000	<5	<5	<5	silicified / recrystallised med gr adam. with lge. coarse tourm clots
		236037					590	15	<5	5	20	recrystallised med gr granite (qtz-musc-minor kspar)

OPERATOR JOHN WHITE REGIONAL GEOLOGY (WHOLE LICENCE) PLOTTER DATE

0221102

COCKINGTON PRINT

COMINCO EXPLORATION PTY. LTD. **GEOCHEMICAL POINT SAMPLE LE ER**

PROJECT	BSS SIEVE SIZE CODE—MESH NUMBER	SAMPLE TYPE CODE	CARD PUNCH PRINT	VERIFY	DATE	SHEET
Queen Hill.	A 200 D 30 G 32 B 150 E 60 H 20 C 100 F 48 T=TOTAL	☐ OXIDIZED PRODUCTS O ☒ FRESH ROCK R ☐ STREAM SEDIMENTS S ☐ WEATHERED BEDROCK W ☐ SURFACE TRANSPORTED T ☐ RESIDUAL SOIL E ☐ MINE DUMP M	Yes ☐ No. ☐	Yes ☐ No. ☐	20.1.80	2

EASTINGS	NORTHINGS	SAMPLE NUMBER	DEPTH TENTHS OF FEET	Source Direction Grid Azimuth	SIZE FRACTION	Sample Type	Sn	W	Cu	Pb	Zn	GEOLOGICAL LOG
		236038					105	<10	<5	<5	<5	tourmalinised / silicified med. gr. adam.
		236039					85	10	<5	5	<5	tourm. / qtz plag (albite) nodules in ~~[illegible]~~ med. gr. adam (qtz - Kspar > plag - minor biot. musc)
		236040					2.85%	45	<5	10	5	massive tourm. with vein qtz fragments + poss fault breccia?
		236041					36	20	<5	5	5	qtz - Kspar - plag (albite?) - minor biotite microgranite.
		236042					85	20	<5	20	<5	qtz - tourm. rock. Poss tourm. microgranite. Tourm infills cavities (120° gr. bays).
		236044					38	<10	15	<5	<5	grey, musc-rich phyllite with musc healing joint fractures.
		236045					85	30	<5	15	<5	qtz - plag (albite?) - minor biot / musc microgranite with rare cavities infilled with tourm.
		236046					105	20	<5	10	<5	qtz - biotite porphyritic microgranite matrix - qtz - Kspar? - biot. Minor qtz / tourm. rounded nodules (<5% of rock).
		236047					420	<10	<5	5	<5	musc-rich qtzite. Minor tourm. bands interbedded with qtz/musc rich units. Minor tourm. stringer veins.

OPERATOR COMPUTER J. WHITE (REGIONAL) CHECK PLOTTER DATE

022103

COCKINGTON PRINT

COMINCO EXPLORATION PTY. LTD. — **GEOCHEMICAL POINT SAMPLE LI ER**

PROJECT: Queen N-11.

BSS SIEVE SIZE CODE—MESH NUMBER: A 200, B 150, C 100, D 80, E 60, F 48, G 32, H 20, T=TOTAL

SAMPLE TYPE CODE: ☐ OXIDIZED PRODUCTS O; ☒ FRESH ROCK R; ☐ STREAM SEDIMENTS S; ☐ WEATHERED BEDROCK W; ☐ SURFACE TRANSPORTED T; ☐ RESIDUAL SOIL E; ☐ MINE DUMP M

CARD PUNCH PRINT: Yes ☐ No. ☐ VERIFY: Yes ☐ No. ☐

DATE: 20.1.80 SHEET: 3

EASTINGS	NORTHINGS	SAMPLE NUMBER	DEPTH TENTHS OF FEET	Source Direction Grid Azimuth	SIZE FRACTION	Sample Type	Sn	W	Cu	Pb	Zn	GEOLOGICAL LOG
								METAL VALUES PPM				
		236052					300	<10	INSUFFICIENT		SAMPLE	wh. grey finely, bedded to laminated mudstone.
		236054					135	20	<5	5	<5	banded qtz-rich, tourm-musc-minor qtz-carb units in silty sandst. grey-black phyllitic shale. - apparently hornfelsed pebbling e.g. musc. eyelets? and tremolite?
		236055					28 1/5	<10	<5	5	<5	
		236056					22	<10	INSUFFICIENT	SAMPLE		similar to 236055.
		236062					100 1/5	40	40	25	5	hornfelsed. bl. silt st. - silt lge carbonate chlorite dolomite to calcite. Exotic limonite stains areas of spec. ind. open vugs gen < 1mm but to 5mm wide qtz-rich fillet. Minor qtz veining, occurs
		236063					18	15	35	<5	5	
		236064					24 1/5	20	80	10	15	black graphitic phyllite - silt about diesen. fyrite (5%) and fg metam. pyrite
		236065					22	<10	20	10	5	similar to 236064. Pyrite more abundant (to 10%) and occurs as both fg disseminations and as coarse (> 1 mm) chips generally ass'd with joint fo. planes // to cleavage.
ST. DIZER		236067					215 ppm	65	2100	<5	60	porous, siliceous, highly pyritic material and alusite knarfels?
		236068					670	25	45	15	<5	

OPERATOR — COMPUTER — J. WHITE (DECIMAL) CHECK — PLOTTER — DATE

02210A

COMINCO EXPLORATION PTY. LTD.

GEOCHEMICAL POINT SAMPLE LI ER

PROJECT: Queen Hill.

BSS SIEVE SIZE CODE—MESH NUMBER: A 200 B 150 C 100 D 80 E 60 F 48 G 32 H 20 T=TOTAL

SAMPLE TYPE CODE: ☐ OXIDIZED PRODUCTS O ☒ FRESH ROCK R ☐ STREAM SEDIMENTS S ☐ WEATHERED BEDROCK W ☐ SURFACE TRANSPORTED T ☐ RESIDUAL SOIL E ☐ MINE DUMP M

CARD PUNCH PRINT: Yes ☐ No. ☐ VERIFY: Yes ☐ No. ☐

DATE: 20.1.80 SHEET: 4

EASTINGS	NORTHINGS	SAMPLE NUMBER	DEPTH TENTHS OF FEET	Source Direction Grid Azimuth	SIZE FRACTION	Sample Type	METAL VALUES PPM Sn	W	Cu	Pb	Zn	GEOLOGICAL LOG
		236069					125	<10	40	20	<5	Poorly bedded pyr-rich silts. Trace fine pyrite is dissem throughout and occurs as small clusts to 0.5mm. Minor small veins occur only in part fractures. These are typically limonite-stained and probably after pyrite.
		236070					60	35	5	<5	20	Partly wk pyritic silts. Abund fine mica (biotite) and acicular hornbl.
		236071					30	10	<5	<5	30	Finely bedded pyritic silt with fine mica, access.
		236072				T/S	24	15	55	20	10	Black silts, chalky in part weathering style suggests rock is carbonaceous. Fine dissem pyrite (≤ 1%) throughout.
	TS	236073					85	15	270	40	710	Black & siltstone with subparallel laycon and stronger bedding. Open vugs (to 0.5mm) are common throughout, however patches of epid/chalcocite/pyrite and pyrite (≤ 5%) are common.
	TS	236074					90	25	40	120	40	Fissile with rare = para laminations siltstone. Minor epid/limonite clots possibly remnant of original sulphide.
		236075					95	15	50	15	90	

OPERATOR | COMPUTER J. WHITE (REGIONAL) | CHECK | PLOTTER | DATE

COCHINGTON PRINT

022103

COMINCO EXPLORATION PTY. LTD.

GEOCHEMICAL POINT SAMPLE LOGGER

PROJECT: Queen Hill.

BSS SIEVE SIZE CODE—MESH NUMBER: A 200, B 150, C 100, D 80, E 60, F 48, G 32, H 20, T=TOTAL

SAMPLE TYPE CODE: ☐ OXIDIZED PRODUCTS (O), ☒ FRESH ROCK (R), ☐ STREAM SEDIMENTS (S), ☐ WEATHERED BEDROCK (W), ☐ SURFACE TRANSPORTED (T), ☐ RESIDUAL SOIL (E), ☐ MINE DUMP (M)

CARD PUNCH PRINT: Yes ☐ No. ☐ VERIFY: Yes ☐ No. ☐

DATE: 20.1.80 SHEET: 5

EASTINGS	NORTHINGS	SAMPLE NUMBER	DEPTH TENTHS OF FEET	Source Direction Grid Azimuth	SIZE FRACTION	Sample Type	Sn	W	Cu	Pb	Zn	GEOLOGICAL LOG
		233163					95	25	30	30	20	qtzite intensely qtz-veined with f.g. dissem. pyrite and minor coarse slugs (1-3%) occurring assid with qtz veins.
		233164					65	15	30	10	5	qtz-tourm rock consisting of irregular bands of qtz and tourmaline with small qtz veins common. Vugs (open) are common (to 1mm) and lined with limonite/goethite (exotic).
		233165					80	20	20	<5	<5	tourm-rich black siltst with finely laminated units rarely preserved. Qtz veins ~~[illegible]~~ occur subparallel to S_0. Vugs to 1mm are common and often lined with qtz and/or limonite. Pyrite occurs as minor dissem. in trace amts.
		233166					95	30	40	20	190	mblack siltst with minor f.g. musc. dissem. throughout. Minor pyrite occurs as small slugs (to 1mm) and coatings on joint fr. surfaces. Minor qtz veining occurs.
		233167					70 1/5	15	10	5	30	~~[illegible]~~ black siltst with qtz-sericite veins parallel to fine bedding lamination. Minor trace f.g. pyrite occur dissem. throughout.

OPERATOR | COMPUTER J. WHITE (REGIONAL) | CHECK | PLOTTER | DATE

022106

COCHINGTON PRINT

COMINCO EXPLORATION PTY. LTD.

GEOCHEMICAL POINT SAMPLE LEDGER

PROJECT	BSS SIEVE SIZE CODE—MESH NUMBER	SAMPLE TYPE CODE		CARD PUNCH PRINT	VERIFY	DATE	SHEET
Queen Hill	A 200 D 80 G 32 B 150 E 60 H 20 C 100 F 48 T=TOTAL	☐ OXIDIZED PRODUCTS O ☒ FRESH ROCK R ☐ STREAM SEDIMENTS S	☐ WEATHERED BEDROCK W ☐ SURFACE TRANSPORTED T ☐ RESIDUAL SOIL E ☐ MINE DUMP M	Yes ☐ No. ☐	Yes ☐ No. ☐	20.1.80	6

EASTINGS	NORTHINGS	SAMPLE NUMBER	DEPTH TENTHS OF FEET	Source Direction Grid Azimuth	SIZE FRACTION	Sample Type	Sn	W	Cu	Pb	Zn	GEOLOGICAL LOG
		233168				T/S	44	<10	<5	<5	5	finely interbedded tourm-rich and qtz-rich units. Tourm also heals numerous joint fractures in outcrop
		233169					75	<10	5	5	5	finely bedded qtz-rich siltst. hornfelsed to muscovite. Tourm occurs as roughly [illegible] bands parallel to So. Limonite occurs in numerous open vugs (to 1mm). Poorly developed bromoxite suggest limonite is not exotic.
	T/S	233170										deformed shale at least two deformations represented by lineations parallel and obliquely to fold axial plane.

OPERATOR COMPUTER J. WHITE (REGIONAL) CHECK PLOTTER DATE

COCKINGTON PRINT

022107

022108

APPENDIX D

DIGHEM Survey Queen Hill and
St. Dizier.

022109

REPORT NO. 307

DIGHEM^{II} SURVEY

IN

WESTERN TASMANIA

FOR

ABERFOYLE EXPLORATION PTY. LTD.

BY

DIGHEM LIMITED

TORONTO, ONTARIO
MAY 30, 1980

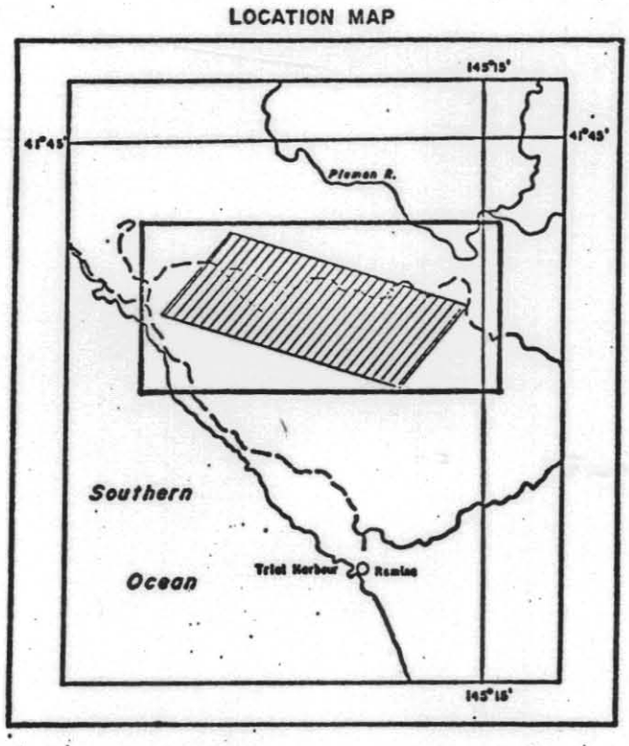
D.C. FRASER
PRESIDENT

Z. DVORAK
GEOPHYSICIST

SUMMARY

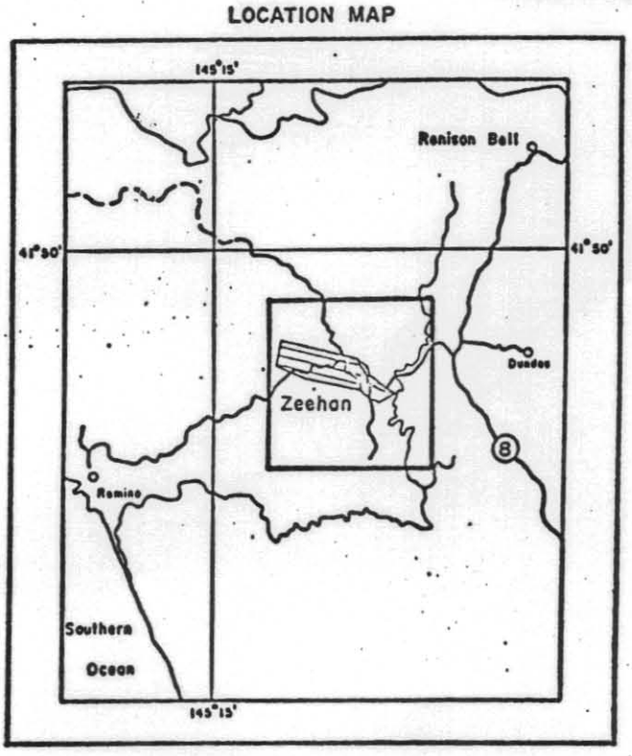
DIGHEM^{II} airborne electromagnetic/resistivity/magnetic surveys totalling 234 line-km were flown in February and March, 1980, for Aberfoyle Exploration Pty. Ltd., over two areas in Tasmania.

The geologic environment within the survey areas varied from resistive to highly conductive. Several targets were located in the St. Dizier area which appear to warrant ground follow-up exploration. The Zeehan area yielded only a few EM anomalies which may have sources in the bedrock.



1. St. Dizier

5 cm



2. Zeehan

Figure 1. The survey areas

INTRODUCTION

DIGHEM^{II} surveys of 234 line-km were flown with line-spacings of 200 and 250 m for Aberfoyle Exploration Pty. Ltd. over two areas in Tasmania (Figure 1). The surveys were flown in the interval of February 11 to March 6, 1980. The Lama jet helicopter VH-PDU flew with an average airspeed of 115 km/h and EM bird height of 35 m. Ancillary equipment consisted of a Geometrics 803 magnetometer with its bird at an average height of 50 m, a Sperry radio altimeter, Geocam sequence camera, 50 Hz monitor, Barringer 8-channel hot pen analog recorder, and a Geometrics G-714 digital data acquisition system with a Kennedy 9700 9-track 800-bpi magnetic tape recorder. The analog equipment recorded six channels of EM data at approximately 900 Hz and one of magnetics and radio altitude. The digital equipment recorded the EM data with a sensitivity of 0.25 ppm/bit and the magnetic field to an accuracy of one gamma.

The Appendix provides details on the data channels, their respective noise levels, and the data reduction procedure. The quoted noise levels are generally valid for wind speeds up to 40 km/h. Higher winds may cause the system to be grounded because excessive bird swinging produces control difficulties in piloting the helicopter. The swinging results from the 5 m^2 of area which is presented by the bird to broad-side gusts. The DIGHEM system nevertheless can be flown under wind conditions that seriously degrade other AEM systems.

DATA PRESENTATION

DIGHEM electromagnetic responses fall into two general classes, discrete and broad. The discrete class consists of sharp well defined anomalies from discrete conductors such as sulfide lenses and steeply dipping sheets of graphite and sulfides. The broad class consists of wide anomalies from conductors having a large horizontal surface such as flatly dipping graphite or sulfide sheets, saline water-saturated sedimentary formations, conductive overburden and rock, and geothermal zones. A vertical conductive slab with a width of 200 m would straddle these two classes.

The vertical sheet (half plane) model is the most common model used for the analysis of discrete conductors. All anomalies plotted on the electromagnetic map are interpreted according to this model. The following section entitled Discrete conductor analysis describes this model in detail, including the effect of using it on anomalies caused by broad conductors such as conductive overburden.

The conductive earth (half space) model is the most suitable model for broad conductors. Resistivity contour maps result from the use of this model. Resistivity contour maps should be prepared when the EM responses predominantly are of the broad class. A later section entitled Resistivity mapping describes the method further, including the effect of using it on anomalies caused by discrete conductors such as sulfide bodies.

Discrete conductor analysis

The EM anomalies appearing on the electromagnetic map are interpreted by computer to give the conductance (i.e., conductivity-thickness product) in mhos of a vertical sheet model. DIGHEM anomalies are divided into six grades of conductance, as shown in Table I. The conductance in mhos is the reciprocal of resistance in ohms.

Table I. EM Anomaly Grades

Anomaly Grade	Mho Range
6	$\geq$ 100
5	50 - 99
4	20 - 49
3	10 - 19
2	5 - 9
1	$\leq$ 4

The mho value is a geological parameter because it is a characteristic of the conductor alone; it generally is independent of frequency, and of flying height or depth of burial apart from the averaging over a greater portion of the conductor as height increases.* Small anomalies from deeply buried strong conductors are not confused with small anomalies from shallow weak conductors because the former will have larger mho values.

* This statement is an approximation. DIGHEM, with its short coil separation, tends to yield larger and more accurate mho values than airborne systems having a larger coil separation.

Conductive overburden generally produces broad EM responses which are not plotted on the EM maps. However, patchy conductive overburden in otherwise resistive areas can yield discrete-like anomalies with a conductance grade (cf. Table I) of 1, or even of 2 for conducting clays which have resistivities as low as 50 ohm-m. In areas where ground resistivities can be as low as 1 ohm-m, anomalies caused by weathering variations and similar causes can have conductance grades as high as 4. The anomaly shapes from the multiple coils often allow such surface conductors to be recognized, and these are indicated by the letter S on the map. The remaining anomalies in such areas could be bedrock conductors. The higher grades indicate increasingly higher conductances. Examples: DIGHEM's New Insco copper discovery (Noranda, Quebec, Canada) yielded a grade 4 anomaly, as did the neighbouring copper-zinc Magusi River ore body; Mattabi (copper-zinc, Sturgeon Lake, Ontario, Canada) and Whistle (nickel, Sudbury, Ontario, Canada) gave grade 5; and DIGHEM's Montcalm nickel-copper discovery (Timmins, Ontario, Canada) yielded a grade 6 anomaly. Graphite and sulfides can span all grades but, in any particular survey area, field work may show that the different grades indicate different types of conductors.

Strong conductors (i.e., grades 5 and 6) are characteristic of massive sulfides or graphite. Moderate conductors (grades 3 and 4) typically reflect sulfides of a less massive character

or graphite, while weak bedrock conductors (grades 1 and 2) can signify poorly connected graphite or heavily disseminated sulfides. Grade 1 conductors may not respond to ground EM equipment using frequencies less than 2000 Hz.

The presence of sphalerite or gangue can result in ore deposits having weak to moderate conductances. As an example, the three million ton lead-zinc deposit of Restigouche Mining Corporation near Bathurst, New Brunswick, yielded a well defined grade 1 conductor. The 10 percent by volume of sphalerite occurs as a coating around the fine grained massive pyrite, thereby inhibiting electrical conduction.

On the electromagnetic map, the actual mho value and a letter are plotted beside the EM grade symbol. The letter is the anomaly identifier. The horizontal rows of dots, beside each anomaly symbol, indicate the anomaly amplitude of the flight record. The vertical column of dots gives the estimated depth. In areas where anomalies are crowded, the identifiers, dots and mho values may be obliterated. The EM grade symbols, however, will always be discernible, and the obliterated information can be obtained from the anomaly listing appended to this report.

The purpose of indicating the anomaly amplitude by dots is to provide an estimate of the reliability of the conductance calculation. Thus, a conductance value obtained from a large ppm anomaly (3 or 4 dots) will be accurate whereas one obtained from a small ppm anomaly (no dots) could be inaccurate.

The absence of amplitude dots indicates that the anomaly from the standard (coaxial maximum-coupled) coil is 5 ppm or less on both the inphase and quadrature channels. Such small anomalies could reflect a weak conductor at the surface, or a stronger conductor at depth. The mho value and depth estimate will illustrate which of these possibilities best fits the recorded data. The depth estimate, however, can be erroneous. The anomaly from a near-surface conductor, which exists only to one side of a flight line, will yield a large depth estimate because the computer assumes that the conductor occurs directly beneath the flight line.

Flight line deviations occasionally yield cases where two anomalies, having similar mho values but dramatically different depth estimates, occur close together on the same conductor. Such examples illustrate the reliability of the conductance measurement while showing that the depth estimate can be unreliable. There are a number of factors which can produce an error in the depth estimate, including the averaging of topographic variations by the altimeter, overlying conductive overburden, and the location and attitude of the conductor relative to the flight line. Conductor location and attitude can provide an erroneous depth estimate because the stronger part of the conductor may be deeper or to one side of the flight line, or because it has a shallow dip.

A further interpretation is presented on the EM map by means of the line-to-line correlation of anomalies. This provides conductor axes which may define the geological structure over portions of the survey area.

The majority of massive sulfide ore deposits have strike lengths of a hundred to a thousand metres. Consequently, it is important to recognize short conductors which may exist in close proximity to long conductive bands. The high resolution of the DIGHEM system, and the line-to-line correlation given on the EM map, are especially important for a proper strike length evaluation.

DIGHEM electromagnetic maps are designed to provide a correct impression of conductor quality by means of the conductance grade symbols. The symbols can stand alone with geology when planning a followup program. The actual mho values are plotted for those who wish quantitative data. The anomaly ppm and depth are indicated by inconspicuous dots which should not distract from the conductor patterns, while being helpful to those who wish this information. The map provides an interpretation of conductors in terms of length, strike direction, conductance and depth. The accuracy is comparable to an interpretation from a ground EM survey having the same line spacing.

An EM anomaly list attached to each survey report provides a tabulation of anomalies in ppm, and in mhos and estimated depth for the vertical sheet model. The anomalies are listed from top to bottom of the map for each line.

The EM anomaly list also shows the conductance in mhos and the depth for a thin horizontal sheet (whole plane) model, but only the vertical sheet parameters appear on the EM map. The horizontal sheet model is suitable for a flatly dipping thin bedrock conductor such as a sulfide sheet having a thickness less than 15 m. The list also shows the resistivity and depth for a conductive earth (half space) model, which is suitable for thicker slabs such as thick conductive overburden. In the EM anomaly list, a depth value of zero for the conductive earth model, in an area of thick cover, warns that the anomaly may be caused by conductive overburden. Since discrete bodies normally are the targets of EM surveys, local base (or zero) levels are used to compute anomaly amplitudes rather than true zero levels. The use of local base levels may distort the horizontal sheet and conductive earth parameters. True zero levels, however, are used for resistivity mapping, discussed below.

Resistivity mapping

Areas of widespread conductivity have been encountered while surveying for base metals. In such areas, anomalies

can be generated by decreases of only 5 m in survey altitude, as well as by increases in conductivity. The typical flight record in conductive areas is characterized by inphase and quadrature channels which are continuously active; local peaks reflect either increases in conductivity of the earth or decreases in survey altitude. For such conductive areas, apparent resistivity profiles and contour maps can aid the interpretation of the airborne data. The advantage of the resistivity parameter is that anomalies caused by altitude changes are virtually eliminated, so the resistivity data reflect those anomalies caused by conductivity changes. This helps the interpreter to differentiate between conductive trends in the bedrock and those patterns typical of conductive overburden. Discrete conductors will generally appear as narrow lows on the contour map and broad conductors will appear as wide lows.

Conductive overburden diminishes the ability of any EM system to effectively explore the bedrock. For example, the lower the resistivity of the cover, the more active the EM channels, and the less the likelihood of recognizing that a particular anomaly might be caused by a bedrock conductor. As a general rule of thumb, the effectiveness of most EM systems for base metal exploration is given in Table II.

Table II. Influence of Conductive Cover On Base Metal Surveys.

Resistivity	Exploration effectiveness for most EM systems
> 300 ohm-m	excellent
100 to 300	good
30 to 100	moderate
< 30	poor

Apparent resistivity maps should always be constructed when the exploration effectiveness (Table II) is moderate to poor. DIGHEM^{II} surveys yield apparent resistivity maps as a standard product.

Channel 40 (see Appendix) presents the apparent resistivity using the so-called pseudo-layer half space model defined in Fraser (1978)*. This model consists of a resistive layer overlying a conductive half space. Channel 41 (often not plotted) gives the apparent depth below surface of the conductive

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

022122

material. The apparent depth therefore is simply the apparent thickness of the overlying resistive layer. The apparent depth (or thickness) parameter will be positive when the upper layer is more resistive than the underlying material, in which case the apparent depth may be quite close to the true depth.

The apparent depth will be negative when the upper layer is more conductive than the underlying material, and will be zero when a homogeneous half space exists. The apparent depth parameter must be interpreted cautiously because it will contain any errors which may exist in the measured altitude of the EM bird (e.g., as caused by a dense tree cover).

The apparent depth parameter is a useful indicator of simple layering in areas lacking a heavy tree cover. The DIGHEM^{II} system has been flown for the purpose of permafrost mapping, where positive apparent depths were used as a measure of permafrost thickness. However, little quantitative use has been made of negative apparent depths because the absolute value of the negative depth is not a measure of the thickness of the conductive upper layer and, therefore, is not meaningful physically. Thus, the apparent depth parameter is useful only in certain situations and so generally is not plotted.

022123

X-type electromagnetic responses

DIGHEM^{II} maps contain x-type EM responses in addition to EM anomalies. An x-type response is below the noise threshold of 2 ppm, and reflects one of the following: a weak conductor near the surface, a strong conductor at depth (e.g., 100 to 120 m below surface), or noise. Those responses that have the appearance of valid bedrock anomalies on the flight profiles are mentioned in the report. The others should not be followed up unless their locations are of considerable geological interest.

The thickness parameter

DIGHEM^{II} can provide an indication of the thickness of a steeply dipping conductor. The ratio of the anomaly amplitude of channel 24/channel 22 generally increases as the apparent thickness increases, i.e., the thickness in the horizontal plane. This thickness is equal to the conductor width if the conductor dips at 90 degrees and strikes at right angles to the flight line. This report refers to a conductor as thin when the thickness is likely to be less than 3 m, and thick when in excess of 10 m. Thick conductors can be high priority targets because most massive sulfide ore bodies are thick, whereas non-economic bedrock conductors are usually thin. An estimate of thickness cannot be obtained when the strike of the conductor is subparallel to the flight line, when the conductor has a shallow dip, when the anomaly amplitudes are small, or when the resistivity of the environment is below 100 ohm-m.

022124

Reduction of conductive overburden response

The DIGHEM^{II} system yields four channels which generally are free of the response of conductive overburden. These are the inphase difference channel 33, the quadrature difference channel 34, and the two anomaly recognition functions of channels 35 and 36. Channels 35 and 36 are used to trigger the conductance channel 37 which identifies discrete conductors. In highly conducting environments, channel 36 is not generated because it is subject to some corruption by highly conductive earth signals.

