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ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED
West Coast Mines

EXPLORATION LICENCE 31/83 MACQUARIE

Reports on Exploration Activity October, 1984 to June, 1985

E.Z. Report No. T206	Bird River Area	I.J. Mathison
E.Z. Report No. T207	Rinadeena Area	I.J. Mathison, D.L. Hopton
E.Z. Report No. T208	Clark River Area	I.J. Mathison

July, 1985

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Vol 1/2

ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED
WEST COAST MINESEXPLORATION LICENCE 31/82 MACQUARIEREPORTS ON EXPLORATION ACTIVITY OCTOBER, 1984 TO JUNE, 1985

E.Z. REPORT NO T206 SEE FICHE NUMBERS 2555, 2556, 2557	BIRD RIVER AREA	I.J.MATHISON
E.Z. REPORT NO T207 SEE FICHE NUMBERS 2558, 2559, 2560	RINADEENA AREA	I.J.MATHISON, D.L. HOPTON
E.Z. REPORT NO. T208 SEE FICHE NUMBERS 2561, 2562, 2563	CLARK RIVER AREA.	I.J.MATHISON

JULY, 1985.

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ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED
WEST COAST MINES

112003

PART OF EXPLORATION LICENCE 31/83

MACQUARIE

BIRD RIVER AREA

REPORT ON EXPLORATION ACTIVITY

OCTOBER, 1984 TO JUNE, 1985.

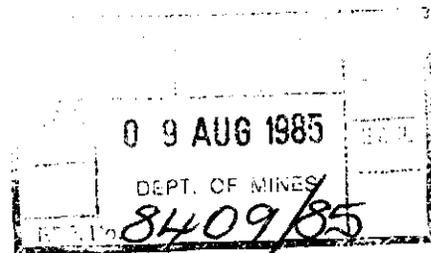
E.Z. REPORT No. T 206

I. J. MATHISON,
JULY, 1985.

PART OF EXPLORATION LICENCE 31/83

MACQUARIE

BIRD RIVER AREA



REPORT ON EXPLORATION ACTIVITY

OCTOBER, 1984 TO JUNE, 1985.

E.Z. REPORT No. T 206

I.J. MATHISON,
JULY, 1985.

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TABLE OF CONTENTS

<u>TABLE OF CONTENTS</u>	i.
<u>1. INTRODUCTION</u>	1.
<u>1.1. Location and Access</u>	1.
<u>1.2. Previous Exploration</u>	1.
<u>1.3. Summary of 1983-84 Results</u>	1.
<u>2. E.Z. EXPLORATION - OCTOBER, 1984 TO JULY, 1985</u>	2.
<u>2.1. Work Completed</u>	2.
<u>2.2. Results Received</u>	2.
<u>2.2.1. GEOLOGY</u>	2.
<u>2.2.2. GEOCHEMISTRY</u>	3.
<u>2.2.3. ROCK GEOCHEMISTRY</u>	4.
<u>2.2.4. PANNED CONCENTRATES</u>	4.
<u>3. DISCUSSION AND CONCLUSIONS</u>	5.

FIGURE, PLATES & APPENDIX

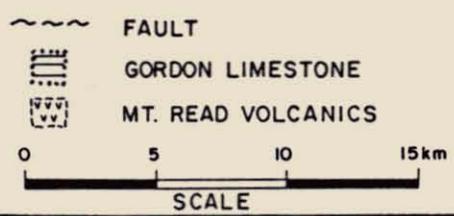
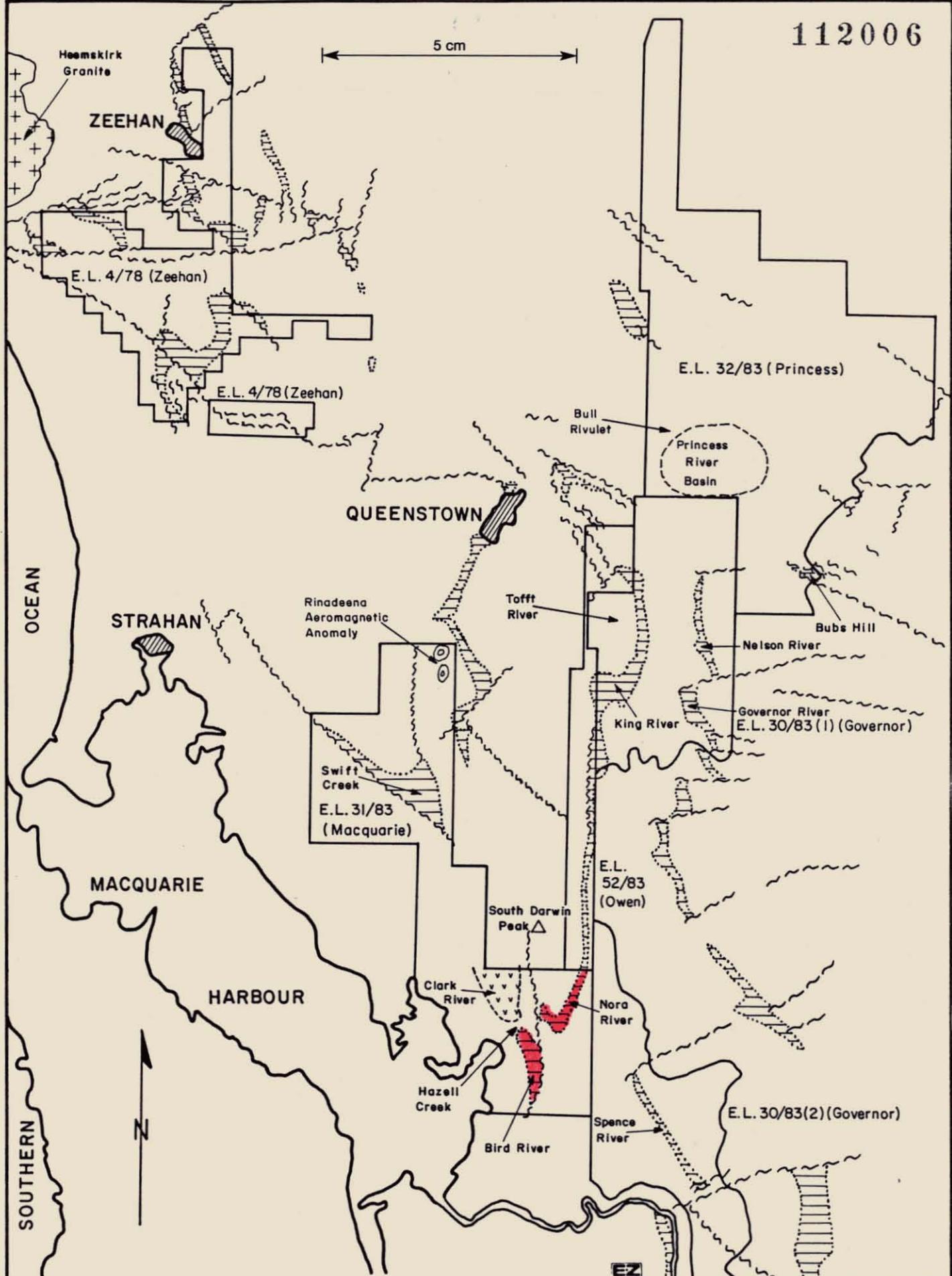
FIGURE 1. Location

PLATE	BR 1.	Geology Interpretation	A0-530-4005
	BR 2.	Sample Locations: Numbers & Types	-4000
	✓BR 3.	Geochemistry - Zn	-4001
	✓BR 4.	- Pb	-4002

APPENDIX Stream Sediment Data Sheets
 Rock Sample Data Sheets
 Heavy Mineral Descriptions - J.F. Gilfillan & Associates Report.

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112006



PROJECT: GORDON LIMESTONE J.V.		
LOCATIONS		
Compiled: S.T.	Date:	PLANNO
Drawn: R.J.R.	Scale	Fig. 1

1. INTRODUCTION

1.1. Location and Access (See Fig. 1)

The Gordon Limestone in the Bird River area outcrops along a narrow belt near Nora River, Bird River and the Kelly Basin Track. The area is 45km by road south of Queenstown.

1.2. Previous Exploration

No early reports of old workings, of systematic exploration, or of base metal mineralisation are known. 1983-84 exploration by E.Z. is documented in the following reports:-

E.Z. Report No.

- | | |
|------|--|
| T185 | Hazel Creek Area - Progress Report on Exploration Activity
1st October, 1983 to 30th March, 1984. |
| T186 | Nora River Area - Progress Report on Exploration Activity
1st October, 1983 to 30th March, 1984. |

1.3. Summary of 1983-84 Results

1983-84 exploration by E.Z. consisted of reconnaissance stream sediment sampling, rock chip sampling and geological mapping. Near the junction of the Bird and Nora Rivers, the Gordon Limestone is displaced by a sinistral, north-south fault, the Bird River Fault. Minor sphalerite-galena mineralisation in quartz carbonate veins was observed in limestone near the Bird River Fault. A stream sediment sample from a stream draining the fault zone reported anomalous zinc (430 ppm). The aim of 1984-85 exploration was to test the Bird River Fault zone for further indications of lead-zinc mineralisation in limestone.

2. E.Z. EXPLORATION - OCTOBER, 1984 TO JULY, 1985

2.1. Work Completed

As a preliminary step, an airphoto interpretation of the area was completed. Limited ground control was provided by 1983-84 mapping. The main aim of the interpretation was the location of areas possibly underlain by limestone close to the Bird River Fault. Photographs used are listed below:-

Series	Scale	Run	Photos	Date Flown
Mt. Lyell (Colour)	1:20,000	8	189, 190	19.1.'79
"	"	9	191, 192	19.1.'79
South West (B & W)	1:45,000	11W	108, 109	6.3.'80

In January and February, 1985 E.Z. field crews carried out additional stream sediment sampling, rock chip sampling and geological mapping around the Bird River Fault. 16 stream sediment samples, 23 rock chip samples and 4 panned concentrates were collected. Geological data were noted at sample locations.

Stream sediments were sieved on site to -1mm. Rock samples and dried stream sediment samples were submitted to Analabs, Burnie for analysis. The -80# fraction of stream sediment samples and whole rock samples were analysed for Cu, Pb, Zn, Ag, Fe and Mn by A.A.S. techniques.

Panned concentrates were submitted to J. Gilfillan & Associates for heavy media separation and microscopic identification of heavy minerals.

2.2. Results Received

2.2.1. GEOLOGY (See Fig. BR 1)

The geology of the Bird River area is dominated by the Bird River Fault. This fault has an apparent sinistral offset of almost 2km and separates the Gordon Limestone into two major blocks and a third minor block.

Near the junction of the Nora and Bird Rivers, the limestone sequence is thickened and is folded around the nose of a south plunging anticline. Additional tight folding closer to the Bird River Fault is probable. Further north it thins out, includes more

siltstone and probably grades into a thin siltstone equivalent.

A small block of limestone outcrops in the bed of the Bird River and along the Kelly Basin Track 1.5km south of the river junction. This is either a small fault block or a fault induced fold repetition of the Gordon Limestone.

A third limestone block outcrops just west of the big bend in the Bird River, 2km south of the river junction. This block is thickest near the fault where it includes dolomitic limestone, silty limestone and fault breccias. It thins to the north west and a facies change to marly siltstones is inferred just north of Hazel Creek (see Clark River Report).

Throughout the area, the Gordon Limestone is underlain by the siliceous quartzites and quartz siltstone of the Ordovician Moina Sandstone and overlain by Silurian quartz sandstone and siltstone (Crotty Quartzite).

2.2.2. GEOCHEMISTRY (See Data Sheets - Appendix & Plates BR 2, 3 & 4)

Sample data and analytical results for stream sediment samples are tabulated in the Appendix and summarised below. Results from four samples collected from the area in 1984 are included.

<u>Stream Sediment Samples</u> n = 20			
Element	Range	Mean	?Anomalous
Cu	<5-10	5	-
Pb	<5-75	20	>60 (3 samples)
Zn	10-85(430)	~50*	>400 (1 sample)
Ag	<0.5-1.0		
Fe	0.05-2.85%		
Mn	10-950 (3850)		

* High value excluded from average.

Sample 59702, collected in 1984, remains the only sample with anomalous zinc (and manganese). It was collected from a small stream draining the fault zone. Two other samples are very weakly anomalous in lead. They were collected from tributaries of the Nora River draining the northernmost limestone block. Manganese values for these two samples were also slightly elevated.

2.2.3. ROCK GEOCHEMISTRY (See Data Sheets - Appendix & Plates BR 2, 3 & 4)

Descriptions and analytical results of rock samples are tabulated in the appendix. Results from four samples collected in 1984 are included.

<u>Rock Samples n = 27</u>			
Element	Range	Mean	?Anomalous
Cu	<5-160	15	160 (1 sample)
Pb	<5-275	35	>200 (2 samples)
Zn	<5-225 (975)	30*	>200 (2 samples)
Ag	<0.5-2.5	-	2.5 (1 sample)
Fe	0.29-4.27%		
Mn	5-550		

* High value of 975 ppm excluded from average.

Three rock samples reported weakly elevated lead and/or zinc values. These include the weakly mineralised limestone breccia sampled in 1984. The galena and sphalerite bearing quartz carbonate veinlets observed in this sample was the only mineralisation seen in the area. The other very weakly anomalous samples were a quartzite sampled 1km west of the fault zone and a shaly limestone from the small block of limestone along the Kelly Basin Track.

2.2.4. PANNED CONCENTRATES (See J. Gilfillan & Assoc. Report - Appendix & Pl. 2)

Most of the heavy minerals identified in the panned concentrates appear to have been reworked from either Ordovician or Silurian sandstones. These include chromite, titaniferous magnetite, rutile, zircon, rounded tourmaline, sphene and rare cassiterite.

Quartz-tourmaline rock, apple green sericite and epidote probably come from altered Mt. Read Volcanics to the north. No minerals indicative of lead-zinc mineralisation were identified.

3. DISCUSSION AND CONCLUSIONS

1985 geological mapping confirmed the extent of the Gordon Limestone predicted by airphoto interpretation and detected a smaller block along the Kelly Basin Track. Some dolomitisation, tectonic brecciation and very minor veinlet hosted lead-zinc mineralisation were observed in the southern limestone block. No other indications of mineralisation were detected.

The only distinctly anomalous stream sediment sample (430 ppm Zn) could point to similar veinlet hosted mineralisation occurring close to the Bird River Fault. Its high (3,850 ppm) manganese content suggests possible manganese scavenging. Very weakly elevated lead and/or zinc values reported from other stream sediment samples and rock samples do not appear to warrant further follow up.

4. RECOMMENDATIONS

No further work is recommended for this area.

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APPENDIX

Stream Sediment Data Sheets

Rock Sample Data Sheets

Heavy Mineral Descriptions - J.F. Gilfillan & Assoc. Report.

E.Z. Co. of A'Asia Ltd.,
ROSEBERY, Tasmania

GEOCHEMICAL SAMPLE DATA SHEET

PROJECT: .. GORDON LIMESTONE
LOCALITY: .. Beck River.....
GRID NAME:
NOMINAL GRID AZIMUTH:

MATERIAL: Stream Sediments.....
SAMPLE METHOD: Sieved to -1mm.
SAMPLED BY: .. M.R. & D.H.....
DATE: .. 2.5/1/85.....

SIZE FRACTION ANALYSED: .. 20 mesh.....
ANALYSED BY: .. ANA LABS.....
METHOD: .. A.A.S.....

SAMPLE NUMBER	SAMPLE LOCATION DATA			STREAM DATA				COMPOSITION DATA			METAL CONTENT (ppm unless specified)														
	GRID LINE NO.	A.M.G. CO-ORDINATES		Str. Order Direction of Flow	Width	Active Stream Load	Clay	Sand	Rock Frag.	Organic	CONTAM.	Geology	Cu	Pb	Zn	Ag	Au	Fe	Mn						
	GRID EASTING	NORTHING	EASTING																						
43 65813	1				5			106030					5	10	35	X	X	1000	315						
44 816	1				1			305020					5	X	50	0.5	X	9050	140						
45 818	1				5			56530					5	10	45	X	X	6350	410						
46 821	1							58015					X	X	10	X	X	500	10						
47 823	1							8020					X	X	15	0.5	X	2150	25						
48 824	1							6040					5	10	20	X	X	5650	45						
49 825	1				1			206020					X	10	80	X	X	4800	90						

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012

Electrolytic Zinc Co. of A'asia Ltd. Rosebery, Tas.			ROCK SAMPLE LEDGER					PROJECT: GORDON LIMESTONE (31/83) LOCALITY: BIRD RIVER		COLLECTED BY: I.J. Mathison		DATE: FEB 1985					
Sample Number	A.M.G. Co-ordinates		Sample Type	Geological Description	Rock-type (Macroscopic)	Thin or Polished Section				Metal Content (p.p.m. unless specified)							
	N	E				T of P	By	Reference	Rock-type (Microscopic)	Cu	Pb	Zn	Ag	Fe%	Mn		
59973				Dark grey dolomitic SILTSTONE	SLT							20	15	x	x	2.46	75
59972				Dark grey extremely finely crystalline LIMESTONE	LST							5	10	5	x	0.29	135
59971				Dark grey extremely finely crystalline DOLOMITE with space filling carbonate veins	DLST							5	75	100	x	1.22	615
59970				Dark grey fine grained argillaceous LIMESTONE	LST							5	10	x	x	1.32	370
59969				Interbedded argillaceous and very finely clastic LIMESTONE	LST							10	15	75	x	0.55	390
59968				Grey to dark grey LIMESTONE	LST							x	10	x	x	0.39	295
59967				Dark grey very fine grained clastic and muddy LIMESTONE	LST							x	10	x	x	0.46	365
59726				Dark grey f.g. thin bedded LIMESTONE	LST							5	30	x	x	0.38	190
59727				Contorted and veined dark grey shaly LIMESTONE	LST							5	10	x	x	1.82	305
59728				Dark grey / brown laminated SILTSTONE	SLT							20	25	x	x	3.12	15
59729				Black SHALE - slaty cleavage	BSH							15	10	x	x	2.07	115
59730				Dark grey shaly LIMESTONE + f.g. LIMESTONE - thin bedded	LST							5	10	x	x	1.67	225
59731				Grey medium crystalline DOLOMITE and dolomitic LIMESTONE	DLST							5	15	x	x	1.52	550
59732				Grey fine grained shaly LIMESTONE	LST							25	25	225	x	3.52	380

Smith Print No. 441822

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Electrolytic Zinc Co. of Asia Ltd. Rosebery, Tas.			ROCK SAMPLE LEDGER				PROJECT: GORDON LIMESTONE (3/83) LOCALITY: BIRD RIVER COLLECTED BY: D. Hopton, I. Mathison DATE: FEB 1985											
Sample Number	A.M.G. Co-ordinates		Sample Type	Geological Description	Rock-type (Macroscopic)	Thin or Polished Section			Metal Content (p.p.m. unless specified)									
	N	E				T or P	By	Reference	Rock-type (Microscopic)	Cu	Pb	Zn	Ag	Fe%	Mn			
65815				White and very pale green CLAY	CLAY							x	35	x	x	0.36	5	
65817				Laminated and crenulated grey and dark grey vfg SANDSTONE	SST							10	20	35	x	2.92	90	
65820				Dark grey laminated fine grained LIMESTONE + silicified LIMESTONE	LST							5	25	x	x	1.02	410	
65822				Grey cleaved SILTSTONE (possibly dolomitic)	SLT							20	10	x	x	3.92	210	
65826				Dark grey very fine grained QUARTZITE	QZT							10	x	x	x	1.82	220	
59770				Pale brown vfg QUARTZITE	QZT							160	205	65	2.5	1.52	75	
59771				Pale grey DOLOMITE	DLST							10	20	.5	x	1.07	395	
59772				Pale grey cleaved SILTSTONE	SLT							x	5	x	x	3.27	70	
59773				Pale yellow grey oxidized cleaved SILTSTONE	SLT							15	10	120	x	4.27	130	
				1984 Samples													B ₂	
59797				Grey to black very fine grained LIMESTONE, silicified, mod ch. vng	LST	T	CMS	CMS	dol LST			5	10	15	x	0.15	165	15
59798				Dark grey - black laminated LIMESTONE, moderate carbonate vng	LST							5	10	40	x	0.38	160	24
59799				Grey LIMESTONE, intensely veined (quartz + carbonate) minor galena	LST	T	CMS	CMS	DLST BX			20	27.5	94.5	x	0.50	490	17
59800				Dark grey finely laminated graphitic SHALE	SH							25	15	115	x	3.15	265	483

Smith Print No. 441822

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JOHN F. GILFILLAN & ASSOCIATES PTY. LIMITED

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PETROGRAPHIC EVALUATION OF FOUR
PANNED HEAVY MINERAL CONCENTRATES
(BIRD RIVER PROJECT).

Report No: E3/81/274

29th March, 1985.

For: Electrolytic Zinc Company of Australasia Ltd.


Dr. B.J. Barron,
Petrologist.

Sample No. 65814

Description of Concentrate A dark grey to mid brown fine to medium grained concentrate in which only a few sparse grains are magnetic.

Thin Section. This is a rather even grained concentrate in which the vast majority of grains lie within the size range 0.13 mm and 0.33 mm (fine to medium grained sand). There are only a few sparse grains which exceed these limits including very fine grained tourmaline-quartz rock, sparse coarse irregular shaped grains of rutile, lithic aggregates which consist of leucoxene-altered titaniferous material \pm dense very fine grained sericite, as well as aggregates of epidote \pm sericite. In the voluminous finer grained fraction black and dark grey oxides greatly predominate, most of which are opaque and a minority of which include translucent red-brown grains, most likely including chromite. The oxide grains commonly retain subhedral octahedral to subrounded or irregular shapes, and since most are not magnetic may include types with titaniferous and hematitic compositions. Also present in the finer fraction are subordinate subrounded to elongate cleavage fragments of rutile, equally sparse grains of zircon and tourmaline (olive green, yellow-brown and blue pleochroic varieties are most common), while accessory grains include clouded monazite, leucoxene-altered grains of titaniferous oxides, epidote and rare grains of cassiterite. Sparse scattered anhedral grains of quartz and weakly perthitic K-feldspar are minor light contaminants.

An X-ray diffraction examination of the finer grained oxide-rich fraction was advisable because of the large proportion of non-magnetic opaque oxide grains present in this sample. This examination reveals the major presence of two different spinels which could include ore of chrome hercynite composition. A subordinate proportion of the black opaque oxides is magnetite and also present are sparse grains of rutile, hematite, sphene and zircon, as well as traces of anatase and cassiterite. If required, more accurate compositions of the spinels may be obtained by electron microprobe techniques, but spinels are not generally of economic value.

Sample No. 65819

Description of Concentrate None remains.

Thin Section. This concentrate comprises a variety of phases and a variety of grain sizes with a more or less continuous range from less than 0.13 mm up to more than 1.5 mm (very fine sand up to very coarse sand). The slightly subordinate very coarse and coarse sand sized grains include a variety of oxidised and stained lithic clasts, most of which are now converted to extremely fine grained red-brown oxides. Certain of these enclose sparse silt sized angular quartz chips while others consist of fine grained quartz tourmaline aggregates. Still others comprise aggregates of quartz and sericite with patches of clouded leucoxene-altered titaniferous oxides, and also polygonised fine grained quartz aggregates with patches of opaque oxides or rutile.

The majority of this sample has a grain size less than 0.5 mm and includes the following phases in approximate decreasing order of abundance; white leucoxene-altered titaniferous oxides and dark grey oxides which are partly altered to leucoxene or red-brown limonitic oxides; black and dark grey opaque oxides (including hematite and titaniferous magnetite), and sparse translucent red-brown isotropic oxides (most likely including chromite), sparse, scattered, irregular shaped and subrounded grains of rutile; well rounded tourmaline grains (including pleochroic olive green, yellow-brown and clear blue types); sparse, small rounded colourless zircon grains; rare grains and aggregates of epidote; rare opaque oxides with rims of apple green "sericite" which may be fuchsite (a chromium mica); rare grains of sphene; ?cassiterite; and irregular shaped quartz grains which form a fairly common contaminant. A single grain of a fresh sulphide phase has a narrow rim of red-brown limonitic oxides due to weathering.

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Sample No. 59738

Description of Concentrate A brown to dark grey and black medium to fine grained concentrate in which only rare small grains are magnetic.

Thin Section. In contrast to many of the previous samples the present concentrate is very significantly oxidised and weathered. It contains grains mostly within the size range 0.25 mm to 0.8 mm (medium to coarse sand sized grains), most of which have subrounded to irregular shapes and are intensely stained by red-brown limonitic oxides. Certain of these retain patches and marginal zones of recognisable carbonate, and some enclose angular chips of quartz ± sericite. Many of the subordinate but yet common grains of opaque oxides retain subhedral octahedral crystal outlines in spite of partial rounding due to abrasion and weathering, while other opaque oxides retain only relict "islands" of fresh oxides "suspended" in a matrix of exceptionally dense fine grained apple green "sericite", (the latter most likely is fuchsite - a chromium mica). Sparse rutile grains and trace proportions of cassiterite are part of a much finer grained fraction (with an average grain size of only about 0.1 mm), also including sparse, well rounded grains of tourmaline (pleochroic, almost opaque blue to pale pink), white leucoxene-altered titaniferous oxide grains (some with narrow rims of red-brown limonitic oxides), as well as rare cubic shaped crystals that are completely pseudomorphed by red-brown limonitic oxides. Sparse, small angular grains and fine grained aggregates of quartz contaminant are accessory.

Sample No. 59956

Description of Concentrate A very coarse grained concentrate of dark brown, strongly oxidised grains and a subordinate fraction of very fine grained pale brown to grey coloured grains. The sample is not significantly magnetic.

Thin Section. Once again this is a concentrate with a strongly bimodal grain size distribution comprising a very abundant coarse grained

019

fraction mainly within the size range 1 mm up to 3 mm. These coarser grains tend to be well rounded to subrounded and invariably are very heavily oxidised to very fine grained red-brown limonitic material commonly enclosing silt-sized and fine sand-sized quartz chips. Other oxidised clasts retain poorly preserved outlines of previous cellular structures, suggesting an organic origin. Sparse lithic clasts of fine grained tourmaline-quartz rock are quite well rounded, while equally sparse quartz grains have strongly irregular shapes.

The voluminous finer grained fraction contains almost equally abundant grains of translucent red-brown limonitic oxides, sphene and white leucoxene-altered titaniferous oxide grains, and opaque oxide grains, as well as subordinate but still fairly common well rounded grains of variegated blue green to pale brown tourmaline, and subrounded grains of rutile, as well as traces of partly oxidised sulphides, clouded ?monazite, red-brown zoned isotropic ?chromite and common angular grains of quartz contamination.

ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED
WEST COAST MINES

PART EXPLORATION LICENCE 31/83

MACQUARIE

RINADEENA AREA

REPORT ON WORK COMPLETED

2ND OCTOBER, 1984 TO 30TH JUNE, 1985

E.Z. REPORT No. T 207

D.L. HOPTON,
I.J. MATHISON,
JULY, 1985

PART EXPLORATION LICENCE 31/83

MACQUARIE

RINADEENA AREA

REPORT ON WORK COMPLETED

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E.Z. REPORT No. T 207

D.L. HOPTON,
I.J. MATHISON,
JULY, 1985

TABLE OF CONTENTS

TABLE OF CONTENTS

LIST OF FIGURES & APPENDICES

1. INTRODUCTION 1.

1.1. Aims of Exploration 1.

1.2. Location and Access 1.

1.3. Published Geology 1.

1.4. Topography, Drainage & Vegetation 2.

1.5. Previous Exploration 2.

2. E.Z. EXPLORATION - 2ND OCTOBER, 1984 TO 30TH JUNE, 1985 2.

2.1. Work Completed 2.

2.1.1. GRIDDING 2.

2.1.2. GEOLOGICAL MAPPING & ROCK CHIP SAMPLING 2.

2.1.3. STREAM SEDIMENT SAMPLING 3.

2.1.4. SOIL SAMPLING 3.

2.1.5. GEOPHYSICS - GROUND MAGNETICS 3.

2.1.6. PANNED CONCENTRATES 4.

2.2. Results Received 4.

2.2.1. GEOLOGY 4

2.2.2. ROCK CHIP GEOCHEMISTRY 4.

2.2.3. STREAM SEDIMENT GEOCHEMISTRY 5.

2.2.4. SOIL SAMPLING 6.

2.2.5. GROUND MAGNETICS 6.

2.2.6. PANNED CONCENTRATES 7.

3. DISCUSSION AND CONCLUSIONS 7.

4. RECOMMENDATIONS 7.

5. REFERENCES 8.

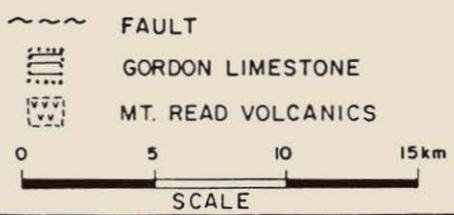
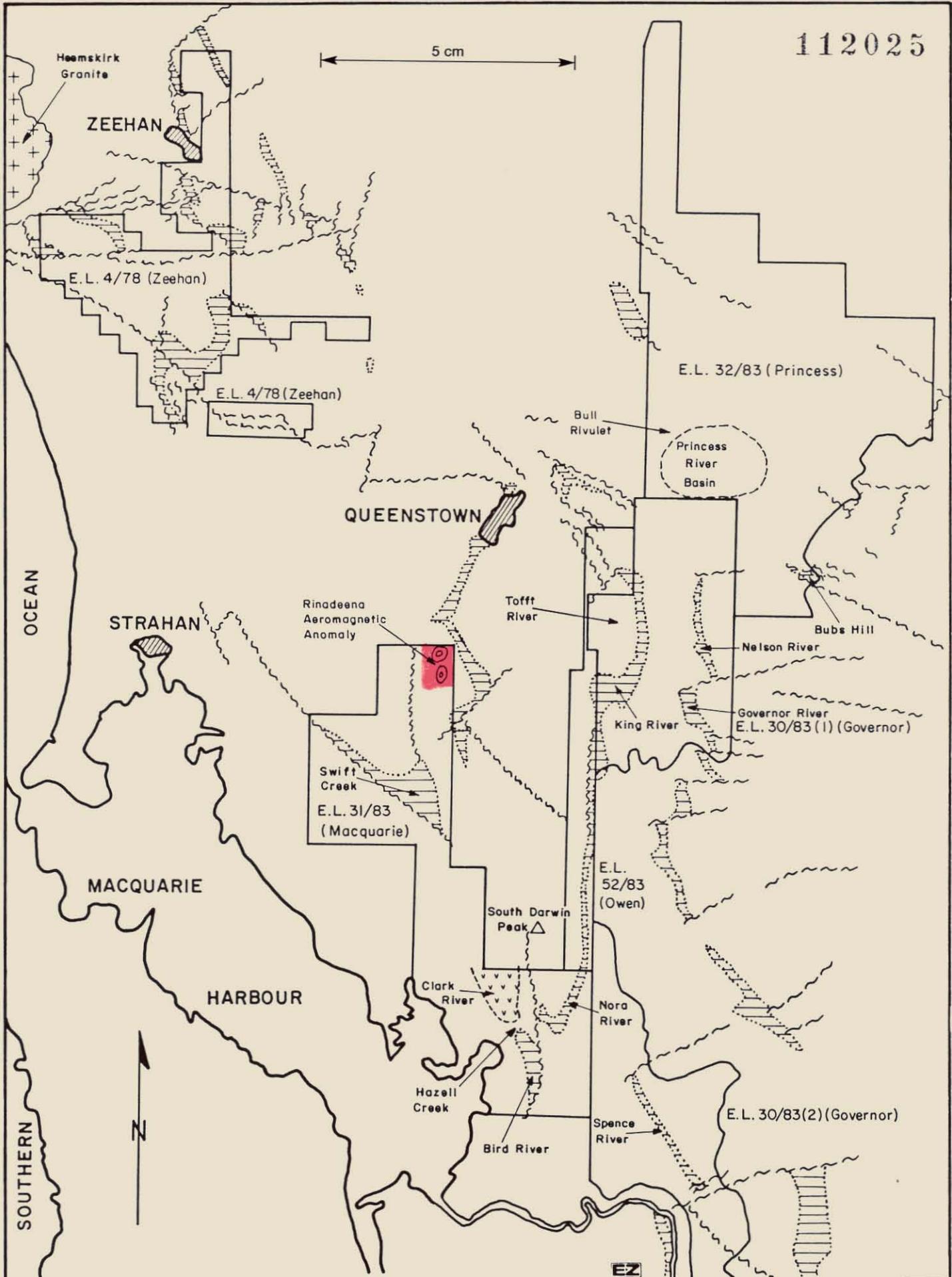
LIST OF FIGURES AND APPENDIX

