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PASMINCO EXPLORATION

ANNUAL REPORT
YOLANDE EL 11/85 & YOLANDE RIVER EL 25/91

ANNUAL REPORT 1992-93

volume 1 of 2

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July 1993

996002

VIEW OF NEWTON DAM LOOKING NORTH TOWARDS MT READ

HENTY VALLEY LOOKING NORTH

996003

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SUMMARY

Exploration conducted on the Yolande EL 11/85 Joint Venture during the period from July 1992 to June 1993 has been principally concerned with detailed investigations of prospective areas identified during the previous year.

Diamond drilling in the Newton Creek – Henty Canal area produced very encouraging results. These include a zone of significant mineralisation and favourable alteration overlain by a conglomerate similar to the sulphide clast–bearing conglomerate at Newton Creek.

Evaluation of existing data combined with detailed mapping and interpretation has identified a promising target within the White Spur area.

Detailed mapping in the Henty Valley area has shown that the favourable horizon containing massive stratiform pyrite is largely concealed by a shallow dipping thrust.

Exploration conducted on the Yolande River EL 25/91 comprises an airborne magnetic and radiometric survey.

Total exploration costs for the two licences for the 12 months ending June 1993 was $249 213.

1 INTRODUCTION

EL's 11/85 and 25/91 cover areas of 74 and 66km^2 respectively. Combined they extend from Lynchford south of Queenstown, northwards to the southern boundary of the Consolidated Rosebery Mine Leases (see Fig.1) covering the western part of the Mount Read Volcanic belt. The licences are continuous over this area except for a strip one kilometre wide between the Yolande River licence and the Lynchford block of the Yolande licence.

This report details exploration undertaken by Pasminco Exploration in the twelve months to June 1993. Work conducted during this period focussed on detailed investigations of a number of prospect areas, principally Newton Creek, Henty Canal, White Spur and Henty Valley and included the first diamond drilling on the Yolande Tenements since the 1970's.

Access to the Yolande Licence is by the Zeehan Highway and the Anthony Road in the south and east and a network of all weather HEC roads and 4WD old logging tracks in the west and north. The least accessible area is the Henty River Valley where steep and rugged topography is covered by temperate rain forest. Higher ground to the north is more open with sparse sub–alpine vegetation.

Apart from access restrictions in steep and forested areas, other exploration difficulties include extensive coverage of bedrock by glacial moraine and skeletal and transported soils overlying felsic volcanics in much of the remaining areas. These factors restrict the use of soil and stream geochemistry.

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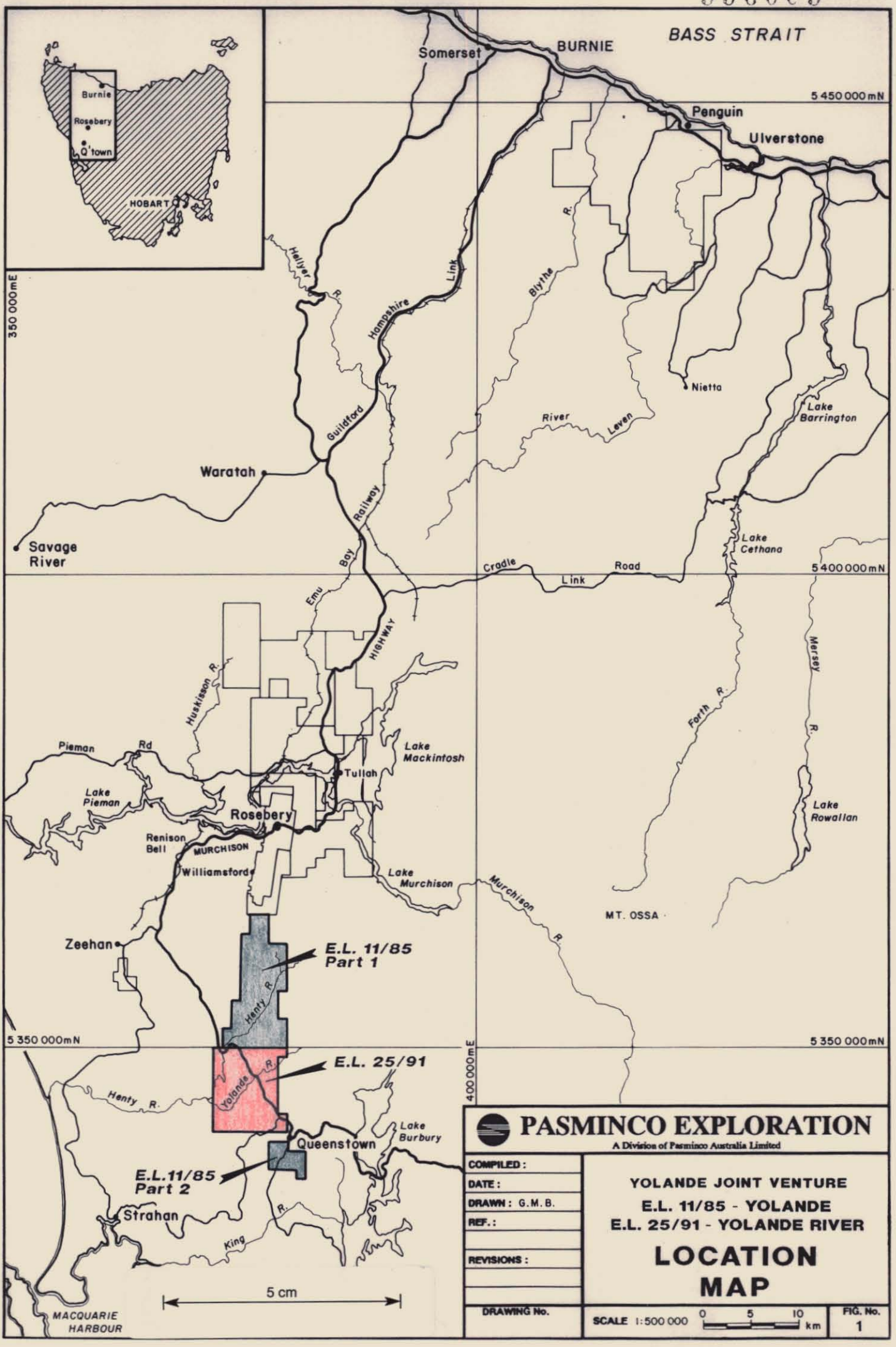


PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

COMPILED :	YOLANDE JOINT VENTURE
DATE :	E.L. 11/85 - YOLANDE
DRAWN : G.M.B.	E.L. 25/91 - YOLANDE RIVER
REF. :	**LOCATION MAP**
REVISIONS :	
DRAWING No.	SCALE 1:500 000 (0 5 10 km)
	FIG. No. 1

2 TENURE

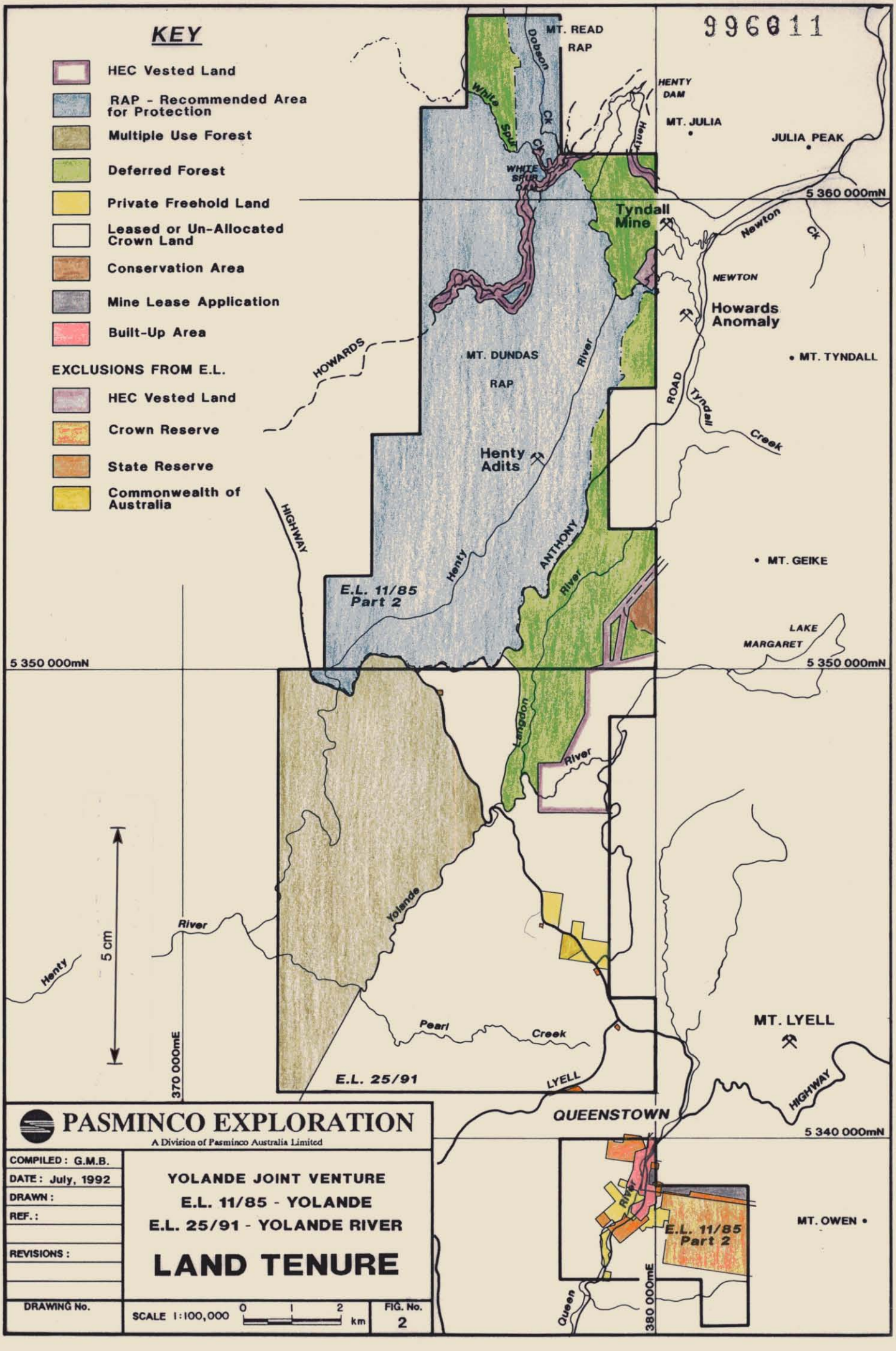
Exploration Licence 11/85, Yolande was granted to Amoco Minerals Australia on 21 August 1985 covering an area of 150km^2. Since that time title has been transferred to Cyprus Minerals Australia Company (11 December 1985), then Cyprus Gold Australia Company (March 1988), then Hudspeth and Company Pty Limited (23 October 1990), and finally to Arimco Mining Pty Limited, the current title holder.

The area of the licence was amended to 151km^2 on 22 May 1988. In compliance with Mines Department regulations the licence was reduced in area to 70km^2 on 20 February 1991. The area of the tenement was amended again by the Department on 15 April 1992 by the addition of 4km^2 to the western part of the Henty Block. The current area of EL 11/85 is 74km^2.

During the period of tenure the licence has been the subject of two Joint Venture Agreements. The initial Agreement was between Cyprus and the Electrolytic Zinc Company of Australia. The EZ interest was subsequently transferred to Norgold Ltd, part of North Broken Hill–Peko Limited. A new Joint Venture Agreement was concluded on 4 December 1990 between Hudspeth, Norgold and Pasminco Australia Limited. Under the terms of this Agreement Pasminco Exploration, a division of Pasminco Australia, are operators and managers of the Joint Venture. Pasminco earned a 50% interest in the tenement on 31 December, 1991. All three parties contributed to exploration expenditure for the remainder of 1991–92 in the proportion: Pasminco (50%), Norgold (25%) and Arimco (25%).

Exploration Licence 25/91, Yolande River was granted to Pasminco Australia Limited on 30 November 1991 covering an area of 66km^2. Under the terms of the Yolande Joint Venture this licence was included in the Agreement. All parties contributed to the exploration expenditure from 1 January – 30 June 1992 on EL 25/91 in the same proportion as for EL 11/85.

Following a meeting with the Mines Department approval was given on 11 May 1992 to amalgamate the Annual Report and Licence Renewal Dates for both EL's 11/85 and 25/91 to reduce the administrative burden. Both licences are now due for renewal on 20 August 1993.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KEY
HEC Vested Land
RAP - Recommended Area for Protection
Multiple Use Forest
Deferred Forest
Private Freehold Land
Leased or Un-Allocated Crown Land
Conservation Area
Mine Lease Application
Built-Up Area
EXCLUSIONS FROM E.L.
HEC Vested Land
Crown Reserve
State Reserve
Commonwealth of Australia
MT. READ RAP
Dobson
White Spur Ck
WHITE SPUR DAM
HENTY DAM
Henty
MT. JULIA
JULIA PEAK
5 360 000mN
Tyndall Mine
Newton Ck
NEWTON
Howards Anomaly
MT. TYNDALL
HOWARDS
MT. DUNDAS RAP
River
ROAD
Tyndall Creek
Henty Adits
HIGHWAY
ANTHONY
Henty River
MT. GEIKE
E.L. 11/85 Part 2
LAKE MARGARET
5 350 000mN
Langdon River
5 cm
Yolande River
Henty
370 000mE
Pearl Creek
E.L. 25/91
MT. LYELL
LYELL HIGHWAY
QUEENSTOWN
5 340 000mN
MT. OWEN
E.L. 11/85 Part 2
Queen
380 000mE
PASMINCO EXPLORATION
A Division of Pasminco Australia Limited
COMPILED : G.M.B.
DATE : July, 1992
DRAWN :
REF. :
REVISIONS :
YOLANDE JOINT VENTURE
E.L. 11/85 - YOLANDE
E.L. 25/91 - YOLANDE RIVER
LAND TENURE
DRAWING No.
SCALE 1:100,000
0 1 2 km
FIG. No. 2

The land tenure of EL's 11/85 and 25/91 comprises the following (see Fig 3).

1. Multiple Use Forest Land
2. Deferred Forest Land
3. Recommended Areas for Protection (Mt Dundas & Mt Read)
4. SW Conversation Area
5. HEC Vested Land
6. Uncommitted Crown Land
7. Private Property
8. Queenstown Urban Conversation Area
9. Crown Reserves

3 PREVIOUS EXPLORATION

Previous mineral exploration has been undertaken by Rio Tinto Australia Exploration, Cyprus Mines, Rickard Mather and the Mt Lyell Company. A comprehensive review of past exploration and prospecting has been compiled by Purvis (1983).

Work completed during the previous year is summarised below:

Grid and loop line cutting totalling 40kms;
Geological mapping at Henty Valley, Newton Creek and White Spur;
UTEM surveys at Newton Creek and Henty Valley;
Infill gravity survey;
Detailed soil sampling;
Detailed lithogeochemical studies.

4 REGIONAL GEOLOGY

The basement in Western Tasmania is a sequence of Proterozoic greenschist facies metasediments. Basement is exposed in the Sticht Range east of the Henty area, and to the west of Dundas.

During the Cambrian a crustal rift developed forming the Dundas Trough, which was the focus for the emplacement of the Mount Read Volcanics.

The Mount Read Volcanics form a belt extending 200km in length by 20km in width along the eastern side of the Dundas Trough. These mid to upper Cambrian volcanics, which are subdivided on the basis of geochemistry into three calc-alkaline suites and one tholiitic suite include intermediate to felsic lavas, subvolcanic porphyries and granites (Crawford et all 1992).

The Mount Read Volcanics are the host to several significant volcanogenic sulphide bodies including:

Rosebery
Hercules
Hellyer
Que River
Mt Lyell

Other significant ore deposits in Western Tasmania include:

Renison
Mt Bischoff
Henty
Oceana
Zeehan Field

There is evidence for at least one period of Cambrian deformation during which time regional structures such as the Henty and Rosebery Faults were active and appear to have influenced volcanism, sedimentation and mineralisation.

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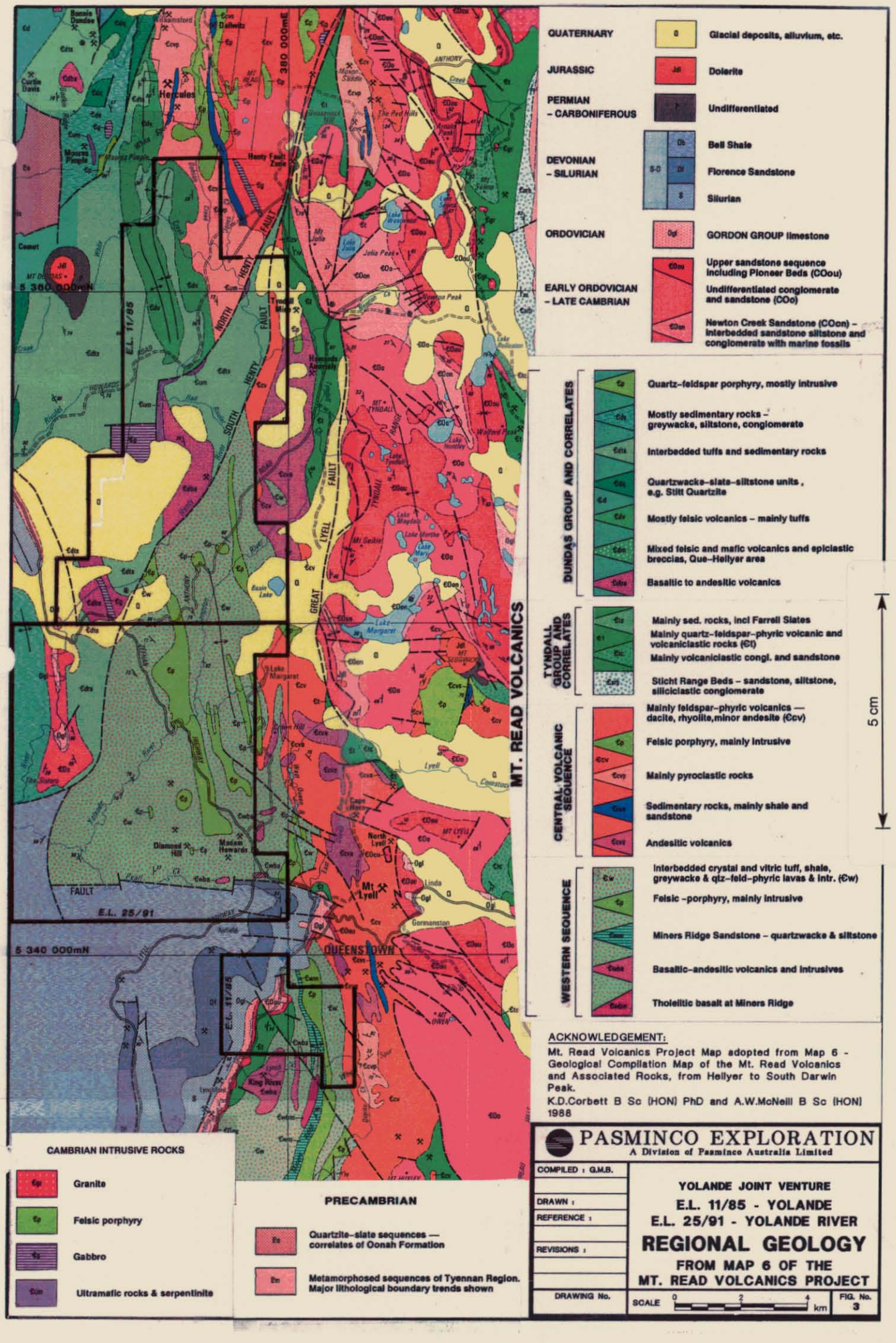


ACKNOWLEDGEMENT:

Mt. Read Volcanics Project Map adopted from Map 6 - Geological Compilation Map of the Mt. Read Volcanics and Associated Rocks, from Hellyer to South Darwin Peak.

K.D.Corbett B Sc (HON) PhD and A.W.McNeill B Sc (HON) 1988

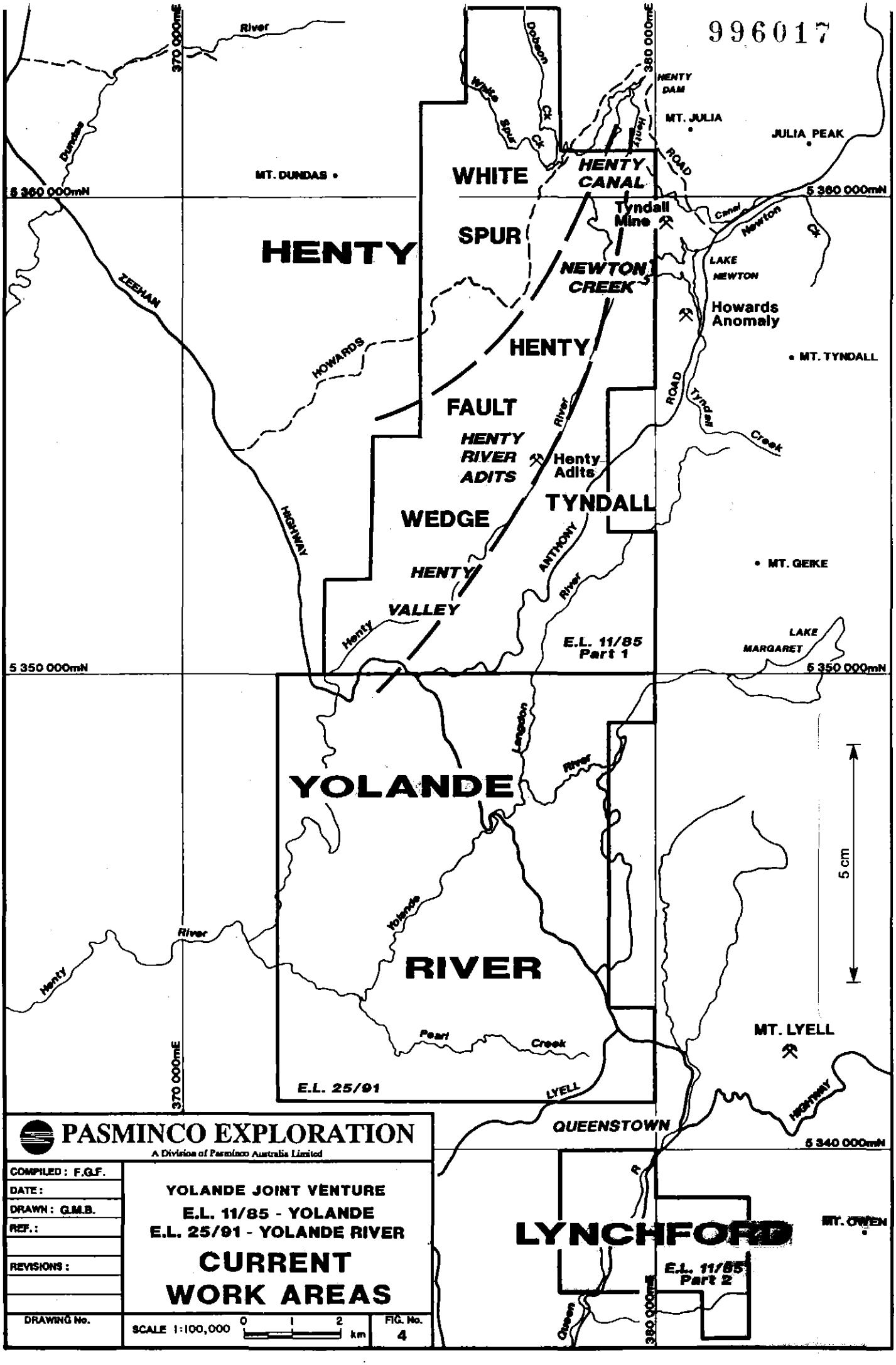
PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

COMPILED : G.M.B.	YOLANDE JOINT VENTURE
DRAWN :	E.L. 11/85 - YOLANDE
REFERENCE :	E.L. 25/91 - YOLANDE RIVER
REVISIONS :	**REGIONAL GEOLOGY**
	FROM MAP 6 OF THE MT. READ VOLCANICS PROJECT
DRAWING No.	SCALE 0 2 4 km — FIG. No. 3

Sedimentation continued in the Dundas Trough after the cessation of volcanism in the late Cambrian. Initially these sediments were partly derived from the volcanics, but during the Ordovician, extensive sediments predominantly derived from Precambrian metamorphics were deposited. This period of sedimentation culminated in the wide spread deposition of a shelf limestone sequence.

The late Devonian Tabberabberan Orogeny in Western Tasmania resulted in the development of predominantly open NNW trending folds in the Ordovician–Devonian cover sequence. Underlying Cambrian structures were significantly modified by this event. Extensive granite emplacement occurred in the latter stages of the Orogeny and were associated with structurally controlled and carbonate replacement tin–tungsten and gold mineralisation.

The Devonian was followed by erosion and glaciation. Younger Palaeozoic sediments were intruded by Jurassic dolerites and extensive uplift and erosion followed. Much of the prospective sequences north of Hellyer were later covered by the extrusion of Tertiary flood basalts.


996017
370 000mE
380 000mE
River
Dundas
MT. DUNDAS
5 360 000mN
Dobson
Myke Spur
Ck
Henty
HENTY DAM
MT. JULIA
JULIA PEAK
ROAD
WHITE
SPUR
HENTY CANAL
Tyndall Mine
Canal
Newton
Ck
LAKE NEWTON
HENTY
NEWTON CREEK
Howards Anomaly
ZEEHAN
HOWARDS
HENTY
MT. TYNDALL
FAULT
River
ROAD
Tyndall
Creek
HENTY RIVER ADITS
Henty Adits
TYNDALL
WEDGE
HIGHWAY
ANTHONY
MT. GEIKE
HENTY
VALLEY
Henty
River
E.L. 11/85 Part 1
LAKE MARGARET
5 350 000mN
Langdon
River
YOLANDE
5 cm
Yolande
River
Henty
River
RIVER
Pearl
Creek
MT. LYELL
E.L. 25/91
LYELL
HIGHWAY
QUEENSTOWN
5 340 000mN
LYNCHFORD
MT. OWEN
E.L. 11/85 Part 2
Queen
380 000mE
PASMINCO EXPLORATION
A Division of Pasminco Australia Limited
COMPILED : F.G.F.
DATE :
DRAWN : G.M.B.
REF. :
REVISIONS :
DRAWING No.
YOLANDE JOINT VENTURE
E.L. 11/85 - YOLANDE
E.L. 25/91 - YOLANDE RIVER
CURRENT WORK AREAS
SCALE 1:100,000
0 1 2 km
FIG. No. 4

5 WORK COMPLETED JULY 1992 – JUNE 1993

5.1 Gridding and Sampling: Newton Creek

Infill line 5358300mN was cut, pegged and soil/wacker sampled from the South Henty Fault to 379560mE following up base metal anomalies identified during the previous season. A further line at 5357900mN was abandoned due to precipitous terrain.

Results are shown in Table 2 and in Figure 9. Three anomalous zones are recognised with a strong correlation between elevated Zn, Fe, Mn, Cu, and Pb, and a minor elevation of As is noted.

Correlation of values between lines remains ambiguous, however the following explanation is consistent with results.

Anomalous zones correlate with values recorded on line 5358400mN with a trend of 325 degrees AMG. This orientation is sub-parallel to the trend of the White Spur Creek Fault, north of the South Henty Fault (SHF), and to the faulted lower contact of the magnetite bearing hornblende-phyric andesite, which forms the faulted footwall to the Newton Creek Spillway sediments.

The zones appear to continue with a minor offset across the South Henty Fault.

The zones are terminated in the south by a cross structure which is interpreted from magnetics.

Whilst the South Henty Fault has anomalous geochemistry, in part, it is not consistently mineralised. Anomalous geochemistry along the SHF coincides with anomalous geochemistry away from the fault.

This implies that the significant mineralising structure is the White Spur Creek Fault and other structures with a similar trend, and not the South Henty Fault.

5.2 Geological Mapping

5.2.1 WHITE SPUR

Geological investigations in the White Spur area have concentrated on the zone surrounding the Rosebery–Hercules Sequence (RHS) and White Spur Formation (WSF) contact in the vicinity of anomalous geochemistry and alteration, identified during the previous season.
The investigations have included: field mapping; gathering of outcrop magnetic susceptibility data; lithogeochemical sampling; interpretation of aeromagnetic and radiometric data and a review of old geochemistry and IP surveys.

Field mapping has identified a set of open parasitic folds plunging shallowly to the south, corresponding with the area of most interest. The short limbs of the parasitic folds appear to be partly accentuated by faulting. The folds are on the western limb of an anticline.

To the east of the RHS/WSF contact the rock type consists of feldspar–phyric, pumiceous, rhyodacitic volcaniclastics and lavas. These rocks have a pink and green blotchy appearance due to Devonian? chlorite/albite alteration, and have a magnetic susceptibilities of between 7.0 and 10.0 (x 10^{-3}). Lithogeochemically these rocks fall into the Mount Black Volcanics (MBV) rather than the Footwall Sequence (FW) field (Fig 22, and Table 2). The high magnetic susceptibility and alteration type is consistent with Mount Black Volcanics.

The White Spur Formation onlaps the Rosebery – Hercules Sequence from the west and the Mount Black Volcanics are thrust over the Footwall Sequence from the east.
This implies that the Footwall Sequence lies below these rocks and that the low alteration index values recorded on the surface need not reflect the degree of alteration at depth.

The WSF/RHS contact is obscured by a peperite consisting of a feldspar, hornblende–phyric lava mixed with pyritic cherty mudstones, and a quartz, feldspar, pyroxene–phyric porphyry. Dugdale (1992) suggests, on petrographic evidence, that these two volcanics are unrelated. A further peperitic quartz feldspar–phyric lava occurs in a black shale unit 250m to the west, within the White Spur Formation.

TABLE 2

YOLANDE – WHITE SPUR SAMPLES

(values in %)

SAMPLE	FORMATION	LITHOLOGY	SiO2	A1203	TiO2	Fe203	MnO	CaO	K20	MgO	P205	Na20	AI *	Ti/Zr
35069	CVC	Vpmf	71.40	14.09	0.50	3.19	0.07	0.58	0.77	1.07	0.06	4.74	26	11.1
35071	CVC	Vpmf	70.50	14.74	0.51	3.53	0.08	0.69	1.71	1.02	0.10	5.96	29	11.6
35073	CVC	Vpmf	72.40	13.58	0.48	2.53	0.04	2.25	1.74	1.08	0.08	1.99	40	11.8
35066	WSF	WSF	56.50	22.90	0.70	4.29	0.04	0.15	5.04	2.61	0.17	0.93	88	
31584	WSF	WSF	63.60	19.36	0.71	4.25	0.04	0.03	2.53	2.44	0.06	1.18	96	
35064	WSF	WSF	66.20	17.42	0.69	3.79	0.04	<0.01	4.31	1.84	0.12	0.19	97	
35075	WSF	WSF	69.30	13.83	0.86	3.71	0.02	0.01	3.31	2.20	0.04	0.10	98	
35070	WSF	WSF	73.20	12.40	0.55	3.94	0.01	0.01	2.71	1.05	0.06	1.07	78	
35068	WSF	WSF	73.90	13.64	0.60	2.36	0.02	0.01	3.91	0.97	0.02	0.16	97	

(values in ppm)

SAMPLE	FORMATION	LITHOLOGY	Rb	Sr	V	Nb	Y	Zr
35069	CVC	Vpmf	28	242	26	16	30	269
35071	CVC	Vpmf	39	187	26	15	33	263
35073	CVC	Vpmf	87	371	34	15	38	243

AI = Alteration Index

$$\frac{100\ (K_2O + MgO)}{(Na_2O + CaO + K_2O) + MgO)}$$

020966

The White Spur Formation overlying the Rosebery–Hercules Sequence consists of a unit of turbidites and black shales which is overlain by a very coarse grained polymict breccia. The polymict breccia is quartz–phyric and contains clasts of black shale, siltstone, quartz porphyry and rare massive pyrite. It is distinctive and is similar to typical Hercules and Rosebery Hangingwall Epiclastics. The turbidite black shale unit is similar to the turbidite and black shale occurring between the Hercules Host Rocks and the Hangingwall Epiclasitics. A further similarity is the presence of enigmatic mica/feldspar alteration within shales.

A diamond drill hole designed to intersect the sequence from the polymict breccia through the parasitic folds in the altered shales and to end in the RHS is to be drilled in the coming year. The target is a Rosebery–Hercules type massive sulphide located in RHS rocks below altered black shales and covered by overthrust Mount Black Volcanics.

5.2.2 NEWTON CREEK – HENTY CANAL

Geological mapping in the Newton Creek – Henty Canal area has attempted to correlate geological units. This was specifically aimed at finding the source of the zinc–rich sulphide clasts found in the Newton Creek Spillway.
Mapping, in conjunction with lithogeochemical sampling, interpretation of magnetic images (Figs. 32 & 33 & 34), inspection of HEC diamond drill core and review of existing IP data, has indicated the following:

1. The "spillway footwall andesite" is geochemically very similar to the Anthony Road Andesites and is considered to represent its feeder.
2. Aeromagnetic data suggests that the "spillway footwall andesite" occupies a structure that appears to have influenced the thickness of sediments, the thickness of lavas and the occurrence of mineralisation.
3. There is a rapid variation in the thickness of sediments and in the mixed andesite sedimentary sequence between YNC5 and the Henty Canal.
4. Geochemically the rhyodacites, dacites, andesites and rhyolites are discrete lithologies.
5. Dacites and andesites are peperitic and are thus conformable.

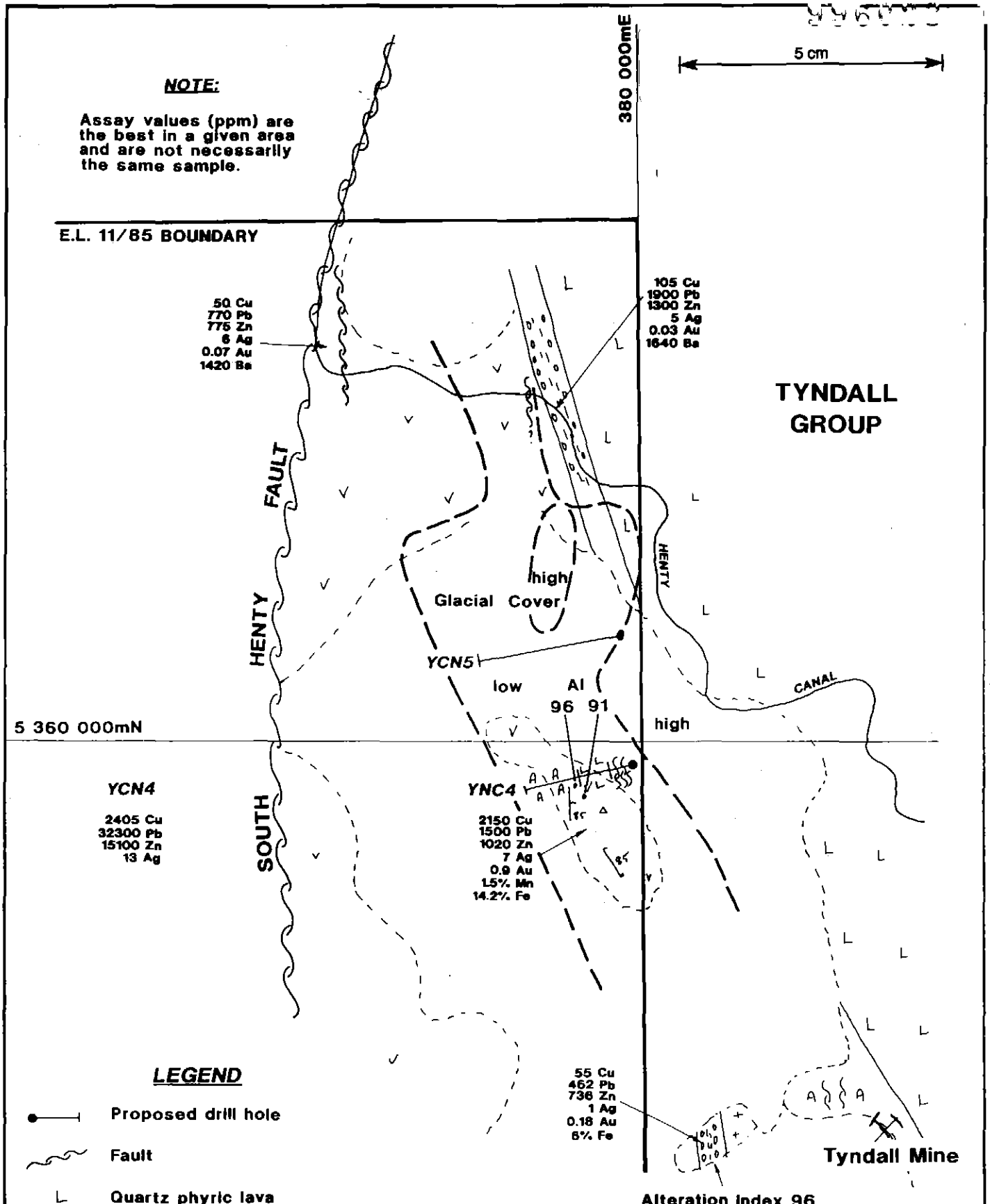
TABLE 1

YOLANDE SOIL SAMPLING – NEWTON CREEK

Job No. 9262

Sample	Type	Cu	Pb	Zn	Ag	Fe%	Mn	As
35018	rock	15	32	82	<1	4.50	269	14
35019	soil	180	285	285	<1	19.60	1680	50
35020	rock	44	58	77	<1	0.91	176	3
35021	soil	13	10	40	<1	3.00	58	3
35022	wacker	4	22	68	<1	1.31	70	<1
35023	soil	220	19	285	<1	8.00	730	<1
35024	soil	45	12	200	<1	10.00	190	4
35025	soil	13	8	140	<1	6.70	127	2
35026	soil	3	4	29	<1	0.81	35	2
35027	soil	4	12	6	<1	0.21	15	2
35028	soil	4	4	5	<1	0.31	21	2
35029	soil	3	4	6	<1	0.25	20	3
35030	soil	5	4	33	<1	1.70	115	6
35031	soil	4	5	11	<1	1.53	44	6
35032	soil	5	3	29	<1	1.07	68	3
35033	soil	9	7	63	<1	1.39	98	2
35034	soil	6	7	74	<1	2.58	74	2
35035	soil	15	9	93	<1	4.36	144	2
35036	soil	13	16	105	<1	7.10	293	5

values in ppm unless otherwise stated



PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

COMPILED: P.M.O.	E.L. 11/85 - YOLANDE JV
DATE: April 1993	HENTY CANAL
DRAWN: P.M.O./P.G.R.	SIMPLIFIED GEOLOGY
REF.:	
REVISIONS:	
DRAWING No.	SCALE 1:10,000 (0 – 200 m)
	FIG. No. 19

6. Dacites that form the hangingwall to the spillway conglomerate correlate geochemically with the following:
   a. clasts within the spillway conglomerate;
   b. the base of the dacites overlying rhyodacites in YNC1;
   c. the top of the dacites which are overlain by andesites in YNC4 & YNC5.
   d. altered lavas associated with mineralisation in YNC5
   e. altered volcanic breccia near the gate west of the Tyndall Mine (Fig. 19) with AI of 96.
7. The source of the "spillway sulphide clasts" is probably close to the dacite / rhyodacite contact. It is associated with Mn carbonate, sericite and K-feldspar altered dacites and with increased sediment thickness.
8. Altered dacites, thicker units of sediments and anomalous geochemistry, all occur to between the Newton Creek spillway and the Henty Canal.
9. A subtle anomalous IP response occurs over the mineralised andesites drilled in YNC4. A stronger response exists immediately to the north of YNC5. This will be drilled in the coming period.
10. The haematitic mixed andesite / sediment sequence in YNC5 is correlated with the Howards Anomaly.
11. Andesite lava breccias were drilled in HEC Diamond drill holes 3181 & 3183 about 100m east of the spillway.
12. Intrusive quartz-phyric porphyries of Tyndall Group rhyolites occur within the andesite/sediment package.

Exploration during the coming period will be focused on the highly prospective area between the Newton Creek spillway and the Henty Canal.

5.2.3 HENTY VALLEY (M.QUAYLE + B.MURPHY)

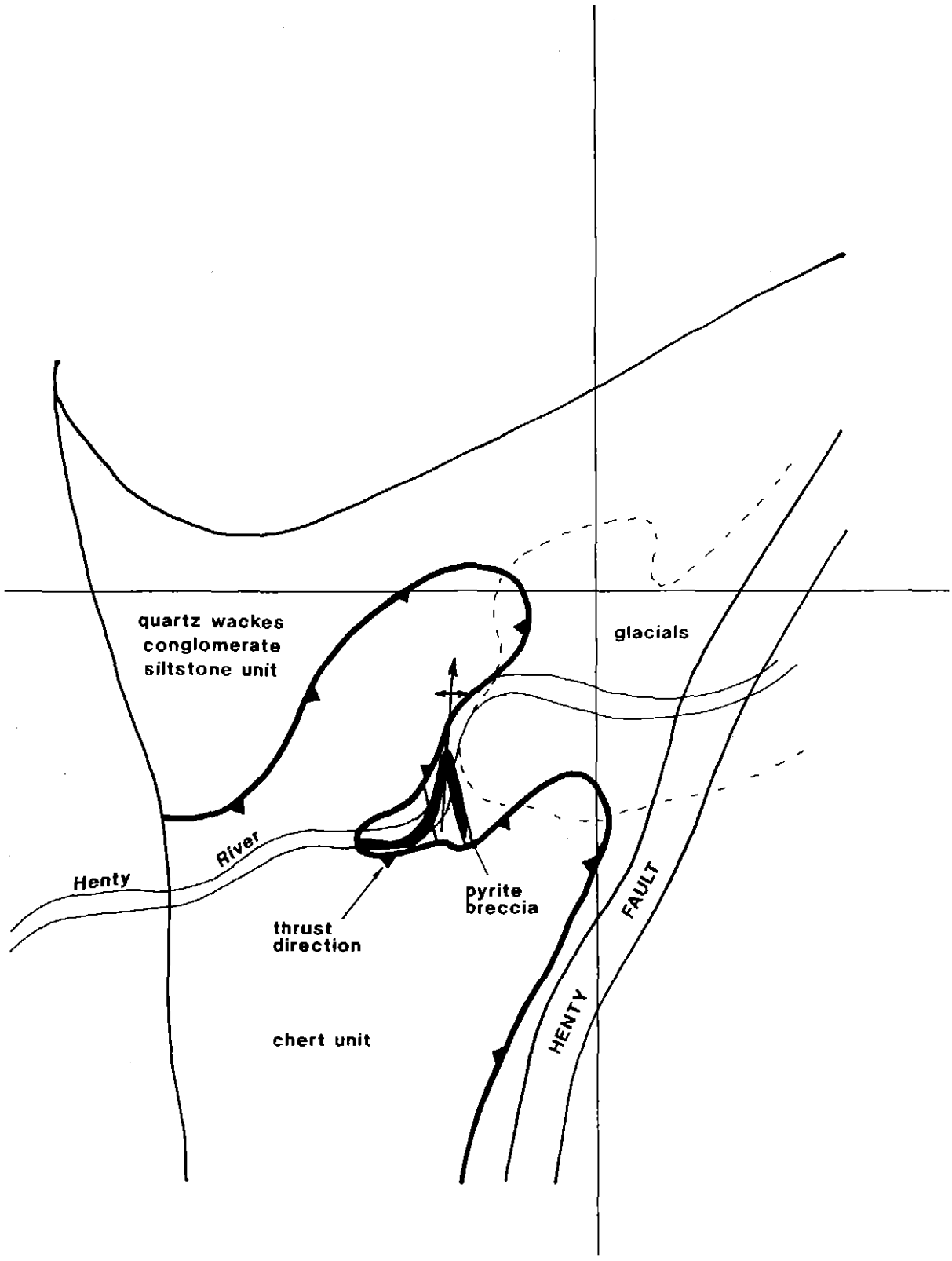
Detailed geological mapping was carried out in the vicinity of outcrops of massive pyrite discovered in the bed of the Henty River during 1991.

Maximum assay results from the pyritic zone include:

50ppm Cu,1.23% Pb, 7700ppm Zn, 12ppm Ag

<0.008ppm Au, 37.8% Fe, 25ppm Ba

996025



PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

COMPILED : P.M.Q.	E.L. 11/85 - YOLANDE JV
DATE : Mar., 1993	HENTY VALLEY
DRAWN :	**HENTY VALLEY THRUST**
REF. :	
REVISIONS :	
DRAWING No.	SCALE 1:5000
	FIG. No. 20

Geological mapping has identified a shallow thrusted contact (Fig.20) between the chert dominated unit to the south and the mixed greywacke, siltstone, conglomerate unit to the north.

Evidence for the thrust is as follows:

1 Cataclastic fabric with steep slickensides developed at the contact; these locally have a back thrust orientation with respect to the low angle zone.

2 Subhorizontal quartz veins, indicating vertical extension in both cherts and greywackes.

3 Increased fracturing in the cherts above the contact show two main trends with apparent sinistral and dextral offsets occurring on similarly oriented fractures. A preliminary interpretation suggests that they represent a conjugate set in relation to the thrust direction (040/050 degrees).

4 Timing relationships between the flat quartz veins and the steep fractures show that the veins generally post-date the fractures. Both sets of structures are closely related to the kinematics of the thrusting event.

The pre-thrust geometry in both the cherts and the greywackes involved F1 folds and S1 cleavage.

In the greywackes the structural trend is generally NE and the folds are moderately to steeply plunging to the north. Some re-orientation of cleavage occurs close to the thrust plane. In the cherts the structural trend is more northerly, the F1 folds may be doubly plunging.

S1 and F1 are unrelated to and pre-date the thrust deformation. The thrust geometry indicates that the cherts are older than the greywackes.

The pyrite breccia is a stratiform unit interpreted to occupy the core of an antiform in the north east part of the river. The western limb is apparently faulted and passes into a broader synform to the west. It occurs within the underlying greywacke unit and thus may be more extensive below overthrust cherts than present exposure indicates.

A proposed IP survey totalling 2.7km along two EW lines straddling the sulphide occurrence and one NS line through it should give an indication of the extent of the zone. If this survey gives encouraging results then the target will be drilled during the summer.

5.3 Diamond Drilling

Six diamond drill holes have been drilled during the year totalling 851.65m. Of these, five were drilled in the Newton Creek – Henty Canal area, and one in the Henty Valley area. Four of the holes were drilled with a man–portable drilling rig. The purpose of using such a rig was to obtain specific geological information, whilst causing minimal impact on environmentally sensitive and extremely rugged areas. Movement of the portable rig was in part helicopter–supported. The drilling statistics are summarised in Table 3 and drill logs appear in Appendix 4.

5.3.1 NEWTON CREEK

A series of three short diamond drill holes were drilled to the S/W of the Newton Dam (Figure 5).

The purpose of the first hole was to observe the nature of the contact relationships of a sandstone–conglomerate unit and to correlate it with the zone of sandstones and conglomerates containing sulphide clasts at the Newton Dam Spillway.

The two other holes were drilled to establish the orientation and nature of a sulphidic siltstone identified during the previous season. The portable rig encountered considerable difficulty in drilling these holes due to broken ground, but despite this was however successful in achieving the aims of the program.

YNC1 (61.2m in length)

Four main lithologies were encountered, these are described from to west to east going up stratigraphy as follows:

a. Rhyodacite plagioclase–phyric pumiceous lava breccia with only minor alteration.
b. Interbedded fine grained sandstone to siltstone derived from felsic volcanics and a metapelitic source. This interval is strongly hydrothermally (sericite–calcite–pyrite) altered and has a weak cleavage developed.
c. Reworked autobrecciated dacitic lava. This is a transition zone from a conglomerate containing minor polymictic clasts becoming increasingly monomictic towards the overlying lavas.
d. Plagioclase–phyric dacitic lava with minor silica–sericite–calcite hydrothermal alteration.

TABLE 3

DIAMOND DRILLING STATISTICS 1992 – 1993

HOLE No.	Prospect/Area	Depth (m)
YNC1	Newton Creek	61.2
YNC2	Newton Creek	53.2
YNC3	Newton Creek	35.05
YNC4	Newton Creek	272.0
YNC5	Newton Creek	364.5
YHV1	Henty Valley	65.7
	TOTAL	851.65

TABLE 4

SIGNIFICANT MINERALISED INTERSECTIONS

DDH YNC4

(values in ppm)

from	**to**	**interval**	**Cu**	**Pb**	**Zn**	**Ag**	**Au**	**Ba**
152.8	156.7	3.9	804	7032	10104	6.1	0.5	15452
172.1	175.7	3.6	111	3070	5162		0.2	1243

note:

The first interval contained upto 18.9% Fe and upto 1.6% Mn much of it in carbonate.
All As values were less than 40 ppm.

Comments:

The dacites are similar to and hereby correlated with the dacites overlying the Newton Spillway (sulphide clast bearing) conglomerate.

The rhyodacite and dacite lavas are both massive and represent significantly different types of volcanics.

A sediment with terrigenous component occurs at the contact. The sequence is grossly conformable.

The sequence dips at 45 degrees and faces to the east.

Only weak cleavage is developed.

The sediments are the most altered and the rhyodacites the least altered in the sequence.

Minor disseminated pyrrhotite is ubiquitous without change in abundance throughout the lithologies.

YNC2 + YNC3 (Figure 5,)

Anomalous Base metal values were recorded in siltstones during the previous season. The orientation of these mineralised sediments could not be established from outcrop however cleavage to bedding relationships of float indicated either a sub-horizontal, or a 45 degrees W orientation.

YNC2 was drilled to establish the nature and orientation of these anomalous sediments.

The following zones were intersected:

From 0 - 39.6m; massive, pumiceous, feldspar-phyric acid volcanics and volcaniclastics. Chloritic patches resembling Rosebery Footwall stylolites are common. Minor occurrences of 1 to 5mm sized pyrite clasts were noted.

From 39.6 - 53.2m; interbedded siltstones, sandstones and pumiceous mass flow deposits. The sediments are laminated and contain a terrigenous component. Crawford petrographically described these sediments at surface as quartz-rich greywackes similar to the Miners Ridge Sandstone (Poltock 1992a).

The drill hole encountered difficulties before completing the required section and so a further hole was drilled.

YNC3 encountered similar lithologies to YNC2 but with an increased abundance of pyrite clasts. Elevated barium values of 1043ppm are associated with this pyrite clast zone.

A massive aphyric vesicular basalt was intersected, which correlates with an outcropping basalt and indicates a grossly conformable orientation.

This DDH also failed to provide a complete section however the primary aim of the drilling was achieved.

Comments:
Similarly mineralised sediments were encountered in drilling confirming a subhorizontal orientation. Pyrite clasts were observed indicating a potential proximal sulphide occurrence. A terrigenous component to the sediments indicates a break in volcanic activity. If a volcanogenic siltstone outcropping in Newton Creek can be correlated with the above siltstones, then an open synform is indicated.

5.3.2 NEWTON CREEK - HENTY CANAL

Two diamond drill holes were drilled between Newton Dam and the Henty Canal (Figs 6, 7). The object of these holes was to test a zone of alteration coincident with anomalous base and precious metals and IP response. Summaries of the important geological results fro each of these holes are presented below.

YNC4 + YNC5 were drilled to test an area where altered volcanics outcrop through a "window" of glacial cover (Figs. 6, 7). These volcanics have high calculated alteration index values (91 and 96) and anomalous base and precious metal values.
The following key ore indicators add to the potential of the target area:

1 The target zone occurs near the "feldspar to quartz transition", near a break in volcanism marked by the presence of epiclastics, and near a change in volcanic types, from dacite to andesite to rhyolite.
2 They appear to be laterally equivalent to the Howards Anomaly and its associated alteration zone.
3 Massive zinc-rich sulphide clasts are known to occur in the vicinity.
4 The area is proximal to the South Henty and Great Lyell Faults and to cross structures inferred from magnetics.
5 The target also coincides with untested anomalous IP response.

YNC4

DDH YNC4 drilled to a depth of 272m intersected a mixed volcanic – sedimentary sequence containing significant mineralisation (Fig. 6).

Four main lithologies were intersected (described from west to east, going up hole and up sequence) as follows:

1 Massive dacites of the Central Volcanic Complex,

2 A mixed andesite/sediment sequence correlated with the Anthony Road Andesites, and Howards Anomaly.

3 Massive quartz–phyric rhyolites of the Tyndall Group,

4 A sheared and weathered clastic unit containing andesite clasts.

Lavas

The dacites and andesites are both distinctly peperitic in part and are thus sub–marine lavas. The rhyolite is possibly a high level intrusive within the top of the andesite sediment package. The rhyolite is distinctly pink in colour and has a high magnetic susceptibility.

Sediments

Although the sediments are heavily overprinted with peperite, a sequence can be recognised. The sediments include cherty siltstones, poorly sorted sandstones and polymict conglomerates.

Contacts:

Cherty siltstones straddle the dacite – andesite contact, both with peperitic textures, indicating a conformable contact. Clasts of massive dacite occur in the polymict conglomerate overprinted with andesite pepertite.

The andesite – rhyolite contact is sharp and minor bleaching near the contact could represent chilling, indicative of an intrusive contact.

The upper contact of the rhyolite is faulted against sheared and weathered clastics that contain andesite clasts but no phyric quartz, which is so distinctive in the rhyolites.

Mineralisation

A zone of about 40m true width contains anomalous base and precious metals. The best intersection is about 150m below surface and is as follows:

3.9m at	804 Cu	7032 Pb	10104 Zn
	6.1 Ag	0.5 Au	15452 Ba (values in ppm)

The zone occurs within the andesite sediment package generally associated with straw coloured carbonate veins. The veins appear to be infilling primary fractures and brecciation in the lavas. Fine grained pyrite and galena and pale sphalerite are the main minerals, however minor 20mm patches of massive brown sphalerite occur, which resemble either insitu crystal growth or a fragment incorporated in a breccia.

Both the underlying dacites and the overlying rhyolites appear unmineralised.

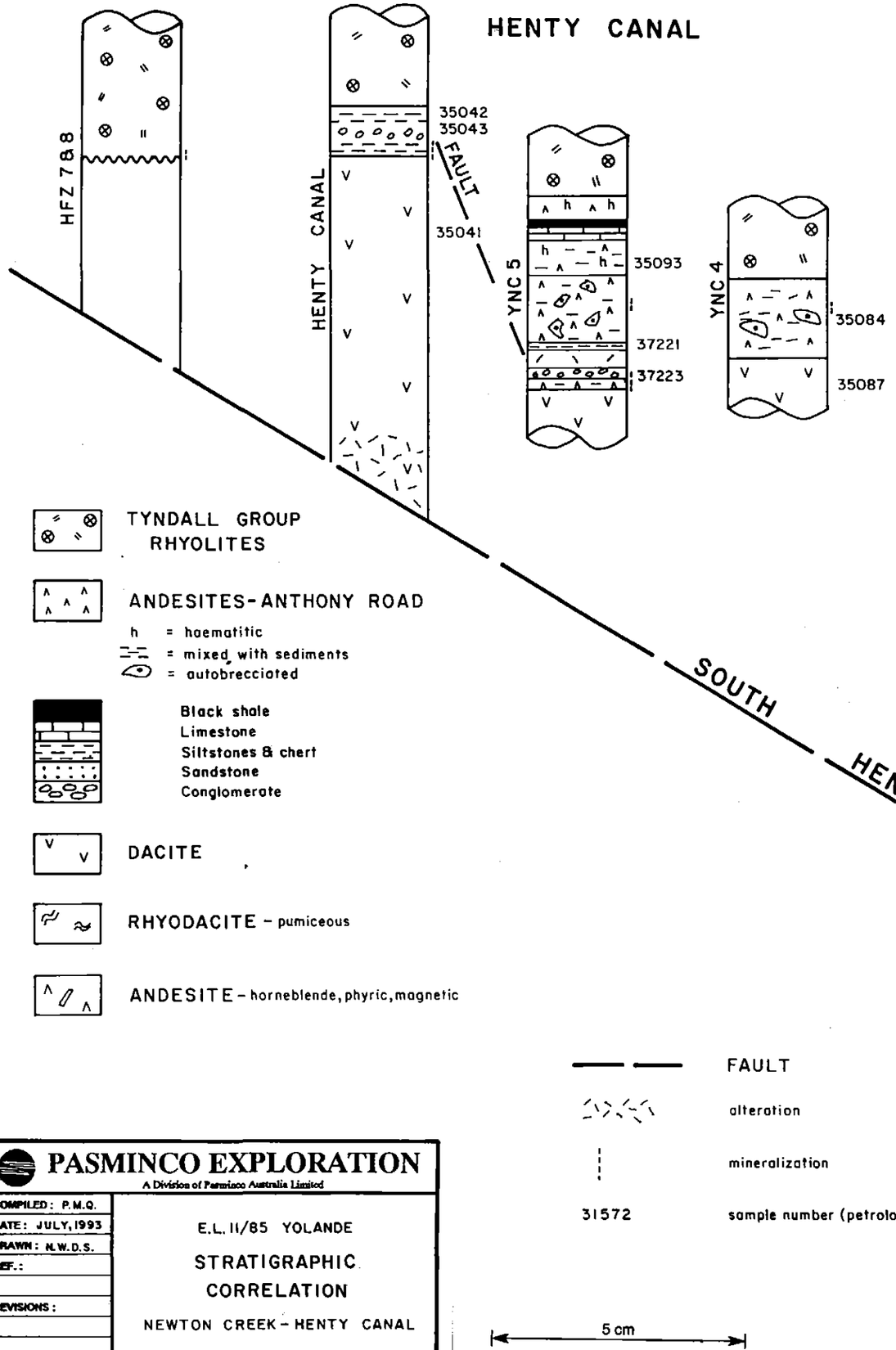
YNC5

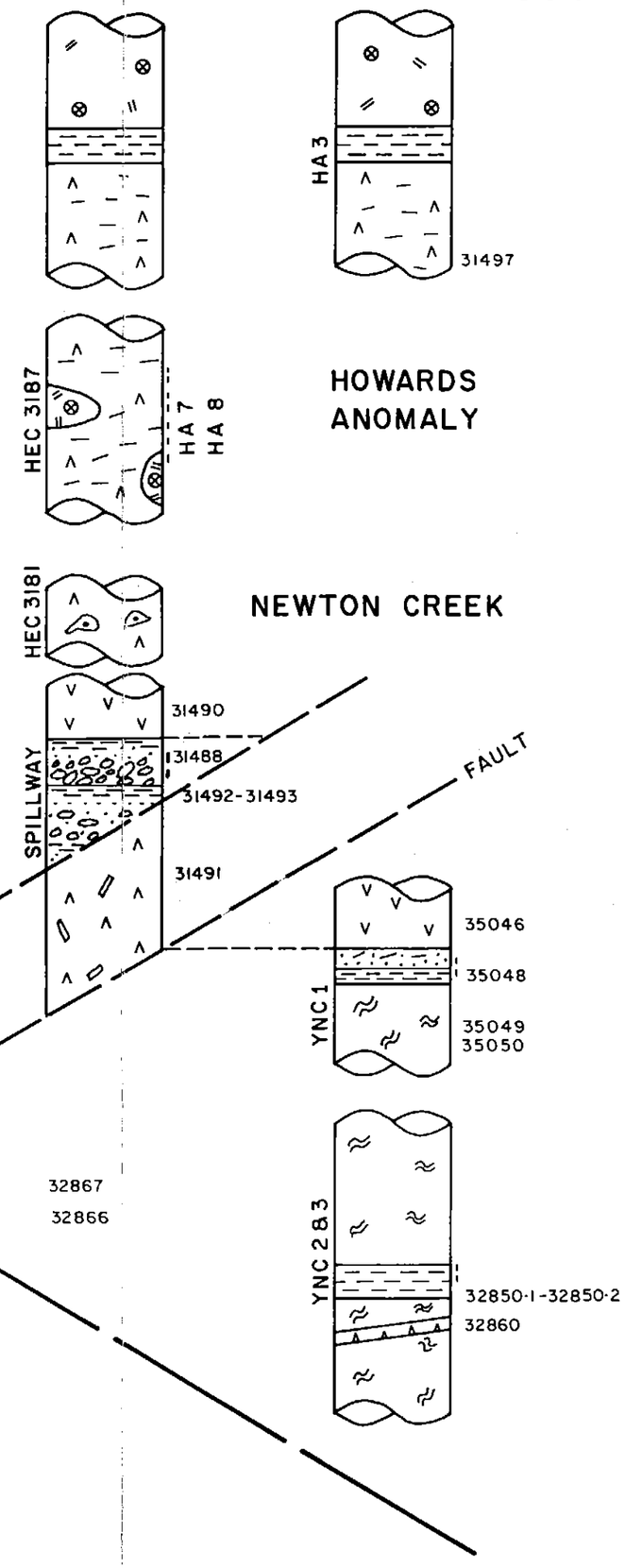
DDH YNC5 was drilled to a depth of 364,5m. The hole (Fig. 7) was drilled to follow up encouraging mineralisation intersected in YNC4 and to investigate a zone of thickening in the andesite/sediment sequence and an apparent magnetic dislocation corresponding to the mineralised zone. These features are consistent with the presence of a growth fault which could have influenced volcanism, sedimentation and mineralisation.

Whilst both holes are similar significant differences exist.

Seven main units were intersected in YNC5 (described from west to east going up hole and up sequence) as follows:

1. Massive feldspar-phyric dacites;
2. A sequence of mixed mineralised sediments, altered dacites and conglomerate derived predominantly from dacites;
3. Massive feldspar-phyric dacites with faulted upper and lower contacts;
4. Massive autoclastic andesites;
5. A mixed sediment-andesite sequence typified by haematitic alteration and carbonate veining;
6. A zone of varied terrigenous sediments including limestones, black shales, wackes and conglomerates;
7. Tyndall Group rhyolites.





PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

COMPILED: P.M.Q.	E.L. 11/85 YOLANDE
DATE: JULY, 1993	STRATIGRAPHIC CORRELATION
DRAWN: N.W.D.S.	NEWTON CREEK - HENTY CANAL
REF.:	
REVISIONS:	
DRAWING No.	SCALE N.T.S.
FIG. No. 21	

Fig.21

Units 1 and 3 are massive dacites similar in appearance and geochemistry to dacites hangingwall to the Newton Creek Spillway conglomerates (Figs. 23 & 24 & 25).

Unit 2 is a zone of considerable interest. The base of this zone consists of hyaloclastitic andesite/dacite with bands of pale alteration. This is overlain by an enigmatic carbonate altered and mineralised primary breccia 4.5m thick, with straw coloured very fine grained carbonate and common 10mm clasts of red brown sphalerite. This is overlain by a 15m wide zone of sericite-calcite altered aphyric felsic lava (Appendix 8, sample 37223) which geochemically falls into the dacite field (Fig. 23, 24, 25).
Veinlets of fine grained sphalerite occur throughout. Overlying the altered lava is a zone of bedded mineralised and highly silicified siltstones and sandstones which appears to grade upwards into a massive conglomerate. This conglomerate which is some 19m thick resembles the Newton Creek Spillway conglomerate. This conglomerate is overlain by two metres of massive sandstone, which is in faulted contact with overlying dacites.

Assay results from the mineralised zone are not yet available.

Mapping, magnetic interpretation (Figs. 32 & 33 & 34) and contact features are consistent with the Tyndall Group rhyolites intersected in both YNC4 & YNC5 being intrusive bodies within the andesite/sediment sequence. Thus the haematitic zone intersected in YNC5 but not in YNC4 could occur to the east of YNC4's collar.

It is assumed, from broad stratigraphic relationships that the younging direction is to the east although little convincing field evidence has been found.

Features including lithology, mineralisation and alteration type all suggest proximity to an ore body that could have produced the sulphide clasts found in the spillway.

Further diamond drilling will follow during the coming year.

5.3.3 HENTY VALLEY

DDH YHV1 was drilled to a depth of 65.7m a by portable drilling rig. The target was a geochemical anomaly from a gossan within andesites similar in composition and possibly equivalent to those associated with the Henty Adits mineralisation.

YHV1 (Fig. 8) intersected a conformable sediment / lava sequence. The sediments (from the top of the hole) are medium grained massive chlorite altered sandstones, black shales with peperitic mixing with lavas, black shales with fine laminae of granular carbonate, and massive, granular carbonate. The lava is a distinctive plagioclase–phyric andesite.
The lava contact with the upper sandstone is sharp and possibly faulted, however contacts with the shales are conformable with a peperitic texture.

A nine metre zone of bleaching and prominent fuchsitic alteration occurs within the lava unit, and is associated with several 5 to 15cm thick quartz pyrite veins. Minor fine grained disseminated pyrite occurs in the shales and carbonate units.

Limited petrology and geochemical analyses will be undertaken to further correlate these lithologies.

