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DATE	09 AUG 1985	FILE
DEPT. OF MINES		
REF. No.	8408/85	

PART OF EXPLORATION LICENCE NO'S

30/83 "GOVERNOR"

AND

32/83 "PRINCESS"

PRINCESS RIVER AREA

REPORT ON EXPLORATION ACTIVITY

OCTOBER, 1984 TO JUNE, 1985.

E.Z. REPORT No. T209

I. J. MATHISON,  
JULY, 1985.

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FIGURES, PLATES AND APPENDIX

## FIGURE 1. Location and Access

- A1. Correlation Diagram Zn and Pb  
 A2. " " Pb and Cu  
 A3. " " Mn and Zn  
 A4. " " Mn and Pb  
 A5. " " Pb and Fe

PLATE	PR 1.	Geology	AD-531-1006
	✓ PR 2.	Geochemistry - Zn	-1002
	✓ PR 3.	" - Pb	-1003
	PR 4.	" - Ba	-1004
	PR 5.	Sample Locations - Numbers & Types	-1005
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	PR 8.	" " - Pb	-1010
	PR 9.	" " - Mn	-1011

## APPENDIX

Stream Sediment Sample Data Sheets

Soil Sample Data Sheets

Deep Bedrock Sample Data Sheets

Rock Sample Data Sheets

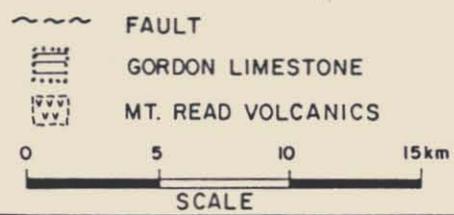
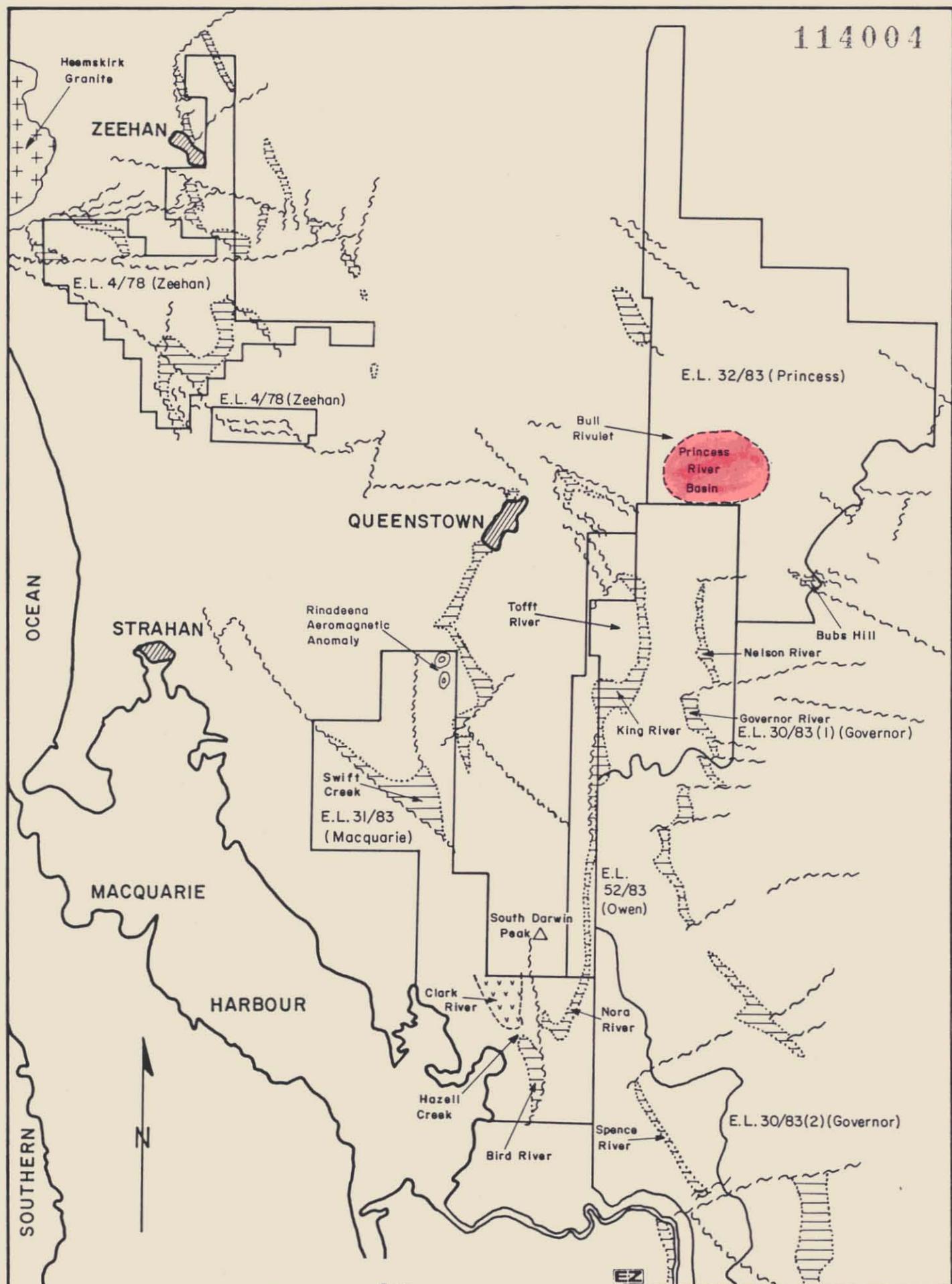
Petrological Report - C.M.S. 85/2/16