FIGURE	✓R1.	Location - E.L. Boundaries	
	✓R2.	Location - Rinadeena Area	
	✓R3.	Rock Sample Locations & Numbers	A1-530-5003
	✓R4.	Stream Sediment Locations & Numbers	-5004
	✓R5.	Rinadeena - Cross Sections	-5001
	✓R6.	Rinadeena Geology (Interp.)	-5005
	✓R7.	Rinadeena Geochemistry - Au	-5006
	✓R8.	Soil Sample Locations & Numbers	-5008
	✓R9.	Rinadeena - Ground magnetics	-5009
	✓R10.	Rinadeena Geology (Fact)	-5007

APPENDIX	Rock Samples - Data Sheets
	Stream Sediment Samples - Data Sheets
	Soil Samples - Data Sheets
	Heavy Mineral Descriptions - J.F. Gilfillan & Assoc. Report E3/81/273

027

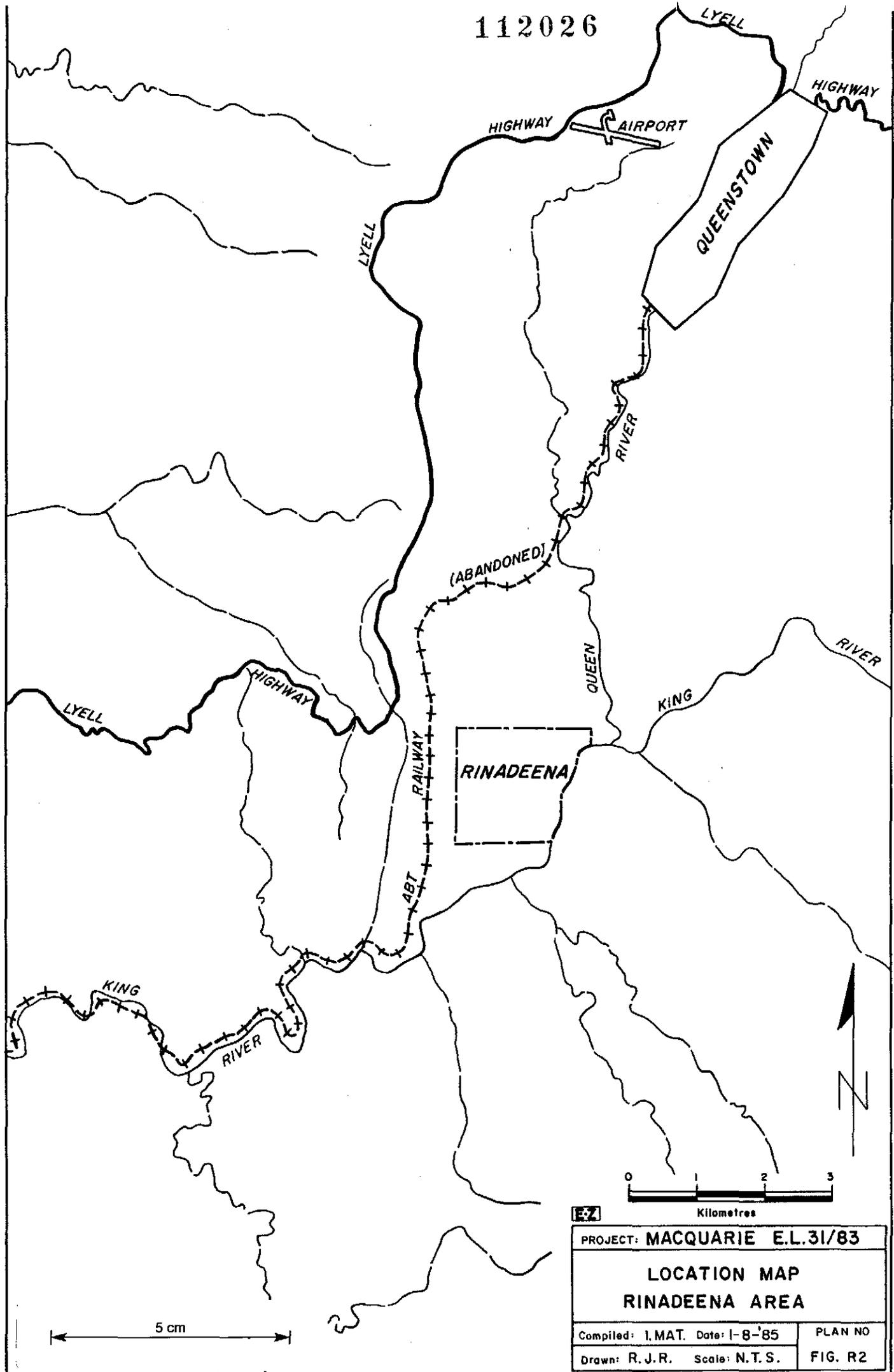
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PROJECT GORDON LIMESTONE J.V.			
LOCATIONS			
Compiled S.T.	Date	PLAN NO	
Drawn R.J.R.	Scale	Fig. 1	

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PROJECT: MACQUARIE E.L.31/83	
LOCATION MAP RINA DEENA AREA	
Compiled: I. MAT. Date: 1-8-'85	PLAN NO
Drawn: R. J. R. Scale: N.T.S.	FIG. R2

1. INTRODUCTION

1.1. Aims of Exploration

The Rinadeena area was selected for reconnaissance exploration following a recent regional aeromagnetic survey of Western Tasmania undertaken by Geox Ltd. for the Tasmanian Mines Department.

A pair of small positive anomalies in the Rinadeena area occur in effectively non-magnetic sediments of the Eldon and Junee Groups and according to Leaman (1982) these appear to be contact anomalies with possibly a deeper source. Only the southernmost of this pair falls within present E.L. boundaries (E.L. 31/83).

Exploration was aimed at attempting to explain the presence of the anomaly and, more specifically, to determine if it is related to some form of mineralisation, especially Au.

1.2. Location and Access (See Fig. R2)

The Rinadeena area is situated approximately 10km south of Queenstown and is bounded on the east and south by the King River and on the north and west by the abandoned Abt Railway. Present road access to the area is via the Abt Railway, with permission from the H.E.C.

1.3. Published Geology (See Fig. R6)

On the Queenstown 1:250,000 Geological Sheet, Ordovician Owen Conglomerate (Junee Group) and Siluro-Devonian quartz siltstone (Eldon Group) are mapped in the Rinadeena area. Earlier more detailed mapping by Mt. Lyell (Solomon, 1957) reports Owen Conglomerate and undifferentiated Silurian quartzite and shales. An extensive north-south fault, the Garfield River Fault, is mapped through the Rinadeena area.

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1.4. Topography, Drainage and Vegetation

The combination of conglomerate, quartzite and less resistant shale and siltstone has resulted in very rugged topography. Fast flowing creeks flow through deeply incised valleys between sharp ridges. The entire area is densely vegetated. Ti-tree and bauera scrub predominate with minor rainforest regrowth near the King River.

1.5. Previous Exploration

not 40'

No exploration activity, old workings or mineral occurrences have been reported from the Rinadeena area. Two small groups of workings - the Woody Hill Mine and the Macquarie lie 4km to the north on the western side of the Garfield River Fault. In these workings, gold occurred in quartz veins through quartz siltstone of the Eldon Group.

2. E.Z. EXPLORATION - 2ND OCTOBER, 1984 TO 30TH JUNE, 1985

2.1. Work Completed

2.1.1. GRIDDING

A grid consisting of north-south baseline, 1.6km long, and five east-west cross lines totalling 7.9km was cut and pegged at 20m slope corrected intervals. Guide ropes and climbing ropes were left along steeper and more slippery portions.

2.1.2. GEOLOGICAL MAPPING & ROCK CHIP SAMPLING

Grid lines and the King River were mapped. Rock chip samples from both outcrop and float were collected along grid lines. Initially, bulk samples representing 100m or 200m intervals were collected. Subsequent follow up sampling was more detailed.

The initial 43 samples were submitted to Analabs, Burnie for analysis. Cu, Pb, Zn, Ag, Fe, Mn and As were determined by A.A.S., Au by fire assay and Ba and Sb by X.R.F. The 25 follow up samples were assayed for Cu, Pb, Zn, Ag, Fe, Mn and Au only.

2.1.3. STREAM SEDIMENT SAMPLING

Most stream sediment samples were collected from sites where grid lines crossed creeks with an active bed load. Samples were wet sieved to -1mm and submitted to Analabs for analysis. Here the samples were dried and sieved to -80#. The -80# fraction was analysed for Cu, Pb, Zn, Ag, Fe and Mn by A.A.S. using nitric/perchloric digestion. Both the -80# and the +80# fractions were assayed for Au by A.A.S. following aqua regia digestion.

To check apparent discrepancies between stream sediment geochemistry and rock chip assays, five additional stream sediment samples were collected from a stream system draining the 'anomalous' area. Four of these were standard size samples and one was a much larger sample. The four standard samples were assayed as above while the larger sample was also assayed for Au by fire assay.

2.1.4. SOIL SAMPLING

Selected sections of the grid, those portions covering the fault zone, ground magnetic anomalies and areas of elevated rock chip geochemistry were soil sampled. Soil samples were collected at 20m spacings using a hand auger. At all sites nominal C horizon samples were collected from the soil/rock interface. Samples were dried and the whole sample was submitted to Analabs for analysis. Cu, Pb, Zn, Ag, Fe and Mn were determined by A.A.S. after nitric/perchloric digestion. Au was determined by fire assay.

Two shallow soil pits were dug. Samples from soil pits were treated as soil samples.

2.1.5. GEOPHYSICS - GROUND MAGNETICS

All grid lines and the base line were covered by a ground magnetic survey. The total magnetic field was read at 10m station intervals using a Lamontagne GSM 18 magnetometer in the 'field' mode. A 2m pole was used. Diurnal variation was monitored using a companion GSM 18 magnetometer in the 'base' mode. Field data was reduced by the machines and lists of corrected data were printed.

The corrected data was plotted as line profiles. Because the data was very noisy, the line profiles were hand smoothed and the resulting hand smoothed profiles were used to prepare a contoured ground magnetic plan.

2.1.6. PANNED CONCENTRATES

11 panned concentrates were collected from the Rinadeena area. Stream sediment was sieved to -1mm and concentrated by panning. The concentrate was then forwarded to Gilfillan & Associated for T.B.E. separation and microscopic identification of the heavy mineral fraction.

2.2. Results Received

2.2.1. GEOLOGY (See Fig's R5 & R6)

Geological mapping of the grid area has revealed a moderately to steeply east dipping sequence of Silurian quartzite, siltstone and mudstone as outlined in Figure R5. Interbedded with the siltstone-mudstone sequence is an unusual medium to coarse grained, multicoloured sediment which was identified in hand specimen as a tuffaceous arkose, a lithic tuff or as a tuffaceous conglomerate.

The position of the Garfield River Fault has been inferred from abrupt changes in lithology and a possible crush zone mapped on line 5,331,400N.

Quartz veining is common throughout the area, especially in the quartzites. No strong cleavage is developed.

2.2.2. ROCK CHIP GEOCHEMISTRY (See Figs R3, R7 and Data Sheets in Appendix)

Results of all analyses are listed on rock sample data sheets in Appendix. Sample locations are shown on Figure R3. Results of the 43 initial samples and the 25 follow up samples are summarised below:-

Rock Chip Samples n = 68

All values in p.p.m. unless stated.

Element	Range	Mean	Anomalous	No. Anomalous
Cu	<5-60	12	60	1
Pb	<5-240	20	240	1
Zn	<5-375	50	375	1
Ag	<0.05	-	-	-
Fe	0.07-5.08%	-	-	-
Mn	10-470(-3700)	-	3700	1
*As	<1-19	4	-	-
*Ba	<10-805	300	-	-
*Sb	<3-7	-	-	-
Au	<0.008-1.10	~ 0.04	>0.40	3

(* n = 43)

Anomalous Cu, Pb and Zn values do not appear to be associated with sulphide mineralisation. Follow up sampling of the 375 ppm Zn reported only 50 ppm Zn.

The three anomalous Au samples were collected in the initial bulk sampling programme. They were composed of vein quartz, quartzite with quartzite and siltstone. Two phases of follow up sampling in the 'anomalous' areas did not repeat the elevated Au values of the initial sampling. The highest value in the follow up samples was 0.14ppm in a float sample of oxidised volcanoclastic sediment with manganese staining. Most other follow up samples reported Au below the level of detection.

2.2.3. STREAM SEDIMENT GEOCHEMISTRY (See Data Sheets in Appendix and Fig. R4)

Results of stream sediment sampling are summarised below:

Stream Sediment Sampling (n = 23)

Element	Range
Cu	<5-15
Pb	<5-20
Zn	10-70
Fe	150-3.50%
Mn	<5-505
Au (A.A.S.) +80#	<0.001-0.007
-80#	<0.001-0.007
Au (Fire Assay) -80#	0.022

The only possibly anomalous value listed above is the 0.022 g/t reported by fire assay of the large sample 61916. At the low level of contained Au reported for other samples, there was no significant difference between -80# and +80# values.

2.2.4. SOIL SAMPLING (See Data Sheets - Appendix & Fig. R8)

Results of analyses of soil samples are summarised below:

Soil Sampling (n = 68)

Element	Range	Possibly Anomalous
Cu	<5-75	75 (1)
Pb	<5-120	120 (1)
Zn	<5-210	210 (1)
Ag	<0.5-0.5	-
Au	<0.008	-
Fe	0.11-5.35%*	*18.0% (1)
Mn	<5-155	-

* One sample 18.0% Fe.

No samples reported gold above the level of detection. The possibly anomalous base metal values do not appear related to any stratigraphic horizon or structural feature. Elevated base metal are associated with weakly elevated Mn values or with the high Fe value.

2.2.5. GROUND MAGNETICS (See Line Profiles - Appendix & Fig. R9)

Ground magnetic results from Rinadeena were very noisy. At first this was attributed to the effects of the mild to active geomagnetic disturbances which prevailed while the survey was in progress. However, subsequent surveys in other areas made it obvious that there were intermittent erratic faults in the system. Because of the difficulties of working in the area and because the results clearly define the magnetic features the survey was not repeated. Results were hand smoothed and plotted on a base map.

Profiles and magnetic contours show a broad magnetic feature with a contrast of 20-40nT and a sharp secondary peak of ~70nT. These anomalies are best developed on lines 30,600N and 31,000N (=30,900N).

On line 30,600N the broad anomaly is associated with a thin, weakly magnetic, tuffaceous conglomerate. The profiles along lines 31,400N and 30,200N also show a distinct response to the tuffaceous sediment.

2.2.6. PANNED CONCENTRATES (See J. Gilfillan Report - Appendix)

No visible gold was detected in the concentrates. Minor pyritic sulphides were noted in vein quartz and partially oxidised magnetite was reported. Most of the heavy silicate minerals, including andalusite and garnet, are similar to those reported from Swift Creek (Mathison, 1984) to the south. They are probably reworked from the Owen Conglomerate and associated sandstone.

3. DISCUSSION AND CONCLUSIONS

Reconnaissance exploration of the Rinadeena area has detected minor Au mineralisation associated with quartz veining in siliceous sediment. No significant rock alteration or other indication of either an underlying igneous intrusive or of a subcropping hydrothermal system were located. Available evidence suggests that mineralisation in this area would be similar to the subeconomic quartz vein mineralisation of the Woody Hill and Macquarie Mines.

The aeromagnetic anomaly in the Rinadeena area is probably related to the tuffaceous conglomerate unit. Although only weakly magnetic in surface outcrop it has a high contrast with the surrounding non-magnetic Junee Group and Eldon Group sediments.

4. RECOMMENDATIONS

No further work in this area is recommended.

5. REFERENCES

- LEAMAN, D., (1982) Preliminary Interpretation - Aeromagnetic Survey, Western Tasmania.
(E.Z. Rosebery Library No. 315.01/10T)
- MATHISON, I.J. (1984) Swift Creek Area - Progress Report on Exploration Activity 1st October, 1983 to 30th March, 1984.
E.Z. Report No. T184.
- SOLOMON, M. (?1957) Queenstown Area 2":1 mile Geological Map.
Mt. Lyell Exploration Department.

APPENDIX

Rock Samples - Data Sheets

Stream Sediment Samples - Data Sheets

Soil Samples - Data Sheets

Heavy Mineral Descriptions - J.F. Gilfillan & Assoc. Report E3/81/273

Ground Magnetic profiles

Electrolytic Zinc Co. of A'asia Ltd. Rosebery, Tas.			ROCK SAMPLE LEDGER						PROJECT: GORDON LIMESTONE LOCALITY: RIVA DEENA COLLECTED BY: DAVID HOPTON DATE: JAN 35											
Sample Number	A.M.G.Co-ordinates		Sample Type	Geological Description	Rock-type (Macroscopic)	Thin or Polished Section				Metal Content (p.p.m. unless specified)										
	N	E				For P	By	Reference	Rock-type (Microscopic)	Cu	Pb	Zn	Ag	Au	As	Fe	Mn	Sa	Sb	
64101	5331300	376200-300	Rock	WH. MD GR. FELDSPATHIC QUARTZITE	QUARTZITE						5	10	X	X	X	1	1700	15	35	3
64102	"	300-400	"	"	"						5	15	X	X	X	X	2250	15	150	X
64103	"	400-500	"	"	"						X	5	X	X	X	1	2250	15	130	6
64104	"	500-600	"	"	"						X	15	X	X	X	X	2350	15	130	4
64105	"	600-700	"	DK. GR. LAMINATED SILTSTONE	SILTSTONE						10	35	X	X	X	8	129	35	440	X
64106	"	700-800	"	GR LAM. SILTY QUARTZITE	QUARTZITE						20	25	X	X	X	6	7100	65	280	5
64107	"	800-900	"	WH. GR MD GR. FELD. QUARTZITE	"						X	15	5	X	1-10	3	129	30	260	X
64112	"	900-1000	"	WH. MD GR. FELD QUARTZITE	"						5	10	X	X	X	1	4150	15	170	3
64113	"	7000-7100	"	"	"						5	60	X	X	X	X	3750	25	20	X
64114	"	7100-7200	"	"	"						5	70	375	X	X	X	4150	15	230	X
64115	"	7200-7300	"	"	"						5	15	X	X	0.05	3	129	15	280	X
64116	"	7300-7400	"	" + WHITE VEIN QUARTZ	"						X	40	X	X	X	1	3600	35	110	X
64134	5331400	376200-300	"	PINK-WH. MD GR. FELD. QUARTZITE	"						10	15	15	X	X	4	1600	5	55	X
64135	"	300-400	"	"	"						10	20	45	X	X	1	1500	10	29	X
64136	"	400-500	"	"	"						5	15	X	X	X	X	1450	5	41	X
64137	"	500-600	"	"	"						10	25	60	X	X	X	1750	5	66	X
64138	"	600-700	"	" + VEIN QUARTZ	"						10	25	20	X	X	X	2050	10	45	X
64139	"	700-800	"	GREY LAM. MICACEOUS SILTSTONE	SILTSTONE						10	30	25	X	X	3	8700	40	352	X
64140	"	800-900	"	MULTI-COL. COARSE GR. TUFF. ARKOSE	ARKOSE						5	30	30	X	X	3	2125	105	455	X
64165	"	900-920	"	"	"						10	X	95	X	X	1	277	100	359	X
64166	"	930-935	"	FE STAINED VEIN QTZ FAULT ROCK	VEIN QUARTZ						20	X	20	X	X	5	127	410	468	X
64167	"	7000-7100	"	YELLOW-GREY LAM. MICA. SHALE	SHALE						40	25	140	X	X	16	417	80	500	X
64141	5330900	376200-300	"	PINK-WH. MD GR. FELD QUARTZITE	QUARTZITE						5	25	15	X	0.02	2	1650	5	70	3
64142	"	300-400	"	"	"						5	20	20	X	0.08	2	1600	5	26	X
64143	"	400-500	"	"	"						5	25	35	X	X	2	1000	X	9	X
64144	"	500-600	"	"	"						10	20	35	X	X	X	1650	5	32	X
64145	"	600-700	"	GREY SILTY SHALE + SSTONE. VEIN QTZ	SHALE						10	35	35	X	X	X	197	35	379	X
64146	"	700-800	"	"	"						35	55	X	X	X	X	2350	X	558	X
64147	"	805	"	MILKY WHITE VEIN QUARTZ	QUARTZ						10	20	30	X	0.40	2	2250	15	16	X
64148	"	870	"	YEL. GR MICA. SHALE + VEIN QTZ	SHALE						5	30	15	X	X	2	7650	45	15	X
64149	"	915	"	YEL. GR MICA. SHALE. Fe STAINING	SHALE						10	15	X	X	X	2	5350	20	X	X

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Electrolytic Zinc Co. of A'asia Ltd. Rosebery, Tas.			ROCK SAMPLE LEDGER				PROJECT: GORDON LIMESTONE		LOCALITY: RINADEENA										
							COLLECTED BY: I. MATHISON		DATE: MARCH 1985										
Sample Number	A.M.G.Co-ordinates		Sample Type	Geological Description	Rock-type (Macroscopic)	Thin or Polished Section			Metal Content (p.p.m. unless specified)										
	N	E				T or P	By	Reference	Rock-type (Microscopic)	Cu	Pb/Zn	Au	Ag	Fe/Mn	Bi/Mo	As/Sb	Co/W		
65213	5331400	376880	FLOAT	Green grey siliceous pebbly SANDSTONE	SST					5	5	<0.000	X	2.64					
											80			190					
65214	5331400	376780	Rock	Interbedded blue grey f.g. SANDSTONE and cleaned SHALE and SILTSTONE	SST/SH					10	X	"	X	1.94					
											60			70					
65215	5330600	377120	Rock	Thin bedded grey SILTSTONE	SLST					15	15	"	X	2.14					
											70			70					
65216	5330600	377140-80	R.C.	Fine-medium grained blue grey SANDSTONE	SST					5	X	"	X	1.34					
											35			75					
65217	5330600	377230-60	R.C. FLOAT	BLUE GREY SILTSTONE	SLST					5	15	"	X	2.24					
											50			45					
65218	5330600	377280-320	FLOAT	White QUARTZITE	QZT					X	X	"	X	0.26					
											5			20					
65219	5330600	377260	R.C.	Blue grey SILTSTONE, slight cleavage	SLST					5	25	"	X	3.94					
											70			70					
65221	5330600	377120	R.C.	Pink brown tuffaceous SANDSTONE to qz. pk. CONGLOMERATE	VS/CAL					5	15	"	X	1.69					
											45			70					
65222	5330600	377120	R.C.	Fine-medium grained siliceous tuffaceous ? Arkose	VS					5	10	"	X	2.14					
											50			80					
65208	5331800	376840	Float	White QUARTZITE and pale grey SILTSTONE	QZT/SLST					5	X	"	X	5.08					
											20			65					

E.Z. Co. of A'Asia Ltd.,
ROSEBERY, Tasmania

GEOCHEMICAL SAMPLE DATA SHEET

PROJECT: CORDON LIMESTONE
LOCALITY: RINADEENA
GRID NAME: RINADEENA
NOMINAL GRID AZIMUTH:

MATERIAL: Stream Sediments
SAMPLE METHOD:
SAMPLED BY: DLH, NF, SC, MR
DATE: DEC '84 - JAN '85

SIZE FRACTION ANALYSED: ...-80 mesh.....
ANALYSED BY: ANALABS
METHOD: A.A.S. Sp. W. by X.R.F.

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SAMPLE NUMBER	SAMPLE LOCATION DATA			STREAM DATA			% COMPOSITION DATA				METAL CONTENT (ppm unless specified)															
	GRID LINE NO.	A.M.G. CO-ORDINATES		Str. Order Direction of Flow	Width (m)	Active Stream Load	Clay	Sand	Rock Frag.	Organic	CONTAM.	Geology	Cu	Pb	Zn	Ag	Fe	Mn	Au -80#	Au +80#	Sb % -80#					
	GRID EASTING	NORTHING	EASTING																							
64109	376620				0.3			X7030		X	X		10	10	55		X	145%	260		X	.002		X		
64110	376760				0.5			56530		X	X		10	5	50		X	8950	315		X	.001		X		
64117	377380				2.0			X6040		X	X		X	5	30		X	2250	25		X	.002		X		
	5331400N																									
64121	376460				0.3			105040		X	X		X	X	15		X	600	5		X	.001	.002		X	
64122	376485				0.3			105040		X	X		X	X	15		X	150	X		X	.005		X	X	
64123	376785				0.5			57520		X	X		X	X	20		X	1400	10		X	.001	.001		X	
64125	376930				1.0			X6040		X	X		10	X	80		X	155%	505		X	.007	.005		X	
64127	377095				0.5			55540		X	X		20	X	80		X	350%	465		X	.002	.002		X	
64128	377120				0.5			55540		X	X		5	X	25		X	9600	10		X	.001	.002		X	
64119	377570				2.0			X7030		X	X		5	X	20		X	2050	25		X	.001	.001		X	
64120	377570				1.5			X7030		X	X		5	5	55		X	6850	255		X	.004	.001		X	
	5330900N																									
64129	376620				0.5			56035		X	X		X	X	25		X	600	5		X	.007	.002		X	
64131	376930				1.0			56530		X	X		5	X	15		X	850	5		X	.002	.007		X	
64132	377060				1.0			X6040		X	X		5	5	40		X	5350	65		X	.002	.002		X	
	5330600N																									
64156	376350				2.0			X6535		X	X		X	X	15		X	750	5		X	.001	.001		X	
64158	377120				1.5			X6040		X	X		10	20	70		X	130%	470		X	.003	.001		X	
	5330200N																									
64154	376790				2.0			X7525		X	X		X	X	10		X	1250	5		X	.001		X	X	
64152	377360				2.0			X7525		X	X		15	X	50		X	110%	320		X	.002	.001		X	

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E.Z. Co. of A'Asia Ltd.,
ROSEBERRY, Tasmania

GEOCHEMICAL SAMPLE DATA SHEET

PROJECT: GORDON LIMESTONE
LOCALITY:
GRID NAME: RINADEENA
NOMINAL GRID AZIMUTH:

MATERIAL:SOIL.....
SAMPLE METHOD: HAND AUGER
SAMPLED BY: B.M.
DATE: FEBRUARY 1985

SIZE FRACTION ANALYSED:
ANALYSED BY: AMALABS
METHOD: A.A.S.

SAMPLE NUMBER	SAMPLE LOCATION DATA				SAMPLE COMPOSITION DATA							METAL CONTENT (ppm unless specified)							
	GRID LINE NO.	A.M.G. CO-ORDINATES			DEPTH (CM)	COLOUR	Clay	Sand	Rock Frags.	Organic	CONTAM.	Geology	Cu	Pb	Zn	Ag	Au	Fe %	Mn
	GRID EASTING	NORTHING	EASTING																
61901	377180				45 BRGY	80	10	5	5			X	5	5	X	X	0.17	10	
902	160				30 WHBR	25	20	5	5			X	X	X	X	X	0.11	10	
903	140				35 LTBR	20	30	5	0			X	15	5	X	X	0.50	5	
904	120				30 DRBR	60	15	2	5			X	20	10	X	X	4.25	5	
905	100				90 LTGROR	80	20					X	20	210	X	X	2.40	155	
906	080				35 BROR	60	10	3	0			15	25	25	X	X	1.50	40	
907	060				30 BR	15	20	5	5			X	20	10	X	X	0.35	15	
908	040				35 BR	75	10	1	5			5	25	10	X	X	0.23	10	
909	020				40 CRWH	80	5	1	5			X	20	15	X	X	0.60	25	
910	000				30 BR	30	20	5	0			X	10	10	X	X	0.32	15	
911	376980				30 BRWH	80	15		5			X	10	15	0.5	X	0.41	20	
912	960				30 DKBRWH	75	20		5			10	10	20	X	X	0.40	15	
913	940				20 BR	75	10	10	5			X	5	5	X	X	0.35	15	
914	920				20 BR	75	10	10	5			X	5	5	X	X	0.27	10	

E.Z. Co. of A'Asia Ltd.,
ROSEBERY, Tasmania

GEOCHEMICAL SAMPLE DATA SHEET

PROJECT: GORDON LIMESTONE MATERIAL:SOIL..... SIZE FRACTION ANALYSED:
 LOCALITY: SAMPLE METHOD: ..HAND AUGER ANALYSED BY: ..AYALABS.....
 GRID NAME: ..RINADEENA.. SAMPLED BY: ..S.C.T.N.F..... METHOD: ..A.A.S.....
 NOMINAL GRID AZIMUTH: DATE:1/85.....

SAMPLE NUMBER	SAMPLE LOCATION DATA				SAMPLE COMPOSITION DATA							Geology	METAL CONTENT (ppm unless specified)						
	GRID LINE NO.	A.M.G. CO-ORDINATES			DEPTH	COLOUR	Clay	Sand	Rock Frags.	Organic	CONTAM.		Cu	Pb	Zn	Ag	Au	Fe %	Mn
	GRID EASTING	NORTHING	EASTING	DEPTH															
58/01	37700N				135	RDBR	50	104				50	40	50	0.5	X	440	120	
102	376980				65	RDBR	50	54.5				30	30	25	X	X	480	15	
103	960				130	RDBR	20	80				20	30	75	X	X	470	40	
104	940				30	RDBR	75	101.5				25	35	50	X	X	370	50	
105	920				140	RDBR	75	25				5	25	50	X	X	270	45	
106	900				105	RDBR	75	20.5				15	40	55	X	X	515	55	
107	880				30	LFBR	25	601.5				10	30	50	X	X	355	85	
108	860				130	CMBA	20	5030				X	20	25	X	X	0.57	15	
109	840				75	ORBR	20	6020				5	45	30	0.5	X	535	35	
110	820				75	BRDR	25	4035				75	120	140	X	X	1800	40	
111	800				40	CMBR	20	6510				5	20	15	0.5	X	0.72	20	

E.Z. Co. of A'Asia Ltd.,
ROSEBERY, Tasmania

GEOCHEMICAL SAMPLE DATA SHEET

PROJECT: GORDON LIMESTONE MATERIAL: SOIL SIZE FRACTION ANALYSED:
 LOCALITY: RINADEENA SAMPLE METHOD: HAND AUGER ANALYSED BY: ANALABS.....
 GRID NAME: RINADEENA SAMPLED BY: G.B. METHOD: A.A.S.....
 NOMINAL GRID AZIMUTH: DATE: FEBRUARY 1985.....