5.4 Geochemistry

5.4.1 DATABASE

A total of 42 whole rock , 31 lithogeochemical and 74 ore suite analyses have been collected during this period (Fig 9, Appendix 1, 2).
A further 2523 soil sample analyses from 1975 Gold Fields Exploration have been added to the database.
At present the Yolande database comprises the following analyses:
total

ore suite	4868
whole rock	81
lithogeochemical	155

Anomalous levels for various elements are summarised in Table 5. These levels are calculated by applying a cut–off factor, and adding two standard deviations to the mean for each element. All samples types have been used in this table and the anomalous values are intended only as a guide. For detailed investigations, sub–sets of similar sample type should be created with appropriate cut–off values for specific areas.

5.4.2 WHITE SPUR

The main focus of lithogeochemical investigations in the White Spur area has been aimed at determining the nature of the CVC rocks, and identifying zones of alteration in the WSF shales.

Figure 22 is a scatter plot of SiO2 vs Ti:Zr for over 400 samples of Mount Black Volcanics and Rosebery – Hercules Footwall Sequence. This plot shows a significantly different trend for these units but with an area of overlap. Samples taken from the study area fall within the MBV field. This is further supported by the magnetic character and chlorite – albite alteration type of these samples. This identification is significant in understanding the structure, stratigraphy and exploration potential of the area and needs further confirmation.

Alteration Index values in black shales need careful interpretation. However, the zone of alteration found in the White Spur Canal last year has been extended for over 700m in length and 200m in width.

5.4.3 NEWTON CREEK

Lithologies of interest in the Newton Creek area are centred around the enigmatic spillway conglomerate, which contains zinc–rich massive sulphide clasts.
These lithologies include:

1 Massive hornblende–phyric andesite, the faulted footwall to the spillway conglomerate;
2 Massive dacites hangingwall to the spillway conglomerate;
3 Clasts from within the spillway conglomerate;
4 Rhyodacite lavas and volcaniclastics of the Central Volcanic Complex to the west;
5 Andesite lavas and volcaniclastics of the Anthony Road Andesite;
6 Howards Anomaly andesite/sediment package to the west.

TABLE 5

ANOMALOUS ELEMENT LEVELS

Element	Samples	Cut off	Mean	SD	Mean+2SD
Cu	4745	5000	33	131	295
Pb	4768	20000	89	656	1401
Zn	4833	20000	153	825	1803
Ag	1291	40	1.1	2.28	5.66
Au	1340	2	0.011	0.063	0.137
Fe%	428	10	4.4	2.2	8.8
Ba	1581	3000	463	390	1243
Mn	1680	3000	479	615	1709
As	1760	3000	20	88	196

values in ppm unless otherwise stated

note: all sample types included

A programme of lithogeochemical sampling was embarked on to characterise these lithologies and to identify lithologies associated with the mineralisation.

The spatial relationships of these units are shown in Figure 21, and the geochemical relationships (Figs. 24, 25) are summarised as follows:

1 The rhyodacites, dacites and andesites are geochemically distinct.

2 The massive hornblende–phyric andesite, footwall to the spillway conglomerate, is similar to and hereby correlated with Anthony Road Andesites.

3 The massive dacite, hangingwall to the spillway conglomerate, is similar to the upper unit in YNC1 and the lowest unit in YNC4 and YNC5.

4 The rhyodacite in YNC1 also occurs as clasts in the spillway and west of the road north of the dam.

5 Altered volcanics from outcrop above the mineralised zone in YNC4 fall in the dacite field.

6 Sample 37223 is mineralised and its alteration type is indicative of proximity to massive sulphide mineralisation. The sample has low SiO2 (57.4%) and high LOI (6.79%) values for Zr, TiO2 and P2O5 and correlates well with the dacite field (Figs. 24 & 25).

7 Several clasts from the spillway correlate with either dacites or rhyodacites, there are however clasts with anomalously high Ti:Zr which may fall in the andesite field.

8 Tyndall Group rhyolites are distinguished by low TiO2.

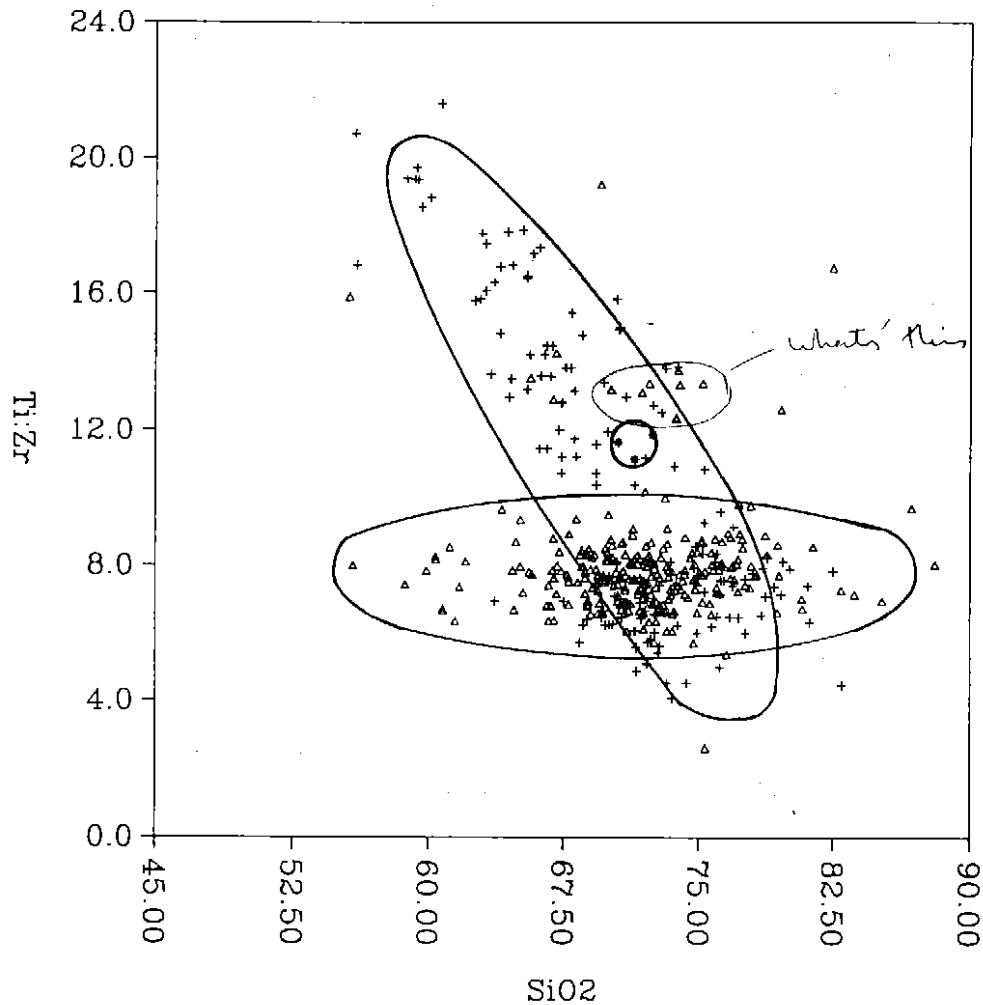
Comments:

Mineralisation and alteration indicative of proximity to massive sulphides, is associated with increased thickness of sediments at or near the rhyodacite / dacite interface.

The hornblende–phyric andesite, footwall to the spillway, is the feeder to the Anthony Road Andesites. It also occupies a significant primary structure that has controlled the thickness of sedimentary deposition.

South of the spillway footwall andesite, the sediments at the rhyodacite / dacite contact are only 30m thick including peperitic dacite, whereas the sediments are at least 150m thick in the spillway area. Similarly, the sediments are thin in the Henty Canal and are significantly thicker immediately to the south. Therefore the zone of interest is considered to lie between the Newton Creek spillway and the Henty Canal.

WHITE SPUR



5 cm

KEY

+ Mt. Black Volcanics

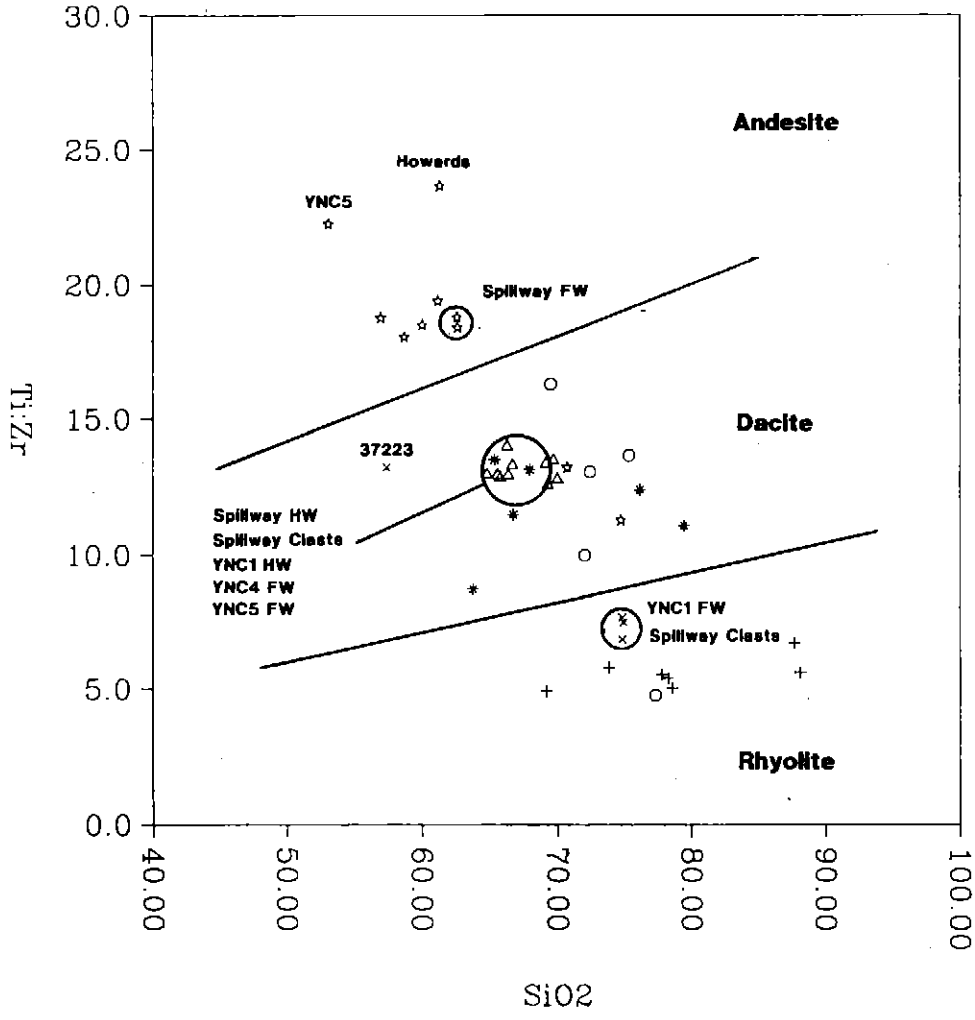
△ Rosebery - Hercules Footwall Sequence

✳ Samples from study area

PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

COMPILED : P.M.Q	E.L. 11/85 - YOLANDE
DATE : July 1993	
DRAWN :	**SCATTER PLOT**
REF. :	**WHITE SPUR**
REVISIONS :	**SiO2 vs Ti : Zr**
DRAWING No.	SCALE NTS — FIG. No. 22

NEWTON CREEK



KEY

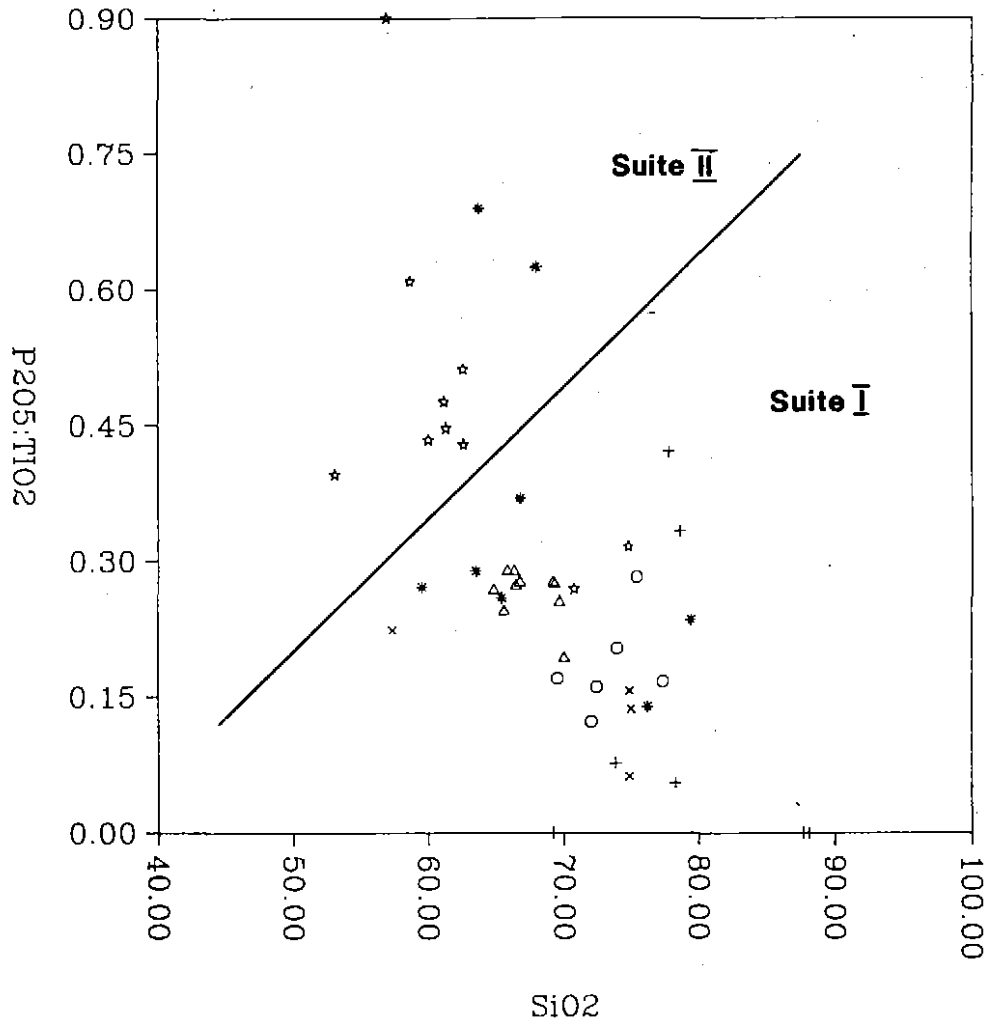
+	Tyndall Group Rhyolites
✡	Anthony Road Andesites
△	CVC Dacites
○	Sediments
✳	Spillway Clasts
×	CVC Rhyodacites

5 cm

PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

COMPILED: P.M.O	E.L. 11/85 - YOLANDE
DATE: July 1993	SCATTER PLOT
DRAWN:	NEWTON CREEK
REF.:	SiO2 vs Ti : Zr
REVISIONS:	
DRAWING No.	SCALE NTS — FIG. No. 23

NEWTON CREEK



KEY

+ Tyndall Group Rhyolites

✡ Anthony Road Andesites

△ CVC Dacites

o Sediments

✳ Spillway Clasts

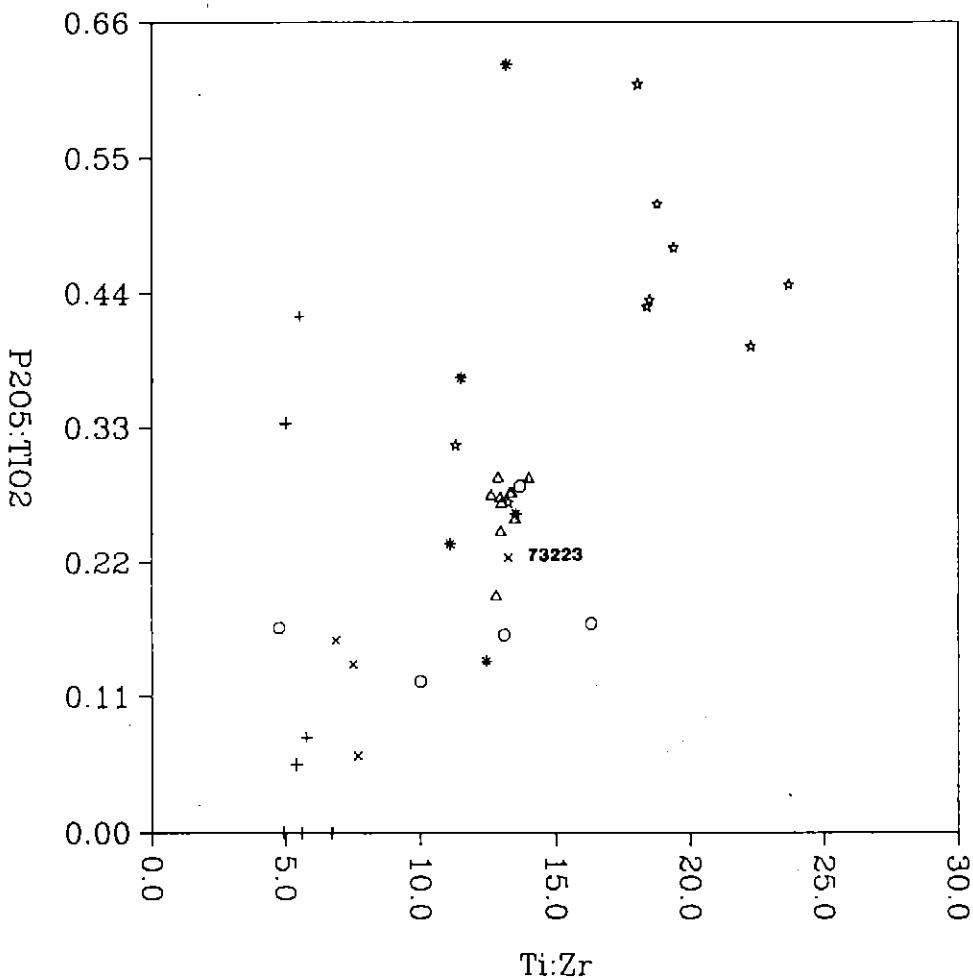
× CVC Rhyodacites

Suites I & II of Crawford (1992)

5 cm

PASMINCO EXPLORATION A Division of Pasminco Australia Limited	
COMPILED : P.M.O DATE : July 1993 DRAWN : REF. :	E.L. 11/85 - YOLANDE SCATTER PLOT NEWTON CREEK SiO2 vs P2O5 : TiO2
REVISIONS :	
DRAWING No.	SCALE NTS FIG. No. 24

NEWTON CREEK



KEY

+	Tyndall Group Rhyolites
✡	Anthony Road Andesites
△	CVC Dacites
o	Sediments
✳	Spillway Clasts
×	CVC Rhyodacites

5 cm

PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

COMPILED : P.M.Q	E.L. 11/85 - YOLANDE
DATE : July 1993	SCATTER PLOT
DRAWN :	NEWTON CREEK
REF. :	Ti : Zr vs P2O5 : TiO2
REVISIONS :	
DRAWING No.	SCALE NTS — FIG. No. 25

5.5 Geophysics

5.5.1 AEROMAGNETICS

5.5.1.1 Yolande River

A magnetic and radiometric survey was flown over Yolande River Licence to the following specifications:

Aircraft;	Aerospatiale Squirrel 350B
Survey size;	432 Line Kilometres
Line Spacing;	200m
Tie Line Spacing;	2000m
Flight Line Direction;	90 degrees AMG
Tie Line Direction;	Orthogonal to traverse lines
Navigation;	DGPS
Nominal sensor terrain clearance;	80m above tree canopy
Nominal aircraft speed;	40m per second

Plans of flight lines and contoured values are enclosed (Figs. 41, 42, 43, 44).

Results are discussed in Leaman (Appendix 9) and are summarised as follows:

1 Three distinctive suites are indicated;

a. Sedimentary units occurring in the west, have a low magnetic background, and are mixed with highly magnetic tuffaceous rocks. The magnetic contrast highlights several structural features including a large syncline.

b. Volcanic units to the east are structurally and magnetically distinctive, and appear to be contained in a large antiform.

c. A series of porphyry bodies occur between units

(a) & (b). These porphyry bodies are spatially associated with known mineralisation, both features perhaps reflecting Devonian structural events.

2 The area is divided into two distinctive structural zones. In the western zone NE, NW, and sub E/W trends are dominant, whereas NS trends are dominant in the eastern zone.

Leaman stresses the initial nature of this study. He recommends collection of physical properties in conjunction with petrology to confirm inferred values for units, and also suggests that the collection of gravity data would enhance subsequent investigation.

5.5.1.2 Aberfoyle Data Exchange

A magnetic and radiometric data exchange was conducted with Aberfoyle and concerned the following data:

Pasminco data; from 378000mE to the eastern extent of the survey area.
Aberfoyle data; from 382000mE to the Western extent of the survey area.

This data covers an area from the South Henty Fault to the Great Lyell Fault. There is considerable magnetic character in the Newton Creek Spillway – Howards Anomaly – Henty Canal area (Figs. 32 to 35) which is currently being assessed.

5.5.2 RADIOMETRICS

Plots of Total Count Radiometrics for Yolande, Yolande River, Newton Creek and Henty Valley are enclosed (Figs. 27,30,35 & 39).
Whilst no detailed interpretation has been carried out using radiometric data, the above plots were produced in order to ascertain their usefulness.

The radiometric plots highlight cultural features such as dams and roadways, and changes in vegetative cover, however other startling correlations are evident.

Thick glacial cover is well defined by its lack of response, thus radiometric character over areas mapped as glacials indicates bedrock is close to the surface. This is well demonstrated in the vicinity of DDH YNC4 at 5359900mN, 379900mE where altered volcanics outcrop as a window in an area of glacial cover.

Within much of the Yolande licence there is little cultural interference, and little variation in vegetative cover, there is however much radiometric character.
This character correlates well with mapped lithologies and structures. The Henty Fault Wedge is characterised by low intensity radiometric character. A particular lithology within the White Spur Formation, mapped as a micaceous greywacke, correlates in fine detail with a sharp decrease in radiometric intensity.

A detailed interpretation of radiometric data is proposed for the coming year.

5.5.3 PHYSICAL PROPERTIES

Specific gravity and magnetic susceptibility data from Diamond drilling undertaken during this period are listed with the drill logs (Appendix 4) and summarised in Table 6.

This data shows that discrimination between formations is possible using physical properties as follows:

1 Tyndall Group Rhyolites have significantly higher magnetic susceptibilities than other formations;
2 Anthony Road Andesite / sediment package has moderate magnetic susceptibilities and moderately high S.G.s;
3 CVC dacites and rhyodacites have low S.G.s, and low magnetic susceptibilities.

Gravity data is sparse over the Yolande licence (Fig. 40). A small scale survey aimed at increasing the definition of gravity features in the Newton Creek – Henty Canal area will be undertaken in the coming year.

TABLE 6

SUMMARY STATISTICS FOR TYNDALL GROUP QUARTZ PHYRIC LAVAS

	Magnetic Sus	SG
Number	64	6
Mean	4.4056	2.6938
Std Dev	3.7667	0.01818
Variance	14.19	0.01
Maximum	12.60	2.79
Minimum	0.21	2.59
Range	12.39	0.20
Coef Var	85.4975	3.0366
Std Err	0.4708	0.0334

SUMMARY STATISTICS FOR ANTHONY ROAD ANDESITES AND MIXED SEDIMENTS

	Magnetic Sus	SG
Number	93	7
Mean	0.2951	2.8500
Std Dev	0.3843	0.1794
Variance	0.15	0.03
Maximum	2.62	3.09
Minimum	0.01	2.55
Range	2.61	0.54
Coef Var	130.2569	6.2963
0.0399	0.0678	

SUMMARY STATISTICS FOR CVC DACITES AND RHYODACITES

	Magnetic Sus	SG
Number	46	9
Mean	0.1770	2.5856
Std Dev	0.0994	0.1785
Variance	0.01	0.03
Maximum	0.51	2.26
Range	0.50	0.50
Coef Var	56.1440	6.9021
Std Err	0.0146	0.0595

6 RGC TAILINGS EASEMENT PROPOSAL

The application for a depth-limited easement over part of EL 11/85, lodged by Renison Goldfields in 1991 as part of there proposed Henty Gold Mine Development, has still not been finalised. Negotiations about the terms of such an easement, especially the scope and timing of a condemnation drilling program have continued with RGC, Aberfoyle (exploration managers of adjacent EL 5/85) and the Mines Department during 1992-93. It is expected that this issue will be resolved early in the next period.

7 CONCLUSIONS

Newton Creek – Henty Canal

Geochemistry suggests that the mineralisation indicated by the spillway sulphide clasts is associated with sediments close to the rhyodacite / dacite interface.

A zone of mineralisation and alteration in a similar stratigraphic position has been intersected along strike approximately two kilometres to the north.

Both occurrences appear to be associated with rapid thickening of sediments.

The area between these occurrences is untested and covered by glacials and must be considered as highly prospective.

White Spur

The Central Volcanic Complex in the zone of interest is considered to be Mt Black Volcanics. As the Rosebery–Hercules Footwall Sequence is overthrust by the Mount Black Volcanics then it could exist at relatively shallow depths below the surface.

Alteration in the White Spur Formation could reflect altered and mineralised Rosebery–Hercules Sequence beneath unaltered Mount Black Volcanics. This alteration extends for at least 700m by 150m.

The target zone lies within a shallowly plunging parasitic fold below altered black shales and quartz–phyric polymict breccias containing massive pyrite clasts. A similar stratigraphic and structural setting occurs at the Hercules deposit.

Henty Valley

The favourable zone, a stratiform pyrite body occupies the core of a steeply plunging antiform. The zone is largely concealed beneath a shallow dipping thrusted sequence.

8 EXPENDITURE

Total expenditure on EL 11/85 during the twelve month period to 30 June 1993, was **$213 733** bringing the total expenditure on licence since it's inception on 21 August 1985 to **$1 189 404.** Similarly, total expenditure on EL 25/91 during the twelve months to 30 June 1993, was **$35 480** bringing the total expenditure since it's inception n 30 November 1991 to **$45 961.**

Detailed of the 1992-93 expenditure are as follows:

	EL 11/85	**EL 25/91**
Personnel: Salaries, Wages & Oncosts	68 865	6 498
Travel & Accommodation	2 808	
Geological Consultants	3 056	
Petrology	2 065	
Analytical Services	1 265	
Geophysical Surveys – Aeromagnetics & Radiometrics		22 007
– Data Acquisition, Image processing	2 186	
Drilling: including access & core processing/storage	74 990	
Helicopter – drill support	1 232	
Track Cutting & Gridding	1 040	
Contract Drafting	1 830	1 439
Other Contractors	955	
Stores & Supplies	2 040	267
Vehicles & Equipment	8 418	512
Computing	4 793	
Tenement Costs	2 570	
Office Running Costs	16 190	1 532
Total Direct Costs	**194 303**	**32 255**
Administration/Management Fee	19 430	3 225
TOTAL EXPENDITURE	**213 733**	**35 480**

9 PROPOSED PROGRAM 1993-94

It is proposed to undertake a major program of exploration during the forthcoming year to evaluate all the key prospects for economic mineralisation and leaving enough time in the last year of tenure of EL 11/85 to enable sufficient work to be completed on any new discovery of such mineralisation to justify an application for either a Mining Lease or Retention Licence before the ground must be relinquished.

The major aspects of the proposed program are as follows:

1 Newton Creek - Henty Canal

Geology: Additional detailed mapping, evaluation of results from Aberfoyle data exchange and structural analysis of magnetic and gravity data, including further petrographic study. Possible specialist sedimentological work to aid in the massive sulphide clasts study.

Geochemistry: Extend the lithogeochemical study to refine the volcanic-stratigraphic interpretation and to focus on areas of favourable alteration.

Drilling: Follow-up the recent encouraging intersections with at least 2-3 holes, to test targets in the Henty Canal area and west of Newton Creek, up to 1 000m total drilling, 1 of which may require helicopter support.

2 White Spur

Geology: Detailed mapping, including specialist structural geological and sedimentological studies in conjunction with further petrographic and other work.

Geochemistry: Extend the lithogeochemical study, incorporating the results from a major study of the Rosebery - Hercules area.

Geophysics: Complete the detailed analysis of existing IP and EM results in view of the refined geological interpretation. If necessary undertake restricted in-fill

surveys to help define drill targets.

Drilling: Test the most promising target(s) with 1-2 holes for 300-500m total drilling.

5 **Henty Valley**

Geophysics: Carry-out a limited IP survey an attempt to map the extent of the massive sulphides beneath the thrust sheet.

Drilling: Test any favourable targets with an initial drill hole, up to 300m long. Helicopter support would be necessary.

4 **Yolande River** (EL 25/91)

Geology: Undertake semi-regional mapping and sampling across the entire tenement, which is relatively un-explored, including more detailed investigations following the geology south of the Henty Valley prospect.

Geochemistry: Lithogeochemical sampling to assist with stratigraphic correlations and to identify areas of favourable hydrothermal alteration. Systematic stream geochemical sampling using path-finder element suite.

Geophysics: Complete a detailed analysis of the recent aeromagnetic and radiometric survey results, in conjunction with the geological investigations, to develop a sub-surface structural model for the area and to highlight potential target areas for more detailed evaluation.

PROPOSED BUDGET 1993-94

A total budget of **$400 000** is proposed for the Yolande JV tenements for the period July 1993 - June 1994.

KEYWORDS

LEAD, ZINC, GOLD, BLACK SHALE, CONGLOMERATE, ACID VOLCANICS, ANDESITE, FACIES MARINE SHALLOW, FAULT, FOLD, THRUST, VOLCANOGENIC, CAMBRIAN, DRILL DIAMOND, GEOCHEM ROCK, GEOL MAPPING DETAILED, GEOPHYS MAGNETICS, IMAGE PROCESSING, PETROLOGY.

LOCATION

QUEENSTOWN SK5505, HENTY RIVER, NEWTON CREEK, WHITE SPUR, YOLANDE RIVER

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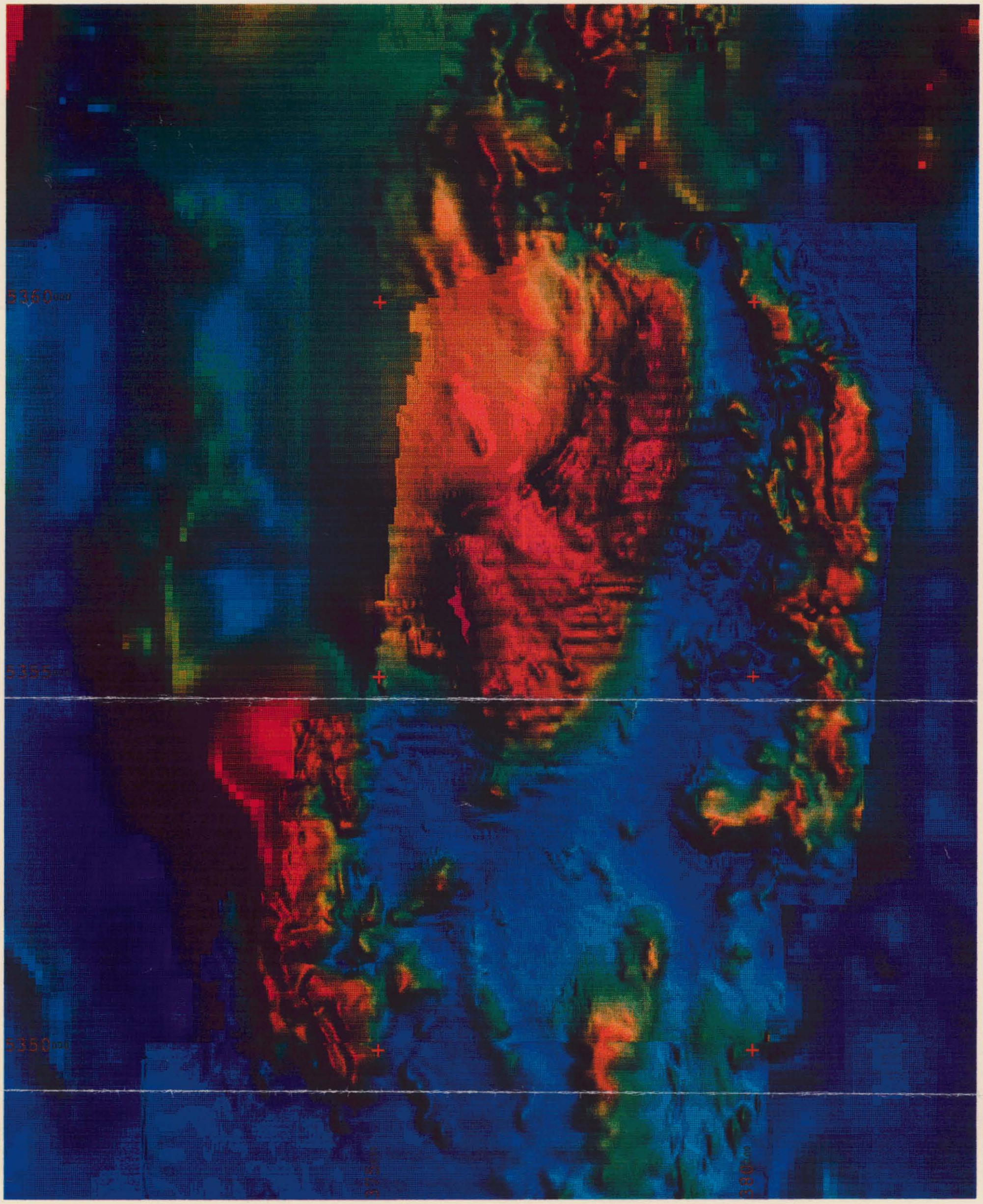

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DATE : July, 1993		
DRAWN :	YOLANDE	
REF. :		
REVISIONS :	MAGNETICS	
	colour drape s/a NE45-70	
DRAWING No.	SCALE 1:50,000 (0 — 1,000 m)	FIG. No. 26

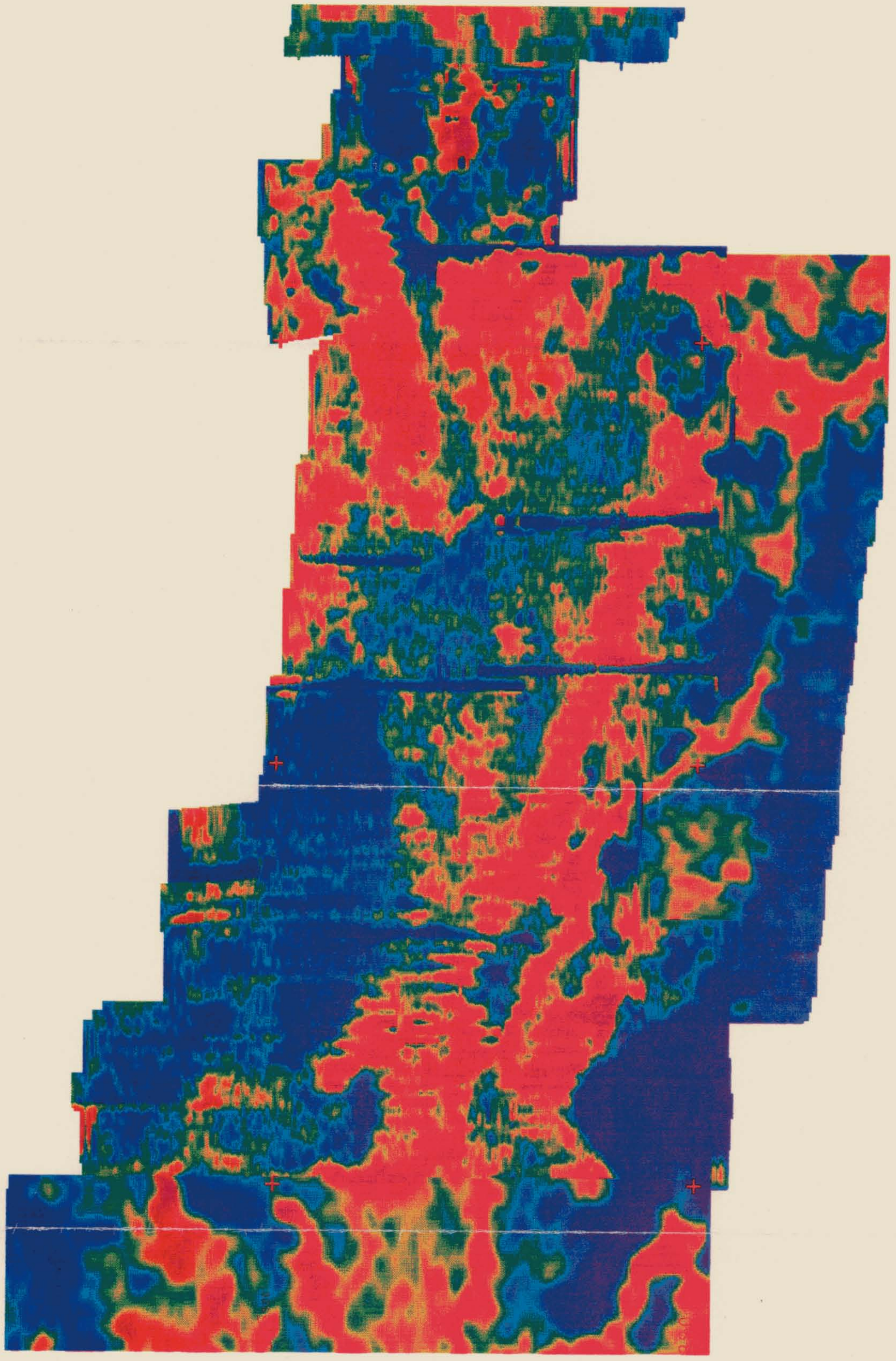
5 cm

A30966

5360000

5355000

5350000



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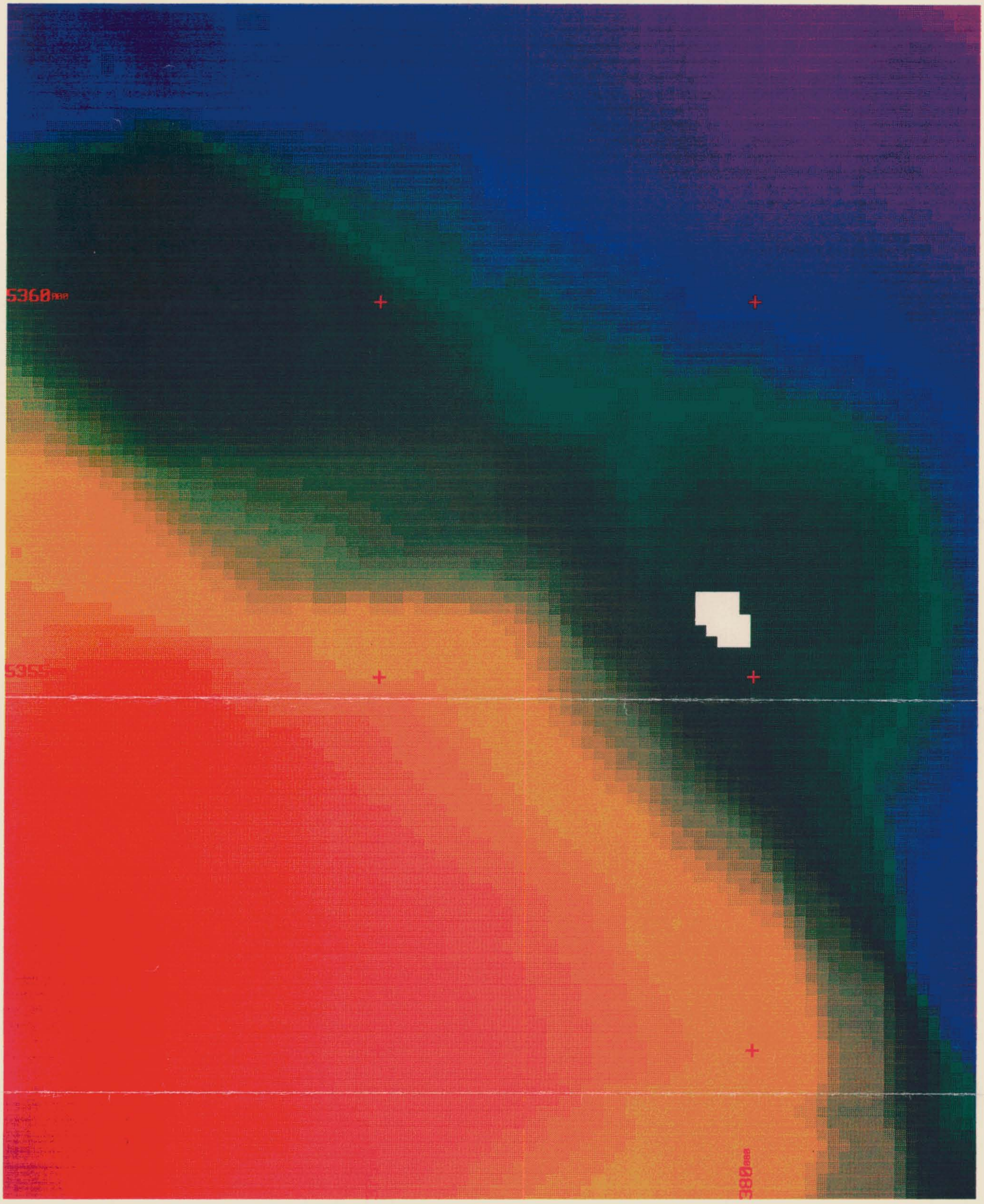
DATE : July, 1993	YOLANDE	
DRAWN :	RADIOMETRICS	
REF. :	Total Count pseudo-colour	
REVISIONS :		
DRAWING No.	SCALE 1:50,000 (0 – 1,000 m)	FIG. No. 27

5 cm

99655



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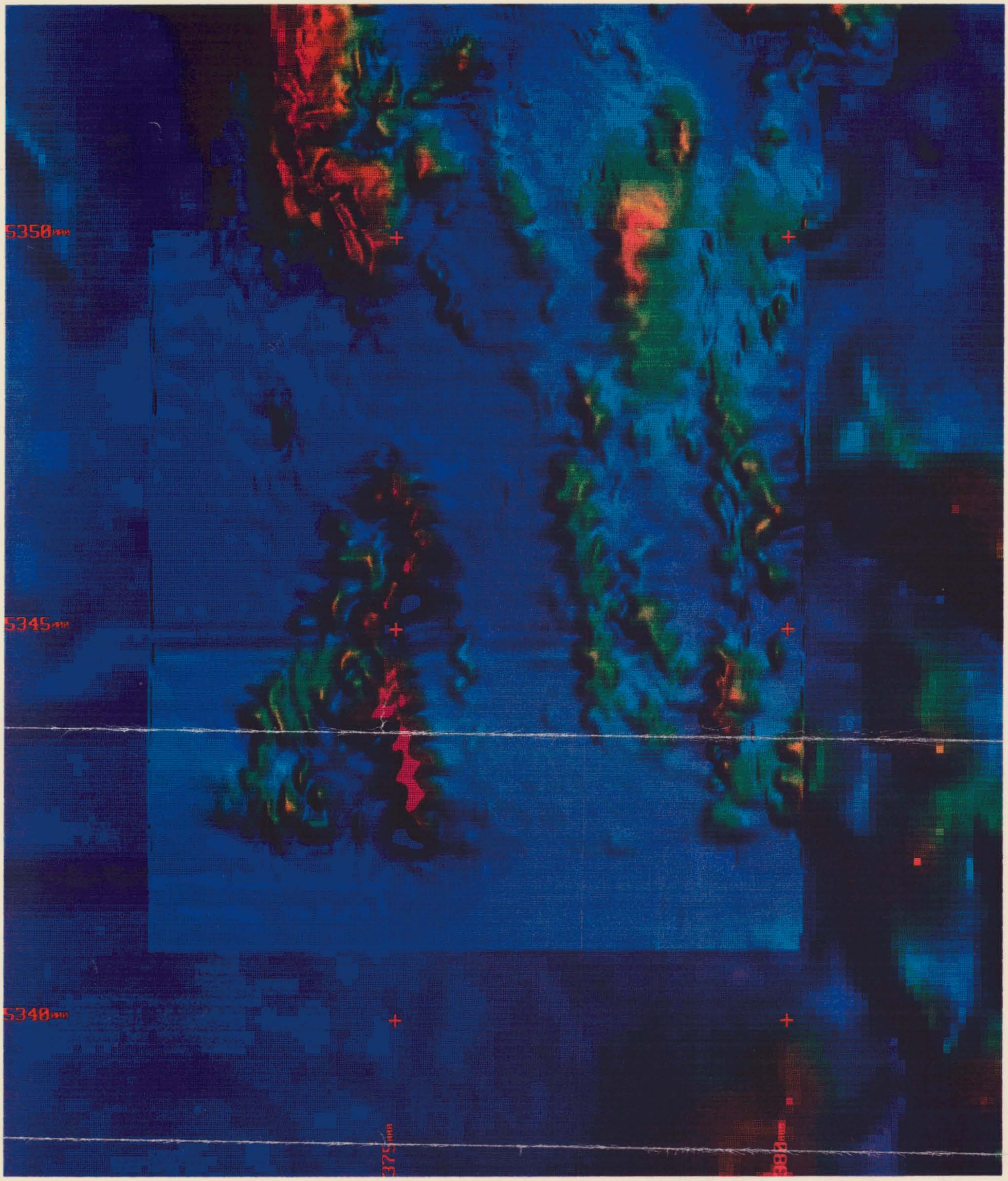
DATE : July, 1993	YOLANDE	
DRAWN :	GRAVITY	
REF. :	pseudocolour	
REVISIONS :		
DRAWING No.	SCALE 1:50,000 0 1,000 m	FIG. No. 28

5 cm

9509966



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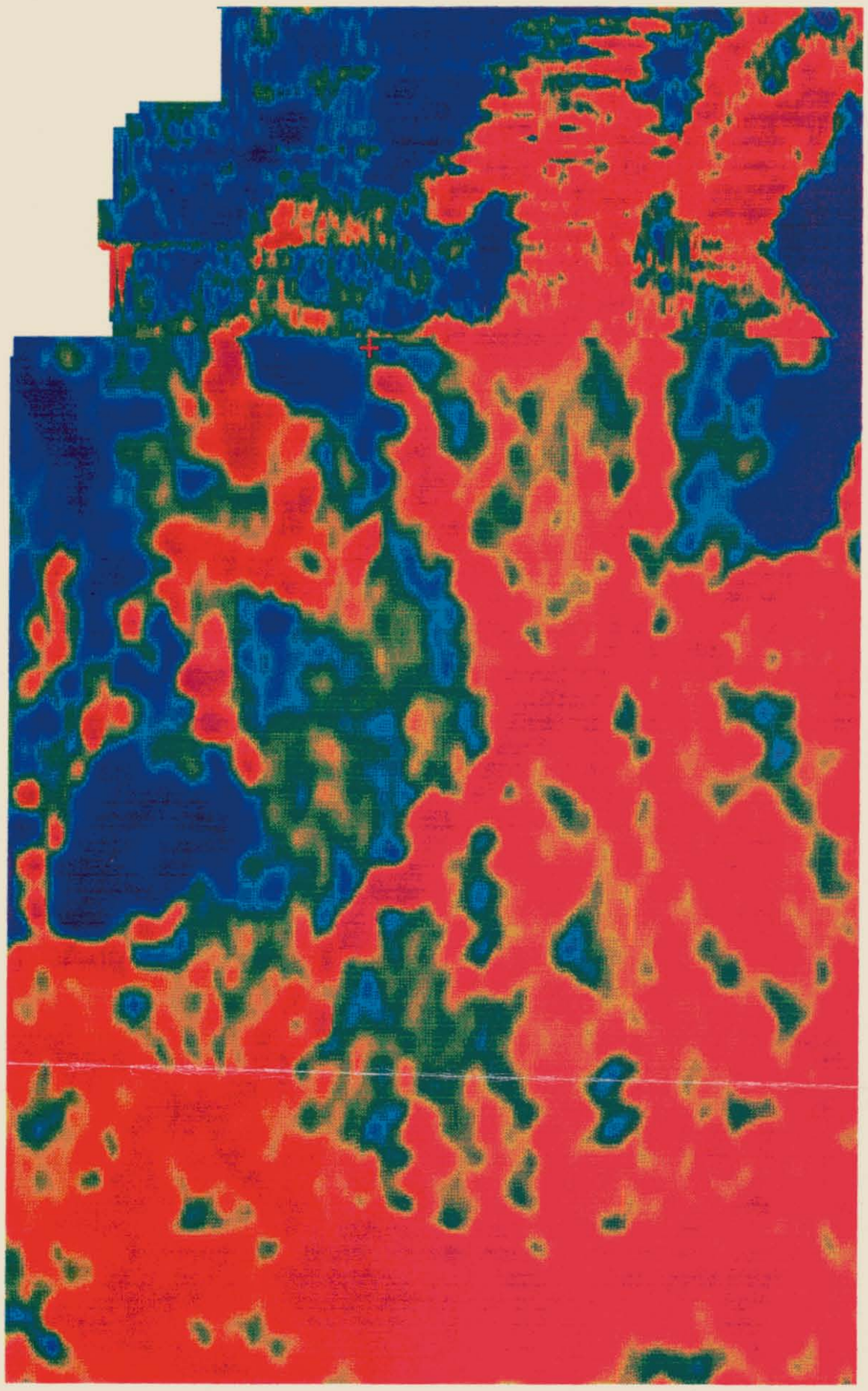
COMPILED :	E.L. 11/85 - YOLANDE JV	
DATE : July, 1993		
DRAWN :	YOLANDE RIVER	
REF. :	MAGNETICS	
REVISIONS :	colour drape s/a NE45-70	
DRAWING No.	SCALE 1:50,000 0 1,000 m	FIG. No. 29

5 cm

990657

5350mN



5345mN

5340mN

375mE

PASMINCO EXPLORATION A Division of Pasminco Australia Limited		
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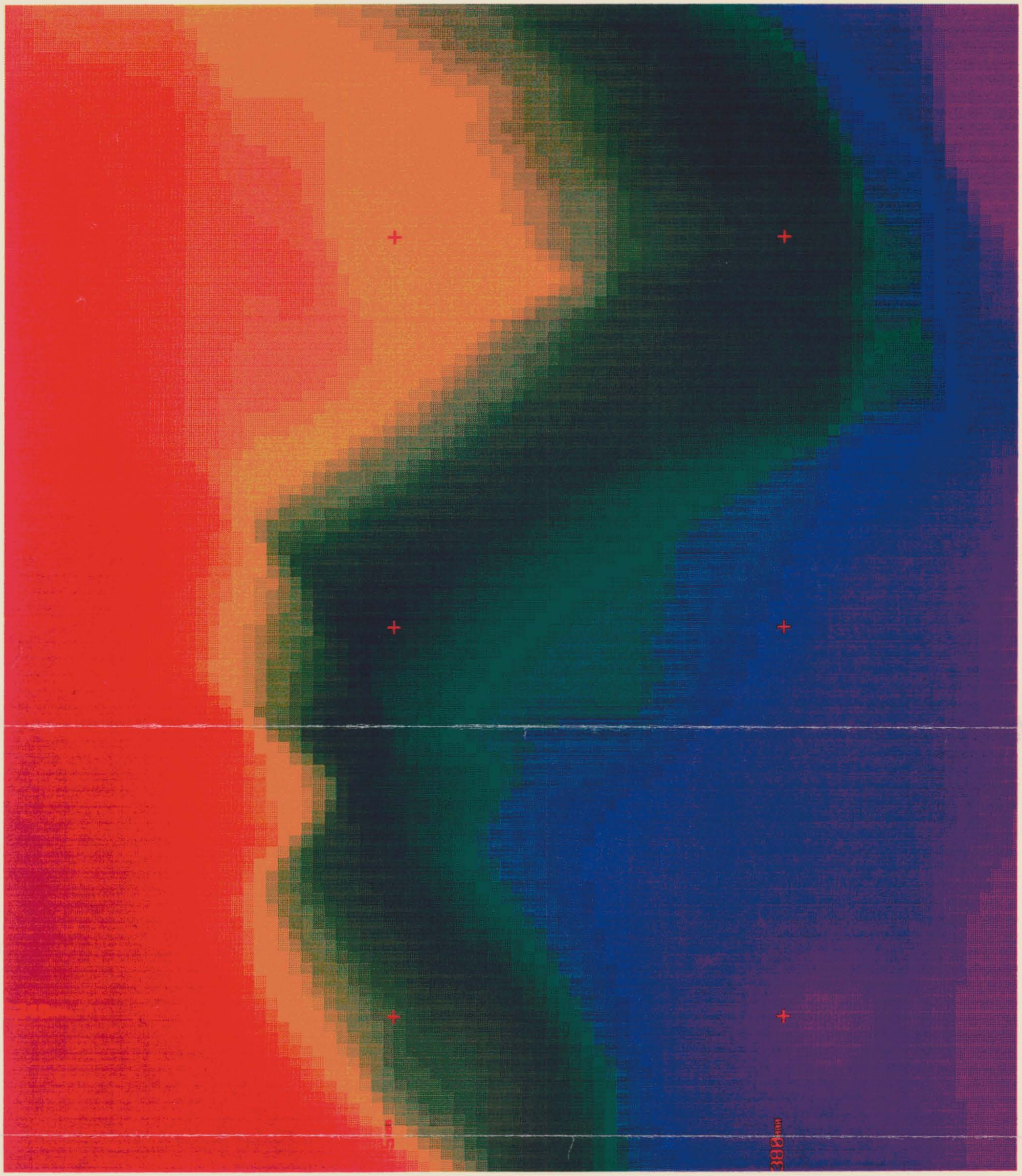
DATE : July, 1993	YOLANDE RIVER	
DRAWN :	RADIOMETRICS	
REF. :	Total Count pseudo-colour	
REVISIONS :		
DRAWING No.	SCALE 1:50,000 0 1,000 m	FIG. No. 30

5 cm

30966



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DATE : July, 1993		
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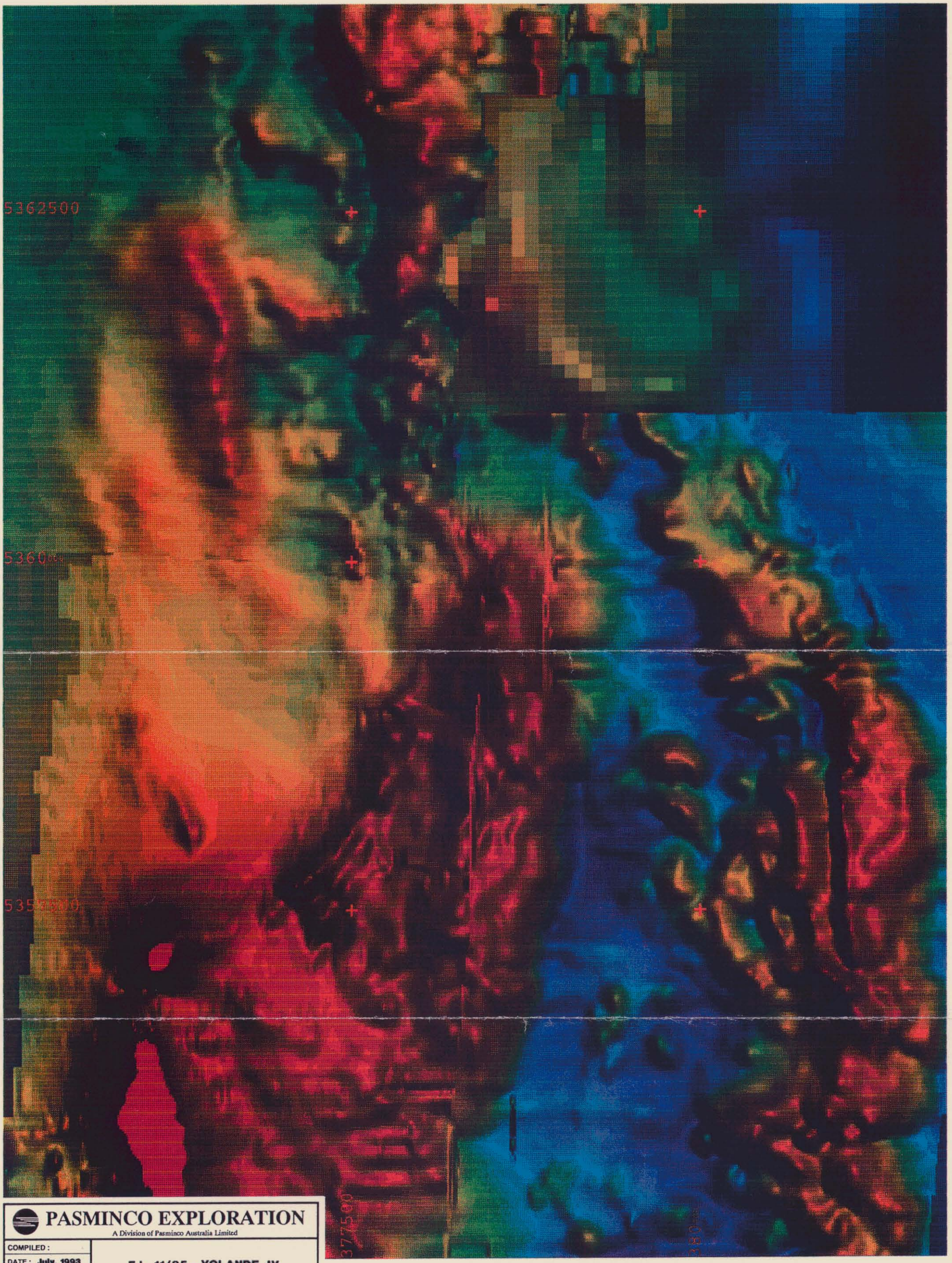
REF. :		
REVISIONS :		
DRAWING No.	SCALE 1:50,000 (0 — 1,000 m)	FIG. No. 31

5 cm

990659



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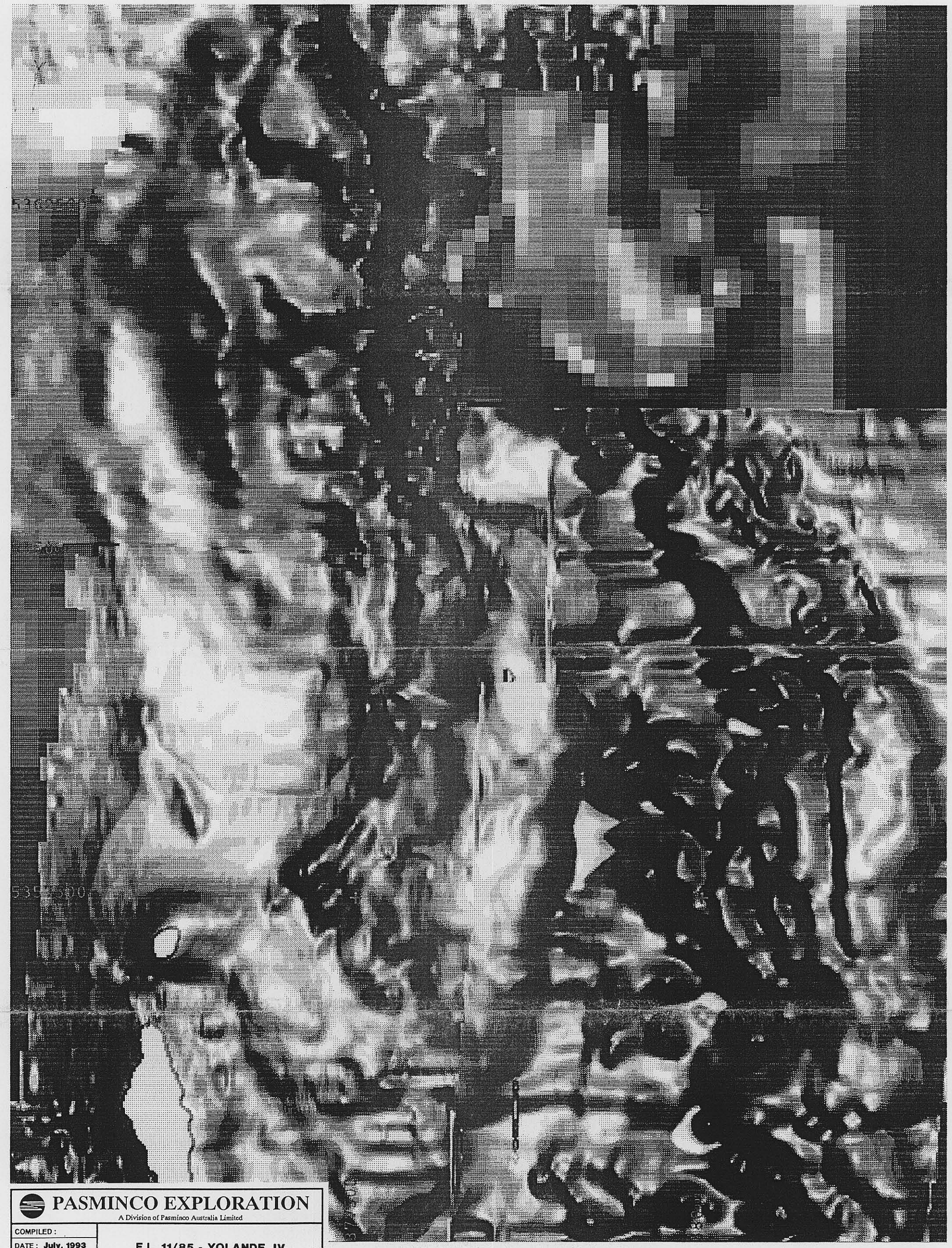
DATE : July, 1993		
DRAWN :	**NEWTON CREEK**	
REF. :	**MAGNETICS**	
REVISIONS :	**colour drape s/a NE45-70**	
DRAWING No.	SCALE 1:25,000 (0 – 500 m)	FIG. No. 32

5 cm

99600



PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

COMPILED :	E.L. 11/85 - YOLANDE JV
DATE : July, 1993	**NEWTON CREEK**
DRAWN :	**MAGNETICS**
REF. :	**s/a NE45-70**
REVISIONS :	
DRAWING No.	SCALE 1:25,000 (0 — 500 m) / FIG. No. 33

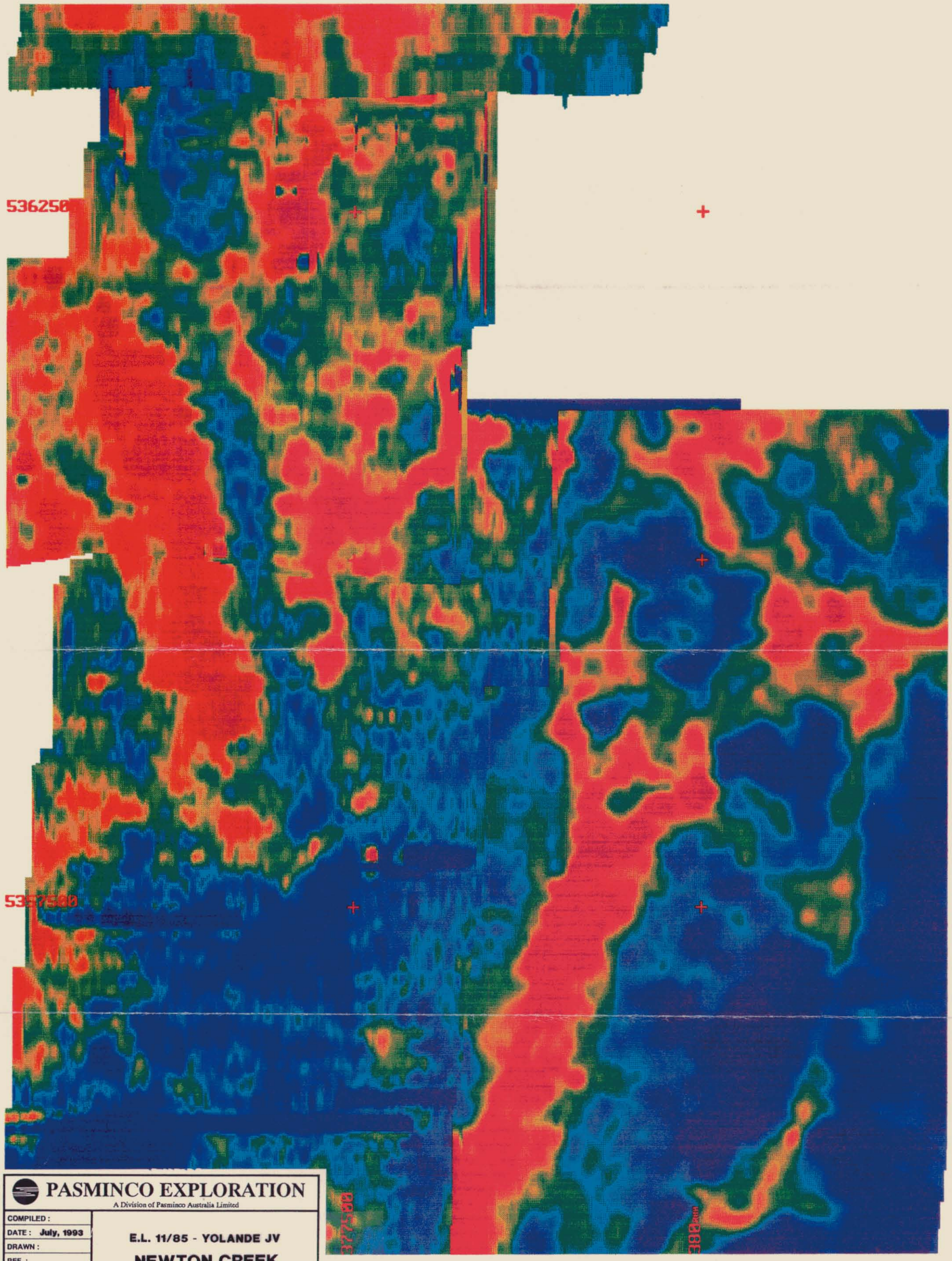
5 cm

996061

PASMINCO EXPLORATION A Division of Pasminco Australia Limited		
COMPILED :	E.L. 11/85 - YOLANDE JV NEWTON CREEK MAGNETICS s/a NW315-70	
DATE : July, 1993		
DRAWN :		
REF. :		
REVISIONS :		
DRAWING No.	SCALE 1:25,000 0 500 m	FIG. No. 34