Discrete conductors usually occur in the bedrock, such as sulfides or graphite, rather than in the overburden, such as conductive clay. Only discrete conductors are plotted on the EM map. Broad (i.e., non-discrete) conductors are not plotted on this map, but are identified by lows on the resistivity contour map.

Reduction of magnetite response

Magnetite produces a form of geological noise on the inphase channels of all EM systems. Rocks containing as little as 1% magnetite can yield negative inphase anomalies. When magnetite is widely distributed throughout a survey area, the inphase EM channels may continuously rise and fall reflecting variations in the magnetite percentage, flying height, and overburden thickness. This can lead to difficulties in recognizing deeply buried bedrock conductors, particularly if conductive overburden also exists. However, the response of magnetite generally vanishes on the inphase differences channel 33. This feature can be a significant aid in the recognition of conductors which occur in rocks containing accessory magnetite.

MAGNETICS

The existence of a magnetic correlation with an EM anomaly is indicated directly on the EM map. An EM anomaly with magnetic correlation has a greater likelihood of being produced by sulfides than one that is non-magnetic. However, sulfide ore bodies may be non-magnetic (e.g., Kidd Creek near Timmins, Ontario, Canada) as well as magnetic (e.g., Mattabi).

The magnetometer data are digitally recorded in the aircraft to an accuracy of one gamma. The digital tape is processed by computer to yield a standard total field magnetic map contoured at 25 gamma intervals. The magnetic data also are treated mathematically to enhance the magnetic response of the near-surface geology, and an enhanced magnetic map is produced with a 100 gamma contour interval. The response of the enhancement operator in the frequency domain is shown in Figure 2. The 100 gamma contour interval is equivalent to a 5 gamma interval for the passband components of the airborne data. This is because these components are amplified 20 times by the operator of Figure 2.

The enhanced magnetic map bears a resemblance to a ground magnetic map. It therefore simplifies the recognition of trends in the rock strata and the interpretation of

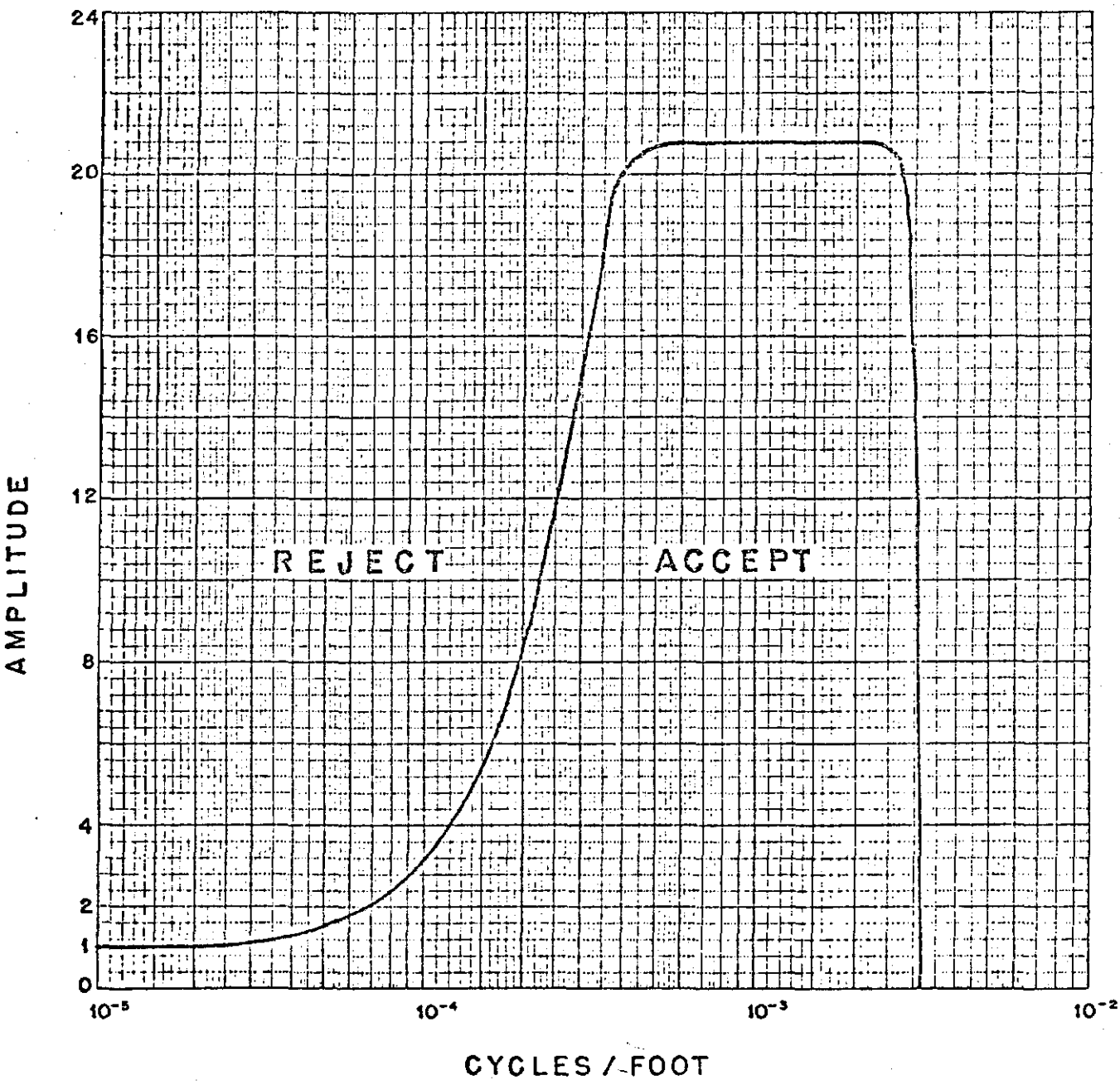


Figure 2 Frequency response of magnetic operator

5 cm

geological structure. The contour interval of 100 gammas is suitable for defining the near-surface local geology while de-emphasizing deep-seated regional features.

Apart from the difference in the contour interval, the enhanced magnetic map and the standard magnetic map are identical when magnetic basement rocks underlie a thousand metres of non-magnetic cover. The difference between the two maps increase with the amount of magnetization of the near-surface geology.

The presence of a magnetic coincidence with an EM anomaly can result because the conductor is magnetic or because a magnetic body occurs in juxtaposition with the conductor. The majority of magnetic conductors represent sulfides containing pyrrhotite or magnetite. However, graphite and magnetite in close association can provide coinciding EM-magnetic anomalies. The truly magnetic conductors tend to follow closely the contoured magnetic highs. Such coincidence may be more evident on the enhanced magnetic map than on the standard magnetic map because of less disturbance from regional magnetic features. The enhancement, therefore, provides data maps which contribute to the evaluation of EM anomalies.

CONDUCTORS IN THE SURVEY AREA

The electromagnetic maps show the locations of conductors and their interpreted conductance (i.e., conductivity-thickness product) and depth. Their strike direction and length are also shown when the anomalies can be correlated from line to line. When studying the EM maps for followup planning, consult the anomaly listings appended to this report to ensure that none of the conductors are overlooked.

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

The apparent depth parameter (channel 41) usually aids in distinguishing between conductive overburden and broad bedrock conductors. The depth parameter is computed as the height of the EM bird above the conductor, less bird altitude. The dense tree cover caused the altimeter readings to be inaccurate. Consequently, the depth parameter did not contribute reliably to the interpretation.

022129

St. Dizier

The area of the sheets comprises 161 line-km of survey. The resistivity of the geologic environment is typically higher than 700 ohm-m, but values as low as 10 ohm-m occur due to locally conductive bedrock and overburden features. The area is active magnetically. The concentration of magnetite at the southwest end of lines 226 to 229 and 231 has produced a prominent, unusual magnetic anomaly of a dipolar character.

Group 1	The grade 1 to 5 anomalies of this grouping reflect a conductive zone which extends beyond the survey boundary. This zone appears to be quite broad. It is better portrayed by the resistivity map. Locally thick sections occur at 202C, 202D, and 203A.
Anomaly 201 I	A thin magnetic bedrock conductor is indicated by this grade 3 anomaly. The conductor may extend beyond the survey boundary.
Group 2	The grade 1 to 6 anomalies of this grouping reflect a system of mostly non-magnetic bedrock conductors. Conductor 215B appears to be thick.
Anomaly 219A-221A	A thin bedrock conductor is indicated by these grade 1 and 2 anomalies. The conductor may be magnetic.
Anomalies 220C, 221C	These grade 3 and 1 anomalies reflect a bedrock conductor or

022131

conductors which may constitute a southeasterly extension of the group 2 conductors.

Group 3

A system of thin, mostly magnetic conductors is indicated by the grade 1 to 3 anomalies of this grouping. It is of interest to note the influence of magnetite on EM inphase channels 22 and 24 at 227C and 228D. High concentration of magnetite resulted in negative EM responses and produced a strong magnetic feature of a bipolar character.

Zeehan

The area of the sheets consists of 12 line-km of survey. The resistivity of the geologic environment varies from about 200 ohm-m to 1000 ohm-m. The low resistivity zone along the western part of line 401 correlates with a pair of weak conductors which may occur in the bedrock. Apart from these anomalies, no other EM responses were observed which would indicate the presence of bedrock conductors in the survey area.

Respectfully submitted,

DIGHEM LIMITED

D.C. Fraser

President

Z. Dvorak

Geophysicist

Eight map sheets accompany this report:

Electromagnetics	2 map sheets
Resistivity	2 map sheets
Magnetics	2 map sheets
Enhanced magnetics	2 map sheets

A P P E N D I X

THE FLIGHT RECORD AND PATH RECOVERY

The flight record is a roll of chart paper containing the geophysical profiles. The profiles are generated by computer at a scale identical to the geophysical maps. The flight record contains up to 17 channels of information, as follows:

Channel Number	Parameter	Scale units/mm	Noise
20	magnetics	10 gamma	2 gamma
21	altitude	3 m	2 m
22	standard* coil-pair inphase	1 ppm	1-2 ppm
23	standard coil-pair quadrature	1 ppm	1-2 ppm
24	whaletail** coil-pair inphase	1 ppm	1-2 ppm
25	whaletail coil-pair quadrature	1 ppm	1-2 ppm
28	ambient noise monitor (standard receiver)	1 ppm	1-2 ppm
29	ambient noise monitor (whaletail receiver)	1 ppm	1-2 ppm
31	sums function inphase***	1 ppm	1-2 ppm
32	sums function quadrature***	1 ppm	1-2 ppm
33	difference function inphase	1 ppm	1-2 ppm
34	difference function quadrature	1 ppm	1-2 ppm
35	first anomaly recognition function	1 ppm	1-2 ppm
36	second anomaly recognition function	1 ppm	1-2 ppm
37	conductance	1 mho	
40	log resistivity	.03 decade	
41	apparent depth to conductive half space	3 m	

* coaxial
** horizontal coplanar
*** generally not plotted

The log resistivity scale of 0.03 decade/mm means that the resistivity changes by an order of magnitude in 33 mm. The resistivities at 0, 33, 67 and 100 mm up from the bottom of the chart are respectively 1, 10, 100 and 1000 ohm-m.

022134

The fiducial marks on the flight record represent points on the ground which were recognized by the aircraft navigator. Continuous photographic coverage allowed accurate photo-path recovery locations for the fiducials, which were then plotted on the geophysical maps to provide the track of the aircraft.

The fiducial locations on both the flight records and flight path maps were examined by a computer for unusual helicopter speed changes. Such changes often denote an error in flight path recovery. The resulting flight path locations therefore reflect a more stringent checking than is provided by standard flight path recovery techniques.

The following brief description of DIGHEM^{II} illustrates the information content of the various profiles*.

The DIGHEM^{II} system has two transmitter coils which are mounted at right angles to each other. (The transmitted frequency is given in the Introduction.) Thus, the system provides two completely independent surveys at one pass. In addition, the flight chart profiles (generated by computer) include an inphase channel and a quadrature channel which essentially are free of the response of conductive overburden. Also, the EM channels may indicate whether the conductor is thin (e.g., less than 3 m), or has a substantial width (e.g., greater than 15 m). Further, the EM channels include a channel of resistivity and another of conductance. A minimum of 10 EM channels are provided. The DIGHEM^{II} system therefore gives information in one pass which cannot be obtained by any other airborne or ground EM technique.

*For a detailed description see D.C. Fraser; Geophysics, v.44, p.1367-1394.

022135

Figure A1 shows a DIGHEM^{II} flight profile over the massive pyrrhotite ore body in Montcalm Township, Ontario. It will serve to identify the various channels.

The two upper channels (numbered 20 and 21) are respectively the magnetics and the radio altitude. Channels 22 and 23 are respectively the inphase and quadrature of the coaxial coil-pair, which is termed the standard coil-pair. This coil-pair is equivalent to the standard coil-pair of all inphase-quadrature airborne EM systems. Channels 24 and 25 are the inphase and quadrature of the additional coplanar coil-pair which is termed the whaletail coil-pair.

Channels 31 and 32 are inphase and quadrature sums functions of the standard and whaletail channels; they provide a condensed view of the four basic channels 22 to 25. The sums channels normally are not plotted.

Channels 33 and 34 are inphase and quadrature differences functions of the standard and whaletail channels. The differences channels are almost free from the response of conductive overburden. Channel 37 is the conductance. The conductance channel essentially is an automatic anomaly picker calibrated in conductance units of mhos; it is triggered by the anomaly recognition functions shown as channels 35 and 36.

Channel 40 is the resistivity, which is derived from the whaletail channels 24 and 25. The resistivity channel 40 yields data which can be contoured, and so the DIGHEM^{II} system yields a resistivity contour map in addition to an electromagnetic map, a magnetic contour map, and an enhanced magnetic contour map. The

022136

enhanced magnetic contour map is similar to the filtered magnetic map discussed by Fraser.*

Figure A2 presents the DIGHEM^{II} results for a line flown perpendicularly to the Montcalm ore body. Channel 20 shows the 175 gamma magnetic anomaly caused by the massive pyrrhotite deposit. For the EM channels, the following points are of interest:

1. On channels 22-25 and 31-34, the ore body essentially yields only an inphase response. The quadrature response is almost completely caused by conductive overburden (which also gives a small inphase response). The hachures show the EM response from the overburden. The overburden response vanishes on the difference EM channels, as can be seen by comparing the quadrature channels 25 and 34. This is an important point to note because DIGHEM^{II} is the only EM system which provides an inphase channel and a quadrature channel which are essentially free of conductive overburden response.

2. The whaletail anomaly of channel 24 has a single peak. This shows that the conductor has a substantial width. If the width had been under 3 m, the conductor would have produced a weak m-shaped anomaly on channel 24.

3. The ore body yields a resistivity of 5 ohm-m in a background of about 200 ohm-m (cf. channel 40). A dipole-dipole ground resistivity survey with an a-spacing of 50 m showed a similar background, but the ore body gave a low of only 53 ohm-m

---

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

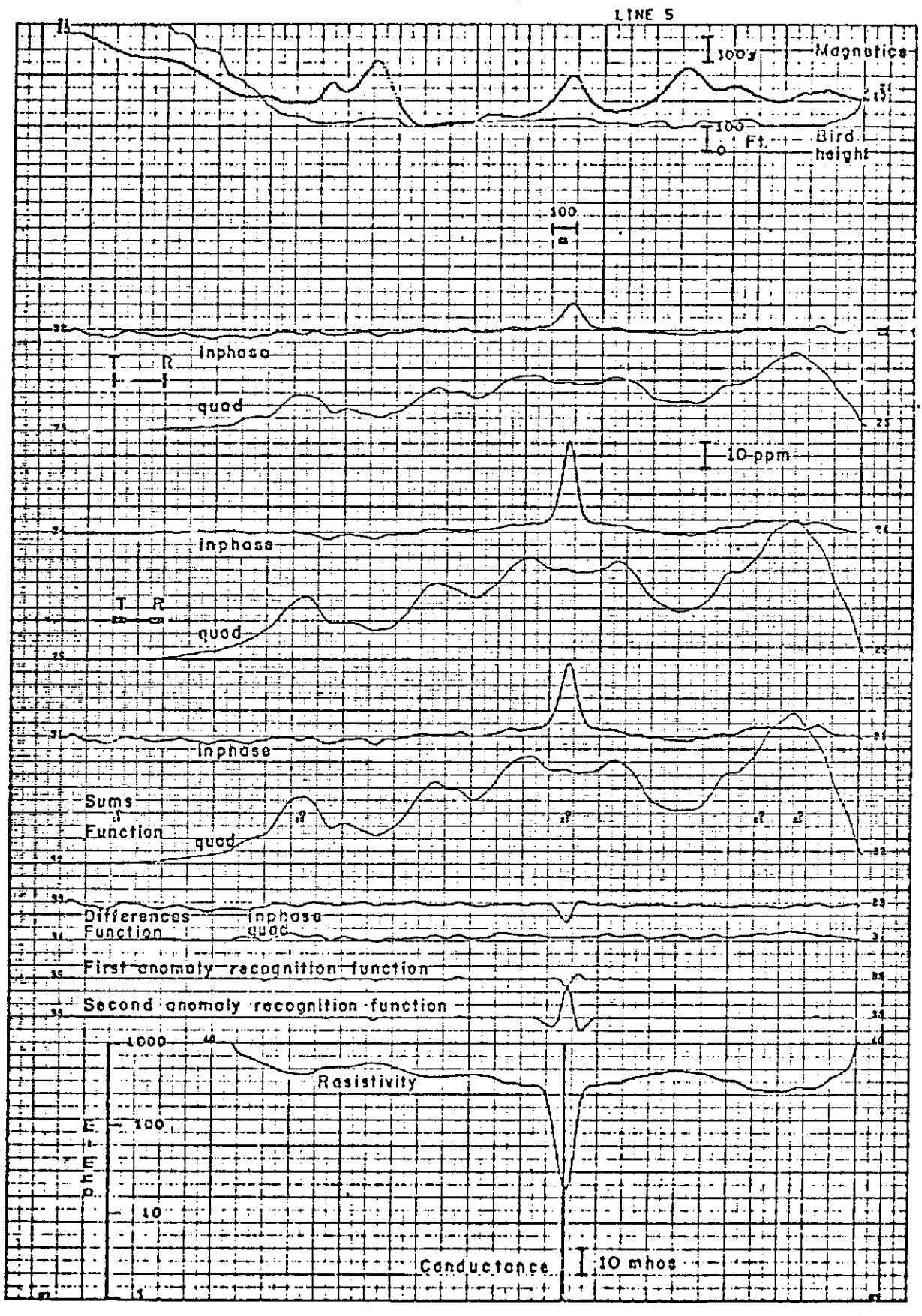


Fig. A1. Flight over Montcalm deposit, with line parallel to strike.

5 cm

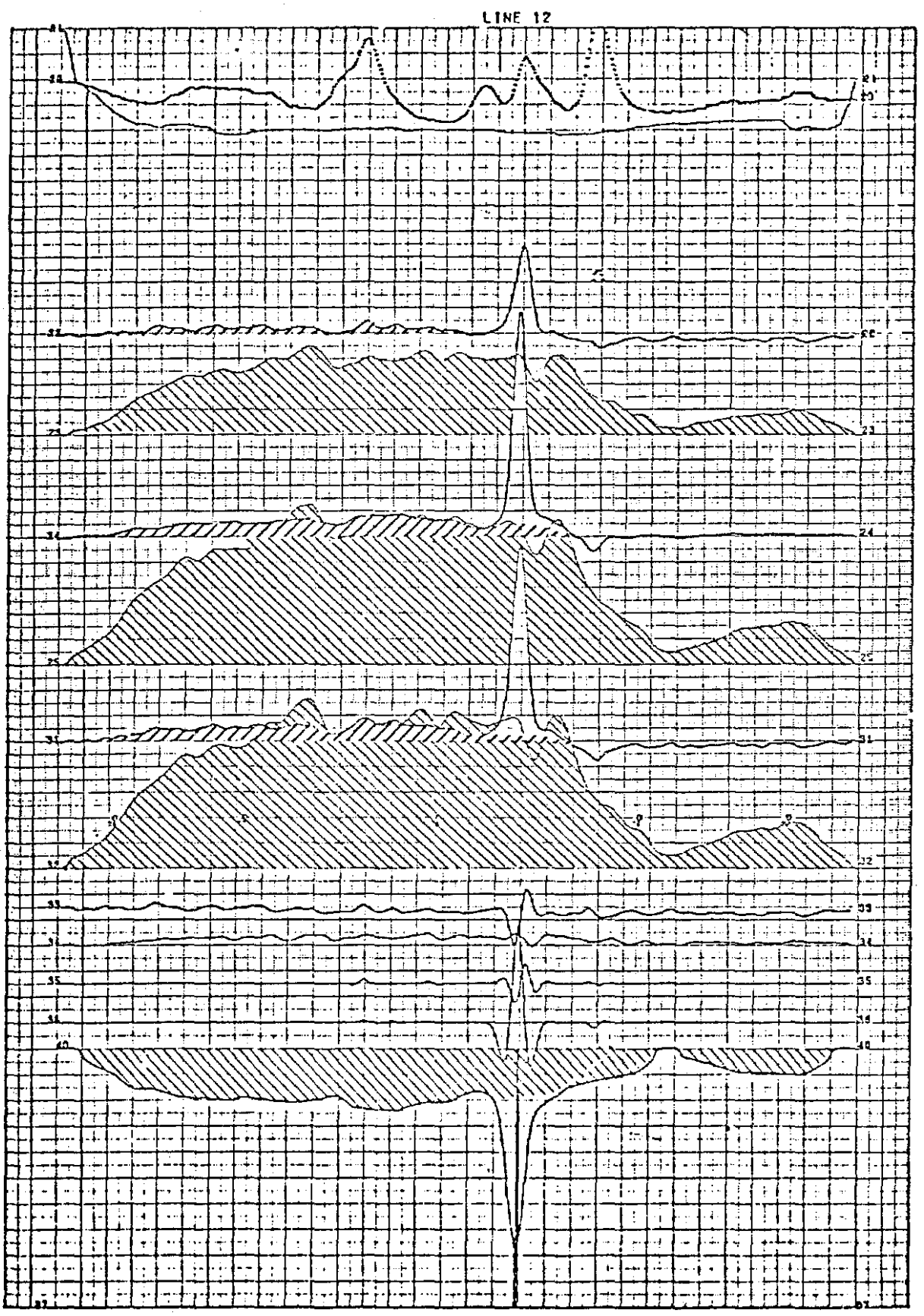


Fig. A2. Flight over Montcalm deposit, with line perpendicular to strike.

022139

because of the averaging effect inherent in the ground technique.

4. The ore body has a conductance of 330 mhos according to its EM response on this particular flight line. The conductance channel 37 saturates at 100 mhos, and so the deposit is indicated by a 100-mho spike.

Figure A1 illustrates the DIGHEM^{II} results for a line flown subparallel to the ore body. The ore body anomaly is small on the standard coil-pair (channel 22) but shows up strongly on the whaletail coil-pair (channel 24).

307-3 ABERFOYLE TASMANIA APR/80

LINE & ANOMALY	STANDARD COIL REAL PPM	STANDARD COIL QUAD PPM	WHALETAIL COIL REAL PPM	WHALETAIL COIL QUAD PPM	VERTICAL DIKE COND MHOS	VERTICAL DIKE DEPTH* FEET	HORIZONTAL SHEET COND MHOS	HORIZONTAL SHEET DEPTH FEET	CONDUCTIVE EARTH RESIS OHM-M	CONDUCTIVE EARTH DEPTH FEET
201A	4	4	4	5	5	147	1	459	76	307
201B	2	2	2	1	6	289	2	781	63	614
201C	1	2	6	5	5	162	1	509	97	338
201D	3	1	3	3	8	112	2	540	46	393
201E	3	5	5	6	5	8	1	291	91	133
201F	15	11	41	19	24	0	5	194	6	131
201G	5	4	0	0	7	201	2	583	65	437
201H	7	1	1	1	8	86	7	545	5	468
201I	9	5	7	9	11	115	3	404	26	300
202A	3	4	8	7	6	77	2	388	63	248
202C	10	7	22	16	14	38	3	283	16	197
202D	16	5	33	9	56	92	10	333	2	282
202E	12	24	10	32	4	27	1	182	76	74
202F	0	3	0	0	1	87	1	577	1034	0
203A	7	25	15	53	3	45	1	172	115	68
203B	0	5	0	0	2	78	1	397	1034	0
205A	2	13	5	25	1	30	1	167	301	35
205B	0	5	0	0	1	1	1	446	1034	0
206A	3	5	0	1	6	124	1	469	162	277
208A	3	0	0	0	15	338	2	770	68	598
209A	2	2	0	3	5	246	1	614	168	401
209B	3	4	1	2	4	138	1	482	120	298
210A	2	4	0	0	6	182	1	498	377	244
211B	3	2	2	2	8	262	2	719	30	589

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

307-3 ABERFOYLE TASMANIA APR/80

022141

LINE & ANOMALY	STANDARD COIL REAL PPM	STANDARD COIL QUAD PPM	WHALETAIL COIL REAL PPM	WHALETAIL COIL QUAD PPM	VERTICAL DIKE COND MHOS	VERTICAL DIKE DEPTH* FEET	HORIZONTAL SHEET COND MHOS	HORIZONTAL SHEET DEPTH FEET	CONDUCTIVE EARTH RESIS OHM-M	CONDUCTIVE EARTH DEPTH FEET
211C	1	5	1	3	1	146	1	409	522	168
211D	6	4	4	6	8	168	2	483	40	364
212A	0	4	0	1	1	5	1	447	1034	0
212B	1	6	1	4	1	57	1	291	521	74
212C	5	3	7	4	13	213	3	563	22	453
212D	2	1	0	1	6	296	1	772	101	588
212E	8	3	10	1	50	215	9	545	3	483
213A	2	9	2	15	1	67	1	230	360	77
213C	2	3	0	2	3	229	1	530	294	307
213D	7	0	13	1	525	224	17	541	1	504
214A	4	2	0	2	8	211	2	632	53	482
214B	10	7	19	13	15	168	3	423	14	338
214C	4	3	1	2	6	224	1	588	73	438
214D	8	4	10	6	18	177	4	490	12	403
214E	2	4	1	4	2	162	1	450	241	253
215A	2	5	0	0	2	157	1	458	424	215
215B	6	5	12	9	11	141	2	430	27	325
215C	4	1	2	2	19	233	4	671	14	561
215D	2	3	1	2	3	183	1	512	220	299
215E	1	4	0	2	2	162	1	469	772	138
215F	2	8	0	5	1	101	1	305	560	106
216B	3	3	1	0	6	215	2	704	68	544
216D	5	10	5	13	3	104	1	317	113	174
216E	3	7	2	8	2	80	1	312	222	145
217A	1	10	1	13	1	62	1	196	835	28
217B	2	13	2	13	1	58	1	192	496	52
218A	3	2	1	1	5	169	2	628	71	466

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

307-3 ABERFOYLE TASMANIA APR/80

022142

LINE & ANOMALY	STANDARD COIL REAL PPM	STANDARD COIL QUAD PPM	WHALETAIL COIL REAL PPM	WHALETAIL COIL QUAD PPM	VERTICAL DIKE COND MHOS	VERTICAL DIKE DEPTH* FEET	HORIZONTAL SHEET COND MHOS	HORIZONTAL SHEET DEPTH FEET	CONDUCTIVE EARTH RESIS OHM-M	CONDUCTIVE EARTH DEPTH FEET
218B	5	8	3	10	4	91	1	325	109	174
218C	2	5	1	3	2	133	1	404	276	211
218D	3	14	4	19	1	17	1	164	288	26
219A	3	9	0	11	2	36	1	213	303	54
219C	1	12	2	20	1	28	1	128	732	0
219D	2	5	1	4	1	142	1	391	415	190
219E	3	5	2	7	3	137	1	393	189	218
219F	1	7	0	4	1	61	1	288	632	63
220A	14	24	16	45	5	0	1	134	58	33
220C	100	142	159	216	14	46	4	138	9	87
220D	2	10	2	7	1	67	1	259	334	92
220E	3	4	2	6	3	154	1	434	184	249
220F	2	7	3	16	1	116	1	299	321	138
220G	2	5	1	2	2	187	1	502	276	294
221A	7	15	15	22	5	60	1	246	65	128
221B	5	19	4	17	2	12	1	162	202	32
221C	12	43	5	43	2	0	1	104	120	6
221D	4	7	0	3	3	128	1	392	166	217
221E	2	8	1	7	1	59	1	250	418	76
222A	1	8	1	9	1	60	1	236	817	39
222B	4	35	6	47	1	20	1	111	247	15
222C	62	99	64	116	9	41	3	146	17	82
222D	21	71	44	111	5	10	1	111	49	37
222E	77	78	56	73	15	53	4	177	10	121
222G	4	0	1	1	16	230	3	688	21	568
222I	1	11	1	10	1	42	1	189	674	32
223A	21	40	12	37	5	42	2	181	51	88
223B	11	23	4	19	3	60	1	223	97	108
223C	1	11	0	0	1	25	1	223	718	11