SAMPLE NUMBER	SAMPLE LOCATION DATA				SAMPLE COMPOSITION DATA							METAL CONTENT (ppm unless specified)							
	GRID LINE NO.		A.M.G. CO-ORDINATES		DEPTH (CM)	COLOUR	Clay	Sand	Rock Frags.	Organic	CONTAM.	Geology	Cu	Pb	Zn	Ag	Au	Fe %	Mn
	GRID EASTING	NORTHING	EASTING	NORTHING															
58112	376	900			40	BR	70		5	25			35	55	40	X	X	0.24	210
113		880			55	CR LTB	45	25	30				X	X	5	X	X	0.25	X
114		860			30	CR LTB	60	53	0	5			X	X	10	X	X	0.19	5
115		840			65	CR OR	BR 60		40				X	5	20	X	X	1.40	15
116		820			60	CR OR	60		40				X	X	15	X	X	1.35	5
117		800			50	CR LTB	OR 60	10	30				X	10	10	0.5	X	0.66	15
118		780			70	LTB	OR 50		50				10	10	20	X	X	1.50	35
119		760			30	LTB	OR 60		40				10	15	25	X	X	1.90	135
120		740			50	YLTB	OR 50	10	40				10	20	35	X	X	1.80	15
121		720			80	BR	OR 40		60				10	20	25	X	X	2.35	15
122		700			30	Y		40	20	40			X	X	10	X	X	0.24	5
123		680			80	OR	BR 90		10				5	20	35	X	X	2.55	25
124		660			50	YWH	70		30				X	10	5	X	X	0.20	X
125		640			50	YOR	90		10				X	10	5	X	X	0.32	X
126		620			55	CR	OR 70		30				15	15	15	X	X	1.50	10
127		600			75	YBR	BK 70	10	20				X	10	5	X	X	0.18	X
						SOIL	PIT												
65208		840			100								5	X	20	X	X	1.44	35
65209		840			100								X	5	15	X	X	1.44	15

112046

040

E.Z. Co. of A'Asia Ltd.,
ROSEBERY, Tasmania

GEOCHEMICAL SAMPLE DATA SHEET

PROJECT: GORDON LIMESTONE MATERIAL: SOIL SIZE FRACTION ANALYSED: ANALABS
 LOCALITY: RINADEENA SAMPLE METHOD: HAND AUGER ANALYSED BY: A.A.S.
 GRID NAME: RINADEENA SAMPLED BY: G.B. METHOD: A.A.S.
 NOMINAL GRID AZIMUTH: FEBRUARY 1985 DATE:

SAMPLE NUMBER	SAMPLE LOCATION DATA				SAMPLE COMPOSITION DATA							METAL CONTENT (ppm unless specified)																
	GRID LINE NO.			DEPTH (cm)	COLOUR	Clay	Sand	Rock Frags.	Organic	CONTAM.	Geology	Cu	Pb	Zn	Ag	Au	Fe %	Mn										
	3	3	0																A.M.G. CO-ORDINATES		NORTHING	EASTING						
58128	3	7	7	100	450	ORBR	80	15	5			5	15	25	X	X	150	20										
129				120	400	ORBR	90	5	5			10	20	25	X	X	285	30										
130				140	190	ORBR	90	5	5			15	30	35	X	X	370	55										
131				160	350	ORDKBR	90	5	5			15	35	35	0.5	X	340	55										
132				180	350	ORBR	90		10			30	35	35	X	X	340	40										
133				200	400	ORLTBR	80		20			25	50	45	X	X	350	95										
134				220	400	ORDKBR	75	5	20			20	45	30	X	X	260	50										
135				240	700	ORDKBR	65	5	25			55	70	110	X	X	375	145										
136				260	200	ORDKBR	65	10	20	5		35	55	45	X	X	345	50										
137				280	200	BR	85		5	10		25	45	30	X	X	190	25										
138				300	400	ORBR	70	10	20			85	20	40	0.5	X	215	25										
139				320	150	YBR	40	20	30	10		15	30	25	X	X	125	40										
140				340	150	YBR	40	20	30	10		5	15	10	X	X	0.20	20										

JOHN F. GILFILLAN & ASSOCIATES PTY. LIMITED

MINERAL EXPLORATION AND GEOLOGICAL CONSULTANTS
PETROLOGY IN ASSOCIATION WITH Dr. B.J. BARRONCommodity Studies
Regional Assessments
Prospect Evaluation
Mineral Exploration
Exploration Management
Mining Geology
PetrologyPostal Address:
P.O. Box 422,
Lane Cove, N.S.W. 2066
AustraliaTelephone:
(02)957 1056

Our Ref: E3/81

Your Ref: E-Z Order No. 900631

PETROGRAPHIC EVALUATION OF ELEVEN
PANNED HEAVY MINERAL CONCENTRATES
(RINADEENA PROJECT).

Report No: E3/81/273

27th March, 1985.

For: Electrolytic Zinc Company of Australasia Ltd.


Dr. B.J. Barron,
Petrologist.

050

Sample No. 64111

Description of Concentrate Only a few dusty brown to dark grey very fine grains remain, several of which are magnetic.

Thin Section. This concentrate contains irregular shaped to angular grains, as well as a minority of subrounded to well rounded grains mostly within the size range 0.15 mm up to 0.8 mm (fine sand to coarse sand size), with sparse grains reaching 1.5 mm to 2 mm across. These coarser grained clasts and fragments include mostly fine grained lithic types which are very heavily stained by red-brown limonitic oxides. Certain of these enclose silt sized angular quartz chips, while others retain relict "islands" of microgranular quartz ± wispy sericite defining a weak foliation. Still others consist of almost monomineralic wispy sericite clouded by dark grey carbonaceous dust.

In the finer grained fraction opaque to translucent grains predominate with approximately equal major proportions of dark grey to black oxides (most likely including both hematite and magnetite), titaniferous oxides that are largely pseudomorphed by white leucoxene and sphene, and grains that are now converted to fine grained red-brown limonitic oxides. The transparent grains account for only about 20% of the total sample, and these include crystals of tourmaline as olive green, brown, and blue-green variegated pleochroic grains, common crystals of quartz, sparse small crystals of zircon, sparse grains of rutile and rare grains of clouded and degraded ?cassiterite. Sparse grains of dense red-brown limonitic oxides that may pseudomorph previous sulphides are associated with minor patches of characteristic fine grained "shredded" quartz.

Sample No. 64118

Description of Concentrate Only three coarse grained red-brown oxidised grains remain (these are set in resin).

Thin Section. This sample exhibits a strong bimodal grain size distribution with approximately equal proportions of the coarser and finer fractions.

The coarser grains have angular to irregular shapes and most likely have a fairly local provenance. They include red-brown cellular organic remains, sparse fine grained lithic types including carbonaceous cherty material with tourmaline, red-brown limonitic oxides enclosing angular quartz chips, clusters of granular vein quartz and a single rounded grain of cassiterite 0.8 mm across.

The finer grained fraction consists of grains mainly within the size range of coarse silt to very fine grained sand 0.04 mm up to 0.1 mm, with sparse coarser grains ranging up to 0.4 mm, medium sand size. The latter are mostly black and dark grey opaque oxides (hematite and magnetite), which have subhedral octahedral cubic to subrounded shapes. Other grains in this size range include quartz, extremely fine grained chert and rare grains of rutile. By far the majority of smaller grains in this fraction, however, include strongly clouded and altered, irregular shaped to subrounded grains of titaniferous oxides, now converted to microgranular sphene ± leucoxene, and almost equally abundant subhedral to well rounded crystals of colourless and pale pink zircon. Also present are subordinate but common elongate prismatic to well rounded crystals of rutile, common well rounded grains of blue-green, yellow-brown and rare blue pleochroic tourmaline, ^{and} rare small grains of cassiterite. Scattered small grains of quartz contamination are accessory.

<u>Sample No.</u>	64124
<u>Description of Concentrate</u>	Only a very few grains of the dusty brown fine grained fraction remain.

Thin Section. This sample consists almost entirely of a finer grained fraction, mostly within the size range 0.1 mm and 0.23 mm, (very fine to fine sand sized grains). A few scattered coarser grains which reach 1 mm across include very heavily oxidised concretionary types consisting of dense red-brown limonitic oxides ± sparse angular quartz grains. The remainder of the sample contains approximately equal major proportions of zircon, rutile, tourmaline and degraded titaniferous oxide grains. The zircon grains have well rounded to subhedral prismatic shapes,

and generally are colourless with fewer pink grains, while the rutile grains have irregular but elongate shapes. The tourmaline crystals have well rounded, subrounded and subhedral prismatic shapes, and these include blue, olive green, yellow-brown, variegated and zoned types. Scattered grains of cassiterite are also present, but these account for less than 2% of the total grains present in the thin section.

Sparse subrounded to irregular shaped, turley opaque grains include grey to black hematite and possibly magnetite, but sulphides or their degraded equivalents are lacking.

Sample No. 64126

Description of Concentrate None remains.

Thin Section. This sample contains mostly opaque to translucent grains within the size range 0.16 mm and 0.5 mm (fine to medium sand sized grains), with a subordinate coarser fraction of grains reaching almost 2 mm across. The coarser grains again include heavily oxidised red-brown translucent hematite-rich types, certain of which enclose angular chips of silt to fine sand sized quartz.

The very dominant finer fraction includes mostly opaque and barely translucent angular to subrounded and even subhedral octahedral grains of black opaque oxides, many of which are in various stages of degradation to translucent white leucoxene indicating a titaniferous primary composition for these grains. Other grains are partly to completely converted to dark red-brown limonitic oxides. The dark grey to black oxides appear to include both hematite and certain octahedral crystals retaining patches of original magnetite. Other irregular shaped clusters of opaque grains are located in fine grained lithic clasts of very fine grained quartz and wispy sericite. Very small grains of accessory phases include nearly colourless subhedral zircon crystals, subrounded crystals of tourmaline (variegated blue to yellow-brown), rare grains of quartz contaminant, and very rare crystals of rutile.

053

Sample No. 64130

Description of Concentrate None remains.

Thin Section. In this concentrate most grains present are within the size range 0.1 mm and 0.25 mm (very fine to fine grained sand size), with sparse grains reaching up to 0.6 mm (coarse sand size). The grains also have somewhat variable shapes, with well rounded, subrounded and fairly angular grains for nearly every phase represented. The sample comprises approximately equal major proportions of zircon, rutile, tourmaline and partly degraded titaniferous oxides. The zircon grains, which are generally well rounded with fewer prismatic shaped, doubly terminated subhedral grains, include both colourless and pale pink types, while rutile grains are subrounded to elongate and prismatic or else have somewhat irregular shapes. The generally well rounded to rarely prismatic shaped tourmaline crystals include zoned and variegated varieties, as well as grains which are blue, orange, olive green or yellow-brown and strongly pleochroic. The irregular shaped titaniferous oxide grains have been pseudomorphed by extremely fine grained sphene ± white leucoxene. Subordinate, but yet fairly common subrounded grains of black opaque oxides most likely include both magnetite and hematite, while sparse grains of translucent red-brown isotropic ?chromite are accessory. Other sparse accessory phases include scattered grains of cassiterite, cleavage fragments and subrounded elongate grains of andalusite, rare grains of well rounded clouded monazite, irregular shaped clusters of epidote and rare grains of garnet. This sample also contains abundant quartz contamination which is present as angular and broken grains which account for about a quarter of the total grains represented in the present thin section.

Sample No. 64133

Description of Concentrate Only a few dusty, very fine pale brown and grey grains remain.

Thin Section. The previous sample 64130 is quite different

from the present one in that the latter contains ubiquitous degraded titaniferous oxides. Most grains in this concentrate lie within the size range 0.1 mm and 0.3 mm (very fine to medium sand size) with rare coarser grains reaching almost 2 mm across, and these include exclusively dense fine grained red-brown limonitic oxides or oxide stained fine grained quartz-rich lithic types. By far the majority of the sample, however, comprises the very fine to medium sand sized fraction including very abundant subrounded to subhedral degraded titaniferous oxides, now converted to clouded white leucoxene ± limonitic oxides with sparse grains retaining fresh black oxides centrally and/or peripherally. Subordinate unaltered trains of black opaque oxides most likely have compositions close to magnetite or hematite, and accessory grains of a red-brown isotropic phase are probably chromite. Transparent grains only account for about 10% to 15% of the total represented in the present thin section, and these include mostly zircon (as subhedral prismatic to quite well rounded grains), almost equally abundant well rounded grains of tourmaline (olive green, yellow-brown and blue pleochroic types are represented), as well as sparse grains of red-brown rutile. Rare accessory phases include clouded grains of monazite, epidote, andalusite, cassiterite, and accessory grains of quartz contamination.

<u>Sample No.</u>	64153
<u>Description of Concentrate</u>	Very few dusty brown grains remain.

<u>Thin Section.</u>	As in the previous sample opaque oxide grains greatly predominate, and these have grain sizes mainly within the range 0.13 mm up to 0.5 mm (very fine to medium grained sand). They include subrounded subhedral, octahedral crystals, as well as angular and rather irregular shaped grains of black opaque oxides (most likely magnetite ± titaniferous magnetite compositions), many grains of which have patchy alteration to red-brown limonitic oxides. Almost equally abundant are similarly shaped grains which are totally pseudomorphed by white leucoxene, certain of which are also partly stained by red-brown limonitic oxides.
----------------------	---

A much finer grained fraction of opaque grains include small subhedral crystals and angular chips of sulphides which tend to be fresh centrally with narrow rims of red-brown limonitic oxides peripherally. Such grains account for about 3% of the total number of grains represented in the present thin section, and their average grain size is only about 0.13 mm. Accessory oxides include rare grains of red-brown to opaque isotropic ?chromite, and rare grains of red- and yellow-brown rutile. Transparent grains comprise approximately 15% of the total sample in the present thin section, and these include common angular cleavage fragments of a colourless clinopyroxene with low positive axial angle, equally common tourmaline as rounded olive green to yellow-brown grains, fresh fragments of ?olivine, green chlorite, minor carbonate, traces of epidote, monazite, and garnet. Sparse quartz grains form a common lighter contaminant, while sparse coarse grains of red-brown oxidised and stained material include organic remains with cellular structures and limonitic oxides enclosing sparse silt sized angular quartz chips.

<u>Sample No.</u>	64155
<u>Description of Concentrate</u>	Only traces of dusty brown grains remain.

<u>Thin Section.</u>	As in the previous sample a finer fraction of grains greatly predominates in the present concentrate with a size variation mainly within the range 0.1 mm and 0.3 mm (very fine to medium grained sand), and approximately equal major proportions of rutile, degraded titaniferous oxides, tourmaline and zircon are present. The rutile occurs in irregular to elongate red- and yellow-brown grains, many of which are subrounded. The titaniferous oxides also have irregular shapes and are converted to very fine grained clouded leucoxene and iron oxides, with sparse, relatively unaltered black opaque oxide grains, which most likely have compositions close to magnetite. The tourmaline grains are quite well rounded and many grains are variegated or zoned with blue-green, pale yellow-brown and clear blue pleochroism, while zircon grains also are well rounded but include clear and pale pink types.
----------------------	--

Subordinate sparse grains include only trace proportions of strongly clouded and partly degraded monazite; rare grains of cassiterite; small lithic fragments comprising dense sericite and clusters of rutile ± sphene granules ± leucoxene, grains which comprise aggregates of fine grained quartz, rare grains of red-brown isotropic chromite; sparse oxidised cubic grains that are now oxidised but once may have comprised sulphides, rare grains of andalusite; garnet; epidote; and fairly common angular grains of quartz contaminant.

Rare coarse grains (up to 2.5 mm across) consist of dense fine grained red-brown limonitic oxides with very sparse, small (silt sized), angular quartz chips.

<u>Sample No.</u>	64157
<u>Description of Concentrate</u>	None remains.

Thin Section. This concentrate consists mainly of grains within the size range 0.08 mm to 0.5 mm (very fine sand size to the upper limit of medium grained sand). Sparse grains in a much coarser size range (1.5 mm up to 3 mm) consist of dense red-brown oxidised organic remains in which individual cells are preserved, as well as dense red-brown oxides enclosing sparse, silt-sized angular quartz grains.

The voluminous finer grained fraction includes very abundant zircon, rutile and degraded titaniferous oxide grains in approximately equal major proportions. The zircon grains generally are quite small with well rounded to prismatic shapes and again include both colourless and pale pink types, while the red- and yellow-brown rutile grains have well rounded to somewhat elongate or irregular shapes and sparse crystals of anatase and brookite also are present. The oxide grains include mostly degraded titaniferous types (now white leucoxene ± clouded microgranular sphene) with some sparse scattered black opaque oxide grains that show little alteration to leucoxene, sphene or red-brown

ferric oxides. Subordinate debris includes fairly common, well rounded grains of variegated and zoned blue-green, yellow-brown and dark blue pleochroic tourmaline and clouded sphene; sparse grains of partly altered cassiterite, rare, well rounded grains of strongly clouded monazite, rare grains of andalusite and garnet. Irregular shaped quartz grains and polygonised quartz aggregates, as well as small lithic clasts of fine grained quartz-sericite rock are fairly common lighter contaminants.

Sample No. 64159

Description of Concentrate None remains.

Thin Section. The average grain size of this concentrate is approximately 0.2 mm but with a rather variable overall size range from about 0.6 mm (very fine sand size), up to 0.85 mm (very coarse sand size). Unlike the previous sample (64157) the present concentrate consists mainly of degraded titaniferous oxide grains that are very largely converted to dense white leucoxene with subordinate dark grey oxide grains, some of which appear to be relatively fresh while others are partly converted to white leucoxene ± minor red-brown oxides. Also present are rare grains of a pale yellow clouded and weathered phase with high relief and strong birefringence which appears to be uniaxial (-), (maybe anatase formed as an alteration product of sphene or ilmenite). The sample contains only sparse grains of tourmaline, as subrounded pleochroic pale brown, olive green and blue grains, with scattered smaller grains of subrounded to subhedral colourless to pale pink zircon. Cleavage fragments and small rounded grains of rutile are sparse, and accessory phases include chlorite, epidote, ?monazite, rare aggregates of shredded quartz enclosing oxidised grains of previous sulphides (now converted to goethite ± hematite). Sparse grains of quartz contamination and lithic aggregates (comprising granular quartz ± carbonate, quartz-sericite rock, and dense red-brown limonitic oxides ± sericite ± silt sized angular quartz chips), also from sparse accessory components.

058

Sample No. 61917

Description of Concentrate Only a few very fine grained remain in this concentrate, several of which are strongly magnetic.

Thin Section. The grain size of this sample is rather variable, with an almost continuous range from less than 0.06 mm up to about 2 mm (very fine sand size up to very coarse sand size). The rather sparse fraction which exceeds 0.5 mm consists of subrounded to irregular shaped stained and strongly oxidised grains comprising almost monomineralic red-brown limonitic oxides commonly enclosing sparse angular silt and very fine sand sized quartz grains, as well as organic clasts with recognisable cellular structures. Sparse lithic clasts include weakly foliated and recrystallised quartz-rich siltstone, strongly polygonised quartzite and very fine grained, weakly foliated sericite rock with patches of dark grey opaque oxides.

The voluminous finer grained fraction consists of the following phases in approximate decreasing order of abundance; zircon, black opaque oxides, rutile, tourmaline, white leucoxene-altered titaniferous oxides, and sparse accessory grains of red-brown isotropic chromite, clusters of microgranular epidote, andalusite, and very rare grains of cassiterite, garnet monazite and partly oxidised sulphide grains. The zircon crystals mostly have subrounded to subhedral shapes and include both pink and colourless grains, while many of the dark grey opaque oxides have narrow rims and patches converted to white leucoxene indicating the presence of a significant titaniferous component. Other opaque oxides include magnetic grains most likely of phases approaching magnetite and hematite compositions. Scattered angular grains of quartz are a common contaminant.

Rinadeena Grid (EL 31/83). 050
Ground Magnetic Profile (1:5000)
Line 30200 N. Date 27-2-85
Operator Mark Rice Plotted by I.J. Mathison
Instrument. Lamontagne GSM-18
Note Mild to active magnetic disturbance throughout

5 cm

62 600

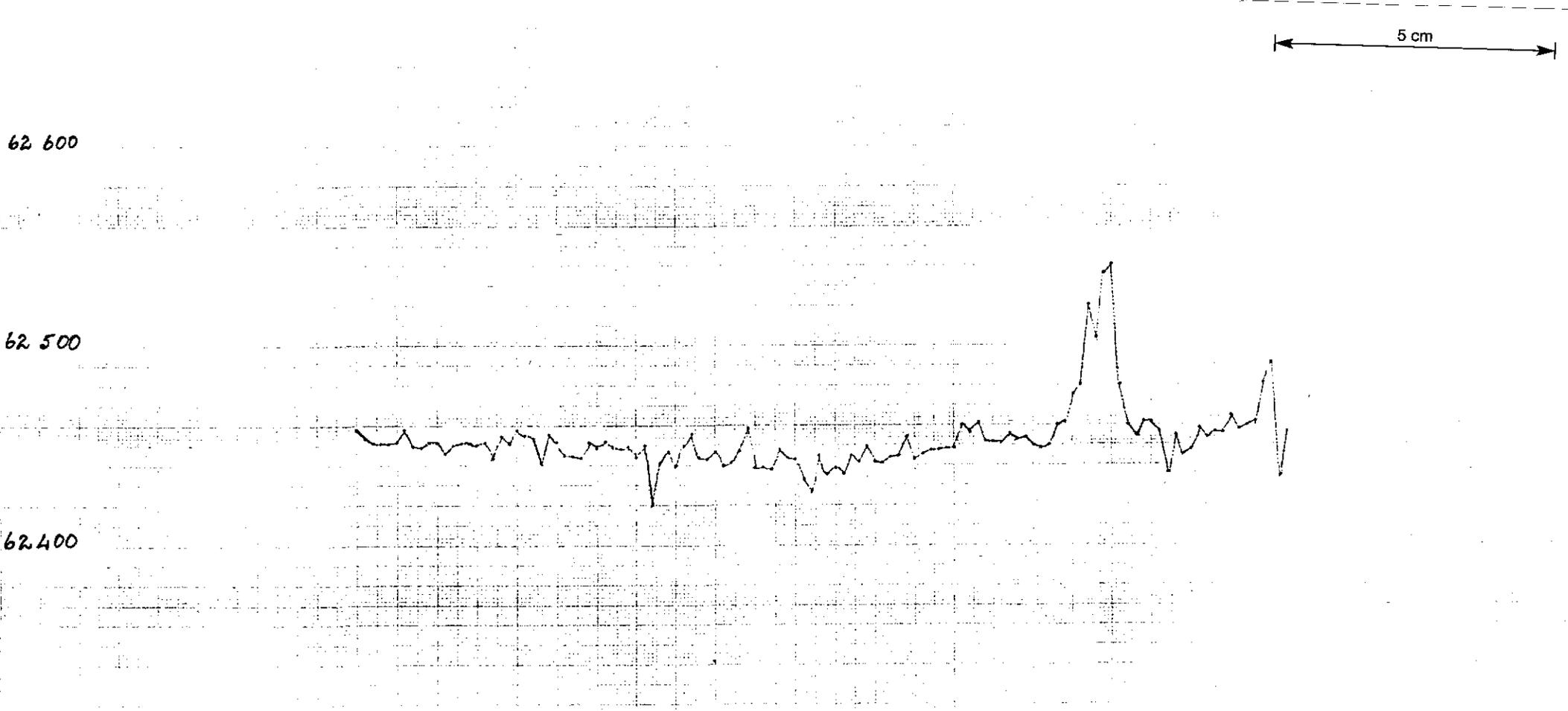
62 500

62 400

76000 mE

100 200 300 400 500 600 700 800 900 77000 100 200 300 400 500 600 700

112057



Kinadeena Grid (EL 31783)

060

Ground Magnetic Profile (1:5000)

Line 30600N Date 27-2-85

Operator Mark Rice Plotted By I.J. Mathison

Instrument Lamontagne GSM-18

Note: Mild to active geomagnetic disturbance throughout

5 cm

62 600

62 500

62 400

Base station out.

76 000 m E

100

200

300

400

500

600

700

800

900

77 000

100

200

300

400

500

600

112058

Rinadeena Grid (E.L. 31/83)

081

Ground Magnetic Profile (1:5000)

Line 31000N Date 2-2-85

Operator Mark Rice Plotted by I.J. Mathison

Instrument Lamontagne GSM-18

Note: Mild to active geomagnetic disturbance througho

5 cm

62 600

62 500

62 400

76 000 mN

100

200

300

400

500

600

700

800

900

77 000

100

200

300

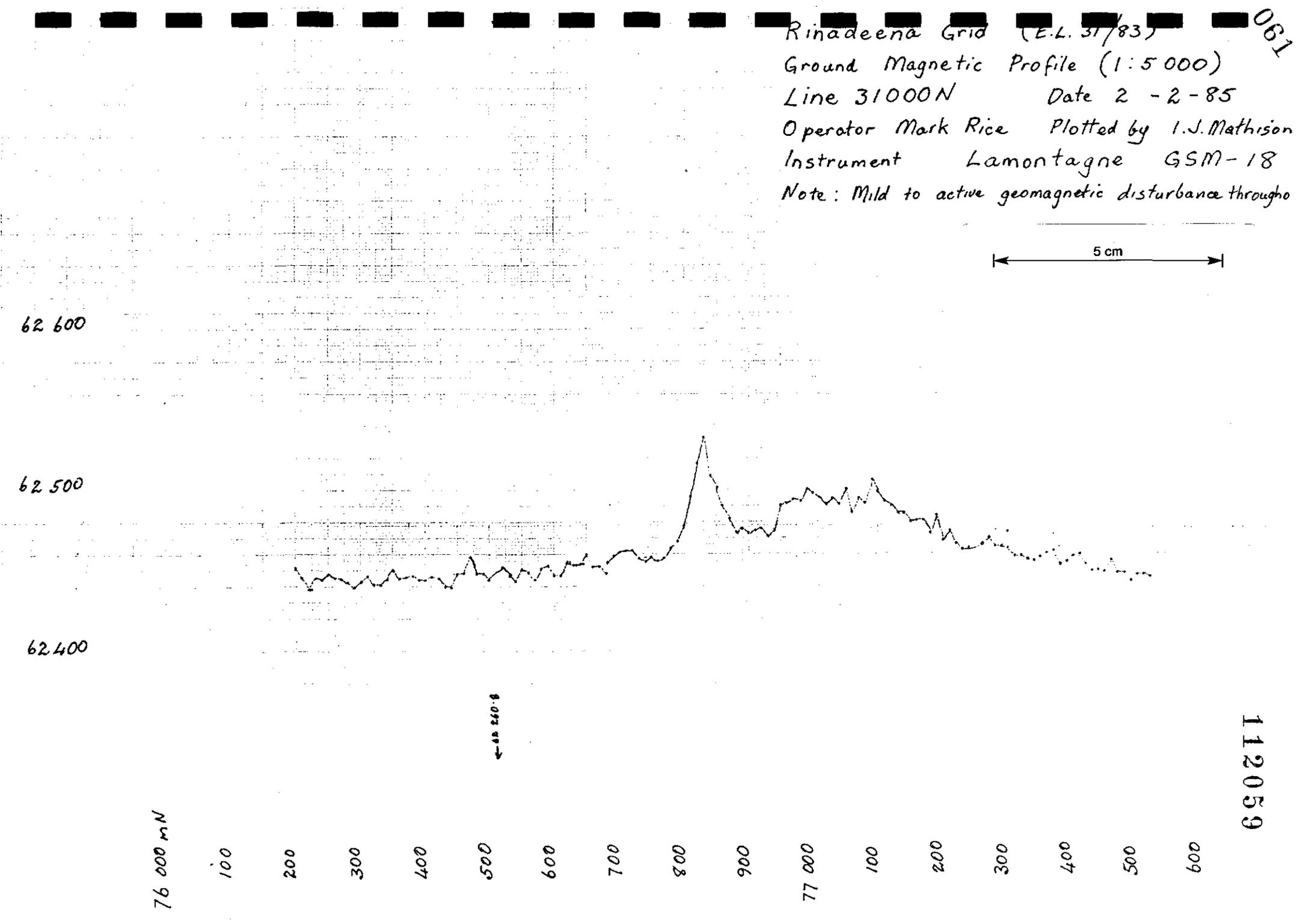
400

500

600

8.092 mN

112059



Rinadeena Grid (EL 31/83)

082

Ground Magnetic Profile

Line 31400 N Date

Operator Mark Rice Plotted by I.J. Mathison

Instrument Lamontagne GSM-18

Note: Mild to active geomagnetic disturbance throughout.

5 cm

62 600

62 500

62 400

76 000 mE

100

200

300

400

500

600

700

800

900

77 000

100

200

300

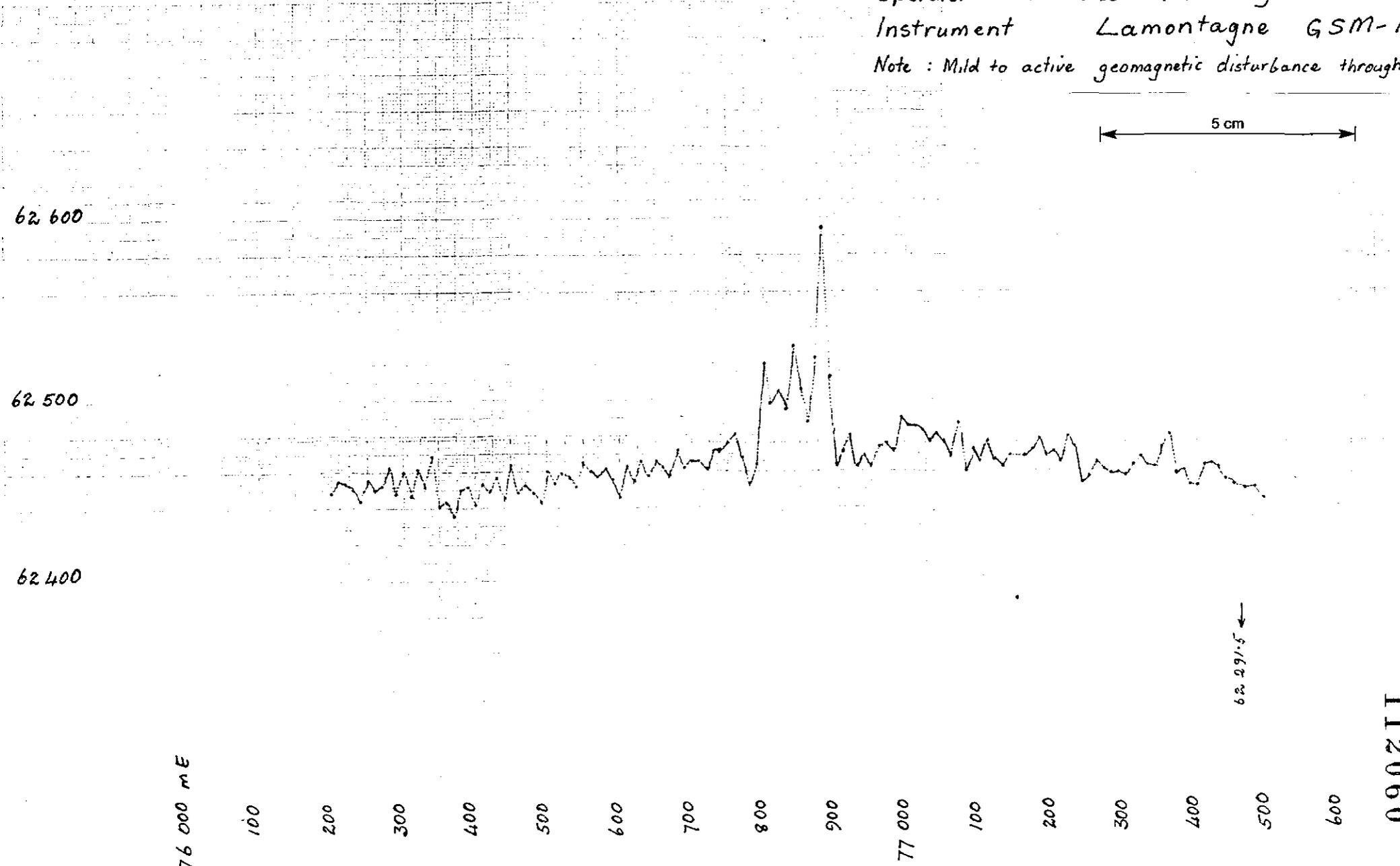
400

500

600

62 291.5

112060



Rinadeena Grid (EL 31783)

063

Ground Magnetic Profile

Line 31800 N Date

Operator Mark Rice Plotted by I.J. Mathiso

Instrument Lamontagne GSM-18

Note: Mild to active geomagnetic disturbance throughout.