5 cm

996062



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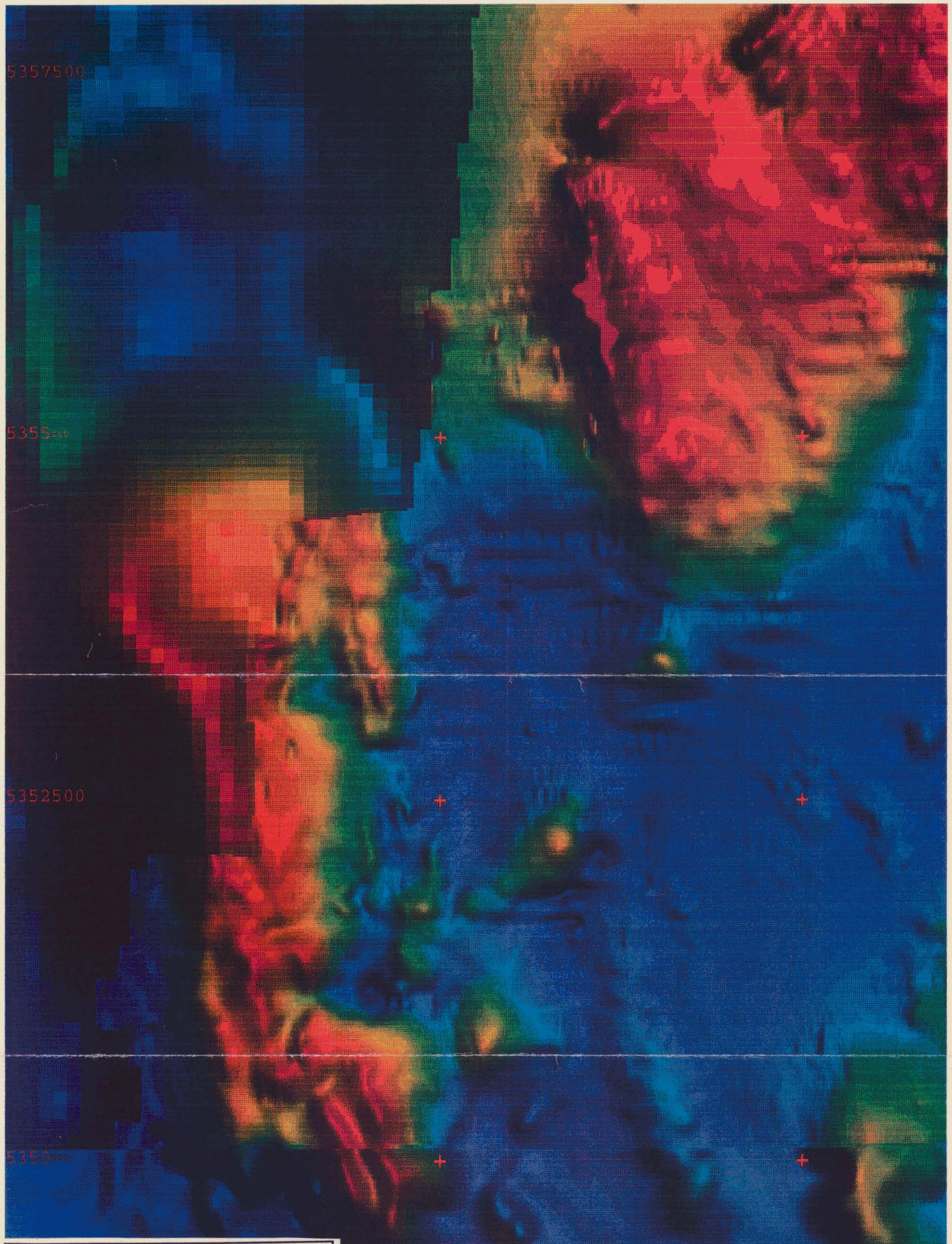
DATE : July, 1993		
DRAWN :		
REF. :		
REVISIONS :		
DRAWING No.	SCALE 1:25,000 (0 – 500 m)	FIG. No. 35

5 cm

996063



PASMINCO EXPLORATION A Division of Pasminco Australia Limited	
COMPILED :	E.L. 11/85 - YOLANDE JV
DATE : July, 1993	HENTY VALLEY
DRAWN :	MAGNETICS
REF. :	colour drape s/a NE45-70
REVISIONS :	
DRAWING No.	SCALE 1:25,000 (0 – 500 m) FIG. No. 36

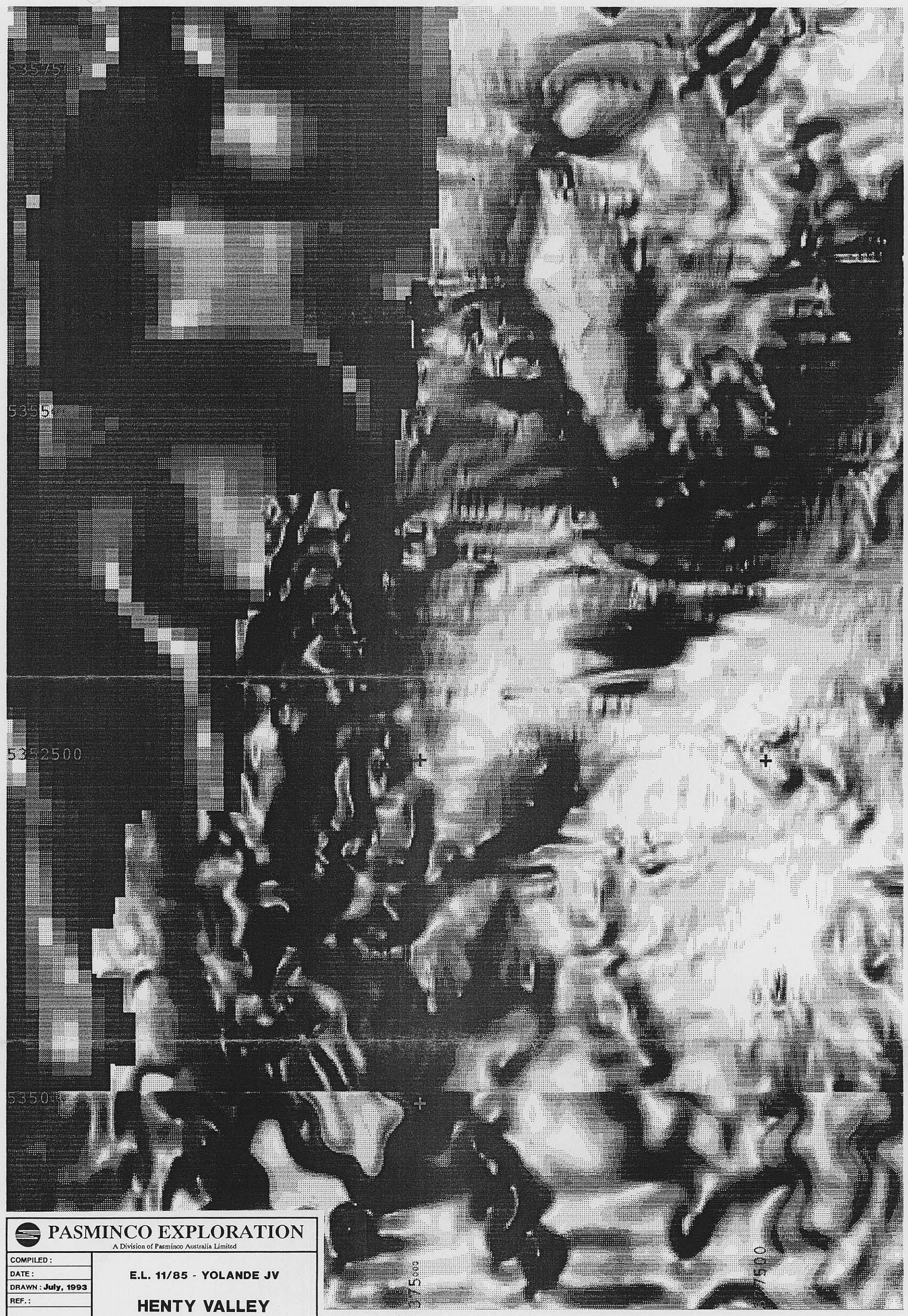
5 cm

99064

PASMINCO EXPLORATION A Division of Pasminco Australia Limited		
COMPILED :	E.L. 11/85 - YOLANDE JV	
DATE : July, 1993		
DRAWN :		
REF. :		
	HENTY VALLEY	
REVISIONS :	MAGNETICS	
	s/a NE45-70	
DRAWING No.	SCALE 1:25,000 (0 – 500 m)	FIG. No. 37

5 cm

990965



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COMPILED :	E.L. 11/85 - YOLANDE JV	
DATE :		
DRAWN : July, 1993		
REF. :	HENTY VALLEY	
	MAGNETICS	
REVISIONS :	s/a NW315-70	
DRAWING No.	SCALE 1:25,000 (0 – 500 m)	FIG. No. 38

5 cm

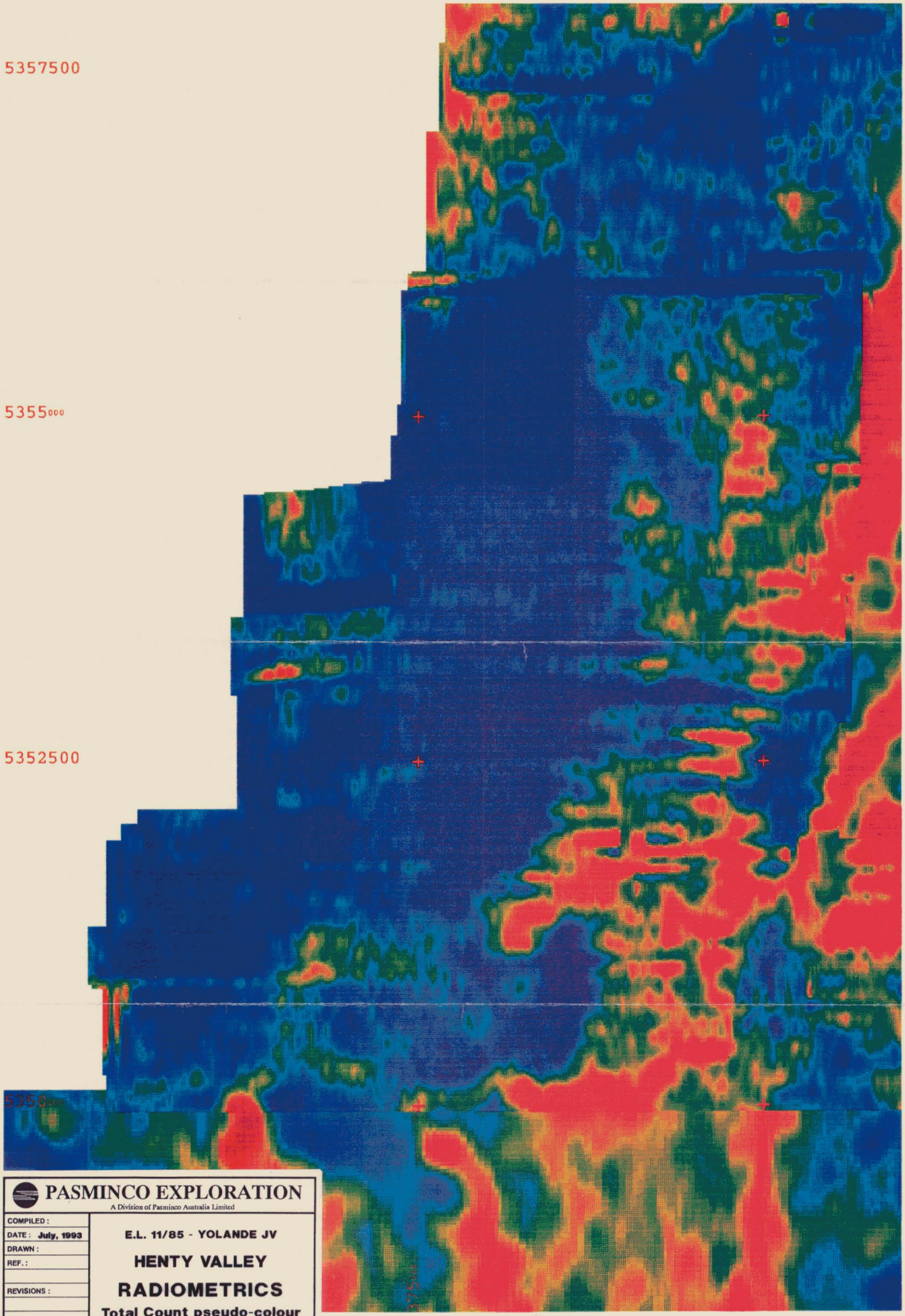
9999999

5357500

5355000

5352500

5350000



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DATE : July, 1993	HENTY VALLEY	
DRAWN :	RADIOMETRICS	
REF. :	Total Count pseudo-colour	
REVISIONS :		
DRAWING No.	SCALE 1:25,000 0 500 m	FIG. No. 39

5 cm

375000E

990966

996068

APPENDICES

APPENDIX I

ANALYTICAL REPORTS

ANALABS

A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd
A.C.N. 004 594 664

996070

Phone (004) 316837 | 14 Thirkell St. CODEE TAS 7320 | Fax (004) 318890

ANALYTICAL REPORT No. 111310.60.09590

THIS REPORT MUST BE READ IN CONJUNCTION WITH THE ACCOMPANYING ANALYTICAL DATA

INVOICE TO:

Pasminco Exploration
P.O. Box 886
BURNIE TAS 7320

ORDER No.	PROJECT
1415	3003

DATE RECEIVED	RESULTS REQUIRED
25/06/93	ASAP

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
5	19/07/93	1	26

SAMPLE NUMBERS	SAMPLE DESCRIPTION	ELEMENT/METHOD
Various	SC Prep : GP029,P1	Cu,Pb,Zn,Ag,Fe,Mn/GA140 Pb,Zn,Fe,Mn/GA104 Au,Au(R),Au(S)/EG309 Ba,Rb,Sr,V,Nb,T,Zr/GX401 Whole Rock Analysis/OX408

RESULTS TO:

Mr M Quayle
Pasminco Exploration
P.O. Box 886
BURNIE TAS 7320

REMARKS

RESULTS TO:

RESULTS TO:

AUTHORISED OFFICER

ANALABS

A Division of Inchcape Testing Services (Australia) Pty. Ltd.
A.C.N. 004 591 664

996071

ANALYTICAL DATA

SAMPLE PREFIX	REPORT No.	REPORT DATE	CLIENT ORDER No.	PAGE
	111310.60.09590	19/07/93	1415	1 OF 5

TUBE No.	SAMPLE No.	Cu	Pb	Pb	Zn	Zn	Ag	Fe	Fe	Mn
1	37201	61	341	-	1036	-	10	3.93	-	4328
2	37202	146	7	-	254	-	<1	>5.00	11.50	>5000
3	37203	43	16	-	305	-	<1	>5.00	12.30	>5000
4	37204	1849	282	-	512	-	3	>5.00	16.00	>5000
5	37205	747	128	-	559	-	2	>5.00	16.50	>5000
6	37206	374	647	-	>5000	1.64	2	>5.00	18.90	>5000
7	37207	153	276	-	>5000	0.94	1	>5.00	14.30	>5000
8	37208	21	367	-	321	-	1	>5.00	10.00	>5000
9	37209	29	510	-	2089	-	1	>5.00	8.26	>5000
10	37210	16	533	-	429	-	1	>5.00	6.46	>5000
11	37211	14	565	-	1372	-	1	>5.00	7.89	>5000
12	37212	52	1121	-	2198	-	1	>5.00	5.21	>5000
13	37213	75	2110	-	4836	0.52	4	>5.00	6.10	>5000
14	37214	2615	>5000	1.52	>5000	8.61	9	>5.00	5.70	950
15	37215	30	35	-	840	-	<1	3.97	-	1250
16	37216	125	14	-	193	-	<1	>5.00	6.50	948
17	37217	12	10	-	213	-	<1	>5.00	13.90	757
18	37218	4	5	-	254	-	<1	3.01	-	3110
19										
20										
21										
22										
23	DETECTION	2	3	0.01	2	0.01	1	0.01	0.01	3
24	UNITS	ppm	ppm	%	ppm	%	ppm	%	%	ppm
25	METHOD	GA140	GA140	GA104	GA140	GA104	GA140	GA140	GA104	GA140

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

AUTHORISED OFFICER *Gary Lindberg*

ANALABS

A Division of Inchcape Testing Services (Australia) Pty. Ltd.
A.C.N. 004 591 664

996072

ANALYTICAL DATA

SAMPLE PREFIX	REPORT No.	REPORT DATE	CLIENT ORDER No.	PAGE
	111310.60.09590	19/07/93	1415	2 OF 5

TUBE No.	SAMPLE No.	Mn	Au	Au(R)	Au(S)	Ba	Rb	Sr	V	Nb
1	35084	-	-	-	-	-	151	10	80	12
2	35087	-	-	-	-	-	97	75	48	7
3	37201	-	0.028	-	0.024	2082	-	-	-	-
4	37202	1.06	0.018	-	-	1259	-	-	-	-
5	37203	0.81	0.081	-	-	2531	-	-	-	-
6	37204	1.13	0.181	-	-	4234	-	-	-	-
7	37205	1.31	0.039	-	-	2068	-	-	-	-
8	37206	1.60	0.338	-	-	2307	-	-	-	-
9	37207	1.32	0.121	-	-	1551	-	-	-	-
10	37208	1.12	0.110	-	-	780	-	-	-	-
11	37209	1.16	0.042	-	-	569	-	-	-	-
12	37210	0.81	0.033	-	-	501	-	-	-	-
13	37211	0.61	0.040	-	-	614	-	-	-	-
14	37212	0.61	0.048	0.052	-	1124	-	-	-	-
15	37213	0.88	0.084	-	-	871	-	-	-	-
16	37214	-	0.020	-	-	406	-	-	-	-
17	37215	-	<0.008	-	-	124	-	-	-	-
18	37216	-	0.010	-	-	348	-	-	-	-
19	37217	-	<0.008	-	-	199	-	-	-	-
20	37218	-	<0.008	-	-	161	-	-	-	-
21	37219	-	-	-	-	-	14	332	5	10
22	37220	-	-	-	-	-	31	349	173	5
23	37221	-	-	-	-	-	148	96	61	13
24	37222	-	-	-	-	-	101	156	61	10
25	37223	-	-	-	-	-	218	19	50	9

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

AUTHORISED OFFICER Gary Lindberg

ANALABS

A Division of Inchcape Testing Services (Australia) Pty. Ltd.
A.C.N. 004 591 664

996073

ANALYTICAL DATA

SAMPLE PREFIX	REPORT No.	REPORT DATE	CLIENT ORDER No.	PAGE
	111310.60.09590	19/07/93	1415	3 OF 5

TUBE No.	SAMPLE No.	Mn	Au	Au(R)	Au(S)	Ba	Rb	Sr	V	Nb
1	37224	–	–	–	–	–	76	54	39	<3
2										
3										
4										
5										
6										
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17										
18										
19										
20										
21										
22										
23	DETECTION	0.01	0.008	0.008	0.008	10	5	5	5	3
24	UNITS	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
25	METHOD	GA104	GG309	GG309	GG309	GX401	GX401	GX401	GX401	GX401

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

AUTHORISED OFFICER *Gary Lindberg*

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A.C.N. 004 591 664

996074

ANALYTICAL DATA

SAMPLE PREFIX	REPORT No.	REPORT DATE	CLIENT ORDER No.	PAGE
	111310.60.09590	19/07/93	1415	4 OF 5

TUBE No.	SAMPLE No.	Y	Zr	Al2O3	SiO2	TiO2	Fe2O3	MnO	CaO	K2O
1	35084	29	223	14.67	66.3	0.52	8.44	0.30	0.26	3.75
2	35087	28	210	13.39	65.8	0.45	7.02	0.35	2.49	2.66
3	37219	17	135	15.38	73.8	0.13	0.62	0.03	0.31	0.33
4	37220	19	143	17.07	53.1	0.53	7.39	0.74	3.66	0.65
5	37221	29	212	13.33	66.7	0.47	2.75	0.20	4.90	4.14
6	37222	34	259	16.40	64.8	0.56	5.37	0.12	2.27	2.08
7	37223	29	263	16.20	57.4	0.58	6.90	2.61	0.62	7.38
8	37224	25	204	12.98	66.4	0.44	9.06	0.29	1.38	2.23
9										
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11										
12										
13										
14										
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16										
17										
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19										
20										
21										
22										
23	DETECTION	5	5	0.05	0.1	0.01	0.01	0.01	0.01	0.01
24	UNITS	ppm	ppm	%	%	%	%	%	%	%
25	METHOD	GX401	GX401	OX408	OX408	OX408	OX408	OX408	OX408	OX408

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

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996075

ANALYTICAL DATA

SAMPLE PREFIX	REPORT No.	REPORT DATE	CLIENT ORDER No.	PAGE
	111310.60.09590	19/07/93	1415	5 OF 5

TUBE No.	SAMPLE No.	MgO	P2O5	SO3	Na2O	TOTAL	LOI			
1	35084	1.13	0.152	1.07	0.15	100.30	3.57			
2	35087	0.80	0.128	0.05	1.92	99.62	4.59			
3	37219	0.12	0.015	0.11	8.70	100.33	0.79			
4	37220	4.31	0.213	0.01	6.27	99.62	5.68			
5	37221	0.45	0.127	<0.01	0.19	99.55	6.27			
6	37222	1.00	0.156	0.13	4.85	99.75	1.97			
7	37223	0.64	0.129	0.26	0.06	99.55	6.79			
8	37224	0.87	0.120	0.20	2.57	99.74	3.19			
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12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	0.01	0.005	0.01	0.05	0.01	0.01			
24	UNITS	%	%	%	%	%	%			
25	METHOD	OX408	OX408	OX408	OX408	OX408	OX408			

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

AUTHORISED OFFICER Gary Lindberg

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A.C.N. 004 591 664

996076

Phone (004) 316837 | 14 Thirkell St. COOEE TAS 7320 | Fax (004) 318890

ANALYTICAL REPORT No. 11310.60.09559

THIS REPORT MUST BE READ IN CONJUNCTION WITH THE ACCOMPANYING ANALYTICAL DATA

INVOICE TO:

Pasminco Exploration
P.O. Box 886
BURNIE TAS 7320

ORDER No.	PROJECT
1414	3003

DATE RECEIVED	RESULTS REQUIRED
11/06/93	ASAP

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
3	21/07/93	1	5

SAMPLE NUMBERS	SAMPLE DESCRIPTION	ELEMENT/METHOD
35761/65	SC Prep : GP029,P1	Cu,Pb,Zn,Ag,Mn/6A140
		Au,Au(S)/6G309
		As/HA140, As/6A140
		Ba,V,Rb,Sr,Y,Zr,Nb/6X401
		Whole Rock Analysis/0X408

REMARKS

RESULTS TO:

Mr M Quayle
Pasminco Exploration
P.O. Box 886
BURNIE TAS 7320

RESULTS TO:

RESULTS TO:

AUTHORISED OFFICER

ANALABS

A Division of Inchcape Testing Services (Australia) Pty. Ltd.
A.C.N. 004 591 664

996077

ANALYTICAL DATA

SAMPLE PREFIX	REPORT No.	REPORT DATE	CLIENT ORDER No.	PAGE
	111310.60.09559	21/07/93	1414	1 OF 3

UBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Mn	Au	Au(S)	As	As
1	35761	64	33	122	1	1722	0.020	-	>100	170
2	35762	26	14	120	1	945	<0.008	-	59	-
3	35763	117	38	120	1	1202	0.018	-	>100	150
4	35764	92	98	302	1	744	0.016	0.016	>100	140
5	35765	39	5	118	1	1343	<0.008	-	>100	150
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20										
21										
22										
23	DETECTION	2	3	2	1	3	0.008	0.008	1	50
24	UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
25	METHOD	GA140	GA140	GA140	GA140	GA140	GG309	GG309	HA140	GA140

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

AUTHORISED OFFICER Gary Lindberg

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A Division of Inchcape Testing Services (Australia) Pty. Ltd.
A.C.N. 004 591 664

996078

ANALYTICAL DATA

SAMPLE PREFIX	REPORT No.	REPORT DATE	CLIENT ORDER No.	PAGE
	111310.60.09559	21/07/93	1414	2 OF 3

TUBE No.	SAMPLE No.	Ba	V	Rb	Sr	Y	Zr	Nb	Al2O3	SiO2
1	35761	690	-	-	-	-	-	-	-	-
2	35762	456	-	-	-	-	-	-	-	-
3	35763	457	-	-	-	-	-	-	-	-
4	35764	571	256	125	126	37	168	4	21.52	52.8
5	35765	635	-	-	-	-	-	-	-	-
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22										
23	DETECTION	10	5	5	5	5	5	3	0.05	0.1
24	UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%
25	METHOD	GX401	GX401	GX401	GX401	GX401	GX401	GX401	OX408	OX408

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

AUTHORISED OFFICER Gary Lindberg

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A Division of Inchcape Testing Services (Australia) Pty. Ltd.
A.C.N. 004 591 664

996079

ANALYTICAL DATA

SAMPLE PREFIX	REPORT No.	REPORT DATE	CLIENT ORDER No.	PAGE
	111310.60.09559	21/07/93	1414	3 OF 3

TUBE No.	SAMPLE No.	Fe2O3	MnO	CaO	K2O	MgO	P2O5	Na2O	TOTAL	SO3
1	35764	9.31	0.09	0.08	3.33	0.50	0.104	3.35	100.48	0.92
2										
3										
4										
5										
6										
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17										
18										
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21										
22										
23	DETECTION	0.01	0.01	0.01	0.01	0.01	0.005	0.05	0.01	0.01
24	UNITS	%	%	%	%	%	%	%	%	%
25	METHOD	OX408	OX408	OX408	OX408	OX408	OX408	OX408	OX408	OX408

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

AUTHORISED OFFICER *Gary Lindberg*

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A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd.
A.C.N. 004 581 604

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NEWTON CK

9960 C 0

Phone (004) 316837 | 14 Thirkell St. CODEE TAS 7320 | Fax (004) 318890

ANALYTICAL REPORT No. 111310.60.09512

THIS REPORT MUST BE READ IN CONJUNCTION WITH THE ACCOMPANYING ANALYTICAL DATA

INVOICE TO:

Pasminco Exploration
P.O. Box 886
BURNIE TAS 7320

ORDER No.	PROJECT
1411	3003

DATE RECEIVED	RESULTS REQUIRED
24/05/93	ASAP

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES
2	11/06/93	1

TOTAL No. OF SAMPLES: 8

SAMPLE NUMBERS	SAMPLE DESCRIPTION	ELEMENT/METHOD
37101/108	SC Prep : GP029	Cu,Pb,Zn,Ag/GA104
37101/108		Au,Au(S)/GG309
37101/108		Ba,As/GX401

RESULTS TO:

Mr M Quayle
Pasminco Exploration
P.O. Box 886
BURNIE TAS 7320

RESULTS TO:

RESULTS TO:

REMARKS

AUTHORISED OFFICER

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A Division of Inchcape Testing Services (Australia) Pty. Ltd.
A.C.N. 004 591 664

996081

ANALYTICAL DATA

SAMPLE PREFIX	REPORT No.	REPORT DATE	CLIENT ORDER No.	PAGE
	111310.60.09519	11/06/93	1411	1 OF 2

TUBE No.	SAMPLE No.	Cu	Pb	Pb:1	Zn	Zn:1	Ag	Au	Au(S)	As
1	37101	2405	4025	-	467	-	12	1.100	-	12
2	37102	410	-	3.23	-	1.51	13	0.387	0.369	31
3	37103	1907	103	-	460	-	<10	0.177	-	40
4	37104	371	71	-	269	-	<10	0.168	-	24
5	37105	110	2177	-	2553	-	<10	0.045	-	20
6	37106	50	1182	-	722	-	<10	0.112	-	37
7	37107	246	-	0.75	-	1.19	<10	0.488	-	17
8	37108	57	351	-	-	1.08	<10	0.025	-	22
9										
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17										
18										
19										
20										
21										
22										
23	DETECTION	20	25	0.01	20	0.01	10	0.008	0.008	2
24	UNITS	ppm	ppm	%	ppm	%	ppm	ppm	ppm	ppm
25	METHOD	GA104	GA104	GA104	GA104	GA104	GA104	GG309	GG309	GX401

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

AUTHORISED OFFICER Gary Lindberg

ANALABS

A Division of Inchcape Testing Services (Australia) Pty. Ltd.
A.C.N. 004 591 664

996082

ANALYTICAL DATA

SAMPLE PREFIX	REPORT No.	REPORT DATE	CLIENT ORDER No.	PAGE
	111310.60.09519	11/06/93	1411	2 OF 2

TUBE No.	SAMPLE No.	Ba	Ba							
1	37101	>10000	2.23							
2	37102	>10000	5.07							
3	37103	787	-							
4	37104	1702	-							
5	37105	525	-							
6	37106	405	-							
7	37107	1513	-							
8	37108	607	-							
9										
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20										
21										
22										
23	DETECTION	10	0.01							
24	UNITS	ppm	%							
25	METHOD	GX401	GX404							

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

AUTHORISED OFFICER Gary Lindberg

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A.C.N. 004 591 864

99608

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ANALYTICAL REPORT No. 111310.60.09458

THIS REPORT MUST BE READ IN CONJUNCTION WITH THE ACCOMPANYING ANALYTICAL DATA

INVOICE TO:
Pasminco Exploration
P.O. Box 886
BURNIE TAS 7320

ORDER No.	PROJECT
1408	3003

DATE RECEIVED	RESULTS REQUIRED
27/04/93	ASAP

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
3	28/05/93	1	10

SAMPLE NUMBERS	SAMPLE DESCRIPTION	ELEMENT/METHOD
35064,35066,35068/071,35073, 35075/077	RO Prep : GP029,P1	Whole Rock Analysis/OX408 Rb,Sr,V,Nb,Y,Zr/GX401 Cu,Pb,Zn,Ag/GA104 Au/GG309

RESULTS TO
Mr M Quayle
Pasminco Exploration
P.O. Box 886
BURNIE TAS 7320

RESULTS TO
Mr F Fitzgerald
Pasminco Exploration
P.O. Box 886
BURNIE TAS 7320

RESULTS TO

REMARKS

AUTHORISED OFFICER

ANALABS

A Division of Inchcape Testing Services (Australia) Pty. Ltd.
A.C.N. 004 591 664

996084

ANALYTICAL DATA

SAMPLE PREFIX	REPORT No.	REPORT DATE	CLIENT ORDER No.	PAGE
	111310.60.09458	28/05/93	1408	1 OF 3

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Au	Rb	Sr	V	Nb
1	35066	26	<25	83	<10	0.012	-	-	-	-
2	35069	-	-	-	-	-	28	242	26	16
3	35071	-	-	-	-	-	39	187	26	15
4	35073	-	-	-	-	-	87	371	34	15
5	35076	-	-	-	-	-	9	6	38	6
6	35077	30	155	492	<10	0.028	25	7	32	5
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22										
23	DETECTION	20	25	20	10	0.008	5	5	5	3
24	UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
25	METHOD	GA104	GA104	GA104	GA104	GG309	GX401	GX401	GX401	GX401

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

AUTHORISED OFFICER Keith Hand

ANALABS

A Division of Inchcape Testing Services (Australia) Pty. Ltd.
A.C.N. 004 591 664

996085

ANALYTICAL DATA

SAMPLE PREFIX	REPORT No.	REPORT DATE	CLIENT ORDER No.	PAGE
	111310.60.09458	28/05/93	1408	2 OF 3

TUBE No.	SAMPLE No.	Y	Zr	Al2O3	SiO2	TiO2	Fe2O3	MnO	CaO	K2O
1	35064	–	–	17.42	66.2	0.69	3.79	0.04	<0.01	4.31
2	35066	–	–	22.90	56.5	0.70	4.29	0.04	0.15	5.04
3	35068	–	–	13.64	73.9	0.60	2.36	0.02	0.01	3.91
4	35069	30	269	14.09	71.4	0.50	3.19	0.07	0.58	0.77
5	35070	–	–	12.40	73.2	0.55	3.94	0.01	0.01	2.71
6	35071	33	263	14.74	70.5	0.51	3.53	0.08	0.69	1.71
7	35073	38	243	13.58	72.4	0.48	2.53	0.04	2.25	1.74
8	35075	–	–	13.83	69.3	0.86	3.71	0.02	0.01	3.31
9	35076	18	118	7.55	70.7	0.26	14.97	0.88	0.05	0.23
10	35077	15	101	7.40	74.7	0.19	11.59	0.25	0.07	0.67
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	5	5	0.05	0.1	0.01	0.01	0.01	0.01	0.01
24	UNITS	ppm	ppm	%	%	%	%	%	%	%
25	METHOD	GX401	GX401	OX408	OX408	OX408	OX408	OX408	OX408	OX408

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

AUTHORISED OFFICER *Keith Hand*

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A Division of Inchcape Testing Services (Australia) Pty. Ltd.
A.C.N. 004 591 664

996086

ANALYTICAL DATA

SAMPLE PREFIX	REPORT No.	REPORT DATE	CLIENT ORDER No.	PAGE
	111310.60.09458	28/05/93	1408	3 OF 3

TUBE No.	SAMPLE No.	MgO	P2O5	Na2O	S	TOTAL	LOI			
1	35064	1.84	0.123	0.19	0.017	100.01	5.38			
2	35066	2.61	0.165	0.93	1.163	100.00	5.52			
3	35068	0.97	0.017	0.16	0.028	100.06	4.42			
4	35069	1.07	0.058	4.74	0.021	99.76	3.25			
5	35070	1.05	0.062	1.07	0.272	99.78	4.49			
6	35071	1.02	0.104	5.96	0.020	100.11	1.26			
7	35073	1.08	0.080	1.99	0.005	99.57	3.37			
8	35075	2.20	0.041	0.10	0.463	100.12	6.25			
9	35076	1.94	0.066	<0.05	0.023	100.27	3.55			
10	35077	0.90	0.065	0.09	0.918	100.41	3.58			
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	0.01	0.005	0.05	0.005	0.01	0.01			
24	UNITS	%	%	%	%	%	%			
25	METHOD	OX408	OX408	OX408	OX408	OX408	OM615			

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

AUTHORISED OFFICER Keith Hand

ANALABS
A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd.
A.C.N. 004 591 664

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FILED 31-7-93

ANALYTICAL REPORT No. 111310.60.09405

THIS REPORT MUST BE READ IN CONJUNCTION WITH THE ACCOMPANYING ANALYTICAL DATA

INVOICE TO:	ORDER No.	PROJECT
Pasminco Exploration P.O. Box 886 BURNIE TAS 7320	1405	3003
	DATE RECEIVED	RESULTS REQUIRED
	26/03/93	ASAP

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
3	26/04/93	1	9

SAMPLE NUMBERS	SAMPLE DESCRIPTION	ELEMENT/METHOD
35051/59	SC Prep : GP029,P1	Cu,Pb,Zn,Ag,Fe/GA140,Fe/GA104 Au,Au(R),Au(S)/GG309 As/HA101 Ba/GX401,S/OM613 Whole Rock Analysis/GX408

RESULTS TO
Mr M Quayle
Pasminco Exploration
P.O. Box 886
BURNIE TAS 7320

RESULTS TO
Mr F Fitzgerald
Pasminco Exploration
P.O. Box 886
BURNIE TAS 7320

RESULTS TO

REMARKS

N.B. S/GX408 IS NOT RECOMMENDED ON SULPHI
SAMPLES AND WAS CHECKED BY OM613

AUTHORISED OFFICER

ANALABS 996088

A Division of Inchcape Testing Services (Australia) Pty. Ltd.
A.C.N. 004 591 664

ANALYTICAL DATA

SAMPLE PREFIX	REPORT No.	REPORT DATE	CLIENT ORDER No.	PAGE
	111310.60.09405	26/04/93	1405	1 OF 3

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Fe	Fe	Au	Au(S)	As
1	35051	19	7	63	<1	3.93	-	-	-	-
2	35052	21	7	59	<1	3.36	-	<0.008	-	12
3	35053	12	19	56	<1	3.51	-	-	-	-
4	35054	38	80	184	<1	>5.00	6.51	<0.008	<0.008	59
5	35055	15	888	1172	2	3.51	-	<0.008	-	41
6	35056	11	970	1038	1	3.03	-	-	-	-
7	35057	12	14	73	<1	2.78	-	<0.008	-	13
8	35058	139	153	199	1	>5.00	5.73	-	-	-
9	35059	15	810	874	1	3.09	-	<0.008	-	29
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	2	3	2	1	0.01	0.01	0.008	0.008	1
24	UNITS	ppm	ppm	ppm	ppm	%	%	ppm	ppm	ppm
25	METHOD	GA140	GA140	GA140	GA140	GA140	GA104	GG309	GG309	HA101

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

AUTHORISED OFFICER

ANALABS

A Division of Inchcape Testing Services (Australia) Pty. Ltd.
A.C.N. 004 591 664

996089

ANALYTICAL DATA

SAMPLE PREFIX	REPORT No.	REPORT DATE	CLIENT ORDER No.	PAGE
	111310.60.09405	26/04/93	1405	2 OF 3

TUBE No.	SAMPLE No.	Ba	S	Al2O3	SiO2	TiO2	Fe2O3	MnO	CaO	K2O
1	35052	1776	-	-	-	-	-	-	-	-
2	35054	1226	-	-	-	-	-	-	-	-
3	35055	633	-	-	-	-	-	-	-	-
4	35057	1043	0.610	15.99	64.6	0.41	4.19	0.11	2.50	2.94
5	35059	353	-	-	-	-	-	-	-	-
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	10	0.005	0.05	0.1	0.01	0.01	0.01	0.01	0.01
24	UNITS	ppm	%	%	%	%	%	%	%	%
25	METHOD	GX401	OM613	OX408	OX408	OX408	OX408	OX408	OX408	OX408

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

AUTHORISED OFFICER

ANALABS 996090

A Division of Inchcape Testing Services (Australia) Pty. Ltd.
A.C.N. 004 591 664

ANALYTICAL DATA

SAMPLE PREFIX	REPORT No.	REPORT DATE	CLIENT ORDER No.	PAGE
	111310.60.09405	26/04/93	1405	3 OF 3

TUBE No.	SAMPLE No.	MgO	P2O5	Na2O	LOI	Total				
1	35057	1.06	0.080	3.05	4.42	99.95				
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	0.01	0.005	0.05	0.01	0.01				
24	UNITS	%	%	%	%	%				
25	METHOD	OX408	OX408	OX408	OX408	OX408				

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

AUTHORISED OFFICER

ANALABS

A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd.
A.C.N. 004 591 864

996091

Phone (004) 316837 | 14 Thirkell St. DODEE TAS 7320 | Fax (004) 318890

ANALYTICAL REPORT No. 11310.60.09394

THIS REPORT MUST BE READ IN CONJUNCTION WITH THE ACCOMPANYING ANALYTICAL DATA

INVOICE TO:

Pasminco Exploration
P.O. Box 886
BURNIE TAS 7320

ORDER No.	PROJECT
1404	3003

DATE RECEIVED	RESULTS REQUIRED
23/03/93	ASAP

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
4	29/04/93	1	10

SAMPLE NUMBERS	SAMPLE DESCRIPTION	ELEMENT/METHOD
31499/35045 NOT CONTINUOUS	RO Prep : GP029,P1	Cu,Pb,Zn,Ag,Fe/GA140,Pb:1/GA104 Au/GG309 Cu,Pb,Zn,Ag,Fe/GA104 Whole Rock Analysis/OX408 Rb,Sr,V,Nb,Y,Zr/GX401,S/GN613

RESULTS TO

Mr M Quayle
Pasminco Exploration
P.O. Box 886
BURNIE TAS 7320

RESULTS TO

Mr P Fitzgerald
Pasminco Exploration
P.O. Box 886
BURNIE TAS 7320

RESULTS TO

REMARKS

N.B. S/OX408 IS NOT RECOMMENDED ON SULPHI
SAMPLES AND WAS CHECKED BY METHOD ON

AUTHORISED OFFICER

ANALABS

A Division of Inchcape Testing Services (Australia) Pty. Ltd.
A.C.N. 004 591 664

996092

ANALYTICAL DATA

SAMPLE PREFIX	REPORT No.	REPORT DATE	CLIENT ORDER No.	PAGE
	111310.60.09394	28/04/93	1401	1 OF 4

TUBE No.	SAMPLE No.	Cu	Cu	Pb	Pb	Pb:1	Zn	Zn	Ag	Ag
1	31499	9	-	28	-	-	74	-	<1	-
2	31500	11	-	18	-	-	17	-	<1	-
3	35013	11	-	78	-	-	104	-	<1	-
4	35014	55	-	462	-	-	736	-	1	-
5	35037	17	-	253	-	-	385	-	2	-
6	35039	12	-	42	-	-	66	-	<1	-
7	35042	15	-	>5000	-	0.59	2375	-	5	-
8	35043	6	-	363	-	-	403	-	<1	-
9	35044	-	40	-	<25	-	-	105	-	<10
10	35045	-	50	-	35	-	-	365	-	<10
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	2	20	3	25	0.01	2	20	1	10
24	UNITS	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm
25	METHOD	GA140	GA104	GA140	GA104	GA104	GA140	GA104	GA140	GA104

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

AUTHORISED OFFICER

ANALABS

A Division of Inchcape Testing Services (Australia) Pty. Ltd.
A.C.N. 004 591 664

996093

ANALYTICAL DATA

SAMPLE PREFIX	REPORT No.	REPORT DATE	CLIENT ORDER No.	PAGE
	111310.60.09394	28/04/93	1401	2 OF 4

TUBE No.	SAMPLE No.	Fe	Fe	Au	Rb	Sr	V	Nb	Y	Zr
1	31499	4.07	-	0.008	-	-	-	-	-	-
2	31500	1.22	-	<0.008	-	-	-	-	-	-
3	35009	-	-	-	114	34	40	8	35	244
4	35010	-	-	-	100	59	<5	15	34	250
5	35011	-	-	-	168	13	68	12	32	257
6	35013	>5.00	5.98	0.018	-	-	-	-	-	-
7	35014	2.01	-	<0.008	-	-	-	-	-	-
8	35037	1.28	-	<0.008	-	-	-	-	-	-
9	35038	-	-	-	63	62	<5	15	38	211
10	35039	1.90	-	<0.008	226	222	40	9	24	222
11	35041	-	-	-	86	307	44	12	44	268
12	35042	1.20	-	<0.008	-	-	-	-	-	-
13	35043	2.28	-	<0.008	-	-	-	-	-	-
14	35044	-	37.80	<0.008	-	-	-	-	-	-
15	35045	-	19.70	<0.008	-	-	-	-	-	-
16	35046	-	-	-	81	246	32	5	32	227
17	35049	-	-	-	95	198	12	10	31	352
18										
19										
20										
21										
22										
23	DETECTION	0.01	0.01	0.008	5	5	5	3	5	5
24	UNITS	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
25	METHOD	GA140	GA104	GG309	GX401	GX401	GX401	GX401	GX401	GX401

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

AUTHORISED OFFICER

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A Division of Inchcape Testing Services (Australia) Pty. Ltd.
A.C.N. 004 591 664

996094

ANALYTICAL DATA

SAMPLE PREFIX	REPORT No.	REPORT DATE	CLIENT ORDER No.	PAGE
	111310.60.09394	28/04/93	1401	3 OF 4

TUBE No.	SAMPLE No.	S	S	Al2O3	SiO2	TiO2	Fe2O3	MnO	CaO	K2O
1	31499	-	0.670	15.15	67.3	0.56	5.44	0.05	0.23	2.71
2	31500	-	2.800	12.89	72.1	0.43	3.93	0.01	0.08	1.82
3	35009	0.015	-	14.96	70.0	0.52	5.20	0.03	0.10	3.52
4	35010	0.011	-	13.77	74.8	0.32	2.45	0.02	0.02	2.09
5	35011	0.195	-	15.91	72.4	0.56	2.26	0.02	0.06	4.79
6	35012	0.303	-	15.03	73.9	0.54	2.51	0.04	0.10	4.47
7	35037	-	2.950	12.16	73.1	0.41	4.78	0.02	0.08	2.72
8	35039	-	0.650	14.39	69.7	0.52	2.92	0.03	0.18	5.18
9	35041	0.034	-	16.62	66.5	0.58	4.44	0.08	0.35	1.85
10	35042	-	3.600	11.83	70.3	0.39	5.13	0.02	0.19	2.48
11	35043	0.205	-	10.90	74.9	0.20	3.25	0.14	1.39	1.93
12	35046	0.099	-	13.76	65.6	0.49	4.53	0.09	3.57	4.06
13	35049	0.253	-	11.59	74.9	0.44	2.87	0.06	0.89	3.10
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	0.005	0.005	0.05	0.1	0.01	0.01	0.01	0.01	0.01
24	UNITS	%	%	%	%	%	%	%	%	%
25	METHOD	OX408	OM613	OX408	OX408	OX408	OX408	OX408	OX408	OX408

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

AUTHORISED OFFICER

ANALABS

A Division of Inchcape Testing Services (Australia) Pty. Ltd.
A.C.N. 004 591 664

996095

ANALYTICAL DATA

SAMPLE PREFIX	REPORT No.	REPORT DATE	CLIENT ORDER No.	PAGE
	111310.60.09394	28/04/93	1401	4 OF 4

TUBE No.	SAMPLE No.	MgO	P2O5	Na2O	LOI	Total				
1	31499	1.73	0.136	2.18	4.21	100.33				
2	31500	0.37	0.038	4.24	3.30	101.77				
3	35009	1.09	0.101	1.42	3.18	100.12				
4	35010	0.84	0.018	1.87	3.32	99.52				
5	35011	0.50	0.086	0.07	2.83	99.69				
6	35012	0.47	0.108	0.05	2.80	100.27				
7	35037	0.51	0.081	2.38	3.63	102.67				
8	35039	0.94	0.139	1.40	2.98	99.00				
9	35041	1.81	0.155	5.29	2.42	100.17				
10	35042	0.58	0.142	1.40	4.73	100.40				
11	35043	0.95	0.040	2.78	3.60	100.30				
12	35046	0.69	0.125	3.09	4.01	100.07				
13	35049	0.79	0.065	2.45	2.16	99.59				
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	0.01	0.005	0.05	0.01	0.01				
24	UNITS	%	%	%	%	%				
25	METHOD	OX408	OX408	OX408	OX408	OX408				

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

AUTHORISED OFFICER

ANALABS

A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd.
A.C.N. 004 581 664

996096

Phone (004) 316837 | 14 Thirkell St. CODEE TAS 7320 | Fax (004) 318890

ANALYTICAL REPORT No. 111310.60.092262

THIS REPORT MUST BE READ IN CONJUNCTION WITH THE ACCOMPANYING ANALYTICAL DATA

INVOICE TO:

Pasminco Exploration
P.O. Box 886
BURNIE TAS 7320

ORDER No.	PROJECT
0200	3003

DATE RECEIVED	RESULTS REQUIRED
29/01/93	ASAP

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
1	18/02/93	1	19

SAMPLE NUMBERS	SAMPLE DESCRIPTION	ELEMENT/METHOD
35018/36	SO Prep : GP029 - P2,P4	Cu,Pb,Zn,Ag,Fe,Mn/GA140,As/GA114

RESULTS TO

Mr N Quayle
Pasminco Exploration
P.O. Box 886
BURNIE TAS 7320

RESULTS TO

Mr F Fitzgerald
Pasminco Exploration
P.O. Box 886
BURNIE TAS 7320

RESULTS TO

REMARKS

Newton Creek
Soil Samples
Inc 58300.N

AUTHORISED OFFICER

ANALABS

A Division of Inchcape Testing Services (Australia) Pty. Ltd.
A.C.N. 004 591 664

996097

ANALYTICAL DATA

SAMPLE PREFIX	REPORT No.	REPORT DATE	CLIENT ORDER No.	PAGE
	111310.60.09262	18/02/93	0200	1 OF 1

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Fe	Mn	As		
1	35018	15	32	82	<1	4.50	269	14		
2	35019	180	285	285	<1	19.60	1680	50		
3	35020	44	58	77	<1	0.91	176	3		
4	35021	13	10	40	<1	3.00	58	3		
5	35022	4	22	68	<1	1.31	70	<1		
6	35023	220	19	285	<1	8.00	730	<1		
7	35024	45	12	200	<1	10.00	198	4		
8	35025	13	8	140	<1	6.70	127	2		
9	35026	3	4	29	<1	0.81	35	2		
10	35027	4	12	6	<1	0.21	15	2		
11	35028	4	4	5	<1	0.31	21	2		
12	35029	3	4	6	<1	0.25	20	3		
13	35030	5	4	33	<1	1.70	115	6		
14	35031	4	5	11	<1	1.53	44	6		
15	35032	5	3	29	<1	1.07	68	3		
16	35033	9	7	63	<1	1.39	98	2		
17	35034	6	7	74	<1	2.58	74	2		
18	35035	15	9	93	<1	4.36	144	2		
19	35036	13	16	105	<1	7.10	293	5		
20										
21										
22										
23	DETECTION	2	3	2	1	0.01	3	1		
24	UNITS	ppm	ppm	ppm	ppm	%	ppm	ppm		
25	METHOD	GA140	GA140	GA140	GA140	GA140	GA140	GA114		

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

AUTHORISED OFFICER

ANALABS

A Division of Inchcape Inspection and Testing Services Australia Pty Ltd.
A.C.N. 004 591 664

996095

Phone (004) 316837 | 14 Thirkell St. CODEE TAS 7320 | Fax (004) 318890

ANALYTICAL REPORT No. 111310.60.09233

THIS REPORT MUST BE READ IN CONJUNCTION WITH THE ACCOMPANYING ANALYTICAL DATA

INVOICE TO:

Pasminco Exploration
P.O. Box 886
BURNIE TAS 7320

ORDER No.	PROJECT
0197	3003

DATE RECEIVED	RESULTS REQUIRED
19/01/93	ASAP

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES
4	04/02/93	1

TOTAL No. OF SAMPLES: 13

SAMPLE NUMBERS	SAMPLE DESCRIPTION	ELEMENT/METHOD
31486/87	RC Prep : GP029,P4	Cu,Pb,Zn,Ag,Fe/GA140
31489	rc Prep :	Cu,Pb,Zn,Ag,Fe/GA104
0314,83,84,88,90/92,94/97	rc Prep :	Al2O3,SiO2,TiO2,Fe2O3,MnO,CaO,K2
0314,83,84,88,90/92,94/97	rc Prep :	Rb,Sr,V,Nb,Y,Zr/GX401

REMARKS

RESULTS TO

Mr M Quayle
Pasminco Exploration
P.O. Box 886
BURNIE TAS 7320

RESULTS TO

Mr F Fitzgerald
Pasminco Exploration
P.O. Box 886
BURNIE TAS 7320

RESULTS TO

AUTHORISED OFFICER

ANALABS

A Division of Inchcape Testing Services (Australia) Pty. Ltd.
A.C.N. 004 591 664

996099

ANALYTICAL DATA

SAMPLE PREFIX	REPORT No.	REPORT DATE	CLIENT ORDER No.	PAGE
	111310.60.09233	04/02/93	0197	1 OF 4

TUBE No.	SAMPLE No.	Cu	Cu	Pb	Pb	Zn	Zn	Ag	Ag	Fe
1	31486	17	-	32	-	88	-	<1	-	4.51
2	31487	60	-	20	-	165	-	<1	-	8.69
3	31489	-	190	-	875	-	350	-	29	-
4										
5										
6										
7										
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9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	2	20	3	25	2	20	1	10	0.01
24	UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%
25	METHOD	GA140	GA104	GA140	GA104	GA140	GA104	GA140	GA104	GA140

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

AUTHORISED OFFICER

ANALABS

A Division of Inchcape Testing Services (Australia) Pty. Ltd.
A.C.N. 004 591 864

996100

ANALYTICAL DATA

SAMPLE PREFIX	REPORT No.	REPORT DATE	CLIENT ORDER No.	PAGE
	111310.60.09233	04/02/93	0197	2 OF 4

TUBE No.	SAMPLE No.	Fe	Rb	Sr	V	Nb	Y	Zr	Al2O3	SiO2
1	31483	-	124	23	196	10	21	144	15.99	64.1
2	31484	-	98	61	89	6	34	181	9.48	70.4
3	31488	-	34	173	<5	16	39	280	13.34	74.8
4	31489	31.10	-	-	-	-	-	-	-	-
5	31490	-	89	134	53	16	30	227	14.60	69.7
6	31491	-	51	567	162	5	20	137	15.10	62.6
7	31492	-	8	374	28	14	37	294	13.20	72.0
8	31494	-	114	63	54	9	38	243	15.50	69.3
9	31495	-	109	40	6	15	35	227	10.86	77.3
10	31496	-	93	131	101	9	32	173	11.96	69.5
11	31497	-	195	168	215	5	14	142	18.01	61.3
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	0.05	5	5	5	3	5	5	0.05	0.1
24	UNITS	%	ppm	ppm	ppm	ppm	ppm	ppm	%	%
25	METHOD	GA104	GX401	GX401	GX401	GX401	GX401	GX401	GX408	GX408

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

AUTHORISED OFFICER

ANALABS

A Division of Inchcape Testing Services (Australia) Pty. Ltd.
A.C.N. 004 591 664

996101

ANALYTICAL DATA

SAMPLE PREFIX	REPORT No.	REPORT DATE	CLIENT ORDER No.	PAGE
	111310.60.09233	04/02/93	0197	3 OF 4

TUBE No.	SAMPLE No.	TiO2	Fe2O3	MnO	CaO	K2O	MgO	P2O5	SO3	Na2O
1	31483	0.51	7.43	0.06	0.03	3.78	2.28	0.122	0.03	1.04
2	31484	0.62	11.89	0.06	0.01	2.45	0.40	0.135	0.03	<0.05
3	31488	0.32	1.93	0.04	0.49	0.82	0.50	0.055	0.18	5.98
4	31490	0.51	5.60	0.06	1.10	2.41	0.77	0.126	0.05	2.68
5	31491	0.42	6.60	0.10	2.51	2.45	3.36	0.181	0.03	4.63
6	31492	0.49	4.19	0.07	0.97	0.33	1.15	0.059	0.16	5.75
7	31494	0.51	5.05	0.03	0.14	3.18	1.10	0.138	0.14	2.58
8	31495	0.18	3.05	0.07	1.19	2.90	1.03	0.028	0.01	0.56
9	31496	0.47	4.76	0.07	1.86	2.94	1.59	0.084	1.28	2.11
10	31497	0.56	5.90	0.10	0.83	5.10	1.67	0.254	3.28	1.25
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	0.01	0.01	0.01	0.01	0.01	0.01	0.005	0.01	0.05
24	UNITS	%	%	%	%	%	%	%	%	%
25	METHOD	OX40B	OX40B	OX40B	OX40B	OX40B	OX40B	OX40B	OX40B	OX40B

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

AUTHORISED OFFICER

ANALABS

A Division of Inchcape Testing Services (Australia) Pty. Ltd.
A.C.N. 004 591 664

996102

ANALYTICAL DATA

SAMPLE PREFIX	REPORT No.	REPORT DATE	CLIENT ORDER No.	PAGE
	111310.60.09233	04/02/93	0197	4 OF 4

TUBE No.	SAMPLE No.	LOI	Total							
1	31483	4.78	100.70							
2	31484	4.14	99.62							
3	31488	1.05	99.50							
4	31490	2.67	100.33							
5	31491	1.62	99.60							
6	31492	1.17	99.50							
7	31494	2.34	100.00							
8	31495	2.43	99.62							
9	31496	2.92	99.54							
10	31497	4.08	102.29							
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	0.01	0.01							
24	UNITS	%	%							
25	METHOD	OX408	OX408							

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

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996103

APPENDIX 2

SAMPLE RECORD SHEET

YOLANDE : Newton Creek and Henty Canal rock samples.

996104

Sample	northing	easting	type					
31483	5358398	379385		wr	lgc		NC	cleaved alt feld phy volc.
31484	5358398	379285		wr	lgc		NC	weathered mafic? fe stain.
31486	5358398	379240	os				NC	black slate very cleaved.
31487	5358398	379220	os				NC	black slate in Henty fault?
31488	5358394	379924		wr	lgc	ts	NC	alt clast from nc cong ,white siliceous.
31489	5358394	379934	os				NC	pyrite clast from nc cong.
31490	5358345	380061		wr	lgc	ts	NC	HW dacite from top of spillway.
31491	5358300	379940		wr	lgc	ts	NC	hb phyric andesite 10m below cong ct.
31492	5358308	379993		wr	lgc	ts	NC	lam sst from ncs cong.
31493	5358309	379994				ts	NC	vfg lam chert from ncs cong.
31494	5358680	379875		wr	lgc	ts	NC	rhyodacite on road north of dam.
31495	5357970	379400		wr	lgc	ts	NC	lam sil slt from creek.
31496	5357920	379636		wr	lgc	ts	NC	lam sil slt from base of hill cong.
31497	5357400	380680		wr	lgc	ts	NC	Howards Anomaly py alt cleaved rock.
31498	5358430	379975				ts	NC	sst from ncs cong.
31499	5360000	380350	os	wr			HC	alt feld phyric volc.
31500	5360830	379400	os	wr			HC	py alt from near S Henty fault.
35001	5358485	379950					NC	hb porphry near dam.
35002	5358485	379940					NC	hb porphyry near dam.
35003	5358600	379960					NC	hb phy or dacite? near ct on road.
35004	5358530	379940					NC	hb phy?
35005	5358800	379700					NC	andesite?
35006	5358800	379660					NC	
35007	5358775	379750					NC	vitric mdst?
35008	5358790	379820					NC	road cut?
35009	5358870	379800		wr	lgc		NC	road cut?
35010	5359000	379700		wr	lgc		NC	from weathered window in glacials.
35011	5359150	380075		wr	lgc		NC	cong sheared from near gate.
35012	5359150	380080		wr			NC	py stained augen schist in cong near gate.
35013	5359155	380085					NC	sed near gate, haematite spots?
35014	5359160	380090	os				NC	pyrite alt cong from near gate.
35015	5359400	380500					NC	Tyndal mine qtz phyric lava.
35016	5358385	379978					NC	dam cong sst.
35017	5358380	379985					NC	dam feld phy sst?
35037	5360720	379425	os	wr			HC	Henty fault pyritic alt volcs.
35038	5360424	379980			lgc		HC	Tyndal qtz phyric lava.
35039	5360610	379880	os	wr	lgc		HC	alt cong.
35040	5360612	379883					HC	cong.
35041	5360715	379540		wr	lgc		HC	alt volc.
35042	5360680	379837	os	wr			HC	py alt cong.
35043	5360674	379840	os	wr			HC	polymict cong.
35046	YNC1 10.2m			wr	lgc	ts	NC	HW andesits
35047	YNC1 29.7m					ts	NC	andesite/conglomerate
35048	YNC1 44.2m					ts	NC	lam xtl sst
35049	YNC1 51.6m			wr	lgc	ts	NC	FW rhyodacite pumice breccia
35050	YNC1 56.1m					ts	NC	FW rhyodacite lava?
35051	YNC1 36.6m		os				NC	
35052	YNC1 38.2m		os				NC	
35053	YNC1 39.8m		os				NC	
35054	YNC1		os				NC	chl breccia in laminated shale.
35055	YNC2		os				NC	laminated sandstone.
35056	YNC2		os				NC	
35057	YNC3 18.7m		os	wr			NC	py clasts iv pumiceous volcaniclastic.
35058	YNC3		os				NC	
35059	YNC3		os				NC	
35063	5360305	377510					WSP	
35064	5360300	377500		wr			WSP	BS lam with felds/sst near lowerwsp ct at canal.
35065	5360510	377270					WSP	leached feld phy sst in lam shales.
35066	5360490	377337	os	wr			WSP	canal alt green py alt folded xtl sst.
35067	5360315	377260					WSP	hyaloclastite canal road.

35068	5360310	377265		wr	WSP	alt BS from below hyaloc.
* 35069				wr lgc	WSP	pumice breccia CVC below ct south of WSP canal.
35070	5360000	377580		wr	WSP	BS on south road along strike from canal alt zone.
* 35071	5360250	377610		wr lgc	WSP	CVC magnetite bearing feld-phy pumice breccia below ct on canal road.
35072	5360256	377565			WSP	ct qtz porphyry.
* 35073	5360585	377510		wr lgc	WSP	Vpm north of canal.
35074	5360795	376955			WSP	lava breccia in WSF north of canal.
35075	5360700	376980		wr	WSP	alt BS from road cut north of WSFcanal.
35076	5359912	379877		wr lgc	NC	line 30 pit alt volcs.
35077	5359892	379896	os	wr lgc	NC	line 30 pit alt volcs.