Heavy Mineral Descriptions - J.F. Gilfillan &amp; Assoc. Report E3/81/275

Ground Magnetic Profiles.

003

114004



PROJECT: GORDON LIMESTONE J.V.		
<b>LOCATIONS</b>		
Compiled: S.T.	Date	PLAN NO
Drawn: R.J.R.	Scale	Fig. 1

## 1. INTRODUCTION

### 1.1. Location (See Fig. 1)

The Princess River area occupies approximately 35km<sup>2</sup> around the upper reaches of Princess River and Bull Rivulet. Part of the drainage basin of the South Eldon River is also included. The Princess River Basin lies 5km north of the Lyell Highway and 14km east of Queenstown. Access to the area is by helicopter. A walking track provides emergency foot access to the area.

### 1.2. Previous Exploration

Published geology of the area is based on field mapping by K.O. Reid (1963). Reid mapped the area as part of his B.Sc. honours project. He assigned the rocks of the area to the Siluro-Devonian Bell Shale - a sequence of dark grey shales and siltstones with occasional thin limestone units and pyritic shales.

In 1967-68, Pickands Mather (Smith, 1968) carried out reconnaissance stream sediment sampling which was followed up by more detailed stream sediment sampling with limited rock chip and soil sampling. Samples were analysed for Cu, Pb, Zn, Ni and cold extractable Cu by A.A.S. techniques. Stream sediment sample analyses returned several elevated lead and zinc values within a high background. Neither the elevated results nor the high background were explained by the soil or the rock chip geochemistry.

In 1983-84, E.Z. field crews carried out a programme of stream sediment sampling, rock chip sampling and reconnaissance geological mapping. Work completed and results received are detailed in E.Z. report T183 (Mathison, 1984).

E.Z. sampling results confirmed the Pickands Mather results. Stream sediment samples reported high lead, zinc and manganese within a high background. Rock chip samples reported base metal values within the range of the "Average Shale" of Hawkes & Webb, 1962, and Levinson, 1980. Barium results,

005

however, were consistently 2 to 5 times higher than the "Average Shale" with a peak of 1.08%. Although manganese scavenging and base metal enrichment in a muskeg type environment appeared to be possible explanations for the elevated stream sediment geochemistry, the possibility of a source related to significant mineralisation had not been adequately tested.

1.3. Aims of Exploration

The aim of the 1984-85 exploration programme was to determine whether the anomalous lead-zinc stream geochemistry was related to significant base metal mineralisation. The notional target was sediment hosted exhalative base metal mineralisation.