62 600

62 500

62 400

76 000 m E

100

200

300

400

500

600

700

800

900

77 000

100

200

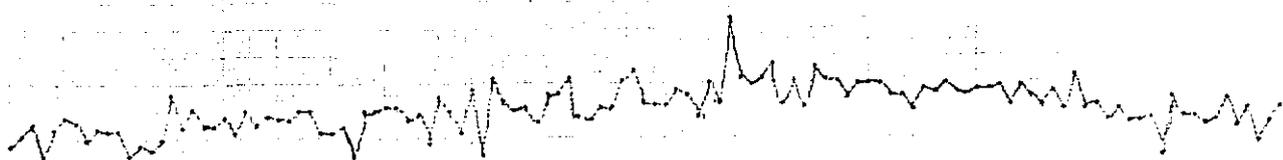
300

400

500

600

112061



Rinadeena Grid (EL 51/83)

064

Ground Magnetic Profile (1:5000)

Line 76200E (BASELINE) 27-28-2-85

Operator Mark Rice Plotted by I.J. Mathisior

Instrument Lamontagne GSM-18

Note Mild to Active geomagnetic disturbance througho

5 cm

62 600

62 500

62 400

31 800 700 600 500 400 300 200 100 000 900 800 700 600 500 400 300 200 100

62197 ←

112062

ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED
WEST COAST MINES

PART OF EXPLORATION LICENCE 31/83

MACQUARIE

CLARK RIVER AREA

REPORT ON EXPLORATION ACTIVITY

1ST OCTOBER, 1984 TO 30TH JUNE, 1985.

E.Z. REPORT T208

I. J. MATHISON,
JULY, 1985

07A

112064

PART OF EXPLORATION LICENCE 31/83

MACQUARIE

CLARK RIVER AREA

REPORT ON EXPLORATION ACTIVITY

1ST OCTOBER, 1984 TO 30TH JUNE, 1985.

E.Z. REPORT T208

I.J. MATHISON,
JULY, 1985

TABLE OF CONTENTS

<u>TABLE OF CONTENTS</u>	
1. <u>INTRODUCTION</u>	1.
1.1. <u>Location and Access</u>	1.
1.2. <u>Topography & Vegetation</u>	1.
1.3. <u>Previous Exploration</u>	1.
1.4. <u>Geophysics</u>	1.
1.5. <u>Summary of 1983-84 Results</u>	2.
1.6. <u>Aim of Exploration</u>	2.
2. <u>WORK COMPLETED - OCTOBER, 1984 TO JUNE, 1985</u>	2.
2.1. <u>Airphoto Interpretation</u>	2.
2.2. <u>Track Cutting</u>	3.
2.3. <u>Stream Sediment</u>	3.
2.4. <u>Rock Sampling</u>	3.
2.5. <u>Ground Magnetism</u>	4.
2.6. <u>Geological Mapping</u>	4.
3. <u>RESULTS</u>	4.
3.1. <u>Geology</u>	4.
3.2. <u>Stream Sediment Geochemistry</u>	6.
3.3. <u>Rock Geochemistry</u>	6.
3.4. <u>Panned Concentrates</u>	7.
3.5. <u>Ground magnetism</u>	7.
4. <u>DISCUSSIONS AND CONCLUSIONS</u>	7.
5. <u>CITED REFERENCES</u>	8.

FIGURE, PLATES AND APPENDIX

FIGURE 1. ✓ Location

PLATE	✓CR 1.	Interpretative Geology	AO-530-3006
	✓CR 2.	Sample Locations	-3000
	✓CR 3.	Geochemistry - Pb	-3002
	✓CR 4.	" - Zn	-3001
	✓CR 5.	" - Au	-3005

APPENDIX

Petrology - C.M.S. Report 85/2/9

Heavy Mineral Descriptions - J.F. Gilfillan & Assoc. Report E3/81/272

Stream Sediment Data Sheets

Rock Sample Data Sheets

Ground Magnetic Profile

5 cm

Heemskirk Granite

ZEEHAN

E.L. 4/78 (Zeehan)

E.L. 4/78 (Zeehan)

E.L. 32/83 (Princess)

Bull Rivulet

Princess River Basin

QUEENSTOWN

Tofft River

Rindeena Aeromagnetic Anomaly

Bubs Hill

Nelson River

Governor River
E.L. 30/83 (1) (Governor)

King River

OCEAN

STRAHAN

Swift Creek

E.L. 31/83 (Macquarie)

MACQUARIE

E.L. 52/83 (Owen)

South Darwin Peak

HARBOUR

Clark River

Nora River

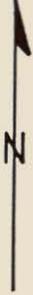
Hazell Creek

Bird River

Spence River

E.L. 30/83(2) (Governor)

SOUTHERN



- FAULT
- GORDON LIMESTONE
- MT. READ VOLCANICS



PROJECT GORDON LIMESTONE J.V.		
LOCATIONS		
Compiled S.T.	Date	PLAN NO
Drawn R.J.R.	Scale	Fig. 1

1. INTRODUCTION

1.1. Location and Access (See Fig. 1)

The Clark River area occupies approximately 15km² just north of Kelly Basin on Macquarie Harbour. The area is 30km south of Queenstown Airport. Access to the area is by helicopter.

1.2. Topography and Vegetation

Most of the area is rugged and densely forested. Streams run in deeply incised valleys between steep strike ridges. Some exposed areas to the west of the Clark River support only button grass with ti-tree and eucalyptus in sheltered patches. The rest of the area is covered by mature rainforest.

1.3. Previous Exploration

Published geology of the area is based on airphoto interpretation supported by detailed mapping along the Kelly Basin Track. No reports of old workings or of mineral occurrences have been sighted. Results of 1983-84 exploration by E.Z. are detailed in E.Z. Report T185.

1.4. Geophysics

The 1981 regional aeromagnetic survey commissioned by the Tasmanian Department of Mines covered this area. Two small circular aeromagnetic anomalies with relative intensities of 50nT were detected. These are described as Anomaly 11 by Corbett et. al. 1982. One of these anomalies plots just west of Clark River and the other plots just south of the sharp bend in Hazel Creek.

1.5. Summary of 1983-84 Results

The Queenstown 1:250,000 Geological Sheet suggests that most of the Clark River area is underlain by Gordon Limestone. Geological reconnaissance by E.Z. field crews in early 1984 detected altered acid and intermediate volcanics outcropping in Hazel Creek and in the Clark River. These volcanics outcrop close to the plotted location of the two small aeromagnetic anomalies. The volcanic rocks sampled included kaolinized rhyolitic tuff; sheared, chloritised, and sericitised volcanic rock; bedded volcanoclastic sediments; and andesitic volcanics with minor pyrrhotite. No geochemical anomalies were detected by this early reconnaissance.

1.6. Aim of Exploration

The aim of the 1984-85 field programme was to determine the extent and characteristics of the volcanic rocks of the Clark River area and to assess the potential of these volcanic rocks for base metal or gold mineralisation.

2. WORK COMPLETED - OCTOBER, 1984 TO JUNE, 19852.1. Airphoto Interpretation

As a first step in planning the 1984-85 programme an air photo interpretation was completed. This allowed the extent of the volcanic rocks to be defined and revealed the most useful position for planned walking tracks and helipads. The following photography was used.

Series	Scale	Run	Photos	Date Flown
Mt. Lyell (colour)	1:20,000	7	160-163	19.1.79
		8	186-190	19.1.79
South West (B&W)	1:45,000	10	085-087	5.5.79
		11W	107-109	6.3.80

2.2. Track Cutting

A button grass covered ridge just west of the Clark River provided initial access to the area. From this starting point a 2.5km walking track was cut through thick rain forest to the east. A second walking track was cut along the crest of the first big ridge east of the Clark River. This track extended for 1.5km N.N.W. to the Clark River and for 3.4km to the S.S.E. across Hazel Creek. A helipad was cleared near the intersection of the walking tracks. The east-west walking track was pegged at 20m slope corrected intervals.

2.3. Stream Sediment Sampling

In January and February, 1985, 62 stream sediment samples and 19 panned concentrates were collected. Stream sediment samples were sieved on site to -1mm. Dried samples were subsequently submitted to Analabs, Burnie where they were sieved to -80#. The -80# fraction was analysed for Cu, Pb, Zn, Ag, Fe, Mn and Au. Au was determined by A.A.S. following aqua regia digestion and carbon rod finish. All other elements were determined by A.A.S. following nitric/perchloric digestion.

Roughly panned concentrates were submitted to John F. Gilfillan & Associates for heavy media separation and microscopic identification of heavy minerals.

2.4. Rock Sampling

Rock chip samples were collected from most stream sediment sample sites, from along cut lines, and wherever unusual or different rock types were observed. Samples were submitted to Analabs, Burnie where samples were crushed and analysed for Cu, Pb, Zn, Ag, Fe, Mn and Au. Au was determined by fire assay and Cu, Pb, Zn, Ag, Fe and Mn by A.A.S. following total dissolution in mixed acids. 60 rock samples were analysed.

12 selected rock samples were also submitted to C.M.S. for thin section petrology.

2.5. Ground Magnetics

To confirm the location of the aeromagnetic anomaly a reconnaissance ground magnetic traverse was read along the east-west walking track. Stations were read at 10m intervals using a Scintrex MP-2 magnetometer and a 2m sensor pole. Diurnal variation was not monitored.

Raw data were plotted as a 1:10,000 scale ground magnetic profile.

2.6. Geological Mapping

Geological observations were noted at all sample sites, along cut lines, and wherever major lithological or structural changes were observed. Data were plotted onto a 1:10,000 scale base map and used, together with airphoto interpretation, to prepare an interpretative geological map.

3. RESULTS

3.1. Geology (See C.M.S. Report - Appendix and Plate CR 1)

Most of the area covered by reconnaissance geological mapping in 1984-85 is underlain by a mixed volcano-sedimentary sequence, the Clark River volcanics. Lithologies described include acid to intermediate pyroclastics, rhyolitic lavas and minor intrusives, fine grained carbonaceous and micaceous quartzites and siltstones. All rocks have been sheared and regionally metamorphosed. Pelitic rocks have developed phyllitic texture, metamorphic mica is common in most metaquartzites, and some intensely sheared volcanic rocks were mapped as chlorite schist. On lithological grounds (see C.M.S. Report) these rocks can be correlated with the western sequence of the Mt. Read Volcanics. In the bed of the Clark River, irregular dykes of altered dolerite were observed cutting through intensely cleaved siltstones and fine grained meta-quartzites.

North of the Clark River, slightly less metamorphosed rhyolitic volcanics and volcano-sedimentary rocks are tentatively assigned to the Tyndall Group of Corbett (1984). A volcanomict grit and a mass flow breccia include clasts

of black shale, metaquartzite, altered granitic rock and reworked tuffaceous material (C.M.S. Report - samples 65858, 59).

To the east of the Clark River volcanics, fine grained argillaceous limestone of the Gordon Limestone outcrop in the bed of the Clark River and in a tributary of Hazel Creek. Marly siltstone and siltstone outcropping along linear creek valleys joining these limestone outcrops are also assigned to the Gordon Limestone. Some of these siltstones contain detrital mica. They are interpreted as facies variants along the very thin (<100m) limestone unit.

Still further east, quartzite, quartz sandstone and micaceous quartz siltstone outcrops as resistant strike ridges. Valleys through this area follow thin siltstone units. These are interpreted as equivalents of the Moina Sandstone.

No outcropping conglomerate rocks characteristic of the Owen Conglomerate were observed in the area mapped. Similar strike ridges to the east may be either Owen Conglomerate or Moina Sandstone.

Very few dip measurements of the Gordon Limestone or Moina Sandstone could be collected. One measurement taken suggests an easterly dip for these sediments. Airphoto observations, however, indicate a westerly dip of 60°. This is supported by measurements taken further south near the Kelly Basin Track (see Bird River Report T206).

A major reverse fault is inferred between the Clark River volcanics and the thin Gordon Limestone. A continuation of the reverse fault near Teepookana and Mt. Strahan to the north is suggested (see Queenstown 1:250,000 Geological sheet).

Another major east to north-east trending strike-slip fault is interpreted north of the Clark River. This fault separates the Tyndall Group rocks under Mt. Sorell from the older Clark River volcanics and the Ordovician sediments to the south.

The western part of the area, west of Mt. Sorell and the Clark River is underlain by Tertiary sediments. Poorly consolidated polymict conglomerates and coarse grained sandstone predominate.

083

No indications of base metal mineralisation or of intense hydrothermal activity were observed. Pyrite was noted in black shales and mass flow breccias south of Mt. Sorell and disseminated pyrrhotite was observed in intermediate volcanics and volcanoclastic sediments along the Clark River.

3.2. Stream Sediment Geochemistry (See Data Sheets - Appendix & Plates CR 2, 3, 4 & 5)

Sampling data and analytical results for stream sediments are listed in the appendix. Results are summarised below. Results of 9 samples collected in early 1984 are included.

Stream Sediment Geochemistry n = 71

Element	Range	Mean	?Anomalous
Cu	<5-50	10	-
Pb	<5-80	12	-
Zn	<5-155	50	-
Ag	<0.5-0.5	-	-
Fe	0.02-3.65%	-	-
Mn	<10-975	-	-
Au	<0.001-0.024	~0.003*	>0.020 (3 samples)

* n = 62

Three samples reported weakly elevated gold values. Two of these were collected from the Clark River and one from a small stream crossing old terraces of the Clark River. A source of gold in the headwaters of the Clark River is suggested.

3.3. Rock Geochemistry (See Data Sheets - Appendix & Plates CR 2, 3, 4 & 5)

Rock descriptions and analytical results are listed in the appendix. Results are summarised below.

Rock Geochemistry n = 60

Element	Range	Mean	?Anomalous
Cu	5-185	25	>150 (1 sample)
Pb	<5-85	15	>80 "
Zn	<5-885	65	>200 (2 samples)
Ag	<0.5	-	-
Fe	0.20-8.86% (25-37%)	-	3 ironstones
Mn	20-3080 (2.14%)	-	1 sideritised dolomite
Au	<0.008-0.06	-	-

All slightly anomalous values above can be attributed to the sample lithology. An altered doleritic intrusive reported 185 ppm Cu; a sideritised dolomite reported 215 ppm Zn, 85 ppm Pb, and high Fe and Mn; and a limonitic ironstone, probably derived from sideritised limestone, reported 885 ppm Zn. None of these is considered indicative of significant base metal mineralisation.

No rock samples reported significant Au values.

3.4. Panned Concentrates (See J.F. Gilfillan & Assoc. Report - Appendix and Plate CR 2)

Most minerals identified in the heavy mineral concentrates reflect the rock types of the drainage area. Zircon, rutile, chromite and rounded tourmaline are common in the Ordovician Sandstone and conglomerate; epidote, chlorite, magnetite, and clinopyroxene are common in the meta volcanics and altered doleritic intrusives; and titanium oxides are common throughout. Only one small grain of gold was identified from a stream draining the southern slopes of Mt. Sorell. Oxidised pyrite was an accessory mineral in the majority of samples. No base metal sulphides or alteration products associated with base metal sulphides were reported.

3.5. Ground Magnetics (See Line Profile - Appendix)

A magnetic feature with a peak of 350nT above background was detected 100-300m east of the Clark River. Detailed mapping and sampling along a nearby creek detected nonmagnetic rocks. Laminated and thin bedded siltstone and quartzite were sampled. However, distinctly magnetic dolerite dykes were sampled 300m to the south in the bed of the Clark River. A basic minor intrusive is suggested as the source of the aeromagnetic anomaly.

4. DISCUSSIONS AND CONCLUSIONS

Geological reconnaissance of the Clark River area have outlined a block of Cambrian volcanosedimentary rocks lying to the west of a major reverse fault. These rocks, the Clark River volcanics, are in fault contact with a very thin limestone and siltstone unit, herein correlated with the Gordon Limestone.

The geological reconnaissance and a thorough stream sediment and rock chip sampling programme have revealed no clear indications of base metal or gold mineralisation. Furthermore, no indication of any significant hydrothermal activity was observed.

The absence of any favourable indications suggest that the chances of discovering mineralisation of any economic significance in this area are very small. No further work in this area is recommended.

5. CITED REFERENCES

E.Z. Report T185 Hazel Creek Area. Progress Report on Exploration Activity 1st October, 1983 to 30th March, 1984.

I.J. Mathison - July, 1984.

E.Z. Report T206 Bird River Area. Report on Exploration Activity October, 1984 to June, 1985.

I.J. Mathison - July, 1985.

CORBETT, K.D., 1984 Geological Compilation Map of the Mount Read Volcanics Que River to Mt. Darwin.

Unpub. Report of the Dept. of Mines - 1985/11.

CORBETT, K.D. et.al. The 1981 West Coast Aeromagnetic Survey : Summary of information and results.

Unpub. Report 1982/83 Dept. of Mines, Tasmania.

APPENDIX

Petrology - C.M.S. Report 85/2/9

Heavy Mineral Descriptions - J.F. Gilfillian & Assoc. Report E3/81/272

Stream Sediment Data Sheets

Rock Sample Data Sheets

Ground Magnetic Profile

087

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19th February, 1985

REPORT CMS 85/2/9

YOUR REFERENCE: Order No. 900625
DATE RECEIVED: 13th February, 1985
SAMPLE NOS.: 12 Samples
SUBMITTED BY: I.J. Mathison
WORK REQUESTED: Petrology


H.W. Fander, M. Sc.

REPORT CMS 85/2/9

Twelve rock chip samples from the Clark River area were received for brief petrological description, with emphasis on probable stratigraphic correlative features. Representative thin-sections were prepared and examined together with their respective cobaltinitrite-stained offcuts, with carbonate stain and chemical tests carried out as warranted. Attached tabulated descriptions summarise the microscopic data and include interpretative comments.

Summary

This suite comprises largely altered and low-grade regionally metamorphosed acid volcanics and subordinate similarly altered psammopelitic sediments.

Volcanics are predominantly rhyolitic types, with a single altered basic represented by sample 59987. Rhyolites include porphyries and relatively minor fragmental types, are typically conspicuously quartz-phenocrystal, and include ferromag (biotite \pm amphibole) phenocrystal varieties.

The clastic sediments are variously quartzose/micaceous to strongly acid-volcanomict, and may include minor basement-derived clasts of metasediment and altered granitoid.

General characteristics of this com-osite acid volcanic/partly volcanomict quartzse sediment suite support correlation with the Western Sequence of the Mt. Read Volcanics. Absence of detrital chromite from the clastic sediments, whilst negative evidence supports a pre-Middle Cambrian age.

A single example of sideritised dolomitic pelite/impure dolomite breccia (sample 65794) could be correlated with Gordon Limestone on strictly petrological grounds, but this would be dependent on field relationships.

D. Cowan, B. Sc.

CENTRAL MINERALOGICAL SERVICES

Sample	Classification - Composition	Fabric	Accessories	Comments
76 S. 22)	<u>Crenulated Phyllite</u> . Fine to semi-sericitic muscovite with minor closely intergrown chlorite, subordinate to minor microcrystalline quartzofeldspathic material; thinly disseminated relict quartz, sericitic albite phenocrysts.	Microcrenulated, phyllitic; banded on fine millimetric scale	Evenly disseminated leucoxic semi-opaques, rare zircons. Traces of oxidised fine-grained pyrite.	Crenulated chloritic mica-quartz, phyllitic regional metavolcanic. Relict features are rhyolitic, flow-banded, lava-like.
380	<u>Altered, Sheared Rhyolite</u> . Frequent extensive sericitised alkali feldspar, subordinate quartz, minor brown hornblende, partly tremolitised augite phenocrysts. Tremolitic microcrystalline quartzofeldspathic matrix.	Phyllitic, incipiently banded, with a vaguely relict fragmental matrix.	Minor chlorite. Disseminated leucoxic semi-opaques, minor traces of oxidised fine pyrite.	Tremolitic, phyllitic regional metavolcanic; sodi-potassic rhyolitic and conceivably a vitric-crystal tuff. Finer detail obscured by marked shearing.
387	<u>Altered Microgabbro</u> . Albitised plagioclase laths with interstitial chlorite aggregates, foliae. Conspicuous leucoxic opaques. Minor chlorite veinlets, amygdalae.	Relict weakly feldspar-porphyritic, weakly amygdaloidal, "doleritic" (subophitic). Pervasively stressed.	Minor clots, films of sericite in chlorite aggregates.	Minor basic intrusive or core zone of thick flow, dependent on field relationships. Alteration predates stress effects.
390	<u>Crenulated Phyllite</u> . Fine to semi-sericitic white mica with minor intergrown chlorite; subordinate/variable proportions of silt- to fine sand-sized subangular quartz. Disseminations of fine oxidised pyrite.	Banded, phyllitic, microcrenulated at high angle. Relict silty to fine sandy pelitic.	Rare relict detrital schorl, zircon. Traces of carbonaceous degraded fine carbonate (?dolomite).	Crenulated metasedimentary phyllite, primarily a carbonaceous-pyritic, ?dolomitic, quartzose, argillaceous siltstone. Oxidised pyrite is bedded "syngenetic".
809	" <u>Metaquartzite</u> ". Relict framework of silt- to fine sand-, minor medium sand-sized subangular quartz grains, minor muscovite flakes. Matrix/cement of microgranular quartz, semi-sericitic white mica.	Weakly banded, poorly (trend bimodal) sorted sandstone with a weak phyllitic overprint.	Minor degraded biotite. Semi-pervasive carbonaceous matter. Traces oxidised pyrite, detrital schorl.	Carbonaceous, micaceous impure orthoquartzite (?fluvial). Reflects low- to mid-greenschist facies regional metamorphism. Devoid of "volcanic" features.
829	" <u>Metaquartzite</u> ". Relict framework of silt- to fine sand-sized, angular to subangular quartz grains, subordinate muscovite flakes. Sericitic/microgranular quartz cement. Semi-pervasive clots, films of sideritic carbonate.	Analogous to 65809, fine-grained; pervasively microfractured/veined, restressed.	Pervasive carbonaceous matter. Traces detrital schorl, zircon, leucoxene. Minor traces of "syngenetic" pyrite.	Close affinities with 65809; finer-grained, slightly relatively micaceous, carbonaceous and pyritic. Secondary carbonate-quartz veinlets films predate late stress.
841	<u>Biotite Rhyolite</u> . Phenocrysts of embayed quartz, extensively sericitised alkali feldspar, chloritised biotite in a sericitic/weakly chlorite-stained, microcrystalline, quartzofeldspathic groundmass.	Coarsely porphyritic, stressed to weakly phyllitic.	Minor leucoxic opaques. Rare xenoliths of chloritic vein-type quartz, impure chert.	Biotite-rhyolitic porphyry. Finer detail obscured by shearing and alteration effects, but general features consistent with a weakly xenolithic minor intrusive.
843	" <u>Metarhyolite</u> ". Frequent sericitic albite, subordinate K-feldspar, variably recrystallized quartz and chloritised biotite phenocrysts in a pervasively chlorite-stained, microcrystalline, quartzofeldspathic groundmass.	Phyllitic. Relict strongly porphyritic, weakly banded; locally relict perlitic-structured.	Disseminated leucoxic Ti-magnetite, rare chloritised ?amphibole phenocrysts.	Chloritic-sericitic, phyllitic low-grade regional metavolcanic. Devitrified-rhyolitic and lava-like, but conceivably vitric-crystal tuffaceous. Finer detail obscured.

mple .	CENTRAL MINERALOGICAL SERVICES			
	Classification - Composition	Fabric	Accessories	Comments
855	<u>Biotite Rhyolite</u> . Microcrystalline quartz with sporadic interspersed films, lenses of sericite. Frequent stressed to partly recrystallized relict quartz, minor sericitised biotite, silicified K-feldspar phenocrysts.	Porphyry-like, with evenly disseminated coarse phenocrysts; featureless silicified microcrystalline groundmass.	Disseminated primary and secondary (altered biotite-exsolved) leucoxenitic semi-opaque mass.	Silicified-sericitised biotite-rhyolitic porphyry; probably a semi-chilled minor intrusive, but dependent on field relationships. Sericitic foliae are sheared veinlets
858	<u>Volcanomict Grit</u> . Framework of sand- to grit-sized subangular clasts of sericitic/variably silicified rhyolitic lava clasts, quartz grains and vein-type composites, minor metapelite clasts. Sparse sericite-quartz matrix.	Poorly sorted, weakly bedded, subangular gritty clastic. Moderately stressed.	Minor clasts of chert, low-grade regional metaquartzite, muscovitic granitoid ("granophyre").	Strongly volcanomict (rhyolitic lava-derived) grit with subordinate metasilted sediment and altered granite-derived components. Reflects post-depositional sericite-quartz alteration.
859	<u>Sericitic "Breccia"</u> . Intercalation of sericitic shale/carbonaceous shale and quartzose volcanomict lithic sandstone with angular-subangular rhyolite, tuffaceous pelite clasts quartz grains, sericitic shaly matrix.	Phyllitic on micro-scale. Relict shale-parted/matrixed (sedimentary), breccia-like.	Minor sheared/sericitised clastic biotite flakes. Conspicuous silt- to fine sand-sized leucoxenitic semi-opaques.	Finer critical detail obscured by shearing effects. General features consistent with a mass flow-type sedimentary breccia. Reworked rhyolitic-tuffaceous in part.
794 .s. 633)	<u>Sideritised Breccia</u> . Fine-grained, vaguely dolomite rhomb-pseudomorphous sideritic (manganiferous) with subordinate to minor accessory sericite, silt- to fine sand-sized quartz, carbonaceous matter.	Coarse-scale breccia with millimetric to centimetric clasts of pelite, altered impure dolomite.	Sporadic irregular displacive sideritic carbonate veinlets. Minor traces fine to ultrafine pyrite.	Thoroughly sideritised slump-breccia-like intercalation of pelitic impure dolomite, dolomitic carbonaceous pelite.

112081

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PETROGRAPHIC EVALUATION OF NINETEEN PANNED
HEAVY MINERAL CONCENTRATES (CLARK RIVER
PROJECT)

Report No: E3/81/272

22nd March, 1985.

For: Electrolytic Zinc Company of Australasia Ltd.


Dr. B.J. Barron,
Petrologist.

092

Sample No. 59932

Description of Concentrate A fine to quite coarse grained dark brown concentrate which contains numerous small magnetic grains. Only traces of the original concentrate remain.

Thin Section. This sample of heavy mineral concentrate has a strongly variable grain size with a distinctly bimodal grain size distribution. Approximately equal major proportions are present of a relatively coarser fraction (mostly within the size range 0.5 mm up to 2 mm - coarse to very coarse grained sand) and a finer grained fraction, mostly within the size range 0.1 mm up to 0.3 mm - fine to medium grained sand).

The coarser fraction consists mainly of subrounded to irregular shaped heavily oxidised and red-brown stained lithic fragments and plant remains. The lithic clasts and fragments include silty and sandy red-brown translucent limonitic oxides; fine grained clouded epidote rock; granular aggregates of quartz ± carbonate ± translucent dark red-brown limonitic oxides; and fine grained degraded and stained foliated "sericite"-rich siltstone.

The finer grained fraction of this sample contains approximately 30% of dark grey to black opaque oxide grains which include well rounded to subhedral cubic shaped crystals (most likely including magnetite since there are magnetic grains present in the small amount of remaining sample). Also present in this fraction is a further 30% of degraded opaque oxides including titaniferous grains that are now largely replaced by clouded leucoxene and sphene, and other oxides converted to translucent red-brown limonitic oxides. The remaining 40% of the finer grained fraction includes common, well-rounded grains of strongly pleochroic blue-green tourmaline, rutile, zircon, sparse grains of cassiterite, sparse grains of chromite set in narrow coronas of dense, fine grained pale green "sericite" which is possibly fuchsite, rare grains of colourless garnet (one of which encloses a single grain of quartz), rare grains of dense green chlorite, octahedral grains of brown spinel and a single small lithic clast is present which encloses a cluster of clouded monazite grains. Sparse grains of quartz contaminant are also present.

093

Sample No. 59934

Description of Concentrate A mid brown fine grained concentrate which contains moderately abundant small magnetic grains. None of the coarser fraction is present in the remaining concentrate.

Thin Section. As in the previous sample, the present concentrate comprises particles of two distinct size ranges. The coarser fraction in this sample, however, includes only about 10% to 12% of the total sample and includes grains mainly within the size range 0.5 mm up to 2 mm across (coarse to very coarse sand). The coarser grains invariably are very strongly oxidised to translucent and almost opaque red-brown limonitic oxides. These include silty and sandy ferricrete, heavily oxidised barely recognisable weakly foliated siltstone and banded concretionary grains of ferric oxides. The remainder of this sample comprises a dominant fraction of fine to medium sand sized grains, mostly within the range 0.13 mm to 0.3 mm.

This finer fraction includes about 65% of well rounded subrounded and subhedral octahedral grains of dark grey opaque oxides and partly degraded opaque oxides, at least some of which are magnetic magnetite (see description of concentrate above). The degraded oxides mostly are titaniferous and are largely converted to clouded leucoxene microgranular sphene ± red-brown limonitic oxides. The remaining 35% of the finer grained fraction includes common subrounded grains of rutile; equally common subrounded to subhedral prismatic zircon, many grains of which are pink; subordinate subrounded to irregular shaped grains of olive green to blue-green tourmaline; sparse grains of cassiterite (one grain of which is a broken subhedral crystal about 0.4 mm across); a single cluster of small clouded monazite crystals and rare small grains of clouded monazite; and sparse small lithic clasts of partly oxidised quartzite; fine grained chlorite-altered grains of ?chromite set in fine grained rims of green "sericite" (or fuchsite) and scattered grains and aggregates of quartz as a common contaminant.

094

Sample No. 59936

Description of Concentrate A dark brown concentrate with abundant dark grey grains and with a variable grain size ranging up to more than 2 mm. Approximately 10% to 15% of the grains represented are strongly magnetic. These include both dark grey (?magnetite) grains, as well as brown oxidised grains.

Thin Section. The grain size of this sample is quite variable ranging from less than 0.16 mm (fine sand size) up to more than 2 mm (very coarse sand size), but with medium sand sized grains greatly predominating. Grain shapes are mostly angular with sparse subrounded and well rounded grains.

The relatively coarser grained fraction, which accounts for about 50% of the total grains and has a grain size generally greater than 0.5 mm (coarse to very coarse sand size), consists mainly of lithic fragments in various stages of degradation due to weathering and oxidation. These include the following types; clinopyroxene-rich fragments now converted partly to wispy actinolitic amphibole and stained by yellow-brown limonitic oxides; almost monomineralic, partly oxidised epidote rock, fine grained tourmaline rock with cherty quartz; strongly foliated, fine grained actinolitic amphibole-quartz-epidote rock; heavily oxidised chert with abundant, almost opaque to dark red-brown limonitic oxides; poorly sorted lithology with angular feldspar chips and clusters, set in dense, fine grained green tourmaline; types which consists of very dense fine grained sericite (partly stained and oxidised); as well as chips of material rich in granular quartz enclosing irregular shaped crystal sites of titaniferous oxides, now converted to leucoxene. Still other lithic fragments include types comprising recrystallised quartz ± carbonate while rare elongate, weakly foliated fragments comprise chlorite ± dark grey opaque oxides ± sphene.

The relatively finer grained fraction (with an average grain size of less than 0.5 mm) comprises smaller lithic fragments of similar types to those described above, as well as a variety of crystal

debris including the following; abundant dark grey opaque oxides (particularly magnetite, see description of concentrate); epidote; tourmaline (strongly pleochroic deep blue and variegated olive green to pale yellow-brown varieties); zircon; common subhedral to irregular shaped (fairly proximal) grains of pyritic sulphides that have wide rims of red-brown limonitic oxides, due to weathering; and common grains of white leucoxene pseudomorphing former titaniferous oxides; and numerous grains of dark red-brown limonitic oxides. Sparse cleavage fragments of fresh clinopyroxene are present, as well as small crystals of rutile and very sparse grains of cassiterite. The latter is also present in a large anhedral patch within a quartz-rich lithic fragment. A single grain of colourless garnet is accessory as is a single coarse grain of pale green actinolitic amphibole, possibly pseudomorphing a pyroxene. Sparse scattered grains of quartz contamination are accessory.