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

LINE & ANOMALY	STANDARD COIL REAL PPM	STANDARD COIL QUAD PPM	WHALETAIL COIL REAL PPM	WHALETAIL COIL QUAD PPM	VERTICAL DIKE COND MHOS	VERTICAL DIKE DEPTH* FEET	HORIZONTAL SHEET COND MHOS	HORIZONTAL SHEET DEPTH FEET	CONDUCTIVE EARTH RESIS OHM-M	CONDUCTIVE EARTH DEPTH FEET
224A	11	29	11	37	3	24	1	161	97	58
224B	1	7	1	8	1	50	1	251	629	49
225A	0	4	1	5	1	53	1	387	1034	0
225B	14	28	8	32	4	21	.1	170	77	65
225D	5	0	0	0	15	199	4	653	13	544
226A	18	48	22	64	4	30	1	148	63	62
226B	1	2	0	0	3	192	1	666	516	271
227C	4	73	14	76	1	0	1	36	191	0
227D	3	4	0	0	6	156	1	516	139	318
228D	16	99	28	136	2	9	1	83	83	12
228E	4	2	1	1	6	132	2	630	29	501
230A	1	18	2	22	1	22	1	94	727	0
231A	0	4	0	2	2	171	1	478	1034	0
240A	2	10	1	8	1	27	1	179	549	23
240B	1	11	1	10	1	40	1	183	772	17

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

307-4 ABERFOYLE, TASMANIA APR/80

LINE & ANOMALY	STANDARD COIL REAL PPM	STANDARD COIL QUAD PPM	WHALETAIL COIL REAL PPM	WHALETAIL COIL QUAD PPM	VERTICAL DIKE COND MHOS	VERTICAL DIKE DEPTH* FEET	HORIZONTAL SHEET COND MHOS	HORIZONTAL SHEET DEPTH FEET	CONDUCTIVE EARTH RESIS OHM-M	CONDUCTIVE EARTH DEPTH FEET
401A	2	13	8	26	2	0	1	142	216	9
401B	6	19	10	37	2	13	1	156	135	40
401C	2	5	2	6	2	56	1	315	303	127
404A	8	7	6	7	9	38	2	318	34	211
405A	6	8	1	4	4	70	1	326	108	168

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

APPENDIX E

12 Mile Creek DIGHEM Anomaly
Follow-up.

[redacted] Abitibi Exploration — GEOCHEMICAL SAMPLE LEDGER

PROJECT: ST. DIZIER 12 MILE CREEK

BSS SIEVE SIZE CODE - MESH NUMBER: A 200, B 150, C 100, D 80, E 60, F 40, G 30, H 20, T = TOTAL

SAMPLE TYPE CODE: ☐ OXIDIZED PRODUCTS O; ☐ FRESH ROCK R; ☐ STREAM SEDIMENTS S; ☐ WEATHERED BEDROCK W; ☐ SURFACE TRANSPORTED T; ☐ RESIDUAL SOIL E; ☐ MINE DUMP M

CARD PUNCH PRINT: YES ☐ NO ☐ VERIFY: YES ☐ NO ☐

DATE:

SHEET: 1

EASTINGS	NORTHINGS	SAMPLE NUMBER	DEPTH in CMS	SIZE FRACTION	Sample Type	Sn	W	Cu	Pb	Zn	GEOLOGICAL LOG
TRENCH	NP										
		253251				50	<20	20	20	25	0.0 m All block
WESTERN END OF TRENCH		253252				10	<20	80	<10	10	3.0 m Conglomerate slate
		253253				15	<20	20	<10	10	6.0 m
		253254				20	<20	160	<10	10	9.0
		253255				10	<20	70	10	10	12.0
		253256				10	<20	120	10	10	15.0
		253257				25	<20	10	20	10	18.0
		253258				<10	<20	30	10	5	21.0
		253259				<10	<20	120	10	15	24.0
		253260				15	<20	10	20	5	27.0
		253261				10	<20	45	<10	10	30.0
		253262				260	<20	10	10	5	33.0
		253263				30	<20	20	10	5	36.0

OPERATOR | COMPUTER | CHECK | PLOTTER | DATE

ASSAYED BY G.T. LTD

Abminco Exploration — GEOCHEMICAL SAMPLE LEDGER

PROJECT: ST DIZIER, 12 MILE CREEK

BSS SIEVE SIZE CODE - MESH NUMBER: A 200, B 150, C 100, D 80, E 60, F 40, G 30, H 20, T = TOTAL

SAMPLE TYPE CODE: O OXIDIZED PRODUCTS, R FRESH ROCK, S STREAM SEDIMENTS, W WEATHERED BEDROCK, T SURFACE TRANSPORTED, E RESIDUAL SOIL, M MINE DUMP

CARD PUNCH PRINT VERIFY: YES / NO / YES / NO

DATE:

SHEET: 2

EASTINGS	NORTHINGS	SAMPLE NUMBER	DEPTH in CMS	SIZE FRACTION	Sample Type	Sn	W	Cu	Pb	Zn	GEOLOGICAL LOG
		253264				15	<20	20	10	10	39.0 metres All black carbonaceous Sst.
TRENCH Nº 2											
		253265				<10	<20	30	<10	5	0.0 metres
WESTERN END OF TRENCH.		253266				10	<20	60	10	5	3.0
		267				20	<20	30	10	5	6.0
		268				10	<20	160	10	10	9.0
		269				15	<20	30	<10	5	12.0
		270				<10	<20	10	<10	5	15.0
		271				30	<20	120	<10	<5	18.0
		272				15	<20	40	<10	<5	21.0
		273				60	<20	15	<10	5	24.0
		274				25	20	15	<10	5	27.0
		275				15	<20	15	<10	5	30.0

OPERATOR | COMPUTER | CHECK | PLOTTER | DATE

ASSAYED BY ET Rtd

022114

[redacted] Exploration [redacted] GEOCHEMICAL SAMPLE LEDGER

PROJECT: ST DIZIER / 12 MILE CREEK

BSS SIEVE SIZE CODE - MESH NUMBER: A 200 D 80 G 30 / B 150 E 60 H 20 / C 100 F 40 T = TOTAL

SAMPLE TYPE CODE: ☐ OXIDIZED PRODUCTS O; ☐ FRESH ROCK R; ☐ STREAM SEDIMENTS S; ☐ WEATHERED BEDROCK W; ☐ SURFACE TRANSPORTED T; ☐ RESIDUAL SOIL E; ☐ MINE DUMP M

CARD PUNCH PRINT YES ☐ NO ☐ VERIFY YES ☐ NO ☐

DATE

SHEET: 3

EASTINGS	NORTHINGS	SAMPLE NUMBER	DEPTH in CMS	SIZE FRACTION	Sample Type	Sn	METAL VALUES PPM W	Cu	Pb	Zn	GEOLOGICAL LOG
		253276				<10	<20	30	<10	5	33.0 Old Work Carbonaceous Slate
		253277				10	<20	15	<10	<5	36.0
		253278				15	<20	10	<10	<5	39.0

OPERATOR | COMPUTER | CHECK | PLOTTER | DATE

ASSAYED BY C.T. LTD.

0221148

Abminco Exploration

GEOCHEMICAL SAMPLE LEDGER

PROJECT: ST DIZIER / 12 MILE CREEK

BSS SIEVE SIZE CODE - MESH NUMBER: A 200 D 80 G 30 / B 150 E 60 H 20 / C 100 F 40 T = TOTAL

SAMPLE TYPE CODE: OXIDIZED PRODUCTS O; FRESH ROCK R; STREAM SEDIMENTS S; WEATHERED BEDROCK W; SURFACE TRANSPORTED T; RESIDUAL SOIL E; MINE DUMP M

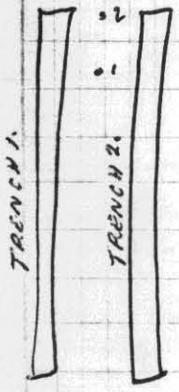
CARD PUNCH PRINT YES NO / VERIFY YES NO

DATE

SHEET 4

EASTINGS	NORTHINGS	SAMPLE NUMBER	DEPTH in CMS	METAL VALUES PPM Sn	WO_3	Cu	Pb	Zn	As	GEOLOGICAL LOG
DRILL HOLE locations	1	233469	200	15	<20	20	40	30	<10	bl. shale.
	2	233470	100	30	30	25	40	30	<10	bl. shale
	3	233471	100	15	20	60	30	45	10	pale grey clay, occ. sulph.
	4	233472	200	20	20	50	40	90	<10	pale grey and buff clay, rare mica + sulp
	5	233473	200	15	20	25	30	80	20	" "
	6	233474	200	30	20	20	10	60	<10	grey clay
	7	233475	200	<10	<20	25	20	60	10	grey clay.

TWELVE MILE CREEK.



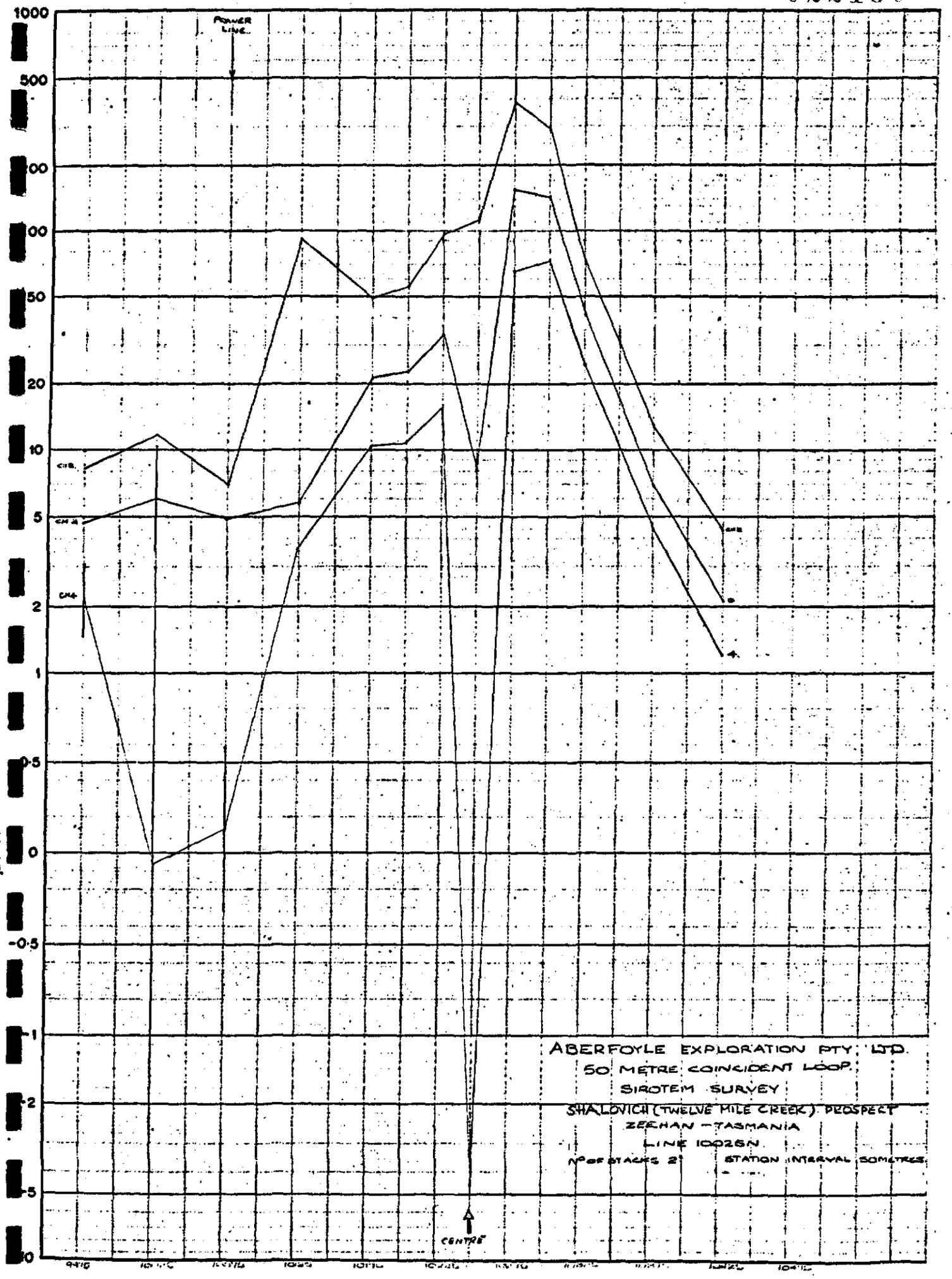
OPERATOR COMPUTER CHECK PLOTTER

ASSAYED: C.T.L. - 21/7/80 ENTERED:- DATE 23/7/80 BY N.S.

02219

LINE 10025 N

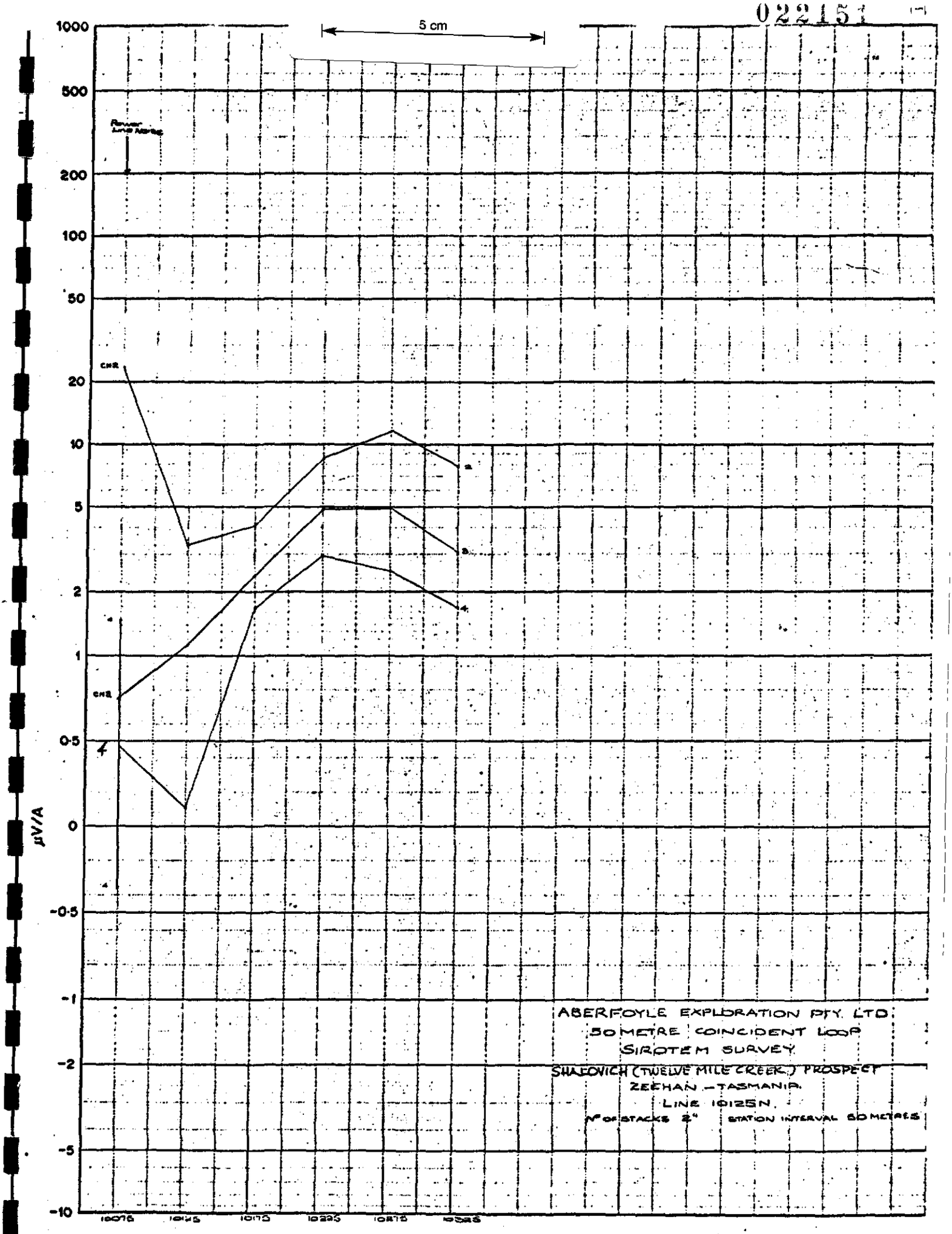
022150



SIROTEM SURVEY

5 cm

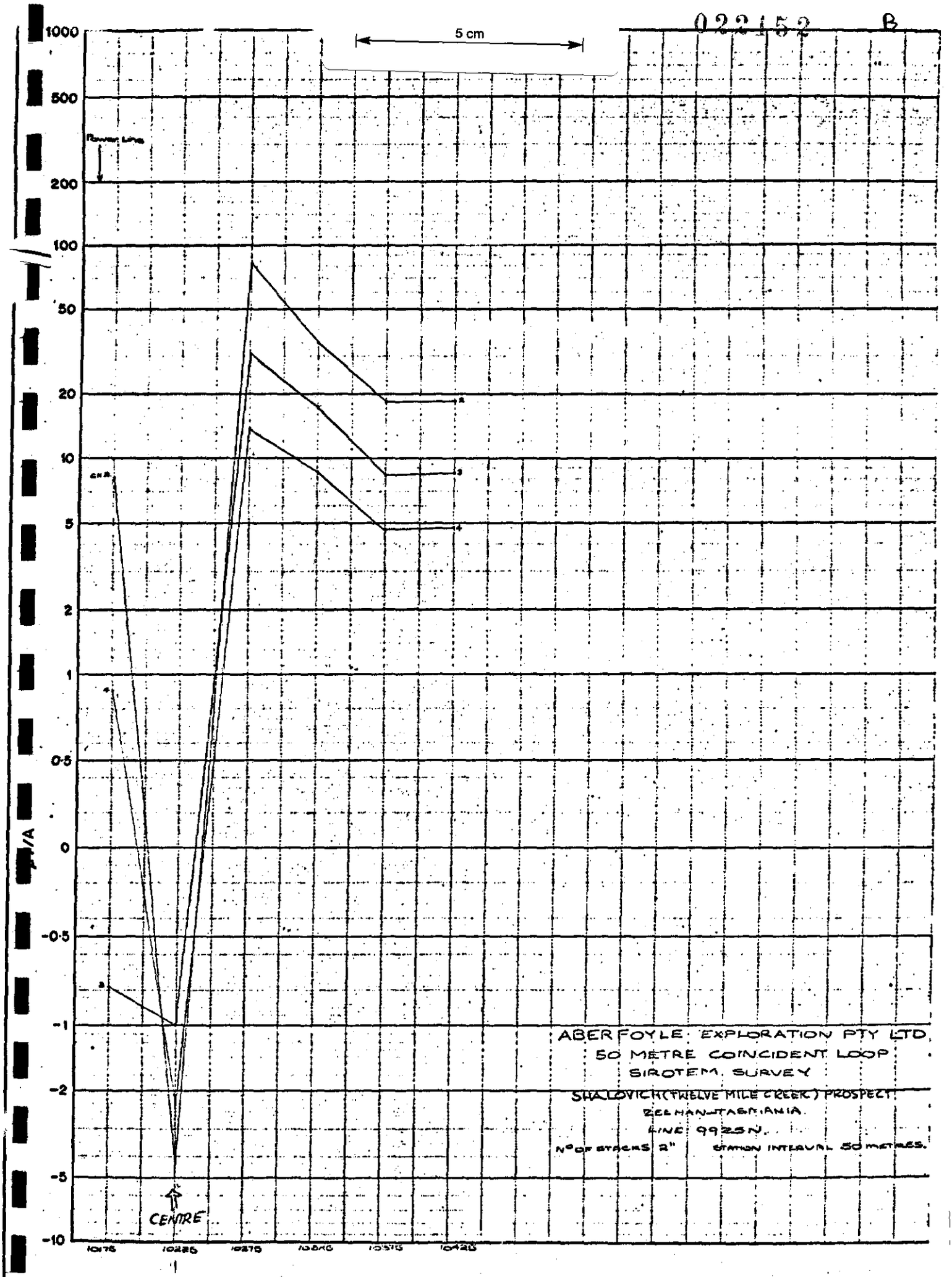
022151



SIROTEM SURVEY

GEOEX PTY LTD

022152 B



GEOEX

SIROTEM SURVEY

022153

D of M | A.O. | C.S. | E.S. & M. | D.S.M.E.
RECEIVED
2 - DEC 1980
ANSWERED
DEPT OF MINES
REF. No.
Registrar
E & I.L.

OPEN FILE

VOLUME 2

PROGRESS REPORT
QUEEN HILL JOINT VENTURE
E.L. 47/71 TASMANIA
QUARTER TO JUNE 30, 1980

MICROFILMED

LIST OF PLATES - VOLUME 2

Plate No.	Title	Scale
QH 138	Geological Legend	
QH 129	Section 2920 Sheet 2	1:500
	Sheet 3	1:500
QH 129	Section 3040 Sheet 4	1:500
	Sheet 5	1:500
QH 129	Section 3060 Sheet 1	1:500
	Sheet 2	1:500
QH 129	Section 3100 Sheet 1	1:500
	Sheet 2	1:500
QH 129	Section 3120 Sheet 2	1:500
	Sheet 3	1:500
QH 129	Section 3480 Sheet 3	1:500
	Sheet 4	1:500
QH 129	Section 3500	1:500
QH 161/00/00	Queen Hill Area Surface Geology	1:2500
QH 161/00/12	Queen Hill Area Surface Geology	1:2500
QH 161/00/25	Queen Hill Area Surface Geology	1:2500
QH 161/80/00	Queen Hill Area Surface Geology	1:2500
QH 161/80/12	Queen Hill Area Surface Geology	1:2500
St.D 42/331/365	St. Dizier Area Geological Map	1:10,000
St.D 42/339/365	St. Dizier Area Geological Map	1:10,000
St.D 42/347/365	St. Dizier Area Geological Map	1:10,000
St.D 41	Big H Area Section 20550	1:500
St.D 41	Big H Area Section 22270	1:500
St.D 41	Big H Area Section 22600	1:500
St.D 41	Big H Area Section 22640	1:500
St.Diz 43	St. Dizier Grid Bedrock Geochemistry	1:2500
St.Diz 44	St. Dizier-Big H Area Geological Interpretation	1:5000
St.Diz 45	St. Dizier Interpreted Geological Sections Sheet 1	1:1000
	Sheet 2	1:1000
	Sheet 3	1:100C

To Accompany Appendix D

X-St.D 40	DIGHEM Survey Magnetics	1:20,000
X-St.D 41	DIGHEM Survey Electromagnetics	1:20,000
X-St.D 42	DIGHEM Survey Resistivity	1:20,000
X-St.D 43	DIGHEM Enhanced Magnetics	1:20,000
X-QH 22	DIGHEM Survey Magnetics	1:20,000
X-QH 23	DIGHEM Survey Electromagnetics	1:20,000
X-QH 24	DIGHEM Survey Resistivity	1:20,000
X-QH 25	DIGHEM Enhanced Magnetics	1:20,000

80/1504D

QUEEN HILL DRILL HOLE REFERENCE

CAMBRIAN

61 / 33 — m/s / D — Shales, mudstones, siltstones & greywacke; Dolomite (Dolomitic Siltstone)

44 — T — Tuffaceous greywacke

PROTEROZOIC

47 — Vt / Vb — Volcanic tuff; Volcanic lava

46 — Ts — Tuffaceous shale

63 — Sh — Shale (carbonaceous)

33 — D — Dolomite

36 — Ch — Chert

59 — S — Siltstone & pyritic mudstone

70 — QS — Thinly bedded quartzites/shales & slates

3 — Q — Massive quartzites

29 — Py > 5% bedded

12 — Py > 5% as veins, disseminated

21 — Po with or without Py, disseminated to massive

22 — Gn and/or Sph and/or Stn with or without Py as veins

ABBREVIATIONS

Carbon rich, locally carbonaceous	(carbon)
Sericite rich, locally sericitic	ser (ser)
Chlorite rich, locally chloritic	chlor (chlor)
Carbonate rich, locally carbonated	carb (carb)
Silicified, locally silicified	silic (silic)
Vesicular, amygdaloidal	vesic
Probable original character	siliceous
Bedding	
Cleavage, foliation	
Fault, unmeasured orientation	
Fault, measured orientation	
Fault Zone, unmeasured orientation	
Fault Zone, measured orientation	
Recrystallisation	
Sedimentary breccia	

Drill hole trace

SULPHIDE CONTACT

Drill hole trace

Py 5 (50)	Pyrite 5%, locally 50 %
Py 5 - 10	Pyrite 5 - 10 %
Gn 2	Galena 2%
Sph 5	Sphalerite 5%
Cpy 15	Chalcopyrite 15 %
Ba 5	Barite 5 %
q vein	quartz vein
c vein	carbonate vein
Si vein	Siderite vein

Perrdogical Sample 230453

ROCK TYPES illustrated by code and colour on left side of drill hole plots

Contact shown thus — Q

Internal variations shown

Drill hole trace

QUEEN HILL LICENCE REFERENCE

QUATERNARY

3 / 8 — Qa / DQ — Alluvium; Dolerite Talus

TERTIARY

51 — Tb — Basalt

27 — Tc — Conglomerate & grit

71 — Tg — Gravels

34 — Ts — Sand, silt, clay & limestone

JURASSIC

10 — Jd — Dolerite

PERMIAN

23 — Pz — Zeehan Glacial Formation

DEVONIAN

14 — Dg — Heemskirk Granite / Adamellite

41 — Db — Bell Shale

40 — Df — Florence Quartzite

SILURIAN

18 — Sc — Crotty Quartzite

ORDOVICIAN

26 — Og — Gordon Limestone

65 — Om — Moina Sandstone

64 — CAMBRIAN — Cc (m/s 61 / T 44) — Crimson Creek Formation; Shales, mudstones, siltstones & greywacke; Tuffaceous greywacke

Oonah Quartzite and Slate

PROTEROZOIC — Puo 56

Vt 47 — Volcanic tuff

Vb 47 — Volcanic lava

dom 33 — Dolomite

m/s 61 — Mudstone (pyritic mudstone)

ch 35 — Chert

€st/slt 59 — Siltstones, locally calcareous, carbonaceous, pyritic

€qt/Q/sst 3 — Massive light grey-buff quartzite (sandstone)

€bs/sh/sl 70 — Shales & slates (locally carbonaceous, calcareous, pyritic)

GENERAL ABBREVIATIONS

MINERAL

Py	-	Pyrite
Cpy	-	Chalcopyrite
Sph	-	Sphalerite
Gn	-	Galena
Po	-	Pyrrhotite
Si	-	Siderite
Mag	-	Magnetite
Ma	-	Marcasite
Ar	-	Arsenopyrite
Stn	-	Stannite
musc	-	muscovite
graph	-	graphite
lim	-	limonite
hem	-	hematite
tm	-	tourmaline
Kspar	-	K feldspar
fd	-	feldspar
bi	-	biotite
plag	-	plagioclase
serp	-	serpentine
chi	-	chiastolite
calc	-	calcareous
q	-	quartz
cord	-	cordierite
chlor	-	chlorite
trem	-	tremolite
diop	-	diopside
pyrox	-	pyroxene
carb	-	carbonate
dom	-	dolomite
Fl	-	fluorite
Am	-	amphibole

TEXTURE

xeno	-	xenocrysts
mic	-	micaceous
sacch	-	saccharoidal
tuff	-	tuffaceous
homog	-	homogenous
porph	-	porphyry
phen	-	phenocrysts
brec	-	breccia
rx	-	recrystallised
dissem	-	disseminated
interb	-	interbedded
nod	-	nodules
frag	-	fragments
alt	-	altered
lam	-	laminated
abund	-	abundant
weath	-	weathered
undiff	-	undifferentiated
fg	-	fine grained
mg	-	medium grained
cg	-	coarse grained
st	-	staining

STRUCTURE

fol	-	foliation / foliated
ax. pl.	-	axial plane
cr. cl.	-	crenulated cleavage
vert	-	vertical
f.a.	-	fold axis
80 →63°M	-	dip/dip direction magnetic