2. WORK COMPLETED OCTOBER, 1984 - JUNE, 1985

2.1. Reconnaissance Exploration

Stream sediment sampling, rock chip sampling and reconnaissance geological mapping were extended to the Bull Rivulet and South Eldon drainage. Tributaries of the Princess River not sampled in 1983-84 were sampled. For this programme a camp was established on the Princess River and a walking track was cut from the Princess River sawmill to the headwaters of the Princess River.

Stream sediment samples were wet sieved on site to -1mm. The dried sample was submitted to Analabs, Burnie, where the -80# fraction was analysed for Cu, Pb, Zn, Ag, Fe, Mn and Ba. Ba was determined by X.R.F. Other elements were determined by A.A.S. following nitric/perchloric digestion.

Rock samples were also analysed by Analabs for Cu, Pb, Zn, Ag, Fe, Mn and Ba. Methods were as for stream sediments except that a total digestion using mixed acids was used.

Panned concentrates were produced by reducing a sieved stream sediment sample by panning to approximately 1% of its original volume. Concentrates were submitted for T.B.E. separation and microscopic identification of heavy minerals.

Results of this programme were not conclusive. A follow up programme was initiated.

## 2.2. Track Cutting

Five east-west grid lines were cut from the walking track. Lines were designed to cross both the alluvial flats of the Princess River and the ridge between the Princess River and Bull Rivulet - known locally as Middle Hill. Planned line spacings ranged from 500m to 1km. A total of 7.7km of grid was pegged at 20m slope corrected intervals.

## 2.3. Geological Mapping and Rock Chip Sampling

All grid lines, the walking track and major streams in the gridded area were mapped and sampled. Rock samples were selected from outcrops at intervals of 100m to 200m or wherever "different" lithologies were observed. Additional stream sediment samples and some panned concentrates were collected from sites where grid lines crossed streams with an active lead load.

## 2.4. Soil Geochemistry

Soil samples were collected from two lines across Middle Hill and from part of a third line. A hand auger was used to collect nominal C horizon samples from the soil/bedrock interface. At sample locations where no soil was developed rock chip samples were collected.

Dried samples were submitted to Analabs, Burnie where the whole sample was crushed and analysed for Cu, Pb, Zn, Fe and Mn. All elements were determined by A.A.S. following total dissolution in mixed acids.

### 2.5. Deep Bedrock Sampling

Deep bedrock samples were collected from two lines across the Princess River flats and from one line across the Middle Hill. A Munrow flow through sample tube and a Wacker portable percussion drill were used to collect a small sample of weathered bedrock from depths up to 17.2m. These samples were submitted to Analabs to be analysed for Cu, Pb, Zn, Fe and Mn. Analytical methods were the same as for soil samples.

### 2.6. Geophysics - Ground Magnetism

The total magnetic field was read at 10m station intervals along all grid lines. A Lamontagne GSM 18 magnetometer was used as an automatic base station. Data from two lines were collected using a Lamontagne GSM 18 magnetometer in a field mode.

Other lines were read using a Geometrics G 816 magnetometer. Data from the two northernmost lines were lost due to battery failure of the Lamontagne instrument. These instruments require 240V A.C. supply for effective operation under camp conditions.

## 3. RESULTS RECEIVED

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

The Princess River area is underlain by a monotonous sequence of dark grey to black cleaved shale and siltstone. Occasional thin sandstone units and one thin limestone unit were mapped. In most areas the cleavage is strongly developed and approaches slaty cleavage in places. Towards the northern end of the Princess River Basin, along line 46,000N, the siltstones are less cleaved, appear siliceous or cherty, and break with a conchoidal fracture. Thin pyritic siltstone beds were sampled in this area.

Bedding and cleavage orientations were measured at most sample sites. These indicate folding around north-south axes in the south trending more NNW to the north. The absence of recognizable marker beds prevents closer definition of the structure. However, the Princess River appears to follow the trough of a syncline with the steep slope to the west and the gentler slope to the east following dip slopes.