<u>Sample No.</u>	59940
<u>Description of Concentrate</u>	A dark brown medium to quite coarse grained sample of which about 15% is magnetic.
<u>Thin Section.</u>	This is a rather coarse grained sample with a somewhat variable grain size mostly within the range 0.5 mm up to 3 mm. Lithic clasts (or fragments) greatly predominate and these include the following types; fine grained tourmaline - quartz rock, some with elongate dark grey opaque crystals (?wolframite); distinctly foliated chlorite-quartz rock with irregular patches of epidote; weakly foliated sericite-rich rock with patchy red-brown limonitic oxides; fine grained epidote- and chlorite-altered ?tuffaceous types with plagioclase chips; carbonate rock; heavily red-brown oxide stained clusters of fine grained subradiating fibrous green chlorite; and types rich in granular feldspar clouded with sericite dust and ragged flakes of metamorphic biotite. Scattered large subrounded clasts consist of dense red-brown limonitic oxides and sparse silt-sized angular quartz and tourmaline grains. About 10% to 15% of the sample comprises dark grey opaque oxides including both magnetite and hematite, with a subordinate proportion of titaniferous oxide grains that are converted to white leucoxene

± sphene. Also present are sparse subhedral to euhedral pyritic sulphide crystals (about 3% of total grains), that are moderately to very largely converted to red-brown limonitic oxides, and several well foliated fine grained lithic fragments also enclose partly oxidised patches of pyritic sulphides. Rare grains of well twinned cassiterite are present, and certain of these are set in a matrix of finely polygonised and strained quartz, while equally rare aggregates of monazite grains generally are irregular to subrounded. Scattered grains of quartz contaminant mostly are subrounded single crystals or aggregates, while zircon and rutile grains are conspicuously absent.

<u>Sample No.</u>	59942
<u>Description of Concentrate</u>	A mid-brown coloured concentrate of fine to coarse sand sized grains. Only sparse coarse and fine grains are strongly magnetic.
<u>Thin Section.</u>	This sample has a strongly variable grain size ranging from less than 0.06 mm (silt sized grains) to angular clasts more than 1.5 mm across. However, most grains appear to lie within the size range 0.16 mm and 0.5 mm (fine to medium sand sized grains). Most of these have fairly angular to subhedral octahedral grain shapes, and more than 80% of grains are opaque to translucent oxides. The dominant oxides are titaniferous grains that are largely converted to white leucoxene, with almost equally abundant grains that are completely converted to dark red-brown limonitic oxides. Sparse aggregates of leucoxene-altered grains are set in a host of extremely fine grained, partly foliated "sericite" (or talc etc.) ± chlorite. Sparse, relatively unoxidised grains of dark grey oxides (including magnetite and hematite) are the strongly magnetic grains of the remaining concentrate. Rare grains of sulphides are very largely converted to red-brown oxides.

This concentrate contains only a minor fine grained fraction with sparse grains of blue green tourmaline and small crystals of zircon, with very rare grains of cassiterite, colourless clinopyroxene and brown hornblende, partly converted to blue-green wispy actinolitic amphibole. Sparse, recognisable lithic fragments include quartz-epidote rock, heavily

oxidised, deformed and polygonised, weakly foliated quartz-chlorite-sericite rock; very fine grained chert, and chlorite rock.

Sample No. 59949

Description of Concentrate A rather coarse grained concentrate comprising mainly mid-brown to mid-grey coloured lithic grains, none of which is magnetic.

Thin Section. This concentrate comprises abundant irregular shaped to subrounded grains and angular cleavage fragments mostly within the size range 0.13 mm and 1 mm (very fine to coarse sand), with a subordinate, very coarse sand sized fraction. Epidote comprises the most abundant material of this sample, with angular pale yellow pleochroic cleavage fragments and numerous subhedral crystals, commonly set in a fine grained matrix of pale green chlorite. Also present are numerous lithic fragments of various fine grained metamorphic types, including the following; weakly foliated epidote-chlorite-actinolite rock; clusters of dense wispy pale green actinolitic amphibole; fine grained epidote-actinolite rock; carbonate rock stained with red-brown limonitic oxides; cherty quartz-rich types, also heavily stained by red-brown limonitic oxides and strongly foliated chlorite rock with patches of wispy actinolitic amphibole and trails of black opaque oxides. Subordinate lithic types include fine grained chert with patches of partly oxidised carbonate, as well as weakly foliated, very fine grained quartz-rich arenite. Common opaque and translucent oxidised grains include mainly limonitic oxides and rare dark grey magnetite grains, as well as common titaniferous oxide grains that are now converted to white leucoxene.

The smaller mineral debris again includes dominant epidote, minor pale blue-green wispy actinolitic amphibole and very rare, subrounded grains of zircon. Sulphide, cassiterite, rutile and monazite are notably absent.

Sample No. 65705

Description of Concentrate None remains, except for a single irregular shaped lithic grain of red-brown non-magnetic limonitic oxides which is set in a mount of clear plastic resin. This grain is slightly more than 1 cm across.

Thin Section. As in previous samples the grain size of the present one is extremely variable ranging from less than 0.15 mm (fine sand size) up to more than 2 mm (very coarse sand size), and most grains lie within the range 0.15 mm and 1 mm. Angular cleavage fragments and clusters of epidote predominate, together with lithic fragments that also contain abundant proportions of this mineral. Epidote in the lithic clasts is partly intergrown with minor granular albite, and quartz, while elsewhere are fragments of fine grained metamorphic lithic types, also containing epidote, together with wispy actinolitic amphibole partly oriented parallel to a weak foliation. Opaque and translucent grains are almost equally abundant as epidote, and these grains have subrounded cubic octahedral and irregular shapes and include abundant black to dark grey oxides, scattered grains of white leucoxene replacing titaniferous oxides, and red-brown oxidised grains, none of which retain any evidence of a sulphide precursor. Rare lithic fragments however comprise dense "shredded" to microgranular quartz and very fine sericite heavily stained by limonitic oxides with traces of fine grained sulphide mineralisation.

The finer mineral fraction of this rock is quite subordinate, but with epidote predominating and relatively few grains of well rounded tourmaline, clinopyroxene, zircon, rutile, dark red-brown spinel, and sparse angular grains of quartz contaminant.

099

Sample No. 65707

Description of Concentrate. A very fine grained to fine grained pale brown concentrate only a few grains of which remain.

Thin Section. This concentrate comprises very abundant, quite well rounded to subrounded and subordinate irregular and angular grains, mostly within the size range 0.06 mm up to 0.16 mm (very fine to fine grained sand sized grains). A fraction of coarse, irregular shaped to quite well rounded grains in the order of 1 mm to 1.5 mm includes only heavily oxidised translucent to almost opaque limonitic oxides enclosing sparse angular silt sized quartz grains. The remaining concentrate contains approximately equal major proportions of opaque and translucent oxide grains, and transparent phases. The black and dark grey opaque oxides comprise about 25% of this finer grained fraction, while a further 25% of grains comprise titaniferous oxides that are largely converted to white leucoxene. A further 15% of this fraction comprises well rounded grains of olive green to brown and dark blue pleochroic tourmaline, and an approximately equal proportion (15%) of quite well rounded zircon crystals also is present, and in addition 15% of grains include very well rounded crystals of red-brown rutile. The remaining 5% of the finer fraction includes sparse, well rounded grains of dark red-brown spinel, rare rounded grains of cassiterite, sphene, quartz contaminant, minor tourmaline, quartz, sericite and chlorite-rich lithic fragments and rare, rather ragged, very pale green actinolitic amphibole crystals.

Sample No. 65710

Description of Concentrate Only a very small proportion of the sample remains as a fine grained dark brown coloured concentrate in which only sparse small black oxide grains are strongly magnetic.

Thin Section. This concentrate has a strongly bimodal grain size distribution with almost equal major proportions of a coarse to very

coarse sand sized fraction (with individual grain sizes mainly within the range 0.5 mm and 1.5 mm), while a finer grained fraction of fine sand sized grains have an average grain size of about 0.15 mm.

In the coarser grained fraction strongly oxidised and partly concretionary deposits of red-brown hematite and limonitic oxides predominate, certain of which enclose sparse silt- and very fine sand-sized angular quartz chips. Almost equally abundant are angular lithic fragments comprising dense granular, almost monomineralic epidote, while elsewhere are developed fine grained subrounded clasts of extremely fine grained weakly foliated chlorite- and epidote-bearing low grade metamorphic rock types.

The finer grained fraction of this sample includes approximately equal proportions of subrounded to irregular shaped opaque grains, and titaniferous grains that are largely converted to white leucoxene ± red-brown limonitic oxides. Very sparse opaque grains retain fresh pyritic sulphides centrally with dense weathered rims of red-brown limonitic oxides. Also present in almost equal proportions to the above are angular crystals and aggregates of epidote, slightly subordinate, well rounded to subrounded grains of tourmaline and relatively abundant, well rounded small grains of nearly colourless to pink zircon crystals. Scattered, well rounded red-brown rutile grains are common and sparse grains of partly oxidised red-brown carbonate and quartz are accessory.

<u>Sample No.</u>	65802
<u>Description of Concentrate</u>	Only traces of a very fine grained brown dusty concentrate are preserved, rare small grains of which are magnetic.
<u>Thin Section.</u>	The average grain size of this concentrate is about 0.26 mm (on the boundary between fine and medium sand sized grains), with sparse coarser grains reaching 1.5 mm across (coarse sand

size). The sparse grains of coarser material are invariably well rounded and comprise very fine grained dense red-brown limonitic oxides with rare angular silt sized quartz chips; very fine grained weakly banded types rich in low birefringent argillic products ± minor sericite, and which enclose patches of fine grained sulphides, while elsewhere are developed angular lithic clasts comprising quartz, wispy sericite and patches of "shredded" quartz accompanying significant sulphide mineralisation.

The finer grained fraction contains at least 50% of opaque to translucent grains, the majority of which include clouded white leucoxene, and approximately equal major proportions of subordinate black opaque oxides and partly oxidised sulphides that are partly oxidised to red-brown limonitic oxides. The latter account for about 5% to 8% of the total grains represented in the section. The remainder of the finer grained fraction includes the following phases in approximate decreasing order of abundance; subrounded to irregular shaped red-brown rutile grains; zircon crystals; olive green to blue-green variegated tourmaline crystals, rare small grains of ?cassiterite and sparse grains of quartz contaminant.

<u>Sample No.</u>	65806
<u>Description of Concentrate</u>	A dark brown to mid-grey medium to coarse grained concentrate containing abundant magnetic grains.
<u>Thin Section.</u>	This concentrate includes mostly angular to irregular shaped grains with a somewhat variable grain size up to about 1.5 mm across. Most grains are in the size range 0.16 mm up to 0.5 mm (fine to medium grained sand). Approximately 75% of the grains in the sample are opaque to translucent, and by far the majority of these comprise dark grey oxides, many of which are partly to completely converted to red- and yellow-brown limonitic oxides. Sparse, similarly oxidised sulphide grains which retain cores of fresh sulphides, account for only

about 3% to 5% of the total sample, while strongly altered titaniferous grains (now white leucoxene) comprise about 8% to 10% of the total sample and sparse grains of red-brown spinel are accessory.

The subordinate transparent crystal fraction of this sample includes the following phases in approximate decreasing order of abundance; tourmaline (blue-green to olive brown pleochroic grains); rutile (including rare grains of anatase); sparse small subhedral to well rounded crystals of zircon; clusters of partly oxidised fine grained carbonate, and sparse, small lithic fragments including fine grained quartz-sericite-leucoxene rock, tourmaline quartz rock ± dark grey opaque oxide rock, granular epidote rock, and fine grained quartzite. Rare grains of a sericite- and magnetite-rich lithology are accessory.

Sample No.

65808

Description of
Concentrate

Virtually none remains.

Thin Section.

The coarse fraction accounts for about 40% of this sample and includes mostly lithic grains within the size range 0.8 mm up to 2 mm across (medium to very coarse grained sand). These grains have irregular to angular and more rarely subrounded shapes and include strongly oxidised and red-brown stained fine grained micaceous foliated and deformed lithic types, weakly foliated and deformed quartzite with subordinate wispy sericite, extremely fine grained, partly oxidised, weakly foliated chlorite rock, aggregates of unoriented fine grained wispy pale green actinolitic amphibole, strongly oxidised and stained yellow- and red-brown types enclosing numerous silt to fine sand sized angular quartz chips, and sparse grains of pumpellyite quartz rock.

The finer grained fraction of this sample has an average grain size of about 0.3 mm and comprises mostly angular to irregular shaped grains with sparse subrounded to well rounded grains. In this fraction at least 60% is opaque to translucent, and titaniferous oxides (now converted to white leucoxene) greatly predominate, with

subordinate scattered dark grey to black opaque oxides and only rare small oxidised grains with "islands" of relict sulphides preserved centrally. The remaining approximately 40% of transparent grains include small lithic fragments similar to those described above, as well as clusters of clinopyroxene and strongly altered clinopyroxene-bearing igneous types, common well rounded grains of strongly pleochroic dark blue and olive green tourmaline, small crystals of zircon, rutile, epidote, prehnite, sphene and quartz contaminant.

Sample No. 65828

Description of Concentrate: None remains.

Thin Section. The coarse fraction in this concentrate accounts for approximately 70% of the total material represented in the present thin section, and has an approximate grain size range from about 0.5 mm up to about 2.5 mm. Most of these subrounded to irregular shaped grains are strongly stained and oxidised to red-brown translucent to almost opaque limonitic oxides, and certain of these clasts retain clearly zoned concretionary structures. Other clasts that are strongly oxidised also retain patches of microgranular quartz ± wispy sericite, while elsewhere are strongly oxidised grains with patches of blue-green granular tourmaline. Relatively unoxidised lithic clasts include tourmaline-quartz rock, weakly foliated sericite-carbonate quartz rock, deformed epidote-quartz rock, partly stained subradiating clusters of carbonate, and dense, somewhat fibrous aggregates of green chlorite. Opaque to translucent oxides are also common in this fraction and appear to include very abundant hematite and magnetite with common grains containing white leucoxene (replacing titaniferous oxides).

The subordinate finer grained fraction comprises grains mostly within the size range of 0.15 mm up to 0.5 mm, (fine to medium grained sand), and includes lithic types similar to those described above, as well as subordinate crystal debris with the following phases

104

in approximate decreasing order of abundance; hematite and partly oxidised magnetite grains, subrounded to well rounded crystals of tourmaline (strongly pleochroic olive green, blue and blue-green), sparse grains of epidote, subrounded grains of rutile, sphene-altered titaniferous oxides, altered fine grained clinopyroxene (and clinopyroxene-rich lithic clasts), and "shredded" quartz with associated, partly oxidised sulphide clusters. Sparse subhedral cubic to irregular shaped sulphide grains which have partly oxidised margins comprise only about 3% of the total grains present, and rare grains of red-brown isotropic chromite are also accessory.

Sample No. 65834

Description of Concentrate: None remains.

Thin Section. The coarse grained fraction of this sample accounts for approximately 25% of the total grains represented, and these grains mostly lie within the size range 0.5 mm up to 1.5 mm (coarse to very coarse sand). They are subrounded to irregular shaped grains, which include abundant strongly oxidised and partly concretionary red-brown limonitic oxides enclosing angular silt sized grains of both tourmaline and quartz; strongly oxidised and stained lithic types that appear to be feldspathic and fragmental; oxidised fine grained quartz-feldspar and sericite-bearing types; epidote-quartz rock; tourmaline rock; fibrous blue-green actinolite rock; oxidised organic remains with cellular structures; stained carbonate; fine grained clusters of radiating green chlorite; fine grained sandy limestone; and quartzite.

The relatively finer grained fraction comprises material mostly within the size range 0.1 mm up to 0.3 mm (very fine up to medium sand size), and this fraction is mostly angular to subrounded. Dark grey to black opaque oxides most likely including both hematite and magnetite greatly predominate, and these are partly to completely converted to red-brown limonitic oxides. Titaniferous oxides which are subordinate but yet common, are largely converted to white leucoxene,

and rare subhedral cubic sulphide grains retain fresh sulphides centrally with narrow rims of red-brown ferric oxides. Common transparent crystal debris includes subhedral crystals of zircon, subrounded grains of brown or blue-green tourmaline, cleavage fragments of pistacite, and small subrounded grains of well cleaved rutile. Accessory debris in this size range includes sparse grains of carbonate, quartz, degraded chromite and amphibole.

Sample No. 65837

Description of Concentrate Only a few grains of the fine grained fraction of this dark grey to brown concentrate remain, and several of these are strongly magnetic.

Thin Section. A coarse fraction represents only about 5% to 8% of this sample and includes subrounded to irregular shaped grains within the size range 0.5 mm up to almost 2 mm across. Such grains mostly are translucent to almost opaque red-brown limonitic oxides, certain of which have concentric colloform bands while in other grains are developed sparse angular silt and fine sand sized chips of quartz. A single clast about 1.5 mm across consists of dense pale green chlorite in fine grained subradiating aggregates.

The abundant fine grained fraction includes grains mostly within the size range 0.06 mm and 0.25 mm (very fine to fine sand size), at least 50% of which are translucent to opaque with grain shapes ranging from subhedral octahedral and subrounded to rather irregular shaped and angular. Black to dark grey opaque oxide grains (including hematite and magnetite) predominate, with common grains of titaniferous oxides (now converted to white leucoxene), and sparse accessory grains with rims of red-brown oxidised rims and fresh pyritic sulphides preserved centrally. Also in minor accessory proportions are well rounded grains of translucent isotropic dark red-brown ?chromite, as well as anhedral patches of dark grey oxides, set in a fine grained pale green chlorite and sericite host lithology. The transparent phases tend to be very fine grained and also quite well rounded grains with approximately

equal major proportions of rutile and zircon, and with subordinate but common, very well rounded grains of blue to olive green pleochroic tourmaline. Rare small grains of ?cassiterite, sphene, and ?monazite are present, and scattered grains of quartz contamination are fairly common.

Sample No. 65854

Description of Concentrate Only a few grains remain of this mid-brown -grey fine grained concentrate with sparse magnetic grains.

Thin Section. This sample, as in several previous samples, exhibits a distinct bimodal size distribution with a distinctly coarser grained fraction mainly within the size range 0.15 mm up to about 1 mm (fine sand to coarse sand) while a finer fraction comprises grains mostly within the range 0.06 mm up to 0.15 mm (very fine to fine sand size). The coarser grains have fairly angular to subrounded shapes and include dominant dark grey to black opaque oxides (including magnetite and hematite), many grains of which are partly converted to red-brown limonitic oxides. Titaniferous oxides also are common, but are largely converted to white leucoxene. Other coarse grains include minor proportions of the following lithic types; degraded quartz-bearing siltstone and very fine grained arenite, very fine grained tourmaline rock, carbonate rock, microgranular epidote rock, very fine grained sericite quartz rock and leucoxene-altered titaniferous opaque oxide-quartz rock.

The finer grained fraction includes similar opaque oxides to those above, as well as sparse subhedral octahedral grains of red-brown isotropic ?chromite, common grains of both rutile and zircon, tourmaline (pleochroic blue as well as olive green grains), and rare grains of clinopyroxene, calcite, chlorite, hornblende, garnet and rare clusters of quartz and fine grained prismatic ?wolframite. Sparse scattered grains of quartz and fewer of muscovite are lighter fraction contaminants.

107

Sample No. 65857

Description of Concentrate None remains.

Thin Section. This sample comprises a variety of angular to quite well rounded mineral grains mostly within the size range 0.06 mm up to about 0.4 mm (very fine to medium grained sand). Sparse coarser grains form a subordinate bimodal fraction with angular to irregular shaped grains up to about 0.8 mm across (coarse sand). The latter include fine grained sericite-quartz-rich lithic types, fine grained chlorite rock, microgranular quartzite, aggregates of fine grained fibrous subradiating pumpellyite, sparse coarse angular grains of colourless clinopyroxene, and coarse angular grains of quartz contaminant. Also present in this coarser fraction are grains of dense red-brown limonitic oxides, certain of which enclose small angular silt-sized chips of quartz.

the ubiquitous finer grained fraction contains very abundant, well rounded to subrounded zircon grains with almost equally abundant grains of titaniferous oxides now converted to very fine grained clouded sphene ± white leucoxene, and subrounded to irregular shaped grains of rutile. Sparse, small, opaque grains comprise approximately 5% to 8% of the total sample and these include black to dark grey oxides, subordinate sulphides partly converted to red-brown limonitic oxides, and rare grains of partly translucent red-brown isotropic ?chromite. Sparse grains of olive green pleochroic tourmaline also account for about 8% of the sample, while accessory grains include epidote, clinopyroxene, clouded monazite, plagioclase, rare grains of cassiterite, blue-green actinolitic amphibole and garnet.

Sample No. 65861

Description of Concentrate: None remains.

Thin Section. As in the previous sample the present concentrate contains very abundant grains mostly within the size range 0.1 mm and 0.2 mm (very fine to fine grained sand), with only sparse crystal and

lithic clasts ranging up to about 0.7 mm across. The lithic material again includes strongly oxidised types that are largely converted to red- and yellow-brown limonitic oxides, as well as sparse fine grained lithic types largely comprising dense yellow-brown-stained sericite.

The very abundant finer grained fraction comprises approximately equal major proportions of zircon, degraded titaniferous oxides and rutile grains. The zircon crystals have subhedral prismatic to subrounded and well rounded shapes and include both colourless and pale pink varieties. The degraded titaniferous oxides, on the other hand, have irregular to subrounded shapes and are converted to clouded, very fine grained white leucoxene ± sphene, while the rutile grains are dark red-brown to yellow-brown and have subhedral prismatic to subrounded shapes. Dark grey to black opaque oxides account for approximately 5% of the total number of grains, and sparse somewhat irregular shaped grains of sulphides with narrow rims of red-brown limonitic oxides are accessory. Sparse, scattered subhedral prismatic to well rounded crystals of olive green and yellow-brown pleochroic tourmaline also comprise about 5% of the grains represented in thin section, as do scattered grains of quartz contamination. Rare small lithic clasts include weakly foliated, very fine grained sericite rock with minor quartz and opaque oxides, as well as microgranular quartzite with leucoxene- and sphene-altered titaniferous oxides. Rare irregular shaped grains of cassiterite are present, as is a single irregular shaped grain of gold.

109

Sample No. 59498

Description of None remains.
Concentrate

Thin Section. As in the previous sample 61917, there is a considerable grain size range in the present concentrate, from less than 0.06 mm up to about 1.5 mm (very fine sand up to very coarse sand size). Lithic grains greatly predominate in this sample particularly in the fraction coarser than 0.15 mm and these include the following types in approximate decreasing order of abundance; fine grained epidote-quartz-(sericite) rock; very fine grained, weakly foliated sericite-chlorite and quartz-bearing siltstone; very fine grained tourmaline rock; weakly foliated ?carbonaceous siltstone with anhedral porphyroblasts of epidote; granular to finely polygonised vein quartz with patches of white leucoxene pseudomorphing previous titaniferous oxide grains, and similar vein quartz with patches of translucent red-brown goethite possibly replacing previous sulphides. Sparse large grains consist almost entirely of dense red-brown limonitic oxides ± silt and very fine grained sand sized angular quartz grains.

The crystal fraction includes very abundant cleavage fragments of epidote, angular grains of titaniferous oxides that are now converted to white leucoxene ± red-brown limonitic oxides and almost equally abundant dark grey to black oxide grains, also with fairly angular to subhedral modified cubic shapes. Subordinate but very common subrounded zircon crystals include both pink and colourless grains, while subhedral broken prismatic tourmaline crystals also are common. The latter are strongly pleochroic olive green, and rarely zoned blue types. Sparse scattered small grains of red-brown rutile, red-brown isotropic chromite, pale green actinolitic amphibole cleavage fragments, similar fragments of andalusite and quartz grains are accessory.

E.Z. Co. of A.A. Ltd.
ROSEBERRY, Tasmania

ROCHESTER SHE

PROJECT: Gordon Est.
LOCALITY: Clark River
GRID NAME:
NOMINAL GRID AZIMUTH:

MATERIAL: Stream Sediments
SAMPLE METHOD: Sieve to -1mm
SAMPLED BY: P.H., I.M., I.M.D.
DATE: 14th Feb. 1985

SIZE FRACTION ANALYSED: -80 mesh
ANALYSED BY: Analabs
METHOD: A.A.S.

SAMPLE NUMBER	SAMPLE LOCATION DATA			STREAM DATA			COMPOSITION DATA					Geology	METAL CONTENT (ppm unless specified)						
	GRID LINE NO.	A.M.G. CO-ORDINATES		Str. Order Direction of Flow	Width	Active Strgam Load	Clay	Sand	Rock Frags.	Organic	CONTAM.		Cu	Pb	Zn	Ag	Au	Fe	Mn
	GRID EASTING	NORTHING	EASTING																
59	931			145	2		5	80	15			5	X	30	X	0.002	3650	40	
60	933			160	2		5	40	40			5	20	100	X	0.001	9550	210	
61	935			170	10		5	60	20			20	55	75	X	0.003	1.8%	410	
62	937			170	8		5	75	20			20	35	60	X	0.006	1.75%	580	
63	938			160	8		5	60	20			20	20	65	X	1.55%		435	
64	939			140	8		5	75	20			30	80	100	X	0.16	1.90%	615	
65	941			205	2		30	40	30			15	10	105	X	0.011	1.55%	390	
66	943			320	1		30	40	30			15	10	100	X	2.05%		410	
67	944			220	2		40	40	20			10	10	75	X	0.011	1.30%	325	
68	945				1		30	40	25	5		15	15	110	X	0.011	1.65%	415	
69	946			140	2		50	30	10	20		15	10	85	X	1.65%		245	
70	947			080	1							10	25	70	X	0.011	1.65%	975	
71	948			260	2		20	50	25	5		15	X	60	X	0.011	1.70%	280	
72	950			230	2							30	10	90	X	0.021	1.90%	365	
73	951			180	1		25	50	15	10		10	X	80	X	0.041	1.80%	435	
74	701			015	2		30	60	10			20	20	85	X	0.002	1.55%	425	
75	702			330	2		40	40	10	10		15	X	55	X	1.10%		390	
76	703			345	2		10	80	10			X	X	5	X	2.05%		X	
77	704			350	2		10	80	10			10	X	30	X	0.002	7250	95	
78	706				2		5	80	15			5	X	10	X	0.006	1900	70	
79	708			330	2							5	5	20	X	0.004	5600	75	
80	709			010	2		10	80	10			5	X	20	X	0.004	5650	130	
81	711				1			50	50			X	X	15	X	0.001	450	X	
82	712				2			50	50			5	10	35	X	0.001	1650	10	
83	713				1							X	X	10	X	X	350	X	
84	714				1			50	50			X	X	10	X	X	250	X	
85	715							50	50			X	X	5	X	X	200	X	
86	716				1			70	50			X	X	10	X	X	250	X	
87	717							70	50			X	X	10	X	X	250	X	
88	718							70	50			X	X	15	X	X	350	X	

PPB

112100
110

PROJECT: Gordon hsr.
LOCALITY: Clark River
GRID NAME:
NOMINAL GRID AZIMUTH:

MATERIAL: Stream Sediments
SAMPLE METHOD: Sieve to -1mm
SAMPLED BY: J.M. D.H., M.P.
DATE: Jan, Feb 1985

SIZE FRACTION ANALYSED: -80 mesh
ANALYSED BY: Analabs
METHOD: A.A.S.