Folding

Fo^1	-	F1 fold deforming bedding plane
Fo^2	-	F2 fold deforming bedding plane

Deformation history

So	-	bedding
S_1	-	first deformation
S_2	-	second deformation

Lineations

L_1	-	lineation produced by S_1
L_2	-	lineation produced by S_2

ROCK TYPES

Sediments

sst	-	sandstone
qtz	-	quartzite
sh	-	shale
sl	-	slate
slt	-	siltstone
a	-	argillite
ch	-	chert
lst	-	limestone
dom	-	dolomite
gw	-	greywacke
cong	-	conglomerate
ms	-	mudstone

Igneous

Vt	-	tuff
Vb	-	lavas
Va	-	agglomerate
um/ub	-	rocks of ultrabasic affinity
dol	-	dolerite
A	-	adamellite
G	-	granite
serp	-	serpentinite

GENERAL SYMBOLS

- 0.2 — Outcrop boundary
- Float
- 0.4 — Contact known
- Contact interpreted
- Contact inferred
- F, 70° — Fault definite (known dip)
- F — Fault inferred
- Bedding strike & dip
- Schistosity with dip
- Joint with dip
- Minor folding showing plunge & trend
- Fold axis showing plunge & trend
- DDH — Diamond drill hole, with projected trace of hole (collar location accurate)
- DDH — Diamond drill hole, with projected trace of hole (collar location not accurate)
- PD — Percussion drill hole
- Shaft
- Trig station
- Lease corner peg
- Building
- Costean or trench
- Pit
- Dump
- Scarp, cliff or breakaway
- River or creek
- Railway or tram track
- Adit
- 2200 — Topographical contours & interval
- Cleared area
- Swamp
- Alluvial deposits
- Track
- Road (unsealed)
- Highway (sealed)
- E.L. 47/71 — Licence boundary & number
- Dam on stream
- T/S — Thin section
- Mine

022155 80/1504 Vol. 1/2

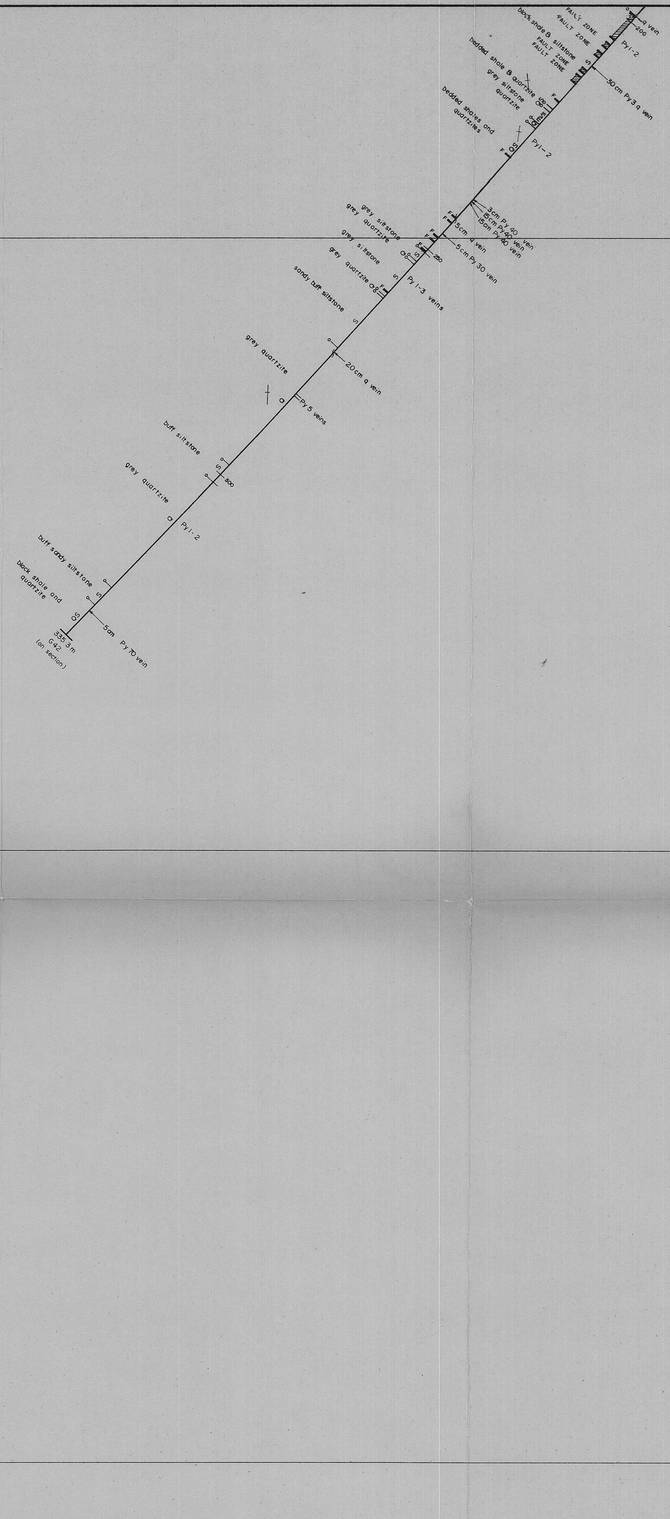
Aberfoyle Exploration Pty Ltd

Geology: C.H.Y., R.M.J.	QUEEN HILL GEOLOGICAL LEGEND Surface Geology & Cross Sections	Date: AUGUST, 1980
Drawn: R.J.E.		Scale:
Traced:		Plate No: QH 138



Aberfoyle Exploration Pty Ltd

Geology	CHY	NORTH WEST TASMANIA	Location code
Drawn	RJE	QUEEN HILL E L 47/71	Date March, 1980
Traced	RJE		Scale 1 500
Checked		CROSS SECTION 2920	Plate No QH129/2920 Sheet 2
Revised by	Date		



Index to Sheets

Sheet 1 | Sheet 2 | Sheet 3

022157

5 cm

80-1504

Aberfoyle Exploration Pty Ltd

Geology: C.H.Y.	NORTH WEST TASMANIA	Location code:
Drawn: R.J.E.	QUEEN HILL E.L. 47/71	Date: March, 1980
Traced: R.J.E.	CROSS SECTION 2920	Scale: 1:500
Checked:		Plate No: QH129/2920 Sheet 3
Revised by: Date:		

80-15/4

G39 XRF

DISTANCE (metres)	Sn ppm	Ag ppm
116.00	< 5.00	< 5.00
135.80	190	
136.80	1200	
138.40	1800	
140.10	400	
140.80	8100	
141.30	5700	
141.90	13800	
142.70	2600	
143.30	2700	
144.60	2100	
167.30	< 5.00	< 5.00
168.20	240	
169.00	410	
170.00	1000	
171.00	8700	
174.00	130	
175.00	260	
175.50	1200	
175.80	3400	
176.80	1400	
177.80	1500	
179.00	1200	
180.00	3000	
181.00	2300	
182.00	1800	
184.00	1400	
184.90	1800	
185.60	220	
186.80	810	
187.80	7200	
188.60	3700	
189.20	930	
189.70	1400	
190.40	4100	
191.20	1400	
192.30	770	
193.10	1900	
193.70	5600	
194.35	2900	
195.30	460	
196.00	420	
196.80	1900	
198.80	3100	
199.50	1000	
200.55	800	
201.75	8900	
202.80	5600	
203.80	700	
204.80	11800	
205.10	1300	
207.10	1400	
207.90	3700	
209.00	1200	
210.00	2400	
211.00	1200	
212.00	850	
213.10	600	
214.00	500	
215.00	1200	
215.70	4.00	
216.40	5300	
218.00	1200	
218.90	1300	
219.80	1100	
220.80	1700	
221.80	3700	
222.60	13300	
223.50	29200	
224.30	41600	
224.90	1500	
225.50	4000	
226.00	1400	

G39 (cont'd)

DISTANCE (metres)	Sn ppm	Ag ppm
226.60	17000	
227.25	28000	
228.00	430	
228.80	3400	
229.70	23000	
231.00	360	
231.10	< 5.00	< 5.00
231.80	3800	
233.30	840	
234.00	44.00	
234.05	< 5.00	< 5.00
234.10	1400	
236.75	170	
236.80	< 5.00	< 5.00
237.85	310	
238.45	3900	
238.00	3700	
239.20	1700	
240.00	1400	
241.70	2300	
242.30	1800	
242.75	1300	
243.75	1400	
244.20	380	
245.40	300	
246.20	1400	
246.70	50	
246.80	< 5.00	< 5.00
247.40	700	
248.30	1050	
249.70	1050	
250.95	220	
251.80	780	
252.63	1400	
253.45	420	
254.30	40	
255.30	440	
256.30	820	
257.20	2400	
258.25	720	
259.30	660	
260.10	840	
261.25	540	
262.20	580	
262.90	3450	
263.80	2250	
264.90	170	
265.95	90	
266.60	1100	
267.30	20	

G41 XRF

DISTANCE (metres)	Sn (ppm)	Ag (ppm)
00	< 5.00	< 5.00
00.00	5	
00.80	10	
04.80	14	
09.00	460	
13.80	34	
20.80	24	
30.00	< 4	
40.00	12	
50.00	10	
60.00	24	
80.00	22	
100.00	290	
120.00	6	
130.00	300	
140.00	150	
150.00	160	
160.00	16	
167.80	850	
171.60	16	
174.70	10	
184.70	42	
194.70	210	
204.70	40	
214.70	220	
218.00	3600	
223.00	4450	
228.00	2850	
233.00	24500	
234.00	110	
244.00	32	
245.00	140	
246.00	30	
252.80	290	
253.00	< 5.00	< 5.00
254.80	400	
255.00	2200	
258.00	8.00	
259.00	200	
260.00	800	
261.00	2200	
262.00	400	
263.00	200	
264.00	330	
265.00	1100	
266.00	1100	
267.00	1100	
268.00	1100	
269.00	1100	
270.00	1100	
271.00	1100	
272.00	1100	
273.00	1100	
274.00	1100	
275.00	1100	
276.00	1100	
277.00	1100	
278.00	1100	
279.00	1100	
280.00	1100	
281.00	1100	
282.00	1100	
283.00	1100	
284.00	1100	
285.00	1100	
286.00	1100	
287.00	1100	
288.00	1100	
289.00	1100	
290.00	1100	
291.00	1100	
292.00	1100	
293.00	1100	
294.00	1100	
295.00	1100	
296.00	1100	
297.00	1100	
298.00	1100	
299.00	1100	
300.00	1100	
301.00	1100	
302.00	1100	
303.00	1100	
304.00	1100	
305.00	1100	
306.00	1100	
307.00	1100	
308.00	1100	
309.00	1100	
310.00	1100	
311.00	1100	
312.00	1100	
313.00	1100	
314.00	1100	
315.00	1100	
316.00	1100	
317.00	1100	
318.00	1100	
319.00	< 5.00	< 5.00
329.00	1100	
339.00	860	
349.00	250	
358.80	340	

Core grinding

G43 XRF

DISTANCE (metres)	Sn (ppm)	Ag (ppm)
00	< 5.00	< 5.00
00.00	5	
04.80	8	
17.80	450	
27.00	< 4	
37.80	6	
47.80	9	
57.80	< 4	
67.80	18	
77.80	50	
87.80	30	
97.80	8	
107.80	16	
117.80	62	
127.80	< 4	
137.80	250	
145.10	6	
147.80	1650	
159.30	5600	
167.80	1100	
168.80	800	
176.80	720	
188.00	22	
189.00	< 5.00	< 5.00
190.00	2300	
191.00	1100	
192.00	1100	
193.00	1600	
194.00	2300	
195.00	450	
196.00	500	
197.00	7000	
198.00	1500	
199.00	1300	
200.00	750	
201.00	2200	
202.00	400	
203.00	200	
204.00	330	
205.00	400	
206.00	800	
207.00	600	
208.00	800	
209.00	400	
210.00	500	
211.00	300	
212.00	400	
213.00	400	
214.00	700	
215.00	1900	
216.00	1000	
217.00	1000	
218.00	3300	
219.00	400	
220.00	400	
221.00	400	
222.00	1600	
223.00	1100	
224.00	1100	
225.00	1100	
226.00	1100	
227.00	500	
228.00	1900	
229.00	2800	
230.00	400	
231.00	400	
232.00	1700	
233.00	500	
234.00	300	
235.00	1400	
236.00	1300	
237.00	800	
238.00	500	
238.80	930	
241.00	600	
242.00	1700	
243.00	26000	
244.00	1400	
245.00	3100	
246.00	9000	
247.00	700	
248.00	1400	
249.00	1400	
250.00	800	
251.00	2100	
252.00	2400	
253.00	2500	
254.00	4900	
255.00	500	
256.00	700	
257.00	1000	

Core grinding

G43 (cont'd) XRF

DISTANCE (metres)	Sn (ppm)	Ag (ppm)
258.00	700	
259.00	1500	
260.00	800	
261.00	1400	
262.00	1800	
263.00	900	
264.00	1100	
265.00	1200	
266.00	1400	
267.00	2800	
268.00	1400	
269.00	1300	
270.00	8300	
271.00	830	
272.00	18700	
273.00	12800	
274.00	4300	
275.00	1100	
276.00	2300	
277.00	1300	
278.00	4300	
280.00	800	
281.00	1900	
282.00	1100	
283.00	1800	
284.00	1800	
286.00	700	
287.00	5100	
288.00	1300	
289.00	2100	
290.00	1900	
291.00	1700	
292.00	1400	
293.00	900	
294.00	2200	
295.00	800	
296.00	600	
297.00	500	
298.00	1100	
299.00	1900	
300.00	700	
301.00	1900	
302.00	1200	
303.00	1900	
304.00	490	
305.00	500	
306.00	1100	
307.00	5200	
308.00	1900	
309.00	1100	
310.00	900	
311.00	900	
312.00	4200	
313.00	2700	
314.00	3000	
315.00	2400	
316.00	800	
317.00	800	
318.00	1000	

Core grinding

RL 200

RL 100

Py

Adit No 25

6st

Py prop S

FOWLER ST

G43 (proj. 14mN) G39 (proj. 57mS) G41 (proj. 8mN)

QUEEN ST

Eastern Reference Plane (30mE)



Index to Sheets

Sheet 3	Sheet 1	Sheet 4
	Sheet 2	Sheet 5

5 cm

DDH 39 Projected onto section – circle shows point of intersection

022158

Aberfoyle Exploration Pty Ltd

Geology: C.H. Y.	NORTH WEST TASMANIA	Location code:
Drawn: R.J.E.	QUEEN HILL E.L. 47/71	Date: March, 1980
Traced: R.J.E.	CROSS SECTION 3040	Scale: 1:500
Checked:		Plate No QH129/3040
Revised by: Date:		Sheet 4

RL 00

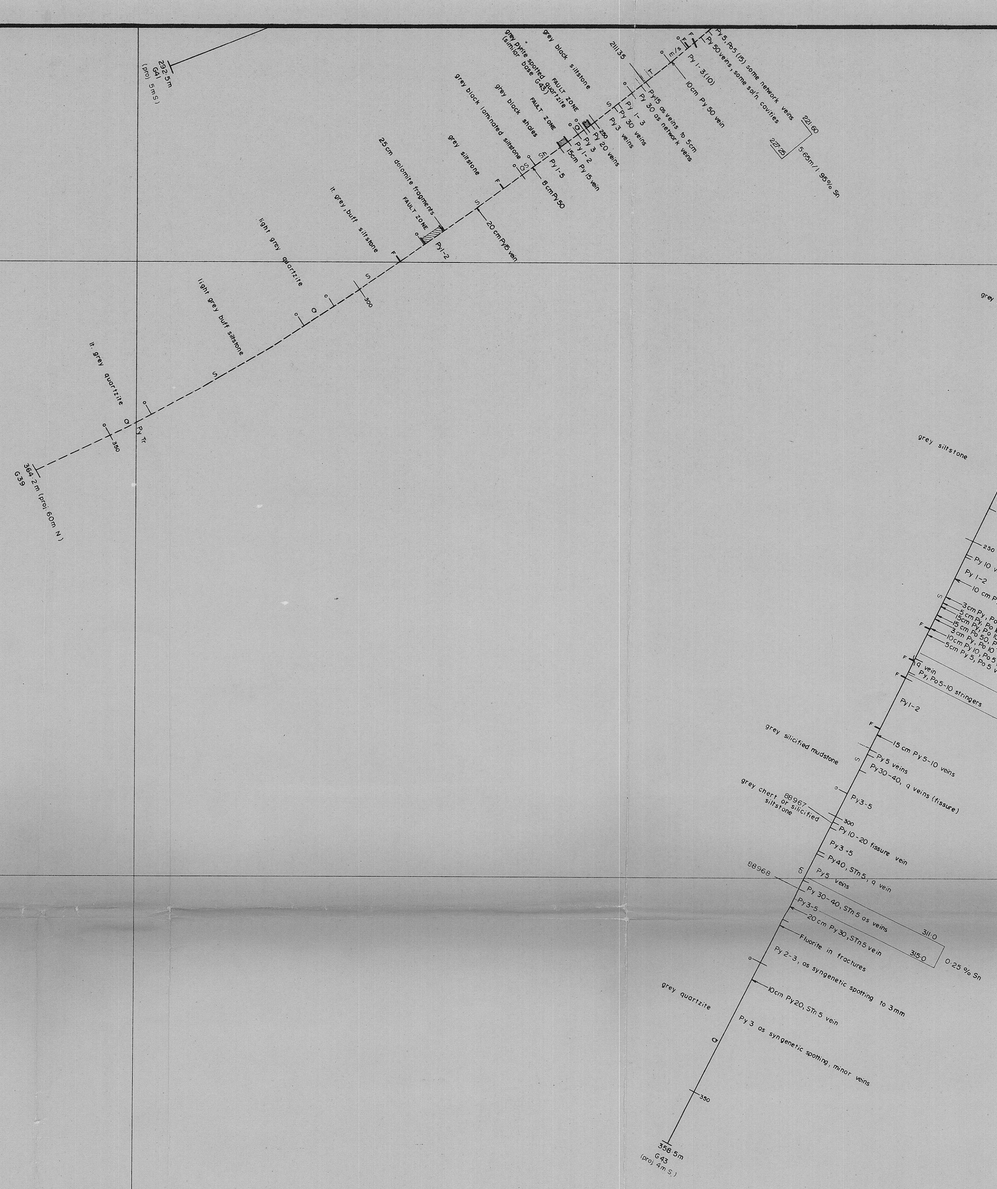
RL -100

RL -200

RL 00

RL -100

RL -200


grey quartzite
light grey bedded siltstone
lt grey buff siltstone
25cm dolomite hosted reef zone
grey siltstone
grey block siltstone
grey sheared siltstone
fault zone
grey block siltstone
grey sheared siltstone
fault zone
grey block siltstone
grey sheared siltstone
fault z

QH51-08

G 49

DISTANCE (metres)	Sn (ppm)	Ag (ppm)
114.35	< 5.00	< 5.00
115.35	1400	1.0
116.35	6450	1.0
117.35	47.00	1.0
118.35	1.600	41.0
119.35	7450	< 1.0
120.35	8.50	41.0
121.35	44.00	41.0
122.35	1850	41.0
123.35	410	1.0
124.05	52	< 1.0
124.65	85	< 1.0
125.70	1850	6.0
126.80	85	1.0
127.80	18.00	8.0
128.00	1.4	1.0
129.00	84.00	14.0
130.00	11.700	18.0
131.80	54800	7.0
132.80	38000	9.0
133.80	88000	8.0
134.80	97800	11.0
135.80	81.000	8.0
136.80	87000	11.0
137.80	18600	60.0
138.80	6.100	47.0
139.80	10800	32.0
140.80	7.900	40.0
141.80	4180	17.0
142.80	880	8.0
143.00	780	6.0
144.80	1.450	31.0
145.80	1380	9.0
146.80	1.450	30.0
147.80	8155	28.0
148.80	8700	110.0
149.80	13500	328.0
150.80	185	7.0
151.80	580	11.0
152.80	1.170	19.0
153.80	1.10	32.5
154.80	53150	18.5

G49 XRF

DISTANCE (metres)	Sn ppm	Ag ppm
158 80	1600	5.0
159 80	4200	4.0
160 80	1400	3.0
161 80	2800	3.0
162 80	1600	4.0
163 80	1400	6.0
164 80	5700	38.0
165 80	1200	1900.0
166 80	1000	190.0
167 80	2000	170.0
168 80	20000	1700.0
169 80	1400	8.0
170 80	1800	8.0
171 80	1400	6.0
172 80	1600	6.0
173 80	1400	6.0
174 80	1400	6.0
175 80	1400	6.0
176 80	1400	6.0
177 80	1400	6.0
178 80	1400	6.0
179 80	1400	6.0
180 80	1400	6.0
181 80	1400	6.0
182 80	1400	6.0
183 80	1400	6.0
184 80	1400	6.0
185 80	1400	6.0
186 80	1400	6.0
187 80	1400	6.0
188 80	1400	6.0
189 80	1400	6.0
190 80	1400	6.0
191 80	1400	6.0
192 80	1400	6.0
193 80	1400	6.0
194 80	1400	6.0
195 80	1400	6.0
196 80	1400	6.0
197 80	1400	6.0
198 80	1400	6.0
199 80	1400	6.0
200 80	1400	6.0
201 80	1400	6.0
202 80	1400	6.0
203 80	1400	6.0
204 80	1400	6.0
205 80	1400	6.0
206 80	1400	6.0
207 80	1400	6.0
208 80	1400	6.0
209 80	1400	6.0
210 80	1400	6.0
211 80	1400	6.0
212 80	1400	6.0
213 80	1400	6.0
214 80	1400	6.0
215 80	1400	6.0
216 80	1400	6.0
217 80	1400	6.0
218 80	1400	6.0
219 80	1400	6.0
220 80	1400	6.0
221 80	1400	6.0
222 80	1400	6.0
223 80	1400	6.0
224 80	1400	6.0

G60 XRF

DISTANCE (metres)	Sn ppm	Ag ppm
181 45	5.00	5.00
181 55	200	5.0
181 70	800	< 5.0
182 00	1800	2.0
182 20	10000	< 5.0
183 00	1900	< 5.0
183 50	1400	5.0
183 70	800	5.0
185 00	240	< 5.0
186 90	< 5.00	< 5.00
187 50	440	< 2.0
187 95	800	< 5.0
188 25	1000	< 5.0
225 15	< 5.00	< 5.00
226 70	< 10	< 5.0
226 78	10	< 5.0
227 15	10	5.0
227 50	< 10	5.0
228 15	1100	< 5.0
228 85	750	5.0
229 15	180	< 5.0
230 15	120	< 5.0
230 80	40	< 5.0
231 50	10	5.0
232 00	< 5.00	< 5.00
232 70	< 10	< 5.0
233 00	25	< 5.0
234 00	< 10	< 5.0
235 00	< 10	5.0
235 65	< 10	
241 80	< 5.00	< 5.00
241 70	15	< 5.0
242 40	< 10	20.0
242 90	< 10	10.0
243 30	< 5.00	< 5.00
244 30	< 10	< 5.0
245 30	< 10	< 5.0
246 30	< 10	< 5.0
247 15	< 10	< 5.0
248 00	< 10	< 5.0
248 00	32	< 5.0
257 70	< 10	< 5.0
258 00	30	< 5.0
259 00	32	< 5.0
270 30	30	< 5.0
271 00	1900	40.0
271 60	4200	< 5.0
272 65	30	< 5.0

G 45

DISTANCE (metres)	Sn (ppm)	Ag (ppm)
173 75	< 5.00	< 5.00
174 75	1400	1.0
175 75	6.50	2.5
176 75	1850	1.5
177 75	7.00	4.0
178 75	1100	3.0
179 75	680	3.0
180 75	760	2.0
181 75	1.50	3.0
182 75	2.50	2.0
183 75	1.50	2.0
184 75	780	1.0
185 75	3700	8.0
186 75	16.00	26.0
187 75	8.00	4.0
188 75	12.00	88.0
189 75	1.900	1.0
190 75	780	1.0
191 75	8700	3.0
192 75	39.00	5.0
193 75	11.50	4.0
194 75	19.00	29.0
195 75	19.00	195.0
196 75	4.10	79.0
197 75	8.50	9.0
198 75	80	3.0
199 75	40	8.0
200 75	118	11.0
201 75	200	87.0
202 75	130	18.0
203 75	84	10.0
204 75	220	11.0
205 75	250	11.0
206 75	80	16.0
207 75	68	19.0
208 75	48	7.0
209 75	200	< 1.0
210 75	10	2.0
211 75	4	2.5
212 75	18	2.0
213 75	40	8.5
214 75	45	8.5
215 75	40	8.5
216 75	110	5.0
217 75	20	2.0
218 75	23	2.0
219 75	28	2.0
220 75	28	2.0
221 75	150	5.0
222 75	90	4.0
223 75	110	9.5
224 75	85.0	15.5
224 85	5.00	5.00
225 00	90	6.5
226 00	80	6.5
227 00	60	< 1.0
228 00	40	< 1.0
229 00	32	5.0
230 00	30	5.0
231 00	310	5.0
232 00	150	5.0
233 00	100	5.0
234 00	40	5.0
235 00	85.0	8.0
236 00	115	5.0
237 00	34	0.0
238 00	38	9.0
239 00	68.00	7.0
240 00	86.00	6.0
243 00	28	< 1.0
244 00	240	1.5

RL 200

100

Reference Plane

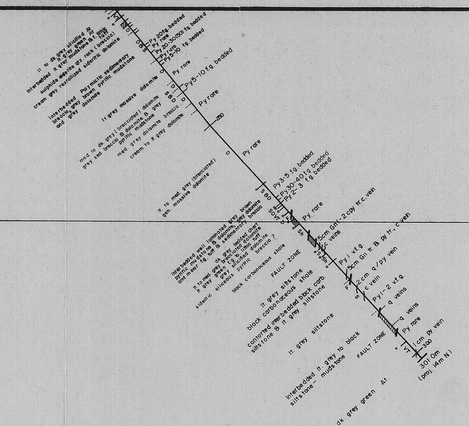
5 cm

022160

Aberfoyle Exploration Pty Ltd

Geology: C.H.Y.	NORTH WEST TASMANIA
Drawn: R.J.E.	QUEEN HILL E.L.47/71
Traced: R.J.E.	CROSS SECTION 3060
Checked:	
Revised by: C.H.Y. Date: 25/11/80 M/5/80	