Surficial manganese-iron oxide deposits were noted in the soil profile when line 45,000N was soil sampled. Similar manganese-iron oxides, manganiferous wads, were sampled in most small streams draining Middle Hill and the east-west ridge north of line 46,000N.

Dolerite boulders were observed in Bull Rivulet and many panned concentrates contained abundant clinopyroxene, and olivine. These are possibly reworked from glacial deposits derived from further north. Rounded quartzite boulders mapped along the crest of Middle Hill also suggest glacial deposition.

3.2. Stream Sediment Geochemistry (See Data Sheets - Appendix and Plates PR 2-6)

Sample details and analytical results for the 85 stream sediment samples collected in 1985 are listed on data sheets in the Appendix. Sample locations and results for Pb, Zn, Mn and Ba have been plotted on base maps. Results are summarized below.

Element	Range	Stream Sediment Sampling n = 85		
		Mean	?Anomalous	No Anomalous
Cu	5-305	70	>140	9
Pb	35-695	240	>500	11
Zn	55-1950	340	>700	12
Ag	<0.5-2.0	-	2.0	5
Fe	1.15-8.00%	3.55%		
Mn	0.01-12.0%	1.40%		
Ba	350-2650	950		

As can be seen from the data sheets and the summary above, Cu, Pb, Zn and Mn results are variable, have a very high background and suggest "anomalous" levels that are much higher than usual in Western Tasmania. However, all high lead and/or zinc values are associated with high Mn and/or Fe values. To examine these correlations in more detail several pairs of metal values were plotted on log-log graph paper. Correlation diagrams were prepared for Zn and Pb, Pb and Cu, Mn and Zn, Mn and Pb and Pb and Fe. 1983-84 results were used in addition to 1984-85 results (See Fig. A1 - A5 in Appendix). These correlation diagrams suggest:-

Fig. A1 - there is little correlation between Pb and Zn values.

Fig. A2 - there is good correlation between Cu and Pb values.

Fig. A3 - there is good correlation between Zn and Mn values.

Fig. A4 - there is good correlation between Pb and Mn values.

Fig. A5 - there is little correlation between Pb and Fe values.

These plots are sufficient to demonstrate the strong relationship between Cu, Pb and Zn values and Mn values.

On Plates PR 2, 3 and 6 Pb, Zn and Mn values suggest possible sources of Pb, Zn and Mn on Middle Hill and the ridge north of the Princess River Basin. Follow up exploration tested this area.

### 3.3. Rock Chip Sampling (See Data Sheets - Appendix and Plates PR 2 - 6)

Sample descriptions and analytical results are listed on data sheets in the appendix. Sample locations are shown on Plate PR 5 and results for Pb, Zn, Mn and Ba have been plotted on base plans. Rock samples collected are separated into four main groups, "ordinary" rocks, pyritic siltstone, vein quartz and iron or manganese rich rocks. Results for these four groups are summarized below.

7.

<u>"Ordinary" Rocks n = 74</u>				
Element	Range	Mean	Average Shale Hawkes & Webb '62	Average Shale Levinson '80
Cu	5-70	25	30-150	50
Pb	5-65	35	20	20
Zn	5-230	70	50-300	100
Ag	0.5-1.0			0.05
Fe	0.99-6.78%	3.7%	4.3%	
Mn	35-3880*	300		
Ba	633-2600	1050	300-600	700

\* Mn stains noted on fracture surfaces of some samples.

<u>Pyritic Shales n = 3</u>		
Element	Range	? Anomalous
Cu	50-180	
Pb	20- 50	
Zn	120-190	
Fe	11.37-22.93%	
Mn	135-2100	
Ba	205-1060	
Au	<0.008	

<u>Vein Quartz n = 5</u>	
Element	Range
Cu	<5-10
Pb	<5-15
Zn	5-35
Fe	0.43-2.13%
Mn	65-2000
Ba	17-96
Au	<0.008

(Elevated Fe & Mn due to selection of 'rusty quartz' wherever possible.)