SAMPLE NUMBER	SAMPLE LOCATION DATA				STREAM DATA			COMPOSITION DATA				METAL CONTENT (ppm unless specified)								
	GRID LINE NO.		A.M.G. CO-ORDINATES		Sig. Order Direction of Flow	Width	Active Stream Load	Clay	Sand	Rock Frags.	Organic	CONTAM.	Geology	Cu	Pb	Zn	Ag	Au	Fe	Mn
	GRID EASTING	NORTHING	EASTING	N																
801	1								70	W				30	10	85	X	.004	1.05%	95
805	1								80	W				10	25	50	X	.020	1.65%	600
807	1								60	W				10	5	35	X	.005	1.00%	255
813									106	W										
816									305	W										
818									565	W										
821									580	W										
823									80	W										
824									60	W										
825									206	W										
827									50	W				10	25	60	X	.002	1.35%	485
830									205	W				15	15	65	X	.002	1.55%	345
831									205	W				5	X	25	X		4200	35
832									304	W				15	15	155	X	.008	1.00%	320
833									40	W				15	15	60	X	.002	1.30%	385
835									40	W				15	20	105	X	.020	1.55%	395
836									580	W				5	5	45	X	.002	1.05%	190
839									305	W				5	10	35	X	.001	3250	50
844									105	W				30	25	90	X		2.00%	305
846									565	W				15	35	55	X	.004	1.65%	535
847									255	W				5	20	55	X	.001	9950	590
848									106	W				20	20	45	X		1.40%	210
850									575	W				X	5	15	X		5000	X
851									60	W				5	5	30	X	.001	1300	290
853									525	W				5	15	20	X		2600	165
858									60	W				5	10	20	X		3500	320
860									70	W				5	10	15	X		4700	135
862									90	W				X	X	10	X		700	X
863									565	W				5	15	10	X	.001	2500	10
864									105	W				5	5	10	X		3300	10
865									105	W				X	5	5	X		800	X

112101
111

PROJECT: *Gorden Est.*
 LOCALITY: *Clark River*
 GRID NAME:
 NOMINAL GRID AZIMUTH:

MATERIAL: *Stream Sediments*
 SAMPLE METHOD: *Sieve to -1mm*
 SAMPLED BY: *ST, F.M., P.H.*
 DATE: *Jan, Feb 1985; Feb 1984*

SIZE FRACTION ANALYSED: *80 mesh*
 ANALYSED BY: *Analytals*
 METHOD: *A.A.S.*

SAMPLE NUMBER	SAMPLE LOCATION DATA			STREAM DATA				COMPOSITION DATA		METAL CONTENT (ppm unless specified)											
	GRID LINE NO.	A.M.G. CO-ORDINATES		Str. Order Direction of Flow	Width	Active Sediment Load	Clay	Sand	Rock Frags.	Organic	CONTAM.	Geology	Cu	Pb	Zn	Ag	Au	Fe	Mn	Ba	
	GRID EASTING	NORTHING	EASTING																		
93 65866 1								5	5	4			x	x	10	x	0.001	450	110		
FEBRUARY 1984 SAMPLING																					
382 59228					6.0			107	515				35	35	110	x	-	8950	760	60	
59229					6.0			108	010				50	45	100	0.5	-	3.65%	805	75	
59231								108	010				40	20	110	0.5	-	3.20%	735	40	
59232					4.0			57	520				50	30	85	x	-	3.25%	610	130	
59901					2.0			60	40				5	20	80	0.5	-	8950	130	80	
59902					3.0			15	5035				5	15	75	x	-	1.05%	160	90	
59904					0.5			15	4540				10	5	50	x	-	1.10%	45	80	
59905					0.5			60	40				5	10	75	0.5	-	1.15%	170	110	
394 59906								40	60				5	10	50	0.5	-	7800	110	85	

112102

Electrolytic Zinc Co. of A'asia Ltd. Rosebery, Tas.			ROCK SAMPLE LEDGER					PROJECT: GORDON LIMESTONE (31/83) LOCALITY: CLARK RIVER		COLLECTED BY: I.J. Mathison		DATE: FEB. 1985					
Sample Number	A.M.G.Co-ordinates		Sample Type	Geological Description	Rock-type (Macroscopic)	Thin or Polished Section			Metal Content (p.p.m. unless specified)								
	N	E				T or P	By	Reference	Rock-type (Microscopic)	Cu	Pb	Zn	Hg	Fe%	Mn	Aw	
59975				Oxidized orange sheared f-mg intermediate TUFF	tI					20	5	65	x	5.46	910	x	(K0.008)
59974				Interbedded and laminated grey QUARTZITE, Volc. WACKE and SILTSTONE	QZT, VS, + SLT					5	10	20	x	2.16	840	x	
59966				Dark grey and grey laminated and cleaved SILTSTONE	SLT					90	5	80	x	8.46	765	x	
59472				Grey phyllitic SILTSTONE intense cleavage	SLT					75	30	135	0.5	6.61	530	x	
59473				Laminated phyllitic SILTSTONE laminations parallel cleavage	SLT					60	20	125	x	6.26	530	x	
59474				Pale green weakly laminated SILTSTONE	SLT					55	10	135	x	8.86	1195	x	
59475				Dark grey f-medium grained micaceous SANDSTONE	SST					15	5	45	x	2.36	195	x	
59476				Green grey laminated SILTSTONE	SLT					70	15	115	x	8.81	740	x	
59477				White vein quartz	QZ, VN					10	x	10	x	1.31	110	x	
59478				Dark grey fg cleaved volcanic SANDSTONE	VS					15	x	35	x	2.06	170	x	
59479				Oxidized khaki fine grained VOLCANICLASTIC SEDIMENT	VS					155	5	105	x	8.21	910	x	
59480				Green grey laminated SILTSTONE and f-mg VOLCANICLASTIC SST	VS					40	20	50	x	3.76	380	x	
59481				Dark grey micaceous impure QUARTZITE	QZT					10	10	35	x	1.86	90	x	
59482				Dark grey med - coarse grained intermediate VOLCANICLASTIC SEDIMENT	VS					5	5	20	x	1.96	115	x	
59483				Green grey sheared intermediate TUFF	tI					10	x	30	x	2.66	60	0.01	

Smith Print. Pt. 44162

112103

113

Electrolytic Zinc Co. of A'asia Ltd. Rosebery, Tas.			ROCK SAMPLE LEDGER				PROJECT: GORDON LIMESTONE (31/63) LOCALITY: Clark River		COLLECTED BY: I. J. Mathison				DATE: Feb. 1985				
Sample Number	A.M.G. Co-ordinates		Sample Type	Geological Description	Rock-type (Macroscopic)	Thin or Polished Section			Metal Content (p.p.m. unless specified)								
	N	E				T of P	By	Reference	Rock-type (Microscopic)	Cu	Pb	Zn	Ag	Fe %	Mn	Au	
59990				Laminated dark grey clay SILTSTONE and grey f.g. qz SANDSTONE	SLT + SST	T	Common	CMS	SLT (qz) - phyllite	85/2/9	10	35	55	x	2.91	390	x
59989				White - cream medium - coarse grained QUARTZITE	QZT						5	30	x	x	0.20	170	x
59988				Oxidized cream SILTSTONE and m.g. quartz SANDSTONE - all cleaved	SLT + SST						10	20	50	x	1.81	3080	x
59987				Dark grey DOHERITE or GABBRO which intrudes laminated SLT (59966)	DLRT	T		CMS	LM	85/2/9	185	10	45	x	7.11	690	x
59986				Dark grey cleaved micaceous QUARTZITE	QZT						10	30	75	x	1.76	230	x
59985				Interbedded dark grey slaty SILTSTONE and f-mg micaceous QUARTZITE	QZT + SLT						30	40	30	x	1.51	185	x
59984				Dark grey f-mg micaceous QUARTZITE and minor slaty SILTSTONE	QZT + SLT						5	20	15	x	1.31	180	x
59983				Oxidized cream medium grained intermediate TUFF or VOLCANIClastic SEAMENT	tI						15	10	25	x	2.41	125	x
59982				Oxidized brownish grey f-mg cleaved intermediate TUFF	tI						30	20	15	x	3.06	420	x
59981				Oxidized bluish grey f-mg intermediate TUFF	tI						10	10	60	x	4.51	480	x
59980				Green grey mg intermediate TUFF with quartz and ? augite phenocrysts	tI	T		CMS	tAr - phyllitic	85/2/9	15	10	85	x	4.06	635	x
59979				CONGLOMERATE (tertiary) with boulders and cobbles of green f-mg QZT	CGL						5	x	x	x	0.87	85	x
59978				Dark green chlorite SCHIST (float and talus)	SCH						55	x	75	x	5.81	1180	x
59977				Dark green folded chlorite SCHIST	SCH						30	x	50	x	7.06	1230	0.01
59976				Dark greenish grey sheared, foliated + crumpled intermediate TUFF	tI	T		CMS	meta tAr - phyllite	85/2/9	10	15	65	x	3.21	465	x

Smith Print No. 241822

112104

114

Electrolytic Zinc Co. of A'asia Ltd. Rosebery, Tas.			ROCK SAMPLE LEDGER					PROJECT: GORDON LIMESTONE (EX 3/63) LOCALITY: CLARK RIVER		COLLECTED BY: I. J. Mathison		DATE: FEB. 1965					
Sample Number	A.M.G.Co-ordinates		Sample Type	Geological Description	Rock-type (Macroscopic)	Thin or Polished Section			Metal Content (p.p.m. unless specified)								
	N	E				T or P	By	Reference	Rock-type (Microscopic)	Cu	Pb	Zn	Ag	Fe%	Mn	Al	
65800				Laminated dark grey and grey SILTSTONE and f.g. qz VOLC WACKE	SLT + VS				5	5	x	x	0.92	30	x		
65799				Interbedded green grey siltstone and grey f-mg quartz VOLC WACKE	SLT + VS				65	5	35	x	5.71	1280	x		
65798				Oxidised yellow sheared mg VOLC WACKE (qz + fs + others)	VS				15	70	50	x	2.16	625	x		
65797				Oxidised pale grey SILTSTONE - cleaved	SLT				25	15	55	x	4.26	350	x		
65796				Brown massive to colloform + porous LIMONITE	LIM				10	35	885	x	37.36	2380	0.01		
65795				Brown porous limonite	LIM				10	25	50	x	35.36	720	0.06		
65794				Dark grey dense iron stained sideritic DOLOMITE	DLST	T. Cowan	CMS	BX (sideritic dolomite slump)	10	85	215	x	25.86	2.14	x		
65793				Interbedded dark grey argillaceous grey fine grained + pale grey chstic LESTONE	LST				5	5	x	x	3.11	1680	0.02		
59484				Gn-gy sheared intermediate TUFF or volcaniclastic sandstone	TI/VS				5	10	25	x	1.91	35	x		
59485				"	TI/VS				5	x	20	x	1.76	20	x		
59486				"	TI/VS				20	5	55	x	3.31	445	0.01		
59487				"	TI/VS				25	40	110	x	3.86	365	x		
59488				"	TI/VS				15	x	25	x	3.16	30	x		

Electrolytic Zinc Co. of A'asia Ltd. Rosebery, Tas.			ROCK SAMPLE LEDGER						PROJECT: Gordon Limestone		LOCALITY: Clark River						
									COLLECTED BY: D.L. Hopton		DATE: Feb. 1985						
Sample Number	A.M.G.Co-ordinates		Sample Type	Geological Description	Rock-type (Macroscopic)	Thin or Polished Section			Metal Content (p.p.m. unless specified)								
	N	E				T or P	By	Reference	Rock-type (Microscopic)	Cu	Pb	Zn	Ag	Fe%	Mn	Au	
65803				Pale grey cleaved SILTSTONE, slaty cleavage	SLT						15	10	20	x	3.81	120	x
65804				Dark grey fine grained argillaceous LIMESTONE	LST						10	5	x	x	1.56	190	x
65809				Dark grey cleaved fine grained micaceous QUARTZITE	QZT	T	Cowan	CMS	QZT (meta quartzite)		5	15	x	x	0.43	240	x
65810				Oxidized cream to yellow m.g. cleaved INTERMEDIATE TUFF	tI						20	15	105	x	4.46	305	x
65811				Oxidized grey fine grained micaceous QUARTZITE	QZT						5	5	15	x	2.06	55	0.01
65812				Green grey medium grained cleaved VOLCANIC ARENITE, tr. py	VS/tI						5	5	x	y	3.11	520	x
65829				Dark grey micaceous QUARTZITE + cleaved micaceous SILTSTONE (gr. vng)	QZT + SLT	T			QZT (meta quartzite)		10	65	90	x	1.76	330	x
65838				Dark grey fine grained LIMESTONE	LST						5	10	x	x	0.35	115	x
65840				Oxidized yellow-cream quartz SANDSTONE with quartzite pebbles	SST-CGL						5	15	35	x	1.06	40	x
65841				Green grey coarse grained sheared Volcaniclastic SEDIMENT (gr. grains)	VS	T		CMS	VA (biotite porphyry)		10	5	50	x	2.96	210	0.01
65842				Oxidized orange medium grained sheared VOLCANIC ARENITE (gr.)	VS						15	5	80	x	3.66	860	x
65843				Green grey fine to medium grained sheared Volcaniclastic Sediment	VS						15	30	45	x	3.31	435	x
65849				Oxidized orange fine to medium grained sheared VS + SILTSTONE	VS						35	60	125	x	3.56	860	x
65852				CONGLOMERATE with haematite veins	CGL (Hte)						25	25	35	x	8.66	1.89	x
65855				Fine-medium grained acid pyroclastic with shaly clasts.	LA	T		CMS	VA (biotite rhyolite porphyry)		5	10	10	x	1.31	65	x

Smith Print. Ph. 221622

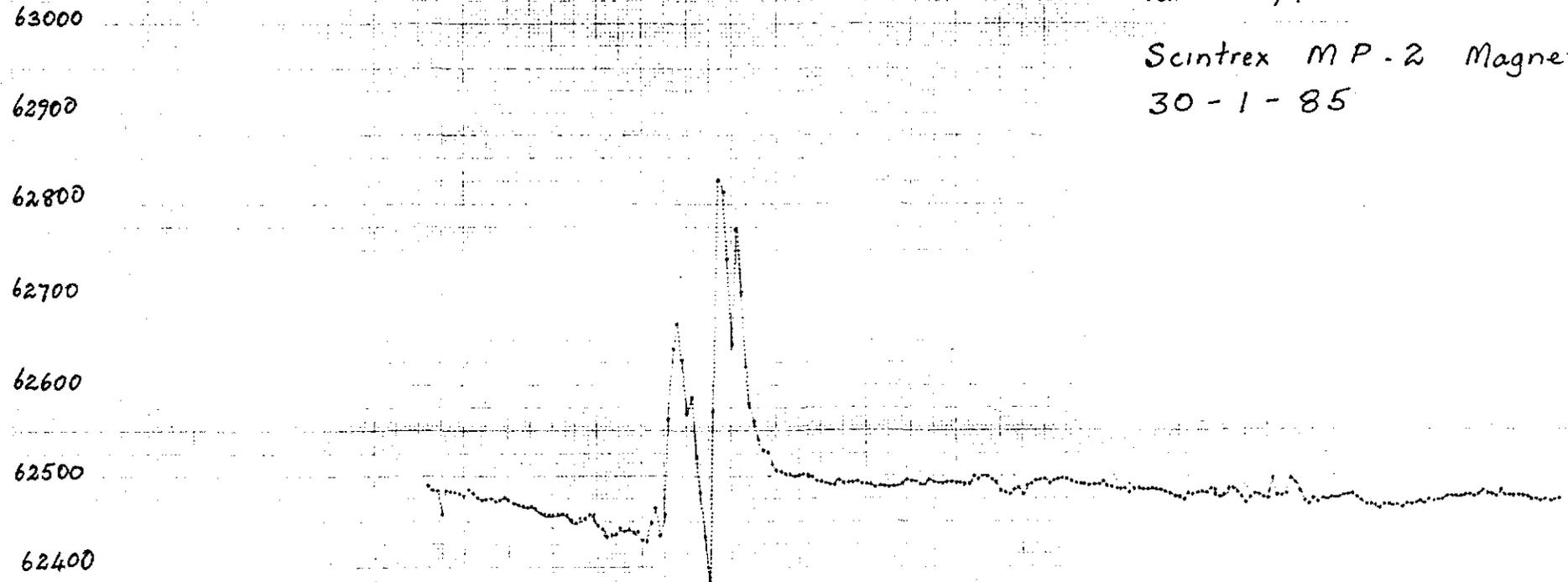
112106

116

EL 31/83 MACQUARIE
CLARKE RIVER
Line 13 000 N

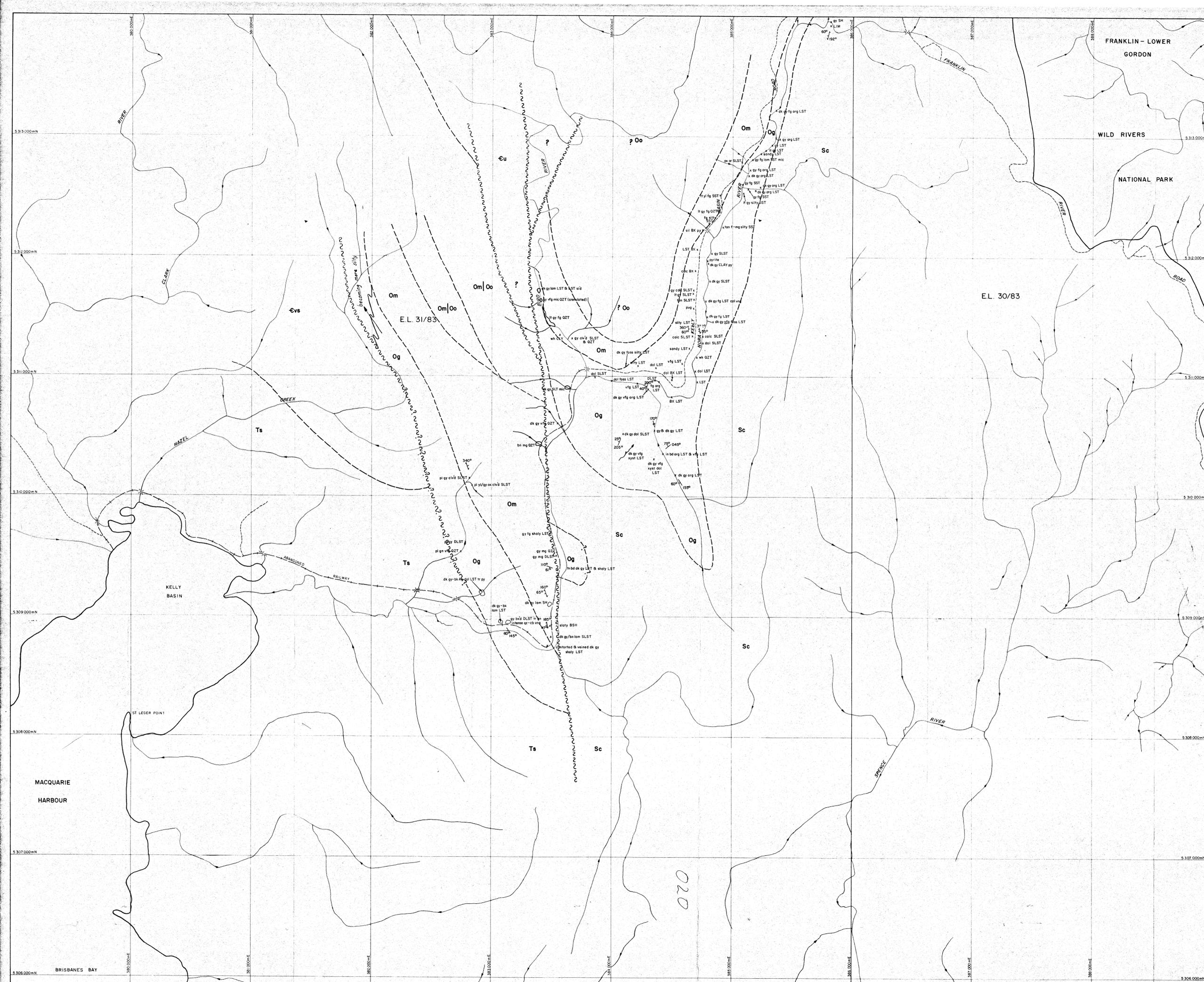
Reconnaissance Ground Magnetometer
Profile (Not corrected for diurnal
variation).

Scintrex MP-2 Magnetometer
30-1-85



112108

118



LEGEND

COLOUR	wh - white
pk - pink	bk - black
br - brown	gr - green
bl - blue	yl - yellow
gy - grey	or - orange
rd - red	cr - cream
cr - cream	pl - pale
lt - light	dk - dark

TEXTURE	foss - fossiliferous
fg - fine grained	sil - siliceous
mg - medium grained	mic - micaceous
cg - coarse grained	ferr - ferruginous
brd - brecciated	ret - reticulate
crd - crested	wa - weak
shrd - sheared	v - very
colc - calcareous	pb - pebble
carb - carbonaceous	cb - cobble
lgn - lignitic	tr - trace
abd - cross bedded	in bd - inter bedded
fn bd - thin bedded	tbc - tubicolous
th bd - thick bedded	frct - fractured
vn - veins, veining	

ROCK TYPE	SST - sandstone	SCT - siltstone
LST - limestone	DLST - dolomite	QLST - quartzite
BX - breccia	CG - conglomerate	BSH - black shale
SH - shale	QZT - quartzite	LIM - limestone
QZT - quartzite	GRN - gneiss	CLY - clay
PUG - gneiss		GRA - gravel

MINERALOGY or ALTERATION	py - pyrite
qt - quartz	sp - sphalerite
gn - galena	cp - chalcopyrite
lim - limonite	sil - silicified
carb - carbonated	
c - calcite	

ORDER	Colour, Texture, Rock Type, Mineralogy or Alteration, Fossils
e.g.	dk gy mg foss SST or gy calc SH py or pl gy LST sil

TOPOGRAPHICAL	cut grid lines	joint
roads	joint - vertical	
tracks	overformed	
tramways	bedding	
power lines	bedding - vertical	
rivers, creeks	quarries	
washy area		

Ts Tertiary Sediments
Poorly consolidated polymict conglomerate and sandstone.

Sc Crofty Quartzite and Equivalents
Lithic and feldspathic quartz sandstone, quartz siltstone.

Og Gordon Limestone
Dark grey micritic limestone, argillaceous limestone, marly siltstone, siltstone.

Om Main Sandstone
Siliceous quartzite, quartz sandstone and quartz siltstone and minor siliceous pebble conglomerate.

Oo Owen Conglomerate
Siliceous white-pink pebble-cobble conglomerate, white quartzite, minor siltstone.

Cu Upper Cambrian
? Sediments.