35080	YNC5	68.10			
35090	YNC5	75.70			
35091	YNC5	78.10			
35092	YNC5	94.30			
35093	YNC5	104.70			
35094	YNC5	128.60			
35095	YNC5	149.40			
35096	YNC5	162.10			
35097	YNC5	189.10			
35098	YNC5	230.30			
37101	YNC4	152.80		NC	
37102	YNC4	153.70		NC	
37103	YNC4	146.10		NC	
37104	YNC4	147.00		NC	
37105	YNC4	163.80		NC	
37106	YNC4	164.70		NC	
37107	YNC4	174.60		NC	
37108	YNC4	177.00		NC	
37201	YNC4	132.60	133.80 os		
37202	YNC4	144.40	146.10 os		
37203	YNC4	148.10	149.90 os		
37204	YNC4	149.90	151.40 os		
37205	YNC4	151.40	152.90 os		
37206	YNC4	154.40	155.90 os		
37207	YNC4	155.90	156.70 os		
37208	YNC4	159.30	160.00 os		
37209	YNC4	161.20	162.60 os		
37210	YNC4	162.60	163.80 os		
37211	YNC4	167.20	168.80 os		
37212	YNC4	172.10	174.60 os		
37213	YNC4	178.80	179.40 os		
37214	YNC4	211.60	211.70 os		
37215	YNC5	97.50	99.20 os		
37216	YNC5	112.50	113.30 os		
37217	YNC5	117.00	118.50 os		
37218	YNC5	138.80	140.20 os		
37219	YNC5	128.60	128.90	wr lgc	
37220	YNC5	145.10	145.60	wr lgc	
37221	YNC5	218.50	218.90	wr lgc ts	
37222	YNC5	287.70	288.20	wr lgc ts	
37223	YNC5	327.10	327.40	wr lgc ts	
37224	YNC5	350.40	350.70	wr lgc	

os = ore suite
wr = alteration suite
lgc = litogeochem suite
ts = thinsection

NC = Newton Creek
HC = Henty Canal
HV = Henty Valley

APPENDIX 3

YOLANDE DDH COLLAR COORDINATES & DOWNHOLE SURVEYS

YOLANDE DDH COLLARS

HOLE_ID	AMG_E	AMG_N	RL	EOH
BR1	374929.50	5350434.00	272.40	502.0
DCP235	376244.00	5363466.00	732.00	161.4
HA1				
HA2				
HA3				
HA4				
HA5				
HA6				
HA7	380617.00	5358501.00	458.30	233.5
HA8	380624.00	5358621.00	472.80	251.5
HEC3091	380481.80	5358768.00	477.80	20.1
HEC3181	380075.15	5358434.28	462.46	18.3
HEC3183	380068.70	5358424.10	466.55	20.5
HEC3185	380008.10	5358546.05	462.81	17.6
HEC3187	380498.86	5358669.92	469.88	20.5
HEC3190	380419.30	5358725.82	471.58	20.1
HEC3193	380400.57	5358823.64	475.26	20.2
HFZ1				
HFZ10	379918.96	5363725.72	594.97	250.2
HFZ11	380108.02	5363990.25	585.61	88.2
HFZ12	379810.00	5363504.30	587.20	469.5
HFZ2				
HFZ3	379797.50	5362917.80	547.30	552.0
HFZ4	379710.40	5362717.20	546.50	708.0
HFZ5				
HFZ6	380030.50	5363801.20	587.19	523.0
HFZ7				
HFZ8				
HFZ9	379884.66	5363838.14	616.92	268.0
HR1	377895.00	5354674.00	132.00	371.0
HR2	377686.00	5354360.00	126.00	230.5
HR3	377946.00	5354864.00	136.00	616.7
HR4	377420.00	5355010.00	445.00	310.0
HR5	377421.00	5355010.00	445.00	421.5
JC1	378200.00	5363500.00	665.00	188.6
MMR1	377043.00	5362227.00	609.80	108.7
YHV1	375042.00	5351000.00	192.00	65.7
YNC1	379662.00	5357909.00	512.50	61.2
YNC2	379360.00	5358062.00	302.00	53.5
YNC3	379320.00	5358052.00	285.00	35.0
YNC4	379961.67	5359959.08	516.42	272.0
YNC5	379917.53	5360194.09	517.74	364.5

YOLANDE DDH downhole surveys

996108

HOLE_ID	DEPTH	DIP	AMG_AZ
BR1	0.0	-50.00	138.90
BR1	152.0	-49.00	141.90
BR1	264.0	-45.00	143.90
BR1	363.0	-36.00	149.90
BR1	469.0	-29.00	128.90
DCP235	0.0	-45.00	322.00
DCP235	0.0	-45.00	322.00
DCP235	35.0	-46.00	320.00
DCP235	35.0	-46.00	320.00
DCP235	77.0	-46.50	324.00
DCP235	77.0	-46.50	324.00
DCP235	119.0	-46.00	327.50
DCP235	119.0	-46.00	327.50
DCP235	161.0	-44.00	331.00
DCP235	161.4	-44.00	331.00
HA7	0.0	-50.00	262.00
HA7	52.0	-50.50	258.00
HA7	140.0	-47.00	258.00
HA7	230.0	-41.00	258.00
HA8	0.0	-50.00	282.00
HA8	50.0	-48.50	278.00
HA8	98.0	-47.00	280.00
HA8	146.0	-45.00	282.00
HA8	200.0	-43.00	282.00
HA8	270.0	-41.00	283.00
HEC3181	0.0	-90.00	0.00
HEC3183	0.0	-90.00	0.00
HEC3185	0.0	-90.00	0.00
HEC3187	0.0	-90.00	0.00
HEC3190	0.0	-90.00	0.00
HEC3191	0.0	-90.00	0.00
HEC3193	0.0	-90.00	0.00
HFZ10	0.0	-57.00	102.00
HFZ10	55.2	-57.00	99.00
HFZ10	85.2	-57.00	98.30
HFZ10	115.2	-56.00	97.00
HFZ10	145.2	-54.00	96.00
HFZ10	174.2	-53.00	95.30
HFZ10	204.2	-51.00	95.00
HFZ10	234.2	-49.00	94.00
HFZ11	0.0	-63.00	102.00
HFZ11	23.2	-60.00	98.00
HFZ11	53.2	-58.30	97.00
HFZ11	84.0	-57.00	98.30
HFZ12	0.0	-75.00	102.00
HFZ12	60.0	-75.30	103.00
HFZ12	99.0	-75.00	104.00
HFZ12	129.0	-74.00	102.00
HFZ12	207.0	-72.00	107.00
HFZ12	322.0	-71.30	117.00
HFZ12	387.0	-70.30	114.30

996109

HFZ12	448.0	-69.00	113.00
HFZ3	0.0	-55.00	102.00
HFZ3	12.2	-56.00	102.00
HFZ3	24.4	-56.00	102.00
HFZ3	36.6	-55.50	102.00
HFZ3	42.7	-55.00	102.00
HFZ3	54.9	-54.50	102.00
HFZ3	61.0	-54.00	102.00
HFZ3	67.1	-53.50	102.00
HFZ3	79.2	-53.00	102.00
HFZ3	85.3	-53.00	106.00
HFZ3	97.5	-52.00	106.00
HFZ3	115.8	-51.50	106.00
HFZ3	128.0	-51.50	105.00
HFZ3	140.2	-51.00	103.00
HFZ3	152.4	-49.00	103.00
HFZ3	158.5	-48.50	102.00
HFZ3	164.6	-48.00	101.00
HFZ4	0.0	-60.00	102.00
HFZ4	12.2	-60.00	102.00
HFZ4	18.6	-59.50	102.00
HFZ4	24.4	-60.00	102.00
HFZ4	31.7	-59.00	104.00
HFZ4	39.6	-60.00	102.00
HFZ4	48.8	-60.50	102.00
HFZ4	73.2	-59.50	102.00
HFZ4	97.5	-58.00	101.00
HFZ4	103.6	-57.00	101.00
HFZ6	0.0	-60.00	102.00
HFZ6	6.1	-60.00	102.00
HFZ6	12.2	-57.50	102.00
HFZ6	12.2	-60.00	102.00
HFZ6	12.2	-59.00	102.00
HFZ6	12.2	-60.00	102.00
HFZ6	12.2	-60.50	102.00
HFZ6	27.4	-60.50	102.00
HFZ6	27.4	-58.50	102.00
HFZ6	27.4	-55.50	94.00
HFZ6	27.4	-59.00	102.00
HFZ6	27.4	-60.50	102.00
HFZ9	0.0	-53.00	102.00
HFZ9	123.2	-52.00	102.00
HFZ9	154.2	-49.00	100.30
HFZ9	184.2	-46.30	99.00
HFZ9	214.2	-45.00	100.00
HFZ9	244.2	-40.00	100.00
HR1	0.0	-58.00	291.50
HR1	371.0	-14.00	291.50
HR2	0.0	-51.00	281.50
HR2	230.5	-43.00	281.50
HR3	0.0	-50.00	291.50
HR3	616.7	-15.00	291.50
HR4	0.0	-71.00	111.50
HR4	310.0	-79.00	111.50
HR5	0.0	-54.00	111.50

996110

HR5	421.5	-51.00	111.50
JC1	0.0	-56.00	283.50
JC1	30.0	-55.00	281.50
JC1	61.5	-54.00	278.00
JC1	100.0	-48.50	277.00
JC1	150.0	-41.50	276.50
JC1	188.6	-37.00	276.50
MMR1	0.0	-60.00	98.50
MMR1	108.7	-60.00	98.50
YHV1	0.0	-55.00	78.50
YHV1	65.7	-55.00	78.50
YNC1	0.0	-60.00	285.00
YNC1	61.2	-60.00	285.00
YNC2	0.0	-75.00	258.00
YNC2	53.2	-75.00	258.00
YNC3	0.0	-90.00	258.00
YNC3	35.0	-90.00	258.00
YNC4	0.0	-45.00	239.50
YNC4	31.0	-45.90	238.00
YNC4	61.0	-45.00	238.50
YNC4	100.0	-44.50	239.00
YNC4	151.0	-42.00	239.25
YNC4	199.0	-39.90	239.25
YNC4	270.0	-35.00	239.25
YNC5	0.0	-45.00	239.50
YNC5	50.0	-43.00	238.50
YNC5	100.0	-42.20	241.50
YNC5	150.0	-39.00	243.25
YNC5	200.0	-33.20	241.50
YNC5	250.0	-26.30	244.00
YNC5	300.0	-20.00	246.00
YNC5	364.5	-17.50	246.50

APPENDIX 4

DIAMOND DRILL HOLE LOGS

PASMINCO EXPLORATION

DIAMOND DRILL CORE LOG

HOLE No. YNC1

PROJECT: YOLANDE: NEWTON CREEK

Vertical Scale 1 : 150

DESCRIPTION				GRAPHIC				CODES		
From	To	LITHOLOGY & ALTERATION	MINERALISATION	Depth	Lithology	Structures	STRUCTURES	LITH	STR	ALT
0.00	8.20	DACITE Brown, Coarse grained, Feldspar phyric, Suface weathering zone.	DISSEMINATED, 0.5% pyrrhotite disseminated, Pyrrhotite at trace to 1% is ubiquitous without change in abundance or occurance through contacts..	0				L Ld		
8.20	12.00	DACITE Grey, Coarse grained, Massive, Feldspar phyric, Slightly Silicified, Slightly Carbonatised, Lithogeochemical and petrographic sample at 10.3m. Feldspars altered to carbonate. CONTACT: Gradational, Alteration change.		10				L Ld		sil co
12.00	15.80	DACITE Pale, Brown, Coarse grained, Massive, Feldspar phyric, Moderately Silicified. Alteration change.						L Ld		sil
15.80	18.50	DACITE Grey, Brown, Coarse grained, Massive, Feldspar phyric, Weathered, oxidised joint faces. CONTACT: Conformable mixed, Mixed with soft sediment.					VEIN, A 50. Massive white quartz vein. VEIN, A 45. Massine white quartz with free growth crystals. VEIN, A 40.	L Ld	vein vein vein	
18.50	21.20	SANDSTONE Pale, Brown, Coarse grained, Fine grained, Massive, Feldspar phyric, Derived from dacite? Fine grained and laminated towards upper contact. CONTACT: Conformable abrupt.		20			CONTACT: conformable, mixing of andesite with soft sediment. BEDDING, A 45.	S sst	ss	
		SANDSTONE CONTAINING CLASTS OF DACITE								

9961112

5 cm

PASMINCO EXPLORATION

DIAMOND DRILL CORE LOG

HOLE No. YNC1

PROJECT: YOLANDE: NEWTON CREEK

Vertical Scale 1 : 150

DESCRIPTION				GRAPHIC				CODES		
From	To	LITHOLOGY & ALTERATION	MINERALISATION	Depth	Lithology	Structures	STRUCTURES	LITH	STR	ALT
		CONTACT: Conformable abrupt.					BEDDING, A 45.			
21.20	23.80	SANDSTONE CONTRINING CLASTS OF DACITE Pale, Buff, Coarse grained, Feldspar phyric, Moderately Silicified, Derived from dacite? CONTACT: Conformable abrupt.					VEIN, A 40. Free growth and rodding indicating extension.	S sst c Ld	vein	sil
23.80	28.80	CONGLOMERATE CONTAINING CLASTS OF DACITE Grey, Buff, Coarse grained, Massive, Feldspar phyric, Moderately Silicified, Sparse irregular clasts of dacite and siliceous altered rock from 10 to 60mm in size and rounded to angular. Matrix resembles andesite derived crystal sandstone. CONTACT: Conformable abrupt.						S cong c Ld		sil
28.80	39.80	CONGLOMERATE CONTAINING CLASTS OF DACITE Grey, Coarse grained, Feldspar phyric, Slightly Silicified, Resembles a partially reworked lava breccia, clasts are predominantly dacite and matrix is dacite derived but rock contains incorporated siliceous clasts. CONTACT: Conformable abrupt.		30			FAULT, A 40, Brittle. Fault contains a granular to sachoroidal quartz sericite pug.	S cong c Ld	flt	sil
							VEIN, A 50.		vein	
39.80	46.10	SANDSTONE Grey, Coarse grained, Laminated, Massive, Feldspar phyric, This interval is continuous, it is distinctly banded in part with finer and coarser laminae but does not display grading (unusual texture?). Where the rock is massive it resembles dacite.		40			CONTACT: conformable abrupt.	S sst		

99611 3

5 cm

PRSMINCO EXPLORATION

DIAMOND DRILL CORE LOG

HOLE No. YNC1

PROJECT: YOLANDE: NEWTON CREEK

Vertical Scale 1 : 150

DESCRIPTION				GRAPHIC				CODES		
From	To	LITHOLOGY & ALTERATION	MINERALISATION	Depth	Lithology	Structures	STRUCTURES	LITH	STR	ALT
		(unusual texture?). Where the rock is massive it resembles andesite. CONTACT: Gradational.					BEDDING, A 45. A 45. CONTACT: conformable.		ss	
46.10	49.00	SILTSTONE Green, Grey, Fine grained, Laminated, Brecciated, Highly Chloritised, Bedding is parralel to above interval and unusual banding texture is similar in part, it is possibly a finer grained part of above interval. Chloritization occurs around zone of brecciation and quartz veining. CONTACT: Gradational.					FAULT, A 20, Breccia, Chlorite. Two parallel quartz veins with brecciated siltstone between and surrounded by a chloritic halo.	S slt	ftt	chl
49.00	61.20	PUMICEOUS MASS FLOW Grey, Cream, Coarse grained, Massive, Pumiceous, Feldspar phyric, Appears to grade into overlying siltstone? LGC + Petrology sample taken. Composition = rhyolite/rhyodacite. Pumice visible in part, but more massive parts resemble lava?		50 60			A 55. CONTACT: conformable abrupt. Rock is weathered to some degree throughout with abundant oxidised jointing in part. Cleavage is not well developed.	V pmf		

9961114

5 cm

YNC1 (values in ppm)

from	to	sample	Cu	Pb	Zn	Ag	Au	Fe%	Ba	As
36.60	38.20	35051	19	7	63	<1	-	3.93	-	-
38.20	39.80	35052	21	7	59	<1	<0.008	3.36	1776	12
39.80	40.60	35053	12	19	56	<1	-	3.51	-	-
47.00	49.00	35054	38	80	184	<1	<0.008	6.51	1226	59

(values in %)

			Al2O3	SiO2	TiO2	Fe2O3	MnO	CaO	K2O	MgO	P2O5	Na2O	LOI
10.20	10.30	35046	13.76	65.60	0.49	4.53	0.09	3.57	4.06	0.69	0.12	3.09	4.01
51.60	51.70	35049	11.59	74.90	0.44	2.87	0.06	0.89	3.10	0.79	0.06	2.45	2.16

(values in ppm)

			Rb	Sr	V	Nb	Y	Zr
10.20	10.30	35046	81	246	32	5	32	227
51.60	51.70	35049	95	198	12	10	31	352

Petrology for YNC1 (see appendix x?)

sample	depth	description
35046	10.2	plagioclase phyric dacite (similar to the Newton Creek Spillway hanging wall dacites).
35047	29.7	plagioclase phyric felsic volcaniclastic.
35048	44.2	laminated interbedded sandstones and siltstones derived from; plagioclase phyric volcanics and pelitic metamorphics.
35049	51.6	rhyodacitic to dacitic plagioclase phyric pumiceous felsic lava breccia.
35050	56.1	rhyodacitic to dacitic plagioclase phyric pumiceous felsic lava breccia.

YNC1 MAGNETIC SUSCEPTIBILITY

depth	value	formation	lithology
0.80	0.18	AA	Ld
2.10	0.14	AA	Ld
3.50	0.14	AA	Ld
4.60	0.33	AA	Ld
5.20	0.19	AA	Ld
6.40	0.14	AA	Ld
8.10	0.16	AA	Ld
8.60	0.11	AA	Ld
9.50	0.23	AA	Ld
11.90	0.06	AA	Ld
12.40	0.16	AA	Ld
12.80	0.12	AA	Ld
14.20	0.11	AA	Ld
15.70	0.19	AA	Ld
17.00	0.10	AA	Ld
19.10	0.07	CVC	sst
21.10	0.30	CVC	sst
22.30	0.18	CVC	sst
23.20	0.04	CVC	sst
25.50	0.40	CVC	cong
26.20	0.21	CVC	cong
27.40	0.27	CVC	cong
28.80	0.07	CVC	cong
31.40	0.01	CVC	cong
37.20	0.12	CVC	cong
38.80	0.13	CVC	cong
41.80	0.16	CVC	sst
44.00	0.51	CVC	sst
47.00	0.06	CVC	slt
49.80	0.13	CVC	pmf
57.40	0.08	CVC	pmf
59.20	0.03	CVC	pmf
61.20	0.09	CVC	pmf

YNC1 SPECIFIC GRAVITY

10.00	2.55	AA	Ld
20.00	2.62	CVC	sst
30.00	2.56	CVC	cong
40.00	2.30	CVC	sst
50.00	2.26	CVC	pmf
60.00	2.57	CVC	pmf

PASMINCO EXPLORATION

DIAMOND DRILL CORE LOG

HOLE No. YNC2

PROJECT: YOLANDE: NEWTON CREEK

Vertical Scale 1 : 150

DESCRIPTION				GRAPHIC				CODES		
From	To	LITHOLOGY & ALTERATION	MINERALISATION	Depth	Lithology	Structures	STRUCTURES	LITH	STR	ALT
0.00	39.60	PUMICEOUS MASS FLOW Green, Grey, Coarse grained, Massive, Feldspar phyric, Pumiceous, Slightly Silicified, Feldspars 0.5 to 3mm pink. Clasts are typically 1 to 20mm white to salmon pink. Minor chloritic patches resembling "Footwall stylolites". Minor 1 to 5mm brown clasts possibly oxidised pyrite clasts. CONTACT: Conformable abrupt.	MASSIVE, trace pyrite Minor red brown spots possibly clasts of oxidised pyrite? 3 to 5mm in size..	0 10 20			JOINT, Chlorite.	V pmf	jnt	sil

996117

5 cm

PASMINCO EXPLORATION
DIAMOND DRILL CORE LOG

HOLE No. YNC2

PROJECT: YOLANDE: NEWTON CREEK

Vertical Scale 1 : 150

DESCRIPTION				GRAPHIC				CODES		
From	To	LITHOLOGY & ALTERATION	MINERALISATION	Depth	Lithology	Structures	STRUCTURES	LITH	STR	ALT
							JOINT, A 20, Chlorite.		jnt	
							FAULT, A 90, Pug.		flt	
				30			JOINT, A 20, Chlorite.		jnt	
							FAULT, A 35, Pug.		flt	
39.60	41.00	SILTSTONE Pale, Green, Fine grained, Massive. CONTACT: Conformable abrupt.		40			CONTACT: abrupt conformable.	S slt	st	
41.00	47.10	PUMICEOUS MASS FLOW Green, Grey, Coarse grained, Massive, Feldspar phyric, Pumiceous, Slightly Chloritised.						V pmf		chl

9961118

5cm

PASMINCO EXPLORATION

DIAMOND DRILL CORE LOG

HOLE No. YNC2

PROJECT: YOLANDE: NEWTON CREEK

Vertical Scale 1 : 150

DESCRIPTION				GRAPHIC				CODES		
From	To	LITHOLOGY & ALTERATION	MINERALISATION	Depth	Lithology	Structures	STRUCTURES	LITH	STR	ALT
		Green, Grey, Coarse grained, Massive, Feldspar phyric, Pumiceous, Slightly Chloritised. CONTACT: Conformable abrupt.	DISSEMINATED, minor pyrite disseminated, very minor galena disseminated, very minor sphalerite as stringers. Very fine grained pyrite and galena are disseminated throughout the rock. Fine grained pyrite is accumulated in bedding parallel bands and red sphalerite occurs lenses 0.5 by 10mm parallel to cleavage..				CONTACT: abrupt conformable.			
47.10	48.80	SANDSTONE Dark, Grey, Medium grained, Laminated, Feldspar phyric, Distinct "metal" grey sst with uniform grainsize and laminations. CONTACT: Conformable abrupt.					BEDDING, A 45.	S sst	st ss	
48.80	51.30	PUMICEOUS MASS FLOW Green, Grey, Coarse grained, Massive, Feldspar phyric, Pumiceous. CONTACT: Conformable abrupt.					CONTACT: gradational.	V pmf	st	
				50			FIRST CLEAVAGE, A 35.		sl	
51.30	52.10	SILTSTONE Pale, Green, Fine grained, Massive, Slightly Silicified. CONTACT: Conformable abrupt.					CONTACT: remaining contacts irregular.	S slt	st	sil
52.10	53.20	PUMICEOUS MASS FLOW Green, Grey, Coarse grained, Massive, Feldspar phyric, Pumiceous.						V pmf		
				60						

99619

5 cm

YNC2 MAGNETIC SUSCEPTIBILITY 396120

depth	mag_sus	fmn code	lith code
1.40	1.40	CV	pmf
2.10	0.09	CV	pmf
3.60	0.07	CV	pmf
4.40	0.49	CV	pmf
5.10	0.16	CV	pmf
5.50	0.38	CV	pmf
6.60	0.23	CV	pmf
7.30	0.05	CV	pmf
8.00	0.15	CV	pmf
8.60	0.08	CV	pmf
9.60	0.15	CV	pmf
10.00	0.11	CV	pmf
15.30	0.46	CV	pmf
16.40	0.37	CV	pmf
17.60	0.29	CV	pmf
19.20	0.14	CV	pmf
20.90	0.55	CV	pmf
21.60	0.44	CV	pmf
22.60	0.42	CV	pmf
23.50	0.01	CV	pmf
24.40	0.05	CV	pmf
26.00	0.21	CV	pmf
26.60	0.78	CV	pmf
28.20	0.09	CV	pmf
29.40	0.11	CV	pmf
32.60	0.52	CV	pmf
33.60	0.87	CV	pmf
33.80	0.07	CV	pmf
35.60	10.00	CV	pmf
36.60	0.25	CV	pmf
39.50	0.04	CV	pmf
40.00	0.21	CV	slt
43.00	0.16	CV	pmf
43.60	0.83	CV	pmf
45.00	0.21	CV	pmf
46.60	0.07	CV	pmf
47.00	0.11	CV	pmf
47.40	0.19	CV	sst
47.90	0.11	CV	sst
48.30	0.24	CV	sst
49.70	0.33	CV	pmf
51.20	0.12	CV	pmf
51.30	0.19	CV	slt

YNC2 SPECIFIC GRAVITY

depth	S.G.		
10.00	2.49	CV	pmf
20.00	2.46	CV	pmf
30.00	2.31	CV	pmf
40.00	2.77	CV	slt
50.00	2.84	CV	pmf

YNC2 ORE SUITE

FROM	TO	sample	Cu	Pb	Zn	Ag	Au	Fe%	Ba	As
47.10	47.70	35055	15	888	1172	2	0.00	3.51	633	41
47.70	48.80	35056	11	970	1038	1		3.03		

PASMINCO EXPLORATION

DIAMOND DRILL CORE LOG

HOLE No. YNC3

PROJECT: YOLANDE: NEWTON CREEK

Vertical Scale 1 : 150

DESCRIPTION				GRAPHIC				CODES		
From	To	LITHOLOGY & ALTERATION	MINERALISATION	Depth	Lithology	Structures	STRUCTURES	LITH	STR	ALT
0.00	11.50	PUMICEOUS MASS FLOW Pale, Green, Coarse grained, Massive, Feldspar phyric, Pumiceous, Slightly Chloritised, Slightly Silicified, Feldspars .5 to 3mm pink, carbonitised in part. Clasts generally 1 to 10mm siliceous or rhyolitic, trace pyrite clasts. Frequent fine leucoxenes. CONTACT: Gradational.	MASSIVE, trace pyrite 5mm pyrite clast..	0 10			FRACTURE, A 20. FRACTURE, A 25.	V pmf	frac frac	chl sil
11.50	22.70	PUMICEOUS MASS FLOW Pale, Green, Coarse grained, Massive, Pumiceous, Feldspar phyric, Slightly Silicified, Slightly Chloritised, Textural difference possibly due to increased pumice content or increased silicification. Clasts typically larger (1 to 30mm) pyrite clasts being more common. CONTACT: Conformable abrupt.	DISSEMINATED, trace pyrite in veins, Trace diss pyrite in carbonate patch.. MASSIVE, trace pyrite Zone with several 3 to 10mm clasts of massive pyrite. Clasts are descrete with sharp boundaries. They concist of massive fine grained pyrite frequently internally brecciated and infilled with fine quartz.. MASSIVE, trace pyrite Zone with upto 30 clasts of massive pyrite from 1 to 40mm. Clasts have sharp boundaries, are massive commonly internally brecciated or rarely disseminated in fine	20			FIRST CLEAVAGE, A 20. CONTACT: gradational. VEIN, A 30. FRACTURE, A 20. FIRST CLEAVAGE, A 40. BEDDING, A 50. Bedding picked out by pyrite band is	V pmf	sil vein frac	sil chl

0061122

5 cm

PASMINCO EXPLORATION

DIAMOND DRILL CORE LOG

HOLE No. YNC3

PROJECT: YOLANDE: NEWTON CREEK

Vertical Scale 1 : 150

DESCRIPTION				GRAPHIC				CODES		
From	To	LITHOLOGY & ALTERATION	MINERALISATION	Depth	Lithology	Structures	STRUCTURES	LITH	STR	ALT
			brecciated or rarely disseminated in fine granular quartz matrix and are associated with minor white silica altered clasts..				pyrite band is perpendicular to and displaced by cleavage.		bb	
22.70	26.70	SILTSTONE WITH MINOR SANDSTONE AND SANDSTONE Pale, Grey, Fine grained, Coarse grained, Bedded, Massive, Slightly Sericitised. CONTACT: Conformable abrupt.	DISSEMINATED, trace pyrite Band of disseminated (bedding parralel) pyrite 3mm thick transposed by cleavage (pre cleavage)..				FRACTURE. Zone of oxidised low and high angle fractures. CONTACT: conformable, mixing with minor bands of Vpmf in siltstone.	S slt m sst f sst	frac	ser
26.70	28.30	SANDSTONE Green, Grey, Coarse grained, Massive, Feldspar phyric, Slightly Chloritised. CONTACT: Conformable abrupt.	DISSEMINATED, trace galena disseminated, trace pyrite disseminated. Stringers of disseminated pyrite alligned in cleavage in fine grained siltstone and disseminated galena and pyrite through grey medium grained massive sst (heavy)..				FIRST CLEAVAGE, A 45.	V sst	sl	chl
28.30	30.70	PUMICEOUS MASS FLOW Pale, Green, Coarse grained, Massive, Feldspar phyric, Pumiceous, Slightly Silicified.		30				V pmf		sil
30.70	33.30	BASIC LAVA Grey, Green, Fine grained, Massive, Vesicles.	DISSEMINATED, trace pyrrhotite disseminated, In vesicles?.					L Lb		
33.30	35.05	SANDSTONE Pale, Grey, Coarse grained, Brecciated, Feldspar phyric.					CONTACT: remaining contacts are within broken core and are not determined.	V sst	st	
				40						

9961123

5 cm

996124

YNC3 MAGNETIC SUSCEPTIBILITY

depth	value	formatiomn	lithology
1.90	0.08	CV	pmf
2.80	0.03	CV	pmf
3.50	0.06	CV	pmf
3.80	0.03	CV	pmf
4.40	0.07	CV	pmf
5.60	0.08	CV	pmf
6.60	0.06	CV	pmf
9.00	0.05	CV	pmf
9.40	0.09	CV	pmf
11.00	0.07	CV	pmf
12.40	0.11	CV	pmf
14.00	0.07	CV	pmf
15.40	0.11	CV	pmf
17.00	0.11	CV	pmf
18.60	0.09	CV	pmf
19.80	0.06	CV	pmf
21.40	0.08	CV	pmf
22.20	0.02	CV	pmf
22.70	0.12	CV	slt
23.60	0.16	CV	slt
23.80	0.07	CV	slt
24.00	0.05	CV	slt
24.80	0.03	CV	slt
24.90	0.06	CV	slt
25.60	0.05	CV	slt
26.10	0.11	CV	slt
26.60	0.05	CV	slt
26.80	0.03	CV	sst
27.40	0.05	CV	sst
28.20	0.07	CV	sst
28.30	0.04	CV	pmf
28.70	0.01	CV	pmf
29.20	0.06	CV	pmf
29.50	0.08	CV	pmf
30.00	0.02	CV	pmf
30.10	0.01	CV	pmf
30.50	0.03	CV	pmf
31.00	0.14	CV	Lb
31.40	0.10	CV	Lb
31.80	0.13	CV	Lb
32.10	0.13	CV	Lb
32.20	0.18	CV	Lb
33.00	0.18	CV	Lb
33.40	0.12	CV	sst
33.70	0.09	CV	sst

YNC3 SPECIFIC GRAVITY

4.40	2.68	CV	pmf
9.00	2.73	CV	pmf
15.40	2.72	CV	pmf
18.60	2.72	CV	pmf
21.50	2.69	CV	pmf
23.50	2.68	CV	slt
27.50	2.61	CV	sst
33.50	2.33	CV	sst

YNC3 ORE SUITE 990125

FROM	TO	sample	Cu	Pb	Zn	Ag	Au	Fe%	Ba	As
18.60	19.20	35057	12	14	73	<1	0.00	2.78	1043	13
23.20	23.70	35058	139	153	199	1		5.73		
24.60	25.10	35059	15	810	874	1	0.00	3.09	353	29

ALTERATION SUITE

			Al2O3	SiO2	TiO2	Fe2O3	MnO	CaO	K2O	MgO	P2O5	Na2O	LOI
18.60	19.20	35057	15.99	64.60	0.41	4.19	0.11	2.50	2.94	1.06	0.08	3.05	4.42

PASMINCO EXPLORATION

DIAMOND DRILL CORE LOG

HOLE No. YNC4

PROJECT: YOLANDE: NEWTON CREEK

Vertical Scale 1 : 200

DESCRIPTION				GRAPHIC				CODES		
From	To	LITHOLOGY & ALTERATION	MINERALISATION	Depth	Lithology	Structures	STRUCTURES	LITH	STR	ALT
0.00	13.40	GLACIAL DEPOSITS White, Red, Very coarse grained, White quartz clasts in fine grained red haematitic/siliceous martrix. CONTACT: Missing.		0 10				S gl		
13.40	39.40	FAULT ZONE (PUG) MIXED WITH FAULT ZONE (PUG) Pale, Green, Sheared, Cleaved, Lithic, Polymict, Highly Kaolinised, This zone contains several zones of pug and rubble interbanded with highly cleaved and sheared rock that resembles underlying clastic. The pug is pale green, the sheared rock is red. CONTACT: Faulted, The contact is missing within zone of pug.	DISSEMINATED, trace pyrite associated with alteration. In fault zone..	20			FAULT. Pug, Shear. Zone of pale green slurry pug and 1mm gravel.	M fz x fz	flt	kao

9961126

5 cm

PASMINCO EXPLORATION

DIAMOND DRILL CORE LOG

HOLE No. YNC4

PROJECT: YOLANDE: NEWTON CREEK

Vertical Scale 1 : 200

DESCRIPTION				GRAPHIC				CODES		
From	To	LITHOLOGY & ALTERATION	MINERALISATION	Depth	Lithology	Structures	STRUCTURES	LITH	STR	ALT
				30						
		CONGLOMERATE Pale, Green, Medium grained, Poorly sorted, Matrix supported, Lithic, Slightly Chloritised, Poorly sorted clastic sediment with notable lack of "Tyndall quartz", fine feldspars are ubiquitous and pale green andesite? clasts common. Rock is moderatly cleaved and the clasts flattened. Lithoteque (35079).					FAULT, Shear, Pug. FIRST CLEAVAGE, D 50. FAULT, Pug.		## flt	
39.40	41.90			40			FAULT, D 5. Irregular low angle fault? contact between different lithologies.	S cong	flt flt	chl
41.90	60.60	CONTAINING CLASTS OF ANDESITE Green, Fine grained, Feldspar phyric, Moderately Chloritised. CONTACT: Faulted, at 60 degrees to LCA. Sharp parallel to cleavage, the contact is well preserved in broken zone. RHYOLITE Green, Red, Very coarse grained, Porphyritic, Quartz phyric, Feldspar phyric, Moderately Chloritised, Prominantly quartz (2-5mm) and feldspar (1-3mm pink) phyric. Overall texture massive but this zone has patchy chlorite/sericite alteration. NOTE: Traces of massive patchy haematite at 56.4m CONTACT: Gradational, Decrease in chlorite alteration.		50			FAULT, Brittle. Broken core.	L Lr	flt	chl

9961127

5 cm

PASMINCO EXPLORATION
DIAMOND DRILL CORE LOG

HOLE No. YNC4

PROJECT: YOLANDE: NEWTON CREEK

Vertical Scale 1 : 200

DESCRIPTION				GRAPHIC				CODES		
From	To	LITHOLOGY & ALTERATION	MINERALISATION	Depth	Lithology	Structures	STRUCTURES	LITH	STR	ALT
							FAULT, Pug, Shear.		flt	
60.60	118.20	RHYOLITE Red, Coarse grained, Porphyritic, Massive, Quartz phyric, Feldspar phyric, Moderately Silicified, Prominant quartz-feldspar phyric with massive overall texture. Note high magnetic susceptibility. Thin section and lithoteque (35080). CONTACT: Gradational, Change in colour.		60 70 80			FAULT, Pug. Highly milled sandy pug.	L Lr	flt	sil

0969128

5 cm

PASMINCO EXPLORATION

DIAMOND DRILL CORE LOG

HOLE No. YNC4

PROJECT: YOLANDE: NEWTON CREEK

Vertical Scale 1 : 200

DESCRIPTION				GRAPHIC				CODES		
From	To	LITHOLOGY & ALTERATION	MINERALISATION	Depth	Lithology	Structures	STRUCTURES	LITH	STR	ALT
			VEIN, quartz carbonate in veins.	90						
				100			VEIN, Quartz, Carbonate. Chlorite. Minor irregular veining		vein	
				110						

996129

5 cm

PASMINCO EXPLORATION

DIAMOND DRILL CORE LOG

HOLE No. YNC4

PROJECT: YOLANDE: NEWTON CREEK

Vertical Scale 1 : 200

DESCRIPTION				GRAPHIC				CODES		
From	To	LITHOLOGY & ALTERATION	MINERALISATION	Depth	Lithology	Structures	STRUCTURES	LITH	STR	ALT
		RHYOLITE Grey, Green, Coarse grained, Porphyritic, Massive, Quartz phyric, Feldspar phyric, Moderately Silicified, As above but with trace 5mm mafic/green? phenocrysts towards contact. CONTACT: Conformable mixed, Resembles a conformable mixed contact but could be intrusive?					VEIN, D 5, Quartz, Chlorite, Carbonate.		vein	
118.20	121.00							L Lr		sil
		ANDESITE Dark, Green, Coarse grained, Hyaloclastitic, Cleaved, Slightly Chloritised, Indistinct banding and resemblance to clastic texture suggest some reworking. CONTACT: Conformable abrupt.	DISSEMINATED, minor pyrite disseminated, Minor bands of fg py. and minor pods (10 by 3mm) of py elongate in cleavage..	120			BEDDING, D 85.			
121.00	122.40						FAULT, D 89, Shear, Sericite.	L Ln	ss	chl
122.40	124.20						FIRST CLEAVAGE, D 78, Sericite. Pyritic pods elongate in cleavage.	S sst	flt sl	ser
		SANDSTONE Cream, Green, Fine grained, Medium grained, Poorly sorted, Bedded, Polymict, Lithic, Polymict, Moderately Sericitised. CONTACT: Conformable abrupt.							ss	
124.20	132.40						BEDDING, D 89.	L Ln		chl ser
		ANDESITE Green, Hyaloclastitic, Reworked, Slightly Chloritised, Slightly Sericitised. CONTACT: Conformable abrupt.		130			FIRST CLEAVAGE, D 82, Sericite.		sl	
132.40	139.40	SANDSTONE Cream, Fine grained, Medium grained, Bedded, Poorly sorted, Lithic, Highly Sericitised. CONTACT: Conformable mixed.	VEIN, minor pyrite in veins, trace galena in veins, carbonate in veins.				VEIN, D 85, Carbonate, Pyrite, Galena.	S sst	vein	ser
							FAULT, D 90. Displacement 10mm N block E.			
							BROKEN CORE, Sericite.		bk	
139.40	172.10	ANDESITE Dark, Green, Coarse grained, Massive, Moderately Chloritised,		140				L Ln		chl cg

9961130

5 cm

PASMINCO EXPLORATION

DIAMOND DRILL CORE LOG

HOLE No. YNC4

PROJECT: YOLANDE: NEWTON CREEK

Vertical Scale 1 : 200

DESCRIPTION				GRAPHIC				CODES		
From	To	LITHOLOGY & ALTERATION	MINERALISATION	Depth	Lithology	Structures	STRUCTURES	LITH	STR	ALT
139.40	172.10	ANDESITE Dark, Green, Coarse grained, Massive, Moderately Chloritised, Moderately Carbonatised, Zone still displays autobreccia textures throughout. Abundant patches of irregular straw yellow mineralized carbonate veining or breccia infill. CONTACT: Conformable abrupt.	DISSEMINATED, abundant pyrite disseminated, minor galena associated with alteration, abundant carbonate as stringers, trace sphalerite in veinlets, Mineralization associated with straw coloured carbonate irregular veins/patches/intergrowths? .	140 150 160			VEIN, D 30, Quartz, Chlorite, Pyrite. VEIN, D 55, Quartz, Chlorite. Slickenlines plunging 55 degrees to 240.	L Ln	vein vein	chl ca
		SANDSTONE Buff, Green, Medium grained, Massive, Calcarious, Slightly Chloritised, Slightly Sericitised, Derived from andesite. Luecoxinised. Abundant mineralized carbonate veins which have been modified by cleavage (ie., precleavage). CONTACT: Gradational.	DISSEMINATED, minor pyrite disseminated.							

9961131

5 cm

PASMINCO EXPLORATION

DIAMOND DRILL CORE LOG

HOLE No. YNC4

PROJECT: YOLANDE: NEWTON CREEK

Vertical Scale 1 : 200

DESCRIPTION				GRAPHIC				CODES		
From	To	LITHOLOGY & ALTERATION	MINERALISATION	Depth	Lithology	Structures	STRUCTURES	LITH	STR	ALT
		CONTACT: Gradational.								
		ANDESITE Green, Medium grained, Massive, Slightly Chloritised, Possibly reworked andesite. CONTACT: Conformable abrupt.		170						
172.10	177.90	ANDESITE Buff, Green, Hyaloclastitic, Poorly sorted, Moderately Sericitised, From the base of the interval (downhole) coarse 5cm patches of andesite in coarse grained clastic, minor siltstone clasts are present. Interval is sericitised and textures are diffuse. CONTACT: Conformable abrupt.	VEIN, minor pyrite in veinlets, minor galena in veinlets, quartz carbonate				VEIN, D 40, Quartz, Carbonate.	S sst	vein	chl ser
177.90	179.80	CONGLOMERATE Buff, Grey, Very coarse grained, Poorly sorted, Matrix supported, Polymict, Lithic, Slightly Sericitised, Very poorly sorted with rounded pink silicified dacites (15mm), siltstone clasts in 3mm to fine matrix which is sericitised in part.	DISSEMINATED, minor pyrite disseminated.					L Ln		chl
179.80	184.00	CONTAINING CLASTS OF DACITE Pink, Fine grained, Massive, Highly Silicified. CONTAINING CLASTS OF SILTSTONE Pale, Grey, Fine grained, Laminated. CONTACT: Conformable abrupt.		180				L Ln		ser
184.00	186.90	SANDSTONE WITH MINOR SILTSTONE Grey, Medium grained, Fine grained, Massive, Bedded, Lithic, Slightly Sericitised, Massive sandstone diffusely bedded with minor siltstone. Composed of quartz and sericite with minor feldspar. CONTACT: Missing.						S cong		ser
186.90	193.40	BRECCIA MIXED WITH Cream, Very coarse grained, Matrix supported, Poorly sorted, Polymict, Lithic, Polymict, Slightly Silicified, Slightly Sericitised, Zone with irregular ragged sediment clasts in fine to coarse poorly sorted sediment with fragmental andesite component. Trace 10mm siliceous pyritic clasts. Minor cleavage development. CONTACT: Faulted, at 30 degrees to LCA.					BROKEN CORE. BEDDING, D 60.	S sst m slt	bk ss	ser
193.40	197.20	ANDESITE Green, Buff, Hyaloclastitic, Slightly Chloritised, Slightly Sericitised, Zone of andesitic clasts in coarse grained sandstone matrix, part of sequence from massive andesite to terrigenous sandstone. CONTACT: Faulted.		190				S bx x		sil ser
		ANDESITE								

9961132

5cm

PASMINCO EXPLORATION

DIAMOND DRILL CORE LOG

HOLE No. YNC4

PROJECT: YOLANDE: NEWTON CREEK

Vertical Scale 1 : 200

DESCRIPTION				GRAPHIC				CODES		
From	To	LITHOLOGY & ALTERATION	MINERALISATION	Depth	Lithology	Structures	STRUCTURES	LITH	STR	ALT
		CONTACT: Faulted.								
197.20	202.00	ANDESITE Dark, Green, Massive, Slightly Chloritised, Similar to above interval but with more massive texture. CONTACT: Conformable abrupt, at 60 degrees to LCA.					BROKEN CORE, Sericite. Pug.	L Ln	bk	chl ser
202.00	203.80	SANDSTONE INTERBEDDED WITH SILTSTONE Green, Grey, Coarse grained, Poorly sorted, Moderately Sericitised, Slightly Chloritised, Irregular interbanded clastic concisting of reworked andesitie and fine grained sericitised siltstone. CONTACT: Conformable abrupt, Alteration change.		200			BROKEN CORE, Sericite. Carbonate, Pug.	L Ln	bk	chl
203.80	207.00	SANDSTONE MIXED WITH BRECCIA AND ANDESITE Pink, Buff, Coarse grained, Very coarse grained, Reworked, Poorly sorted, Polymict, Moderately Silicified, Slightly Sericitised, Similar to above interval but with increased silicification and colour change. The clastic texture is diffuse as is banding (10cm scale) on grainsize and andesite component.					FIRST CLEAVAGE, D 55.	S sst b slt	sl	ser chl
207.00	209.60	CONTACT: Gradational, at 55 degrees to LCA.						S sst x bx & Ln		sil ser
209.60	213.00	SILTSTONE Pale, Grey, Fine grained, Massive, Moderately Silicified, Slightly Sericitised, Cherty in part, and sericitised in part. Beds approximatly 5cms. INTERBEDDED WITH SANDSTONE Buff, Coarse grained, Poorly sorted, Polymict, Lithic, Moderately Sericitised, Clasts include minor pink feldspar phyric and grey relict feldspar phyric dacite? and minor siliceous trace pyritic clasts. Crystals include 1mm feldspars and 1mm quartz(silicified feldspars?). CONTACT: Conformable abrupt.	VEIN, minor sphalerite in veins, quartz minor galena in veins. Very coarse grained black sphalerite with quartz/carbonate/galena..	210			D 65. Angle of kink band with sence being E block moving normally at shallow angle.	S slt		sil ser
213.00	219.90	ANDESITE Green, Grey, Very coarse grained, Hyaloclastitic, Slightly Chloritised, Slightly Sericitised, Zone of Hyaloclastite grading to sandstones derived mostly from reworked andesite. Angular 1 to 10cm clasts of fragmented andesite in reworked andesite derived clastic with minor pink dacite and minor siliceous clasts. CONTACT: Conformable abrupt.						L Ln		chl ser
219.90	223.00	DACITE MIXED WITH SILTSTONE Buff, Hyaloclastitic, Moderately Sericitised, Irregular zone of sericitised ragged lava resembling dacite in grey siliceous mudstone matrix. Texture is different to andesitic hyaloclastite, also sediment is finer grained and more massive.		220			FAULT, D 40, Breccia.	L Ld x slt	flt	ser
223.00	223.90						BEDDING, D 65, Facing uphole.	S sst	ss	ser
223.90	225.70							L Ld		ser

5cm

9961133

PASMINCO EXPLORATION

DIAMOND DRILL CORE LOG

HOLE No. YNC4

PROJECT: YOLANDE: NEWTON CREEK

Vertical Scale 1 : 200

DESCRIPTION				GRAPHIC				CODES		
From	To	LITHOLOGY & ALTERATION	MINERALISATION	Depth	Lithology	Structures	STRUCTURES	LITH	STR	ALT
[illegible]	[illegible]	massive.					uphole.	J SST		ser
223.90	225.70	MIXED WITH SILTSTONE Pale, Grey, Fine grained, Massive, Slightly Carbonatised, Slightly Silicified. CONTACT: Conformable abrupt.						L Ld		ser
225.70	230.50	SANDSTONE GRADING TO SILTSTONE Buff, Grey, Medium grained, Fine grained, Bedded, Laminated, Lithic, Slightly Sericitised, Slightly Silicified, Two sets of medium grained lithic sandstone grading to fine grained laminated chert, note trace pyrite in chert. CONTACT: Conformable abrupt.		230				L Ld x slt		ser
230.50	231.50	DACITE Pink, Grey, Massive, Quartz phyric, Slightly Sericitised, Massive dacite with abundant 1 3mm pink feldspars which are carbonitised in the more sericitised upper part of interval. CONTACT: Conformable abrupt.						L Ld		ser
231.50	261.30	DACITE MIXED WITH SILTSTONE Grey, Green, Hyaloclastitic, Slightly Sericitised, Uniform zone of 1 10cm aangular fragmental dacite in fine grained pale grey silicified siltstone. Minor zones of increased sericitisation and carbonate alteration of feldspars. CONTACT: Conformable abrupt, at 55 degrees to LCA.						L Ld		co
		DACITE Pink, Buff, Massive, Feldspar phyric, Moderately Sericitised, Slightly Carbonatised, Altered dacitic lave with trace siltstone component. CONTACT: Gradational, Alteration change.		240						
		DACITE Dark, Grey, Medium grained, Massive, Feldspar phyric, Slightly Carbonatised, Massive homogenious unit, frequent fine white and cream carbonate veinlets, feldspars altered carbonitised. Diffuse zonal alteration in part CONTACT: Gradational.		250						

9961134

5cm

PASMINCO EXPLORATION
DIAMOND DRILL CORE LOG

HOLE No. YNC4

PROJECT: YOLANDE: NEWTON CREEK

Vertical Scale 1 : 200

DESCRIPTION				GRAPHIC				CODES		
From	To	LITHOLOGY & ALTERATION	MINERALISATION	Depth	Lithology	Structures	STRUCTURES	LITH	STR	ALT
261.30	263.90	DACITE Dark, Grey, Medium grained, Hyaloclastitic, Slightly Carbonatised, Irregular breccia texture cemented with white carbonate. Resembles hyaloclastite in part but could be overprinted with tectonic breccia?	VEIN, carbonate Zone of irregular white carbonate veining.	260				L Ld		co
263.90	272.00	DACITE Pink, Grey, Massive, Feldspar phyric, Moderately Silicified, Zone is typified by increased silicification and pink colouration banded with grey less silicified dacites.		270				L Ld		sil
				280						

9961135

5 cm

996136

YNC4 MAGNETIC SUSCEPTIBILITY

depth	mag-sus	formation	lithology
4.40	0.03	G	gl
5.90	0.10	G	gl
7.40	0.25	G	gl
10.40	0.12	G	gl
13.40	0.25	F	fz
37.40	0.02	F	fz
39.40	0.18	?	cong
40.40	0.38	?	cong
42.00	0.69	TG	Lr
43.40	0.33	TG	Lr
45.10	0.25	TG	Lr
47.20	0.25	TG	Lr
48.00	0.21	TG	Lr
49.40	0.30	TG	Lr
52.40	3.28	TG	Lr
53.70	0.85	TG	Lr
55.40	0.22	TG	Lr
58.40	0.27	TG	Lr
61.40	8.96	TG	Lr
64.40	6.37	TG	Lr
66.90	3.77	TG	Lr
69.40	3.75	TG	Lr
72.80	3.67	TG	Lr
75.80	0.61	TG	Lr
78.80	1.42	TG	Lr
79.40	5.16	TG	Lr
82.40	4.93	TG	Lr
85.40	8.33	TG	Lr
88.40	4.14	TG	Lr
91.40	5.61	TG	Lr
92.40	9.71	TG	Lr
94.40	4.05	TG	Lr
97.40	9.92	TG	Lr
100.40	3.45	TG	Lr
103.40	10.20	TG	Lr
106.40	1.61	TG	Lr
109.40	12.60	TG	Lr
112.40	11.10	TG	Lr
115.40	7.56	TG	Lr
118.40	7.41	TG	Lr
121.40	0.09	AA	Ln
124.40	0.26	AA	Ln
127.40	0.15	AA	Ln
130.40	0.13	AA	Ln
133.40	0.19	AA	sst
136.40	0.24	AA	sst
139.40	0.68	AA	Ln
142.40	0.37	AA	Ln
144.10	0.32	AA	Ln
145.40	2.62	AA	Ln
148.40	0.56	AA	Ln

151.40	0.83	AA	Ln
154.40	0.56	AA	Ln
157.40	0.23	AA	Ln
160.40	0.43	AA	Ln
163.40	0.27	AA	Ln
166.40	0.28	AA	Ln
169.40	0.23	AA	Ln
172.40	0.14	AA	sst
175.40	0.14	AA	sst
178.40	0.18	AA	Ln
181.40	0.32	AA	Ln
184.40	0.19	AA	cong
187.40	0.06	AA	sst
189.60	0.07	AA	sst
191.70	0.29	AA	sst
193.40	0.15	AA	bx
195.40	0.54	AA	bx
197.20	0.18	AA	Ln
202.00	0.42	AA	Ln
203.30	0.18	AA	Ln
205.80	0.14	AA	sst
208.40	0.30	AA	sst
211.40	0.16	AA	slt
217.40	0.01	AA	Ln
220.40	0.16	AA	Ld
223.40	0.13	AA	sst
226.40	0.14	AA	Ld
229.40	0.20	AA	Ld
232.40	0.23	CVC	Ld
235.40	0.36	CVC	Ld
238.40	0.13	CVC	Ld
241.40	0.20	CVC	Ld
244.40	0.14	CVC	Ld
247.40	0.11	CVC	Ld
250.40	0.21	CVC	Ld
253.40	0.23	CVC	Ld
256.40	0.25	CVC	Ld
259.40	0.16	CVC	Ld
262.40	0.23	CVC	Ld
265.40	0.12	CVC	Ld
268.40	0.15	CVC	Ld
272.00	0.12	CVC	Ld

YNC4 SPECIFIC GRAVITY

50.00	2.59	TG	Lr
100.40	2.79	TG	Lr
118.00	2.70	TG	Lr
151.40	3.09	AA	Ln
170.00	2.86	AA	Ln
200.50	2.75	AA	Ln
250.40	2.76	CVC	Ld
272.00	2.72	CVC	Ld

996138

380 000mE

380 000mE

Conglomerate with andesite clasts

trace haematite

Zone of high magnetic susceptibility

TYNDALL GROUP RHYOLITES

Hyaloclastite in sandstone

Andesite autobreccia

Hyaloclastite in polymict conglomerate

Hyaloclastite in cherty siltstones

ANTHONY ROAD ANDESITES

379 800mE

379 800mE

CENTRAL VOLCANIC COMPLEX

MASSIVE DACITES

400mR.L.

PASMINCO EXPLORATION

DIAMOND DRILL CORE LOG

HOLE No. YHV1

PROJECT: YOLANDE: HENTY VALLEY

Vertical Scale 1 : 150

DESCRIPTION				GRAPHIC				CODES		
From	To	LITHOLOGY & ALTERATION	MINERALISATION	Depth	Lithology	Structures	STRUCTURES	LITH	STR	ALT
0.00	4.00	SANDSTONE Pale, Green, Medium grained, Massive, Slightly Chloritised, Massive pale green matrix with coarser dark green chlorite flecks. Indistinct fine layers 1mm thick, 20mm apart (40 deg to LCA). CONTACT: Faulted, at 40 degrees to LCA. Very sharp.		0			PRIMARY FABRIC, A 40. Indistinct laminations possibly bedding.	S sst	so	chl
4.00	10.40	ANDESITE Pale, Green, Medium grained, Massive, Feldspar phyric, Slightly Chloritised, Pale green matrix (similar to previous interval?) with abundant distinct 2 to 4mm euhedral plagioclase evenly distributed throughout interval. Minor dark 1mm chloritic grains throughout? CONTACT: Gradational, Alteration change.		10			FRACTURE. Zone of broken core. low angle fractures and high angle joints with prominant iron staining.	L Ln		chl
10.40	19.50	ANDESITE Pale, Green, Medium grained, Massive, Feldspar phyric, Highly Kaolinised, Slightly Silicified, This is the same lithology as previous interval but has distinct white kaolin/fuchsite alteration centered around abundant 5 to 15cm quartz pyrite/goethite veins (60 to 90 deg to LCA). CONTACT: Gradational, Alteration change.	pyrite in veins, minor pyrite on fractures, Zone of massive pyrite altered to goethite in quartz veins and iron staining on joint and fracture faces..				VEIN, Pyrite, Fracture. Zone of fracturing and alteration haloing high angle quartz pyrite/goethite veins. VEIN, Pyrite, Fracture. Quartz/pyrite veining, fracturing and alteration (fuchsite/kaolin). VEIN, Pyrite, Fracture. Quartz/pyrite viening surrounded by fracturing and alteration.	L Ln	frac vein vein vein	kao sil
19.50	28.20	ANDESITE Pale, Green, Medium grained, Massive, Feldspar phyric, Slightly Chloritised, Lithology as above, alteration associated with surface weathering.		20			VEIN, Pyrite, Fracture. Quartz/pyrite veining, fracture+alteration.	L Ln	vein	chl

9961139

5cm

PASMINCO EXPLORATION

DIAMOND DRILL CORE LOG

HOLE No. YHV1

PROJECT: YOLANDE: HENTY VALLEY

Vertical Scale 1 : 150

DESCRIPTION				GRAPHIC				CODES		
From	To	LITHOLOGY & ALTERATION	MINERALISATION	Depth	Lithology	Structures	STRUCTURES	LITH	STR	ALT
		Slightly Chloritised, Lithology as above, alteration associated with surface weathering. CONTACT: Gradational, Alteration change.					fracture+alteration.			
28.20	31.80	ANDESITE White, Brown, Fine grained, Massive, Feldspar phyric, Highly Kaolinised, Lithology as above, kaolin pyrite fuchsite alteration associated with zone of shearing and brecciation. CONTACT: missing but coincides with shearing and brecciation.	minor pyrite on fractures, Zone of iron staining on fracture faces associated with fuchsite alteration..	30			FRACTURE, Pyrite. Zone of broken core with pyrite stained fractures and joints.	L Ln	frac	kao
31.80	32.90	BLACK SHALE No recovery, possibly washed out broken core.					FRACTURE. Zone of pyrite stained fractures and associated bleaching.	S bsh	frac	
32.90	39.80	BLACK SHALE AND ANDESITE Brown, Black, Fine grained, Brecciated, Moderately Kaolinised, Zone of sheared brecciated mixed shales and lavas.					FAULT, Brittle, Pyrite. Core loss and brittle fracture in broken pyrite stained core.	S bsh & Ln	flt	kao
							FRACTURE, Pyrite. Zone of brecciation and broken core.			
							FAULT, Pyrite. Brittle faulting and pyrite stained broken core.		frac flt	
39.80	40.65	BLACK SHALE AND ANDESITE NO RECOVERY.		40			FAULT, A 40, Brittle. Brittle fault.	S bsh	flt	
40.65	43.10	BLACK SHALE Black, Fine grained, Disrupted on abundant irregular hatchwork of fine carbonate veinlets. CONTACT: obscured but grossly					FAULT, A 30, Brittle. Displacement probable east side up vertical.	S bsh		

9961140

5 cm

PASMINCO EXPLORATION

DIAMOND DRILL CORE LOG

HOLE No. YHV1

PROJECT: YOLANDE: HENTY VALLEY

Vertical Scale 1 : 150

DESCRIPTION				GRAPHIC				CODES		
From	To	LITHOLOGY & ALTERATION	MINERALISATION	Depth	Lithology	Structures	STRUCTURES	LITH	STR	ALT
		black, fine grained, disrupted by abundant irregular network of fine carbonate veinlets. CONTACT: obscured but grossly conformable.					side up vertical.			
43.10	54.50	ANDESITE Pale, Green, Medium grained, Massive, Feldspar phyric, Slightly Silicified, Similar to previous plagioclase phyric lavas, minor variation in matrix grainsize and constituents. CONTACT: missing, but zone of quenching towards contact.	minor pyrite in veins, very minor sphalerite in veins, Very minor coarse grained sphalerite in quartz vein..	50			FRACTURE. Zone of broken core with pyrite staining on joint and fracture faces, and fine irregular calcite veining in slate. VEIN. Sphalerite. Massive coarse grained white quartz and calcite. minor weathering pits. minor sphalerite.	L Ln	frac vein	sil
54.50	64.60	BLACK SHALE Black, Fine grained, Laminated, Laminated black slate,undeformed bedding at 40 deg to LCA. Common 5 to 15mm beds of granular mg carbonate sandstone. Frequent pyrite spots in carbonate parallel to bedding, minor crosscutting carbonate veins. CONTACT: conformable irregular soft sediment mixing.	DISSEMINATED, minor pyrite disseminated, Minor fine disseminated pyrite and pyrite spots frequently associated with calcite, ubiquitous in black slate. M. DISSEMINATED, minor pyrite	60				S bsh		

9961411

5 cm

PASMINCO EXPLORATION

DIAMOND DRILL CORE LOG

HOLE No. YHV1

PROJECT: YOLANDE: HENTY VALLEY

Vertical Scale 1 : 150

DESCRIPTION				GRAPHIC				CODES		
From	To	LITHOLOGY & ALTERATION	MINERALISATION	Depth	Lithology	Structures	STRUCTURES	LITH	STR	ALT
64.60	65.70	SANDSTONE Khaki, Medium grained, Massive, Massive rock with a granular texture, possibly carbonate rich, resembles carbonate beds from slate unit.	DISSEMINATED, minor pyrite disseminated. Minor aggregates of fine grained pyrite/calcite, similar in form to occurances in previous interval..	70 80			BEDDING, A 40. Zone with minor fine calcite veining at high angle to bedding.	S sst	ss	

996142

5cm

YHV1 MAGNETIC SUSCEPTIBILITY

depth	value	formation	lithology
1.30	0.34	HFW	sst
2.40	0.26	HFW	sst
2.70	0.12	HFW	sst
3.60	0.14	HFW	sst
4.00	0.12	HFW	Ln
5.80	0.12	HFW	Ln
7.20	0.05	HFW	Ln
9.50	0.13	HFW	Ln
10.00	0.14	HFW	Ln
11.40	0.04	HFW	Ln
12.60	0.10	HFW	Ln
13.80	0.09	HFW	Ln
14.70	0.06	HFW	Ln
15.20	0.07	HFW	Ln
15.70	0.18	HFW	Ln
17.20	0.11	HFW	Ln
17.90	0.05	HFW	Ln
19.00	0.02	HFW	Ln
19.80	0.16	HFW	Ln
20.50	0.07	HFW	Ln
23.20	0.09	HFW	Ln
25.10	0.10	HFW	Ln
26.00	0.11	HFW	Ln
27.30	0.11	HFW	Ln
28.70	0.04	HFW	Ln
30.10	0.03	HFW	Ln
30.80	0.07	HFW	Ln
31.80	0.03	HFW	bsh
33.80	0.06	HFW	bsh
34.70	0.04	HFW	bsh
36.20	0.09	HFW	bsh
37.00	0.19	HFW	bsh
37.60	0.10	HFW	bsh
39.00	0.07	HFW	bsh
42.40	0.05	HFW	bsh
43.00	0.07	HFW	bsh
44.00	0.07	HFW	Ln
44.40	0.11	HFW	Ln
45.00	0.15	HFW	Ln
46.40	0.19	HFW	Ln
47.60	0.18	HFW	Ln
50.50	0.20	HFW	Ln
51.20	0.02	HFW	Ln
51.40	0.14	HFW	Ln
53.60	0.14	HFW	Ln
54.70	0.15	HFW	bsh
57.40	0.10	HFW	bsh
60.60	0.13	HFW	bsh
63.30	0.14	HFW	bsh
65.70	0.21	HFW	sst

YHV1 SPECIFIC GRAVITY

9.70	2.46	HFW	Ln
26.00	2.41	HFW	Ln
33.80	2.50	HFW	bsh
42.70	2.53	HFW	bsh
47.60	2.76	HFW	Ln
51.50	2.74	HFW	Ln
63.30	2.76	HFW	bsh
65.70	2.77	HFW	sst

YHV1 ORE SUITE (values in ppm)

FROM	TO	sample	Cu	Pb	Zn	Ag	Au	Ba	As	Mn
10.40	11.20	35761	64	33	122	1	0.02	690	170	1722
12.50	13.00	35762	26	14	120	1	0.00	456	59	945
14.30	15.20	35763	117	38	120	1	0.02	457	150	1202
15.20	16.40	35764	92	98	302	1	0.02	571	140	744
18.20	19.30	35765	39	5	118	1	0.00	635	150	1243

APPENDIX 5

SELECTED LITHOGEOCHEMICAL RESULTS

YOLANDE samples sorted on SiO2

sample	formation	Lithology	SiO2	AI	Al2O3	TiO2	P2O5	Fe2O3	MnO	CaO	K2O	MgO	Na2O
31686.2			45.30	96	16.60	1.37	0.35	22.56	0.14	0.04	3.84	0.65	0.16
75864			46.87	84	18.15	0.58	0.10	13.27	0.33	0.40	4.46	9.07	2.14
37220	AA	Ln	53.10	33	17.07	0.53	0.21	7.39	0.74	3.66	0.65	4.32	6.27
35066	WSF	Sbsh	56.50	88	22.90	0.70	0.17	4.29	0.04	0.15	5.04	2.61	0.93
75868	AA	Ln	56.96	45	17.25	0.60	0.54	7.23	0.08	3.43	2.48	4.28	4.75
37223	MQ	Lr-d	57.40	92	16.20	0.58	0.13	6.90	2.61	0.62	7.38	0.64	0.06
31687.1			57.90	76	17.45	0.88	0.11	10.87	0.13	0.10	2.40	2.15	1.33
75869	AA	Ln	58.71	32	16.77	0.46	0.28	6.80	0.08	3.29	1.08	3.75	6.75
75834			59.53	50	17.98	0.81	0.22	8.73	0.01	0.33	2.50	1.42	3.58
30195			60.00	43	15.38	0.76	0.12	7.26	0.11	1.99	1.22	4.29	5.42
75870	AA	Ln	60.02	39	15.98	0.53	0.23	7.30	0.13	2.14	1.84	3.76	6.66
75828	AA	Ln	61.16	47	15.04	0.42	0.20	6.79	0.11	3.54	2.99	3.60	3.78
31497	AA	Ln	61.30	76	18.01	0.56	0.25	5.90	0.10	0.83	5.10	1.67	1.25
75852	AA	Ln	62.57	42	15.33	0.41	0.21	6.71	0.08	2.30	2.64	2.94	5.54
31491		Ln	62.60	45	15.10	0.42	0.18	6.60	0.10	2.51	2.45	3.36	4.63
75871			63.51	41	16.58	0.76	0.22	6.11	0.09	1.99	2.69	1.26	3.65
31584.2			63.60	96	19.36	0.71	0.06	4.25	0.04	0.03	2.53	2.44	0.18
75836			63.75	4	10.74	0.29	0.20	1.70	0.09	9.56	0.27	0.34	5.73
31483			64.10	85	15.99	0.51	0.12	7.43	0.06	0.03	3.78	2.28	1.04
35057	CVC	pmf	64.60	42	15.99	0.41	0.08	4.19	0.11	2.50	2.94	1.06	3.05
37222	CVC	Ld	64.80	30	16.40	0.56	0.15	5.37	0.12	2.27	2.08	1.00	4.85
75853			65.36	31	14.49	0.50	0.13	5.81	0.08	3.13	2.32	0.77	3.76
35046	CVC	Ld	65.60	42	13.76	0.49	0.12	4.53	0.09	3.57	4.06	0.69	3.09
31688.1			65.60	52	12.54	0.73	0.11	6.50	0.19	2.46	2.89	1.22	1.39
35087	CVC	Ld	65.80	44	13.39	0.45	0.13	7.02	0.35	2.49	2.66	0.80	1.92
35064	WSF	Sbsh	66.20	97	17.42	0.69	0.12	3.79	0.04	<0.01	4.31	1.84	0.19
35084	AA	Ln	66.30	92	14.67	0.52	0.15	8.44	0.30	0.26	3.75	1.13	0.15
37224	CVC	Ld	66.40	42	12.98	0.44	0.12	9.06	0.29	1.38	2.23	0.67	2.57
35041	CVC	Ld	66.50	39	16.62	0.58	0.16	4.44	0.08	0.35	1.85	1.81	5.29
37221	AA	Ln	66.70	47	13.33	0.47	0.13	2.75	0.20	4.90	4.14	0.45	0.19
75872			66.74	10	10.27	0.27	0.10	1.98	0.12	7.50	0.86	0.43	4.10
75844			67.04	69	14.10	0.61	0.15	5.12	0.08	0.37	4.57	2.62	2.85
31499		L	67.30	65	15.15	0.56	0.14	5.44	0.05	0.23	2.71	1.73	2.18
75848			67.96	44	14.91	0.32	0.20	4.00	0.06	0.44	3.44	1.33	5.64
75873			69.16	29	14.26	0.47	0.13	6.16	0.08	1.02	1.24	1.08	4.70
75865			69.18	25	16.81	0.18	0.00	1.53	0.01	0.25	2.52	0.30	8.39
35075	WSF	Sbsh	69.30	98	13.83	0.86	0.04	3.71	0.02	0.01	3.31	2.20	0.10
31494	CVC	Lr-d	69.30	61	15.50	0.51	0.14	5.05	0.03	0.14	3.18	1.10	2.58
31496	CVC	Sslt	69.50	53	11.96	0.47	0.08	4.76	0.07	1.86	2.94	1.59	2.11
31490	CVC	Ld	69.70	46	14.60	0.51	0.13	5.60	0.06	1.10	2.41	0.77	2.68
35039		cong	69.70	79	14.39	0.52	0.14	2.92	0.03	0.18	5.18	0.94	1.40
75847			69.92	94	15.01	0.39	0.00	4.51	0.01	0.01	3.95	2.26	0.37
35009	CVC	Lr-d	70.00	75	14.96	0.52	0.10	5.20	0.03	0.10	3.52	1.09	1.42
35042	CVC	Vcong	70.30	66	11.83	0.39	0.14	5.13	0.02	0.19	2.48	0.58	1.40
31484			70.40	99	9.48	0.62	0.14	11.89	0.06	0.01	2.45	0.40	<0.05
216481.2			70.40	69	15.01	0.56	0.14	3.52	0.02	0.16	3.77	0.74	1.84
35071	CVC	Vpmf	70.50	29	14.74	0.51	0.10	3.53	0.08	0.69	1.71	1.02	5.96
35076	AA	Ln	70.70	96	7.55	0.26	0.07	14.97	0.88	0.05	0.23	1.94	<0.05
35069	CVC	Vpm	71.40	26	14.09	0.50	0.06	3.19	0.07	0.58	0.77	1.07	4.74
31492	CVC	Vsst	72.00	18	13.20	0.49	0.06	4.15	0.07	0.97	0.33	1.15	5.75
30985.2			72.00	54	14.63	0.30	0.04	2.44	0.05	0.05	4.91	0.26	4.28
31500	CVC		72.10	34	12.89	0.43	0.04	3.93	0.01	0.08	1.82	0.37	4.24
35073	CVC	Vpmf	72.40	40	13.58	0.48	0.08	2.53	0.04	2.25	1.74	1.08	1.99
35011	CVC	Scong	72.40	98	15.91	0.56	0.09	2.26	0.02	0.06	4.79	0.50	0.07
35037	CVC		73.10	57	12.16	0.41	0.08	4.78	0.02	0.08	2.72	0.51	2.38
35070	WSF	Sbsh	73.20	78	12.40	0.55	0.06	3.94	0.01	0.01	2.71	1.05	1.07
31438			73.80	44	12.69	0.16	0.01	1.30	0.04	1.81	3.79	0.39	3.55
37219	TG	Lr	73.80	5	15.38	0.13	0.01	0.62	0.03	0.31	0.33	0.12	8.70
35068	WSF	Sbsh	73.90	97	13.64	0.60	0.02	2.36	0.02	0.01	3.91	0.97	0.16