Manganiferous & Limonitic Wads and Ironstones n = 19

Element	Range
Cu	10-180
Pb	<5-235
Zn	115-2275
Ag	<0.5
Fe	4.08-25.93%
Mn	(0.03*) 2.25-29.5%
Ba	972-10,400

\*Two poorly consolidated sediments cemented by limonitic reported 300 & 550 ppm Mn.

The above summaries indicate that no 'ordinary' rocks were in any way anomalous. The only anomalous base metal values were obtained from spongy manganiferous wads which are recent deposits in stream channels. Similar material developed in soil profiles also reported elevated base metals (see Section 3.4).

### 3.4. Soil Geochemistry (See Data Sheets - Appendix and Plates PR 7, 8 & 9)

Soil sample results are summarized below:-

<u>Soil Geochemistry n = 99</u>				
Element	Range	Mean	?Anomalous	No. Anomalous
Cu	<5-125	20	>80	1
Pb	<5-80	30		
Zn	<5-645	25	>150	2
Fe	0.15-18.39%			
Mn	<0.01-22.5%			

All possibly anomalous values above are associated with high manganese. Soil sampling of line 45,000N revealed a soil horizon enriched in manganese. From 4,320E to 4,920E manganese values ranges from 0.5-22.5%. The three elevated base metal values come from this area.

### 3.5. Deep Bedrock Sampling (See Data Sheets - Appendix and Plates 7, 8 and 9)

Analytical results for samples from the Wacker drill are summarized below:-

<u>Wacker Sampling n = 58</u> (13 samples not bedrock)			
Element	Range	Mean	?Anomalous
Cu	10-115	40	-
Pb	10-75	30	-
Zn	10-345	100	-
Fe	1.39-9.89%		
Mn	40-9490		

These results are similar to the results for "ordinary" rocks (see Section 3.3).

There are no apparent differences between samples from under the Princess River flats and samples from the ridge of Middle Hill.

## 4. DISCUSSIONS AND CONCLUSIONS

Stream sediment geochemistry suggested sources of lead, zinc and manganese along a line of ridges east and north of the Princess River basin. These results appeared similar to results from the White Spur area south of Rosebery where an area with highly anomalous Pb, Zn and Mn values was developed at the change of slope of a steep ridge (see Russell & Van Moort, 1981). The primary source of these elements was the significant volcanogenic base metal mineralisation of South Hercules. Streams draining this soil anomaly also report highly anomalous Pb, Zn and Mn values while streams draining the actual host rocks are weakly anomalous in Pb and Zn only.

At Princess River no primary source of base metals was detected on the ridges. A source in manganiferous soil profiles is suggested. The primary source of this material is unknown. No local source was detected.

Deep sampling under the Princess River flats revealed no indications of mineralisation in this area.

## 5. RECOMMENDATIONS

Residues of stream sediment samples are to be submitted for lead isotope, microscopic and electron microscope analyses. If the results of these analyses suggest either a transported origin for the Princess River base metals or manganese scavenging of base metals in streams, no further work is recommended.

## 6. CITED REFERENCES

HAWKES, H.E. and WEBB, J.S., 1962

Geochemistry in Mineral Exploration.

Harper & Row, New York.

LEVINSON, A.A., 1980

Introduction to Exploration Geochemistry 2nd Edition

Applied Publishing Ltd., Wilmette.

MATHISON, I.J., 1984

Princess River Area - Progress Report on Exploration Activity

1st October, 1983 to 30th March, 1984.

E.Z. Report No. T183.

RUSSELL, D.W. & Van MOORT, J.C., 1981

Biogeochemistry and Pedogeochemistry of the White Spur Area,  
near Rosebery, Tasmania.