Location code:
Date: August, 1979
Scale: 1:500
Plate No QH129/3060 SHEET 1



Index to Sheets

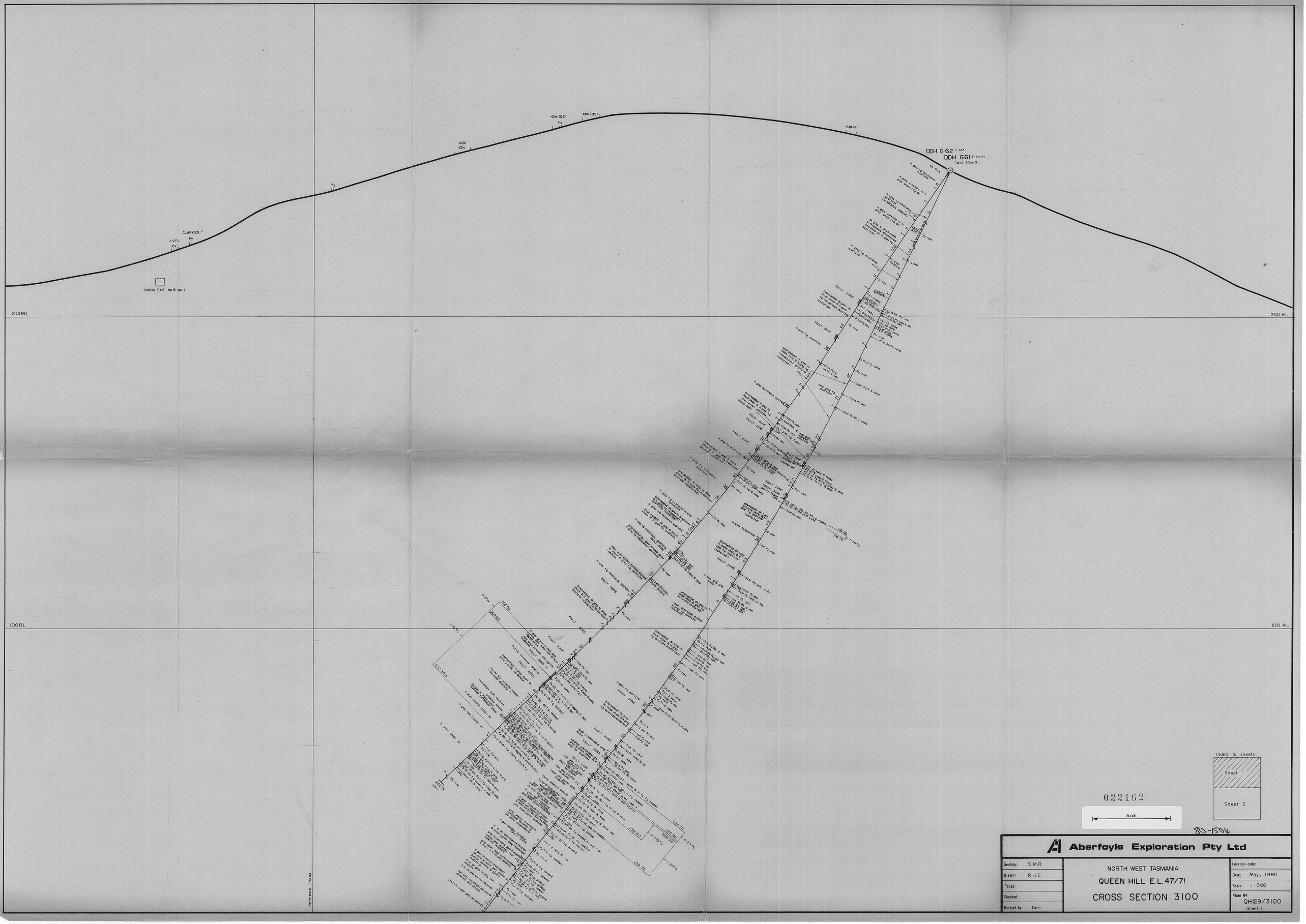
Sheet 1

Sheet 2

022161

5 cm

Aberfoyle Exploration Pty Ltd		
Geology: S.R.	NORTH WEST TASMANIA	Location code:
Drawn: R.J.E.	QUEEN HILL E.L. 47/71	Date: April, 1980
Traced: R.J.E.	CROSS SECTION 3060	Scale: 1:500
Checked:		Plate No QH129/3060 Sheet 2
Revised by: Date:		

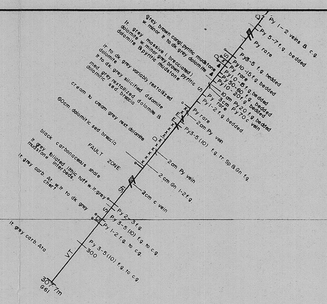


022162

80-1504

Aberfoyle Exploration Pty Ltd

Geology: S.M.R.	NORTH WEST TASMANIA	Location code:
Drawn: R.J.E.	QUEEN HILL E.L.47/71	Date: May, 1980
Traced:	CROSS SECTION 3100	Scale: 1:500
Checked:		Plate Nº QH129/3100 Sheet 1
Revised by: Date:		



00 RL

RL 00

-100 RL

RL -100

-200 RL

RL -200

Reference Plane

Index to sheets

Sheet 1

Sheet 2

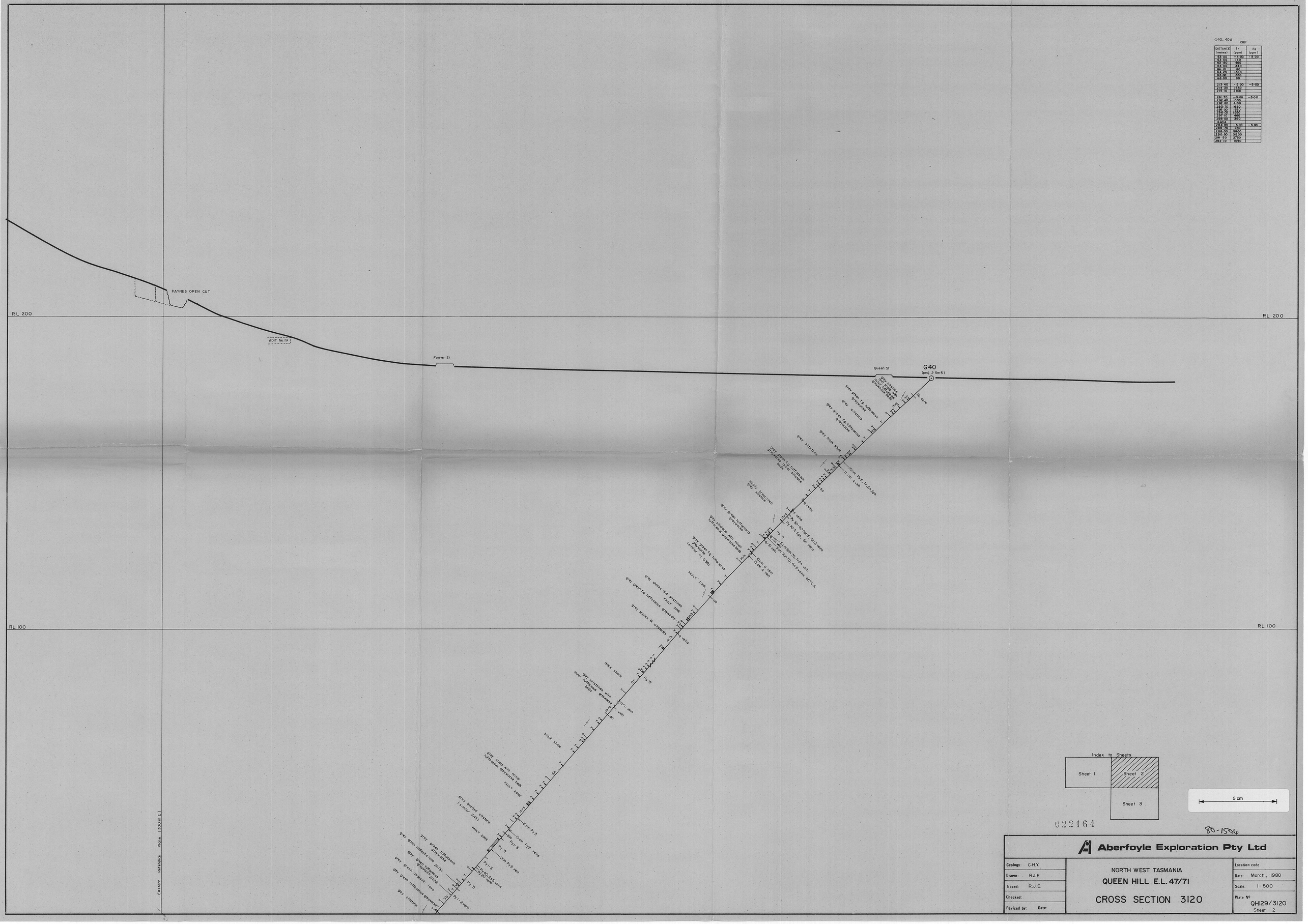
022163

5 cm

80-1504

Aberfoyle Exploration Pty Ltd

Geology: S.M.R.	NORTH WEST TASMANIA	Location code:
Drawn: R.J.E.	QUEEN HILL E.L.47/71	Date: May, 1980
Traced:	CROSS SECTION 3100	Scale: 1:500
Checked:		Plate No QH129/3100 Sheet 2
Revised by: Date:		



G40, 40A

XRF

DISTANCE (metres)	Sn (ppm)	Ag (ppm)
63.00	-5.00	-5.00
63.50	140	
63.80	400	
64.00	340	
64.10	80	
64.25	1500	
65.00	550	
66.00	90	
213.40	-5.00	-5.00
214.30	1650	
215.10	2100	
291.70	-5.00	-5.00
292.40	1000	
292.80	4100	
293.70	1650	
296.00	1550	
296.00	1550	
297.10	460	
298.00	360	
0.00A		
282.80	-5.00	-5.00
285.70	240	
286.00	5600	
290.50	3800	
291.50	2750	
292.10	1050	

022164

80-1504

Aberfoyle Exploration Pty Ltd

Geology: C.H.Y.	NORTH WEST TASMANIA	Location code:
Drawn: R.J.E.	QUEEN HILL E.L. 47/71	Date: March, 1980
Traced: R.J.E.		Scale: 1:500
Checked:	CROSS SECTION 3120	Plate No QH129/3120 Sheet 2
Revised by: Date:		


RL 00
RL 00
RL-100
RL-100
RL-200
RL-200
Eastern Reference Plane (300m E)
Index to Sheets
Sheet 1
Sheet 2
Sheet 3
5 cm
022165
80-1504
Aberfoyle Exploration Pty Ltd
Geology: C.H.Y.
Drawn: R.J.E.
Traced: R.J.E.
Checked:
Revised by: Date:
NORTH WEST TASMANIA
QUEEN HILL E.L. 47/71
CROSS SECTION 3120
Location code:
Date: March, 1980
Scale: 1:500
Plate Nº QH129/3120
Sheet 3

G19 SPEC.		
DISTANCE (metres)	Sn (ppm)	Ag (ppm)
50-90	- 5.00	- 5.00
91-92	200	4.5
92-93	800	4.5
93-94	600	4.5
95-98	1100	6.0
98-99	700	4.5
92-96	- 5.00	- 5.00
96-97	600	1.5
97-98	800	3.5
98-99	1800	8.0
99-100	1000	8.0
100-101	1000	8.0
100-101	1200	4.5
104-105	- 5.00	- 5.00
105-106	600	9.0
106-107	1500	13.0
106-108	2400	8.0
107-108	1800	35.0
108-109	8800	638.0
109-110	1200	8.0
109-111	4100	89.0
115-82	- 5.00	- 5.00
116-74	4800	302.0
117-83	1800	11.0
118-28	800	10.5
119-48	3700	98.5
120-49	1200	29.5
121-50	600	29.5
130-51	1500	26.5
131-06	- 5.00	- 5.00

G20 SPEC.		
DISTANCE (metres)	Sn (ppm)	Ag (ppm)
130-76	- 5.00	- 5.00
131-87	500	4.5
131-88	600	8.0
132-86	2800	6.5
133-81	1700	5.0
134-14	1800	2.5
135-13	1700	2.5
136-89	500	4.0
137-77	500	7.5
138-88	1200	3.5
139-90	1800	1.5
140-21	100	1.5
141-84	100	2.5
142-85	100	5.5
142-65	100	5.5
143-25	217000	9.5
144-17	1300	4.5
144-79	428000	16.5
145-69	142000	9.5
145-81	134000	8.5
146-24	13600	8.0
147-82	1900	6.5
148-74	500	6.5
149-59	- 5.00	- 5.00

RL 200

RL 100

Reference Plane

Road

<bs (Qs)

Trenches ?

collapsed pit

perf collapsed Adit

Adit No.22

Poverty Point Pit
(proj. 15m N)
138 ¾ Sn

DDH G19
(proj. 8.0m N)

MONTANA No.2 MAIN SHAFT
situated 15m S of section.

(Collar G27 see Sec. 3500)

DDH G20, 37
(proj. 6m N)

MAIN SHAFT

MONTANA No. 2

Index to sheets

Sheet 1	Sheet 3
Sheet 2	Sheet 4

5 cm

022166

89-150K

Aberfoyle Exploration Pty Ltd

Geology:	
Drawn: R.J.E.	
Traced: R.J.E.	
Checked:	
Revised by: Date:	

NORTH WEST TASMANIA
QUEEN HILL E.L. 47/71
CROSS SECTION 3480

Location code:	
Date: May, 1980	
Scale: 1:500	
Plate No	QH 129/3480 Sheet 3

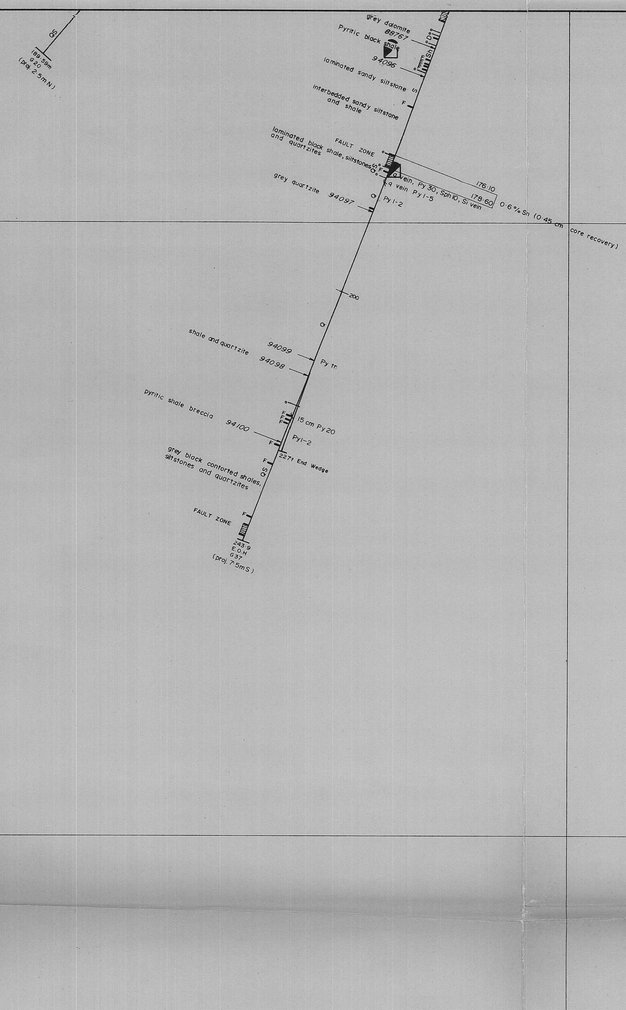
RL 00

RL -100

RL - 200

Reference Plane

Eastern Reference Plane (300m E)



Index to sheets

Sheet 1	Sheet 3
Sheet 2	Sheet 4

022167

80-150

Aberfoyle Exploration Pty Ltd

Geology:	NORTH WEST TASMANIA	Location code:
Drawn: R.J.E.	QUEEN HILL E.L.47/71	Date: May, 1980
Traced: R.J.E.	CROSS SECTION 3480	Scale: 1:500
Checked:		Plate No QH 129/3480 Sheet 4
Revised by: Date:	5 cm	



022168

Aberfoyle Exploration Pty Ltd

Geology:	NORTH WEST TASMANIA	Location code:
Drawn: R.J.E.	QUEEN HILL E.L. 47/71	Date: May, 1980
Traced: R.J.E.	CROSS SECTION 3500	Scale: 1 : 500
Checked:		Plate Nº QH129/3500
Revised by: Date:		

5 cm

360000 E
250 E
500 E
750 E
1000 E
1250 E
1500 E
1750 E
362000 E
5361250 N
1000 N
750 N
500 N
250 N
5360000 N

grey f.mg (mic) qtzite
grey f.mg (mic) (sil.) qtzite
f.mg homog. qtzite
grey black f.cg qtzite with qtz. veins
grey f.g. (mic.) fol. sts.
grey sl.
f.mg. qtzite
bedded mg qtzite with thin beds of grey vfg sl.
thin (<1cm) gn/qtz. veins in qtzite/sl.
meagre mg qtzite float coverage
grey f.mg (mic) (sil.) qtzite
grey f.mg homog. qtzite (silic.)
STRIKE (090°)
thin (~2cm) gn/qtz veins in qtzite/sl.
I.S. 286°)
Mine dump 338476
To Golf Course
massive bedded grey mg qtzite with thin qtz veins
rare float grey mg (mic) qtzite
grey f.mg (mic) qtzite
grey f.cg (mic.) qtzite
grey white bedded fg qtzite with gn veins ± sph
I.S. 230°)
v. wealth grey white fg qtzite/sts.
v. large boulder of vein qtz.
Tailings
grey black f.mg qtzite with gn. and sph. veins and minor py assoc. with the gn
grey fol. sts and minor massive qtzite
grey mg. qtzite
massive qtzite
grey white massively bedded f.mg. qtzite
Shaft
Adit
black sl.

ML 43M/73
ML 50M/76
ML 52M/76
ML 51M/76

022169
80-159

G.N. M.N.
11°14'00"
Magnetic north correct 1978 annual change easterly by 04'

SCALE
metres 0 20 40 60 80 100 metres
5 cm

80/12	00/12	20/12
80/00	00/00	20/00
80/87	00/87	20/87

Index to adjoining sheets

Aberfoyle Exploration Pty Ltd

Geology: J.R.T.	NORTH WEST TASMANIA	Location code:
Drawn:	QUEEN HILL AREA	Date: June, 1980
Traced: R.J.E.	SURFACE GEOLOGY	Scale: 1:2,500
Checked:		Plate No QH161-00/00
Revised by: Date:		

Aberfoyle Exploration Pty Ltd

Geology: J. R. T.	NORTH WEST TASMANIA	Location code:
Drawn:	QUEEN HILL AREA	Date: June, 1980
Traced: R.J.E.	SURFACE GEOLOGY	Scale: 1:2,500
Checked:		Plate No QH161 - 00/12
Revised by: Date:		

022170 80-154

Zeehan

Oonah Hill

Queen Hill

MONTANA DAM

QUEEN No.5 SHAFT

Queen No.4 Shaft

N° 2 MONTANA SHAFT

POVERTY POINT Open Cut

Old Mine Foundation

Old Mill

Old Reef Line

Old Battery

Old Coarse Lode

Golf Coarse Lode

Cemetery

Core Storage

ABERFOYLE EXP. Office

Tailings

Collapsed Adits

Trenches

Pits

Shafts

Dwellings

Mine Workings

Mine Tailings Excavated & ready for treatment

Mine Tailings Excavated & not ready for treatment

Mine Tailings Not Excavated

Mine Tailings Reworked

Mine Tailings Reworked & Excavated

Mine Tailings Reworked & Not Excavated

Mine Tailings Reworked & Partly Excavated

Mine Tailings Reworked & Partly Not Excavated

Mine Tailings Partly Excavated & ready for treatment

Mine Tailings Partly Excavated & not ready for treatment

Mine Tailings Partly Not Excavated

Mine Tailings Partly Reworked

Mine Tailings Partly Reworked & Excavated

Mine Tailings Partly Reworked & Not Excavated

Mine Tailings Partly Reworked & Partly Excavated

Mine Tailings Partly Reworked & Partly Not Excavated

Mine Tailings Partly Reworked & Partly Excavated & ready for treatment

Mine Tailings Partly Reworked & Partly Excavated & not ready for treatment

Mine Tailings Partly Reworked & Partly Not Excavated

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & ready for treatment

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & not ready for treatment

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & ready for treatment

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & not ready for treatment

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & ready for treatment

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & not ready for treatment

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & ready for treatment

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & not ready for treatment

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & ready for treatment

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & not ready for treatment

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & Not Excavated

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & Not Excavated & ready for treatment

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & Not Excavated & not ready for treatment

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & ready for treatment

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & not ready for treatment

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & ready for treatment

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & not ready for treatment

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & ready for treatment

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & not ready for treatment

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & ready for treatment

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & not ready for treatment

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & ready for treatment

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & not ready for treatment

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & ready for treatment

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & not ready for treatment

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & ready for treatment

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & not ready for treatment

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & ready for treatment

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & not ready for treatment

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & ready for treatment

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & not ready for treatment

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & ready for treatment

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & not ready for treatment

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & ready for treatment

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & not ready for treatment

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & ready for treatment

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & not ready for treatment

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & ready for treatment

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & not ready for treatment

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & ready for treatment

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & not ready for treatment

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & ready for treatment

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & not ready for treatment

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & ready for treatment

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & not ready for treatment

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & ready for treatment

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & not ready for treatment

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & ready for treatment

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & not ready for treatment

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & ready for treatment

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & not ready for treatment

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated

Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & ready for treatment

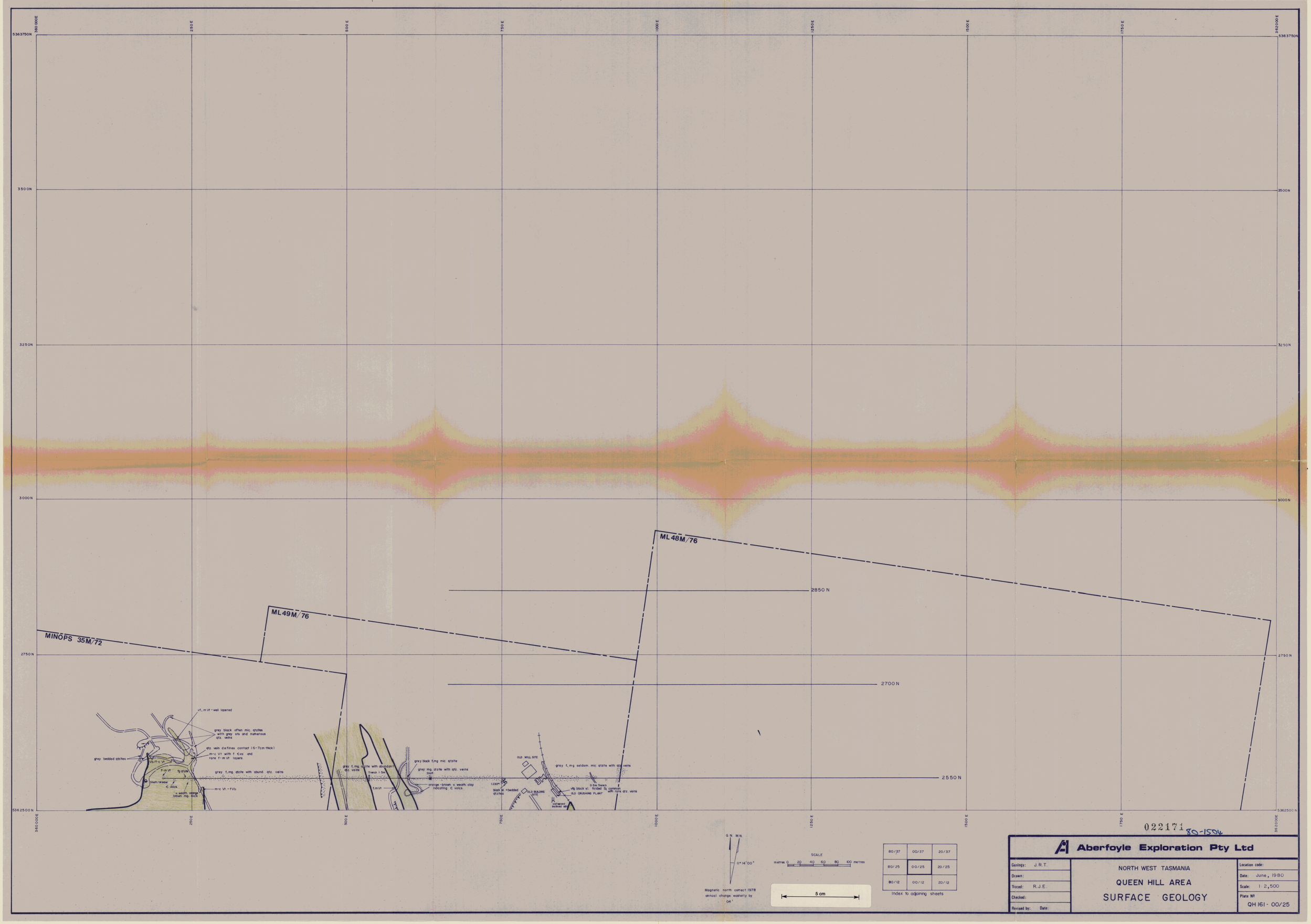
Mine Tailings Partly Reworked & Partly Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & not ready for treatment

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & ready for treatment

Mine Tailings Partly Reworked & Partly Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & Not Excavated & not ready for treatment

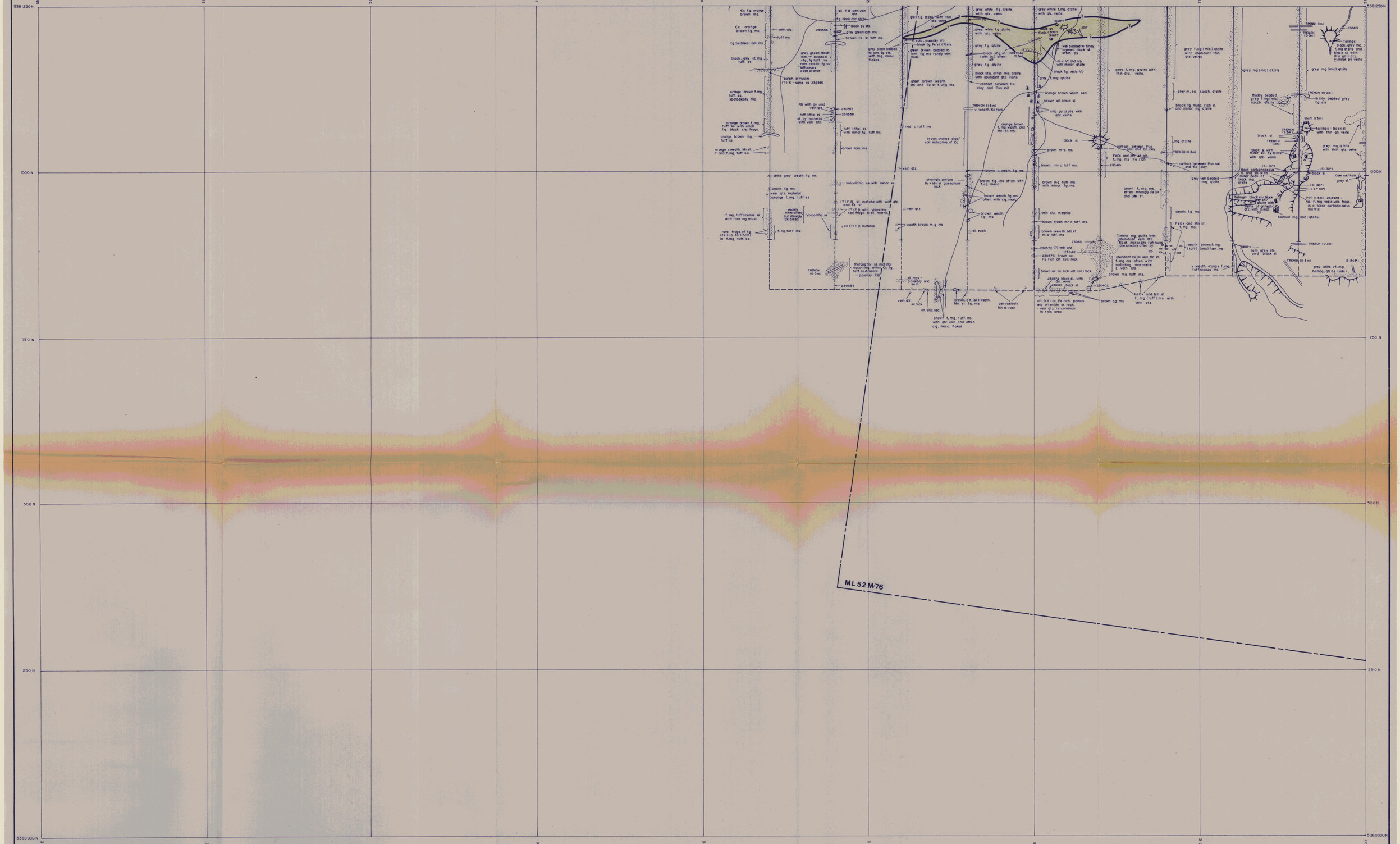
Mine Tailings Partly Reworked & Partly Not Excavated &