Cvs Cambrian Volcanics and Sediments
Volcaniclastic sediments, quartzite and siltstone.


~~~~~ Fault Approximate.  
 ~?~?~ Fault Inferred.  
 --- Lithological Boundary - Approximate.

112109  
5 cm

Fig. B.R. 1

**ELECTROLYTIC ZINC CO. OF ASIA LTD.**  
PROJECT: BIRD RIVER, E.L. 31/83, TAS.

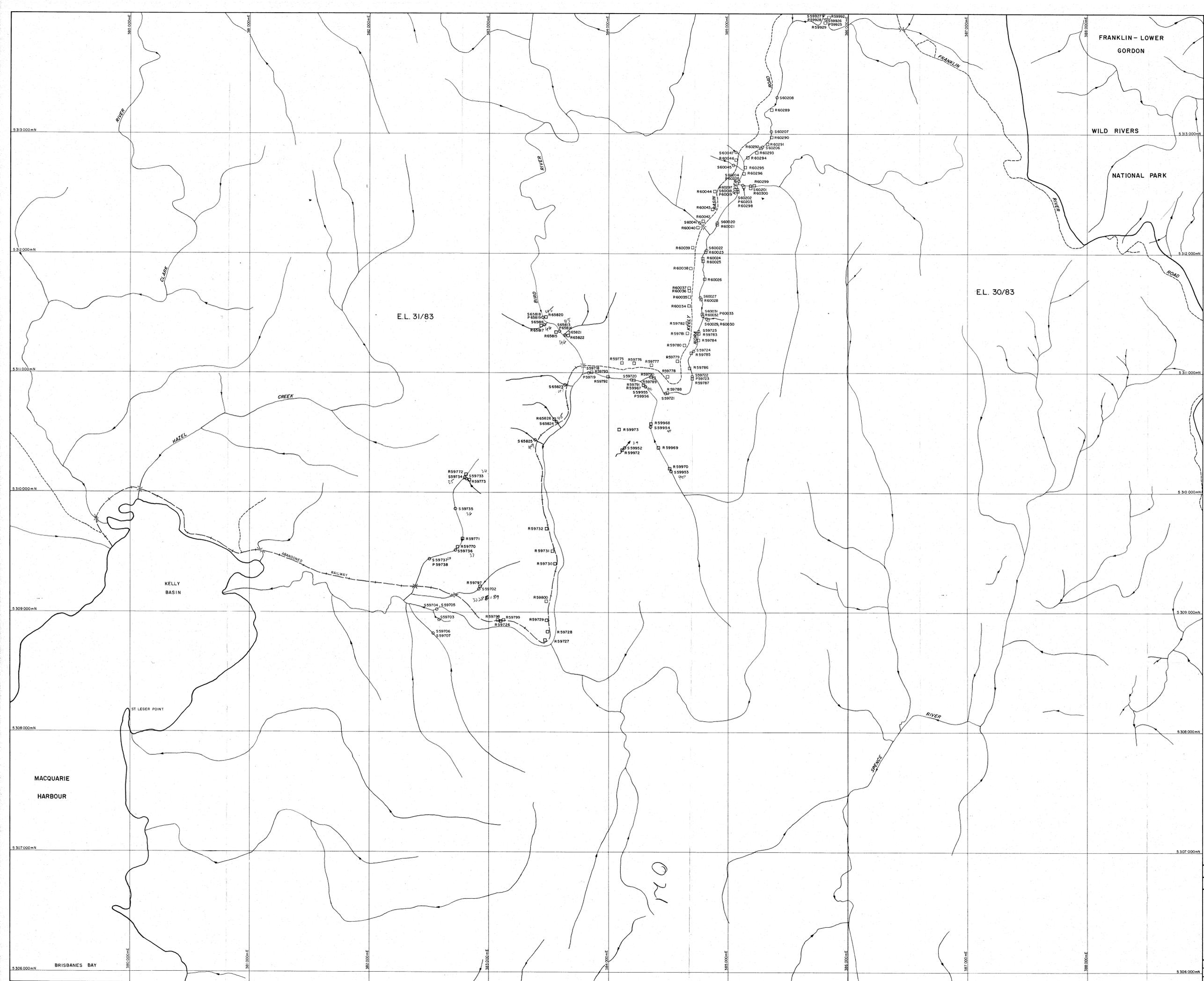
**GEOLOGY 020**

**INTERPRETATION**

1:5-2460  
Scale: 1:10,000  
Reference: 530-1004  
Drawn: R.J.R.

Survey: I.M.A.T.  
Date: 29-7-85  
Checked:

Revised:  
Ref. No.  
AO-530-4005



- STREAM SEDIMENT SAMPLE.  
SAMPLE No. S8902
- PANNEDED CONCENTRATE - STREAM SEDIMENT SAMPLE.  
SAMPLE No. P45678
- ROCK CHIP SAMPLE.  
SAMPLE No. R23456

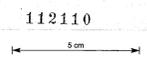
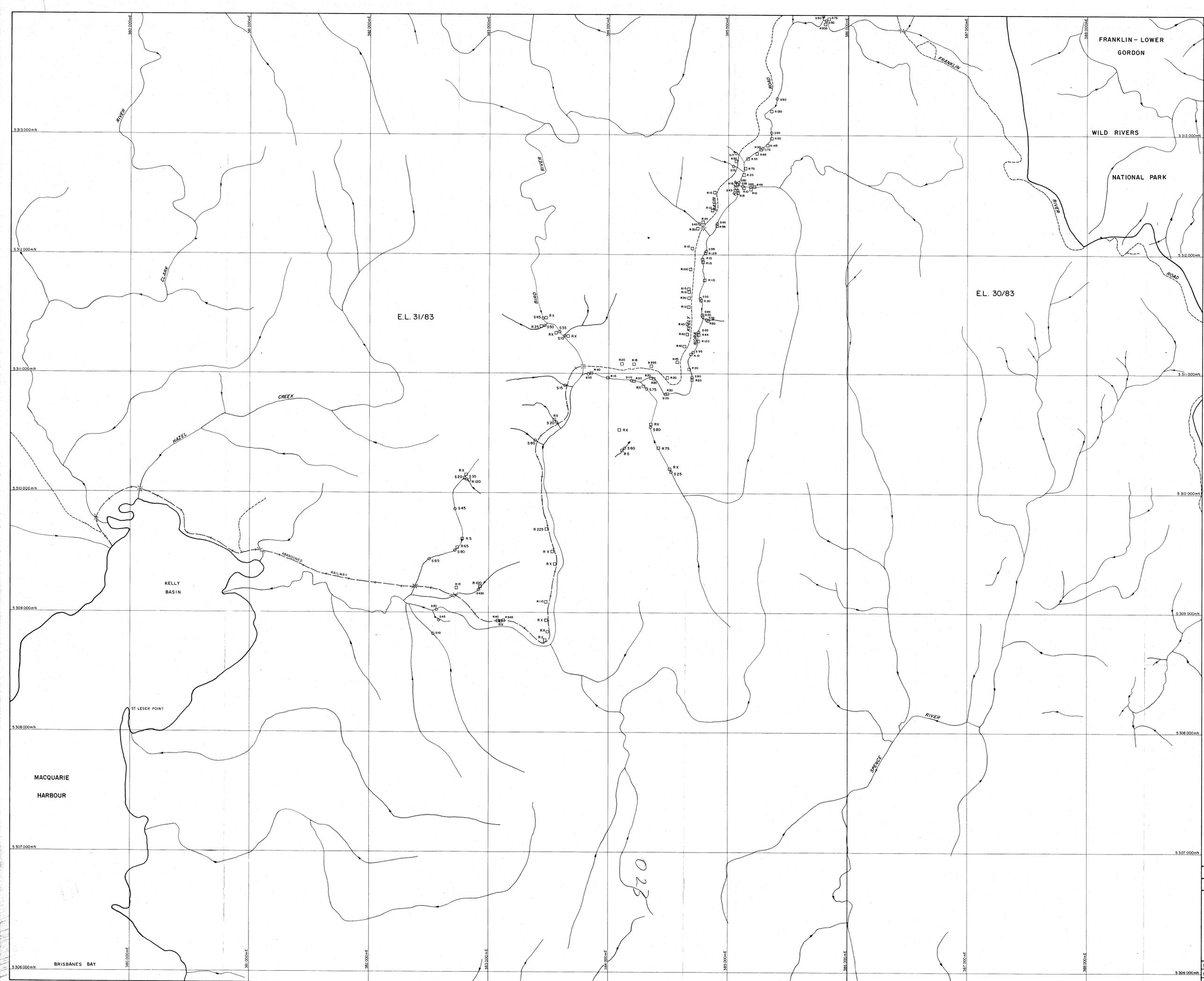


Fig. B.R. 2

**ELECTROLYTIC ZINC CO. OF A'ASIA LTD.**  
**PROJECT: BIRD RIVER, E.L. 31/83, TAS.**  
 021  
**SAMPLE LOCATIONS**  
**NUMBERS and TYPES**

|                     |                  |             |
|---------------------|------------------|-------------|
| Scale: 1:10,000     | Survey: I.M.A.T. | Revised:    |
| Reference: 530-1000 | Date: 16-10-'84  | Ref. No.    |
| Drawn: R.J.R.       | Checked:         | AO-530-4000 |

85-2460



○ STREAM SEDIMENT SAMPLE.  
 S 65  
 □ ROCK CHIP SAMPLE.  
 R 10  
 X = below 5 ppm.  
 Note: All results are ppm.

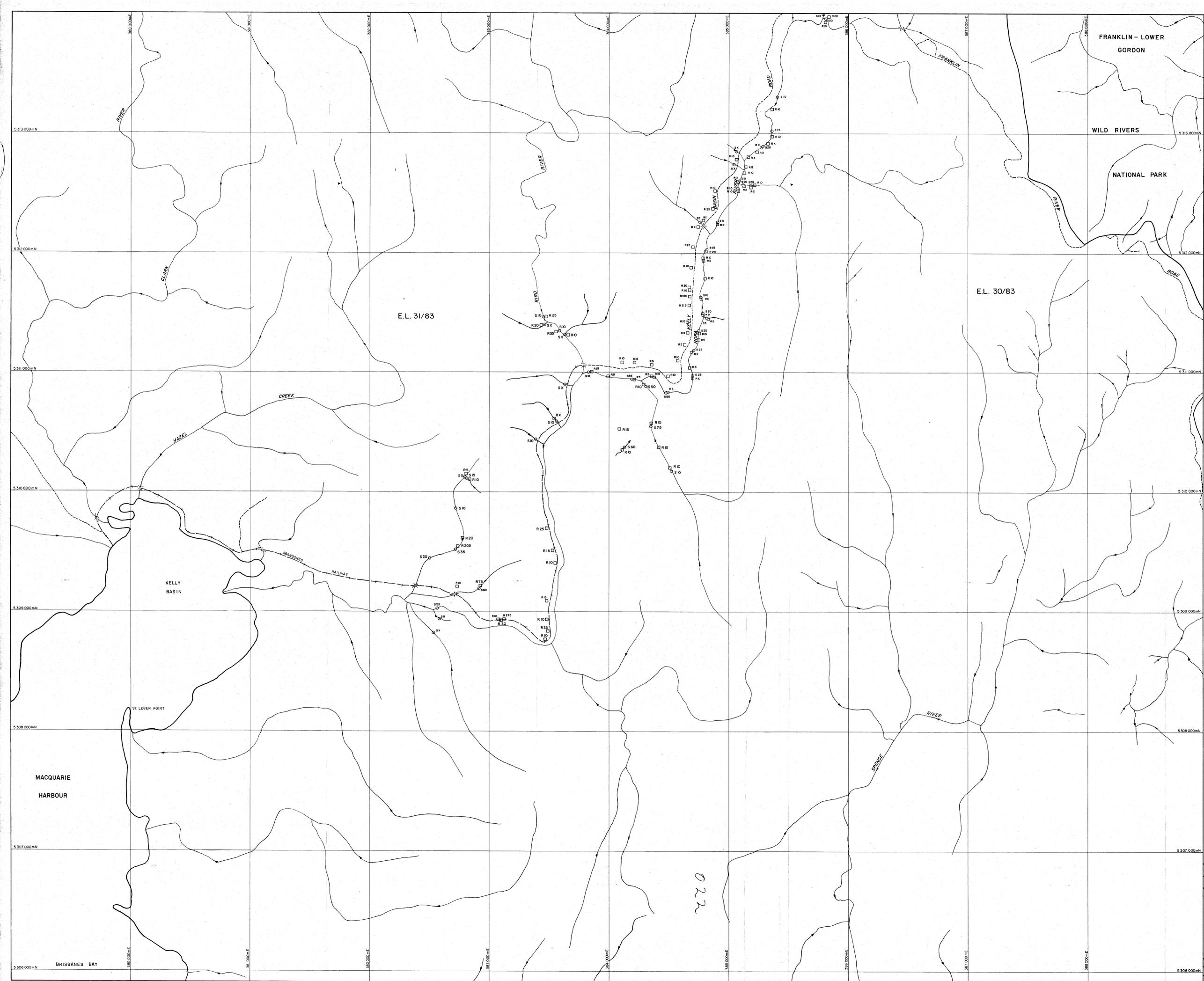
112111  
 5cm

85-2460

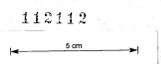
Fig. B.R. 4  
 ELECTROLYTIC ZINC CO. OF ASIA LTD.  
 PROJECT: BIRD RIVER, E.L. 31/83, TAS.

GEOCHEMISTRY 023  
 Zn

|                     |                  |             |
|---------------------|------------------|-------------|
| Scale: 1:10,000     | Survey: I.M.A.T. | Revised:    |
| Reference: 530-1001 | Date: 16-10-84   | Ref. No.    |
| Drawn: R.J.R.       | Checked:         | AO-530-4001 |



○ STREAM SEDIMENT SAMPLE.  
S25  
□ ROCK CHIP SAMPLE.  
R10  
X = below 5 ppm.  
Note: All results are ppm.



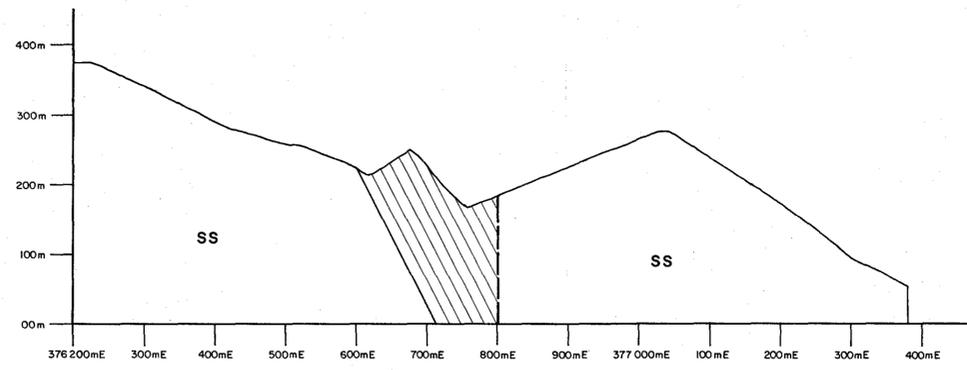
85-246

Fig. B.R. 3  
ELECTROLYTIC ZINC CO. OF ASIA LTD.  
PROJECT: BIRD RIVER, E.L. 31/83, TAS.

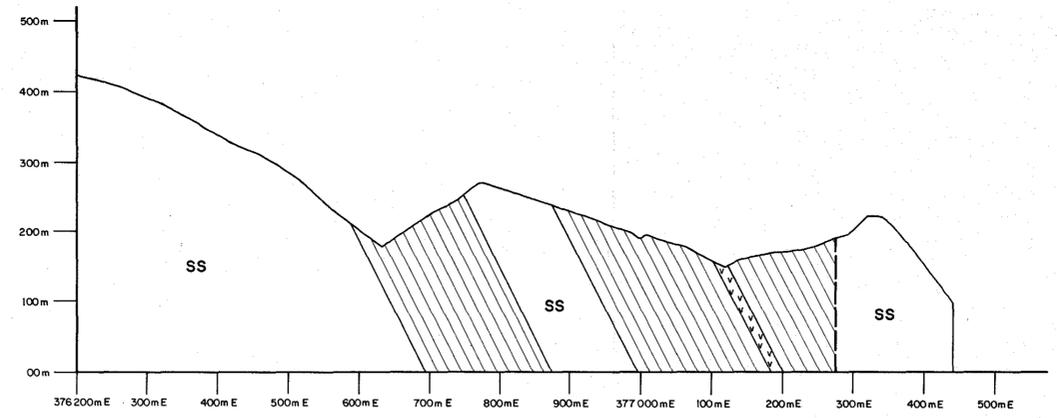
GEOCHEMISTRY  
Pb 022

|                     |                |             |
|---------------------|----------------|-------------|
| Scale: 1:10,000     | Survey: L.MAT. | Revised:    |
| Reference: 530-1002 | Date: 16-10-84 | Ref. No.    |
| Drawn: R.J.R.       | Checked:       | AO-530-4002 |

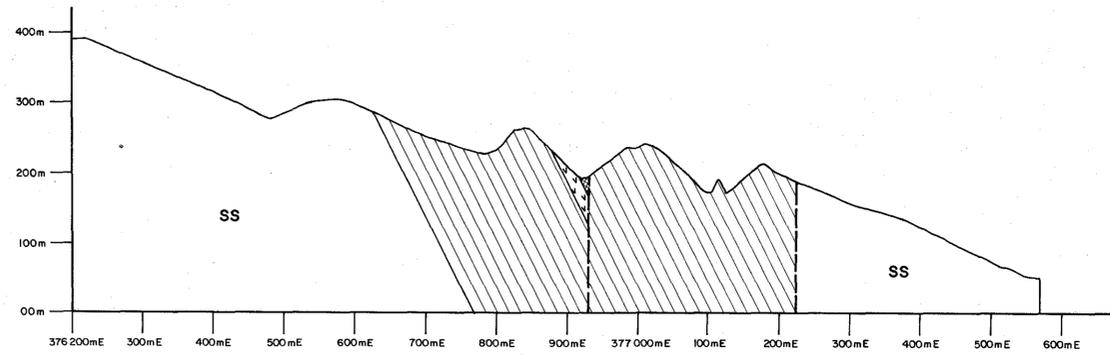
AI-530-5001



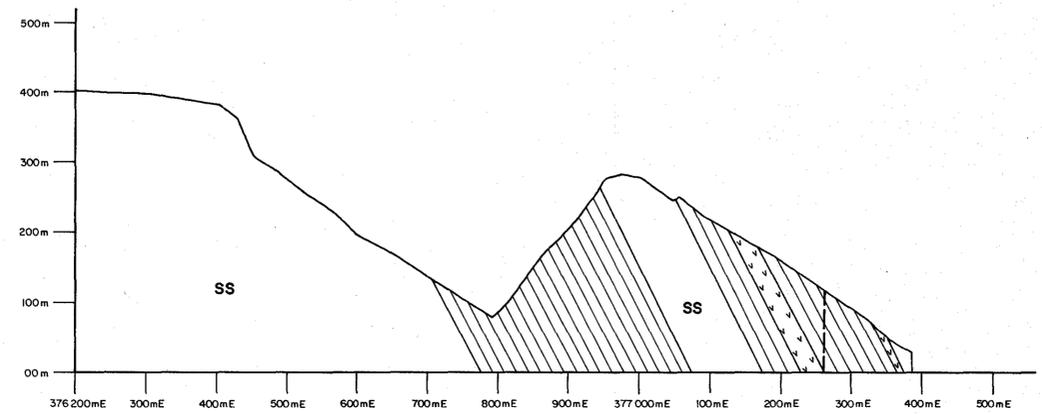
5 331 800m N



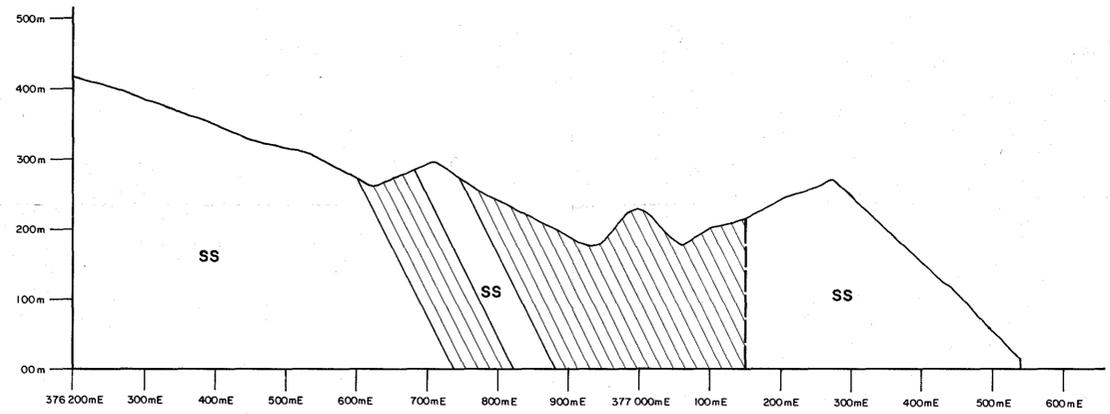
5 330 600m N



5 331 400m N



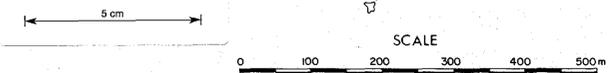
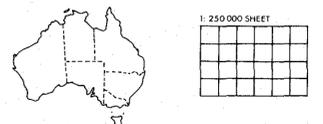
5 330 200m N



5 330 900m N

- LEGEND -

-  White and grey, medium grained feldspathic, micaceous Quartzite.
-  Grey micaceous Siltstones and laminated Shales - interbedded Quartzites.
-  Multicoloured medium-coarse grained Tuffaceous Arkose, occ. conglomerate.
-  ? Crush zone.
-  Inferred fault.



**EZ** 112113  
 ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED  
 MINERAL RESOURCES DIVISION

Fig. R5

PROJECT: MACQUARIE E.L. 31/83, TAS.

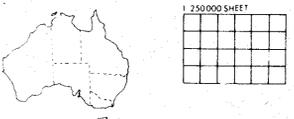
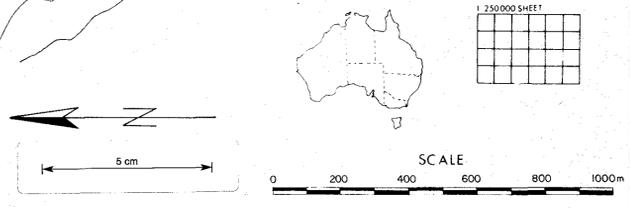
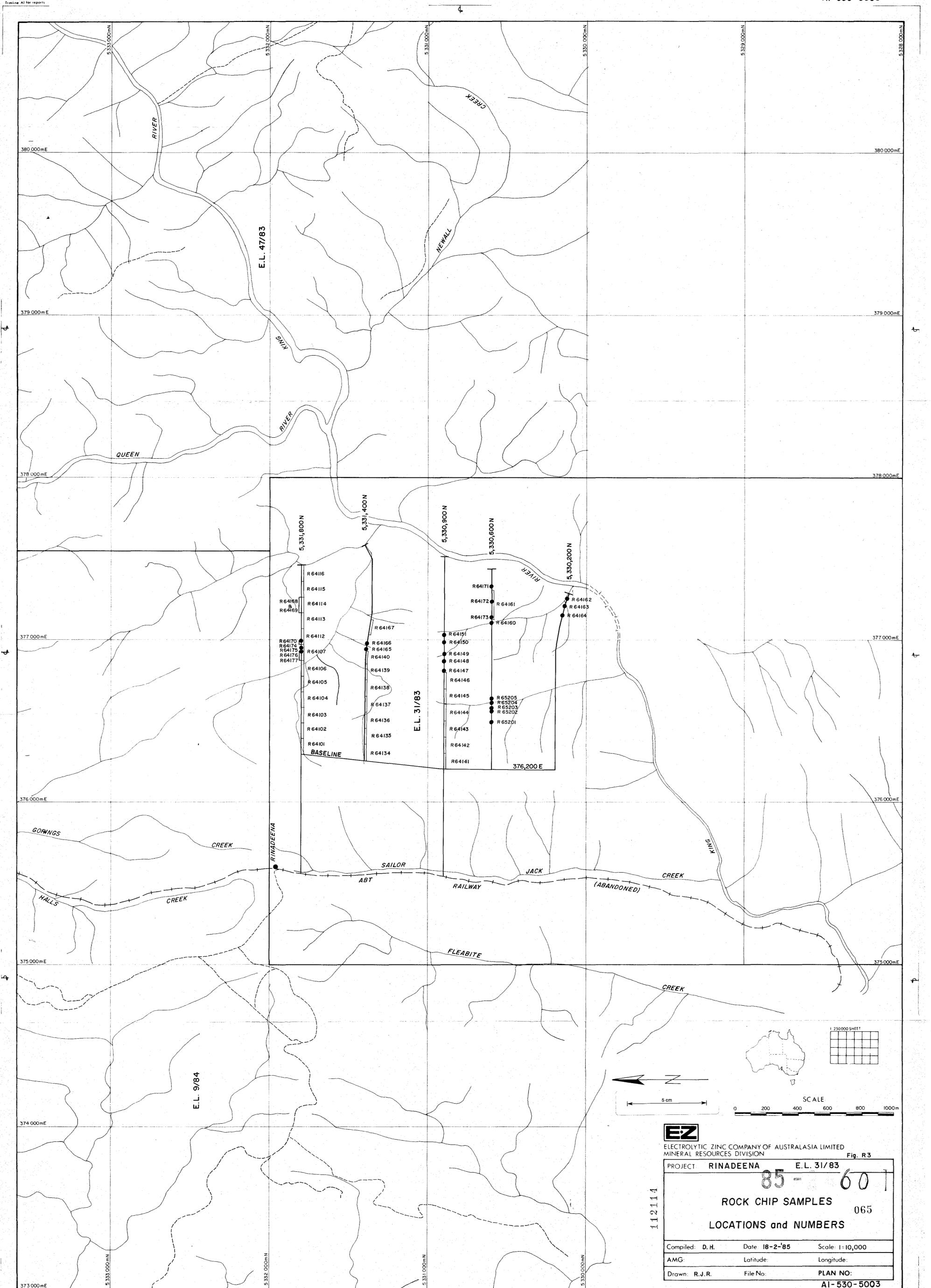
RINADEENA  
**85-2460**  
 CROSS SECTIONS  
 067

Compiled: D.H. Date: 12-2-'85 Scale: 1:5000

AMG: Latitude: Longitude:

Drawn: R.J.R. File No: PLAN NO:

AI-530-5001



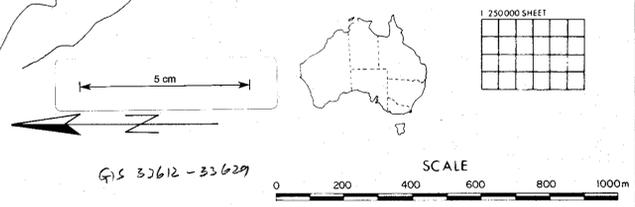
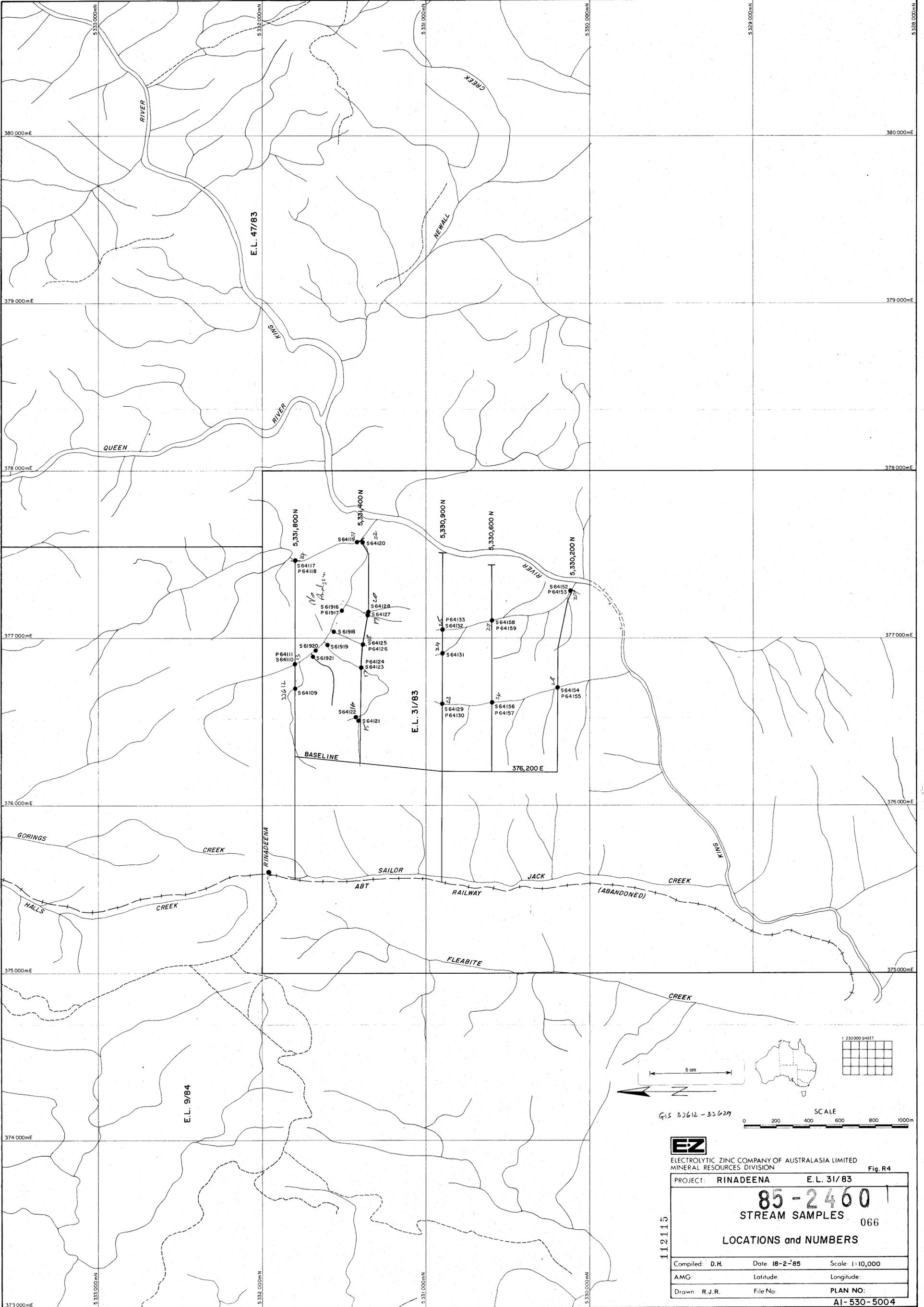
**EZ**  
ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED  
MINERAL RESOURCES DIVISION

PROJECT: RINADEENA E.L. 31/83  
85 - 60  
 ROCK CHIP SAMPLES  
 LOCATIONS and NUMBERS

|                |               |                         |
|----------------|---------------|-------------------------|
| Compiled: D.H. | Date: 18-2-85 | Scale: 1:10,000         |
| AMG            | Latitude:     | Longitude:              |
| Drawn: R.J.R.  | File No:      | PLAN NO:<br>A1-530-5003 |

112114

Fig. R3



**EZ**  
 ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED  
 MINERAL RESOURCES DIVISION

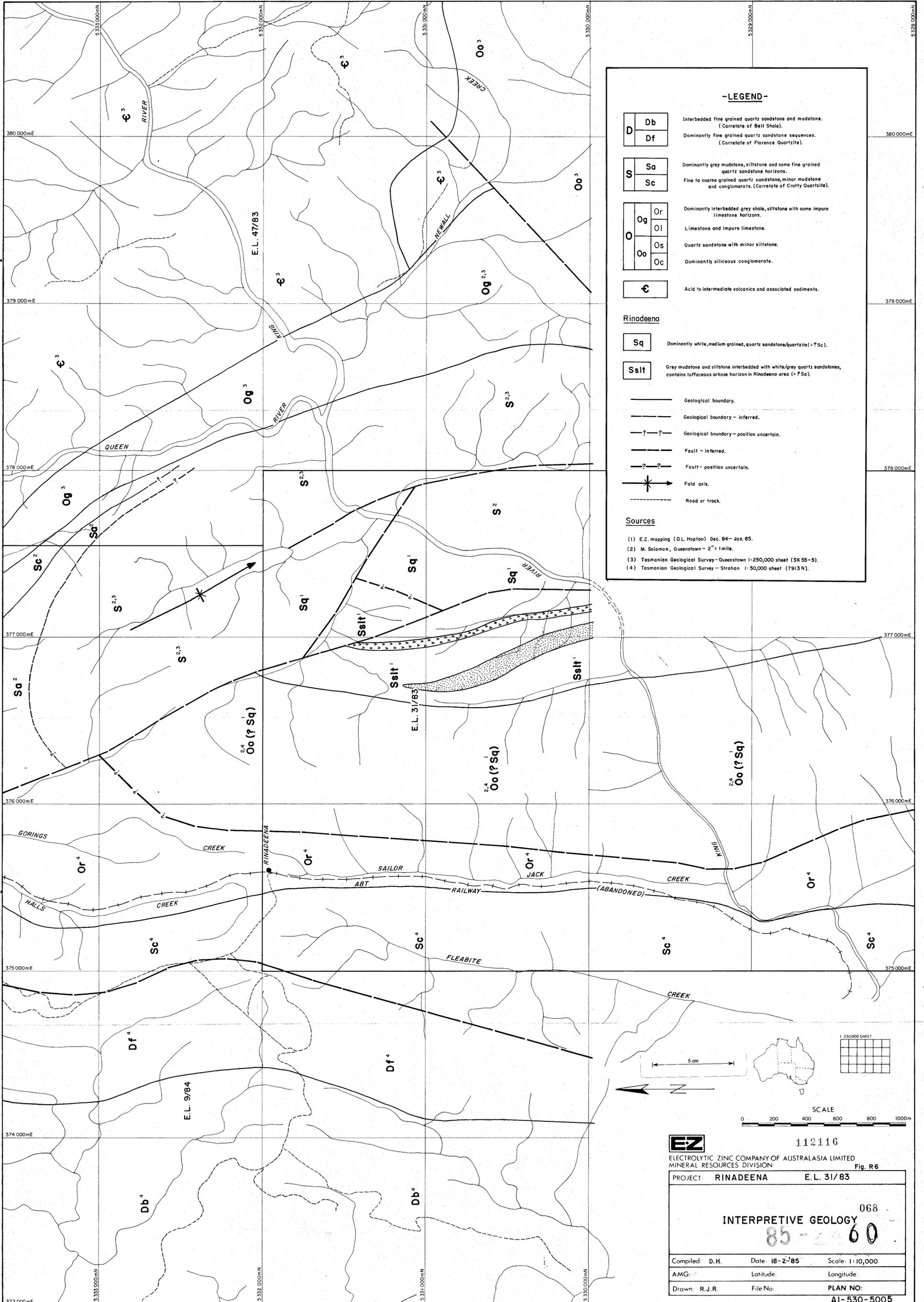
PROJECT: RINADEENA E.L. 31/83

**85-2460**  
 STREAM SAMPLES 066  
 LOCATIONS and NUMBERS

112115

|                |               |                 |
|----------------|---------------|-----------------|
| Compiled: D.H. | Date: 18-2-85 | Scale: 1:10,000 |
| AMG:           | Latitude:     | Longitude:      |
| Drawn: R.J.R.  | File No:      | PLAN NO:        |

AI-530-5004



**-LEGEND-**

|   |    |                                                                                      |
|---|----|--------------------------------------------------------------------------------------|
| D | Db | Interbedded fine grained quartz sandstone and mudstone. (Correlate of Bell Shale).   |
|   | Df |                                                                                      |
| S | Sa | Dominantly grey mudstone, siltstone and some fine grained quartz sandstone horizons. |
|   | Sc |                                                                                      |
| O | Og | Dominantly interbedded grey shale, siltstone with some impure limestone horizons.    |
|   | Or |                                                                                      |
|   | Oo | Quartz sandstone with minor siltstone.                                               |
|   | Oc | Dominantly siliceous conglomerate.                                                   |
| € |    | Acid to intermediate volcanics and associated sediments.                             |

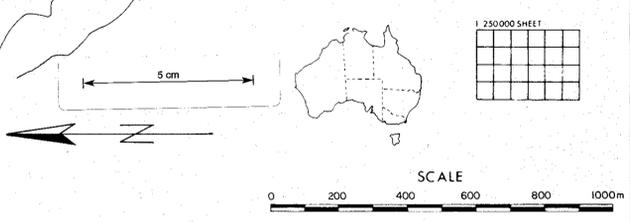
**Rina deena**

|       |                                                                                                                                            |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Sq    | Dominantly white, medium grained, quartz sandstone/quartzite (= ? Sc).                                                                     |
| Ssilt | Gray mudstone and siltstone interbedded with white/gray quartz sandstones, contains tuffaceous arkose horizon in Rina deena area (= ? Sa). |

Geological boundary.  
 Geological boundary - inferred.  
 Geological boundary - position uncertain.  
 Fault - inferred.  
 Fault - position uncertain.  
 Fold axis.  
 Road or track.

**Sources**

- (1) E.Z. mapping (D.L. Hopton) Dec. 84 - Jan. 85.
- (2) M. Solomon, Queenstown - 2" = 1 mile.
- (3) Tasmanian Geological Survey - Queenstown 1:250,000 sheet (SK 55-5).
- (4) Tasmanian Geological Survey - Strahan 1:50,000 sheet (7913 N).



**EZ** 112116

ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED  
MINERAL RESOURCES DIVISION Fig. R6

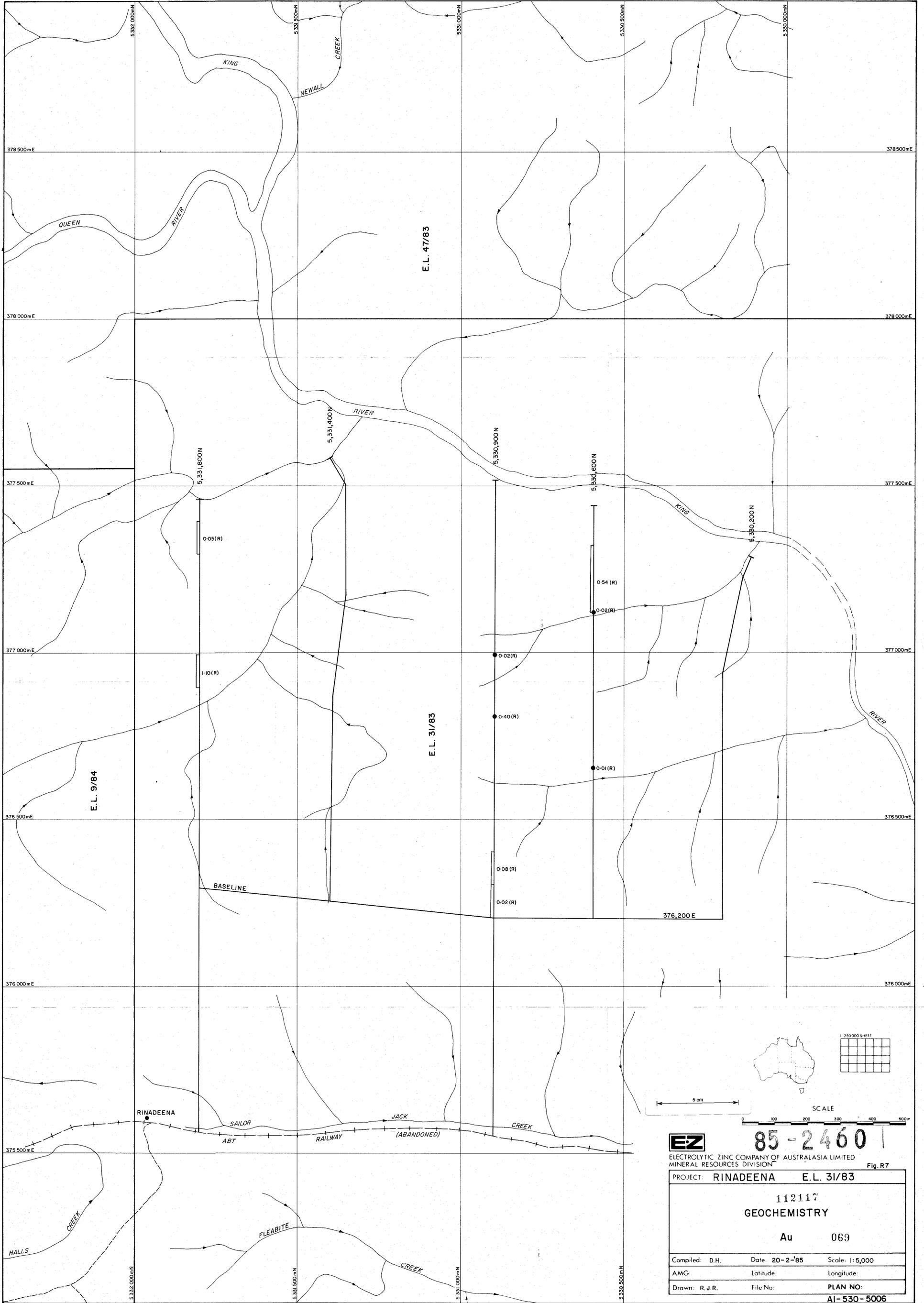
PROJECT: RINA DEENA E.L. 31/83

**INTERPRETIVE GEOLOGY** 068

85 24 60

|                |               |                 |
|----------------|---------------|-----------------|
| Compiled: D.H. | Date: 18-2-85 | Scale: 1:10,000 |
| AMG:           | Latitude:     | Longitude:      |
| Drawn: R.J.R.  | File No:      | PLAN NO:        |

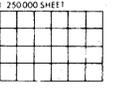
AI-530-5005



85-2460

ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED  
MINERAL RESOURCES DIVISION

|                        |                |                         |
|------------------------|----------------|-------------------------|
| PROJECT:               | RINADEENA      | E.L. 31/83              |
| 112117<br>GEOCHEMISTRY |                |                         |
| Au                     |                | 069                     |
| Compiled: D.H.         | Date: 20-2-'85 | Scale: 1:5,000          |
| AMC:                   | Latitude:      | Longitude:              |
| Drawn: R.J.R.          | File No:       | PLAN NO:<br>AI-530-5006 |



SCALE

Fig. R7



**LEGEND**

|               |             |
|---------------|-------------|
| <b>COLOUR</b> | wh - white  |
| pk - pink     | bk - black  |
| br - brown    | gr - green  |
| bl - blue     | yl - yellow |
| gy - grey     | or - orange |
| rd - red      | pl - pale   |
| cr - cream    | dk - dark   |
| lt - light    |             |

|                      |                      |
|----------------------|----------------------|
| <b>TEXTURE</b>       | foss - fossiliferous |
| fg - fine grained    | sil - siliceous      |
| mg - medium grained  | mic - micaceous      |
| cg - coarse grained  | ferr - ferruginous   |
| bx - brecciated      | clvd - cleaved       |
| shrd - sheared       | int - intense        |
| calc - calcareous    | wk - weak            |
| carb - carbonaceous  | v - very             |
| lam - laminated      | pb - pebble          |
| xbd - cross bedded   | cb - cobble          |
| tn bd - thin bedded  | tr - trace           |
| tk bd - thick bedded | in bd - inter bedded |
| vn - veins, veining  | tbl - tubular        |
| min - minor          | frct - fractured     |
|                      | pbly - pebbly        |

|                  |                    |
|------------------|--------------------|
| <b>ROCK TYPE</b> | SLT - siltstone    |
| SST - sandstone  | DLST - dolomite    |
| LST - limestone  | CGL - conglomerate |
| BX - breccia     | BSH - black shale  |