35012		cong	73.90	97	15.03	0.54	0.11	2.51	0.04	0.10	4.47	0.47	0.05
35077	AA	Ln	74.70	91	7.40	0.19	0.06	11.59	0.25	0.07	0.67	0.90	0.09
35010	CVC	Ld	74.80	61	13.77	0.32	0.02	2.45	0.02	0.02	2.09	0.84	1.87
31488	CVC	Ld	74.80	17	13.34	0.32	0.05	1.93	0.04	0.49	0.82	0.50	5.98
35043	CVC	Vcong	74.90	41	10.90	0.20	0.04	3.25	0.14	1.39	1.93	0.95	2.78
35049	CVC	pmf	74.90	54	11.59	0.44	0.06	2.87	0.06	0.89	3.10	0.79	2.45
32149			75.20	83	13.47	0.38	0.03	2.56	0.01	0.04	3.88	0.77	0.94
75874			75.32	26	12.89	0.46	0.13	1.87	0.03	0.58	1.55	0.41	5.14
75875			76.15	30	11.42	0.36	0.05	4.09	0.05	0.28	0.90	0.82	3.79
31437			76.60	44	12.48	0.15	0.01	1.13	0.03	0.67	3.01	0.45	3.79
31495	CVC	Vslt	77.30	69	10.86	0.18	0.03	3.05	0.07	1.19	2.90	1.03	0.56
75845			77.69	43	11.60	0.18	0.05	0.63	0.01	0.05	2.01	0.29	2.95
75849			77.77	34	11.69	0.19	0.08	2.24	0.02	0.07	1.98	0.46	4.69
75850			78.27	48	11.18	0.18	0.01	1.56	0.02	0.22	3.58	0.17	3.77
75851			78.56	39	11.89	0.18	0.06	0.83	0.00	0.03	2.69	0.13	4.44
75876			79.46	10	12.28	0.34	0.08	0.30	0.00	0.40	0.63	0.00	5.40
75866			87.68	28	6.18	0.17	0.00	0.69	0.02	0.05	0.85	0.36	3.01
75867			88.11										

996147

YOLANDE samples sorted on TiO2

sample	formation	lithology	TiO2	SiO2	Al2O3	AI	P2O5	Fe2O3	MnO	CaO	K2O	MgO	Na2O
75867			0.10	88.11	5.94	51	0.00	0.74	0.03	0.13	1.73	0.32	1.87
30175.2			0.12	93.80	2.24	79	0.06	1.61	0.15	0.10	0.46	0.44	0.14
37219	TG	Lr	0.13	73.80	15.38	5	0.01	0.62	0.03	0.31	0.33	0.12	8.70
31437			0.15	76.60	12.48	44	0.01	1.13	0.03	0.67	3.01	0.45	3.79
31438			0.16	73.80	12.69	44	0.01	1.30	0.04	1.81	3.79	0.39	3.55
75866			0.17	87.68	6.18	28	0.00	0.69	0.02	0.05	0.85	0.36	3.01
75845			0.18	77.69	11.60	43	0.05	0.63	0.01	0.05	2.01	0.29	2.95
31495	CVC	Vslt	0.18	77.30	10.86	69	0.03	3.05	0.07	1.19	2.90	1.03	0.56
75850			0.18	78.27	11.18	48	0.01	1.56	0.02	0.22	3.58	0.17	3.77
75851			0.18	78.56	11.89	39	0.06	0.83	0.00	0.03	2.69	0.13	4.44
75865			0.18	69.18	16.81	25	0.00	1.53	0.01	0.25	2.52	0.30	8.39
75849			0.19	77.77	11.69	34	0.08	2.24	0.02	0.07	1.98	0.46	4.69
35077	AA	Ln	0.19	74.70	7.40	91	0.06	11.59	0.25	0.07	0.67	0.90	0.09
35043	CVC	Vcong	0.20	74.90	10.90	41	0.04	3.25	0.14	1.39	1.93	0.95	2.78
35076	AA	Ln	0.26	70.70	7.55	96	0.07	14.97	0.88	0.05	0.23	1.94	<0.05
75872			0.27	66.74	10.27	10	0.10	1.98	0.12	7.50	0.86	0.43	4.10
75836			0.29	63.75	10.74	4	0.20	1.70	0.09	9.56	0.27	0.34	5.73
30985.2			0.30	72.00	14.63	54	0.04	2.44	0.05	0.05	4.91	0.26	4.28
35010	CVC	Ld	0.32	74.80	13.77	61	0.02	2.45	0.02	0.02	2.09	0.84	1.87
75848			0.32	67.96	14.91	44	0.20	4.00	0.06	0.44	3.44	1.33	5.64
31488	CVC	Ld	0.32	74.80	13.34	17	0.05	1.93	0.04	0.49	0.82	0.50	5.98
75876			0.34	79.46	12.28	10	0.08	0.30	0.00	0.40	0.63	0.00	5.40
75875			0.36	76.15	11.42	30	0.05	4.09	0.05	0.28	0.90	0.82	3.79
32149			0.38	75.20	13.47	83	0.03	2.56	0.01	0.04	3.88	0.77	0.94
75847			0.39	69.92	15.01	94	0.00	4.51	0.01	0.01	3.95	2.26	0.37
35042	CVC	Vcong	0.39	70.30	11.83	66	0.14	5.13	0.02	0.19	2.48	0.58	1.40
35037	CVC		0.41	73.10	12.16	57	0.08	4.78	0.02	0.08	2.72	0.51	2.38
75852	AA	Ln	0.41	62.57	15.33	42	0.21	6.71	0.08	2.30	2.64	2.94	5.54
35057	CVC	pmf	0.41	64.60	15.99	42	0.08	4.19	0.11	2.50	2.94	1.06	3.05
31491		Ln	0.42	62.60	15.10	45	0.18	6.60	0.10	2.51	2.45	3.36	4.63
75828	AA	Ln	0.42	61.16	15.04	47	0.20	6.79	0.11	3.54	2.99	3.60	3.78
31500	CVC		0.43	72.10	12.89	34	0.04	3.93	0.01	0.08	1.82	0.37	4.24
35049	CVC	pmf	0.44	74.90	11.59	54	0.06	2.87	0.06	0.89	3.10	0.79	2.45
37224	CVC	Ld	0.44	66.40	12.98	42	0.12	9.06	0.29	1.38	2.23	0.67	2.57
35087	CVC	Ld	0.45	65.80	13.39	44	0.13	7.02	0.35	2.49	2.66	0.80	1.92
75874			0.46	75.32	12.89	26	0.13	1.87	0.03	0.58	1.55	0.41	5.14
75869	AA	Ln	0.46	58.71	16.77	32	0.28	6.80	0.08	3.29	1.08	3.75	6.75
37221	AA	Ln	0.47	66.70	13.33	47	0.13	2.75	0.20	4.90	4.14	0.45	0.19
31496	CVC	Sslt	0.47	69.50	11.96	53	0.08	4.76	0.07	1.86	2.94	1.59	2.11
75873			0.47	69.16	14.26	29	0.13	6.16	0.08	1.02	1.24	1.08	4.70
35073	CVC	Vpmf	0.48	72.40	13.58	40	0.08	2.53	0.04	2.25	1.74	1.08	1.99
31492	CVC	Vsst	0.49	72.00	13.20	18	0.06	4.15	0.07	0.97	0.33	1.15	5.75
35046	CVC	Ld	0.49	65.60	13.76	42	0.12	4.53	0.09	3.57	4.06	0.69	3.09
75853			0.50	65.36	14.49	31	0.13	5.81	0.08	3.13	2.32	0.77	3.76
35069	CVC	Vpm	0.50	71.40	14.09	26	0.06	3.19	0.07	0.58	0.77	1.07	4.74
31494	CVC	Lr-d	0.51	69.30	15.50	61	0.14	5.05	0.03	0.14	3.18	1.10	2.58
31483			0.51	64.10	15.99	85	0.12	7.43	0.06	0.03	3.78	2.28	1.04
31490	CVC	Ld	0.51	69.70	14.60	46	0.13	5.60	0.06	1.10	2.41	0.77	2.68
35071	CVC	Vpmf	0.51	70.50	14.74	29	0.10	3.53	0.08	0.69	1.71	1.02	5.96
35084	AA	Ln	0.52	66.30	14.67	92	0.15	8.44	0.30	0.26	3.75	1.13	0.15
35009	CVC	Lr-d	0.52	70.00	14.96	75	0.10	5.20	0.03	0.10	3.52	1.09	1.42

35039		cong	0.52	69.70	14.39	79	0.14	2.92	0.03	0.18	5.18	0.94	1.40
37220	AA	Ln	0.53	53.10	17.07	33	0.21	7.39	0.74	3.66	0.65	4.32	6.27
75870	AA	Ln	0.53	60.02	15.98	39	0.23	7.30	0.13	2.14	1.84	3.76	6.66
35012		cong	0.54	73.90	15.03	97	0.11	2.51	0.04	0.10	4.47	0.47	0.05
35070	WSF	Sbsh	0.55	73.20	12.40	78	0.06	3.94	0.01	0.01	2.71	1.05	1.07
31497	AA	Ln	0.56	61.30	18.01	76	0.25	5.90	0.10	0.83	5.10	1.67	1.25
35011	CVC	Scong	0.56	72.40	15.91	98	0.09	2.26	0.02	0.06	4.79	0.50	0.07
216481.2			0.56	70.40	15.01	69	0.14	3.52	0.02	0.16	3.77	0.74	1.84
31499		L	0.56	67.30	15.15	65	0.14	5.44	0.05	0.23	2.71	1.73	2.18
37222	CVC	Ld	0.56	64.80	16.40	30	0.15	5.37	0.12	2.27	2.08	1.00	4.85
75864			0.58	46.87	18.15	84	0.10	13.27	0.33	0.40	4.46	9.07	2.14
37223	MQ	Lr-d	0.58	57.40	16.20	92	0.13	6.90	2.61	0.62	7.38	0.64	0.06
35041	CVC	Ld	0.58	66.50	16.62	39	0.16	4.44	0.08	0.35	1.85	1.81	5.29
35068	WSF	Sbsh	0.60	73.90	13.64	97	0.02	2.36	0.02	0.01	3.91	0.97	0.16
75868	AA	Ln	0.60	56.96	17.25	45	0.54	7.23	0.08	3.43	2.48	4.28	4.75
75844			0.61	67.04	14.10	69	0.15	5.12	0.08	0.37	4.57	2.62	2.85
31484			0.62	70.40	9.48	99	0.14	11.89	0.06	0.01	2.45	0.40	<0.05
35064	WSF	Sbsh	0.69	66.20	17.42	97	0.12	3.79	0.04	<0.01	4.31	1.84	0.19
35066	WSF	Sbsh	0.70	56.50	22.90	88	0.17	4.29	0.04	0.15	5.04	2.61	0.93
31584.2			0.71	63.60	19.36	96	0.06	4.25	0.04	0.03	2.53	2.44	0.18
31688.1			0.73	65.60	12.54	52	0.11	6.50	0.19	2.46	2.89	1.22	1.39
75871			0.76	63.51	16.58	41	0.22	6.11	0.09	1.99	2.69	1.26	3.65
30195			0.76	60.00	15								

996149

YOLANDE samples sorted on Alteration Index
AI = 100 K2O MgO + X Na2O CaO K2O MgO + + + /

sample	formation	lithology	AI	SiO2	Al2O3	TiO2	P2O5	Fe2O3	MnO	CaO	K2O	MgO	Na2O
75836			4	63.75	10.74	0.29	0.20	1.70	0.09	9.56	0.27	0.34	5.73
37219	TG	Lr	5	73.80	15.38	0.13	0.01	0.62	0.03	0.31	0.33	0.12	8.70
75876			10	79.46	12.28	0.34	0.08	0.30	0.00	0.40	0.63	0.00	5.40
75872			10	66.74	10.27	0.27	0.10	1.98	0.12	7.50	0.86	0.43	4.10
31488	CVC	Ld	17	74.80	13.34	0.32	0.05	1.93	0.04	0.49	0.82	0.50	5.98
31492	CVC	Vsst	18	72.00	13.20	0.49	0.06	4.15	0.07	0.97	0.33	1.15	5.75
75865			25	69.18	16.81	0.18	0.00	1.53	0.01	0.25	2.52	0.30	8.39
75874			26	75.32	12.89	0.46	0.13	1.87	0.03	0.58	1.55	0.41	5.14
35069	CVC	Vpm	26	71.40	14.09	0.50	0.06	3.19	0.07	0.58	0.77	1.07	4.74
75866			28	87.68	6.18	0.17	0.00	0.69	0.02	0.05	0.85	0.36	3.01
75873			29	69.16	14.26	0.47	0.13	6.16	0.08	1.02	1.24	1.08	4.70
35071	CVC	Vpmf	29	70.50	14.74	0.51	0.10	3.53	0.08	0.69	1.71	1.02	5.96
75875			30	76.15	11.42	0.36	0.05	4.09	0.05	0.28	0.90	0.82	3.79
37222	CVC	Ld	30	64.80	16.40	0.56	0.15	5.37	0.12	2.27	2.08	1.00	4.85
75853			31	65.36	14.49	0.50	0.13	5.81	0.08	3.13	2.32	0.77	3.76
75869	AA	Ln	32	58.71	16.77	0.46	0.28	6.80	0.08	3.29	1.08	3.75	6.75
37220	AA	Ln	33	53.10	17.07	0.53	0.21	7.39	0.74	3.66	0.65	4.32	6.27
31500	CVC		34	72.10	12.89	0.43	0.04	3.93	0.01	0.08	1.82	0.37	4.24
75849			34	77.77	11.69	0.19	0.08	2.24	0.02	0.07	1.98	0.46	4.69
75851			39	78.56	11.89	0.18	0.06	0.83	0.00	0.03	2.69	0.13	4.44
75870	AA	Ln	39	60.02	15.98	0.53	0.23	7.30	0.13	2.14	1.84	3.76	6.66
35041	CVC	Ld	39	66.50	16.62	0.58	0.16	4.44	0.08	0.35	1.85	1.81	5.29
35073	CVC	Vpmf	40	72.40	13.58	0.48	0.08	2.53	0.04	2.25	1.74	1.08	1.99
35043	CVC	Vcong	41	74.90	10.90	0.20	0.04	3.25	0.14	1.39	1.93	0.95	2.78
75871			41	63.51	16.58	0.76	0.22	6.11	0.09	1.99	2.69	1.26	3.65
75852	AA	Ln	42	62.57	15.33	0.41	0.21	6.71	0.08	2.30	2.64	2.94	5.54
35046	CVC	Ld	42	65.60	13.76	0.49	0.12	4.53	0.09	3.57	4.06	0.69	3.09
35057	CVC	pmf	42	64.60	15.99	0.41	0.08	4.19	0.11	2.50	2.94	1.06	3.05
37224	CVC	Ld	42	66.40	12.98	0.44	0.12	9.06	0.29	1.38	2.23	0.67	2.57
30195			43	60.00	15.38	0.76	0.12	7.26	0.11	1.99	1.22	4.29	5.42
75845			43	77.69	11.60	0.18	0.05	0.63	0.01	0.05	2.01	0.29	2.95
31437			44	76.60	12.48	0.15	0.01	1.13	0.03	0.67	3.01	0.45	3.79
31438			44	73.80	12.69	0.16	0.01	1.30	0.04	1.81	3.79	0.39	3.55
75848			44	67.96	14.91	0.32	0.20	4.00	0.06	0.44	3.44	1.33	5.64
35087	CVC	Ld	44	65.80	13.39	0.45	0.13	7.02	0.35	2.49	2.66	0.80	1.92
31491		Ln	45	62.60	15.10	0.42	0.18	6.60	0.10	2.51	2.45	3.36	4.63
75868	AA	Ln	45	56.96	17.25	0.60	0.54	7.23	0.08	3.43	2.48	4.28	4.75
31490	CVC	Ld	46	69.70	14.60	0.51	0.13	5.60	0.06	1.10	2.41	0.77	2.68
75828	AA	Ln	47	61.16	15.04	0.42	0.20	6.79	0.11	3.54	2.99	3.60	3.78
37221	AA	Ln	47	66.70	13.33	0.47	0.13	2.75	0.20	4.90	4.14	0.45	0.19
75850			48	78.27	11.18	0.18	0.01	1.56	0.02	0.22	3.58	0.17	3.77
75834			50	59.53	17.98	0.81	0.22	8.73	0.01	0.33	2.50	1.42	3.58
75867			51	88.11	5.94	0.10	0.00	0.74	0.03	0.13	1.73	0.32	1.87
31688.1			52	65.60	12.54	0.73	0.11	6.50	0.19	2.46	2.89	1.22	1.39
31496	CVC	Sslt	53	69.50	11.96	0.47	0.08	4.76	0.07	1.86	2.94	1.59	2.11
35049	CVC	pmf	54	74.90	11.59	0.44	0.06	2.87	0.06	0.89	3.10	0.79	2.45
30985.2			54	72.00	14.63	0.30	0.04	2.44	0.05	0.05	4.91	0.26	4.28
35037	CVC		57	73.10	12.16	0.41	0.08	4.78	0.02	0.08	2.72	0.51	2.38
35010	CVC	Ld	61	74.80	13.77	0.32	0.02	2.45	0.02	0.02	2.09	0.84	1.87
31494	CVC	Lr-d	61	69.30	15.50	0.51	0.14	5.05	0.03	0.14	3.18	1.10	2.58
31499		L	65	67.30	15.15	0.56	0.14	5.44	0.05	0.23	2.71	1.73	2.18

35042	CVC	Vcong	66	70.30	11.83	0.39	0.14	5.13	0.02	0.19	2.48	0.58	1.40
75844			69	67.04	14.10	0.61	0.15	5.12	0.08	0.37	4.57	2.62	2.85
31495	CVC	Vslt	69	77.30	10.86	0.18	0.03	3.05	0.07	1.19	2.90	1.03	0.56
216481.2			69	70.40	15.01	0.56	0.14	3.52	0.02	0.16	3.77	0.74	1.84
35009	CVC	Lr-d	75	70.00	14.96	0.52	0.10	5.20	0.03	0.10	3.52	1.09	1.42
31687.1			76	57.90	17.45	0.88	0.11	10.87	0.13	0.10	2.40	2.15	1.33
31497	AA	Ln	76	61.30	18.01	0.56	0.25	5.90	0.10	0.83	5.10	1.67	1.25
35070	WSF	Sbsh	78	73.20	12.40	0.55	0.06	3.94	0.01	0.01	2.71	1.05	1.07
30175.2			79	93.80	2.24	0.12	0.06	1.61	0.15	0.10	0.46	0.44	0.14
35039		cong	79	69.70	14.39	0.52	0.14	2.92	0.03	0.18	5.18	0.94	1.40
32149			83	75.20	13.47	0.38	0.03	2.56	0.01	0.04	3.88	0.77	0.94
75864			84	46.87	18.15	0.58	0.10	13.27	0.33	0.40	4.46	9.07	2.14
31483			85	64.10	15.99	0.51	0.12	7.43	0.06	0.03	3.78	2.28	1.04
35066	WSF	Sbsh	88	56.50	22.90	0.70	0.17	4.29	0.04	0.15	5.04	2.61	0.93
35077	AA	Ln	91	74.70	7.40	0.19	0.06	11.59	0.25	0.07	0.67	0.90	0.09
37223	MQ	Lr-d	92	57.40	16.20	0.58	0.13	6.90	2.61	0.62	7.38	0.64	0.06
35084	AA	Ln	92	66.30	14.67	0.52	0.15	8.44	0.30	0.26	3.75	1.13	0.15
75847			94	69.92	15.01	0.39	0.00	4.51	0.01	0.01	3.95	2.26	0.37
31686.2			96	45.30	16.60	1.37	0.35	22.56	0.14	0.04	3.84	0.65	0.16
31584.2			96	63.60	19.36	0.71	0.06	4.25	0.04	0.03	2.53	2.44	0.18
35076	AA	Ln	96	70.70	7.55	0.26	0.						

996151

APPENDIX 6

THIN SECTION LOCATIONS

YOLANDE THIN SECTION LOCATIONS

sample	northing	easting	DDH	depth	comment
216481					
216540	5356875.0	379026.0			
216541	5357556.0	379288.0			
216542					vesicular evolved plag-phy chl
31488	5358394.0	379924.0			
31490	5358345.0	380061.0			
31491	5358300.0	379940.0			
31492	5358308.0	379993.0			
31493	5358309.0	379994.0			
31494	5358680.0	379875.0			
31495	5357970.0	379400.0			
31496	5357920.0	379636.0			
31497	5357400.0	380680.0			
31498	5358430.0	379975.0			
31536	5358750.0	379825.0			aphyric felsic lava
32140	5354740.0	380000.0			
32150	5357800.0	379000.0			
32153	5358360.0	379149.0			cf MRS ACG
32165	5357960.0	379553.0			
32170	5358535.0	379039.0			v cb alt
32173	5358798.0	379680.0			aphyric evolved
32176	5359197.0	379306.0			
32188	5357563.0	379200.0			
32196	5359800.0	378730.0			HDS?
32197	5359595.0	378779.0			cf Henty Dyke Swarm tholiites
32806	5360032.0	378770.0			cf HDS tholiites
32850.1	5358061.0	379295.0			
32850.2	5358061.0	379295.0			cf MRS ACG
32860	5358061.0	379267.0			
32866	5358260.0	379266.0			
32867	5358261.0	379287.0			
35009	5358870.0	379800.0			
35010	5359000.0	379700.0			
35017	5358380.0	379985.0			
35041	5360715.0	379540.0			
35042	5360680.0	379837.0			
35043	5360674.0	379840.0			
35046			YNC1	10.2	
35047			YNC1	29.7	
35048			YNC1	44.2	
35049			YNC1	51.6	
35050			YNC1	56.1	
35080			YNC4	88.4	
35084			YNC4	160.0	strong chl,ser,py,sp alt
35087			YNC4	244.8	cf 35046 spillway HW
35093			YNC5	104.7	haematitic
35094			YNC5	128.7	
37221			YNC5	218.5	aphyric sil,ser,cb alt
37222			YNC5		
37223			YNC5	288.0	aphyric

996154

APPENDIX 7

CRAWFORD PETROGRAPHIC REPORT – JUNE 1993

SAMPLE NUMBER: 31488

LOCATION: PASMINCO Newton Ck - Henty Canal Areas: clast in the Newton Ck conglomerate

SUMMARY:

This is a formerly glassy weakly plagioclase-phyric dacitic lava with weak early sericite alteration overprinted by moderate silica-chlorite alteration.

HAND SPECIMEN:

This is a very altered sparsely plagioclase-phyric formerly glassy dacite with extensive areas of albite-silica alteration

THIN SECTION:

This sample is a dacitic to rhyolitic lava with around 3-5 modal% of small (<1mm long) albitized plagioclase phenocrysts with very slight sericite speckling set in a strongly recrystallized formerly glassy groundmass. Very often these occur aggregates in clots of 5 or 6 subhedral crystals, sometimes together with altered FeTi oxide microphenocrysts and calcite; the latter possibly replaces minor augite, although the textural evidence is not convincing. There were no discrete mafic silicate phenocrysts in this sample, but occasional former FeTi oxide phenocrysts and microphenocrysts are now composed of black rims of magnetite or hematite enclosing quartz and bladed rather opaque sphene(?) crystals. Very small, elongate prismatic apatite microphenocrysts are not uncommon.

The groundmass of this sample was originally devitrified glass. However, moderate hydrothermal alteration, probably mainly silica flooding, has led to development of an exceptionally heterogeneous groundmass composed of a fine-grained quartzo-feldspathic intergrowth in which are set anhedral grains and polycrystalline aggregates of secondary quartz. Curved trails of fine-grained, olive-green chlorite occur throughout the groundmass, and are very unevenly distributed. One area of the section is heavily pervaded by dense fine-grained sericite. A few meandering veinlets of polycrystalline fine-grained quartz transect the rock, and clearly post-date the sericite alteration, and a few small patches of calcite occur scattered through the rock.

This sample was a glassy weakly plagioclase-phyric dacitic lava that has suffered weak to moderate hydrothermal alteration, essentially an earlier sericite alteration overprinted by silica ± chlorite alteration.

SAMPLE NUMBER: 31490

LOCATION: PASMINCO Newton Ck - Henty Canal Area: Hangingwall Dacite

SUMMARY:

This is a weakly foliated, moderately plagioclase-phyric formerly glassy dacitic lava, originally very similar to 31488.

HAND SPECIMEN:

This is a dark grey-green weakly foliated plagioclase-phyric dacitic lava with altered plagioclase phenocrysts up to about 2mm long.

THIN SECTION:

This sample is foliated formerly plagioclase-phyric dacitic lava. Former plagioclase phenocrysts make up around 5 modal% of the rock, and are albitized, although most are strongly overprinted by calcite. They occur dominantly in aggregates of four or five crystals, in clots up to about 2mm long. As for the previous sample (31488), there were probably no mafic silicate phenocrysts in this rock, although a few small deformed calcite aggregates may be replacing original augite. Former FeTi oxide microphenocrysts are altered to messy leucoxenitic material, and long, narrow apatite crystals are quite common, although rarely longer than 0.3mm.

The groundmass of this sample was originally glassy, but devitrified, then recrystallized to a fine-grained mosaic intergrowth of quartz and feldspar in which occasional coarser-grained anhedral quartz patches have grown and trails and patches of very fine-grained dull green chlorite and subordinate sericite are common. A moderately well-developed foliation pervades this sample, and is defined by streaks of sericite and Fe-stained sericite, and to a lesser extent by probably recrystallized groundmass chlorite. Scattered small patches of calcite overprint limited areas of groundmass, as well as former plagioclase phenocrysts. A few small discontinuous quartz veinlets cut the rock, but the degree of silica alteration is probably less than in 31488.

This was a plagioclase-phyric glassy dacitic lava, probably almost identical to 31488. It suffered a less intense hydrothermal alteration than 31488, but has been moderately deformed to produce a weak foliation.

SAMPLE NUMBER: 31491

LOCATION: PASMINCO Newton Ck - Henty Canal Area

SUMMARY:

This is a plagioclase+hornblende+quartz+FeTi oxide-phyric andesitic lava with a low-grade burial metamorphic alteration assemblage.

HAND SPECIMEN:

This is a grey altered quite strongly porphyritic plagioclase+ hornblende-phyric andesitic lava.

THIN SECTION:

This sample is a plagioclase+hornblende+quartz+FeTi oxide phyric andesitic lava with a microphyric groundmass. The rock contains around 5-8 modal% of hornblende phenocrysts, approximately 20 modal% of plagioclase phenocrysts, and perhaps 1-2 modal% of quartz phenocrysts. The plagioclase phenocrysts are mainly euhedral tabular prisms to about 3mm long maximum, and are fairly heavily riddled with very fine sericite. Ghost zoning is still evident, although the plagioclases are entirely albitized. Hornblende phenocrysts are also up to about 3mm long, mainly well-formed prisms with strong olive to almost colourless pleochroism, and almost all contain small tabular plagioclase inclusions. Occasional hornblende phenocrysts have chloritic rims and chlorite development along cleavage. Quartz phenocrysts are very strongly rounded and resorbed. Former FeTi oxide phenocrysts are fairly fresh, and show limited, or no leucoxenitic alteration.

The groundmass of this sample is composed dominantly of albitized plagioclase laths with interstitial quartz and perhaps minor Kspar, and not uncommon tiny opaques. Chlorite occurs as small patches, perhaps replacing small hornblende or orthopyroxene crystals. Fine-grained epidote is quite common throughout the groundmass, but the primary texture of the groundmass is perfectly preserved. Occasional small anhedral patches of secondary quartz are also present. A small coarser-grained cognate inclusion composed of plagioclase, chlorite after a mafic silicate, and a significant amount of rather stubby apatite crystals.

This is a typical 'Crown Hill'-type hornblende andesite, with a low-grade burial metamorphic alteration overprint, but no sign of hydrothermal alteration.

SAMPLE NUMBER: 35046

LOCATION: PASMINCO Newton Ck - Henty Canal Areas: Hangingwall Andesite

SUMMARY:

This is a weakly foliated and weakly hydrothermally altered (silica-sericite±calcite) plagioclase-phyric dacitic lava strikingly similar petrographically to dacite 31490, but unrelated to hornblende andesite 31491.

HAND SPECIMEN:

This is a dark grey moderately plagioclase-phyric dacitic to andesitic lava with a weak foliation.

THIN SECTION:

This sample is dacitic lava with around 10 modal% of rather ragged euhedral albite phenocrysts mainly less than 2mm long. These are often grouped in multi-crystal clots of four or five crystals; most albitized plagioclase phenocrysts show weak to moderate calcite ± sericite alteration. A couple of very small, chloritized former mafic phenocrysts are present, and altered former FeTi oxide microphenocrysts are common, with magnetite rims and very dark sphene crystals inside the original crystal outline.

The groundmass of this sample was undoubtedly originally glassy. It devitrified to a very fine-grained quartzo-feldspathic material. However, it has suffered strong recrystallization to a heterogeneous, very weakly foliated quartzose aggregate in which coarser ragged and anhedral quartz grains and stringers are set in the finer quartzo-feldspathic groundmass. The foliation is defined by irregular and discontinuous wavy streaks and bands of sericite and much less voluminous chlorite. Messy fine-grained calcite sometimes follows and overprints the sericite forming the foliation, and rather coarser-grained patches and veinlets of calcite are quite common.

This is a weakly hydrothermally altered plagioclase-phyric dacitic lava with pronounced petrographic similarities to sample 31490. I see no reason to link either of these with distinctive hornblende andesite 31491; they are more evolved and show no evidence that hornblende was present. More importantly, even andesitic end-members of the hornblende andesite - dacite fractionation series have quartz phenocrysts, and there are certainly no quartz phenocrysts in either 31490 or 35046. It is very unlikely that these samples are related to andesite 31491.

SAMPLE NUMBER: 31492 and 31498

LOCATION: PASMINCO Newton Ck - Henty Canal Areas: Newton Creek Spillway conglomerate.

SUMMARY:

These are essentially identical probably former crystal vitric tuffs composed of albitized broken plagioclase phenocrysts set in a thoroughly recrystallized formerly vitric ash matrix. Both have suffered weak hydrothermal recrystallization.

HAND SPECIMEN:

These are very similar mid-grey volcaniclastic fine sandstones with visible detrital albite phenocryst fragments.

THIN SECTION:

These samples are virtually identical in every respect. They are either hydrothermally altered and recrystallized volcanogenic sandstones, or recrystallized vitric crystal tuffs. The dominant framework component in these rocks is made of anhedral to euhedral, generally broken albite plagioclase phenocryst fragments; these make up around 25 modal% of the rock. These are rarely larger than 1.5mm across, and are usually much smaller. They are very lightly speckled by sericite. Not uncommon small FeTi oxide detrital grains are altered to messy leucoxenitic material. There are no other framework components in either rock. The plagioclase crystal detritus is almost always ragged edged, and has clearly reacted with adjacent matrix during recrystallization of the vitric ash matrix

The matrix of both samples is a very heterogeneous-textured quartzo-feldspathic aggregate that was almost certainly composed of vitric ash, although no shard shapes are preserved due to the strong recrystallization. Small anhedral granular epidote crystals are scattered through the matrix. A very weak foliation pervades both rocks, winding around detrital plagioclase grains, and defined by streaks and veinlets of chlorite.

It is not possible to ascertain whether these samples were epiclastic volcanogenic sandstones derived from plagioclase-phyric dacitic volcanics, or crystal lithic tuffs composed of broken plagioclase phenocrysts set in a vitric ash matrix. I prefer the latter interpretation, due to the perhaps surprizing lack of any other detrital lithic components in these rocks. Both have clearly suffered weak hydrothermal recrystallization, although this probably involved only limited silica mobility.

SAMPLE NUMBER: 31493

LOCATION: PASMINCO Newton Ck - Henty Canal Areas: Newton Creek Spillway conglomerate.

SUMMARY:

This is a weakly hydrothermally altered fairly thinly interbedded volcanogenic sandstone-siltstone-shale derived from plagioclase-phyric glassy felsic tuffs and volcanics.

HAND SPECIMEN:

This is a bedded volcaniclastic fine sandstone to siltstone, with a few almost cm-wide black shaley beds.

THIN SECTION:

This sample is clearly bedded in thin section, but there is no significant mineralogical variation accompanying the grainsize change from shale to fine sandstone. All beds are matrix-supported and have a wavy bedding-parallel cleavage defined by chlorite streaks that wrap around small detrital framework grains of broken albite phenocrysts. In the coarsest beds, these detrital albite grains are around 0.2mm across, and are much finer grained in siltstone and shale beds. The only other detrital component is scattered totally altered (leucoxenitized) former FeTi oxide microphenocrysts.

The matrix of the rock was probably the same in all beds, and was vitric ash. It has recrystallized thoroughly in all beds to a fine-grained quartzo-feldspathic material that is fairly uniform texturally. A few discontinuous bands composed of aggregates of tiny pyrite grains set in silica trend parallel to the bedding and cleavage; these are related to the recrystallization and alteration of the rock and are clearly secondary in origin. A few anhedral grains of quite reddish sphalerite occur together with some 0.1mm-sized pyrite grains in the coarsest (and presumably most porous) fine sandstone bed in the section.

This is a weakly hydrothermally altered fine-grained volcanogenic (epiclastic) fine sandstone - siltstone- shale derived from glassy felsic plagioclase-phyric volcanics, probably including much tuffaceous material as typified by sample 31492.

SAMPLE NUMBER: 31495

LOCATION: PASMINCO Newton Ck - Henty Canal Areas: from sediments possibly correlated with a conglomerate unit below Newton Creek dam.

SUMMARY:

This is a weakly-cleaved, very fine-grained volcanogenic siltstone to shale originally composed of comminuted felsic vitric ash and a very minor component of broken plagioclase phenocrysts.

HAND SPECIMEN:

This is a very fine-grained, even-textured tuff or volcanogenic mudstone with vague traces of bedding defined by a weak colour change from deeper to lighter grey.

THIN SECTION:

This sample was originally a very fine-grained tuff or volcanogenic sedimentary rock. The colour banding is clearly due to variable intensity of calcite overprinting and chlorite alteration. The detrital grain population of this sample is less than 1 modal%, and consists of small (<< 0.1mm long) anhedral fragments of albite microphenocrysts, with a few small zircon crystals notably more concentrated along at least one probable bedding plane that is clearly not stylolitic.

The matrix of this sample was probably composed entirely of vitric ash, or possibly comminuted vitric ash. It has uniformly recrystallized to a very fine-grained quartzo-feldspathic intergrowth that is evenly pervaded by fine-grained chlorite. Chlorite is more abundant in the more calcite-rich bands, with the latter mineral occurring as anhedral and irregular spots. A weak but persistent cleavage, defined by fine sericite streaks, intersects the apparent bedding at about 40°.

The concentration of a few detrital zircon grains on a bedding plane suggests that this is a fine-grained sediment rather than a tuff, where such gravity sorting might be unexpected. I suggest that this sample was composed almost entirely of comminuted felsic vitric ash with a very minor detrital component of broken plagioclase phenocrysts. The recrystallization of the ash to a quartzo-feldspathic aggregate and subsequent calcite-chlorite alteration and weak cleavage development reflect only weak hydrothermal alteration.

SAMPLE NUMBER: 31496

LOCATION: PASMINCO Newton Ck - Henty Canal Areas: from sediments possibly correlated with a conglomerate unit below Newton Creek dam.

SUMMARY:

This is a quite strongly hydrothermally altered (sericite-calcite±pyrite) fine-grained metasediment (fine sandstone to siltstone) derived from pelitic metamorphics, with no apparent detrital volcanic component.

HAND SPECIMEN:

This is a grey volcanogenic(?) siltstone with a few darker, thin (1-2mm) shaley bands.

THIN SECTION:

This sample was a fairly fine-grained sandstone to siltstone, the original components and texture of which are very difficult to determine due to quite strong sericite-calcite hydrothermal alteration. The sample was probably a matrix-supported sediment, but it is very difficult to judge the original amount of framework detrital components. Throughout most of the section, apparent detrital lithic clasts averaging around 0.05-0.2 mm across are composed of an exceedingly fine-grained quartz-feldspar(?)-sericite mixture with either carbonaceous material or submicroscopic magnetite giving these 'clasts' a slightly darker tint than adjacent matrix, which is otherwise composed of the same indeterminate very fine-grained quartz-sericite intergrowth. In fact, in many places the apparent clastic texture seems to be a 'false brecciation' texture produced by the strong hydrothermal alteration, and clasts are simply 'islands' of the protolith immersed in and isolated by more strongly recrystallized and 'cleaner' matrix. Quite common (perhaps 3-5 modal% max) of the rock is composed of anhedral grains of detrital quartz. However, their common polycrystalline nature, and their undulose extinction indicate that they are definitely not detrital volcanic quartz. Furthermore, several grains include, or are intergrown with muscovite flakes, and clearly indicate that they are detrital quartz derived from pelitic metamorphics. Several small green detrital tourmaline grains of similar derivation were also noted, and it is almost certain that the not uncommon large muscovite-sericite flakes in the rock are also detrital from a similar source.

Quite strong hydrothermal alteration produced a pervasive sericite - calcite overprint on the rock, and sericite also forms a weak cleavage that wraps around. Numerous small ragged-edged aggregates of (probably) fine-grained pyrite are clearly alteration-related, but occur disseminated throughout the rock.

This sample was probably a fine sandstone to siltstone derived entirely from pelitic metamorphics and fine-grained metasediments. Strong hydrothermal alteration and recrystallization produced pervasive sericite-calcite alteration. The absence of any obvious volcanic detritus in this sample contrasts with the previous sample (31495).

SAMPLE NUMBER: 35048
LOCATION: PASMINCO Newton Ck - Henty Canal Areas: from sediments possibly correlated with a conglomerate unit below Newton Creek dam.

SUMMARY:

This is a hydrothermally altered (sericite-calcite± pyrite) interbedded fine sandstone to siltstone metasediment with detrital plagioclase phenocrysts derived from felsic volcanics, and much finer-grained detrital quartz, muscovite and occasional schistose to gneissic lithic clasts derived from a pelitic metamorphic source.

HAND SPECIMEN:

This is a dark grey siltstone to fine sandstone very similar to 34196, with a few wavy darker shaley layers less than 2mm thick.

THIN SECTION:

This sample is a series of interbedded shale to fine-sandstone layers, with the latter being rarely thicker than 4mm. The coarsest beds are composed of about 30-40 modal% of relatively large detrital albite phenocrysts and plentiful much finer grained detrital anhedral quartz grains with undulose extinction and occasional muscovite inclusions, suggesting a pelitic metamorphic (or granitic) source. Several clasts are composed of intergrown muscovite and quartz, and were probably gneissic. Discrete clasts of detrital muscovite are also not uncommon, some up to about 0.4mm long. The bimodal grainsize distribution of the detrital component in the coarser beds, coupled with the mineralogy of the detrital grain population suggests a felsic volcanic source for the albite phenocryst debris, and a pelitic metamorphic source for the quartz-muscovite. Detrital small grains of green tourmaline and pale green zircon are not uncommon.

The matrix of this sample is now a very fine-grained quartzo-feldspathic intergrowth heavily pervaded by sericite and calcite, and containing abundant secondary quartz that has recrystallized from the altered matrix. If I had not just looked at the previous sample (31496), I would probably have argued that this sample had a groundmass composed originally of vitric ash, although no shard textures would be expected to be preserved following such strong alteration-related recrystallization. I still favour this possibility. However, it cannot be ruled out that, as for 31946, much of this matrix was simply mud lacking any vitric component. Aggregates of small pyrite grains with very irregular shapes clearly crystallized in situ, and are scattered through the rock, forming perhaps 0.5 modal% of the sample.

This sample is a fine-grained metasediment of mixed provenance, including detritus from both felsic volcanic and pelitic metamorphic sources. It has suffered quite strong hydrothermal alteration, producing sericite-calcite±pyrite.

SAMPLE NUMBER: 35017

LOCATION: PASMINCO Newton Ck - Henty Canal Areas

SUMMARY:

This is either an epiclastic sandstone derived from glassy plagioclase-phyric felsic volcanics, or a crystal vitric tuff. It has suffered possibly an earlier chlorite±silica hydrothermal alteration event, followed by strong and pervasive sericite alteration.

HAND SPECIMEN:

This is a rather coarse sandstone containing abundant detrital albite phenocrysts and some metavolcanic(?) lithic clasts to about 3mm across in an strongly altered grey-green groundmass.

THIN SECTION:

This sample is a very strongly altered volcanogenic (epiclastic) sedimentary rock or crystal tuff with intense and pervasive sericite alteration. The great bulk of the detrital grain population is made up by quite large former albite phenocrysts, many broken, but maintaining prismatic habits, and averaging 1-2mm long. These are not concentrated in bands, but occur scattered unevenly throughout the thin section. Some albite grains are up to 4mm long, and most are partially to completely overprinted by sericite. Occasional small granular epidote crystals occur in some of the larger albite grains. One or two prismatic chlorite pseudomorphs are clearly after former mafic phenocrysts, but preservation is too poor to determine whether these were augite or hornblende. Former FeTi oxide detrital grains are totally altered to messy leucoxenitic aggregates. Possible former vitric clasts are present, but it is virtually impossible to distinguish these from the similarly altered matrix.

There is little doubt that the matrix of this sample was vitric ash. It has recrystallized to a very fine-grained, fairly even-textured quartzo-feldspathic intergrowth that contains an abnormal amount of disseminated fine chlorite. Very strong sericite overprinting pervades the sample, with sericite forming a dense meshwork.

This rock was either a matrix-supported sandstone derived from plagioclase-phyric felsic glassy volcanics, or else is a crystal vitric tuff. I suggest that this sample may have experienced an earlier silica-chlorite hydrothermal alteration before these component were redistributed and overprinted by strong sericite alteration.

SAMPLE NUMBER: 31497

LOCATION: PASMINCO Newton Ck - Henty Canal Areas: Howards Anomaly.

SUMMARY:

This is a strongly hydrothermally altered formerly plagioclase+hornblende+quartz-phyric andesite. It suffered an earlier episode of quartz-epidote-pyrite veining, and a strong pervasive later sericite alteration.

HAND SPECIMEN:

This is a grey-brown strongly altered meta-andesitic volcanic with some bands of more intense sericite or chlorite alteration to a few mm thick.

THIN SECTION:

This sample is definitely a former plagioclase+hornblende-phyric andesitic volcanic rock, albeit now strongly altered. Former plagioclase phenocrysts are up to at least 3mm long, and have been albitized before being strongly sericitized. Many are barely recognizable, and merge with the similarly altered groundmass, making it impossible to determine the original modal abundance of plagioclase phenocrysts. They probably make up 10-15 modal% of the rock. Occasional clusters of epidote granules are present in the cores of many plagioclase phenocrysts. Former hornblende phenocryst are less abundant (perhaps 5-7 modal%), but more distinctive, despite there being totally replaced by a messy aggregate of chlorite, sericite, fine-grained and abundant magnetite and scattered epidote. Most hornblende phenocrysts are euhedral prisms to about 3mm long. A few highly reacted and resorbed, rounded quartz phenocrysts are present. Former small FeTi oxide phenocrysts are totally altered to sericite with magnetite rims.

The groundmass of this sample was probably glassy with abundant small plagioclase laths scattered throughout. Intense sericite alteration has all but obliterated the original texture and mineralogy, and it is now composed of a dense brown-cream intergrowth of sericite with scattered seams and discontinuous bands of tiny magnetite. Occasional coarser idiomorphic opaque grains are probably pyrite. More intense pyrite concentrations occur in meandering seams composed of exceptionally fine-grained silica and epidote, and at least two small spots of rather deep orange-brown sphalerite were noted. It is very difficult to determine the relative timing of the quartz-epidote-pyrite veining versus the strong sericite alteration. It appears to me that the sericite probably post-dates the former, which are still quite evident as the sericite did not overprint them to the same extent as it did the more feldspar-rich groundmass.

This plagioclase+hornblende-phyric andesite suffered earlier quartz-epidote-pyrite hydrothermal veining and subsequent intense sericite alteration

SAMPLE NUMBER: 35049

LOCATION: PASMINCO Newton Ck - Henty Canal Areas: Footwall rhyodacite breccia unit.

SUMMARY:

This was a dacitic or rhyodacitic plagioclase-phyric hyaloclastite or glassy lava breccia that has suffered only weak regional burial metamorphic alteration - recrystallization.

HAND SPECIMEN:

This is a mid-grey plagioclase-phyric lava breccia with 5mm-sized clasts or fragments of rather pale pumiceous felsic lava that are strongly altered.

THIN SECTION:

This sample is a monomict felsic lava breccia in which the brecciated texture is less evident in thin section than in hand specimen due to recrystallization of the abundant original glass. Only subtle, but rather sudden changes in texture of the groundmass provide any evidence for the brecciated nature of this rock, which has all the appearance of a plagioclase-phyric formerly highly glassy dacitic lava. Albitized plagioclase phenocrysts are stubby to prismatic mainly subhedral crystals with moderate sericite speckling, mainly less than 1mm long, but often aggregated in clots of four or five crystals. Also present in many crystal clots are leucoxene-altered FeTi oxide phenocrysts, and the same material occurs scattered through the sample, making up about 1-2 modal% of the rock. There is no evidence for the former existence of mafic silicate phenocrysts in this rock.

As noted above, the primary brecciated texture of this sample has been almost obliterated by thorough and pervasive recrystallization of the groundmass and matrix glass originally present in this rock. The quartzo-feldspathic material after glass is quite heterogeneous in texture and grainsize of the recrystallization products varies in a manner probably reflecting the original breccia fragments. Matrix areas between fragments are impossible to pick mineralogically or texturally from the recrystallized groundmass of the fragments, and were presumably filled with broken glass shard and spalled-off material. A rather weak an impersistent sericite mesh is present through the matrix, although this is much less intense and pervasive than in some of the preceding samples.

This rock was probably a dacitic hyaloclastite, and the fragments show no obvious evidence of extensive vesiculation that might be expected to be preserved if the fragments were originally pumiceous. The alteration style suggests to me regional low-grade burial alteration rather than local hydrothermal alteration.

SAMPLE NUMBER: 35050

LOCATION: PASMINCO Newton Ck - Henty Canal Areas: footwall rhyodacite unit.

SUMMARY:

This sample was a plagioclase-phyric dacitic or rhyodacitic hyaloclastite or glassy lava breccia, essentially identical originally to sample 35049. It shows only weak regional burial metamorphic alteration.

HAND SPECIMEN:

This is a grey, plagioclase-phyric felsic lava breccia very similar to the preceding sample, except the breccia texture is even less obvious in this rock, presumably due to stronger alteration.

THIN SECTION:

This sample is very similar petrographically to the previous sample (35049), but the brecciated texture is a bit better preserved (but still not really obvious). It was clearly a highly glassy felsic lava breccia. Plagioclase phenocrysts make up around 5-8 modal% of this sample, and all are albitized prisms mainly less than 1mm long, although many occur in multi-crystal clots up to several mm across. Albite phenocrysts are less sericitized than in the previous sample, and like that rock, there are no former mafic phenocrysts in this rock. Small leucoxene-altered FeTi oxide microphenocrysts are not uncommon.

The matrix of this rock is rather variable texturally, reflecting the brecciated nature of the rock. Fragment margins are indistinct and merge into the matrix. The most obvious lava fragments have a rather coarse-grained, almost mosaic-textured quartzo-feldspathic groundmass after glass, whereas the matrix between these fragments is generally finer-grained quartzo-feldspathic intergrowths with wispy wavy sericite throughout. A weak sericite mesh is unevenly developed throughout the thin section, but the metamorphic grade and texture of this rock suggest that it has suffered only regional burial metamorphic degradation, and not significant local hydrothermal alteration.

This is a dacitic to rhyodacitic plagioclase-phyric hyaloclastite or monomict felsic glassy lava breccia, essentially identical originally to the preceding sample 35049.

SAMPLE NUMBER: 31494

LOCATION: PASMINCO Newton Ck - Henty Canal Areas: footwall rhyodacite?

SUMMARY:

This is a formerly glassy weakly plagioclase-phyric dacitic to rhyodacitic lava with a weak burial metamorphic alteration assemblage dominated by pervasive but not intensely developed sericite.

HAND SPECIMEN:

This is a pale grey, massive plagioclase-phyric felsic lava.

THIN SECTION:

This sample is a petrographically simple, weakly plagioclase-phyric formerly glassy lava of dacitic to rhyodacitic composition. Albitized plagioclase phenocrysts up to 3mm long, but mainly much smaller, make up around 5 modal% of this sample, and are fairly strongly overprinted by exceptionally fine-grained sericite. Clots of albite phenocrysts intergrown with subordinate FeTi oxides and small apatite crystals are more common than discrete plagioclase phenocrysts. A few very small probably former augite microphenocrysts now altered to chlorite also occur in these clots of phenocrysts, and leucoxene-altered FeTi oxide microphenocrysts are not uncommon throughout the rock.

The groundmass of this lava has a texturally well-preserved mosaic texture typical of recrystallization from felsic glass. Groundmass anhedral feldspar intergrown with similar anhedral quartz in this mosaic intergrowth is mainly altered to sericite, and fine-grained pale green interstitial chlorite is also fairly common.

This is a texturally well-preserved weakly plagioclase-phyric formerly glassy dacitic to rhyodacitic lava with a weak burial metamorphic overprint dominated by a fine meshwork of sericite.

SAMPLE NUMBER: 35009

LOCATION: PASMINCO Newton Ck - Henty Canal Areas: Footwall rhyodacite?

SUMMARY:

This is a formerly glassy dacitic to rhyodacitic lava that is essentially identical to 31494, except that it is slightly more strongly sericitized and has rather less plagioclase phenocrysts than 31494.

HAND SPECIMEN:

This is a greenish plagioclase-phyric felsic to andesitic lava with a mottled, streaky green groundmass.

THIN SECTION:

This sample is petrographically very similar to the preceding sample 31494, in that it is a sparsely plagioclase-phyric, formerly glassy dacitic to rhyodacitic lava. The only significant differences from 31494 are that this rock (i) contains notably less abundant (perhaps 2-3 modal%) plagioclase phenocrysts (of otherwise similar appearance and extent of sericitization), but is (ii) rather more altered than 31494.

The groundmass of this rock was glassy, but has devitrified and recrystallized to a relatively coarse mosaic quartzo-feldspathic intergrowth identical to that in 31494. It is however, more altered, being laced by a fairly dense sericite mesh that is almost strong enough to be called a 'cleavage'. This may be due to a very weak hydrothermal alteration, but I feel that the alteration is probably still of regional burial metamorphic alteration.

SAMPLE NUMBER: 35010

LOCATION: PASMINCO Newton Ck - Henty Canal Areas: Footwall rhyodacite?

SUMMARY:

This is a low-grade metamorphosed plagioclase-phyric crystal vitric tuff of rhyodacitic composition.

HAND SPECIMEN:

This is a buff-coloured, rather weathered weakly plagioclase-phyric felsic lava with a streaky poorly developed cleavage.

THIN SECTION:

This sample was probably, based on the weight of the evidence, a crystal vitric tuff, although a second and less likely possibility is that the rock was a plagioclase-phyric glassy dacitic lava. Most albitized plagioclase phenocrysts are broken crystal fragments around 0.3-0.5mm across, showing only slight sericite alteration, and these make up around 2 modal% of the sample. Few entire plagioclase phenocrysts are present. There are no mafic phenocrysts in this rock.

The groundmass of this sample is a rather dark, very fine-grained quartzo-feldspathic intergrowth after glass. It is streaked by a wavy discontinuous cleavage that is defined by Fe-stained sericite, but outside the cleavage streaks the groundmass is relatively free of sericite compared to previously described rocks from this unit.

The broken phenocrysts suggest a pyroclastic, tuffaceous origin for this rock. However, there is no textural evidence preserved for a vitric ashy nature of this groundmass, but the thorough recrystallization of the originally glassy groundmass (matrix?) has probably obliterated an primary shard textures. I suggest that this is a low-grade burial metamorphosed crystal vitric tuff of felsic (rhyodacitic?) composition.

SAMPLE NUMBER: 35041

LOCATION: PASMINCO Newton Ck - Henty Canal Areas: Footwall rhyodacite?

SUMMARY:

This is a quite strongly plagioclase-phyric, formerly glassy dacitic lava with a weak to moderate chloritic (±pyrite) hydrothermal alteration overprinted by a weak sericite alteration associated with regional burial metamorphism.

HAND SPECIMEN:

This is a mottled dark green plagioclase-phyric dacitic to andesitic lava.

THIN SECTION:

This sample is a texturally fairly well-preserved moderately to strongly plagioclase-phyric dacitic lava, with around 25 modal% of albitized plagioclase phenocrysts in a rather chloritic, formerly glassy groundmass. Plagioclase phenocrysts are mainly 0.5-1.5mm long prismatic crystals, occasionally larger, but very often gathered in multi-crystal clots of as many as 20 crystals. Occasionally intergrown in the plagioclase-dominated clasts are leucoxene-altered FeTi oxide grains and one or two small chloritized augite phenocrysts. Former FeTi oxide phenocrysts are now composed of granular crystalline sphene within a magnetite rim. Apatite microphenocrysts are not uncommon.

The groundmass of this sample was originally glassy, and has devitrified to an exceptionally fine-grained, indeterminate material, presumably of quartzo-feldspathic composition. It is, however, pervaded by a very fine-grained mesh of green chlorite, in places looking almost like perlitic cracks being filled by chlorite. Occasional areas are overprinted by a dense sericite mesh, and wavy stylolitic concentrations of insoluble opaques transect the rock in a few places. A couple of very narrow seams of fine-grained euhedral pyrite are also present.

This was a glassy quite plagioclase-phyric dacitic lava that possibly suffered a moderately chloritic hydrothermal alteration before suffering the same regional burial metamorphic overprint as the previous three samples (31494, 35009, 35010).

SAMPLE NUMBER: 35042

LOCATION: PASMINCO Newton Ck - Henty Canal Areas: in conglomerate from Henty Canal.

SUMMARY:

This is a sparsely plagioclase-phyric vitric crystal tuff with an earlier hydrothermal alteration (silica±sphalerite) is overprinted by a regional burial metamorphism-related pervasive sericite alteration.

HAND SPECIMEN:

This is a pale grey, probably silicified felsic volcanic or volcaniclastic rock

THIN SECTION:

This sample is a strongly altered almost aphyric rock, probably originally a vitric ash-rich tuff. It contains a few thoroughly recrystallized small phenocrysts and microphenocrysts formerly of albitic composition. However, these have been replaced by polycrystalline silica. The only other phenocrysts in this rock are the occasional small, highly altered (leucoxene) crystals of former FeTi oxide, and not uncommon small apatite microphenocrysts.

The groundmass, or matrix of this sample is a rather pale coloured almost cryptocrystalline quartzo-feldspathic material with a blotchy texture. With the eye of faith, it is possible to see common, small, totally altered curved vitric shards in this groundmass, indicating that the rock was almost certainly a vitric crystal tuff. The groundmass (or matrix) is transected by common narrow seams of polycrystalline quartz, some of which contain deep yellowish sphalerite.

This rock was a sparsely plagioclase-phyric vitric crystal tuff that has suffered moderate silica (±sphalerite) hydrothermal alteration overprinted by very fine sericite alteration probably associated with regional burial metamorphism.

SAMPLE NUMBER: 35043

LOCATION: PASMINCO Newton Ck - Henty Canal areas: In conglomerate from Henty Canal.

SUMMARY:

This is a conglomerate composed solely of clasts of vitric crystal tuff identical to vitric tuff sample 35042. The rock has suffered hydrothermal silica veining with minor associated galena, sphalerite and probably minor pyrite.

HAND SPECIMEN:

This is a volcaniclastic fine conglomerate, framework-supported, with angular and subangular clasts of chert pale coloured through grey to black fine-grained rocks, and notably, several clearly detrital pyritic massive sulphide clasts to almost 1cm long.

THIN SECTION:

This sample is deceptive in thin section in that the coarse clastic nature of the sample so obvious in hand specimen is far less obvious in the thin section. Nevertheless, the sample is clearly composed of abundant clasts of vitric tuff that are almost identical to that forming sample 35042 described above. It is possible to discern former vitric shards in this sample, but every clast is now composed of extremely fine-grained quartzo-feldspathic intergrowths after glass in which are set around 0-2 modal% of angular broken albite phenocryst fragments. Interfragment areas are probably filled by silica-albite.

All fragments are cut by a fairly abundant network of veinlets that are variably composed of polycrystalline quartz, quartz and albite, albite and calcite, and quartz-calcite and an unidentified sulphide that appears to be galena. In a few narrow veinlets, quite red sphalerite(?) occurs intergrown with calcite.

This is a conglomerate in which the clasts are clearly derived from a single lithology, a vitric crystal tuff almost identical to sample 35042. The rock has suffered post-depositional hydrothermal alteration dominated by silica veining with associated base metal sulphides and probable fine-grained pyrite.

SAMPLE NUMBER: 35047

LOCATION: PASMINCO Newton Ck - Henty Canal Areas:

SUMMARY:

This was probably a plagioclase-phyric glassy dacitic lava; it has suffered weak regional burial metamorphic degradation.

HAND SPECIMEN:

This is a grey plagioclase-phyric felsic volcanic or volcaniclastic rock with sericitic alteration.

THIN SECTION:

This sample is rather difficult to diagnose with certainty, the problem being basically whether it was a felsic crystal vitric tuff or a felsic lava. About 5-7 modal% of the rock consists of albitized plagioclase phenocrysts to about 3mm long maximum, although most are around 0.5-1mm long. Many are well-formed euhedral prismatic crystals, although clots of albite phenocrysts are also common. There were no mafic phenocrysts in this sample, although former FeTi oxide microphenocrysts are fairly common and altered to leucoxene.

The groundmass/matrix of this sample is what causes the uncertainty in diagnosing the sample. It was undoubtedly glassy, but is now composed of an unusual textured quartzo-feldspathic intergrowth that is more like altered and recrystallized felsic vitric tuffs than glassy lavas. A very fine-grained quartzo-feldspathic matrix with a rather swirling texture defined by dispersed sericite is pervaded by curved, darker chloritic fractures, and contains abundant small anhedral quartz grains, mostly polycrystalline, that have grown in situ.

On balance, and based especially on the abundant entire, prismatic unbroken plagioclase phenocrysts, I suggest that this sample was a dacitic lava. It could have been a welded tuff with a rather fluidal-textured matrix, but such rocks are rare in the Mount Read Volcanics. The alteration shown by this sample is probably of regional metamorphic origin, and is weaker than rocks from this set that I judge to have suffered local hydrothermal alteration.

SAMPLE NUMBER: 35060

LOCATION: PASMINCO Newton Ck - Henty Canal Areas: north island andesite?

SUMMARY:

This was a texturally very well-preserved very sparsely plagioclase-phyric dacitic or rhyodacitic lava that may have suffered weak silica alteration.

HAND SPECIMEN:

This is a massive, extremely fine-grained silicified felsic lava or tuff with small-scale tectonic brecciation and Fe-staining along fractures.

THIN SECTION:

This sample is surprisingly well preserved given the very silicified appearance of the hand specimen. It is clearly a sparsely plagioclase-phyric felsic lava with an originally glassy to spherulitic groundmass. Former plagioclase phenocrysts make up only about 1 modal% of this rock and are perfectly euhedral rather stubby prismatic crystals, but they seem to me to be composed of Kspar or very fine-grained Kspar-silica intergrowths. Green chlorite patches are not uncommon within the former plagioclase crystal sites. Altered FeTi oxide phenocrysts are fairly uncommon, but are dispersed through the thin section.

The groundmass of this sample is remarkably even-textured, and was probably composed largely of glass. However, it is now a very ragged intergrowth of quartz and fine-grained feldspar with extremely fine-grained and evenly distributed chlorite. Tiny feldspar microlites occur throughout the groundmass, in places almost forming spherulitic textures. In the Mount Read Volcanics, this texture is more reminiscent of the groundmass of a shallow felsic dyke rather than a glassy lava flow. The alteration is difficult to assess. It may be that the sample has been pervasively silica-Kspar altered, although the colour of this hand specimen is atypical of the typical brick red silica-Kspar metasomatized felsic lavas of, say, the Mt Darwin area. It may be a weak silica alteration only, and this could be easily judged from the wholerock analysis.

SAMPLE NUMBER: 35061

LOCATION: PASMINCO Newton Ck - Henty Canal Areas

SUMMARY:

This is a fine-grained banded sedimentary rock derived from pelitic metamorphics and a carbonate-rich source; the carbonate has been totally replaced by chlorite, and associated patchy magnetite-hematite alteration occurs in a number of diffuse bands.

HAND SPECIMEN:

This is a banded, grey, rather porous volcanogenic(?) fine-grained sedimentary rock with a few irregular bands and patches of fine-grained opaques.

THIN SECTION:

This sample is a very unusual metasediment composed of bands of angular detrital quartz up to a few mm thick separated by bands to several cm thick of exceptionally unusual textured chlorite aggregates. These are trapezoidal to rhombohedral grains of green chlorite, often with opaque hematitic cores, that are not framework supported, but are separated by a matrix of very fine-grained quartzo-feldspathic material. I suggest that there are two possibilities for the origin of this texture. First, they may have been calcite rhombs that grew during a precursor phase of carbonate alteration, or by recrystallization of a carbonate-rich vitric ash. Certainly they commonly have rhombic shapes, and presumably if this were the case, the carbonate has been faithfully replaced by chlorite. The alternative possibility, and one I am not at all confident of, is that these chloritic clasts were glassy fragments or lapilli. If this were the case, I am surprised that so many have rhombic shapes. There is probably no volcanogenic component in this sample.