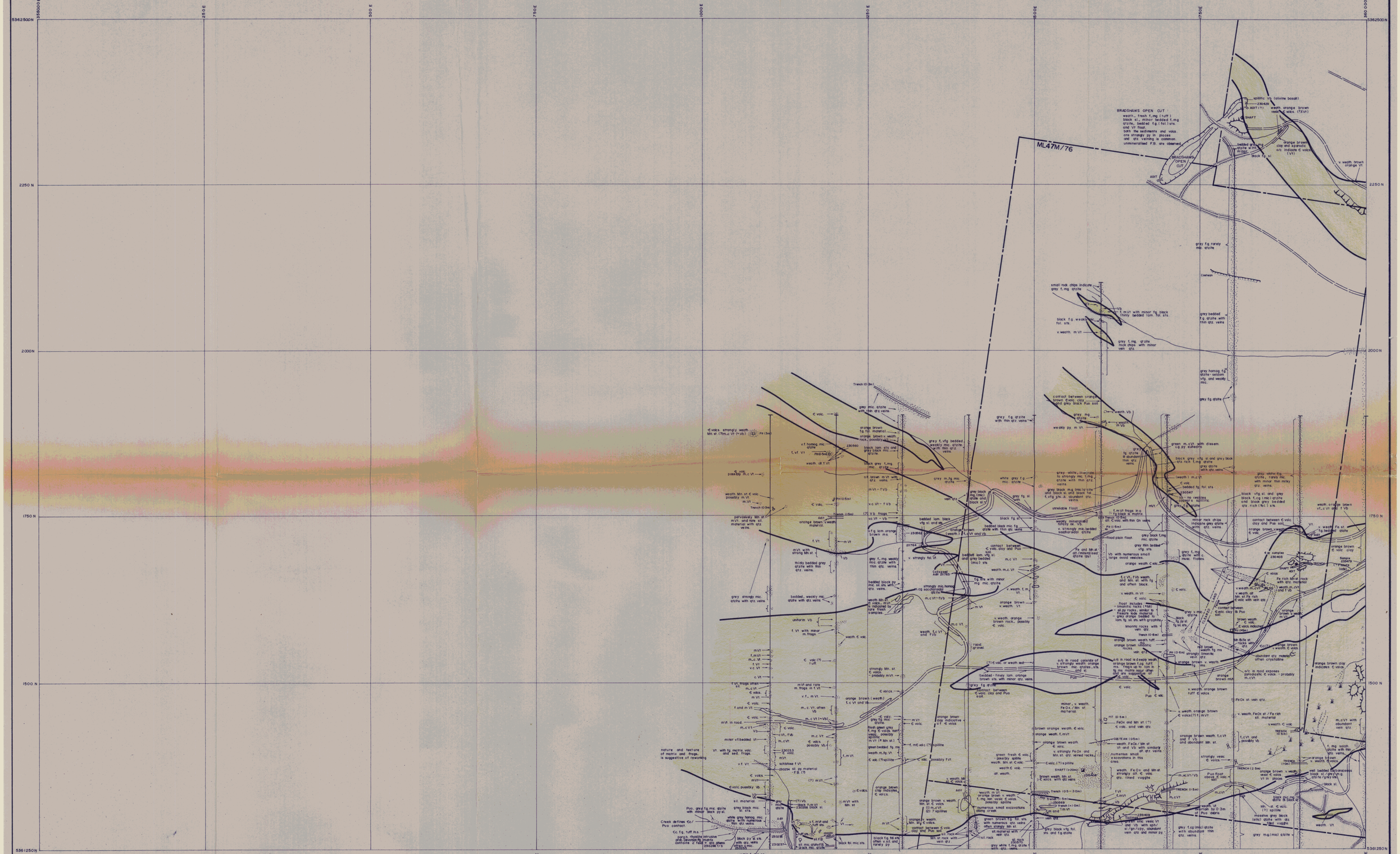


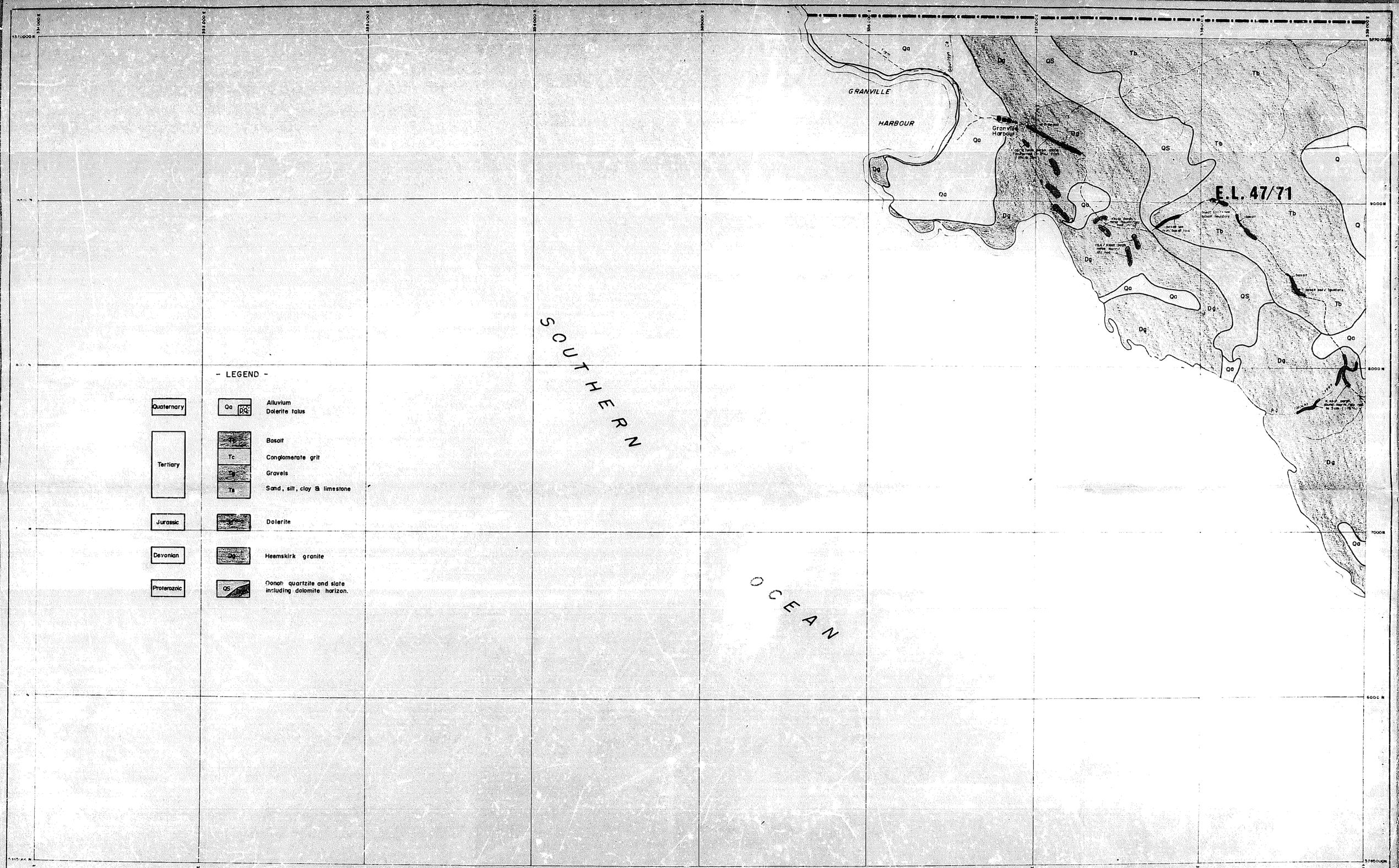
022171 80-1504

Aberfoyle Exploration Pty Ltd

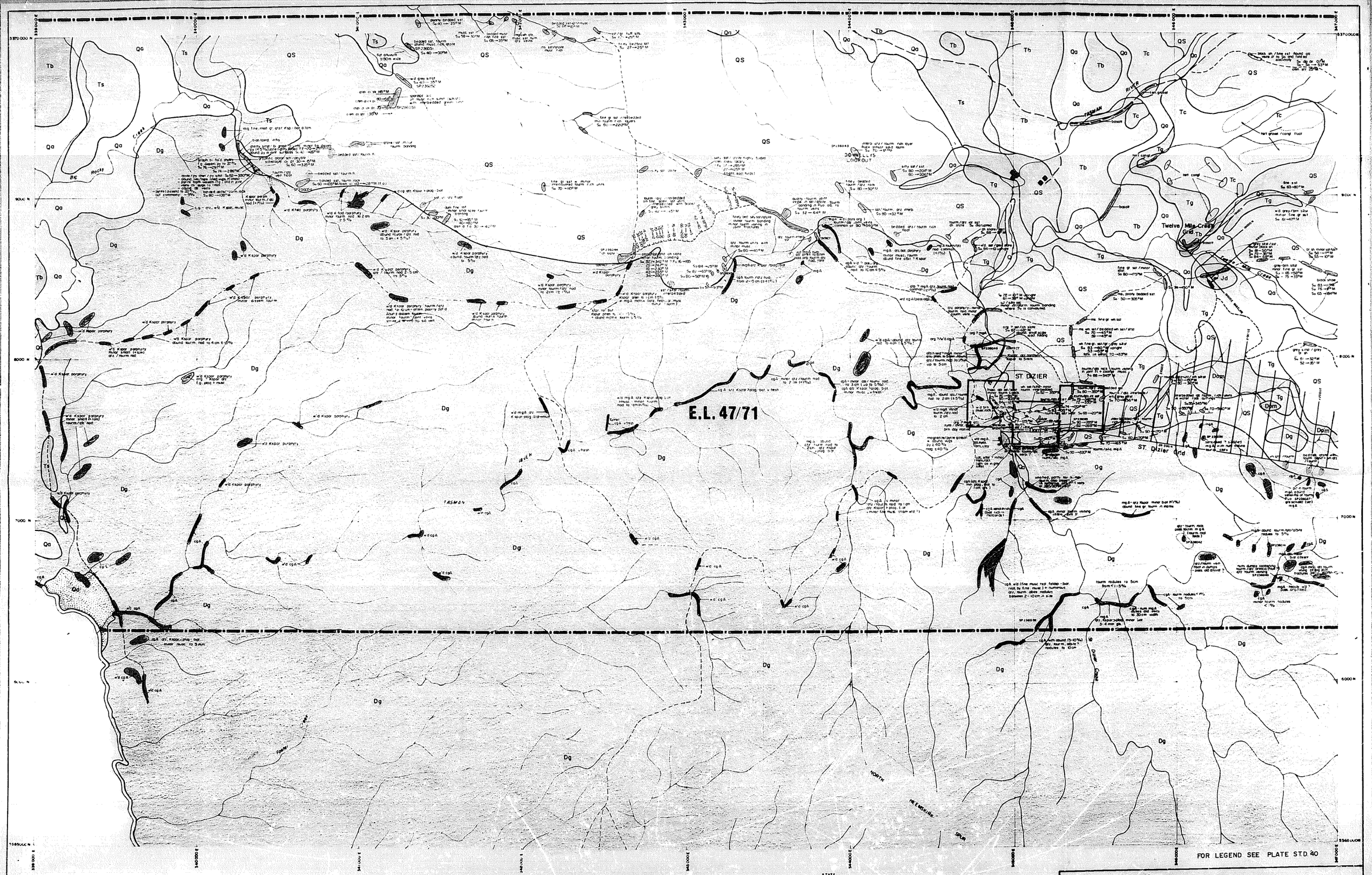
Geology: J.R.T.	NORTH WEST TASMANIA	Location code:
Drawn:	QUEEN HILL AREA	Date: June, 1980
Traced: R.J.E.	SURFACE GEOLOGY	Scale: 1:2,500
Checked:		Plate Nº QH 161 - 00/25
Revised by: Date:		


358000 E
250 E
500 E
750 E
1000 E
1250 E
1500 E
1750 E
360000 E
5361250 N
1000 N
750 N
500 N
250 N
5360000 N
ML 52 M/76
Cc fg orange brown ms.
Cc orange brown fg. ms
vein qtz
tuff ms
fg bedded - lam. ms
black, grey vf. mg. tuff ss
grey green brown lam — bedded vfg. fg tuff ms. rare clastic fg. ss
tuffaceous appearance
porph. intrusive (?) C - same as 230566
orange brown f.mg. tuff ss. sporadically mic.
orange brown f.mg. tuff ss with small fg. black sts. frags.
orange brown mg. tuff ss.
orange v.weath. Mn st. f and f.mg. tuff s s
sil. F.B. with vein qtz
fg. black mic qtzite
black py sts.
grey green ash ms.
brown Fe st tuff ms.
230556
grey black bedded lam fg sts. with m.g. musc. flakes
FB with py and vein qtz.
230557
230558
tuff. lithic ss with minor fg. tuff ms.
brown lam. ms
red c tuff ms
brown orange clay/ soil indicative of Cc
vein qtz.
brown v. weath. fg. ms
brown fg. ms often with f.cg musc.
brown weath fg. ms often with c.g. musc.
brown weath. fg. ms
sil rock
grey white fg qtzite with qtz. veins
grey fg. qtzite with thin qtz veins
grey white fg qtzite with qtz veins
grey fg. qtzite
black vf.g sh. (with sh.) often clf
grey f.g. qtzite
black vf.g. often mic. qtzite with abundant qtz. veins
contact between Cc. clay and Puo soil
TRENCH (1.5 m) v. weath. Cc rock
orange brown weath. sed.
brown sil. black sl
silic. py qtzite with qtz. veins
black sl.
brown m-c. ms
brown m-c tuff ms.
brown mg. tuff ms with minor f.g. ms.
vein qtz. material
brown fresh m-c tuff. ms.
brown weath. Mn st m.c tuff. ms
230411
230572 (?) vein qtz
230482
230573 brown ox. Fe rich alt. (sil.) rock
brown ox Fe rich alt. (sil.) rock
230574 black sl. with Qtz. veins
230401 black sl.
230402
grey white f.mg. qtzite with qtz. veins
SHAFT 230571 SHAFT
ADIT
well bedded to finely layered black sl. often py
m-c Vf and Vb with minor qtzite
black f.g. vesic Vb
grey f.mg. qtzite
grey f.mg. qtzite with thin qtz. veins.
contact between Puo soil and Cc clay
FeOx and Mn st. clf f.mg ms Fe rich
230410
brown f., mg ms. often strongly FeOx and Mn st.
minor mg. qtzite with abundant vein qtz float. micro-vuggy rutt rocks presumably after py
abundant FeOx and Mn st. f.mg. ms. often with radiating. marcasite & vein qtz.
brown mg. tuff ms.
FeOx and Mn st f.mg. (tuff) ms. with vein qtz.
brown cg. ms
grey f.cg (mic.) qtzite with abundant thin qtz. veins
grey m.-cg. sooch qtzite
black fg music. rich sl. and minor mg qtzite
mg. qtzite
TRENCH (0.3m)
contact between Puo soil and Cc. clay
grey well bedded mg. qtzite
weath. fg. ms
FeOx and Mn st f. mg ms.
weath. brown f. mg. (tuff.) (mic) lam. ms
v. weath. orange f. mg. tuffaceous ms
TRENCH (0.5 m)
grey white vf. mg. homog qtzite (silic)
TRENCH (3m)
TRENCH (0.3m)
230413
Tailings black, grey mic. f. mg qtzite and black sl. with thin qtz. veins + minor py veins
grey mg (mic) qtzite
grey mg (mic) qtzite
TRENCH (0-2m)
thickly bedded grey f. mg (mic) sooch qtzite
thinly bedded grey fg. sts
South (7.5m)
TRENCH (1.5m)
tailings - black sl. with thin qtz. veins
TRENCH (2m)
black sl
grey mg qtzite with thin qtz. veins
black sl with minor sil. py qtzite with qtz. veins
(S - 10°)
black carbonaceous sl. and sh. with minor beds of black mg qtzite
black sl.
(S - 30°)
(S - 140°)
(S - 90°)
Open cut 4.6m grey sl.
PIT (1.5m) 233478 - fol. f.-mg. vesic. voic. frags. in c. black carbonaceous matrix
Tailings - black sl./black grey sh. qtzite with traces of qtz. veins and minor py
bedded mg. (mic) qtzite.
TRENCH (0.3m)
lam. grey sts. and black sl.
TRENCH (0.5 m)
(S - 84°)
grey white vf. mg. homog qtzite (silic)
sil. rock - possibly silic. sed.
vein qtz
sil rock
alt silic. sed.
brown, alt (sil.) weath. Mn st. fg. ms
pervasively Mn st rock
brown f. mg. tuff ms. with qtz. vein and often c.g. musc. flakes
alt (sil.) ox. Fe rich. porous and often Mn. st rock. vein qtz. is common in this area
strongly porous Fe + Mn st. gossanous rock
(?) F.B. sil. material with vein qtz. and Fe. st.
(?) F.B. with volcaniic sed. frags. in sil. matrix
(?) vein qtz
weath. brown m. g. ms
sill (?) F.B. material
Volcanic ss with minor ss.
weath. fg. ms
vein qtz. material
orange f. mg. tuff ss
weakly mineralised, but strongly carbonated
Volcanic ss
f. mg. tuffaceous ss with rare mg. musc.
rare frags of fg sts. (up to 1.5cm) in f.mg. tuff ss.
f. cg. tuff ms.
TRENCH (0.5m)
thoroughly sil. material occurring within Cc fg tuff sediments - possibly F.B.
230559
G.N.
M.N.
11° 14' 00"
Magnetic north correct 1978 annual change easterly by 0.4'
SCALE
metres 0 20 40 60 80 100 metres
5 cm
60/12
60/00
60/87
80/12
80/00
80/87
00/12
00/00
00/87
Index to adjoining sheets
022172
Aberfoyle Exploration Pty Ltd
Geology: J.R.T.
Drawn:
Traced: R.J.E.
Checked:
Revised by: Date:
NORTH WEST TASMANIA
QUEEN HILL AREA
SURFACE GEOLOGY
80-1504
Location code:
Date: June. 1980
Scale: 1: 2,500
Plate No
QH 161 - 80/00


2350 E
2500 E
2750 E
3000 E
3250 E
3500 E
3750 E
4000 E
5362500 N
2250 N
2000 N
1750 N
1500 N
5361250 N
ML47M/76
BRADSHAWS OPEN CUT
weath., fresh f.mg (tuff) black sl., minor bedded f.mg qtzite, bedded f.g. (fol) sts. and Vf float. both the sediments and volcs are strongly py in places and qtz. veining is common. unmineralised F.B. are observed.
BRADSHAWS OPEN CUT
AD/T
SHAFT
spilitic Vb (olivine basalt)
230429
AD/T (?)
weath. orange brown vesicular volcs. (?) Vf)
bedded grey f.g. qtzite with m.f. m. clast
black f.g. sl.
orange brown clay and sporadic o/c indicate € volcs (Vf)
v. weath brown orange Vf.
grey f.g. rarely mic. qtzite
Contact
small rock chips indicate grey f. mg. qtzite
Vb
f.m.vf with minor fg. black thinly bedded lam. fol. sts.
black f.g. weakly fol. sts.
v. weath. m Vf
grey f.mg. qtzite rock chips with minor vein qtz.
grey bedded f.g. qtzite with thin qtz. veins
grey homog. f.g. qtzite: seldom vfg. and weakly mic.
grey f.g. qtzite
contact between orange brown € volc. clay and grey black Puo soil
weath. Vb
grey mg. qtzite
weath. m Vb
weakly py. m Vf.
grey f.g. qtzite with thin qtz. veins
grey f.g. qtzite with abundant thin qtz. veins
green m. cVf with dissem. f.g. py. euhedra
black grey vfg. sl. and grey qtz. rich f.mg. qtzite
grey qtzite with qtz. veins
(weath.) m. cVf
€ volc. bedded fg. fol. sts
230547
Vb - no vesicles appears spilitic
grey f.g. qtzite
grey white f.g. qtzite, f. rarely mic. with minor thin milky qtz. veins.
black vfg. sl. and grey black f. cg (mic) qtzite and black grey bedded qtz. rich (fol.) sts.
weath. orange brown vf. c Vf and f Vb
minor rock chips indicate grey qtzite with qtz. veins
contact between € volc. clay and Puo soil.
v. weath. Fe st. in bedded qtzite
orange brown clay and sporadic o/c indicate € volcs (Vf)
Trench (10-3m)
grey mic. qtzite with thin qtz. veins.
€ volc.
orange brown fg. fol. material
orange brown v. weath. rock, possibly
€ volcs. strongly weath. Mn st. (?fm. c Vf (+Vb)
Pit (3m)
grey f. vfg bedded weakly mic. qtzite with thin qtz. veins
v. f. homog. mic. qtzite
230560
black lam. sts and grey black mic. qtzite
f. vf. Vf
RED SOIL
weath. dk f. Vf
black grey f. mg. mic. qtzite
sil. brown m Vf with qtz. veins.
m Vf - f Vb
grey m. fg. mic. qtzite
€ volc. possibly m. c Vf
weath. Mn. st. € volc possibly m. Vf
m. Vf
Trench (10-3m)
pervasively Mn. st. m Vf. and rare sil. material with qtz veins.
€ volc.
grey (10-5m)
Trench (15m)
Adit
orange brown € weath. material.
€ volc.
v. c Vf - f Vb
(?) Vb frogs
vc. Vf - Vb
f. Vf.
m Vf
m Vf. with strong Mn st.
Vb
thinly bedded grey qtzite with thin qtz. veins.
grey f. mg. weakly mic. qtzite with thin qtz. veins.
grey strongly mic. qtzite with qtz veins.
bedded, weakly mic. qtzite with qtz. veins
bedded block py mic. sil. sts. with qtz. veins.
weath. Mn st. € volcs., m Vf. is replaced by rare fresh samples
uniform Vb
f. Vf with minor m. frogs.
weath. € volc
€ volc (?) tuff
m Vf
f, m Vf
m. c. Vf
f. Vf
v. c. Vf
c Vf
f Vf, frogs often ss
m. c. Vf - € volcs
m Vf
€ volc.
m Vf in road.
m. c Vf
Vb
c Vf, f Vb
minor vf. bedded Vf
Vf with fg. matrix volc and sed. frogs.
nature and texture of matrix and frogs, is suggestive of reworking
v. f. Vf
€ volcs
m Vf
€ volc possibly Vb
sil. material
grey black mic. qtzite with minor black py st.
Creek defines Co./ Puo contact
Cc. f.g. tuff m.s.
porph. rhyolite intrusive prob. Devonian fg. matrix contains 2" fldsp. phenos
230286 f/S
Puo. grey f.g. mic. qtzite with minor black py st.
white grey homog. mic. qtzite with numerous thin qtz. veins.
black py. fg. sts. with qtz. veins
v. mic. f. mg. ss with py. ogging.
Adit
orange brown € weath. material.



GRANVILLE
HARBOUR
Granville Harbour
E.L. 47/71
SOUTHERN
OCEAN
Qa
Dg
QS
Tb
Q
- LEGEND -
Quaternary
Qa Alluvium
DQ Dolerite talus
Tertiary
Tb Basalt
Tc Conglomerate grit
Tg Gravels
Ts Sand, silt, clay & limestone
Jurassic
Dolerite
Devonian
Dg Heemskirk granite
Proterozoic
QS Oonah quartzite and slate including dolomite horizon.
FOR LEGEND SEE PLATE STD 40
Base sheet enlarged from Tasmanian Lands Dept. Tour
Magnetic north correct 1979 moves easterly by 0.2° in three years
Aberfoyle Exploration
Geology J. W.
Drawn J. W.
Traced R. J. E.
Checked
Revised by Date
NORTH WEST TASMANIA
QUEEN HILL E.L.47/71
ST. DIZIER AREA
GEOLOGICAL MAP
Location code
Date April, 1980
Scale 1:10,000
Plate No. STD 42 / 331/365



FOR LEGEND SEE PLATE ST.D. 40

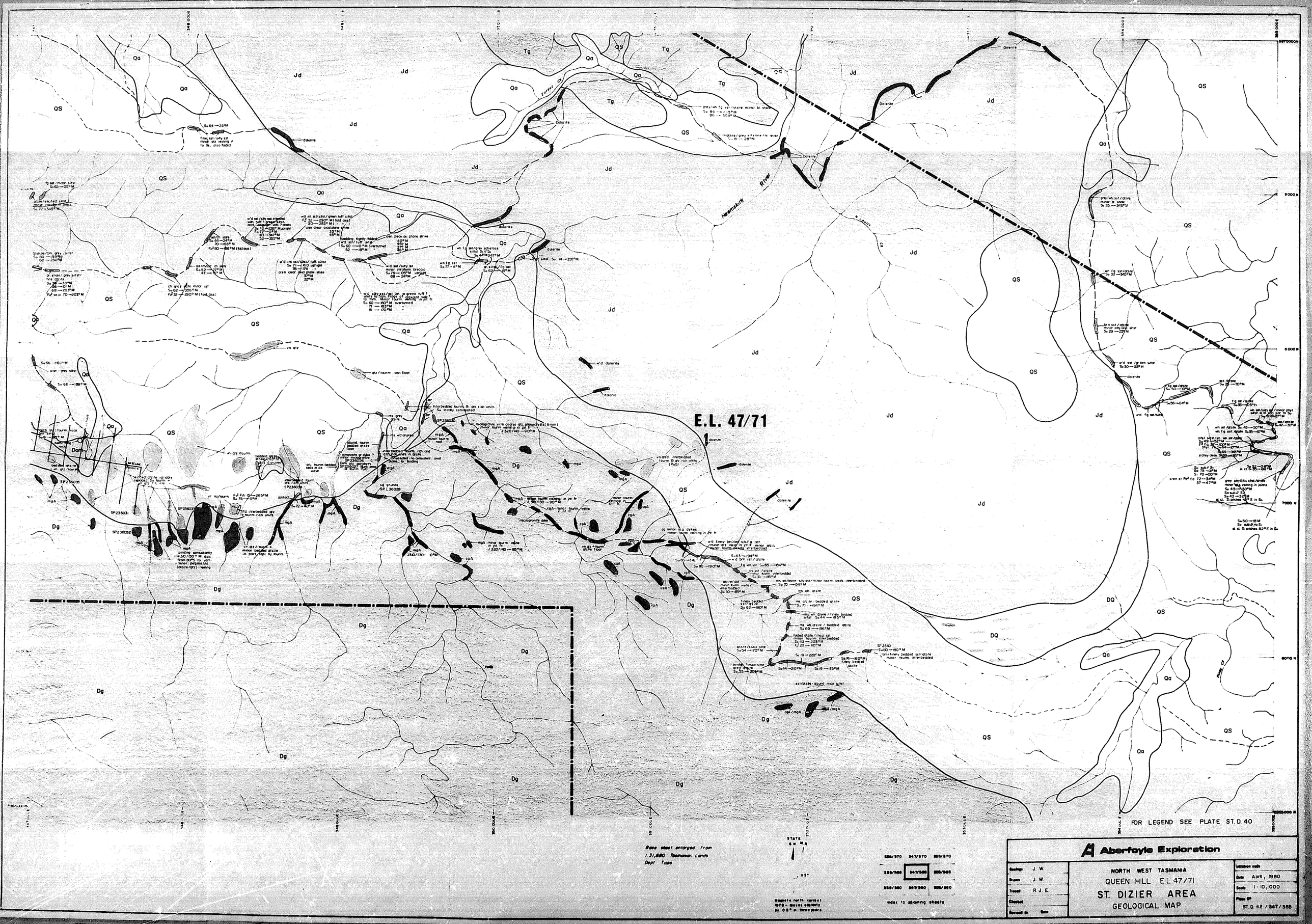
Base sheet enlarged from 1:31,680 Tasmanian Lands Dept Topo

STATE

331/370	339/370	347/370
321/365	339/365	347/365
331/360	334/360	347/360

Aberfoyle Exploration

Geology J. W.	NORTH WEST TASMANIA	Location code
Drawn J. W.	QUEEN HILL E.L. 47/71	Date April, 1980
Traced R. J. E.	ST. DIZIER AREA	Scale 1:10,000
Checked	GEOLOGICAL MAP	Plate No. ST.D. 42 / 339/365
Revised by Date		


E.L. 47/71
Heemskirk River
Qa
QS
Jd
Tg
Dg
DQ
Dom
Dolerite
FOR LEGEND SEE PLATE ST.D.40
Base sheet enlarged from 1:31,680 Tasmanian Lands Dept Topo
STATE
Magnetic north correct 1979 - Moves easterly by 0.2° in three years
Index to adjoining sheets
Aberfoyle Exploration
Geology J. W.
Drawn J. W.
Traced R. J. E.
Checked
Revised by Date
NORTH WEST TASMANIA
QUEEN HILL E.L.47/71
ST. DIZIER AREA
GEOLOGICAL MAP
Location code
Date April, 1980
Scale 1:10,000
Plate No ST.D.42 / 347/365

W

E

DDH 101

21250E

finely bedded andalusite slates, pale grey mostly with yellowish surface oxidation patchily developed predominantly sericitic phyllitic cleavage developed in parts.

lightly altered kaolinised & sericitised quartzite no CO_3 reaction.

granitoid veining developed locally (t. spar / qtz. with sulphide)

Tr Py, magnetite dissem

50

%Sn	Cu	Pb	Zn
54.86			
57.00	0.007	0.009	0.039
58.22	0.007	0.018	0.003	0.070
60.66	0.008	0.008	0.002	0.007
63.70	0.005	0.006	0.005	0.012
66.75	0.020	0.013	0.009	0.230
69.80	0.009	0.011	0.006	0.025
72.85	0.009	0.0008	0.003	0.034
75.90	0.006	0.022	0.004	0.032
78.90	0.006	0.013	0.004	0.012
80.47	0.002	0.015	0.004	0.019
83.52	0.002	0.011	0.003	0.002
86.56	0.003	0.010	0.003	0.009
87.48	0.008	0.020	0.005	0.003

50 m

50m

quartzite (dolomite)

quartzite

Tr Po, magnetite

FAULT ZONE
v. poor core recovery

100

white m.g. marble
local skarn patches
developed (qtz/garnet rich & feldspar rich)
probably very pure
dolomite mudstone

minor dissem. py

%Sn	Cu	Pb	Zn
140.51			
142.88	0.24	0.07	<0.01	0.89
144.48	0.59	0.02	<0.01	0.04
148.44			
149.35	0.12	0.04	0.01	0.01
150.88		0.02	0.01	0.02
152.10		0.07	0.01	0.04

100 m

100m

Tr Py

Tr Py/Po

locally banded Po 5-10

150

Py 5, Po 5

locally up to 10% Po

dark green, magnetite rich skarn.
magnetite amphibolite skarn

calcite - serpentine magnetite skarn: low in magnetite

grey green bedded quartzite probably locally carbonate rich dissem. serpentine, garnet, kaolin

160.63 m

150 m

150m

5 cm

022175

80-1504 1/2

Aberfoyle Exploration Pty Ltd

Drawn: M.T.	NORTH WEST TASMANIA	Location code:
Traced: R.J.E.	QUEEN HILL LICENCE EL47/71	Scale: 1: 500
Checked:	BIG 'H' - AREA	Date: May, 1980
Revised: Date:	SECTION 20550 N	Plate No. St. D. 41/20550

S

N

BBH H184

0

50 m

50 m

100m

100 m

andalusite slate

altered dolomite locally magnetite skarn

Po 1-2

fosterite magnetite skarn

Po 50-60

andalusite slate

occasional Po veins

50

100

NO CORE

altered quartzite (minor skarn development)

light coloured m.g. adamellite, low in mafics, little alteration evident some phases are f.g.