Econ. Geol. v76, p339-349

- 014
- FIGURE A1. Correlation Diagram Zn and Pb  
A2. Pb and Cu  
A3. Mn and Zn  
A4. Mn and Pb  
A5. Pb and Fe

3 Cycle by 4 Cycle Log-Log

015

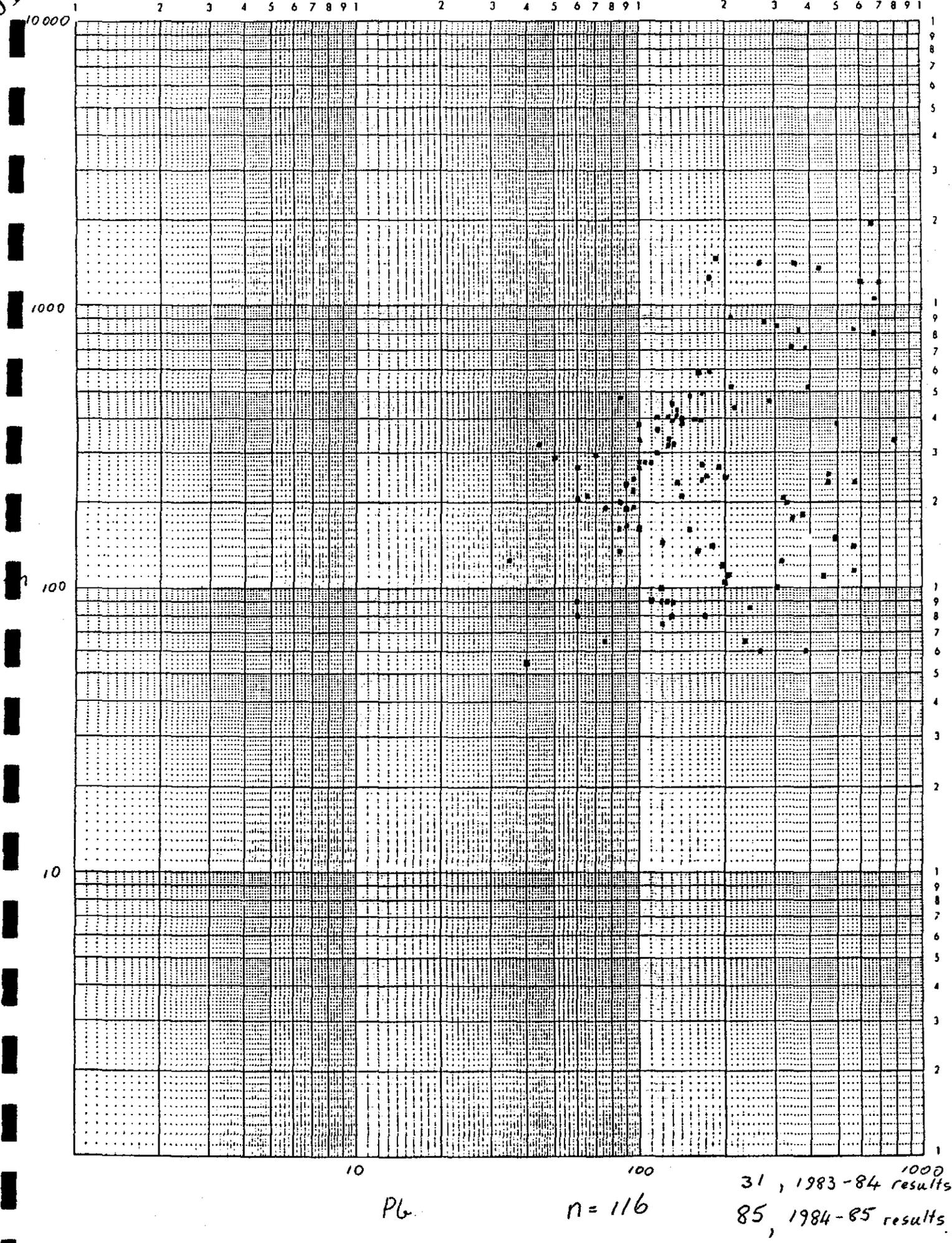


Fig. A1. - Correlation Diagram Zn and Pb - Princess River Stream Sediments