The quartz-rich beds/bands are framework supported, and angular quartz grains mainly smaller than 0.1mm across, with undulose extinction, dominate these bands. Other detrital clasts in these bands are occasional muscovite grains and bluish green tourmaline. Several of the quartz-rich bands are strongly impregnated by fairly fine-grained magnetite (altered to hematite?) that transgress upward or downward into the adjacent chloritic bands.

The sample was clearly a siltstone originally, with quartz-rich bands derived from pelitic metamorphics, and probably bands of finer-grained carbonate-rich silt or mud. Recrystallization of carbonate led to development of abundant rhombs of calcite in the finer bands, and a subsequent intense hydrothermal alteration led to thorough and pervasive chlorite alteration of the carbonate, associated with patchy hematite development

SAMPLE NUMBER: 35062

LOCATION: PASMINCO Newton Ck - Henty Canal Areas

SUMMARY:

This is a weathered, well-sorted quartz sandstone derived from a pelitic metamorphic source. It has suffered hydrothermal alteration that produced a silica-disseminated pyrite assemblage.

HAND SPECIMEN:

This is a pale brown quartzose metasediment with disseminated and weathered fine-grained pyrite grains.

THIN SECTION:

This sample is a strikingly well-sorted quartzose fine sandstone, with an average grainsize around 0.1-0.2mm across. It is framework supported, and contains common (perhaps 2-3 modal%) oxidized disseminated pyrite grains around 0.1mm across and smaller. The quartz is of metamorphic origin, shows undulose extinction, and contains occasional muscovite inclusions. The only lithic clasts are composed of very fine-grained chalcedonic silica, and are probably cherty. Detrital green to pale brown pleochroic tourmaline is quite common, and detrital zircon grains are also well represented although not abundant.

The abundant detrital quartz that dominates this sample is mainly cemented by silica with messy hematitic material along many grain boundaries. Well-formed pyrite grew in relative abundance throughout the rock, but these grains are totally altered to red hematite.

This is a quartz sandstone derived from a pelitic metamorphic source. It has suffered silica-pyrite alteration, and has been subsequently weathered in the near-surface environment.

APPENDIX 8

CRAWFORD PETROGRAPHIC REPORT – JULY 1993

SAMPLE NUMBER: 35084

LOCATION: PASMINCO Newton Ck Areas

SUMMARY:

This is a recrystallized and foliated formerly very sparsely plagioclase-phyric glassy dacite lava, with strong chlorite-sericite±pyrite±sphalerite alteration.

HAND SPECIMEN:

This is a foliated dark grey sparsely porphyritic dacitic to andesitic lava(?) with stretched clots of chlorite defining the foliation.

THIN SECTION:

This sample is a quite strongly foliated formerly glassy felsic lava that was almost aphyric. A few small phenocryst clots of subhedral albite crystals are present, but even these clots of three or four crystals are mainly smaller than 1mm across. These make up probably less than 1 modal% of the rock. There were no former mafic silicate phenocryst phases in this rock, but not uncommon former FeTi oxide microphenocrysts are smeared into the foliation, totally replaced by messy leucoxene, and disaggregated in some grains.

The groundmass of this rock was probably devitrified glass that recrystallized to a very fine-grained quartzo-feldspathic intergrowth. Further recrystallization accompanying deformation and foliation development probably led to a coarsening of the grainsize of this quartzo-feldspathic material, and pervasive chlorite-sericite alteration. Bright green chlorite is most pronounced, and occurs as streaks and augen defining the foliation, intergrown with subordinate sericite. Disseminated, mainly fine-grained idiomorphic pyrite is a minor but notable feature of this rock, and at least four small patches of almost colourless sphalerite are present, always associated with, and apparently overprinting the chlorite. It has clearly (re?)crystallized post-foliation.

This sample was probably a sparsely plagioclase-phyric dacitic glassy lava that suffered a mild to moderate chlorite-sericite alteration before being strained and recrystallized to a foliated chlorite-sericite-dominated lithology. I have seen numerous pervasively chlorite-altered sparsely plagioclase-phyric dacitic lavas (with glomeroclots of plagioclase rather than discrete phenocrysts) from the Newton Creek Spillway, and lava domes(?) south of the spillway. This rock looks very much like a foliated version of those dacites.

SAMPLE NUMBER: 35087

LOCATION: PASMINCO Newton Ck Area

SUMMARY:

This is a formerly glassy sparsely plagioclase-phyric dacitic lava with weak to moderate hydrothermal alteration (chlorite-sericite-calcite±—pyrite). It is very similar to sample 35046.

HAND SPECIMEN:

This is a dark grey weakly foliated dacitic to andesitic sparsely plagioclase-phyric lava(?).

THIN SECTION:

This sample is a sparsely plagioclase-phyric dacitic lava with a moderate hydrothermal overprint and weak foliation development. About 3-5 modal% of the rock is made up of blocky small albitized plagioclase phenocrysts, mainly < 1mm long, many of which have been rather deformed and fractured by foliation development. There is no convincing evidence for the former presence of mafic silicate phenocrysts in this rock, and FeTi oxide phenocrysts and microphenocrysts are altered to leucoxene.

The groundmass of this lava is composed of a mosaic quartz-feldspar intergrowth with abundant larger anhedral blebs of quartz crystallizing from this otherwise fairly even-textured intergrowth. The mosaic intergrowth texture is indicative of crystallization from devitrified glass. Chlorite-sericite alteration is pervasive through the groundmass, with the chlorite forming tiny wavy lamellae, and the sericite forming a more persistent and pervasive, though very fine, mesh through the rock. Occasional small idiomorphic disseminated pyrite grains are present, and patchy overprinting calcite makes up ~10 modal%of this rock.

This was a sparsely plagioclase-phyric glassy dacitic lava that has suffered weak chlorite-sericite-calcite±pyrite hydrothermal alteration. Overall, previously-described dacite sample 35046 was originally striking similar to this sample. The only key differences now are that it has a much finer-grained groundmass than 35087(simply reflecting the recrystallization history and original crystallinity of the devitrified glass pre hydrothermal alteration), and it was less chloritized during the hydrothermal alteration that affected both samples. Sample 35046 also contained a few former small augite(?) phenocrysts, although at this abundant their presence or absence is more fortuitous than diagnostic.

SAMPLE NUMBER: 35093 PASMINCO Newton Ck Area

SUMMARY:

This is a plagioclase+hornblende-phyric andesite, possibly a dyke rock, that suffered strong hydrothermal alteration (chlorite-silica-hematite±calcite) and subsequent foliation development and recrystallization.

HAND SPECIMEN:

This is a very dark grey, foliated plagioclase-phyric dacitic or andesitic rock with streaky quartz segregations and strong patchy hematite alteration

THIN SECTION:

This sample is a strongly altered and foliated formerly plagioclase+hornblende-phyric andesitic lava. It consists of around 10 modal% of albitized plagioclase phenocrysts, most of which are less than 1mm long, although occasional crystals are up to 2mm long, They are all slightly pink-tinged due to the presence of submicroscopic hematite, and are also very slightly rounded and resorbed in many crystals, a feature characteristic of the 'Anthony Rd - Crown Hill-type' hornblende andesites. Former hornblende phenocrysts make up only a few modal% of the rock and are thoroughly altered to chlorite with quartz and finely disseminated hematite (opacite) abundant in the rims, and most have retained distinctive hornblende crystal shapes. Former FeTi oxide phenocrysts and microphenocrysts are replaced by very fine-grained hematite. A distinctive feature of this rock is the presence of the lensoidal very hematite-rich 'fragments' stretched and smeared into the weak foliation. These are also clearly plagioclase+hornblende-phyric andesitic fragments essentially identical to the host rock, the only difference being that they are intensely riddled with fine-grained hematite. Careful examination shows that these are not fragments at all (eg the occasional long plagioclase phenocryst extends from an intensely hematitized domain to an unhematite-altered domain), but simply domains of the rock that have suffered more intense hematite-replacement and chlorite dissolution.

The groundmass of this rock before alteration was probably devitrified glass charged with albite laths and microlites. In fact it is so crystal-rich (though not holocrystalline) that it may well be a dyke rock rather than a lava). Hydrothermal alteration produced domains of strong chlorite-silica alteration with interleaved areas of intense hematite replacement and chlorite dissolution. Calcite, although apparently overprinting the earlier alteration assemblage in places, also pre-dates the main foliation development, as it is itself smeared into the foliation. Foliation development post-dated hydrothermal alteration, and led to extensive recrystallization of chlorite, silica and calcite.

SAMPLE NUMBER: 37221

LOCATION: PASMINCO Newton Ck Area

SUMMARY:

This is a weakly to moderately hydrothermally altered (silica-sericite-calcite) formerly glassy aphyric felsic lava.

HAND SPECIMEN:

This is a light grey rather carbonate-altered aphyric felsic lava or dyke rock.

THIN SECTION:

This sample is a petrographically very simple formerly glassy aphyric dacitic lava that has suffered moderate carbonate alteration following recrystallization of devitrified glass. A few small, thoroughly altered former plagioclase phenocrysts are present, mainly less than 0.5mm long, and replaced by fine-grained silica and calcite. The only other phases present were occasional small FeTi oxide phenocrysts now composed of rims of magnetite or hematite with a quartz filling, and the odd small prism of apatite.

The great bulk of this rock is composed of an even-textured originally mosaic- to sugary textured intergrowth of quartz and albite. Much of the albite has been replaced by very fine-grained sericite. Chlorite is rare, and interstitial to quartz, but calcite is quite abundant and overprints about 20-30 modal% of the rock, as well as forming a number of small veinlets.

This was undoubtedly a glassy aphyric felsic lava that has suffered weak to moderate hydrothermal alteration and recrystallization, producing the dominant assemblage sericite-silica-calcite.

SAMPLE NUMBER: 37223

LOCATION: PASMINCO Newton Ck Area

SUMMARY:

This is a hydrothermally altered (sericite-Kspar-calcite) formerly glassy aphyric felsic lava.

HAND SPECIMEN:

This is a pale grey, aphyric felsic lava with weak, diffuse, darker wavy zones possibly richer in chlorite.

THIN SECTION:

This sample is another almost aphyric formerly glassy felsic lava, although it differs from the previous sample in a number of respects. It contains about 1 modal% max of small, totally sericitized plagioclase phenocrysts set in a formerly glassy groundmass. The few former FeTi oxide microphenocrysts in this rock are altered to magnetite and quartz, and are sometimes rather disaggregated.

The groundmass devitrified to an exceptionally fine-grained, presumably quartzo-feldspathic material that is riddled by ultra-fine-grained sericite. Abundant patches of ragged, anhedral, often polycrystalline quartz have grown from the devitrified glass, and in some places coalesce to form discontinuous, irregular segregations and veinlets. A fine mesh of sericite pervades the rock, and is locally intensely developed in some places, obvious in hand specimen as the darker streaks. Calcite overprints about 5 modal% of the rock as small mainly discrete crystals about 0.2mm across, although occasional larger patches are present. Very minor amounts of disseminated equant pyrite and bladed hematite are scattered through the rock.

The analysis provided for this sample shows strong Na and Ca depletion, and an exceptional enrichment in K2O (>7%). I don't think that the sericite abundance in this sample can account for this high K2O, and conclude that the feldspar in the very fine-groundmass quartz-feldspar intergrowth may well be Kspar (rather than the usual albite). This is a hydrothermally altered (sericite-Kspar-calcite) formerly glassy aphyric felsic lava.

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APPENDIX 9

LEAMAN GEOPHYSICAL REPORT

LEAMAN GEOPHYSICS
Survey Review, Specification, Reduction, Interpretation
Gravity, Magnetic and Seismic Methods
Structure and Prospect Evaluation

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996185

EL 25/91 YOLANDE RIVER AEROMAGNETIC SURVEY ACQUISITION AND INITIAL INTERPRETATION

for
PASMINCO EXPLORATION

by
D.E. Leaman

July 1993

YOLRIV

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SUMMARY

Completion of an initial interpretation of new aeromagnetic data within the Yolande River area NW of Queenstown has shown that there are at least three distinctive suites of Cambrian rocks or that some of these suites are structurally juxtaposed.

In the west of the area the sedimentary rocks include some tuffaceous units. The magnetic background is very low and the tuffs are generally among the most magnetic rocks in the licence area. Some members are very strongly magnetised and possess properties normally associated with the Comstock or Lynchford Tuffs. These units allow mapping of the western region including the fault offsets associated with the Firewood Siding Fault and the linking faults joining this to the Ewarts Creek Fault system. The tuffs suggest that they are infolded as part of a large syncline.
The volcanic suites of the east of the area, north of Queenstown, are structurally and magnetically distinct. The rocks are more magnetic in bulk and variable in composition and properties. They also appear to be contained in a large antiform which has been sliced by NW-trending faults.
The region between these two suites is largely occupied by a family of porphyries, each member possessing a distinct and recognisable magnetic character. Margins of the porphyry bodies tend to mirror the structural demands of the blocks to east and west. The properties of the intrusives are variable but some exposures should be revisited in order to check existing mapping which may not be consistent.

Trend patterns are zonally distinctive across the licence area and the eastern and western zones display different trend emphases. N-S trends are dominant in the east while NE, NW and sub E-W are dominant in the west. NNW trends are dominant in the block involving most porphyry. The zonal boundaries trend NW-SE and imply a Devonian re-arrangement. This trend system can be linke into the western part of the Firewood Siding Fault per an extension of the Ewarts Creek Fault system.
Mineralisation in the area appears to be associated with the porphyries although it is unclear which composition is critical. This may be an illusory relationship since the porphyries may be linked to the central zonal boundaries and it may be the Devonian fault linkages about them which are important. All are suggested by the magnetic field.

Many assumptions have been made, and published geology simply accepted, to derive the present initial conclusions. There is scope to refine this work following some outcrop review. Infill of the presently poor gravity coverage would also allow control of the interpretation and improved definition of the porphyries which seem central to the understanding of this area.
Targetting may depend upon appraisal of Devonian and older structural controls if these can be deduced. For example, the two E-W arms of the Firewood Siding Fault may mark the approximate site of an older feature, perhaps at a northing midway between them. That would be of interest because the Madam Howards mineralisation would then lie at the intersection of that older control and the regime boundary 2/3. It would also account for the change in mafic volcanism and observed termination of porphyries nearby.

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INTRODUCTION

EL 25/91, Yolande River, is an area of about 65 square kilometres located NW of Queenstown in western Tasmania. The Yolande River flows across the area from the northeast (Figure 1). Ground access is restricted to the Zeehan Highway and the Lake Margaret road and a few tracks.

The area is not well understood geologically although regional maps are available (*e.g.*, Baillie, 1977; Corbett *et al*, 1989). This reflects stratigraphic and correlation problems inherent in the exposed greywacke and volcaniclastic sequences, extensive occurrences of basalt, andesite and porphyry, and a major cross-cutting fault system.

The area is not known to be extensively mineralised and the barytes workings at Madam Howards are somewhat enigmatic. Other mineralisation occurs at Gold Creek in the north of the area.

Some previous reviews of the Yolande River area (*e.g.*, Leaman, 1989) considered known geology and regional gravity and aeromagnetic data but found these insufficient to draw inferences and conclusions of exploration significance.
The Henty River extension of this licence area (see Figure 1) was also discussed by Leaman (1989) but upgraded magnetic coverage (Leaman, 1990) and subsequent exploration by Pasminco Exploration has enabled considerable re-evaluation of the prospects and structures within the area.
The new Yolande River licence area was included in recent aeromagnetic surveys for Pasminco Exploration in view of such results. This report outlines briefly the parameters of survey, primary presentations of the magnetic field and an initial interpretation of structural and lithological elements in order to guide future mapping, exploration, physical property assessment and general target focus.

AEROMAGNETIC SURVEY

The licence area was surveyed during March 1993 by Geoterrex Pty. Ltd on behalf of Pasminco Exploration.

The survey used a Squirrel helicopter and a Scintrex Caesium Vapour Magnetometer with a sensitivity of 0.05 nT and a cycle time of 0.1 secs. The nominal terrain clearance was 80 m with a sample interval less than 10 m. Traverse lines were flown E-W with a separation of 200 m while tie lies were N-S 2 km apart.
Navigation was based on Sercel NR103 GPS and NDS100 UHF DGPS systems.

The raw data have been corrected for diurnal and base corrections and converted to residual format using the 1990 IGRF definition updated to March 1993. Residual values have been modified by the addition of 2000 nT. The reference base value used was 62335 nT (for 420 000 S, 453 000 E). Plots have been prepared using contour intervals of 1, 10

and 100 nT using a 50 x 50 grid mesh.

Although details have not been provided by the contractor this preliminary analysis suggests that the residuals are true and that the base station was adjusted to the IGRF estimate before correction. This means that any quantitative analysis should resolve a near neutral or zero modelling curve offset from observed data.

No images were available to the writer at time of preparation of this report.

A spectrometer was also carried during the survey. This was a 16.8 l Nuclear Data 256 Channel ADC spectrometer recording at 1 sec intervals. No data are yet available.

Results of the magnetic survey are shown in Figures 2, 3, 4, 6, 7 and 8. Various scales and overlays have been used in these presentations in order to indicate rock correlations and location of anomalous features.

GEOLOGY AND ROCK PROPERTIES

A geological base map compiled from Mines Department sources is shown in Figure 5.

The western portion of the area; that is west of the Three Sisters (about 373 000 E, 5346 000 N) and north of the Firewood Siding Fault, contains Cambrian sedimentary rocks with minor tuffs. These are overlain (?) by basal Ordovician materials in an apparent syncline. Further north, near Ewart Creek at 5350 000 N, this structure has been considered to be entirely fault-bounded.

East of 373 500 E, and generally east of the Henty River, the Cambrian rocks have been described as greywacke siltstone with interbedded acid tuffs (Baillie, 1977). Dips and foliations are complex and no obvious patterns have been mapped. Exposure has limited evaluation of the continuity of tuff horizons and their relationships.

Within the Queenstown sheet area (east of 376 000 E)(Corbett *et al*, 1989) the materials appear to be enriched in volcanic components and include at least three quartz-feldspar porphyry variants. Some of these bodies have a NNW extension but all appear to terminate a little north of the Madam Howards deposits.
Basalts and andesites occur north and south of the transverse fault mapped NE of Madam Howards.

The far NE portion of the licence area includes large volumes of felsic pyroclastic rocks generally equated to the Mt Read Volcanics.

The major fault extending across the Mt Lyell and Mt Owen areas to the east has been mapped into this region a little east of Davies Hill (379 000 E, 5345 000 N). There is some evidence of sinistral

lateral displacement on this structure across a gross antiform (?) but the sense is not systematic and clear given existing mapping and assumptions about lithologies. North of the fault exposed porphyries are associated with crystal tuffs.

The Firewood Siding Fault and its Henty River offset zone, which appears to connect northward into the Ewart Creek Fault system, dominates the region and rock distribution. Ordovician to Devonian rocks are exposed south of this predominantly E-W structure while the Cambrian volcaniclastic suites are exposed north of it. The mapping of Corbett *et al* (1989) shows that these formations dip into the southern block and may underlie the younger Palaeozoic rocks (see also Leaman, 1989, 1990). Onlapped and faulted relationships between all units are indicated along the Queen River south of Queenstown.

No rock property data base is available for the materials exposed in this area but it may be presumed that properties observed or inferred for similar materials to north and east are relevant to this study.

Such observations would suggest very low susceptibilities and magnetisations for most felsic volcanics (< 0.0002 cgs) while basalts, andesites and porphyries could possess variable properties but generally not much different from the other volcanics. Associated sedimentary rocks would offer contrasts of at least an order of magnitude less. Tuffs, however, may be locally very strongly magnetised with values perhaps as high as 0.003 cgs. This would be the case if materials were comparable or equivalent to the Comstock or Lynchford Tuffs.

Note: 0.00012 cgs is equivalent to 0.0015 SI units.
0.0012 SI is equivalent to 0.0001 cgs units.

Properties of the magnitude indicated have been used as a basis for analysis until/unless examination suggests them to be misleading or incorrect.

Plots of the magnetic field have been superimposed on geological base maps in Figures 6, 7 and 8.

INTERPRETATION

INTRODUCTION

This initial interpretation is based on the data summarised in previous sections of this report. It is assumed that geological and lithological variations and descriptions, currently published, are valid and justified (and consistent) and that rock property judgments are reasonable.

The interpretation depends only on magnetic data. Gravity data exist for the eastern half of the licence but the station spacing is approximately 1 km and is unlikely to resolve any of the issues raised by current geological mapping or this magnetic survey. Gravity coverage of the western half of the Yolande River area is sparse.

A phased interpretation has been provided; including a qualitative response correlation, trend analysis and cross area modelling to test some of the assumptions and assess the type of geological information which may be extracted.

ANOMALY CORRELATIONS

Review of Figures 7 and 8 illustrates the uneven character of responses and the variability of lithology.
Consider Figure 7.

Quartz feldspar porphyry.
There are at least six mapped exposures of this lithology - including Diamond Hill. There is negligible magnetic response at Diamond Hill (377 000 E, 5343 000 N); 377 000, 5345 000; 376 300, 5345 800 but subtle to modest responses may be noted on the larger bodies near 376 500, 5348 500; 378 700, 5347 000 and 380 000, 5343 000. There are also some locally marked variations at 380 000, 5342 600 and 378 700, 5347 300. In the context of the bulk character of the unit and its responses the latter are distinctly anomalous.

Quartz feldspar hornblende porphyry.
The main body mapped with this composition extends NNW from Madam Howards and is strongly magnetised. Only parts of a sub parallel body extending from Davies Hill have equivalent responses. The far northern and southern limits of this second (eastern) body are anomalous. The response patterns of the southern end of the Madam Howards body and much of the Davies Hill body suggest a different lithology - perhaps more like the quartz-feldspar porphyry.

Quartz-feldspar-pyroxene porphyry.
This unit is strongly magnetised wherever observed. A significant exposure extends south of Lake Margaret township.

Andesitic/basaltic intrusives and extrusives.
These lithologies appear to be consistently and moderately magnetic across the Crown Hill and Madam Howards regions.

Crystal tuffs.
The tuffs mapped west of Crown Hill and SW of Lake Margaret township appear to generate a subtle to moderate response but the effect is unclear.

Mt Read Volcanic units and presumed equivalents.
These rocks show variable to moderate magnetisations.

General Cambrian sequence near Madam Howards.
Most of the predominantly sedimentary units north of the Firewood Siding Fault and extending north of Madam Howards are non magnetic. These units are described as tuffaceous but their magnetic character cannot be distinguished from local greywackes.

Western tuffs.
The tuffs mapped in the area immediately east of the Three Sisters are strongly magnetic but the properties are far from uniform. Note especially the unit at 374 600 E, 5343 000 N whose response suggests either anomalous behaviour, incomplete or incorrect mapping. The zone north and east of the fault junction along the Firewood Siding Fault at 373 000, 5342 000 is distinctive and clearly lithologically different from materials to both east and west. A suggestion of comparable character is implied just east of the Ewart Creek Fault zone in the north of area at about the same easting as the southern effect.

Some responses mark the general position of the Firewood Siding Fault. These tend to be local and aligned E-W. Most such effects are geometric responses due to the angular change in source distribution along the fault - especially where strongly magnetic units, such as the western tuffs, are involved. Some other effects may reflect local alteration or oxidation along the fault, particularly at offset sites.

TRENDS

Trends inferred from the aeromagnetic data are shown in Figure 9. This diagram is the result of an essentially subjective review of gradients and trend continuity and patterns.

The pattern recovered does, however, suggests some major discontinuities within the geology of this area. Few features extend unambiguously across the entire area and some trends and orientations are either more continuous or more common in certain parts of the region. Relatively few of the trends suggested are pronounced in the existing geological mapping and the magnetic survey will make a considerable contribution to mapping of the area.

Three main regimes and one sub regime have been recognised in the magnetic field and inferred trend patterns shown in Figure 9.

Regime 1 is restricted to the NE corner of the area and includes the Mt Read Volcanics-dominated part of the licence area. N-S trends appear to be dominant. Other elements are subsidiary. This character

is modified near the mapped extension of the Lyell-Owen Fault system a little north of Davies Hill.

Regime 2 contains a more complex trend pattern. There are many NW-SE elements which mimic the general fault systems across the Queenstown region but the previously dominant N-S trends are balanced by some ENE and E-W elements. This regime contains most of the larger exposures of porphyry within the area.

Regime 3 is quite different. There are rare N-S elements and some major, isolated sub E-W features but other elements are inconsistent. There are few prevailing NW-SE trending features. The eastern boundary of this regime trends either NNW or NW and may be compound but it is certainly located somewhere near the western contacts of the mapped porphyries.
A sub regime has been recognised within this regime. This relates the strong magnetic character associated with the western tuffs and is shown shaded in the Figure. The boundaries of this internal zone are either faulted or have sweeping arcs like many other elements of the third regime. This suggests that many boundaries and features are caused by unit changes and their folded presentation. It would also imply that the materials of sub regime 3A are contained in the core of an antiform or a synform. If these rocks can indeed be correlated with the Comstock or Lynchford Tuffs - on the basis of their extreme properties - then a synclinal arrangement is probable.

Figure 9 also shows the location of sites of apparently anomalous porphyry (circled) and mineralisation.
Mineralised sites appear to lie near the margins of regime 2 or trend sets which must be youngest. Too few sites are known to draw any firm conclusions but regime 2 would appear to be a crucial element in the regime since it separates two very different rock suites and structural patterns. It is also unclear whether the known mineralised sites reflect the true potential of the area or past prospecting efficiency in a difficult region.

MODELLING

Ten magnetic profiles across the licence area have been examined in detail. These have not been selected with any particular bias or objective. The set was intended to provide some systematic indication of the structural and lithological patterns of the region and has not been focussed on any particular element. Nine profiles correspond to regular grid intervals.

The analysis has been directed toward general structural appraisal, assessment of probable bulk contrasts, and implied dips and volumes of materials.

Any exploration significance of the findings must depend on such analysis, subsequent ground proving, rock property confirmation and perhaps revision with linkage to gravity data.

The models provided represent samples of the simplest consistent

solutions found and do not necessarily represent a unique style of solution. Some options have been tested, and details are given below, but others may well exist. Some may not be assessed until some aspects of rock distribution or properties have been confirmed. It must be stressed that this is an initial, *guide*, interpretation.

All models satisfy primary data needs, including the definition of base levels, and are consistent in their use of credible properties. This does not make them correct, merely feasible.

Line 5350 000 mN (Figure 10)

This northern boundary profile samples tuffs adjacent to the Ewart Creek Fault zone in the western regimes as well as the northern extension of the central porphyries and the principal block of Mt Read Volcanic correlates.

The model stresses the very high contrasts required of the western tuffs. The lesser unit must have an effective contrast of 0.0005 cgs while the major anomaly requires 0.015 cgs. It should also be noted that the major anomaly is compound and comprised of at least two sources. This means that one or both of them possess much higher contrasts than the average value inferred assuming no non magnetic *materials interbedded. It might* also be possible to model this tuff pattern with a fault block or syncline. Either option would require contrasts up to 0.003 cgs. The background character of the field away from these tuffs re-inforce this conclusion and also show that little anomalous or magnetic occurs across a large part of the area.

The major exposure of quartz-feldspar porphyry produces a small response step but even this implies a substantial contrast and a locally elevated variation near its western face (not detailed in Figure). The largest anomaly in the eastern section is linked to the crystal tuff. Anomaly forms indicate that the junction between tuff and porphyry is steep but probably dips steeply east. Resolution of the contribution of the subtler Mt Read equivalents is less certain.

Approximate regime boundaries are also suggested in the Figure.

Line 5349 000 mN (Figure 10)

This profile includes some 3D effects from the termination of many units in the north of the region - especially about regime 3A near the Ewarts Creek Fault System. An equivalent solution of this effect has been generated in order to account for the regional anomaly form and allow improved assessment of shallow dips and contrasts. It must be recognised that this approximation is imperfect and that the section must not be extended more deeply without considerable adjustment and consideration of such regional effects.

The modelling at this northing does suggest how a synclinal form involving tuffs might appear. In this case only lower contrast tuffs are present and presumably the stratigraphically higher, and higher contrast, tuffs have been eroded but appear across the faults to the

north.

Two porphyries appear in the section and have been described as similar. The magnetic profile shows that the compositions applied by Corbett *et al* (1989) must either be verified or amended. These rocks are not the same. Or, if they are, then a major change in alteration and volume must occur near the regime boundary.
An alternate interpretation consistent with the mapping can be conceived. This requires that the bulk of the volume indicated for the eastern porphyry is composed of the crystal tuff which must then dip relatively shallowly to the east. There is no evidence supporting such a dip.

The final change to Mt Read Volcanics equivalents is also distinctive but it should be noted that the volume indicated for materials at the survey limit cannot be considered reliable.

Line 5348 000 mN (Figure 11)

This profile indicates the nature of the contribution of the crystal tuff and its relativity to the adjacent porphyries. It also shows that these poprhyies can be distinguished from other compositions.

The crystal tuff possesses a modest magnetic contrast but this is much less than the hornblende porphyry on its western face (overlying unit?). The underlying porphyry, to the east, is not less magnetic even though it has been mapped as a normal porphyry. This comment applies notwithstanding the reduction in the observed field which has geometric and interference origins. It remains an option that the crystal tuff forms an anticlinal core and that the eastern porphyry actually overlies it with the same properties as the western body. This would be distinguishable in a more detailed analysis but the mapped dips and compositions are not consistent with such a solution.

The observation that the more easterly pyroxene rich porphyry variant dips east could allow some review of relationships. This unit is distinctive.
All the high contrast rocks lie in regime 1 and give the bulk appearance of an antiform or anticline.

The porphyry of regime 2 appears "normal" and certainly is less magnetic.
The rocks of regime 3, with the exception of a single tuff bed, are virtually non magnetic.

Line 5347 000 mN (Figure 11)

This profile tests the possibility, based on mapping, of westerly dips in the east of the region. This seems to be sustainable magnetically although the indicated dips seem a little shallow overall. The relative contributions from the crystal tuff and basalt-andesites is apparent. The andesites of Crown Hill are strongly magnetised and are more magnetic than the pyroxene porphyry nearby.

A major discontinuity occurs between the crystal tuff and the western hornblende porphyries. There is a change in facing, dip or intrusion style. This relationship may have occurred on previous sections but the bulk of porphyry limited definition.

The more westerly normal porphyry makes little contribution to the magnetic field but could be included to remove the slight negative mismatch between the observed and calculated profiles west of 377 000 E.

The materials of regime 3 are essentially not magnetic and the very high contrast with a single tuff unit is marked. This unit must dip east. This dip pattern could indicate a structural continuity between regimes 2 and 3.

Line 5346 000 mN (Figure 12)

This profile samples the largest available cross section of porphyries and much of the western tuffs. Basalts of the Crown Hill area are also reviewed.

The model is relatively simple across the non magnetic rocks of regime 3 and the pattern of a folded tuff sequence, ambiguously suggested in other profiles, is certainly implied. The tuffs form an extension of regime 3A and a strongly magnetised.

The large body of hornblende porphyry satisfies both exposure and magnetic field constraints north of Madam Howards. The presence of a large body can account for the irregular and poor correlations between magnetic field and surface exposure observed around the exposed material. The implied contrast seems low and this may indicate that the normal porphyry forms a core to the body interpreted or that the total volume is much less. Other sections indicate higher contrasts. The entire porphyry mass occupies regime 2.

Structural opposition again marks the junction between regimes 1 and 2 west of Crown Hill and north of Davies Hill. Basalts and other volcanics appear to dip west in this region.

Line 5345 000 mN (Figure 12)

This profile supports previous comments about the character of the porphyries of regime 2 and the tuffs of regime 3. The poorly exposed basalts and andesites at the eastern margin of the area have not been modelled.

The western tuff sequences are disrupted by the cross faulting associated with the Firewood Siding Fault and it is the geometry of the fault and its truncation of the tuffs which generates the asymmetry of anomaly observed.

The variability of the western tuffs may also be noted; most are significantly magnetised, some very strongly (0.003 cgs)..

Line 5344 000 mN (Figure 13)

Patterns for the western tuffs similar to those at 5345 N may be observed in this section. There are two distinct tuff types in the western succession; one very strongly magnetised.

The apparent reduction in contrast within the porphyries of regime 2 may reflect a three dimensional effect near the limit of the intrusion. The normal porphyry north of Diamond Hill makes no contribution to the profile.

The local basalts are much more distinctive and appear to dip east rather than west as indicated in available mapping.

Line 5343 000 mN (Figure 13)

The components of this profile are very similar to those at 5344 N and display the same contrasts within the western tuffs. No response due to any porphyry variant is apparent other than at line end where the mapped "normal" porphyry has the properties of a pyroxene type. The mineralisation at Madam Howards appears to occur near the truncation of the basaltic sequence.

Line 5342 000 mN

This profile was not modelled since it lies very close to the strike of the Firewood Siding Fault and is dominated by geometric effects which cannot be compensated by simple modelling methods.

Line 5341 000 mN (Figure 14)

This model represents a simple attempt to review the overall stratigraphic and structural continuity of Cambrian rocks from their exposures east of the Queen River beneath the Siluro-Devonian cover. The model cannot be considered realistic for two reasons; it depends on some equalisation of the significant 3D effects generated at the Firewood Siding Fault, and only a magnetic upper unit is presumed within the Cambrian sequence.

It does, however suggest the depth range which should be considered in any structural analysis of the region south of the Firewood Siding Fault. There are also no substantial magnetic aberrations observed until the profile approaches exposure near its eastern end.

Line 373 500 mE (Figure 14)

This profile acts as a modelling tie line and tests property and geometric assumptions where these have been used to generate a regional effect in other profiles. The section samples only the western tuffs and background of regime 3.

INFERRED PROPERTIES

The following properties have been deduced during modelling. All are generally consistent with inferences or observations in adjacent areas although some values, such as those for the Mt Read Volcanics correlates may be higher than observed elsewhere.

Cambrian sedimentary rocks: 0.0 cgs

Porphyry: qz-fd: 0.0 - 0.0004 cgs
hb : 0.0002 - 0.0005 cgs
py : 0.0008 cgs

It is possible that some identifications of base porphyry are invalid since the range 0.0-0.0004 is misleading. The deductions are bimodal, 0.0001 or less and >0.00035 cgs.

Basalt/andesite: 0.0004 - 0.0009 cgs.

Mt Read Volcanics: 0.0002 - 0.0003 cgs

Crystal tuff: 0.0002 - 0.0009 cgs. This variation may be important.

Western tuffs: type 1: <0.0001 cgs
type 2: 0.0003 - 0.0006 cgs
type 3: >0.002 cgs.

Tuffs with the characteristics of type 3 have only been observed previously at Comstock or Lynchford.

While some variation and overlap is evident between some of the magnetic units in the Yolande River area the indicated properties are separable in most cases and marked variations from the mean should cause ground review. Most such problems attach to the porphyries.

RECOMMENDATIONS

The interpretation depends upon the inferred or assumed rock properties and some attempt should be made either to confirm the absolute values or the relativity and contrasts indicated.

There is also a need to review the petrology and magnetisation, as well as distribution, of the quartz porphyries. These bodies seem to be related to the mineralised sites which are known and form a distinct magnetic regime which forms the contact between two contrasting magnetic terranes. Dips, alteration and deformation near these regime boundaries should be reviewed wherever outcrop permits.

The magnetic data obtained have not been over interpreted in this initial study but complete appraisal should be based on updated geological information and property assessments and may need to employ some 3D methods. Coupling with another method, such as gravity, in order to appraise the porphyries is strongly recommended.

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Baillie, P.W., 1977. Strahan. 1:50 000 geological map sheet. *Tas Department of Mines Geological Atlas.*

Corbett, K.D., Calver, C.R., Everard, J.L., & Seymour, D.B., 1989. Queenstown. 1:25 000 geological map sheet. *Tas Department of Mines Geological Atlas.*

Leaman, D.E., 1989. Gravity and magnetic interpretation of EL 11/85, Yolande River. Report for Pasminco Mining by Leaman Geophysics, September.

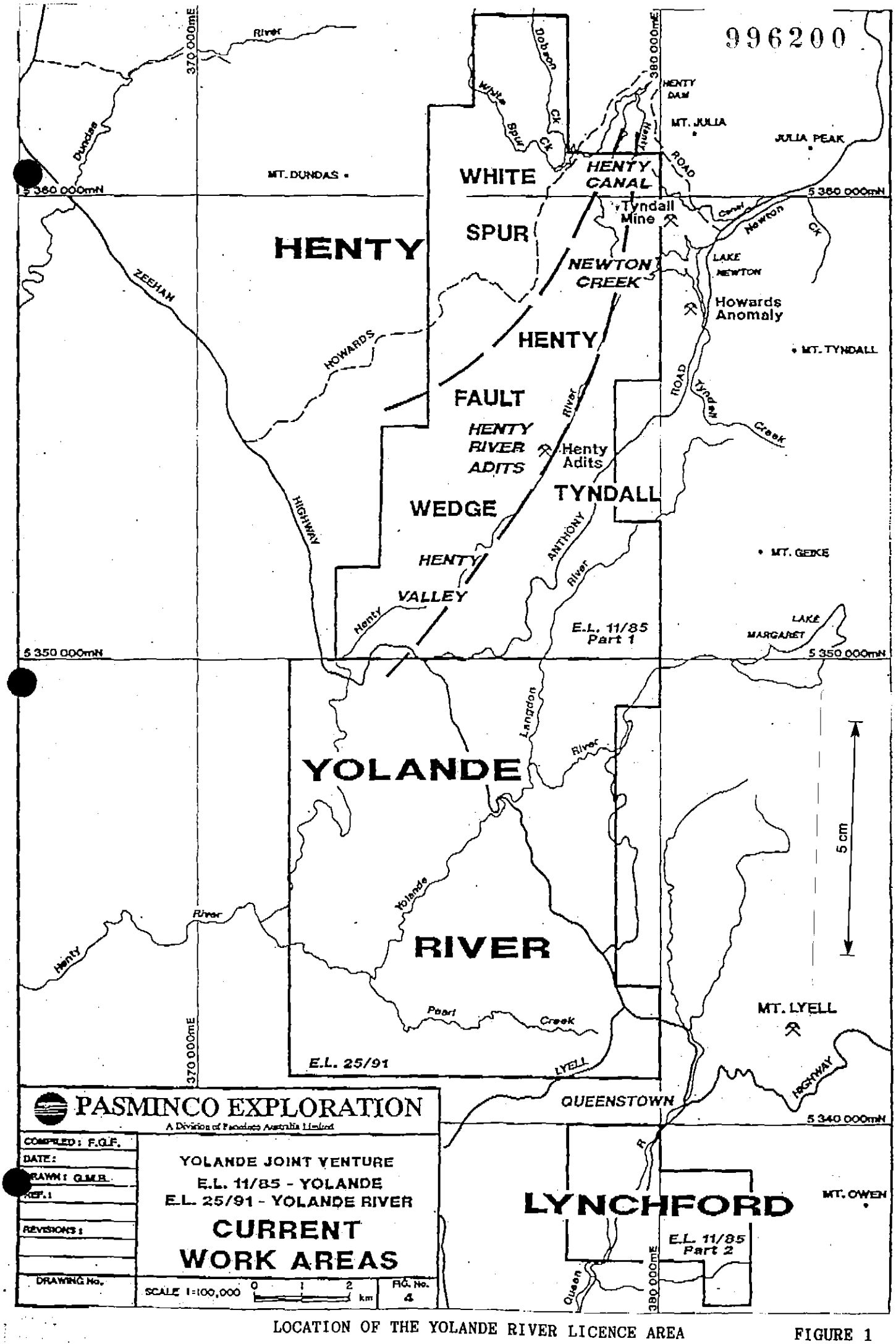
Leaman, D.E., 1990. Aeromagnetic survey EL 11/85, Yolande River. Acquisition report (including update interpretation) for Pasminco Mining by Leaman Geophysics, July.

Report submitted on behalf of Leaman Geophysics

by

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

Date: 26/7/93



LOCATION OF THE YOLANDE RIVER LICENCE AREA FIGURE 1

COMPILATION OF THE MAGNETIC FIELD MAPPING AS PRESENTED BY THE CONTRACTOR

YOLANDE RIVER EL 25/91

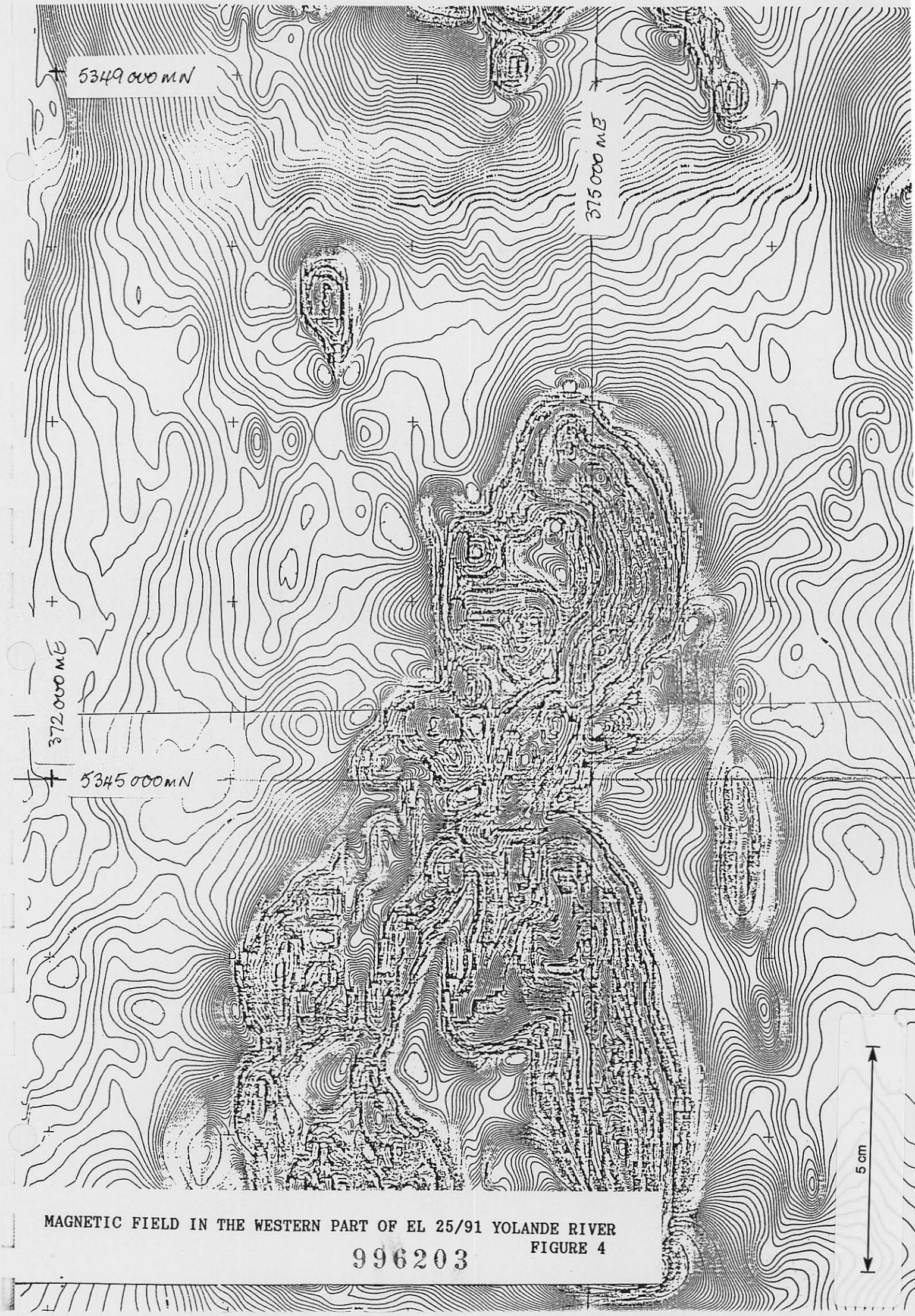
contour intervals 1, 10, 100 nT

FIGURE 2

MAGNETIC FIELD IN THE EASTERN PART OF EL 25/91 YOLANDE RIVER

FIGURE 3

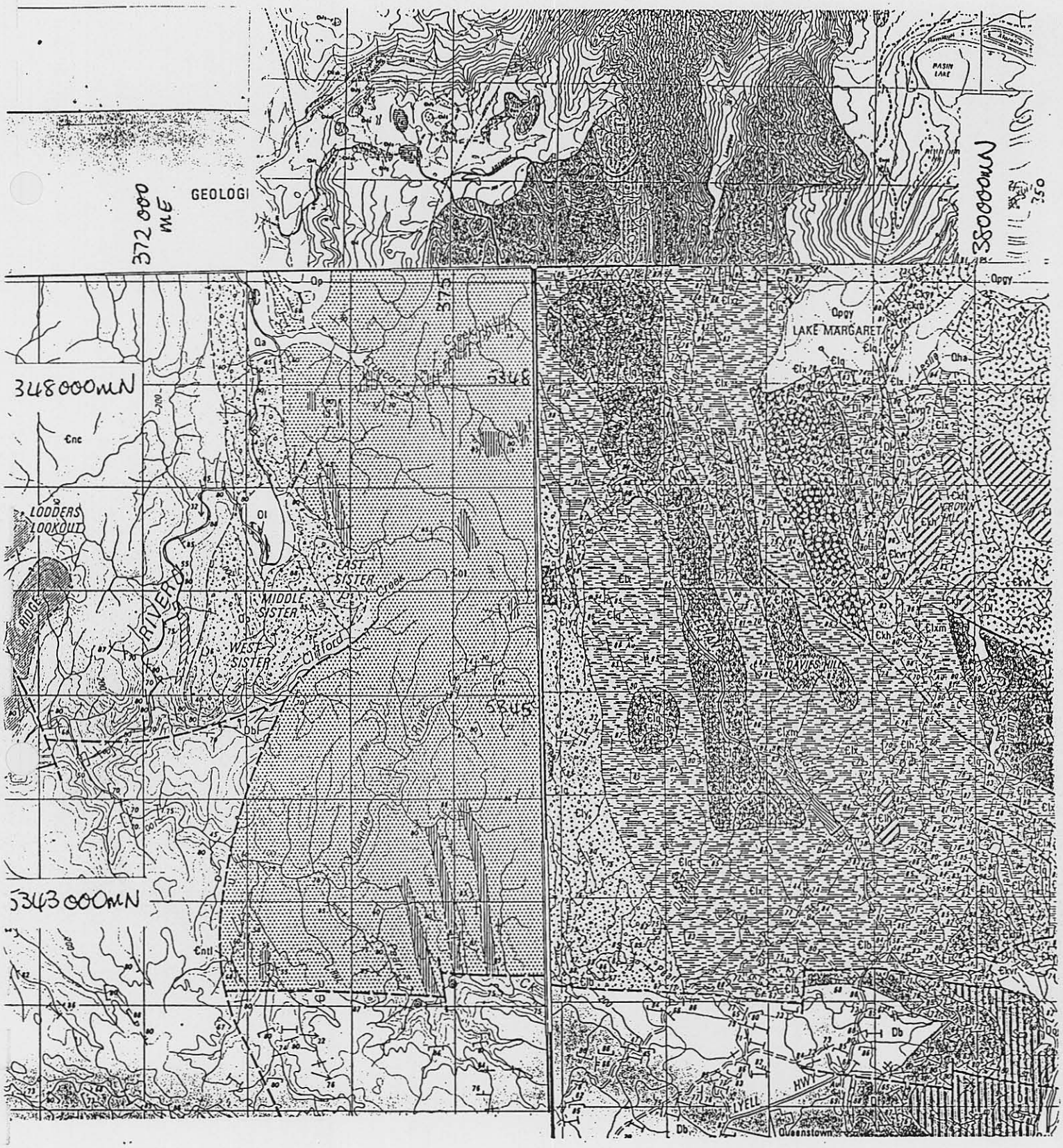
996202



MAGNETIC FIELD IN THE WESTERN PART OF EL 25/91 YOLANDE RIVER

FIGURE 4

996203

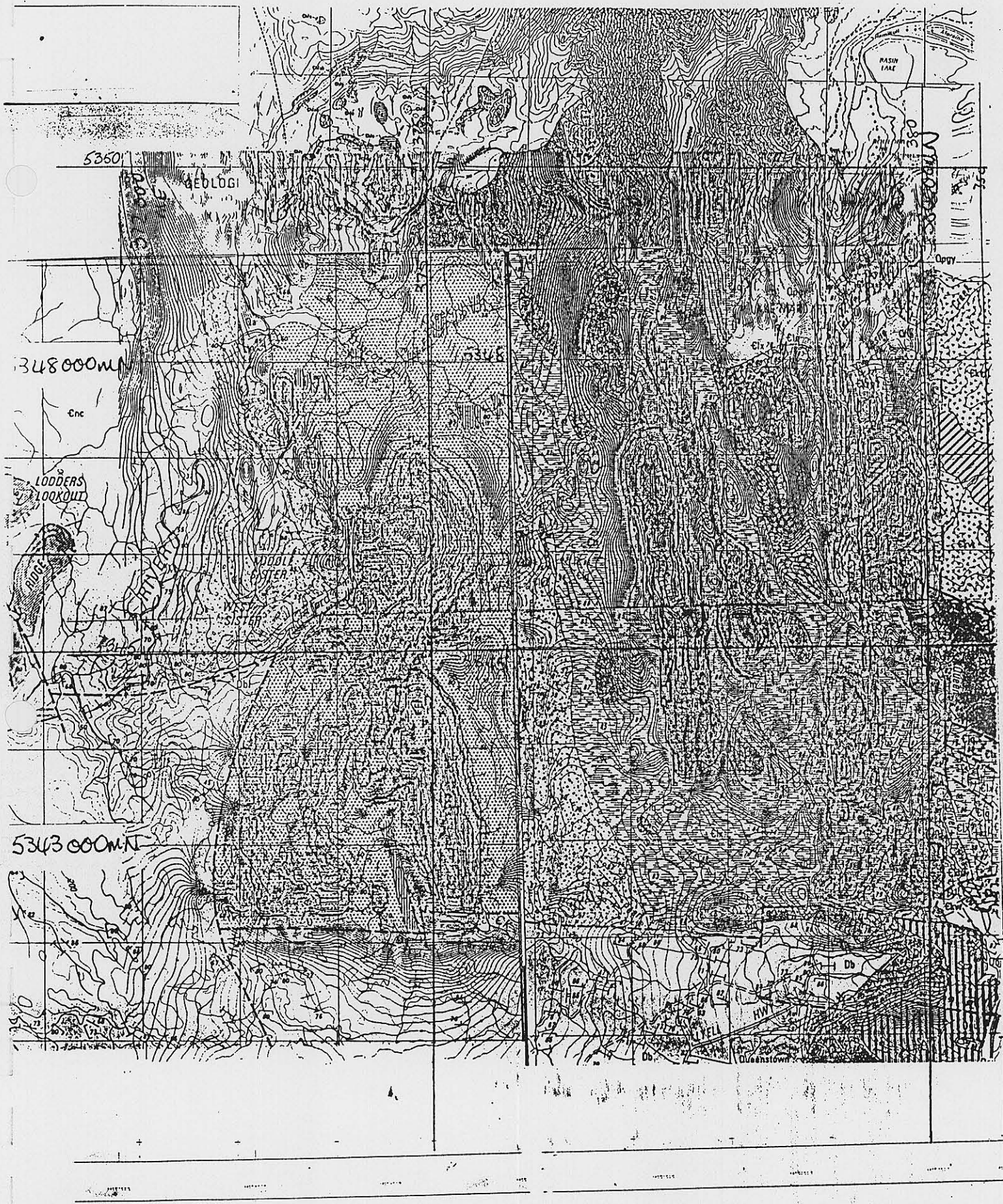


996204

GEOLOGICAL BASEMAP COMPILATION YOLANDE RIVER REGION
Mines Department sources including Baillie (1977), Corbett et al (1989)

FIGURE 5

5 cm

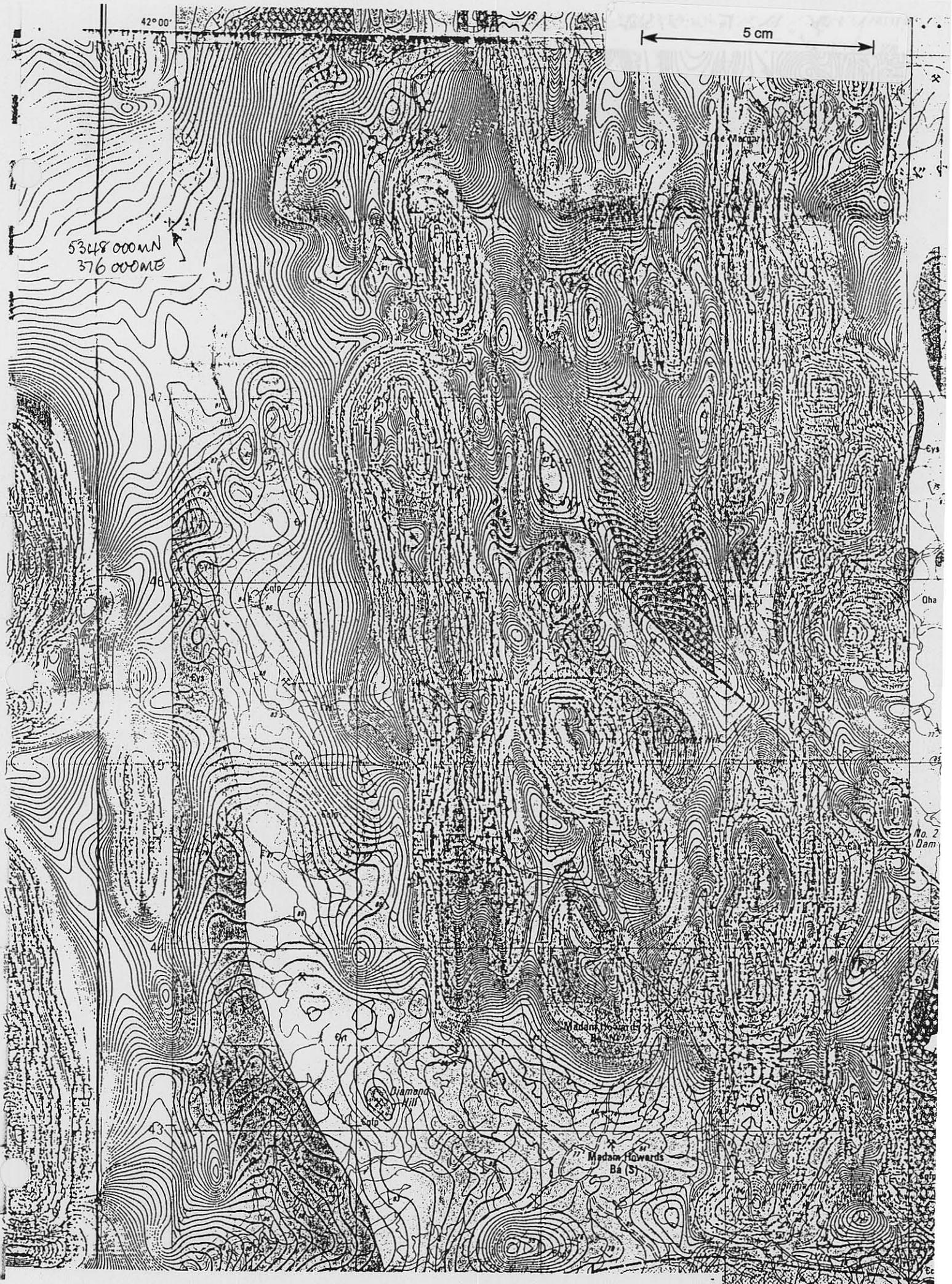


996205

OVERVIEW OF GEOLOGY AND MAGNETIC FIELD EL 25/91 YOLANDE RIVER

5 cm

FIGURE 6



GEOLOGY AND MAGNETIC FIELD IN EASTERN HALF OF EL 25/91
YOLANDE RIVER

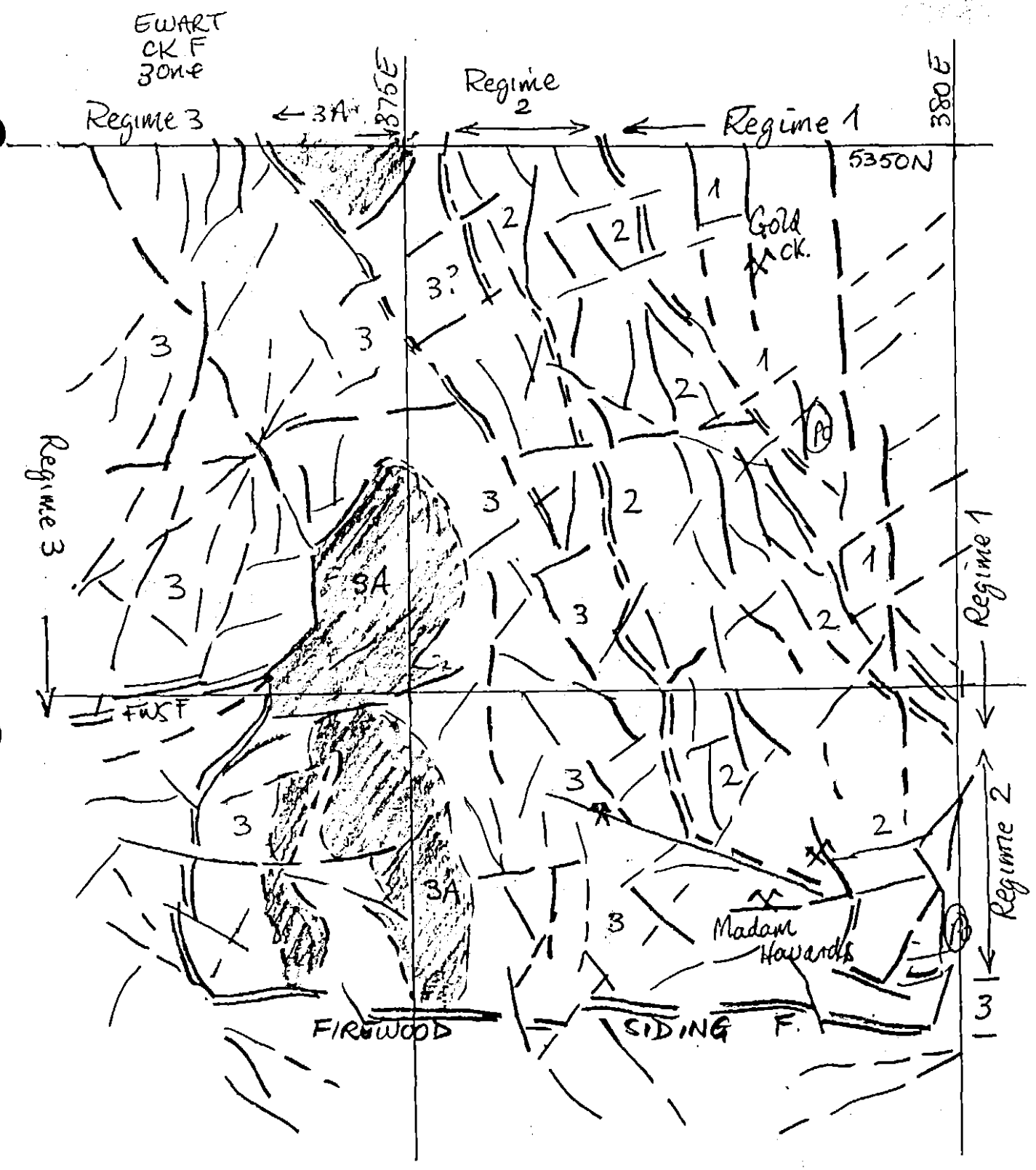
FIGURE 7

996206

GEOLOGY AND MAGNETIC FIELD IN WESTERN HALF OF EL 25/91
YOLANDE RIVER

996207

FIGURE 8



TRENDS RECOGNISED IN THE MAGNETIC FIELD ACROSS THE YOLANDE RIVER LICENCE AREA EL 25/91

FIGURE 9

LEAMAN GEOPHYSICS
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Hobart, Tasmania 7001

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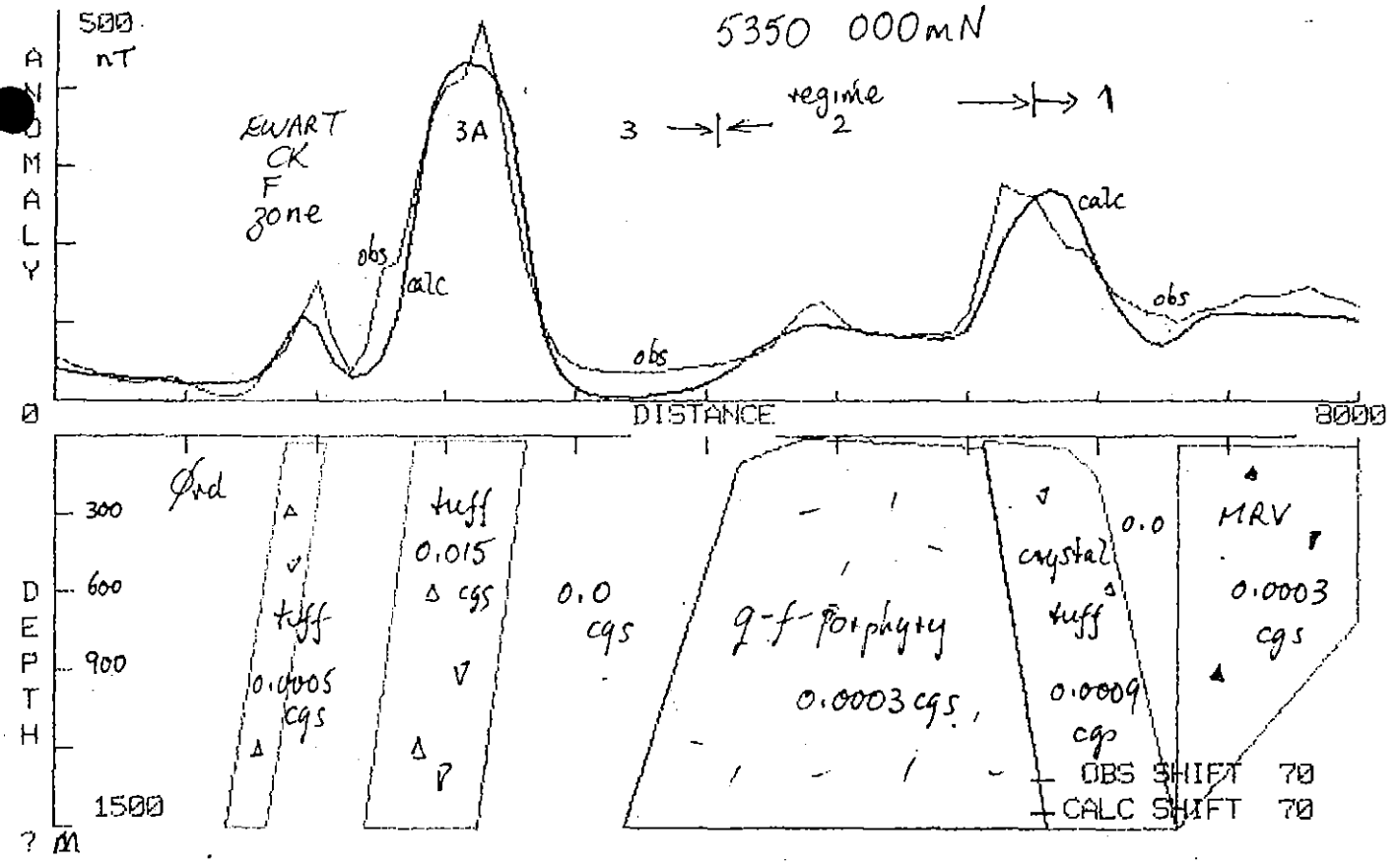
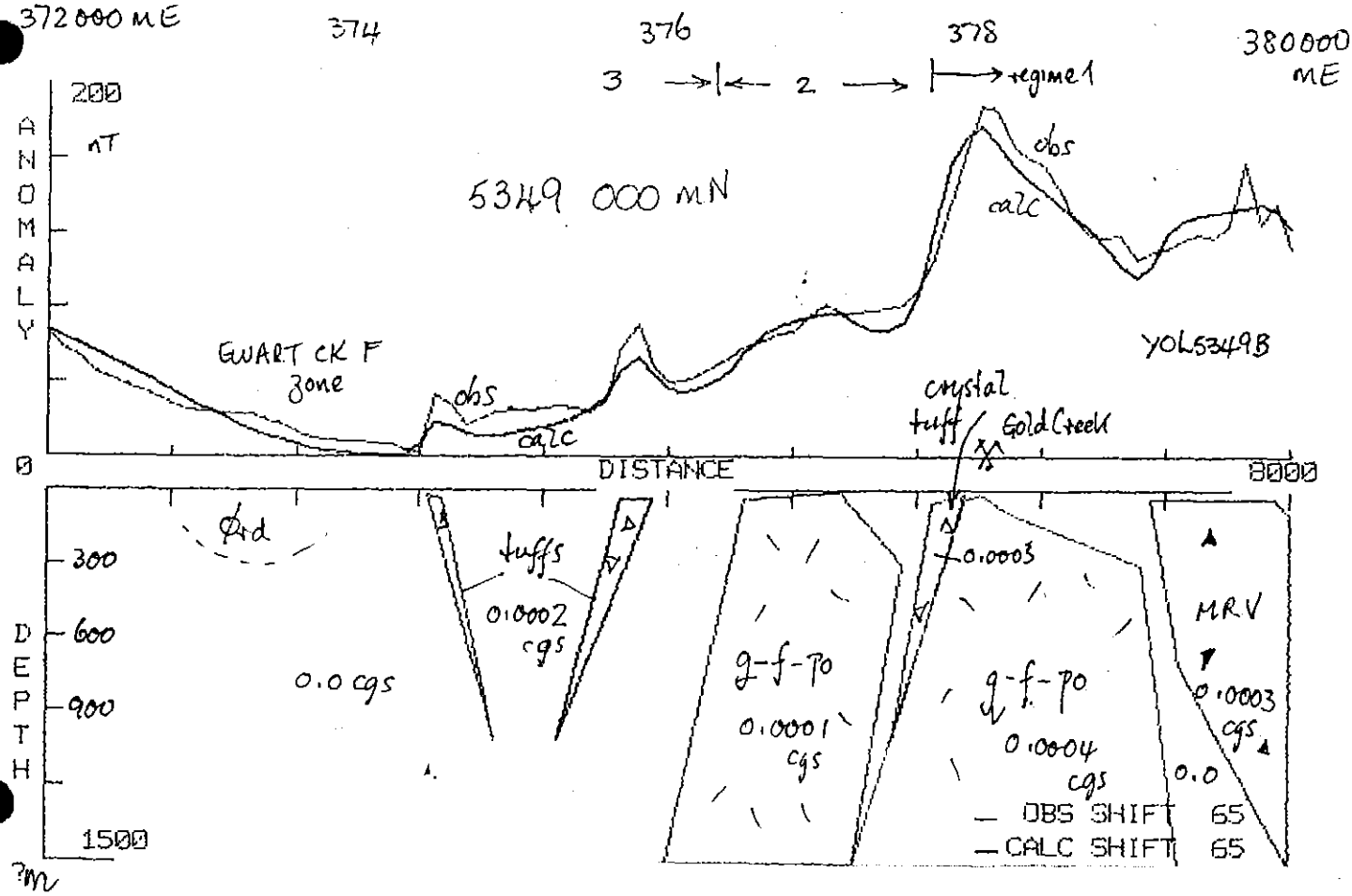
07/93