147.0m

m	% Sn	Cu	Zn
3.05	Tr	Tr	0.01
6.10	Tr	Tr	0.03
9.15	Tr	Tr	0.02
12.20	Tr	0.03	0.01
15.25	Tr	0.07	0.02
18.30	Tr	0.07	0.03
19.20	Tr	0.03	0.02
22.26	Tr	0.01	0.01
24.38	Tr	0.01	0.01
26.82	Tr	Tr	0.05
29.57	Tr	0.01	0.01
32.61	Tr	0.01	0.03
33.53	Tr	Tr	0.01
35.97	Tr	0.01	0.01
38.71	Tr	Tr	0.01
39.92	Tr	0.02	0.01
42.98	Tr	0.07	0.01
46.02	Tr	0.01	Tr
48.77	Tr	0.01	0.01
	Tr	Tr	

5 cm

80-1504 1/2

Aberfoyle Exploration Pty Ltd

Drawn: M.T.	NORTH WEST TASMANIA		Location code:
Traced: R.J.E.	QUEEN HILL LICENCE EL47/71		Scale: 1:500
Checked:	BIG 'H' - AREA		Date: May, 1980
Revised: Date:	SECTION 22270E		Plate No.: St. D.41/22270

S

20100 N

N

DDH H102

f.g. heavily kaolinised (weath. dom.) aplite

light coloured locally porphyritic (hornebiende) adamellite (P.M. - aplitic)

banded altered quartzite skarn minerals, garnet, olivine, locally developed

Pol veins & dissem

50

calcareous quartzite

quartzite (as above)

calcareous quartzite ± fluorite on joints developed

50 m

50 m

light coloured granitised sediments possibly altered f.g. to porphyritic adamellite

100

coarse grained adamellite, feldspars show yellowish alteration colour

100 m

100 m

~% Sn, <0.01% Cu, <0.01% Pb, <0.01% Zn

150

172.2 m

150m

150 m

5 cm

80-1504 1/2

Aberfoyle Exploration Pty Ltd

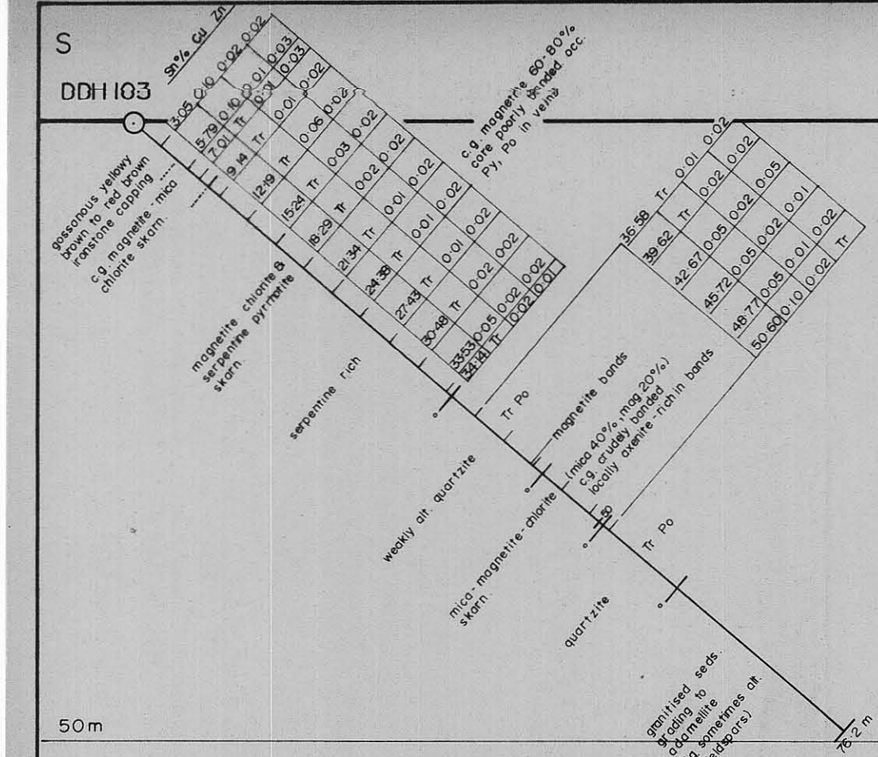
Drawn: M.T.	NORTH WEST TASMANIA QUEEN HILL LICENCE EL47/71 BIG 'H' - AREA SECTION 22600 E	Location code:
Traced: R.J.E.		Scale: 1: 500
Checked:		Date: May, 1980
Revised: Date:		Plate No. St. D. 41/22600

S

N

2 0100 N

DDH 103



50 m

50 m

100 m

100m

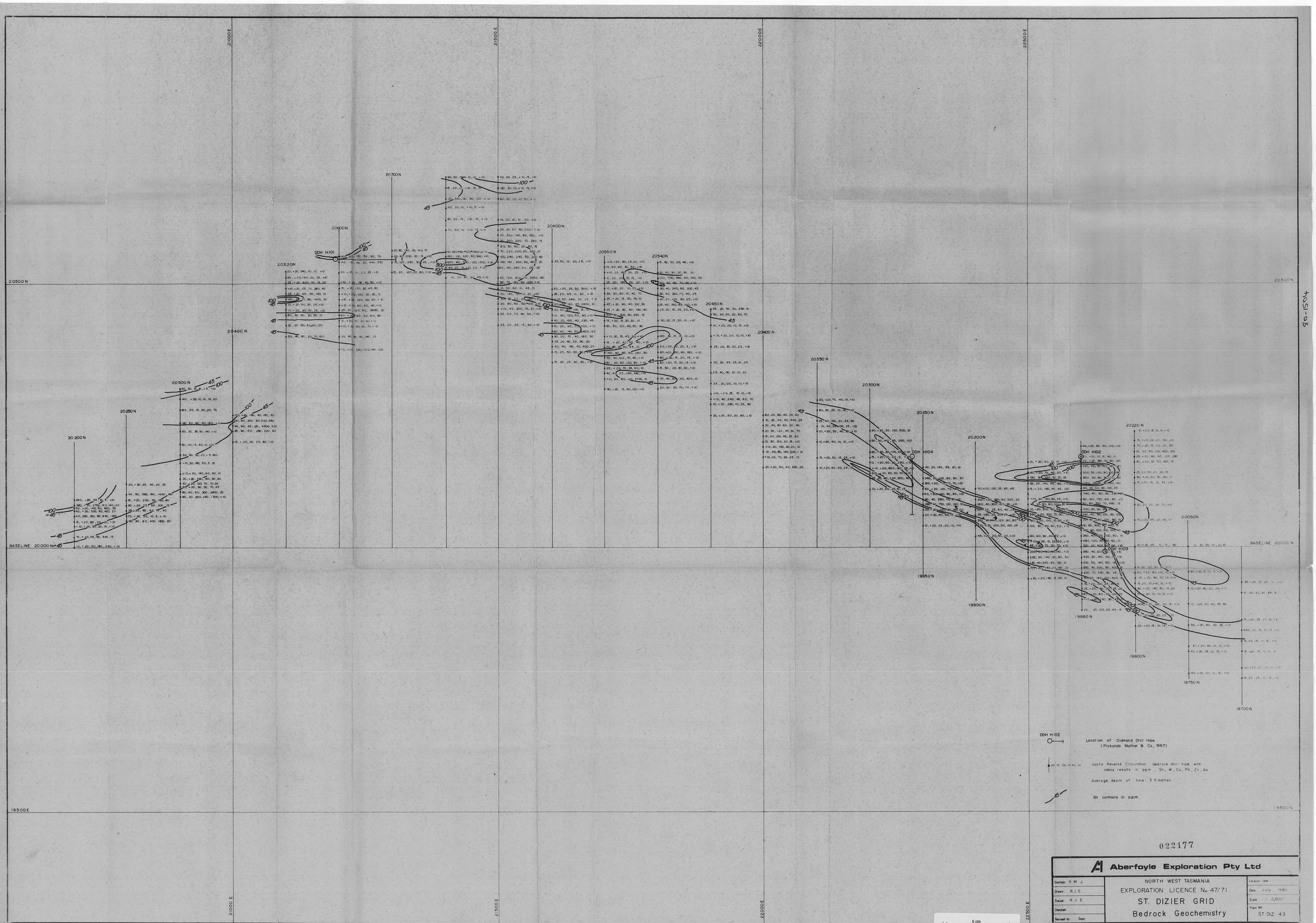
022176

80-1504 1/2

Aberfoyle Exploration Pty Ltd

Drawn: M.T.	NORTH WEST TASMANIA QUEEN HILL LICENCE EL47/71 BIG 'H' - AREA SECTION 22640E		Location code:
Traced: R.J.E.			Scale: 1:500
Checked:			Date: May, 1980
Revised:	Date:		Plate No: St. D 41/22640

5 cm

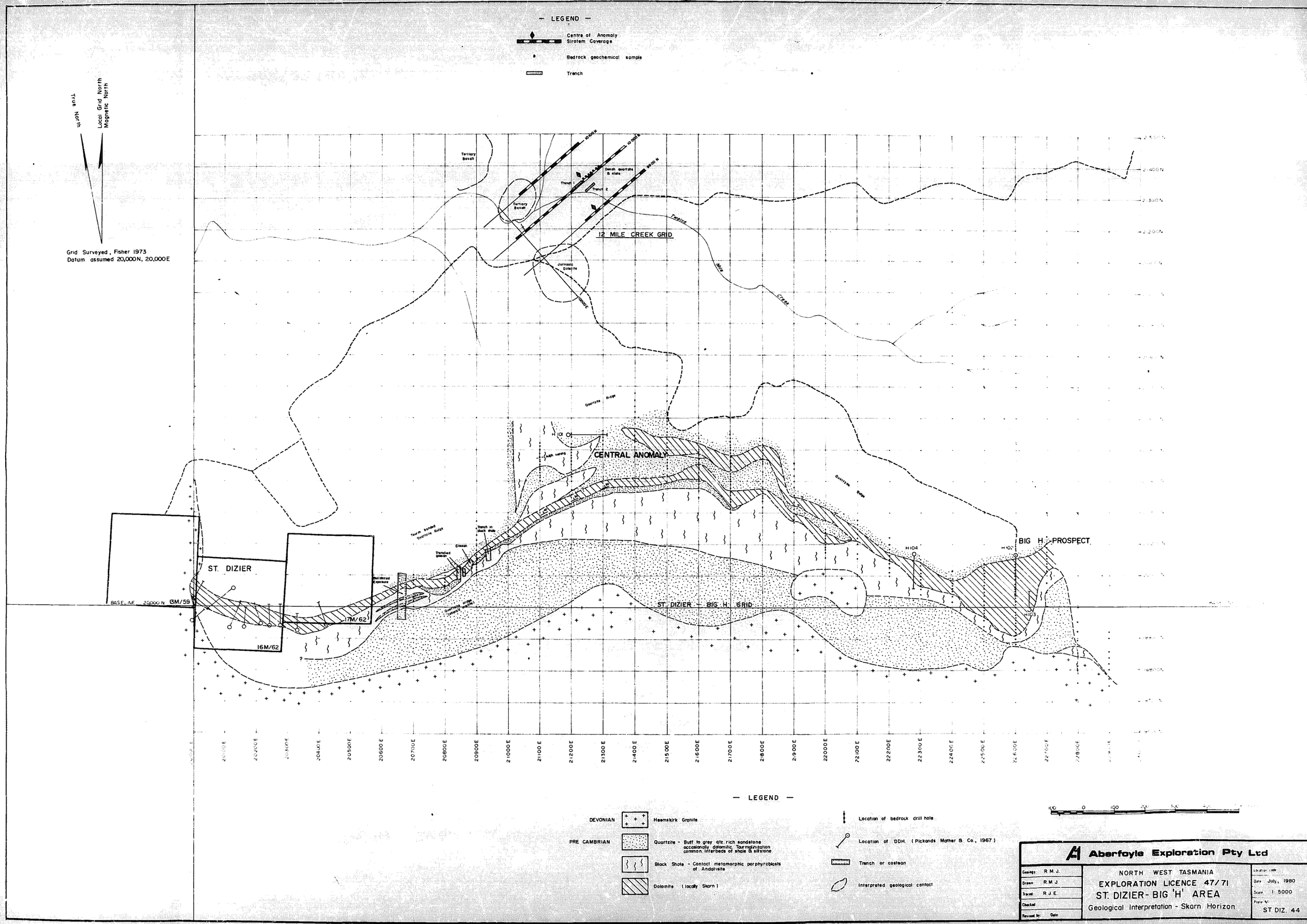


022177

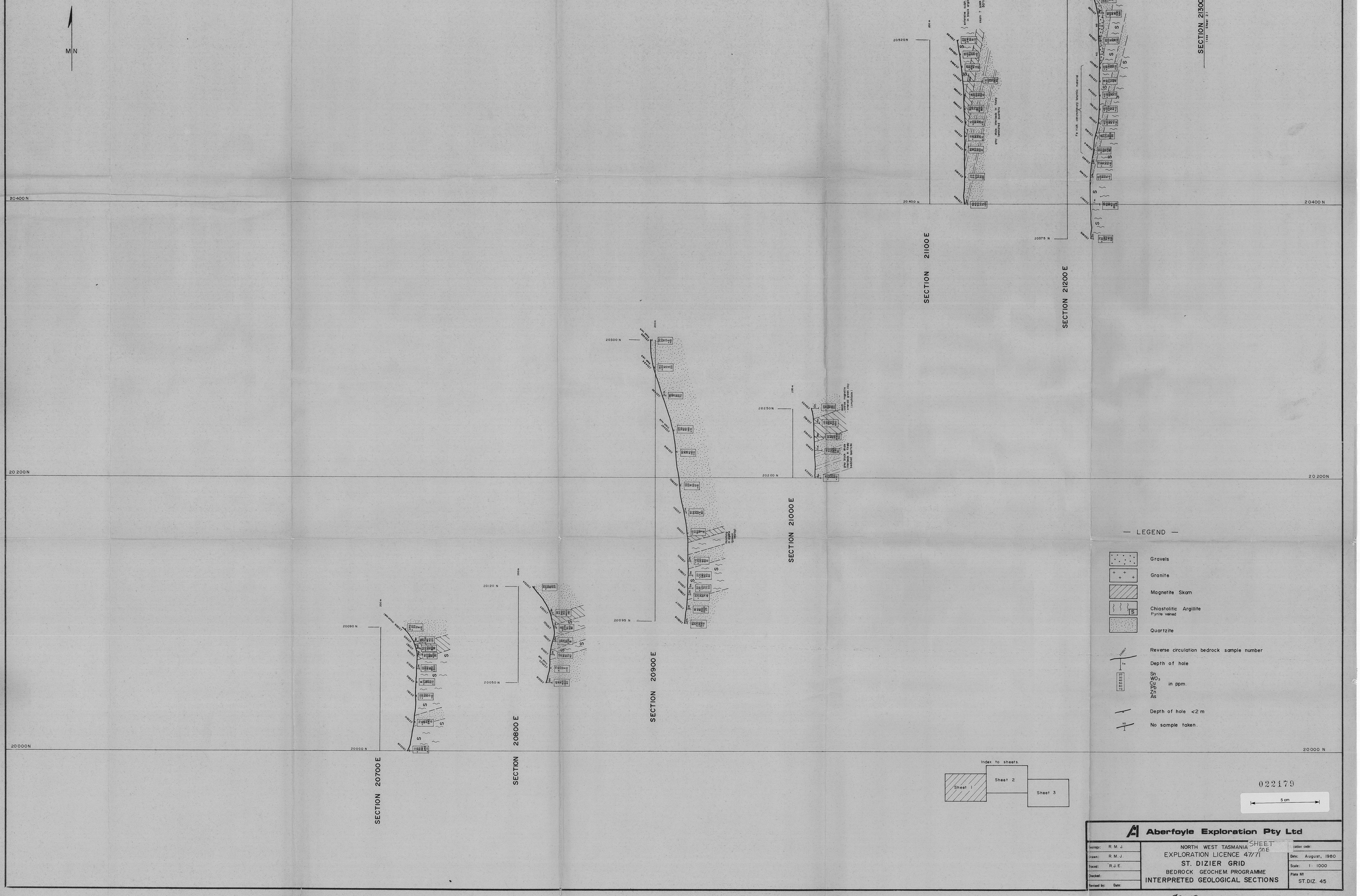
Aberfoyle Exploration Pty Ltd

Geology: R M J	NORTH WEST TASMANIA	Location Code
Drawn: R J E	EXPLORATION LICENCE No. 47/71	Date: July 1980
Traced: R J E	ST. DIZIER GRID	Scale: 1:2,500
Checked:	Bedrock Geochemistry	Plate No: ST DIZ 43
Revised by: Date:		

80-1504



— LEGEND —
Centre of Anomaly
Sirotem Coverage
Bedrock geochemical sample
Trench
True North
Local Grid North
Magnetic North
Grid Surveyed, Fisher 1973
Datum assumed 20,000N, 20,000E
Tertiary Basalt
Tertiary Basalt
Trench 1
Trench 2
Dense quartzite & slate
Jurassic Dolerite
12 MILE CREEK GRID
Twelve Mile Creek
Quartzite Ridge
CENTRAL ANOMALY
Quartzite Ridge
Tourm banded Quartzite Ridge
Trench in black shale
Gossan
Trenched gossan
Bulldozed Exposure
Quartzite Ridge (interbed shale)
ST. DIZIER
BASELINE 20000 N
13M/59
17M/62
16M/62
ST. DIZIER - BIG H GRID
BIG H PROSPECT
H104
H102
H103
20100E
20200E
20300E
20400E
20500E
20600E
20700E
20800E
20900E
21000E
21100E
21200E
21300E
21400E
21500E
21600E
21700E
21800E
21900E
22000E
22100E
22200E
22300E
22400E
22500E
22600E
22700E
22800E
— LEGEND —
DEVONIAN
Heemskirk Granite
PRE CAMBRIAN
Quartzite - Buff to grey qtz. rich sandstone occasionally dolomitic. Tourmalinization common. Interbeds of shale & siltstone.
Black Shale - Contact metamorphic porphyroblasts of Andalusite
Dolomite (locally Skarn)
Location of bedrock drill hole
Location of DDH. (Pickands Mather & Co., 1967)
Trench or costean
Interpreted geological contact
Aberfoyle Exploration Pty Ltd
Geology: R.M.J.
Drawn: R.M.J.
Traced: R.J.E.
Checked:
Revised by: Date:
NORTH WEST TASMANIA
EXPLORATION LICENCE 47/71
ST. DIZIER - BIG 'H' AREA
Geological Interpretation - Skarn Horizon
Location code
Date July, 1980
Scale 1:5000
Plate No. ST. DIZ. 44



Aberfoyle Exploration Pty Ltd

Geology: R. M. J.	NORTH WEST TASMANIA SHEET ONE	...cation code:
Drawn: R. M. J.	EXPLORATION LICENCE 47/71	Date: August, 1980
Traced: R. J. E.	ST. DIZIER GRID	Scale: 1 : 1000
Checked:	BEDROCK GEOCHEM. PROGRAMME	Plate No.
Revised by: Date:	INTERPRETED GEOLOGICAL SECTIONS	ST. DIZ. 45

80-1504

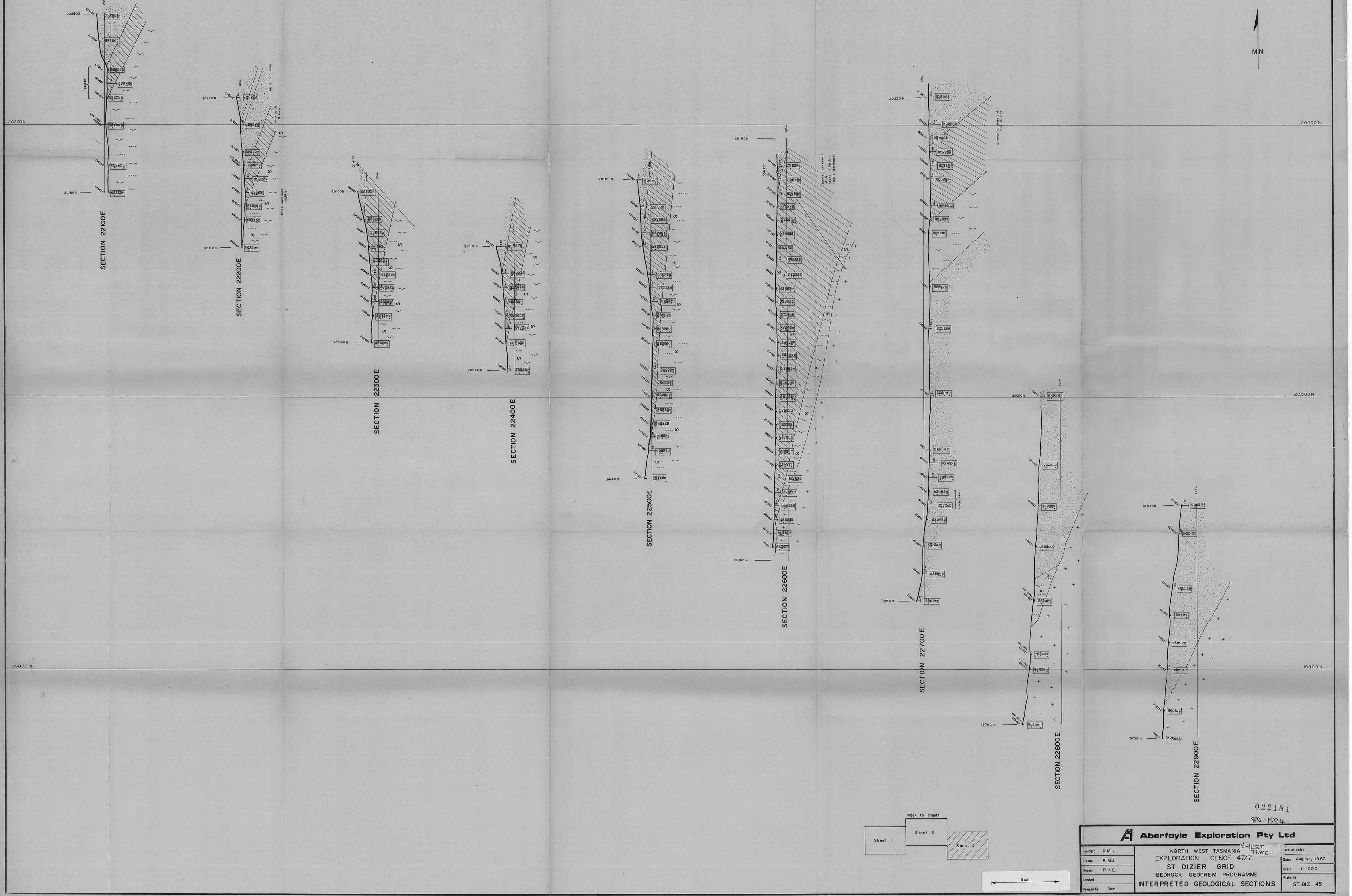


022180

Aberfoyle Exploration Pty Ltd		
Geology: R. M. J.	NORTH WEST TASMANIA	Location code:
Drawn: R. M. J.	EXPLORATION LICENCE 4771	Date: August, 1980
Traced: R. J. E.	ST. DIZIER GRID	Scale: 1: 1000
Checked:	BEDROCK GEOCHEM. PROGRAMME	Plate No
Revised by: Date:	INTERPRETED GEOLOGICAL SECTIONS	ST. DIZ. 45

SHEET TWO

80-1504



022181
80-1504

Aberfoyle Exploration Pty Ltd

Geology: R.M.J.	NORTH WEST TASMANIA SHEET THREE
Drawn: R.M.J.	EXPLORATION LICENCE 47/71
Traced: R.J.E.	ST. DIZIER GRID
Checked:	BEDROCK GEOCHEM. PROGRAMME
Revised by: Date:	INTERPRETED GEOLOGICAL SECTIONS
	Location code:
	Date: August, 1980
	Scale: 1:1000
	Plate No: ST.DIZ. 45

DIGHEM[II] SURVEY

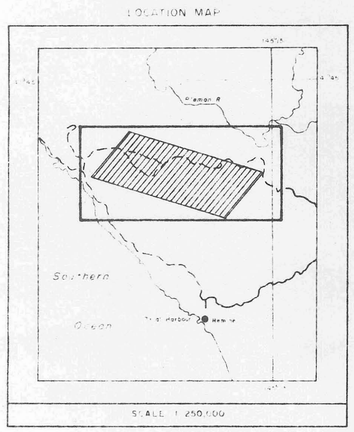
ST DIZIER AREA, TASMANIA

MAGNETICS

FOR

ABERFOYLE EXPLORATION PTY. LTD.