| SH - shale       | LIM - ironstone    |
| QZT - quartzite  | CLY - clay         |
| GRT - grit       | GRA - gravel       |
| PUG - pug        |                    |
| ark - arkose     |                    |

|                                 |                     |
|---------------------------------|---------------------|
| <b>MINERALOGY or ALTERATION</b> | py - pyrite         |
| qt - quartz                     | sp - sphalerite     |
| gn - goethite                   | cp - chalcopyrite   |
| lim - limonite                  | sil - silicified    |
| cbd - carbonated                | tuff - tuffaceous   |
| c - calcite                     | fe st - Fe staining |

**ORDER**

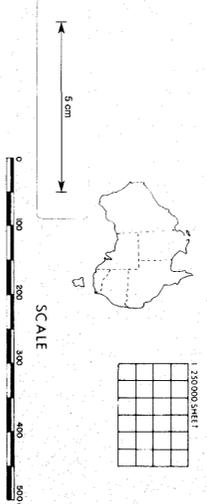
Colour, Texture, Rock Type, Mineralogy or Alteration, Fossils.  
e.g.  
dk gy mg foss SST. or gy calc SH py. or pl gy LST sid.

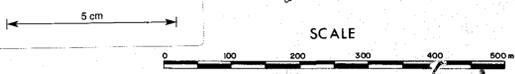
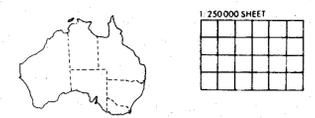
○ Symbol denoting scree or float.

◐ Symbol denoting outcrop.

**EN** 112118  
ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED  
MINERAL RESOURCES DIVISION  
PROJECT: RINADEENA E.L. 31/83 Fig. R10  
**85-2460**  
GEOLOGY  
(FACT) 072

Compiled: D.H. Date: 8-3-85 Scale: 1:5,000  
AMG: Longitude: Plan No.:  
Drawn: R.J.R. File No.:  
AI-530-5007





**EZ**  
ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED  
MINERAL RESOURCES DIVISION

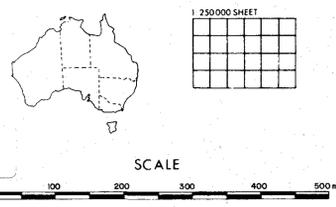
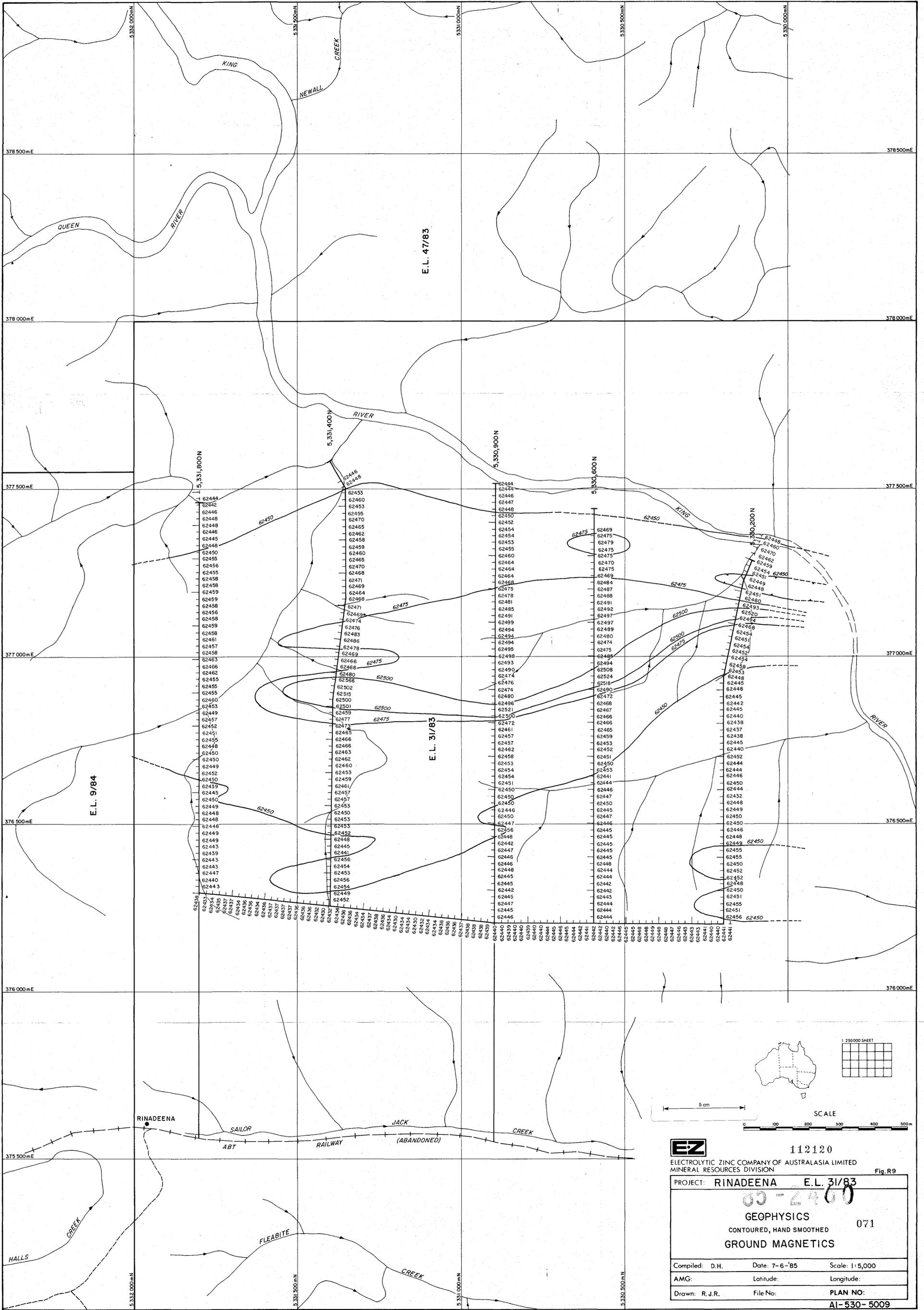
PROJECT: RINADEENA E.L. 31/83

112119 SOIL SAMPLES 070

LOCATIONS and NUMBERS

|                |               |                |
|----------------|---------------|----------------|
| Compiled: D.H. | Date: 8-3-'85 | Scale: 1:5,000 |
| AMG:           | Latitude:     | Longitude:     |
| Drawn: R.J.R.  | File No:      | PLAN NO:       |

AI-530-5008

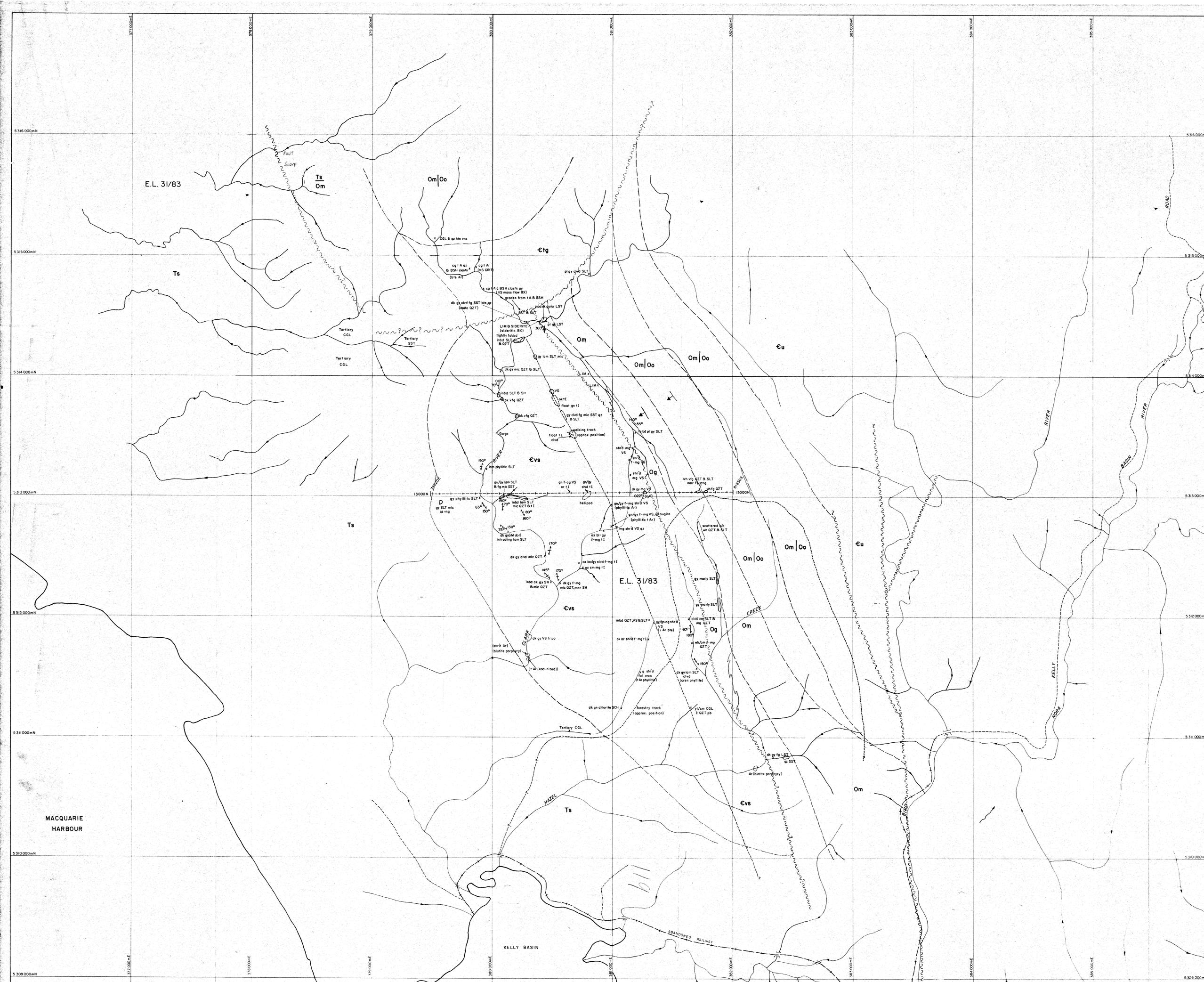


**EZ** 112120  
 ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED  
 MINERAL RESOURCES DIVISION Fig. R9

PROJECT: RINADEENA E.L. 31/83  
 05-2460  
 GEOPHYSICS 071  
 CONTOURED, HAND SMOOTHED  
 GROUND MAGNETICS

|                |              |                |
|----------------|--------------|----------------|
| Compiled: D.H. | Date: 7-6-85 | Scale: 1:5,000 |
| AMG:           | Latitude:    | Longitude:     |
| Drawn: R.J.R.  | File No:     | PLAN NO:       |

AI-530-5009



**LEGEND**

|               |             |
|---------------|-------------|
| <b>COLOUR</b> | wh - white  |
| pk - pink     | bk - black  |
| bl - blue     | gr - green  |
| gy - grey     | yl - yellow |
| rd - red      | or - orange |
| cm - cream    | pl - pale   |
| lt - light    | dk - dark   |

**TEXTURE**

|                      |                      |
|----------------------|----------------------|
| fg - fine grained    | foa - fossiliferous  |
| mg - medium grained  | sil - siliceous      |
| cg - coarse grained  | mic - micaceous      |
| btd - brecciated     | ferr - ferruginous   |
| clvd - cleaved       | int - intense        |
| shrd - sheared       | wk - weak            |
| col - calcareous     | v - very             |
| carb - carbonaceous  | pb - pebble          |
| lam - laminated      | cb - cobble          |
| xbd - cross bedded   | tr - trace           |
| th bd - thin bedded  | in bd - inter bedded |
| th bd - thick bedded | tbl - tabular        |
| vn - veins, veining  | frct - fractured     |

**ROCK TYPE**

|                 |                    |
|-----------------|--------------------|
| SST - sandstone | SLT - siltstone    |
| LST - limestone | DLST - dolomite    |
| BX - breccio    | CGL - conglomerate |
| SH - shale      | BSH - black shale  |
| QZT - quartzite | LIM - limestone    |
| GRIT - grit     | CLY - clay         |
| PUG - pug       | GRA - gravel       |

**MINERALOGY or ALTERATION**

|                   |                   |
|-------------------|-------------------|
| qt - quartz       | py - pyrite       |
| gn - galeite      | sp - sphalerite   |
| lim - limonite    | cp - chalcopyrite |
| carb - carbonated | slc - silicified  |
| c - calcite       | bae - barite      |
|                   | hta - hematite    |

**ORDER**  
Colour, Texture, Rock Type, Mineralogy or Alteration, Fossils.  
e.g. dk gy mg foss SST, or gy calc SH py, or pl gy LST sil.

**TOPOGRAPHICAL**

|                |                    |
|----------------|--------------------|
| cut grid lines | joint - 090°       |
| roads          | joint - vertical   |
| tracks         | overturned         |
| tramways       | bedding            |
| power lines    | bedding - vertical |
| rivers, creeks | quarries           |
| swampy area    |                    |

**ROCK TYPE (cont.)**  
METAMORPHIC  
SCH - Schist  
fol - foliated  
cre - crystalline

**IGNEOUS**

|                     |                  |               |
|---------------------|------------------|---------------|
| Prefixes            | A - acid         | Suffixes      |
| l - luff            | I - intermediate | r - rhyolite  |
| i - lava            | M - basic        | d - dacite    |
| l - minor intrusive |                  | g - gneissite |
|                     |                  | di - diorite  |

VS - volcanoclastic sediment  
Thin section description shown in brackets

- Ts Tertiary Sediments**  
Poorly consolidated polymict conglomerate and sandstone.
- Sc Crofty Quartzite and equivalents**  
Lithic and feldspathic quartz sandstone, quartz siltstone.
- Og Gordon Limestone**  
Dark gray micritic limestone, argillaceous limestone, marly siltstone, siltstone.
- Om Moira Sandstone**  
Siliceous quartzite, quartz sandstone, quartz siltstone, minor siliceous pebble conglomerate.
- Oo Owen Conglomerate**  
White-pink, siliceous, pebble-cobble conglomerate, white quartzite and quartz sandstone, minor siltstone.
- Cu Upper Cambrian ?**  
Sediments.
- Ctq Tyndall Group Equivalents**  
(Corbett 1984)
- Cvs Cambrian Volcano-Sedimentary Sequence**  
Regionally metamorphosed acid-intermediate volcanics, carbonaceous micaceous quartzite and phyllitic siltstone.

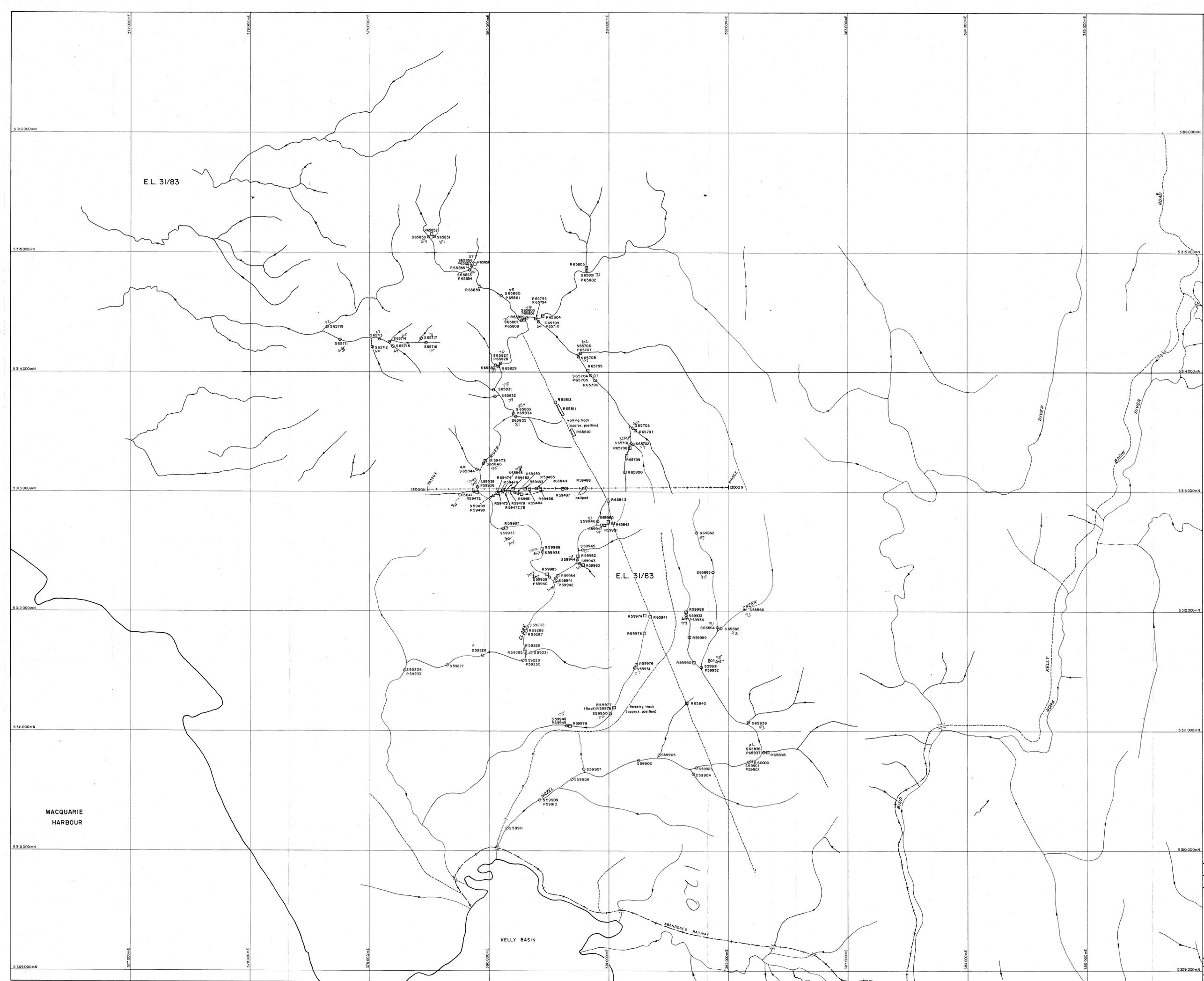
|       |                                     |      |
|-------|-------------------------------------|------|
| ~~~~~ | Fault - Approximate                 | 5 cm |
| ~~~~~ | Fault - Inferred                    |      |
| ~~~~~ | Lithological boundary - Approximate |      |

**35-24001**  
Fig. CR.1

**ELECTROLYTIC ZINC CO. OF ASIA LTD.**  
PROJECT: CLARK RIVER, E.L. 31/83, TAS.

**112121**  
**GEOLOGY**  
**INTERPRETATION**

|                    |              |             |
|--------------------|--------------|-------------|
| Scale 1:10,000     | Survey 1 MAT | Revised     |
| Reference 530-0005 | Date 29-7-85 | Ref No      |
| Drawn R.J.R.       | Checked      | AO-530-3006 |



- STREAM SEDIMENT SAMPLE  
SAMPLE No S12345
- PANNELED CONCENTRATE - STREAM SEDIMENT SAMPLE  
SAMPLE No P67890
- ROCK CHIP SAMPLE  
SAMPLE No R34567

112122  
5 cm

35-2460

Fig. C.R.2

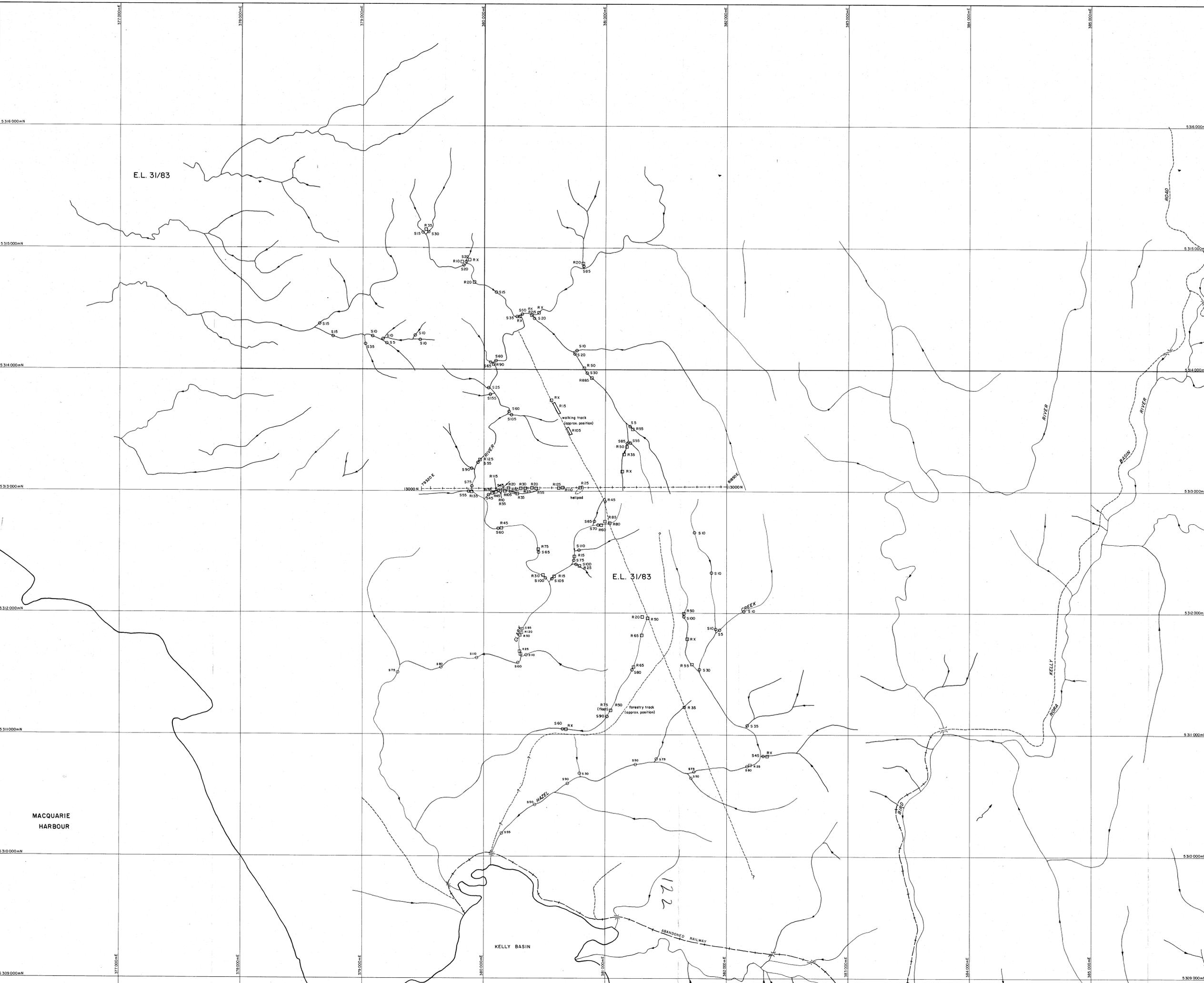
ELECTROLYTIC ZINC CO. OF ASIA LTD.  
PROJECT: CLARK RIVER, E.L. 31/83, TAS.

GIS 33642-27 704  
SAMPLE LOCATIONS

NUMBERS and TYPES

120

|                       |                 |             |
|-----------------------|-----------------|-------------|
| Scale: 1:10,000       | Survey: I.MAT.  | Revised:    |
| Reference: AO-530-000 | Date: 16-10-84  | Ref. No.    |
| Drawn: R.J.R.         | Checked: I.MAT. | AO-530-3000 |



○ STREAM SEDIMENT SAMPLE  
S10

□ ROCK CHIP SAMPLE  
R50

x = below 5 ppm.

Note: All results are ppm.

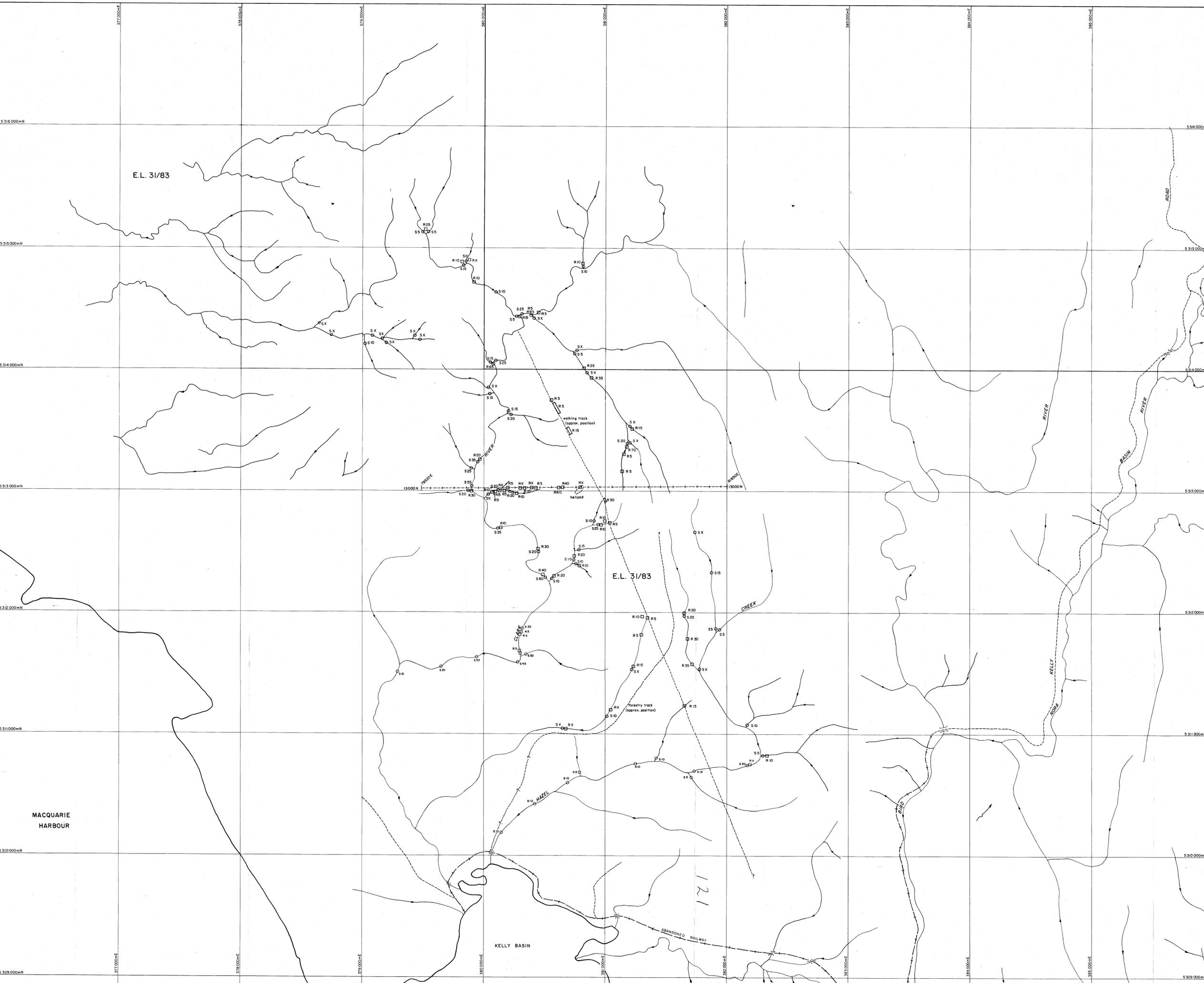
112123  
5 cm

85-24001

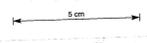
Fig. C.R.4  
ELECTROLYTIC ZINC CO. OF ASIA LTD.  
PROJECT: CLARK RIVER, E.L. 31/83, TAS.

GEOCHEMISTRY  
Zn  
122

|                     |                   |             |
|---------------------|-------------------|-------------|
| Scale: 1:10,000     | Survey: I.M.A.T.  | Revised:    |
| Reference: 530-0002 | Date: 16-10-84    | Ref. No.    |
| Drawn: R.J.R.       | Checked: I.M.A.T. | AO-530-3001 |



○ STREAM SEDIMENT SAMPLE.  
S 35  
□ ROCK CHIP SAMPLE.  
R 5  
x = below 5 ppm.  
Note: All results are ppm.



**85-2460**  
Fig. C.R.3

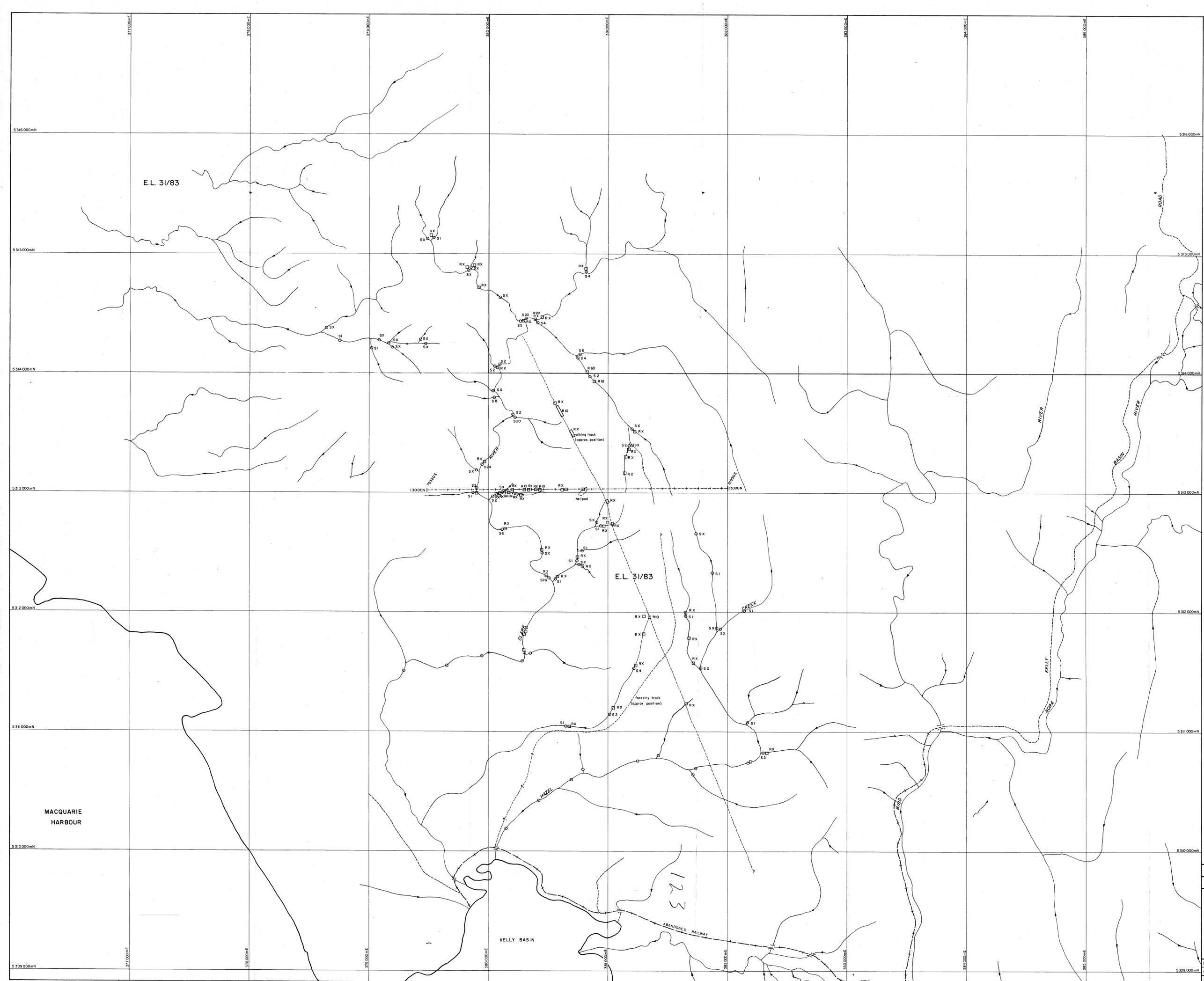
ELECTROLYTIC ZINC CO. OF ASIA LTD.  
PROJECT: CLARK RIVER, E.L. 31/83, TAS.

112124  
GEOCHEMISTRY

121

Pb

|                     |                 |             |
|---------------------|-----------------|-------------|
| Scale: 1:10,000     | Survey: I.MAT.  | Revised:    |
| Reference: 530-0003 | Date: 16-10-84  | Ref. No.    |
| Drawn: R.J.R.       | Checked: I.MAT. | A0-530-3002 |



- STREAM SEDIMENT SAMPLE  
SAMPLE No S12345
  - PANNED CONCENTRATE - STREAM SEDIMENT SAMPLE  
SAMPLE No P67890
  - ROCK CHIP SAMPLE  
SAMPLE No R34567
- N.B. - All values in ppb.  
 SX = VALUE  $\times$  1ppb  
 RX = VALUE  $\times$  8ppb



**85-2400**  
Fig. C.R. 5

**ELECTROLYTIC ZINC CO. OF ASIA LTD.**  
**PROJECT: CLARK RIVER, E.L. 31/83, TAS.**

112125  
**GEOCHEMISTRY** 123  
 Au

|                 |                   |             |
|-----------------|-------------------|-------------|
| Scale: 1:10,000 | Survey: I.M.A.T.  | Revised:    |
| Reference:      | Date: 20-3-'85    | Ref. No.    |
| Drawn: R.J.R.   | Checked: I.M.A.T. | A0-530-3005 |