LEAMAN GEOPHYSICS
G.P.O. Box 320 D.
Hobart, Tasmania 7001

996209

YoL5350A

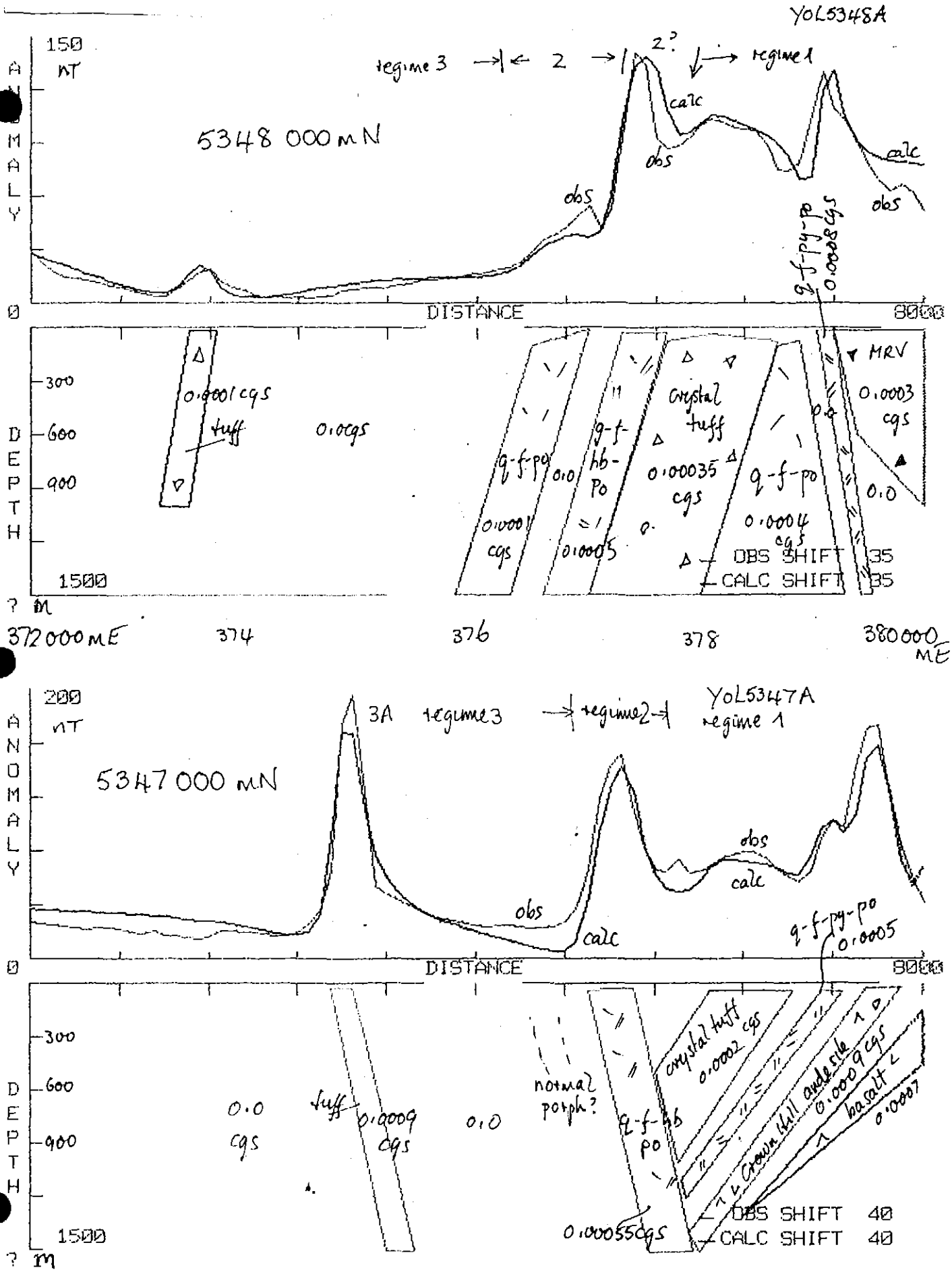




PRELIMINARY 2D MAGNETIC MODELS 5350 000 N YOLANDE RIVER REGION
5349 000 N

FIGURE 10

LEAMAN GEOPHYSICS
G.P.O. Box 320 D,
Hobart, Tasmania 7001



PRELIMINARY 2D MAGNETIC MODELS 5348 000 N YOLANDE RIVER REGION
5347 000 N

FIGURE 11

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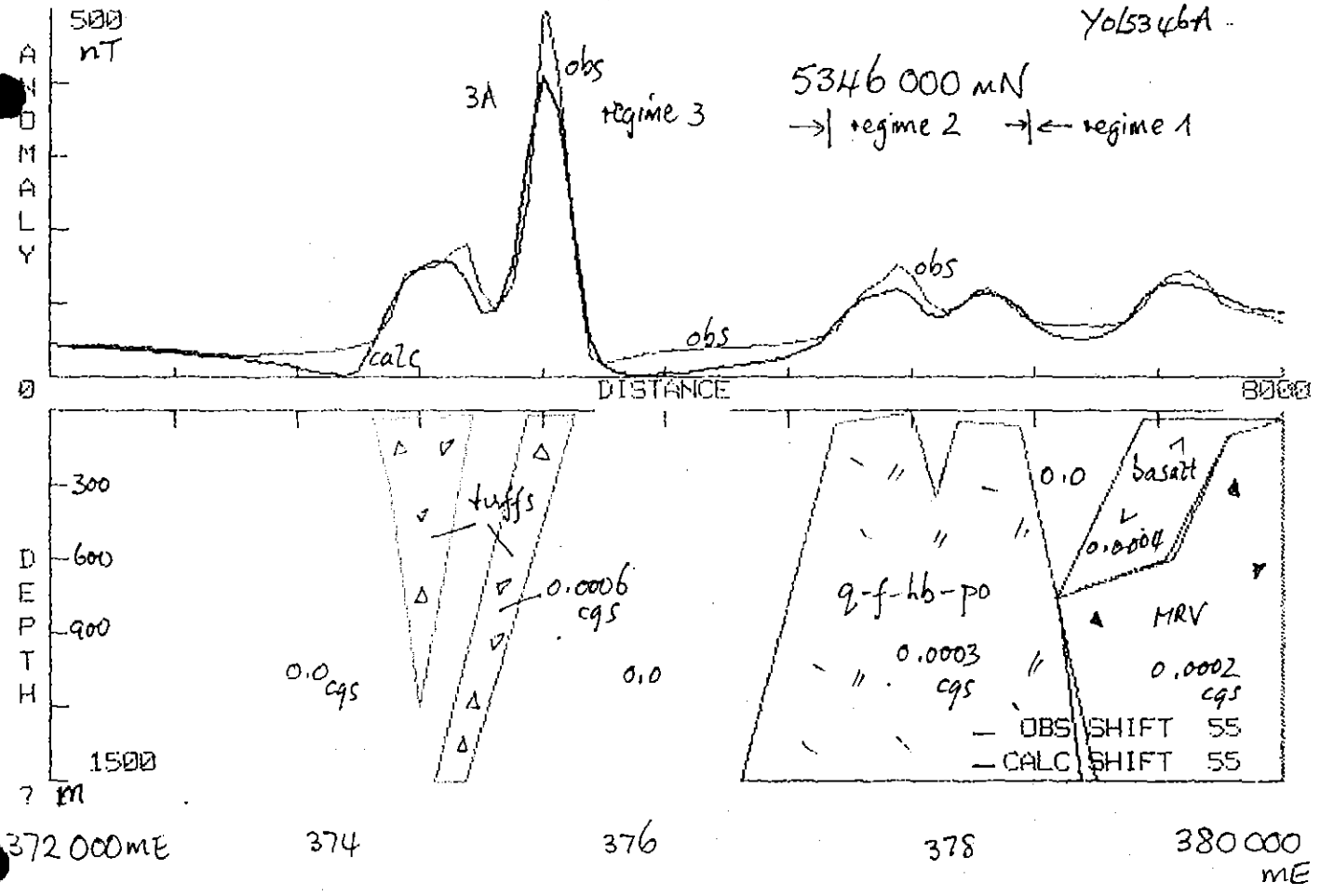
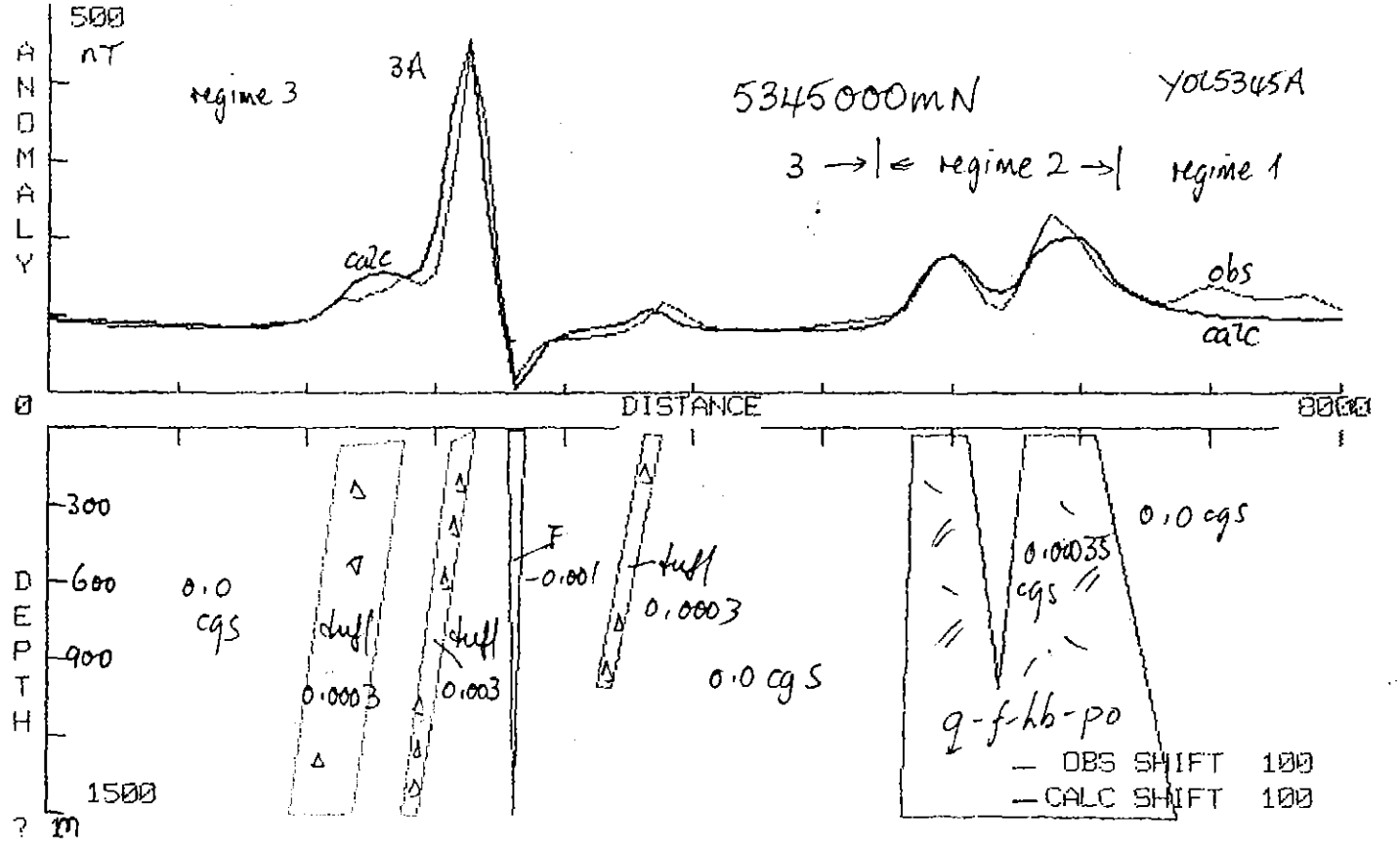
G.P.O. Box 320 D,
Hobart, Tasmania 7001

996211



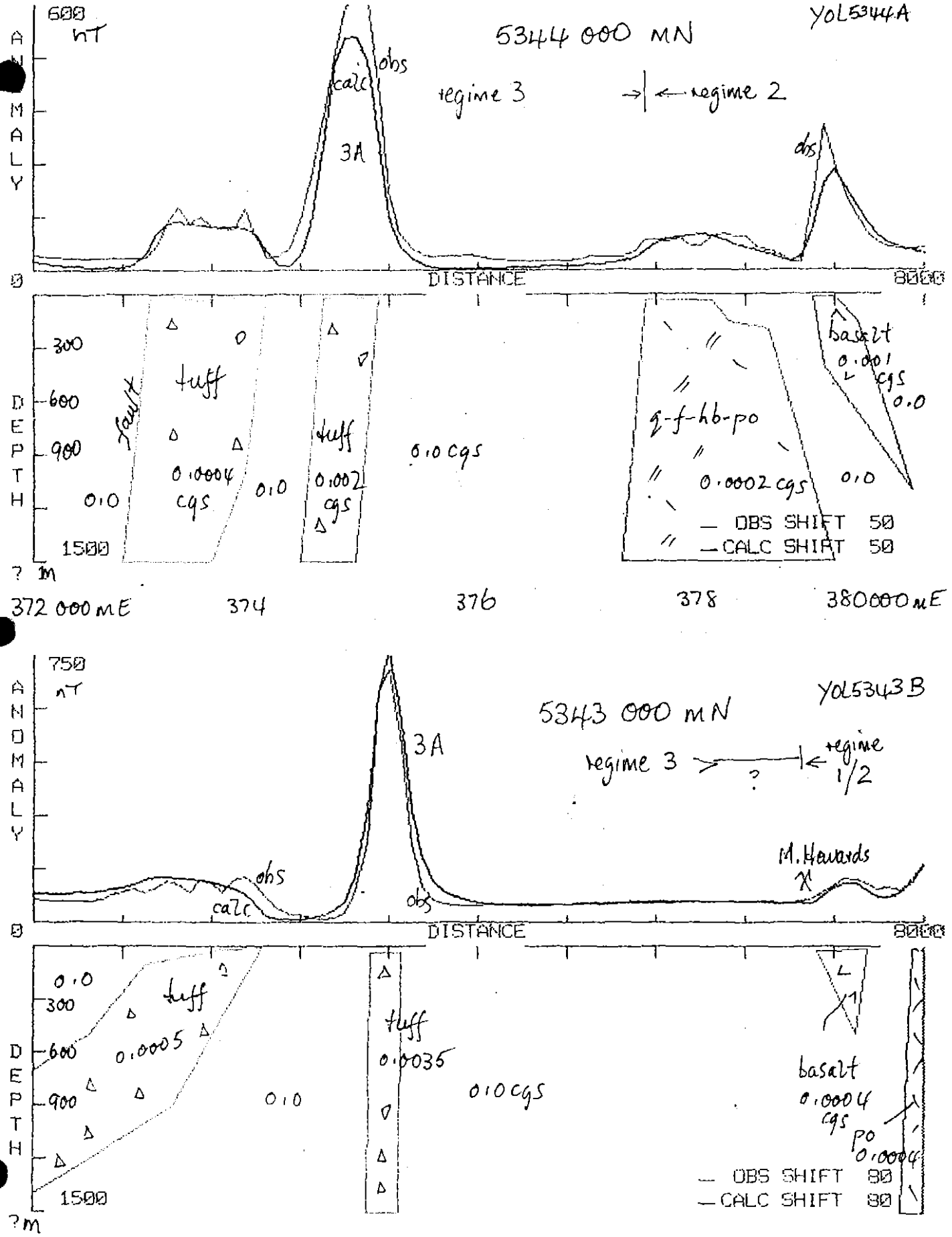


PRELIMINARY 2D MAGNETIC MODELS 5346 000 N YOLANDE RIVER REGION
5345 000 N

FIGURE 12

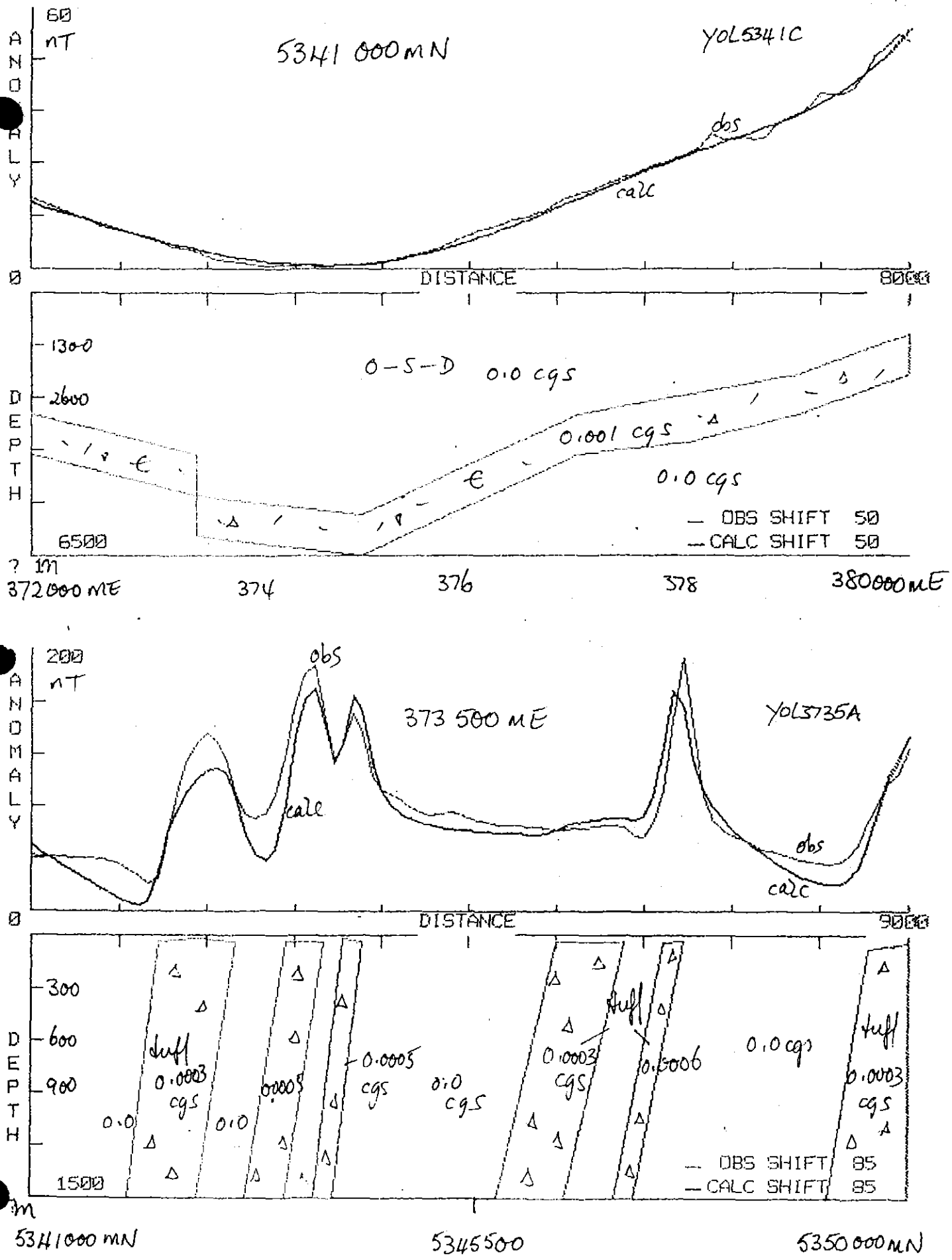
LEAMAN GEOPHYSICS
G.P.O. Box 320 D,
Hobart, Tasmania 7001

996212



PRELIMINARY 2D MAGNETIC MODELS 5344 000 N YOLANDE RIVER REGION
5343 000 N

FIGURE 13



PRELIMINARY 2D MAGNETIC MODELS 5431 000 N YOLANDE RIVER REGION
373 500 E

FIGURE 14

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996214

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PASMINCO EXPLORATION

ANNUAL REPORT
YOLANDE EL 11/85 & YOLANDE RIVER EL 25/91

ANNUAL REPORT

volume 2 of 2

MINES
FILE REF.
- 3 AUG 1993
DOC. REF.
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Covering letter see
Folio 57-98 EL 25/91
Folio 11-12 EL 11/85
DATE

AUTHOR: PM Quayle

DATE: July 1993

REPORT No.: T93-7

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Pasminco Exploration - Burnie
- Melbourne
- Rosebery
Arimco Mining Pty Ltd - Sydney
- Perth
Geopeko - Melbourne

SUBMITTED BY:

ACCEPTED BY:

Burnie
July 1993

FIGURES

PLAN

379 100mE · 379 200mE · 379 300mE · 379 400mE · 379 500mE · 379 600mE · 379 700mE · 379 800mE · 379 900mE · 380 000mE

5 358 100mN · 5 358 000mN · 5 357 900mN

A — A

Fault

South Henty Fault

Magnetic

Linear

Creek

Henty River

32860 · 32850 · YNC2 · YNC3 · 31495 · SHALE · CONGLOMERATE · 32165 · 31496 · YNC1 · X75836 · GLACIALS · CONGLOMERATE

sample	Al2O3	SiO2	TiO2	Fe2O3	MnO	CaO	K2O	MgO	P2O5	Na2O	SO3	LOI
31493	10.86	77.30	0.18	3.03	0.07	1.19	2.90	1.03	0.03	0.36	0.01	2.43
31496	11.96	69.30	0.47	4.76	0.07	1.86	2.94	1.59	0.08	2.11	1.28	2.92
75836	10.74	63.73	0.29	1.70	0.09	9.56	0.27	0.34	0.20	5.73		7.33

	Rb	Sr	V	Nb	Y	Zr
31495	109	40	9	15	35	227
31496	93	131	101	9	32	173
75836	7	457	34	8	40	199

Petrology (appendix x1 and Poltock 1993)

31493	fine grained volcanogenic siltstone derived from felsic vitric ash with minor broken plagioclase phenocrysts.
31496	fine grained siltstone to sandstone derived from pelitic metamorphics.
32165	chlorite altered plagioclase rich felsic volcaniclastic
32850A	devitrified volcaniclastic sandstone derived from felsic plagioclase quartz phyric lavas and vitric tuffs.
32850B	quartz rich greywacke (cf Miners Ridge Sandstone) with disseminated sphalerite and pyrite.
32860	aphyric basaltic lava or dyke.

LEGEND

1. GENERAL FORM

Rock type, colour, grain size, overall texture, constituents & textures, alteration, mineralisation.

Rock Types can be combined using a –
Subordinate Rock Types are separated by /
Each Descriptor Group is separated by ,
Descriptors within a group are separated by .
Derwent series 19 colours (in brackets) are intended for the Cambrian sequences.

2. ROCK TYPES

Lavas Intrusives or Volcaniclastics

L I V	o	(14) acid
	i	(46) intermediate
	b	(46) basic
	u	(23) ultrabasic
	r	rhyolite
	d	(11) dacite
	n	(46) andesite
	ba	(46) basalt
	g	(20) granite
	di	(23) diorite
	do	(45) dolerite
	gb	(23) gabbro
	s	(23) serpentinite

Sediments S or Volcaniclastics V

	bsh	(18) black shale
	sh	(36) shale
	slt	(33) siltstone
	sst	(38) sandstone
	w	(37) greywacke
	cong	(36) conglomerate
	bx	breccia
	tbd	turbidite
	msf	mass flow
	cht	(34) chert
	lst	(65) limestone
	dol	(65) dolomite
	fe	(64) iron formation
	gl	(x) glacial deposits
	fg	(x) fluvioglacial deposits
	dlv	(x) alluvial deposits
	cvl	(x) colluvial deposits (talus)

Metamorphic and Tectonic Rocks — Colours should be hatched

M	sht	(38) schist
	qzt	(40) quartzite
	hf	(50) hornfels
	sk	(50) skarn
	mb	(48) marble
	m	mylonite
	fz	fault breccia (pug)

Unassigned — ? — Use alone or as a qualifier to other rock types where uncertain

3. DESCRIPTORS

Colour:

pa	pale	bl	blue
dk	dark	wt	white
gy	grey	ye	yellow
or	orange	buf	buff
bk	black	gn	green
pk	pink	ppl	purple
rd	red	crm	cream
brn	brown	khk	khaki

Grainsize:

fg	fine grained
mg	medium grained
cg	coarse grained
vcg	very coarse grained

DESCRIPTORS continued

Overall Texture:

fb	flow banded
fbx	flow brecciated
hyl	hyaloclastic
pill	pillowed
peg	pegmatitic
msv	massive
bds	bedded
por	porphyry
porphyric	
peg	pegmatitic
bd	bedded
xbd	cross bedded
ufs	upwards fining sequence
ps	poorly sorted
cs	clast supported
ms	matrix supported
fol	foliated
lin	lineated
shd	sheared
bx	brecciated
oug	augen
vnd	veined

Constituents & Internal Textures:

ply	polymict
ti	tithic
pm	pumice
xl	crystal
vit	vitric
sph	spherulites
ves	vesicles
amy	amygdales
wsp	wisps
sty	stylolites
f	feldspar
q	quartz
mic	micaceous
cal	calcareous
px	pyroxene
hb	hornablende
or	chromite
mag	magnetite

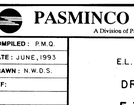
Alteration:

bch	bleached
dtx	de-textured
ox	oxidised
ab	albitised
cb	carbonatised
chl	chloritised
ser	sericitised
kao	kaolinitised
ep	epidotised
sil	silicified
fuc	fuchsitic

Mineralisation:

dis	disseminated
v	vein
str	stringer
msv	massive
bnd	banded
cls	clasts
gos	gossan
sul	sulphides
py	pyrite
cpy	chalcopyrite
asp	arsenopyrite
gn	galena
sp	sphalerite
cp	chalcopyrite
ba	barite
mag	magnetite
hm	haematite
lm	limonite
au	gold
ag	silver
to	tourmaline
q	quartz
cb	carbonate
sd	siderite
mn	manganese carbonate
fl	fluorite

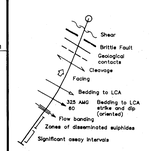
4. DIAMOND DRILLHOLE



- Chloritic (Doritic) Lavas/Sills
- Siliceous (Rhyolitic) Lavas/Sills
- Basic Dyke
- Hyaloclastite, Peperite
- Lava/sediment breccias
- Breccia
- Feldspar
- Quartz Crystals
- Lithic Clasts
- Black Mudstone Clasts
- Vesicles/Amygdales
- Spherulites
- Stylolite/"pseudo flamme"
- Pumice Breccia
- Flow Banding
- Cloudy albite or Nodular Carbonate alteration
- Skarns
- Sulphides
- Schistose
- Massive Sulphides
- Brecciation (crackle/rb-afts)

4. MAPPING SYMBOLS

- Strike and Dip of Strata (25)
- Strike and dip of inverted strata
- Strike and dip of cleavage or foliation (60)
- Plunge of lineation (50)
- Geological boundary position accurate
- Geological boundary position approximate
- Mine
- Abandoned prospect or mine
- Costean or trench
- Diamond drill hole, including projection
- Unconformity
- Fault
- Fault with dip (70)
- Thrust Fault
- Plunging antiform
- Plunging synform
- Shear/strong cleavage
- Vein
- Si + Ser + Py Alteration Zone
- I.P. Anomaly
- Magnetic/Gravity/TM Lineaments
- Magnetic Trend Line



996216

5 cm

93-3477.

CROSS SECTION

RL 500m · RL 400m · RL 300m · RL 200m

379 100mE · 379 200mE · 379 300mE · 379 400mE · 379 500mE · 379 600mE · 379 700mE · 379 800mE · 379 900mE · 380 000mE

SURFACE PROFILE — LINE A–A

DACITE

RHYODACITE to DACITE

YNC1 — 6.2m @ 1.85% Cu, 0.8% Pb, 1.0% Zn

volcaniclastic conglomerate

terrigenous derived sediments

terrigenous derived sediments

Newton Creek

South Henty Fault

Henty River

Linear

Magnetic

YNC3 · YNC2

YNC1

from	to	sample	Cu	Pb	Zn	Ag	Au	Fe%	Ba	As
36.00	38.20	35051	19	7	63	<1	-	3.93	-	-
38.20	39.80	35052	21	7	59	<1	<0.008	3.36	1776	12
39.80	40.60	35053	12	19	56	<1	-	3.51	-	-
47.00	49.00	35054	38	80	184	<1	<0.008	6.51	1226	59

(values in %)

from	to	sample	Al2O3	SiO2	TiO2	Fe2O3	MnO	CaO	K2O	MgO	P2O5	Na2O	LOI
10.20	10.30	35046	13.76	65.60	0.49	4.53	0.09	3.37	4.06	0.69	0.12	3.09	4.01
51.60	51.70	35049	11.39	74.90	0.44	2.87	0.06	0.89	3.10	0.79	0.06	2.45	2.16

(values in ppm)

from	to	sample	Rb	Sr	V	Nb	Y	Zr
10.20	10.30	35046	81	246	32	5	12	227
51.60	51.70	35049	95	198	12	10	31	352

Petrology for YNC1 (see appendix x1)

sample	depth	description
35046	10.2	plagioclase phyric dacite (similar to the Newton Creek Spillway hanging wall dacites).
35047	29.2	plagioclase phyric felsic volcaniclastic.
35048	44.2	laminated interbedded sandstones and siltstones derived from; plagioclase phyric volcanics and pelitic metamorphics.
35049	51.6	rhyodacitic to dacitic plagioclase phyric pumiceous felsic lava breccia.
35050	56.1	rhyodacitic to dacitic plagioclase phyric pumiceous felsic lava breccia.

YNC2 (values in ppm)

from	to	sample	Cu	Pb	Zn	Ag	Au	Fe%	Ba	As
47.10	47.70	35055	15	888	1172	2.0	<0.008	3.51	693	41
47.70	48.80	35056	11	970	1038	1.0	-	3.03	-	-

YNC3 (values in ppm)

from	to	sample	Cu	Pb	Zn	Ag	Au	Fe%	Ba	As
18.60	19.20	35057	12	14	73	<1	<0.008	2.78	1043	13
23.20	23.70	35058	139	153	199	1.0	-	5.73	-	-
24.60	25.10	35059	15	810	874	1.0	<0.008	3.09	353	29

(avalues in %)

from	to	sample	Al2O3	SiO2	TiO2	Fe2O3	MnO	CaO	K2O	MgO	P2O5	Na2O	LOI
18.60	19.20	35057	15.99	64.60	0.43	4.19	0.11	2.50	2.94	1.06	0.08	3.05	4.42

COMPILED :	P.M.Q.
DATE :	JUNE, 1993
DRAWN :	N.W.D.S.
REF :	
REVISIONS :	

PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

E.L. 11/85 – YOLANDE J.V.

DRILL SECTION

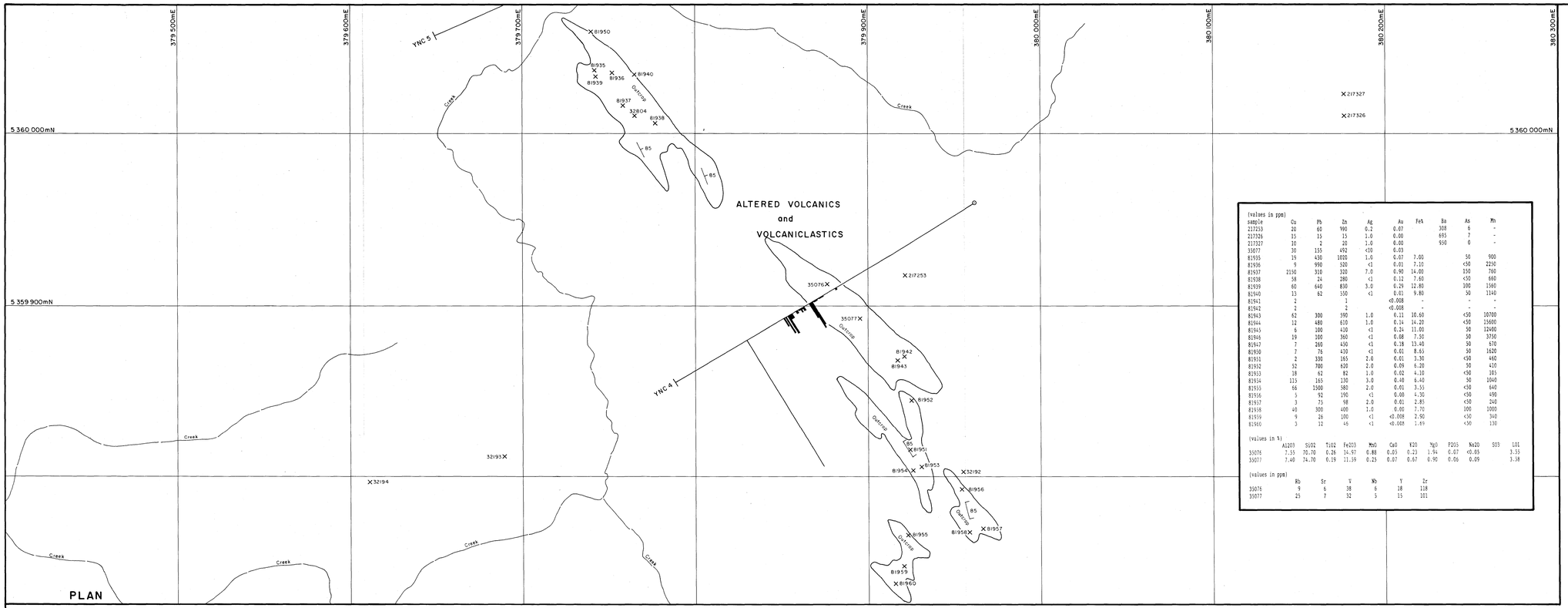
5 358 000m.N.

GEOLOGICAL INTERPRETATION

DRAWING No.

SCALE 1:1000 (0 20 40 METRES)

FIG. No. 5



(values in ppm)

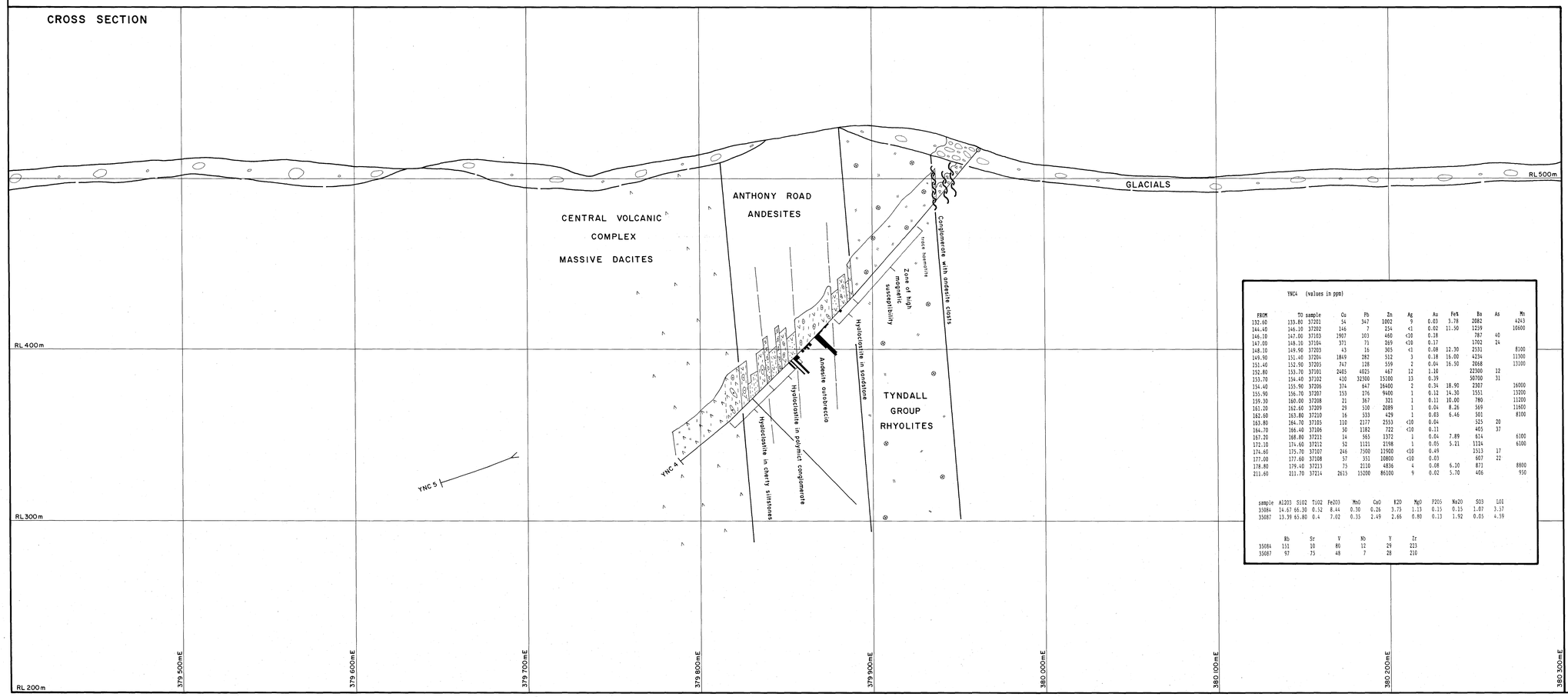
sample	Cu	Pb	Zn	Ag	Au	FeX	Ba	As	Mn
217253	20	60	990	0.2	0.07		308	6	-
217326	15	15	15	1.0	0.00		695	7	-
217327	10	2	20	1.0	0.00		950	0	-
35077	30	155	492	<10	0.03				
81935	19	430	1000	1.0	0.07	7.00		50	900
81936	9	990	500	<1	0.01	7.10		<50	2250
81937	2150	310	320	7.0	0.90	14.00		350	760
81938	58	24	280	<1	0.12	7.60		<50	660
81939	60	640	830	3.0	0.29	12.80		100	1560
81940	13	62	550	<1	0.01	9.80		50	1140
81941	2		1		<0.008	-		-	-
81942	2		2		<0.008	-		-	-
81943	62	300	590	1.0	0.11	10.60		<50	10700
81944	12	480	610	1.0	0.14	14.20		<50	15600
81945	6	100	410	<1	0.24	11.00		50	12400
81946	19	100	360	<1	0.08	7.50		50	3750
81947	7	260	450	<1	0.18	13.40		50	870
81950	7	76	410	<1	0.01	8.65		50	1620
81951	2	330	165	2.0	0.01	3.30		<50	460
81952	52	700	620	2.0	0.09	6.20		50	410
81953	18	92	82	1.0	0.02	4.10		<50	105
81954	115	165	130	3.0	0.40	6.40		50	1040
81955	66	1500	580	2.0	0.01	3.55		<50	640
81956	3	92	190	<1	0.00	4.35		<50	490
81957	3	75	98	2.0	0.01	2.85		<50	240
81958	40	300	400	1.0	0.00	7.70		100	1000
81959	9	26	100	<1	<0.008	2.90		<50	340
81960	3	12	45	<1	<0.008	1.69		<50	130

(values in %)

sample	Al2O3	SiO2	TiO2	Fe2O3	MnO	CaO	K2O	MgO	P2O5	Na2O	SO3	LOI
35076	7.35	70.70	0.26	14.97	0.88	0.03	0.23	1.94	0.07	<0.05		3.55
35077	7.40	74.70	0.29	11.39	0.25	0.07	0.87	0.90	0.06	0.09		3.38

(values in ppm)

sample	Rb	Sr	V	Nb	Y	Zr
35076	9	6	38	6	18	118
35077	25	7	32	5	15	101



YNCA (values in ppm)

FROM	TO	sample	Cu	Pb	Zn	Ag	Au	FeX	Ba	As	Mn
132.60	133.80	37201	54	347	1002	9	0.03	3.78	2082		4243
144.40	146.10	37202	146	7	254	<1	0.02	11.50	1239		10600
146.10	147.00	37203	1907	103	460	<10	0.28		787	40	
147.00	148.10	37204	371	71	269	<10	0.17		1762	24	
148.10	149.90	37203	43	16	365	<1	0.08	12.30	2531		8100
149.90	151.40	37204	1849	282	512	3	0.38	16.00	4234		11300
151.40	152.90	37203	747	128	559	2	0.04	16.50	2068		13100
152.80	153.70	37101	2405	4025	467	12	1.16		22300	12	
153.70	154.40	37102	410	32900	15100	13	0.39		50700	31	
154.40	155.90	37205	274	647	16400	2	0.34	18.90	2307		16000
155.90	156.70	37207	353	376	9400	1	0.12	14.30	1551		13200
159.30	160.00	37208	21	367	321	1	0.11	10.00	780		11200
161.20	162.60	37209	29	510	2089	1	0.04	8.26	569		11600
162.60	163.80	37210	16	533	429	1	0.03	6.46	501		8100
163.80	164.70	37105	110	2177	2553	<10	0.64		525	20	
164.70	166.40	37106	50	1182	722	<10	0.21		405	37	
167.20	168.80	37211	14	565	1372	1	0.04	7.89	614		6100
172.10	174.60	37212	52	1121	2198	1	0.05	5.21	1124		6100
174.60	175.70	37107	246	7500	13700	<10	0.49		1513	17	
177.00	177.60	37108	57	351	10800	<10	0.03		607	22	
178.80	179.40	37213	75	2110	4836	4	0.08	6.10	871		8800
211.60	211.70	37214	2615	15200	86100	9	0.02	5.70	406		950

sample	Al2O3	SiO2	TiO2	Fe2O3	MnO	CaO	K2O	MgO	P2O5	Na2O	SO3	LOI
35084	14.67	66.30	0.52	8.44	0.30	0.26	3.75	1.13	0.15	0.15	1.07	3.37
35087	13.39	65.80	0.4	7.02	0.35	2.49	2.66	0.80	0.13	1.92	0.05	4.59

	Rb	Sr	V	Nb	Y	Zr
35084	151	10	80	12	29	223
35087	97	75	48	7	28	210

LEGEND

1. GENERAL FORM

Rock type, colour, grain size, overall texture, constituents & textutres, alteration, mineralisation.

Rock Types can be combined using a –
Subordinate Rock Types are separated by /
Each Descriptor Group is separated by ,
Descriptors within a group are separated by ;
Derwent series 19 colours (in brackets) are intended for the Cambrian sequences.

2. ROCK TYPES

Lavas or Intrusives or Volcaniclastics	L I V	a	(14) acid
		i	(46) intermediate
		b	(44) basic
		u	(33) ultrabasic
		r	rhyolite
		d	(11) dacite
		a	(46) andesite
		ba	(48) basalt
		g	(20) granite
		di	(22) diorite
		do	(45) dolerite
		gb	(23) gabbro
		s	(23) serpentinite
Sediments or Volcaniclastics	S V	bsh	(38) black shale
		sh	(36) shale
		st	(38) siltstone
		sst	(34) sandstone
		*	(37) greywacke
		cong	(36) conglomerate
		bx	breccia
		tbd	turbidite
		mvf	mass flow
		ch1	(34) chert
		lst	(45) limestone
		dol	(46) dolomite
		fe	(44) iron formation
		gl	(4) glacial deposits
		fg	(4) fluvioglacial deposits
		alv	(4) alluvial deposits
		cvf	(4) colluvial deposits (talus)
Metamorphic and Tectonic Rocks	M	sch1	(38) schist
		qzt	(46) quartzite
		hf	(50) hornfels
		sk	(50) skarn
		mb	(46) marble
		m	mylonite
		fz	fault breccia (pug)
Colours should be hatched			
Unassigned		?	Use alone or as a qualifier to other rock types where uncertain

3. DESCRIPTORS

Colour:

pa	pale	bl	blue
dk	dark	wt	white
gy	grey	ye	yellow
or	orange	buf	buff
bk	black	gn	green
pk	pink	pur	purple
rd	red	cm	cream
brn	brown	kha	khaki

Grainsize:

fg	fine grained
mg	medium grained
cg	coarse grained
vcg	very coarse grained

DESCRIPTORS continued

Overall Texture:

fb	flow banded
fbx	flow brecciated
hyl	hyaloclastic
lp	lapilli
peg	pegmatitic
mav	massive
blo	blocky
aph	aphyric
por	porphyric
peg	pegmatitic
bd	bedded
xbd	cross bedded
ufs	upward fining sequence
pa	pisolitic
clst	clast supported
ma	matrix supported
fol	foliated
clvd	cleaved
shd	sheared
bx	brecciated
aug	augen
vnd	veined

Constituents & Internal Textures:

ply	polymict
li	lithic
pm	pumice
xl	crystal
vit	vitric
sph	spherulites
ves	vesicles
amy	amygdales
lth	lithics
xtl	xtalplates
f	feldspar
q	quartz
mic	micaceous
cal	calcareous
px	pyroxene
hb	hornblende
cr	chromite
mag	magnetite

Alteration:

bch	bleached
ch	chert-textured
ca	calcified
alb	albitised
cb	carbonatised
ep	epidotised
ser	sericitised
kao	kaolinitised
ep	epidotised
sil	silicified
fuc	fuchsitic

Mineralisation:

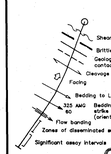
dis	disseminated
v	vein
str	stringer
mav	massive
bnd	banded
pbs	pebble
sp	spleen
wf	wulfenite
py	pyrite
po	pyrrhotite
cep	cressoyanite
gn	galena
sp	sphalerite
cp	chalcopyrite
ba	barite
mag	magnetite
hm	hematite
lm	limonite
au	gold
ag	silver
to	tourmaline
q	quartz
cb	carbonate
sd	siderite
mn	manganese carbonate
fl	fluorite

4. DIAMOND DRILLHOLE

Chloritic (Dacitic) Lavas/Sills
Siliceous (Rhyolitic) Lavas/Sills
Basic Dyke
Hyaloclastite, Peperite
Lava/sediment breccias
Breccia
Feldspar
Quartz Crystals
Lithic Clasts
Black Mudstone Clasts
Vesicles/Amygdales
Spherulites
Stylolite/"pseudo fiamme"
Pumice Breccia
Flow Banding
Cloudy silica or Nodular Carbonate alteration
Skarns
Sulphides
Schistose
Massive Sulphides
Brecciation (cracks/fracs/rafts)

4. MAPPING SYMBOLS

Strike and Dip of Strata (55)
Strike and dip of inverted strata
Strike and dip of cleavage or foliation (80)
Plunge of lineation (50)
Geological boundary position accurate
Geological boundary position approximate
Mine
Abandoned prospect or mine
Costean or trench
Diamond drill hole, including projection
I.P. Anomaly
Magnetic/Gravity/TM Lineaments
Magnetic Trend Line
Unconformity
Fault
Fault with dip (70)
Thrust Fault
Plunging antiform
Plunging synform
Shear/strong cleavage
Vein
Slt + Ser + Py Alteration Zone



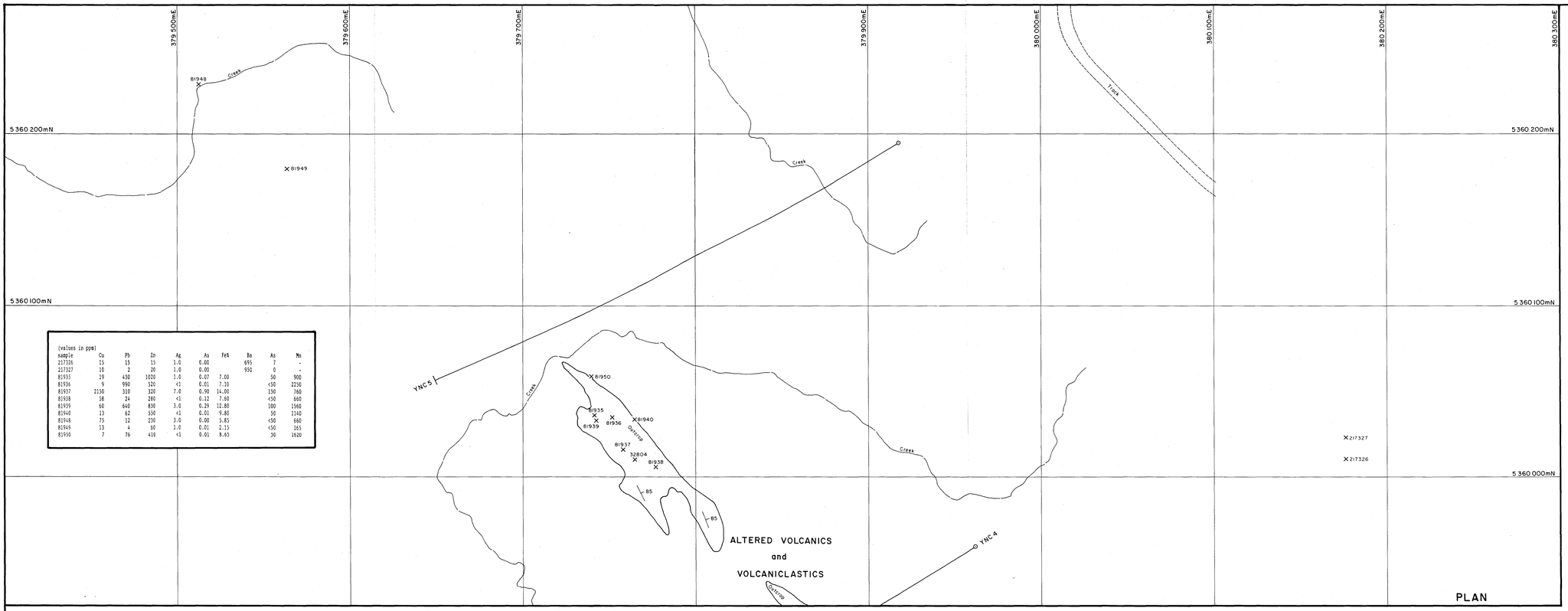
996217

5 cm

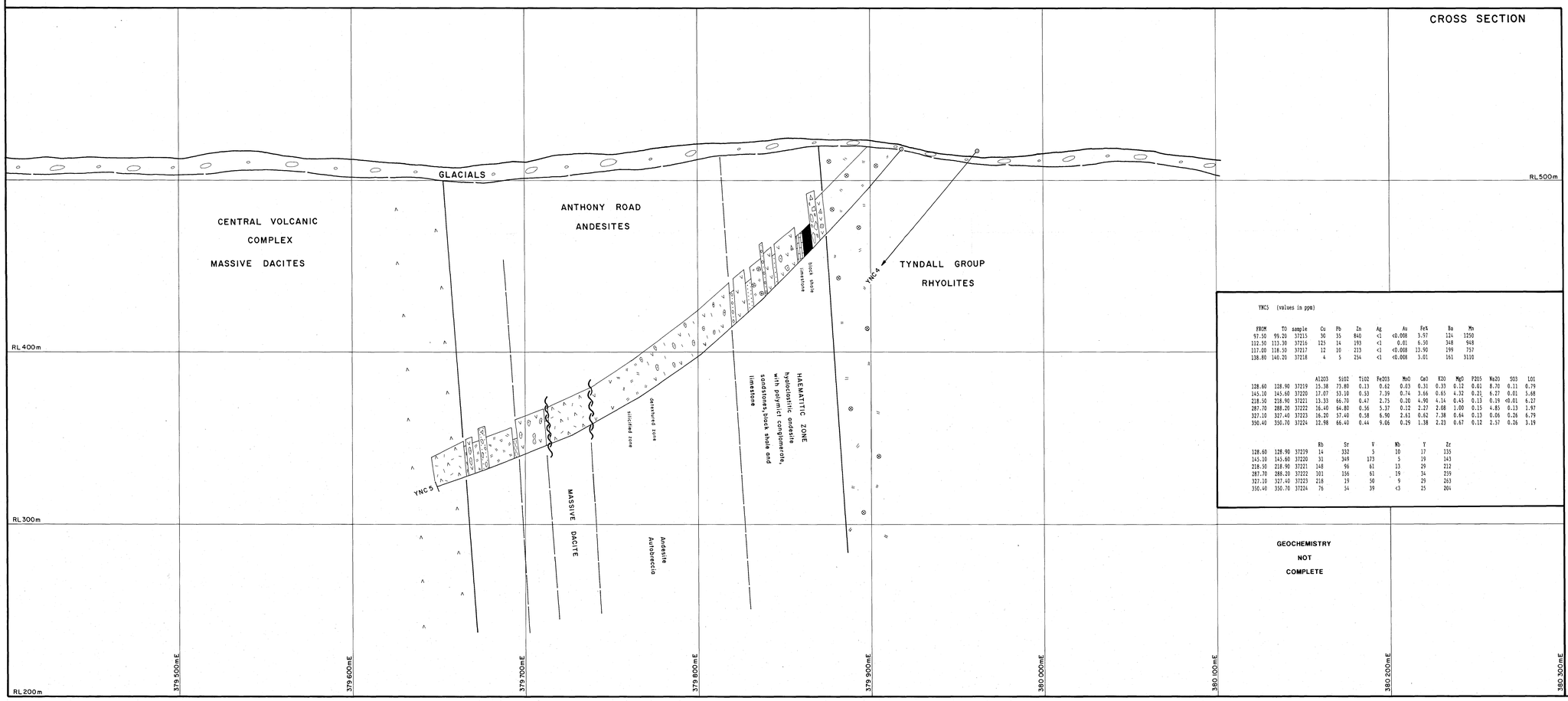
93-3477.1

PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

COMPILED : P.M.Q.	E.L. 11/85 - YOLANDE J.V.
DATE : JUNE, 1993	DRILL SECTION
DRAWN : N.W.D.S.	5 359 900mN.
REF:	GEOLOGICAL INTERPRETATION
REVISIONS :	
DRAWING No.	SCALE 1:1000 (0 20 40 METRES)
	FIG. No. 6



(values in ppb)									
sample	Cu	Pb	Zn	Ag	Au	Fe%	Ba	As	Mn
217326	15	15	15	1.0	0.00		695	7	-
217327	10	2	20	1.0	0.00		950	0	-
81935	19	430	1020	1.0	0.07	7.00		50	900
81936	9	990	520	<1	0.01	7.10		<50	2250
81937	2150	310	320	7.0	0.90	14.00		150	760
81938	18	24	280	<1	0.12	7.60		<50	660
81939	60	640	830	3.0	0.29	12.80		100	1560
81940	13	62	590	<1	0.01	9.80		50	1140
81948	75	12	230	3.0	0.00	5.83		<50	660
81949	13	4	60	1.0	0.01	2.15		<50	165
81950	7	76	410	<1	0.01	8.65		50	1620



YNC5 (values in ppm)

FROM	TO	sample	Cu	Pb	Zn	Ag	Au	Fe%	Ba	Mn
97.50	99.20	37215	50	35	840	<1	<0.008	3.97	124	1250
112.50	113.30	37216	125	14	193	<1	0.01	6.30	348	948
117.00	118.50	37217	12	10	213	<1	<0.008	13.90	199	757
138.80	140.20	37218	4	5	256	<1	<0.008	3.01	161	3110

		A1203	Si02	Ti02	Fe203	MnO	CaO	K20	MgO	P2O5	Na20	SO3	LOI
128.60	128.90	37219	15.38	73.80	0.13	0.62	0.03	0.31	0.33	0.12	0.01	8.70	0.11	0.79
143.10	143.60	37220	17.07	53.10	0.53	7.39	0.74	3.66	0.65	4.32	0.21	6.27	0.01	5.68
218.50	218.90	37221	13.33	66.70	0.47	2.75	0.20	4.90	4.14	0.43	0.13	0.19	<0.01	6.27
287.70	288.20	37222	16.40	64.80	0.56	5.37	0.12	2.27	2.08	1.00	0.15	4.85	0.13	1.97
327.10	327.40	37223	16.20	57.40	0.58	6.90	2.61	0.62	2.38	0.64	0.13	0.06	0.26	6.79
350.40	350.70	37224	12.98	66.40	0.44	9.06	0.29	1.38	2.23	0.67	0.12	2.37	0.26	3.19

		Rb	Sr	V	Nb	Y	Zr
128.60	128.90	37219	14	332	5	10	17	135
143.10	143.60	37220	31	349	173	5	19	143
218.50	218.90	37221	148	96	61	13	29	212
287.70	288.20	37222	101	156	61	19	34	259
327.10	327.40	37223	218	19	50	9	29	263
350.40	350.70	37224	76	54	39	<3	25	204

GEOCHEMISTRY
NOT
COMPLETE

LEGEND

1. GENERAL FORM

Rock type, colour, grain size, overall texture, constituents & textures, alteration, mineralisation.

Rock Types can be combined using a –
Subordinate Rock Types are separated by /
Each Descriptor Group is separated by ,
Descriptors within a group are separated by .
Derwent series 19 colours (in brackets) are intended for the Cambrian sequences.

2. ROCK TYPES

Lavas Intrusives or Volcaniclastics (L I V):

q	(14)	acid
i	(46)	intermediate
b	(44)	basic
u	(33)	ultrabasic
r		rhyolite
d	(11)	dacite
n	(44)	andesite
ba	(48)	basalt
g	(20)	granite
di	(22)	diorite
do	(45)	dolerite
gb	(35)	gabbro
s	(33)	serpentinite

Sediments or Volcaniclastics (S V):

bsh	(36)	black shale
sh	(36)	shale
slt	(30)	siltstone
sst	(39)	sandstone
w	(27)	greywacke
cong	(39)	conglomerate
bx		breccia
tbd		turbidite
msf		mass flow
cht	(34)	chert
lst	(65)	limestone
dol	(45)	dolomite
fe	(64)	iron formation
gl	(4)	glacial deposits
fg	(4)	fluvioglacial deposits
alv	(4)	alluvial deposits
col	(4)	colluvial deposits (talus)

Metamorphic and Tectonic Rocks (M):

sch	(38)	schist
qzt	(40)	quartzite
hf	(50)	hornfels
sk	(50)	skarn
mb	(46)	mantle
m		mylonite
fz		fault breccia (pug)

Colours should be hatched

Unassigned: ? — Use alone or as a qualifier to other rock types where uncertain

3. DESCRIPTORS

Colour:

ple	pale	bl	blue
dk	dark	wht	white
gy	grey	yel	yellow
or	orange	buf	buff
blk	black	grn	green
pk	pink	ppl	purple
rd	red	crm	cream
brn	brown	sha	shale

Grainsize:

fg	fine grained
mg	medium grained
cg	coarse grained
vcg	very coarse grained

DESCRIPTORS continued

Overall Texture:

fb	flow banded
flx	flow brecciated
hyl	hyaloclastic
pill	pillowed
pap	papertic
mav	massive
lam	laminated
aph	aphyric
por	porphyric
peg	pegmatitic
bd	bedded
xbd	cross bedded
ufs	upwards fining sequence
ps	poorly sorted
ce	clast supported
ms	matrix supported
fol	foliated
sfol	foliated
shd	sheared
bx	brecciated
ovg	ovgen
vnd	veined

Constituents & Internal Textures:

ply	polymict
lt	lithic
pm	pumice
xl	crystal
vtl	vitric
sph	spherulites
ves	vesicles
amy	amygdales
wsp	wisps
sty	stylolites
f	feldspar
q	quartz
mic	microcrenus
cal	calcareous
py	pyroxene
hb	hornblende
cr	chromite
mag	magnetite

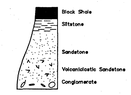
Alteration:

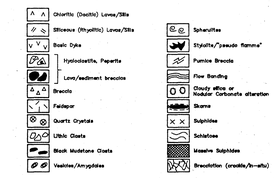
bch	bleached
dtx	de-textured
ox	oxidised
ab	albitised
cb	carbonatised
chl	chloritised
ser	sericitised
kao	kaolinitised
ep	epidotised
sil	silicified
fuc	fuchsitic

Mineralisation:

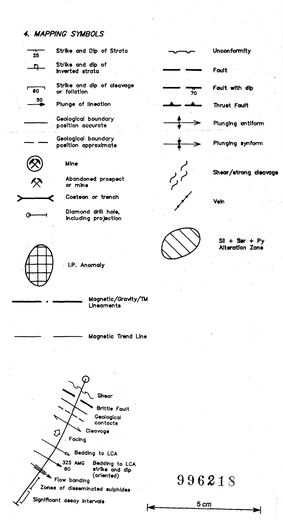
dis	disseminated
v	vein
str	stringer
mav	massive
brx	breccia
stc	stockwork
qse	qseson
sul	sulphides
py	pyrite
po	pyrrhotite
asp	arsenopyrite
gn	galena
sp	sphalerite
cp	chalcopyrite
bn	bornite
mag	magnetite
hm	haematite
lm	limonite
au	gold
ag	silver
to	tourmaline
q	quartz
cb	carbonate
sd	siderite
mn	manganese carbonate
fl	fluorite

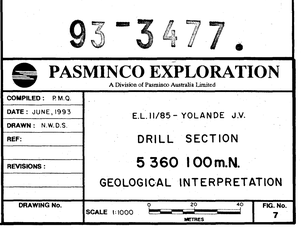
4. DIAMOND DRILLHOLE





4. MAPPING SYMBOLS



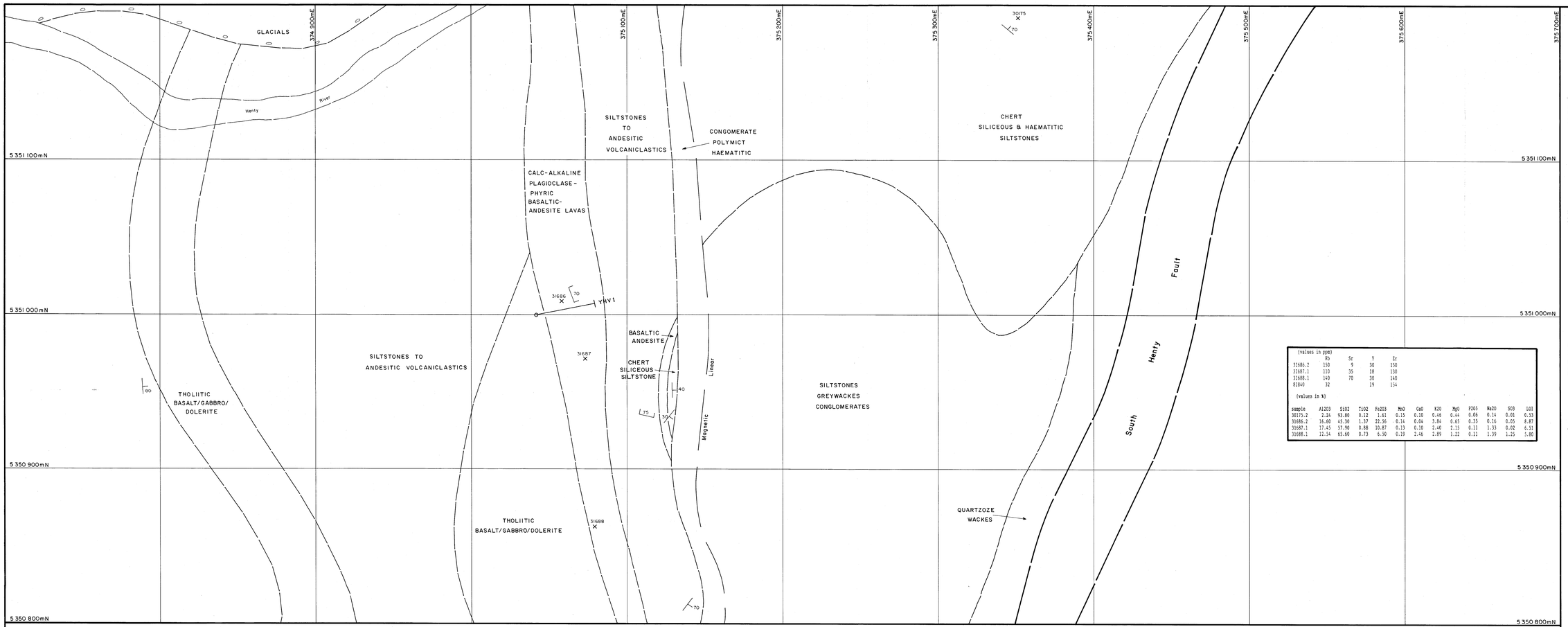


996218

93-3477.

PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

COMPILED: P.M.Q.	E.L. 11/85 - YOLANDE J.V.
DATE: JUNE, 1993	DRILL SECTION
DRAWN: N.W.D.S.	5 360 100m.N.
REF:	GEOLOGICAL INTERPRETATION
REVISIONS:	
DRAWING No.	SCALE 1:1000 (0 20 40 METRES) — FIG. No. 7



(values in ppm)	Rb	Sr	Y	Zr
31686.2	150	9	30	150
31687.1	110	35	18	130
31688.1	140	70	30	140
81840	32		19	154

(values in %)

sample	Al2O3	SiO2	TiO2	Fe2O3	MnO	CaO	K2O	MgO	P2O5	Na2O	SO3	LOI
30175.2	2.24	93.80	0.12	1.61	0.15	0.10	0.46	0.44	0.06	0.14	0.01	0.53
31686.2	16.60	45.30	1.37	22.56	0.14	0.04	3.84	0.65	0.35	0.16	0.05	8.87
31687.1	17.45	57.90	0.88	10.87	0.13	0.10	2.40	2.15	0.11	1.33	0.02	6.51
31688.1	12.54	65.60	0.73	6.50	0.19	2.46	2.89	1.22	0.11	1.39	1.25	5.80

LEGEND

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		d	(11) dacite
		n	(44) andesite
		ba	(46) basalt
		g	(20) granite
		di	(22) diorite
		do	(45) dolerite
		gb	(25) gabbro
		s	(23) serpentinite
Sediments or Volcaniclastics	S V	bsh	(36) black shale
		sh	(36) shale
		slt	(28) siltstone
		sst	(38) sandstone
		w	(37) greywacke
		cong	(38) conglomerate
		bx	breccia
		tbd	turbidite
		maf	mass flow
		cht	(34) chert
		lst	(65) limestone
		dol	(65) dolomite
		fe	(64) iron formation
		gl	(4) glacial deposits
		fg	(4) fluvioglacial deposits
		dlv	(4) alluvial deposits
		cvl	(4) colluvial deposits (talus)
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		qzt	(46) quartzite
		hf	(50) hornfels
Colours should be hatched		sk	(50) skarn
		mb	(46) marble
		m	mylonite
		fz	fault breccia (pug)
Unassigned		?	Uses alone or as a qualifier to other rock types where uncertain

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brn	brown	kha	khaki

Grainsize:

fg	fine grained
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cg	coarse grained
vcg	very coarse grained

DESCRIPTORS continued

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por	porphyritic
blo	blocky
sph	aphyric
por	porphyritic
peg	pegmatitic
bd	bedded
xbd	cross bedded
ufs	upwards fining sequence
ps	poorly sorted
cs	clast supported
ms	matrix supported
fol	foliated
clvd	cleaved
shd	sheared
bx	brecciated
aug	augen
vnd	veined

Constituents & Internal Textures:

py	polymict
lithic	lithic
pm	pumice
xl	crystal
vtl	vitric
sph	spherulites
ves	vesicles
amy	amygdales
wsp	wisps
sty	stylolites
f	feldspar
q	quartz
mic	micaceous
cal	calcareous
px	pyroxene
hb	hornblende
cr	chromite
mag	magnetite

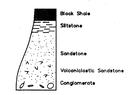
Alteration:

bch	bleached
dtx	de-textured
ox	oxidised
alb	albitised
ca	carbonatised
chl	chloritised
ser	sericitised
epi	epidotised
sp	spilitised
sil	silicified
fus	fusitastic

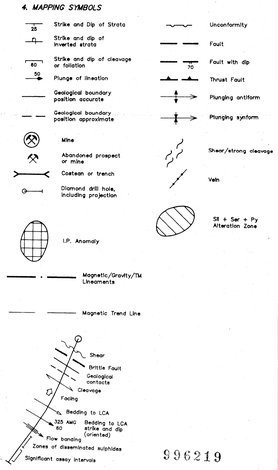
Mineralisation:

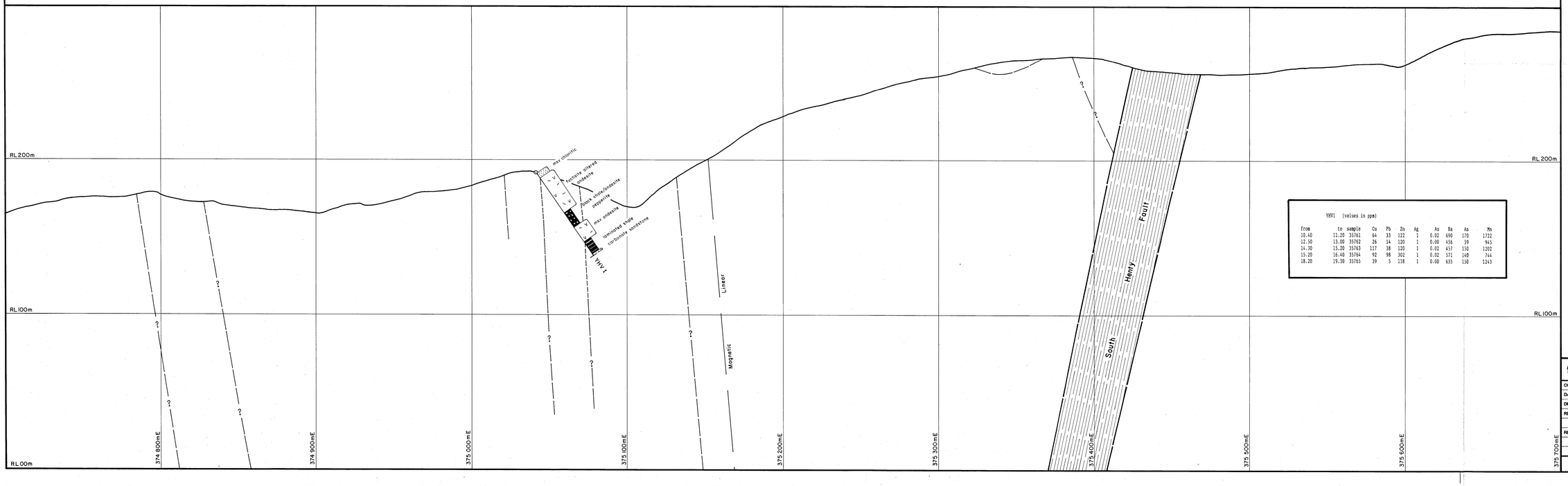
dis	disseminated
v	vein
str	stringer
mav	massive
bnd	banded
clo	clasts
gse	gossan
sul	sulphides
py	pyrite
po	pyrrhotite
cp	chalcopyrite
bo	bottle
mag	magnetite
hm	haematite
im	ilmonite
au	gold
ag	silver
cc	calcite/aline
q	quartz
cb	carbonate
sd	siderite
mn	manganese carbonate
fl	fluorite

4. DIAMOND DRILLHOLE



4. MAPPING SYMBOLS





YHV1 (values in ppm)										
from	to	sample	Cu	Pb	Zn	Ag	Au	Ba	As	Mn
10.40	11.20	35761	64	33	122	1	0.02	690	170	1722
12.50	13.00	35762	26	14	120	1	0.00	456	59	965
14.30	15.20	35763	117	38	120	1	0.02	457	150	1202
15.20	16.40	35764	92	98	302	1	0.02	571	149	744
18.20	19.30	35765	39	5	118	1	0.00	635	150	1243

996219

5 cm

93-3477.1

PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

COMPILED : P.M.Q.	E.L. 11/85 – YOLANDE J.V.
DATE : 26-7-93	DRILL SECTION
DRAWN : N.W.D.S.	5 351 000m.N.
REF:	GEOLOGICAL INTERPRETATION
REVISIONS :	
DRAWING No.	SCALE 1:1000 (0, 20, 40 METRES)
	FIG. No. 8

YOLANDE WHOLE ROCK GEOCHEMISTRY
(values in %)

sample	Al2O3	SiO2	TiO2	Fe2O3	MnO	CaO	K2O	MgO	Na2O	P2O5	S	LOI
31483	15.99	64.10	0.51	7.43	0.06	0.03	3.78	2.28	1.04	0.12		4.78
31484	9.48	70.40	0.62	11.89	0.06	0.01	2.45	0.40	<0.05	0.14		4.14
31488	13.34	74.80	0.32	1.93	0.04	0.49	0.82	0.30	3.98	0.05		1.03
31490	14.60	69.70	0.51	5.60	0.06	1.10	2.41	0.77	2.68	0.13		2.67
31491	15.10	62.60	0.42	6.60	0.10	2.51	2.45	3.36	4.63	0.18		1.62
31492	13.20	72.00	0.49	4.13	0.07	0.97	0.33	1.13	5.75	0.06		1.17
31494	15.50	69.30	0.51	5.05	0.03	0.14	3.18	1.10	2.58	0.14		2.34
31495	10.86	77.30	0.18	3.05	0.07	1.19	2.90	1.03	0.56	0.03		2.43
31496	11.96	69.30	0.47	4.76	0.07	1.85	2.54	1.39	2.11	0.08		2.92
31497	18.01	61.30	0.56	5.90	0.10	0.83	5.10	1.67	1.25	0.25		4.08
31499	15.15	67.30	0.56	5.44	0.05	0.23	2.71	1.73	2.18	0.14	1	4.21
31500	12.89	72.10	0.43	3.93	0.01	0.08	1.82	0.37	4.24	0.04	3	3.30
35009	14.96	70.00	0.52	5.20	0.03	0.10	3.52	1.09	1.42	0.10	0	3.18
35010	13.77	74.80	0.32	2.45	0.02	0.02	2.09	0.84	1.87	0.02	0	3.32
35011	15.91	72.40	0.36	2.26	0.02	0.06	4.79	0.30	0.07	0.09	0	2.83
35012	15.03	73.90	0.34	2.51	0.04	0.10	4.47	0.47	0.05	0.11	0	2.80
35037	12.16	73.10	0.41	4.78	0.02	0.08	2.72	0.31	2.38	0.08	3	3.63
35039	14.74	69.70	0.32	2.92	0.03	0.18	5.18	0.94	1.40	0.14	1	2.98
35041	16.62	66.30	0.58	4.44	0.08	0.35	1.85	1.81	5.29	0.16	0	2.42
35042	11.83	70.30	0.39	3.13	0.02	0.19	2.48	0.58	1.40	0.14	4	4.73
35043	10.90	74.90	0.20	3.23	0.14	1.39	1.93	0.55	2.78	0.04	0	3.69
35064	17.42	66.20	0.69	3.79	0.04	<0.01	4.31	1.84	0.19	0.12		5.38
35066	22.90	56.10	0.70	4.29	0.04	0.15	5.04	2.61	0.93	0.17		5.52
35068	13.64	73.90	0.66	2.36	0.02	0.01	3.91	0.97	0.16	0.02		4.42
35069	14.09	71.40	0.50	3.19	0.07	0.58	0.77	1.07	4.74	0.06	0	3.25
35070	12.40	73.20	0.55	3.94	0.01	0.01	2.71	1.65	1.07	0.06		4.49
35071	14.74	70.30	0.51	3.53	0.08	0.69	1.72	1.01	3.96	0.10	0	1.26
35073	13.58	72.40	0.48	2.33	0.04	2.25	1.74	1.68	1.99	0.08	0	3.37
35075	13.83	69.30	0.86	3.71	0.02	0.01	3.31	2.20	0.10	0.04		6.25
35076	7.55	70.70	0.26	14.97	0.88	0.05	0.23	1.94	<0.05	0.07	0	3.35
35077	7.40	74.70	0.19	11.59	0.25	0.07	0.67	0.90	0.09	0.06	1	3.58

YOLANDE SOIL SAMPLING : NEWTON CREEK
Job number 9262 (values in ppm unless otherwise stated)

sample	type	Cu	Pb	Zn	Ag	Fe%	Mn	As
35018	rock	15	32	82	<1	4.30	269	14
35019	soil	180	285	285	<1	19.60	1680	50
35020	rock	44	58	77	<1	0.91	176	3
35021	soil	13	10	40	<1	3.00	58	3
35022	wacker	4	22	68	<1	1.31	70	<1
35023	soil	220	19	285	<1	8.00	730	<1
35024	soil	43	12	200	<1	10.00	198	4
35025	soil	13	8	140	<1	6.70	127	2
35026	soil	3	4	29	<1	0.81	35	2
35027	soil	4	12	6	<1	0.21	15	2
35028	soil	4	4	5	<1	0.31	21	2
35029	soil	3	4	6	<1	0.25	20	3
35030	soil	5	4	33	<1	1.70	115	6
35031	soil	4	5	11	<1	1.53	44	6
35032	soil	5	3	29	<1	1.07	68	3
35033	soil	9	7	53	<1	1.79	98	2
35034	soil	6	7	74	<1	2.58	74	2
35035	soil	15	9	93	<1	4.36	144	2
35036	soil	13	16	185	<1	7.10	293	5

YOLANDE LITHOGEOCHEMISTRY
(values in ppm)

sample	Rb	Sr	V	Nb	Y	Zr
31483	124	23	196	10	21	144
31484	58	61	89	6	34	181
31488	34	173	<5	16	39	280
31490	89	134	53	16	30	227
31491	51	367	162	3	20	137
31492	8	374	28	14	37	294
31494	114	63	54	9	38	243
31495	109	40	6	15	35	227
31496	93	131	101	9	32	173
31497	195	168	215	5	14	142
35009	114	34	40	8	35	244
35010	100	39	<5	15	34	250
35011	168	13	68	12	32	257
35038	63	62	<5	15	38	211
35039	226	222	40	9	24	222
35041	85	307	44	12	44	268
35069	28	242	26	16	30	269
35071	39	187	26	15	33	263
35073	87	371	34	15	38	243
35076	9	6	38	6	18	118
35077	23	7	32	5	15	101

YOLANDE ORE SUITE GEOCHEMISTRY
(values in ppm unless otherwise stated)

sample	Cu	Pb	Zn	Ag	Au	Fe%
31486	17	32	88	<1	-	4.31
31487	60	20	165	<1	-	8.69
31489	190	875	350	29	-	31.10
31499	9	28	74	<1	0.01	4.07
31500	11	18	17	<1	<0.008	1.22
35013	11	78	104	<1	0.02	5.98
35014	55	462	736	1	<0.008	2.01
35037	17	253	385	2	<0.008	1.28
35039	12	42	66	<1	<0.008	1.90
35042	15	5900	2375	5	<0.008	1.20
35043	6	363	403	<1	<0.008	2.28
35044	40	<25	105	<10	<0.008	37.80
35045	30	35	365	<10	<0.008	15.70
35066	26	<25	83	<10	0.01	-
35077	30	155	492	<10	0.03	-

YOLANDE Zinc Number

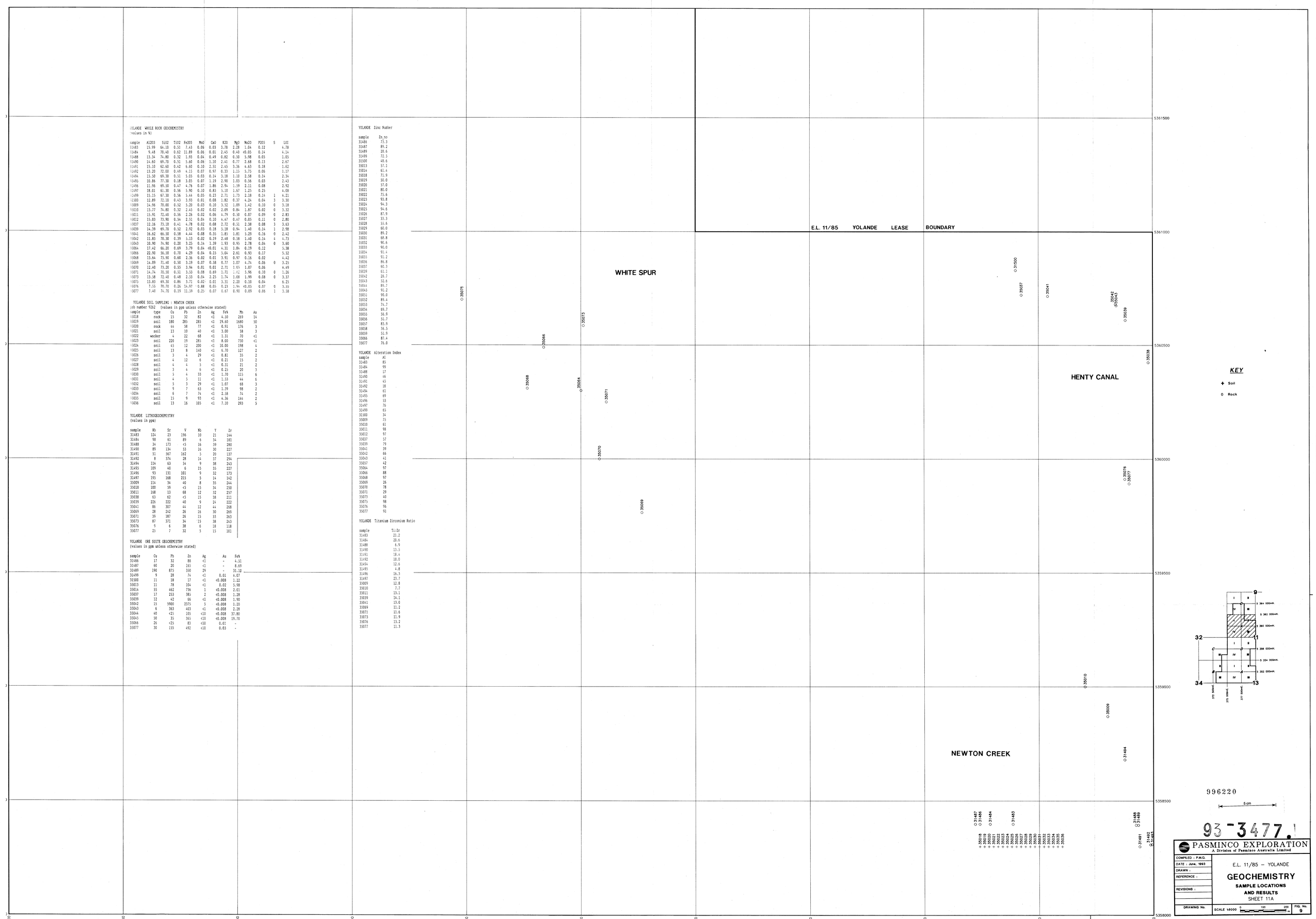
sample	Zn.no
31486	73.3
31487	89.2
31489	28.6
31499	72.5
31500	48.6
35013	57.1
35014	61.4
35018	71.9
35019	90.0
35020	57.0
35021	80.0
35022	73.6
35023	93.8
35024	94.3
35025	94.6
35026	87.9
35027	33.3
35028	33.6
35029	60.0
35030	89.2
35031	68.8
35032	90.6
35033	90.0
35034	91.4
35035	91.2
35036	86.8
35037	60.3
35039	61.1
35042	28.7
35043	32.6
35044	89.7
35045	91.2
35051	90.0
35052	89.4
35053	74.7
35054	69.7
35055	56.9
35056	51.7
35057	83.9
35058	56.5
35059	51.9
35066	87.4
35077	76.0

YOLANDE Alteration Index

sample	AI
31483	85
31484	99
31488	17
31490	46
31491	43
31492	18
31494	61
31495	69
31496	53
31497	76
31499	63
31500	34
35009	75
35010	61
35011	98
35012	97
35037	57
35039	79
35041	39
35042	66
35043	41
35057	42
35064	97
35066	88
35068	97
35069	26
35070	78
35071	29
35073	40
35075	98
35076	96
35077	91

YOLANDE Titanium Zirconium Ratio

sample	Ti:Zr
31483	21.2
31484	20.6
31488	6.9
31490	13.5
31491	18.4
31492	10.0
31494	12.6
31495	4.8
31496	16.3
31497	23.7
35009	12.8
35010	7.7
35011	13.1
35039	14.1
35041	13.0
35069	11.2
35071	11.6
35073	11.9
35076	13.2
35077	11.3



KEY
+ Soil
O Rock

996220

5 cm

93-3477.1

PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

COMPILED : P.M.G.	E.L. 11/85 – YOLANDE
DATE : June, 1993	**GEOCHEMISTRY**
DRAWN :	**SAMPLE LOCATIONS AND RESULTS**
REFERENCE :	SHEET 11A
REVISIONS :	
DRAWING No.	SCALE 1:5000 0 100 200 m
	FIG. No. 9

E.L. 11/85 YOLANDE LEASE BOUNDARY

WHITE SPUR
SOIL SAMPLING
MT. LYELL 1975

NEWTON CREEK
RECENT
SOIL & ROCK
SAMPLING

KEY

○ < 50 ppm

○ 270 Values in ppm
size of marker proportional to value

5362000
5361500
5361000
5360500
5360000
5359500
5359000
5358500
5358000

175000 175500 176000 176500 177000 177500 178000 178500 179000 179500 180000

9
32 11
34 13

5 364 000mN.
5 362 000mN.
5 360 000mN.
5 358 000mN.
5 356 000mN.
5 354 000mN.
5 352 000mN.

375 500mE. 376 000mE. 376 500mE.

996221

5 cm

93-3477.

PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

COMPILED : P.M.G.	E.L. 11/85 – YOLANDE
DATE : June, 1993	**GEOCHEMISTRY**
DRAWN :	**Zn VALUES**
REFERENCE :	SHEET 11A
REVISIONS :	
DRAWING No.	SCALE 1:5000 0 100 200 m
	FIG. No. 10

E.L. 11/85 YOLANDE LEASE BOUNDARY

WHITE SPUR
SOIL SAMPLING
MT. LYELL 1975

NEWTON CREEK
RECENT
SOIL & ROCK
SAMPLING

KEY

< 50 ppm

270 Values in ppm
size of marker proportional to value

996222

93-3477.

PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

COMPILED : P.M.G.	E.L. 11/85 – YOLANDE
DATE : June, 1993	**GEOCHEMISTRY**
DRAWN :	**Pb VALUES**
REFERENCE :	SHEET 11A
REVISIONS :	
DRAWING No.	SCALE 1:5000 FIG. No. 11

E.L. 11/85 YOLANDE LEASE BOUNDARY

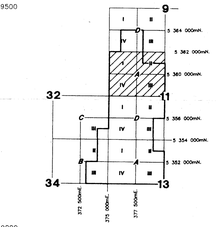
WHITE SPUR
SOIL SAMPLING
MT. LYELL 1975

NEWTON CREEK
RECENT
SOIL & ROCK
SAMPLING

KEY

○ < 50 ppm

◯ 270 Values in ppm
size of marker proportional to value



996223

5 cm

93-3477.

PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

COMPILED : P.M.G.	E.L. 11/85 – YOLANDE
DATE : June, 1993	**GEOCHEMISTRY**
DRAWN :	**Cu VALUES**
REFERENCE :	SHEET 11A
REVISIONS :	
DRAWING No.	SCALE 1:5000 0 100 200 m — FIG. No. 12

E.L. 11/85 YOLANDE LEASE BOUNDARY

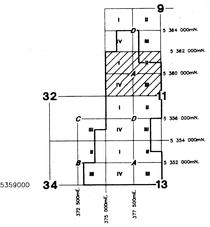
5361500
5361000
5360500
5360000
5359500
5359000
5358500
5358000

375000 375500 376000 376500 377000 377500 378000 378500 379000 379500 380000

KEY

○ < 0.01 ppm

○ 270 Values in ppm
size of marker proportional to value



996224

5 cm

93-3477

PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

COMPILED : P.M.G.	E.L. 11/85 – YOLANDE
DATE : June, 1993	**GEOCHEMISTRY**
DRAWN :	**Au VALUES**
REFERENCE :	SHEET 11A
REVISIONS :	
DRAWING No.	SCALE 1:5000 0 100 200 m — FIG. No. 13

E.L. 11/85 YOLANDE LEASE BOUNDARY

WHITE SPUR

NEWTON CREEK

5361500
5361000
5360500
5360000
5359500
5359000
5358500
5358000

375000
375500
376000
376500
377000
377500
378000
378500
379000
379500
380000

KEY

< 500 ppm

270 Values in ppm
size of marker proportional to value

32 9 11 34 13

5 364 000mN.
5 362 000mN.
5 360 000mN.
5 358 000mN.
5 356 000mN.
5 354 000mN.
5 352 000mN.

375 500mE
375 700mE
377 300mE

996225

5 cm

93-3477.1

PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

COMPILED : P.M.G.	E.L. 11/85 – YOLANDE
DATE : June, 1993	**GEOCHEMISTRY**
DRAWN :	**Ba VALUES**
REFERENCE :	SHEET 11A
REVISIONS :	
DRAWING No.	SCALE 1:5000 0 100 200 m — FIG. No. 14

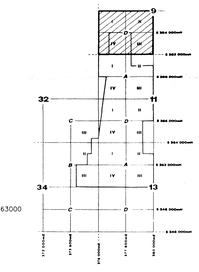
E.L. 11/85 YOLANDE LEASE BOUNDARY

WHITE SPUR
SOIL SAMPLING
MT. LYELL 1975

KEY

○ < 50 ppm

◯ 270 Values in ppm
size of marker proportional to value



996226

5 cm

93-3477.

PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

COMPILED : P.M.G.	E.L. 11/85 – YOLANDE
DATE : June, 1993	**GEOCHEMISTRY**
DRAWN :	**Cu VALUES**
REFERENCE :	SHEET 9D
REVISIONS :	
DRAWING No.	SCALE 1:5000 0 100 200 m — FIG. No. 15

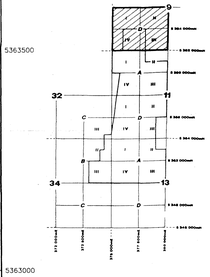
E.L. 11/85 YOLANDE LEASE BOUNDARY

WHITE SPUR
SOIL SAMPLING
MT. LYELL 1975

KEY

○ < 50 ppm

◯ 270 Values in ppm
size of marker proportional to value



996227

5 cm

93-3477.

PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

COMPILED : P.M.G.	E.L. 11/85 – YOLANDE
DATE : June, 1993	**GEOCHEMISTRY**
DRAWN :	**Zn VALUES**
REFERENCE :	SHEET 9D
REVISIONS :	
DRAWING No.	SCALE 1:5000 0 100 200 m — FIG. No. 16

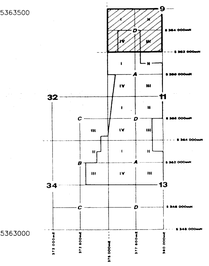
E.L. 11/85 YOLANDE LEASE BOUNDARY

WHITE SPUR
SOIL SAMPLING
MT. LYELL 1975

KEY

○ < 50 ppm

◯ 270 Values in ppm
size of marker proportional to value



996228

5 cm

93-3477.

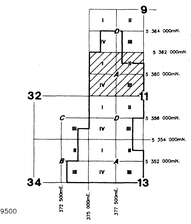
PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

COMPILED : P.M.O.	E.L. 11/85 – YOLANDE
DATE : June, 1993	**GEOCHEMISTRY**
DRAWN :	**Pb VALUES**
REFERENCE :	SHEET 90
REVISIONS :	
DRAWING No.	SCALE 1:5000 (0, 100, 200 m) — FIG. No. 17

5361500
5361000
5360500
5360000
5359500
5359000
5358500
5358000

375000 375500 376000 376500 377000 377500 378000 378500 379000 379500 380000

35041
35042
35043
32856
32196
32197
32176
35010
35009
32173
31536
31484
32170
32153
32865
32867
32860
32850.2
32850.1
31488
31498
35017
31493
31492
31491



996229

5 cm

93-3477.1

PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

COMPILED : P.M.O	E.L. 11/85 YOLANDE
DATE : JUNE, 1993	**PETROLOGY**
DRAWN :	SAMPLE LOCATIONS
REF:	
REVISIONS :	SHEET 11A
DRAWING No.	SCALE 1:5,000 (0 100 200 metres)
	FIG. No. 18

KEY

\+ GRAVITY STATION

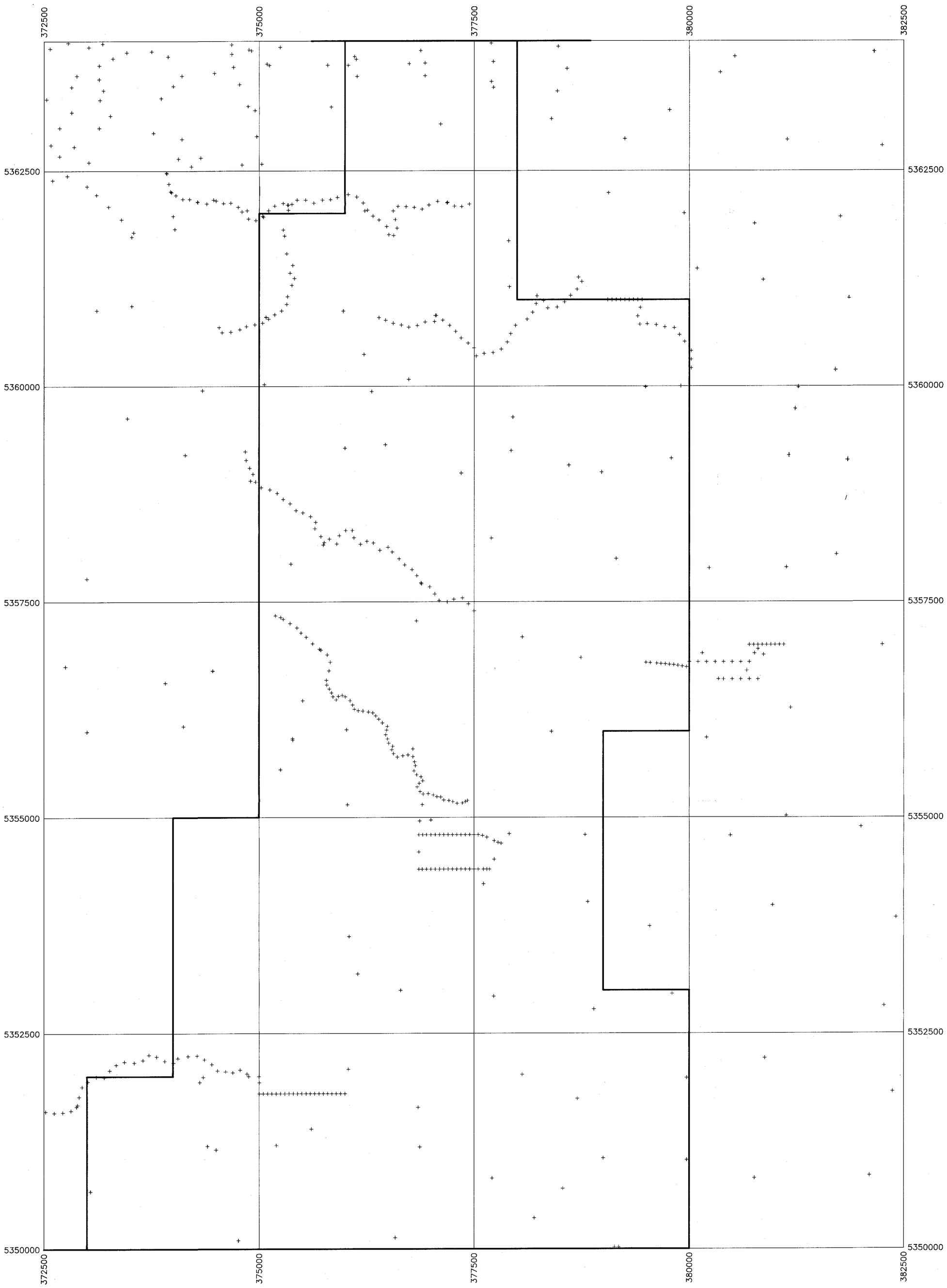
PASMINCO EXPLORATION
A Division of Pasminco Australia Limited

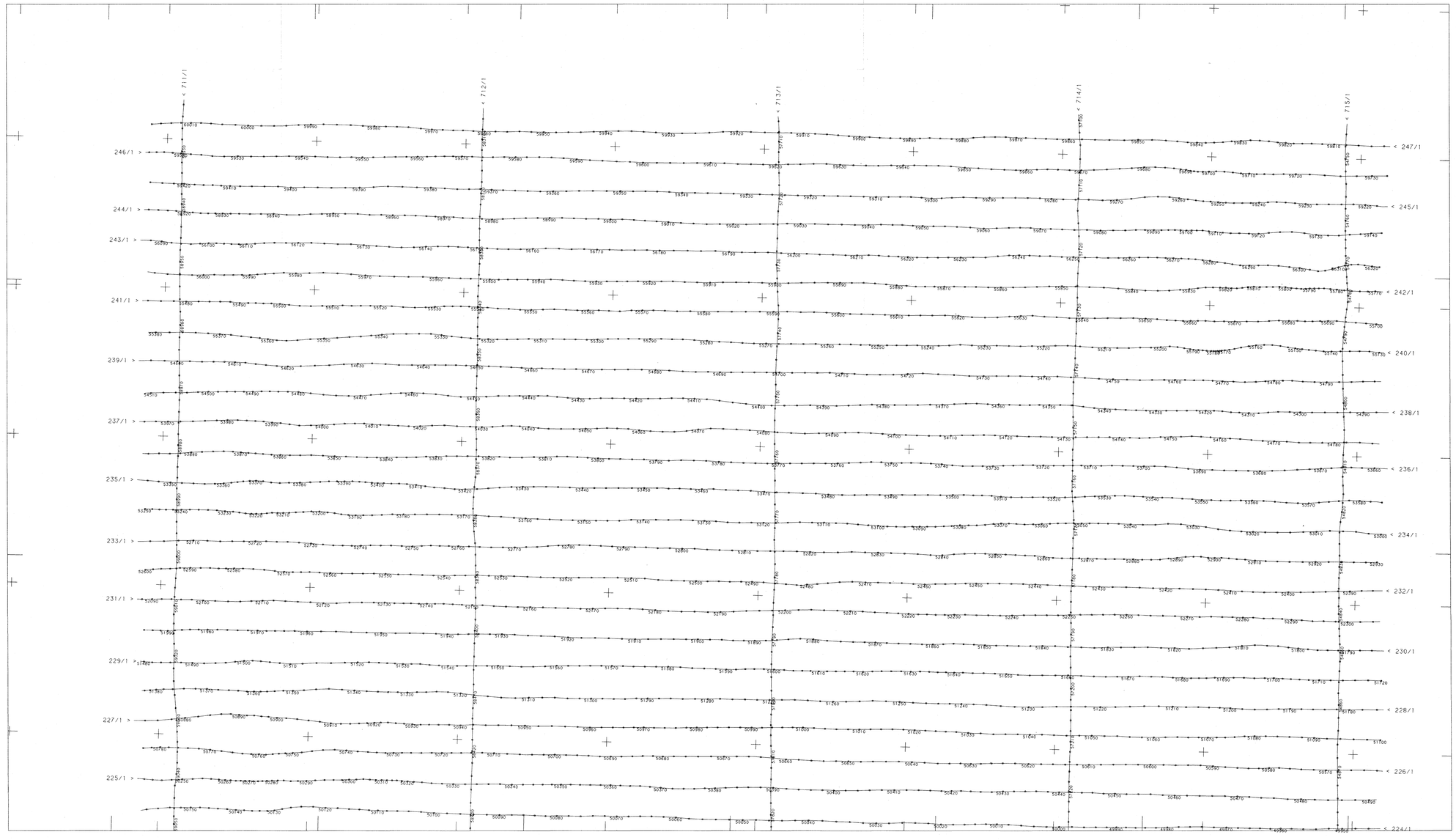
COMPILED : P.M.Q.	E.L. 11/85 - YOLANDE J.V.
DATE : JULY, 1993	YOLANDE
DRAWN : P.M.Q.	GRAVITY
REF:	STATION LOCATION
REVISIONS :	
DRAWING No.	SCALE 1:25,000 (0 500 1000 METRES) — FIG. No. 40

93-3477.

5 cm

996230





AIRBORNE SURVEY SPECIFICATIONS

AIRCRAFT :	Squirrel Helicopter
MAGNETOMETER :	SCINTREX cesium vapour optical absorption towed as a bird Sensitivity : 0.05 nT
RECORDING INTERVAL :	0.1 sec
NOMINAL TERRAIN CLEARANCE :	Sensor in towed bird at 80 m
SPECTROMETER :	Nuclear Data 256 channel ADC Volume : 16.8 litres
TOTAL COUNT WINDOW :	0.41 - 2.82 MeV
POTASSIUM WINDOW :	1.35 - 1.57 MeV
URANIUM WINDOW :	1.63 - 1.89 MeV
THORIUM WINDOW :	2.42 - 2.82 MeV
RECORDING INTERVAL :	1.0 sec
DATA RECORDING :	Geoterrex MADACS acquisition system Digital to magnetic tape
NOMINAL TERRAIN CLEARANCE :	Detectors in aircraft at 110 m
NOMINAL LINE SPACING :	Traverse lines 200 m Tie lines 2000 m
FLIGHT PATH NAVIGATION :	SERCEL NR103 GPS and SERCEL NDS100 UHF DGPS navigation system
FLIGHT PATH RECORD :	real time from UHF DGPS system corrected for selected availability

FLIGHT PATH

Grid notation refers to Australian Map Grid Zone 55
Navigation fix 32768

5351000N
5350000N
5349000N
5348000N
5347000N
5346000N

MAP INDEX
145°26'30"E 145°33'30"E
41°59'00"S — 1 — 41°59'00"S
42°02'00"S — 2 — 42°02'00"S
145°26'30"E 145°33'30"E

996231

5cm

TN GN MN

Grid Convergence = 1.90°
Declination = 13.03°

SCALE 1:10000

200 0 200 400 600 800 m

93-3477.

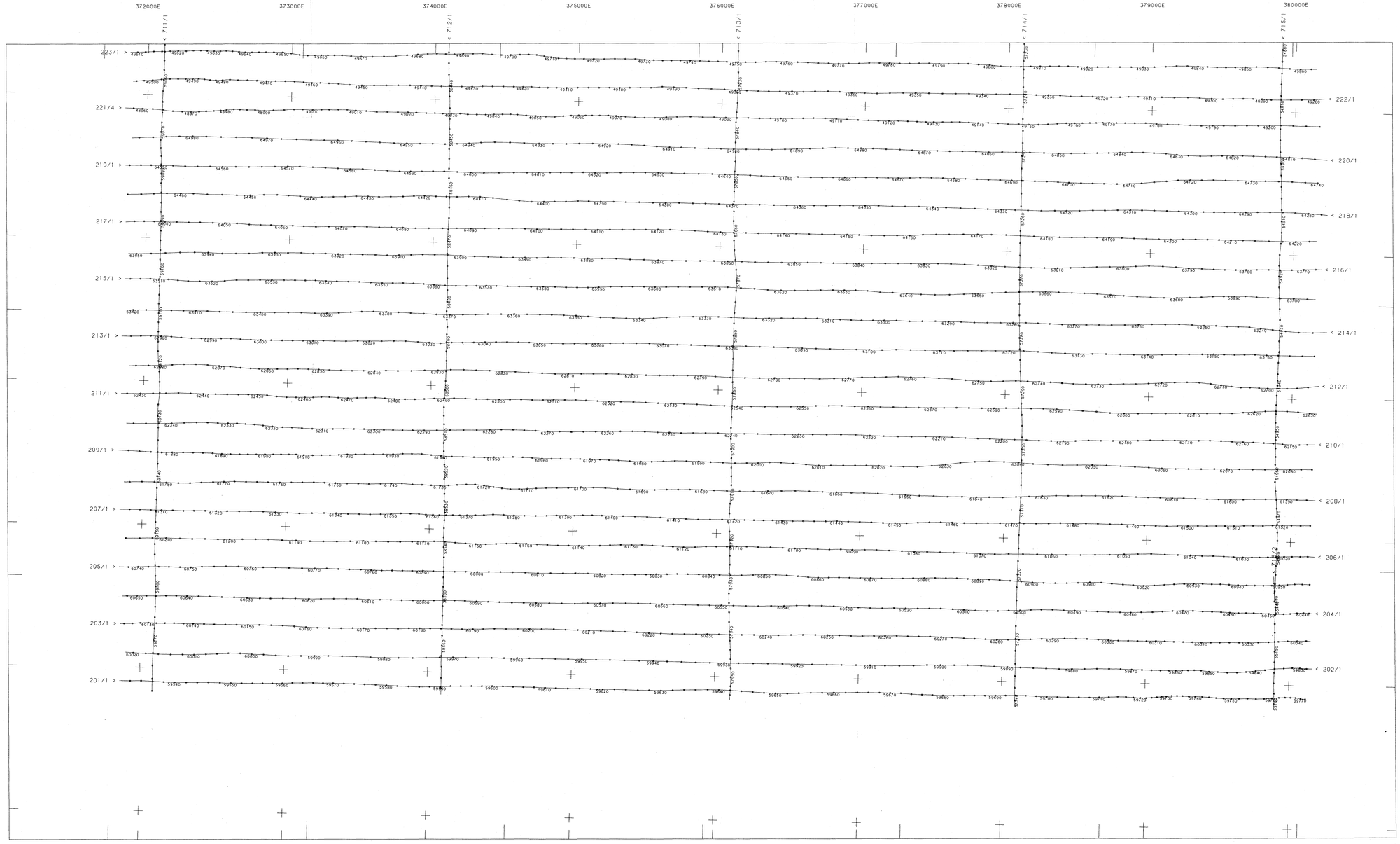
JOB NO : 3-446
Surveyed by GEOTERREX PTY LTD : March 1993
Compiled by GEOTERREX PTY LTD., SYDNEY
Processed by GEOTERREX PTY LTD., SYDNEY

PASMINCO EXPLORATION

YOLANDE RIVER EL 25/91
FLIGHT PATH
BURNIE SK55-3
SHEET 1 OF 2

fig.41

DRAWING NO: | DATE : 13-MAY-1993



AIRBORNE SURVEY SPECIFICATIONS

AIRCRAFT :	Squirrel Helicopter
MAGNETOMETER :	SCINTREX cesium vapour optical absorption mounted on a bird Sensitivity : 0.05 nT
RECORDING INTERVAL :	0.1 sec
NOMINAL TERRAIN CLEARANCE :	Sensor in towed bird at 80 m
SPECTROMETER :	Nuclear Data 256 channel ADC Volume : 16.8 litres
TOTAL COUNT WINDOW :	0.4 - 3.00 MeV
POTASSIUM WINDOW :	1.35 - 1.57 MeV
URANIUM WINDOW :	1.63 - 1.89 MeV
THORIUM WINDOW :	2.42 - 2.82 MeV
RECORDING INTERVAL :	1.0 sec
DATA RECORDING :	Geoterrex MADACS acquisition system Digital to magnetic tape
NOMINAL TERRAIN CLEARANCE :	Detectors in aircraft at 110 m
NOMINAL LINE SPACING :	Traverse lines 200 m Tie lines 2.0 km
FLIGHT PATH NAVIGATION :	SERCEL NR103 GPS and SERCEL NDS100 UHF DGPS navigation system
FLIGHT PATH RECORD :	real time from UHF DGPS system corrected for selected availability

FLIGHT PATH

Grid notation refers to Australian Map Grid Zone 55
Navigation fix

32768

MAP INDEX

145°26'30"E 145°33'30"E
41°59'00"S 41°59'00"S
1
2
42°05'00"S 42°05'00"S
145°26'30"E 145°33'30"E

996232

5cm

GN
TN
MN

Grid Convergence = 1.01°
Declination = 13.03°

SCALE 1:10000

200 0 200 400 600 800 m

93-3477.

JOB NO : 3-446
Surveyed by GEOTERREX PTY LTD : March 1993
Compiled by GEOTERREX PTY LTD. SYDNEY
Processed by GEOTERREX PTY LTD. SYDNEY

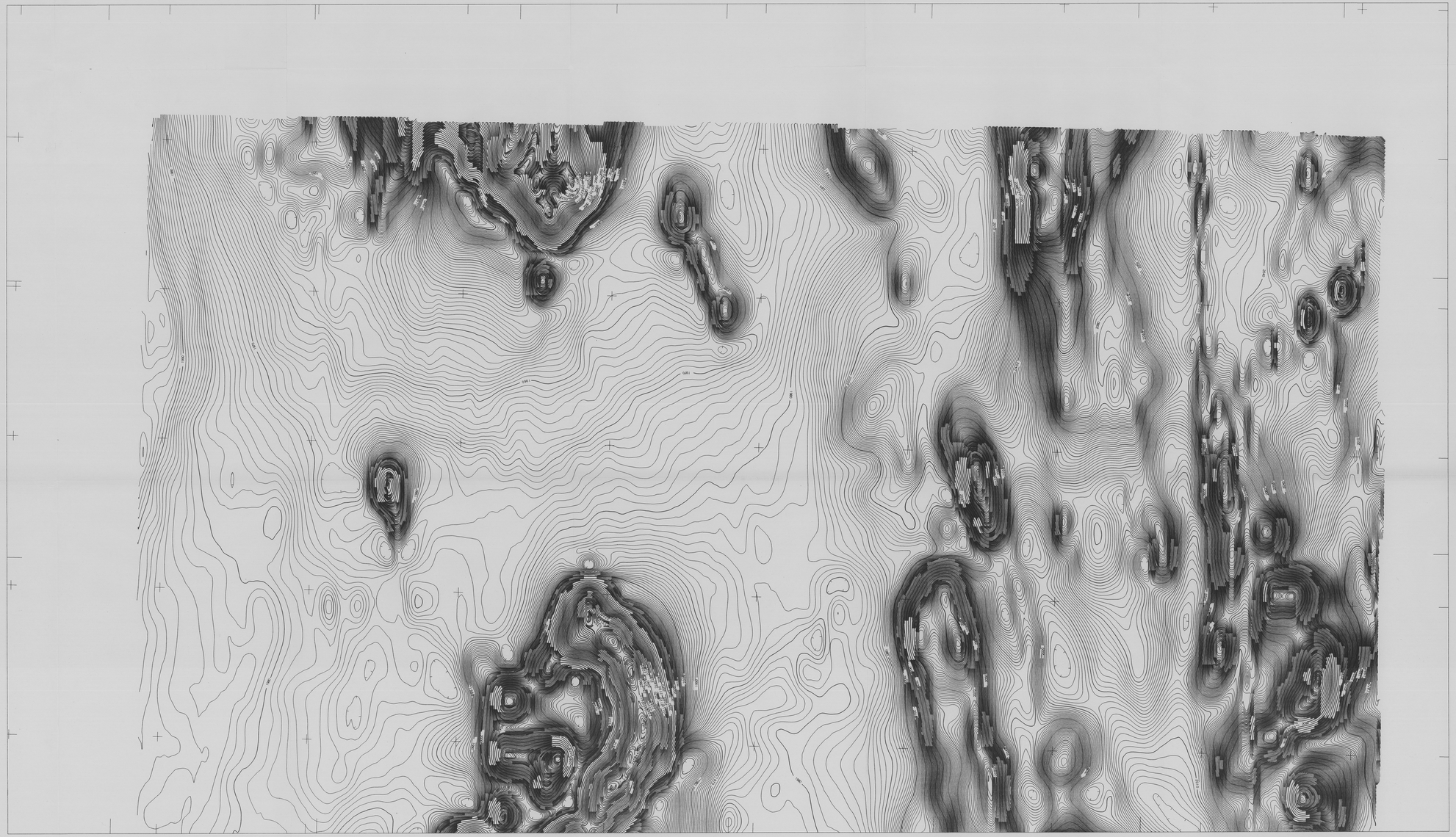
PASMINCO EXPLORATION

YOLANDE RIVER EL 25/91
FLIGHT PATH
BURNIE SK55-3
SHEET 2 OF 2

fig.42

DRAWING NO:

DATE : 13-MAY-1993



AIRBORNE SURVEY SPECIFICATIONS

AIRCRAFT :	Squirrel Helicopter
MAGNETOMETER :	SCINTREX cesium vapour optical absorption mounted on a bird Sensitivity : 0.05 nT
RECORDING INTERVAL :	0.1 sec
NOMINAL TERRAIN CLEARANCE :	Sensor in towed bird at 80 m
SPECTROMETER :	Nuclear Data 256 channel ADC Volume 3.16 litres
TOTAL COUNT WINDOW :	0.41 - 2.82 MeV
POTASSIUM WINDOW :	1.35 - 1.57 MeV
URANIUM WINDOW :	1.63 - 1.89 MeV
THORIUM WINDOW :	2.42 - 2.82 MeV
RECORDING INTERVAL :	1.0 sec
DATA RECORDING :	Geoterrex MADACS acquisition system Digital to magnetic tape
NOMINAL TERRAIN CLEARANCE :	Detectors in aircraft at 110 m
NOMINAL LINE SPACING :	Traverse lines 200 m Tie lines 2.0 km
FLIGHT PATH NAVIGATION :	SERCEL NR103 GPS and SERCEL NDS100 UHF DGPS navigation system
FLIGHT PATH RECORD :	real time from UHF DGPS system corrected for selected availability

RESIDUAL MAGNETIC CONTOURS

Grid notation refers to Australian Map Grid Zone 55

Magnetics :	Discrete recorded, tie-line levelled
IGRF :	1990 model (updated for secular variation to March 1993) removed, datum 2000 nT added.
Total Field :	62335 nT (at 4200000S, 1453000E)
Inclination :	72.5 degrees S
Declination :	13.03 degrees E
Grid mesh size :	50 m x 50 metres
Grid filter :	None
Contour interval :	1, 10 and 100 nT

MAP INDEX

145°26'30"E 145°33'30"E
41°59'00"S
1
2
42°05'00"S
145°26'30"E 145°33'30"E

5 cm

TN GN MN

996233

Grid Convergence = 1.00°
Declination = 13.03°

SCALE 1:10000

200 0 200 400 600 800 m

93-3477.

JOB NO. : 3-446
Surveyed by GEOTERREX PTY LTD : March 1993
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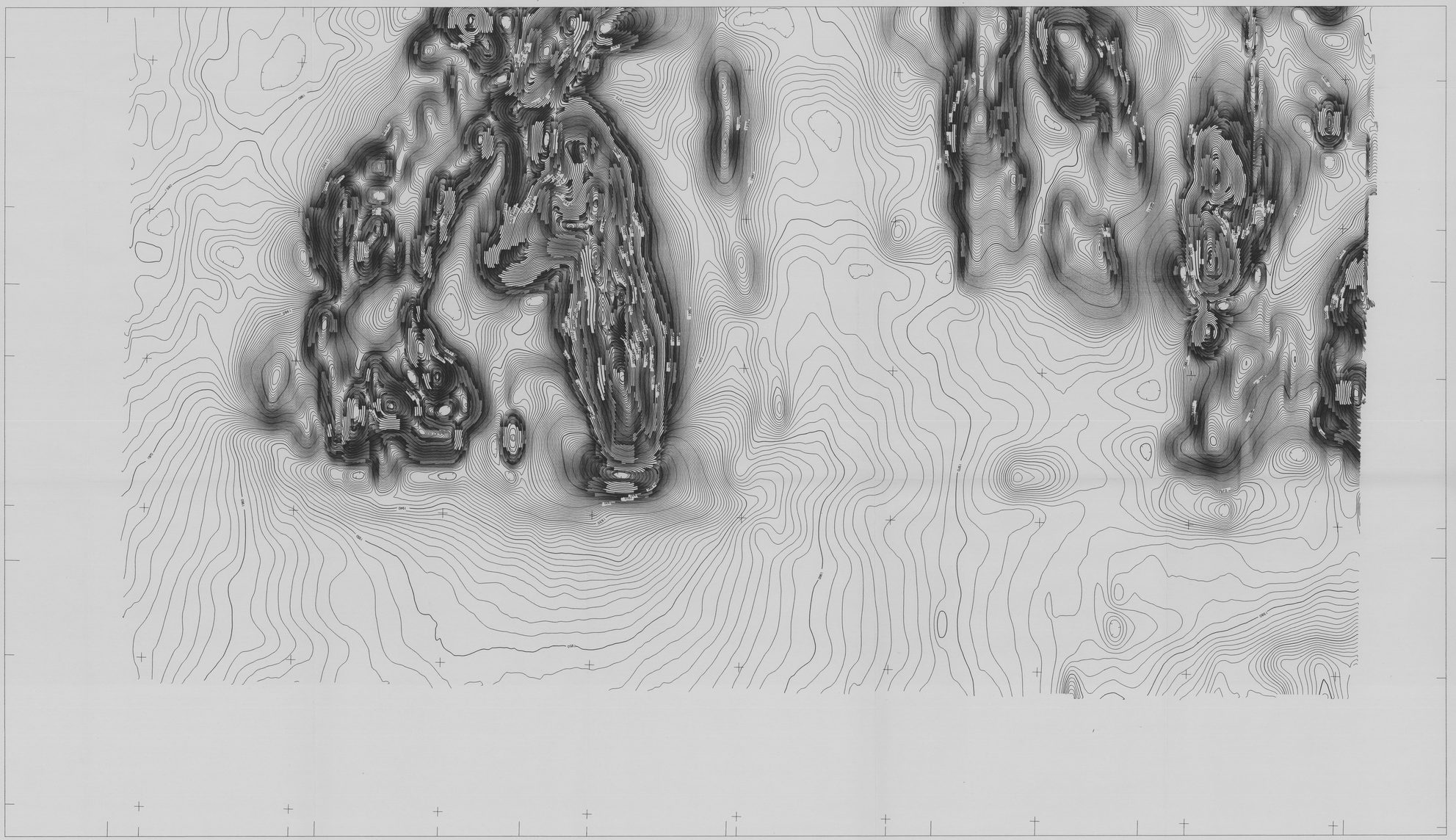
PASMINCO EXPLORATION

YOLANDE RIVER EL 25/91
RESIDUAL MAGNETIC CONTOURS
BURNIE SK55-3
SHEET 1 OF 2

fig.43

DRAWING NO: | DATE : 12-MAY-1993



AIRBORNE SURVEY SPECIFICATIONS

AIRCRAFT :	Squirrel Helicopter
MAGNETOMETER :	SCINTREX cesium vapour optical absorption mounted on a bird Sensitivity = 0.05 nT Cycle : 0.2 sec
RECORDING INTERVAL :	0.2 sec
NOMINAL TERRAIN CLEARANCE :	Sensor in towed bird at 80 m
SPECTROMETER :	Nuclear Data 256 channel ADC Volume : 16.8 litres
TOTAL COUNT WINDOW :	0.4 - 3.00 MeV
POTASSIUM WINDOW :	1.35 - 1.57 MeV
URANIUM WINDOW :	1.63 - 1.89 MeV
THORIUM WINDOW :	2.41 - 2.82 MeV
RECORDING INTERVAL :	1.0 sec
DATA RECORDING :	Geoterrex MADAS acquisition system Digital to magnetic tape
NOMINAL TERRAIN CLEARANCE :	Detectors in aircraft at 110 m
NOMINAL LINE SPACING :	Traverse lines 200 m Tie lines 1000 m
FLIGHT PATH NAVIGATION :	SERCEL NR103 GPS and SERCEL NDS100 UHF DGPS navigation system
FLIGHT PATH RECORD :	real time from UHF DGPS system corrected for selected availability

RESIDUAL MAGNETIC CONTOURS

Grid notation refers to Australian Map Grid Zone 55	
Magnetics :	Diurnals removed; tie-line levelled
IGRF :	1990 model (updated for secular variation to March 1993) removed.
Total Field :	62335 nT (at 420000S, 1453000E)
Inclination :	72.5 degrees S
Declination :	13.03 degrees E
Grid mesh size :	50 x 50 metres
Grid filter :	None
Contour interval :	1, 10 and 100 nT

MAP INDEX

145°26'30"E 145°33'30"E
41°59'00"S — 1 — 41°59'00"S
42°05'00"S — 2 — 42°05'00"S
145°26'30"E 145°33'30"E

5 cm

TN GN MN

Grid Convergence = 1.01°
Declination = 13.03°

996234

SCALE 1:10000

200 0 200 400 600 800 m

93-3477.

JOB NO : 3-446
Surveyed by GEOTERREX PTY LTD : March 1993
Compiled by GEOTERREX PTY LTD. SYDNEY
Processed by GEOTERREX PTY LTD. SYDNEY

PASMINCO EXPLORATION

YOLANDE RIVER EL 25/91
RESIDUAL MAGNETIC CONTOURS
BURNIE SK55-3
SHEET 2 OF 2

fig.44

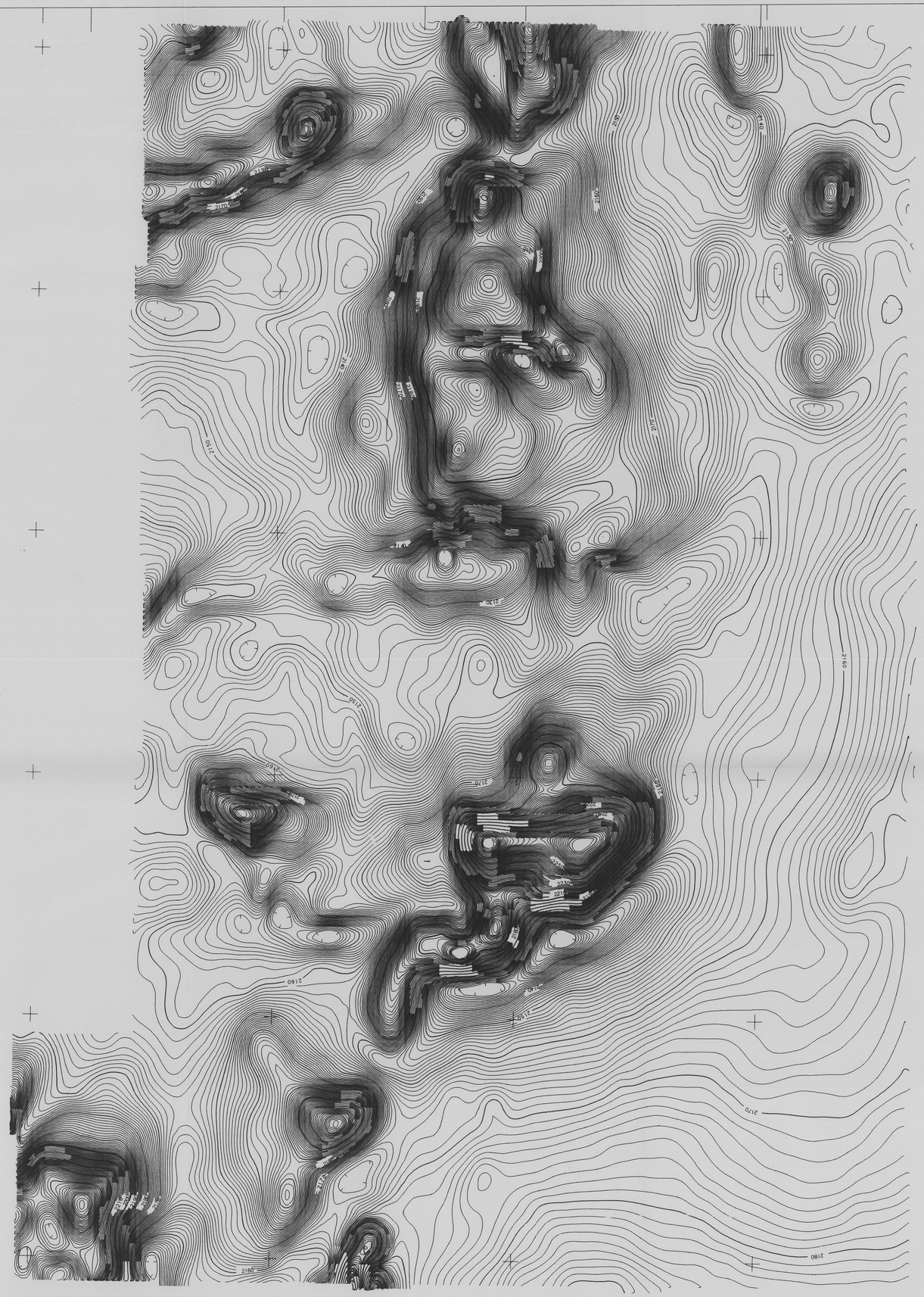
DRAWING NO: | DATE : 12-MAY-1993

386000E 387000E 388000E 389000E 390000E

41°39'00"S
41°40'00"S
41°41'00"S
41°42'00"S

5388000N
5387000N
5386000N
5385000N
5384000N
5383000N

145°37'30"E 145°38'00"E 145°39'00"E 145°40'00"E 145°41'00"E



AIRBORNE SURVEY SPECIFICATIONS

AIRCRAFT :	Squirrel Helicopter
MAGNETOMETER :	SCINTREX cesium vapour optical absorption mounted on a bird Sensitivity : 0.05 nT
RECORDING INTERVAL :	0.1 sec
NOMINAL TERRAIN CLEARANCE :	Sensor in towed bird at 80 m
SPECTROMETER :	Nuclear Data 256 channel ADC Volume : 16.8 litres
TOTAL COUNT WINDOW :	0.4 - 3.00 MeV
POTASSIUM WINDOW :	1.35 - 1.57 MeV
URANIUM WINDOW :	1.63 - 1.89 MeV
THORIUM WINDOW :	2.42 - 2.82 MeV
RECORDING INTERVAL :	1.0 sec
DATA RECORDING :	Geoterrex MADACS acquisition system Digital to magnetic tape
NOMINAL TERRAIN CLEARANCE :	Detectors in aircraft at 110 m
NOMINAL LINE SPACING :	Traverse lines 100 m Tie lines 1.0 km
FLIGHT PATH NAVIGATION :	SERCEL NR103 GPS and SERCEL NDS100 UHF DGPS navigation system
FLIGHT PATH RECORD :	real time from UHF DGPS system corrected for selected availability

RESIDUAL MAGNETIC CONTOURS

Grid notation refers to Australian Map Grid Zone 55

Magnetics :	Diurnals removed. Tie-line levelled
IGRF :	1990 model (updated for secular variation to March 1993) removed, datum 2000 nT added
Total Field :	62154 nT (at 414000S, 1454000E)
Inclination :	72 degrees S
Declination :	13.2 degrees E
Grid mesh size :	25 x 25 metres
Grid filter :	None
Contour interval :	1, 10 and 100 nT

GN
TN
MN

Grid Convergence = 0.89°
Declination = 13.20°

SCALE 1:10000

200 0 200 400 600 800 m

5 cm

JOB NO : 3-446
Surveyed by GEOTERREX PTY LTD : March 1993
Compiled by GEOTERREX PTY LTD. SYDNEY
Processed by GEOTERREX PTY LTD. SYDNEY

995090

PASMINCO EXPLORATION

LAKE MACKINTOSH EL 37/89
RESIDUAL MAGNETIC CONTOURS
BURNIE SK55-3
SHEET 1 OF 1

Figure 25

DRAWING NO: | DATE : 26-MAY-1993