LOCATION MAP



SCALE 1:20,000

1 0 2 Kilometres

1/2 0 1/2 Miles

Plate X-ST.D 40

80-1504 022182

5 cm

REGISTERED PROFESSIONAL ENGINEER
D. C. FRASER
PROVINCE OF ONTARIO

Flight line

Fiducials and numbers

ISOMAGNETIC LINES

(total field)

1000 1000 gammas

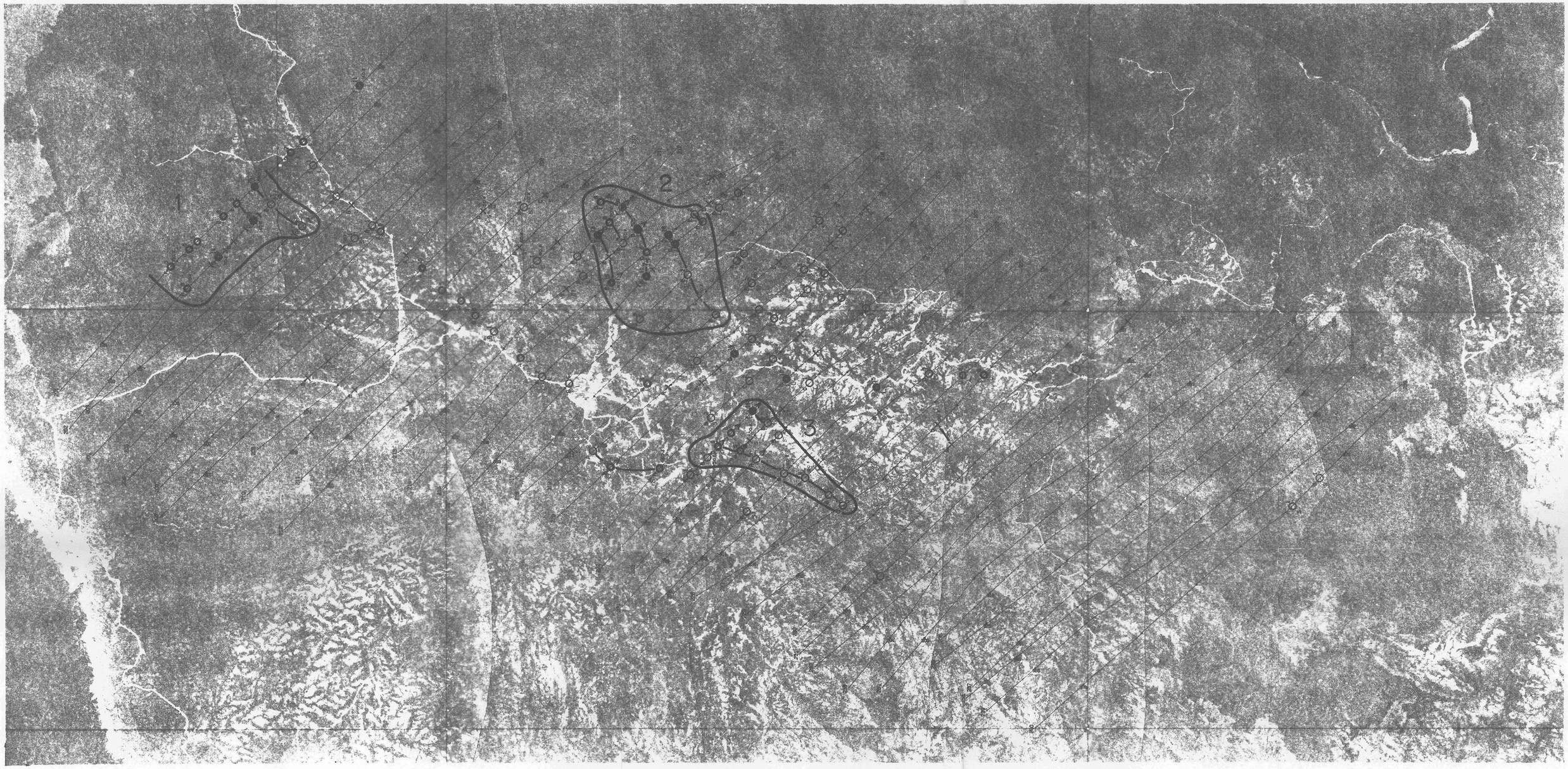
200 200 gammas

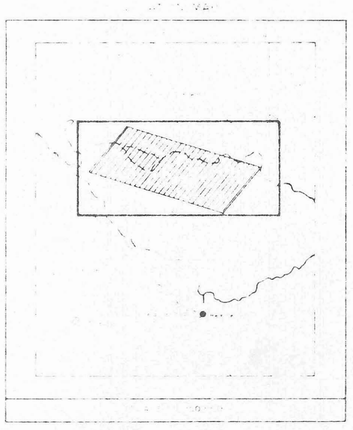
50 gammas

25 gammas

magnetic depression

Magnetic Inclination within the survey area 72°





DIGHEM^{II} SURVEY

ST. DIZIER AREA, TASMANIA

ELECTROMAGNETICS

FOR 022183

ABERFOYLE EXPLORATION PTY. LTD.

SCALE 1: 20,000

Miles

Plate X-ST.D 41

80-1504

5 cm

REGISTERED PROFESSIONAL ENGINEER
D.C. FRASER
PROVINCE OF ONTARIO

Flight line

Flight numbers

ANOMALY GRADE	EM GRADE SYMBOL	MHO RANGE
6	●	⩾ 100
5	✱	50 — 99
4	●	20 — 49
3	◉	10 — 19
2	○	5 — 9
1	○	⩽ 4
	×	Possible conductor

DIGHEM anomalies are divided into six grades of conductivity – thickness product. This product in mhos is the reciprocal of resistance in ohms. The mho is a measure of conductance, and is a geologic parameter. Most swamps yield Grade 1 anomalies but highly conducting clays can give Grade 2 anomalies. The multi-coil anomaly shapes often allow surface conductors to be recognized, and these are indicated by the letter S on this map. The remaining Grade 1 and 2 anomalies could be weak bedrock conductors. The higher grades indicate increasingly higher conductances. Examples: The ore bodies of the Magusi River camp yield Grade 4 anomalies, while Mattabi and Whistle give Grade 5. Graphite and sulphides can span all grades but, in this survey area, field work may show that the different grades indicate different types of conductors.

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

	Conductor axis
S	Probable surface response
S?	Possible surface response
L	Probable line (power, telephone, pipe, or fence)
L?	Possible line
?	Questionable anomaly
	Apparent thickness > 10 m
	Dip
100γ	Direct magnetic correlation of 100 gammas

DIGHEM maps are designed to provide a correct impression of conductor quality by means of the conductance grade symbols. The symbols can stand alone with geology when planning a followup program. The actual mho values are plotted for those who wish quantitative data. The anomaly ppm and depth are indicated by inconspicuous dots which should not distract from the conductor patterns, while being helpful to those who wish this information. The map provides an interpretation of all conductors in terms of length, strike direction, conductance and depth. The accuracy is comparable to an interpretation from a ground EM survey having the same line spacing.

DIGHEM^{II} SURVEY

ST. DIZIER AREA, TASMANIA

RESISTIVITY

FOR

ABERFOYLE EXPLORATION PTY. LTD.

SCALE 1:20,000

0 2 Kilometres

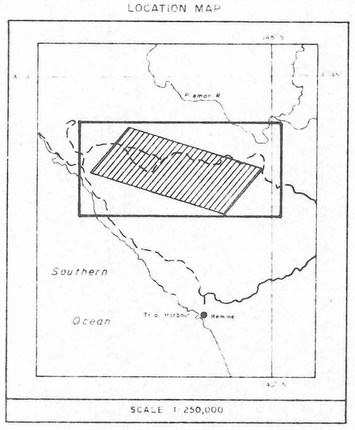
1/2 0 1/2 Miles

Plate X- ST. D 42

022184

5 cm

LOCATION MAP



SCALE 1:250,000

80-1504

REGISTERED PROFESSIONAL ENGINEER
D.C. FRASER
PROVINCE OF ONTARIO

Flight line

Fiducials and numbers

LEGEND

Contours in ohm - m at eight intervals per decade

100
75
56
42
31
23
17
13
10

Note

The numbers face in the direction of increasing value

DIGHEM^{II} SURVEY

ST. DIZIER AREA, TASMANIA

ENHANCED MAGNETICS

FOR 022185

ABERFOYLE EXPLORATION PTY. LTD.

SCALE 1:20,000

0 1 2 Kilometres

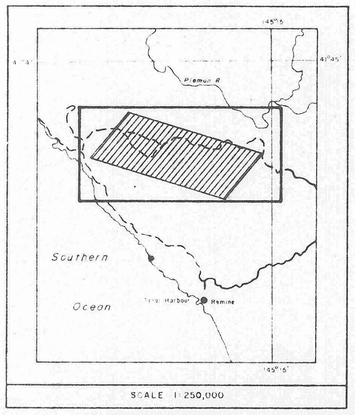
1/2 0 1/2 Miles

Plate X-ST. D 43

80-1504

5 cm

LOCATION MAP



SCALE 1:250,000

REGISTERED PROFESSIONAL ENGINEER
D.C. FRASER
PROVINCE OF ONTARIO

Flight line

9327

Fiducials and numbers

9327

ISOMAGNETIC LINES

(enhanced field)

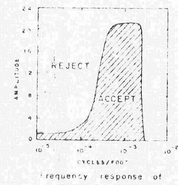
5000 gammas

1000 gammas

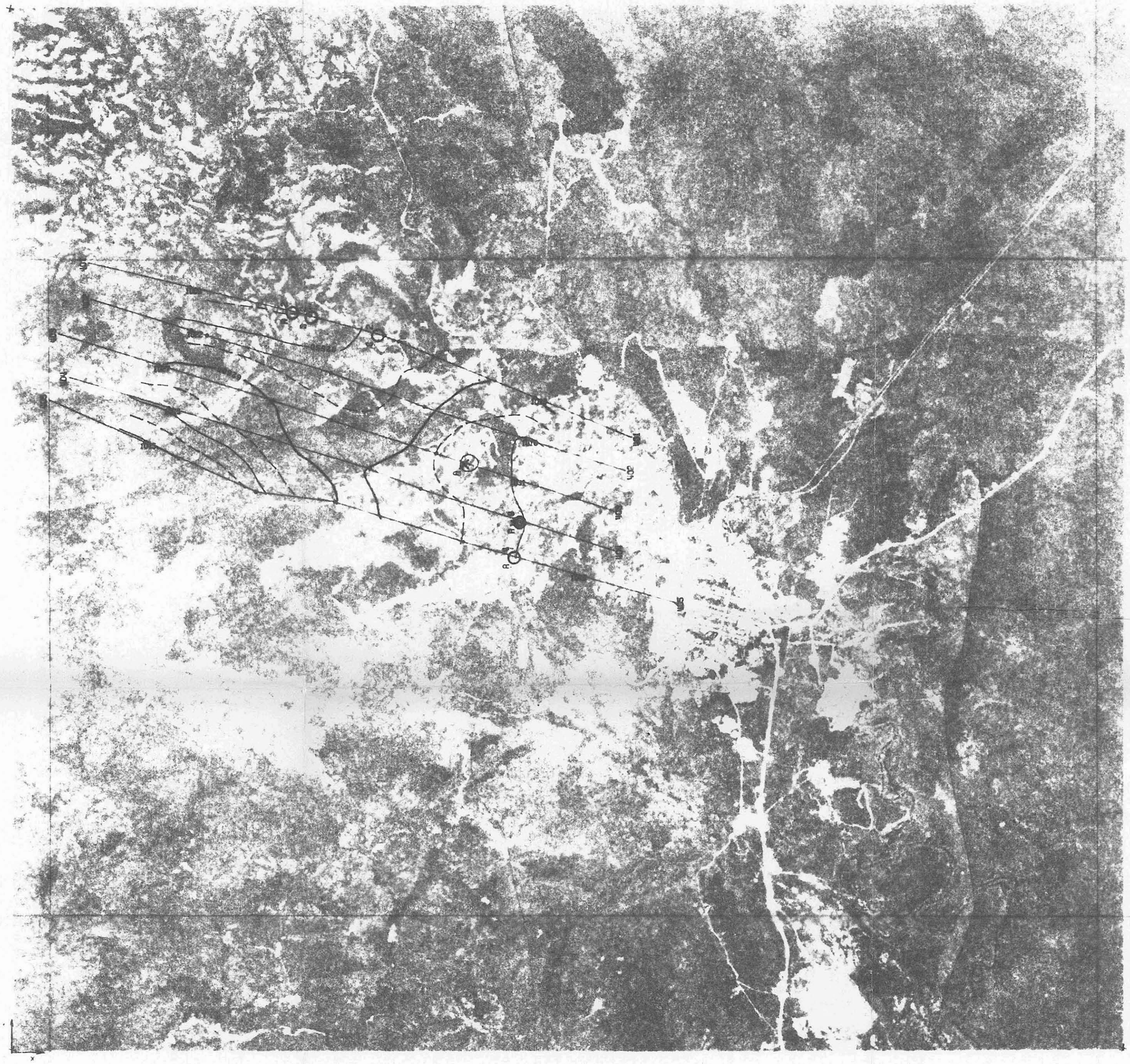
200 gammas

100 gammas

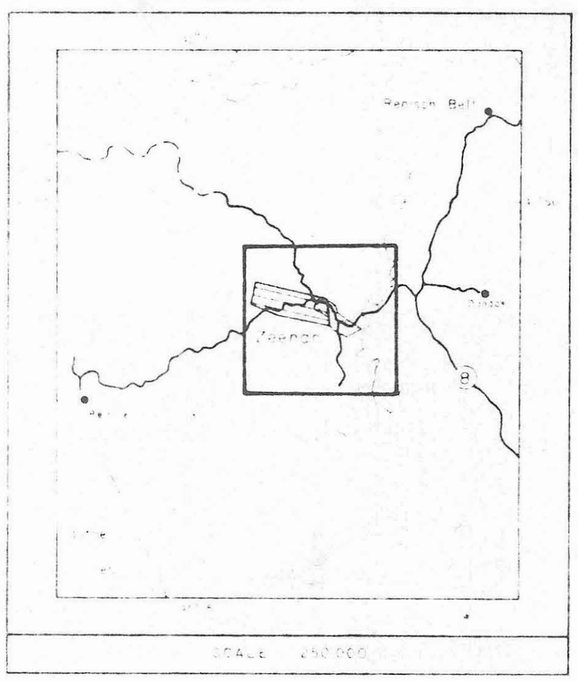
magnetic depression



Frequency response of magnetic operator



LOCATION MAP



SCALE 250,000

DIGHEM^{II} SURVEY

ZEEHAN (QUEEN HILL), TASMANIA

MAGNETICS 022180

FOR

ABERFOYLE EXPLORATION PTY. LTD.

REGISTERED PROFESSIONAL ENGINEER
D. C. FRASER
PROVINCE OF ONTARIO

SCALE 1 : 20,000

2 0 1 2 Kilometres

1/2 0 1/2 1 Miles

Plate X-QH 22

5 cm

80-1504

Flight line

Fiducials and numbers

ISOMAGNETIC LINES

(total field)

1000 — 1000 gammas

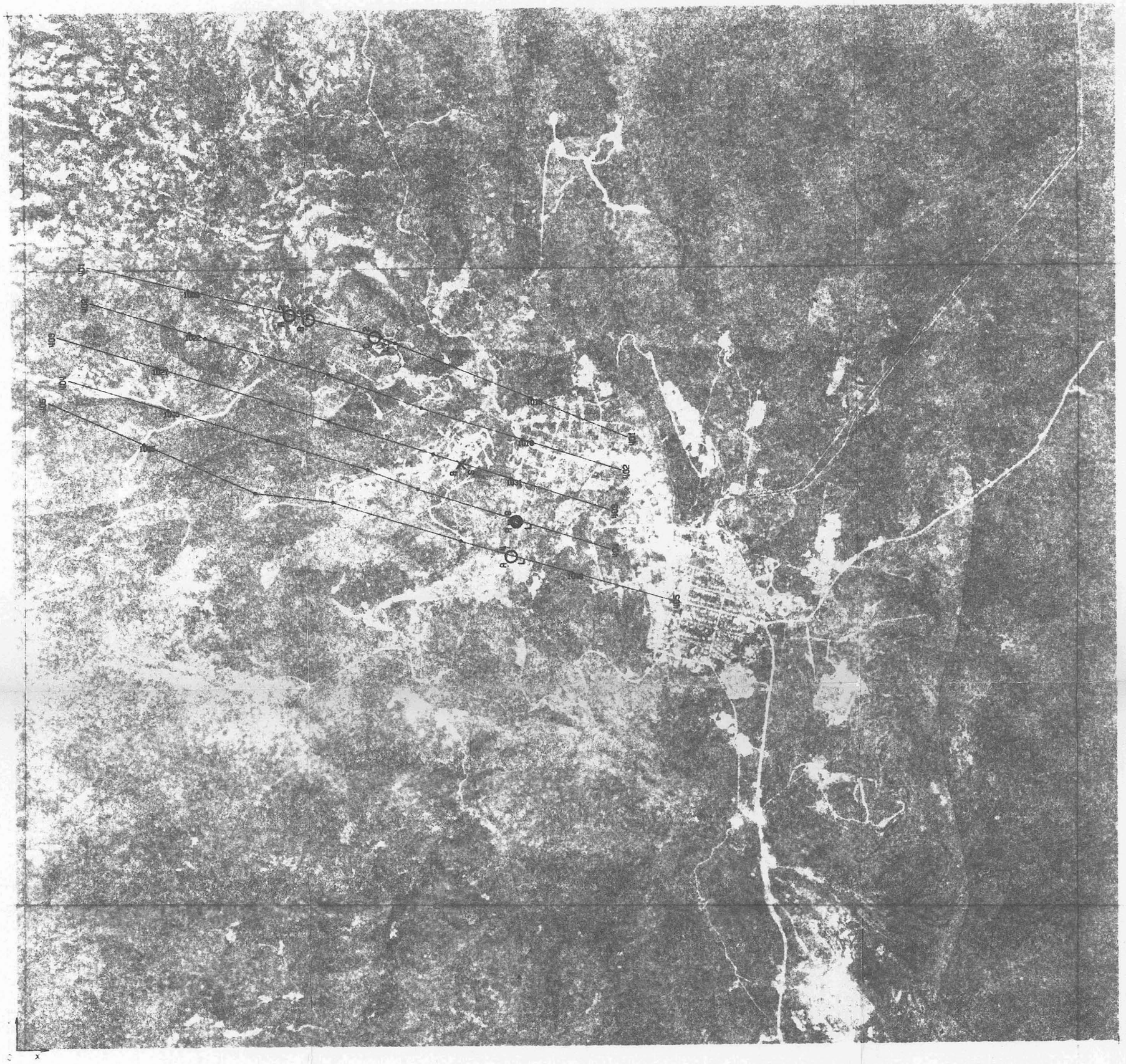
200 — 200 gammas

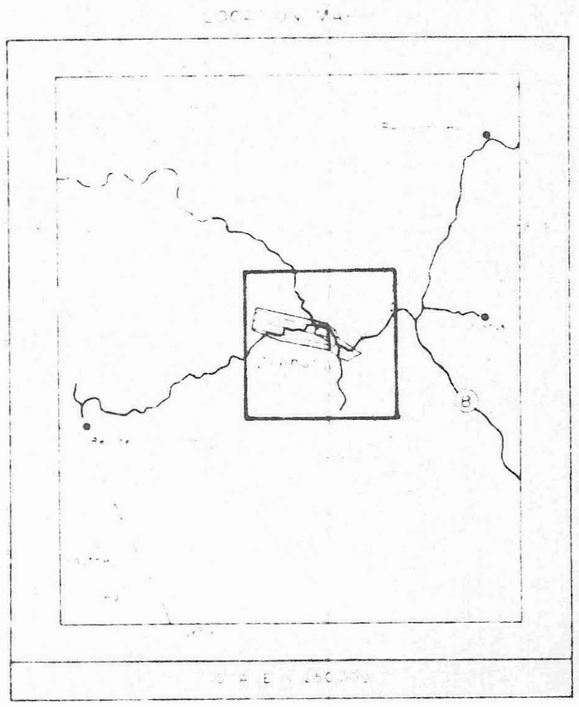
50 gammas

25 gammas

magnetic depression

Magnetic Inclination within the survey area: 72°





DIGHEM^{II} SURVEY

ZEEHAN (QUEEN HILL), TASMANIA

ELECTROMAGNETICS

022187 FOR

ABERFOYLE EXPLORATION PTY. LTD.

Flight line

Fiducials and numbers

SCALE 1:20,000

2 Kilometres

1/2 0 1/2 1 Miles

Plate X-QH 23

5 cm

80-1504

ANOMALY GRADE	EM GRADE SYMBOL	MHO RANGE
6	●	≥ 100
5	✸	50 – 99
4	●	20 – 49
3	◉	10 – 19
2	O	5 – 9
1	○	≤ 4
	×	Possible conductor

DIGHEM anomalies are divided into six grades of conductivity – thickness product. This product in mhos is the reciprocal of resistance in ohms. The mho is a measure of conductance, and is a geologic parameter. Most swamps yield Grade 1 anomalies but highly conducting clays can give Grade 2 anomalies. The multi-coil anomaly shapes often allow surface conductors to be recognized, and these are indicated by the letter S on this map. The remaining Grade 1 and 2 anomalies could be weak bedrock conductors. The higher grades indicate increasingly higher conductances. Examples: The ore bodies of the Magusi River camp yield Grade 4 anomalies, while Mattabi and Whistle give Grade 5. Graphite and sulphides can span all grades but, in this survey area, field work may show that the different grades indicate different types of conductors.

identifier → c 38 ← mho value

Depth is greater than
. 50 feet
: 100 feet
⁝ 150 feet
⁞ 200 feet

Inphase and Quadrature of Standard coil is greater than
. 5 ppm
.. 10 ppm
... 15 ppm
.... 20 ppm

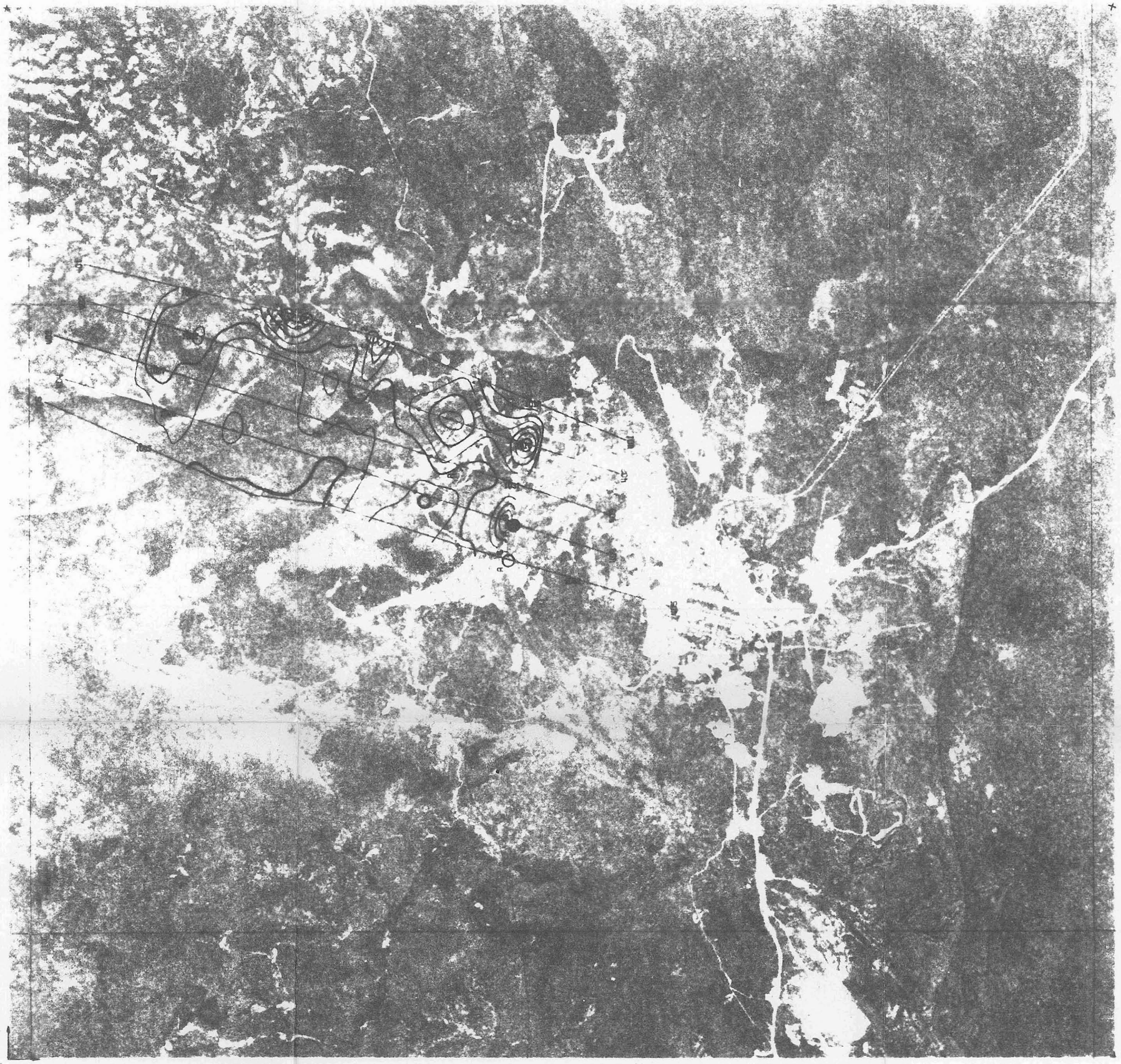
Refer to list of anomalies in survey report for the actual ppm values for all coils, and for conductor depths.

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

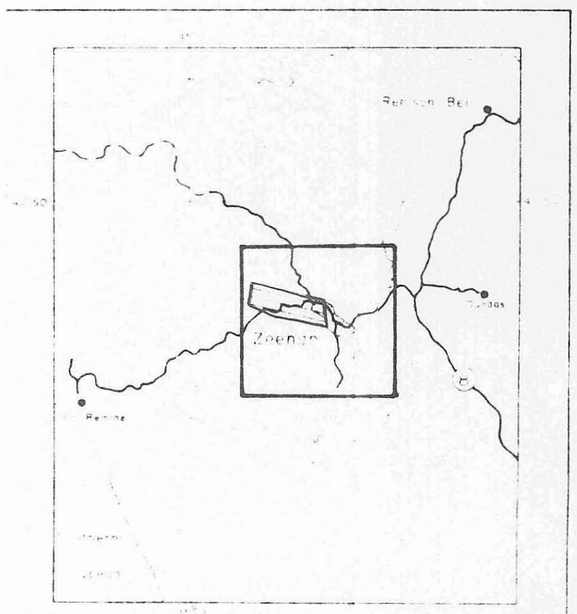
	Conductor axis
S	Probable surface response
S?	Possible surface response
L	Probable line (power, telephone, pipe, or fence)
L?	Possible line
?	Questionable anomaly
	Apparent thickness > 10 m
	Dip
100γ	Direct magnetic correlation of 100 gammas

DIGHEM maps are designed to provide a correct impression of conductor quality by means of the conductance grade symbols. The symbols can stand alone with geology when planning a followup program. The actual mho values are plotted for those who wish quantitative data. The anomaly ppm and depth are indicated by inconspicuous dots which should not distract from the conductor patterns, while being helpful to those who wish this information. The map provides an interpretation of all conductors in terms of length, strike direction, conductance and depth. The accuracy is comparable to an interpretation from a ground EM survey having the same line spacing.

REGISTERED PROFESSIONAL ENGINEER
D. C. FRASER
PROVINCE OF ONTARIO



LOCATION MAP



SCALE 1 250,000



DIGHEM^{II} SURVEY

ZEEHAN (QUEEN HILL), TASMANIA

022188 RESISTIVITY

FOR

ABERFOYLE EXPLORATION PTY. LTD.

SCALE 1 20,000

1/2 0 1/2 1 Miles

Plate X-QH 24

80-1504

5 cm

Flight line

Fiducials and numbers

LEGEND

Contours in ohm - m at eight intervals per decade

100
75
56
42
31
23
17
13
10

Note

The numbers face in the direction of increasing value

DIGHEM^{II} SURVEY

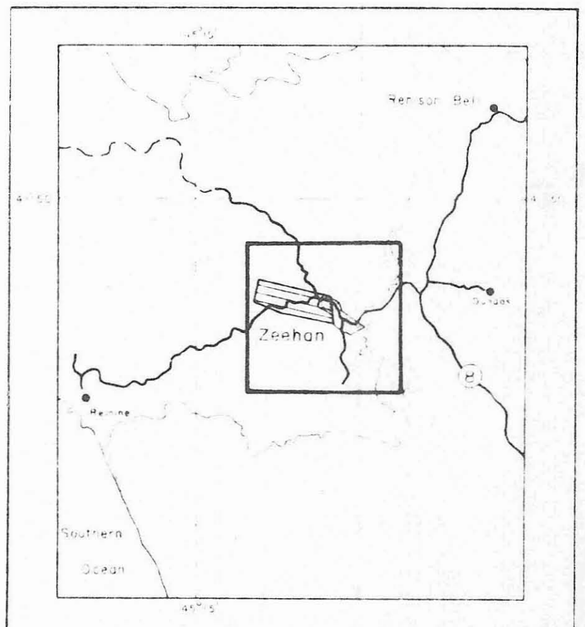
ZEEHAN (QUEEN HILL), TASMANIA

ENHANCED MAGNETICS

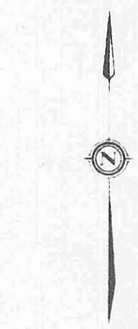
FOR 022189

ABERFOYLE EXPLORATION PTY. LTD.

LOCATION MAP



SCALE 1 250,000



REGISTERED PROFESSIONAL ENGINEER
D. C. FRASER
PROVINCE OF ONTARIO

Flight line

Fiducials and numbers

SCALE 1 20,000

1 0 1 2 Kilometres

1/2 0 1/2 1 Miles

Plate X-QH 25

80-1504

5 cm

ISOMAGNETIC LINES

(enhanced field)

5000 gammas

1000 gammas

200 gammas

100 gammas

magnetic depression