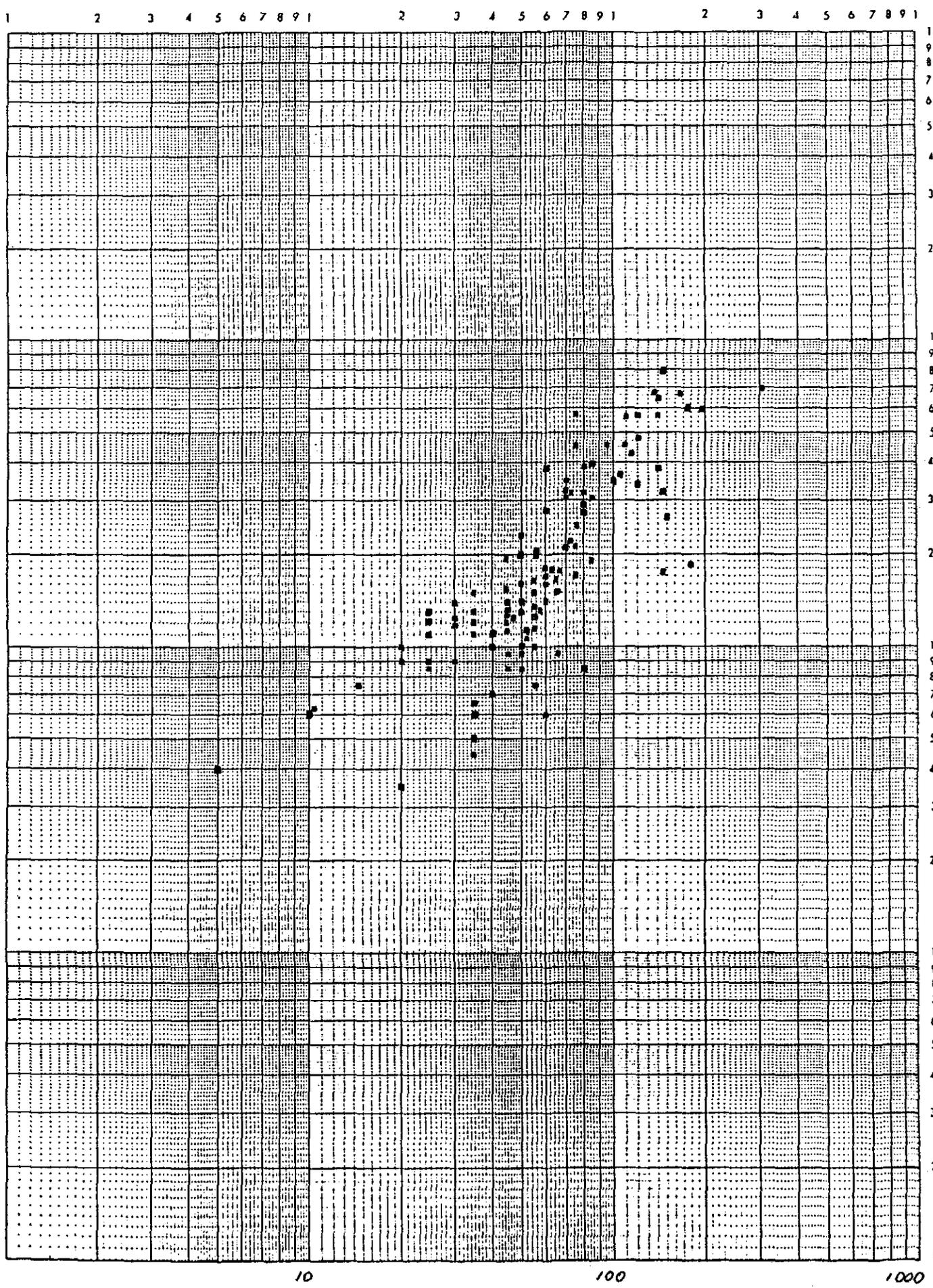
3 Cycle by 4 Cycle Log Log

016

1000

Pb 100 ppm

10



Cu ppm

n = 116

Fig. A2. - Correlation Diagram Pb and Cu - Princess River Stream Sediments

017

3 Cycle by 4 Cycle Log-Log

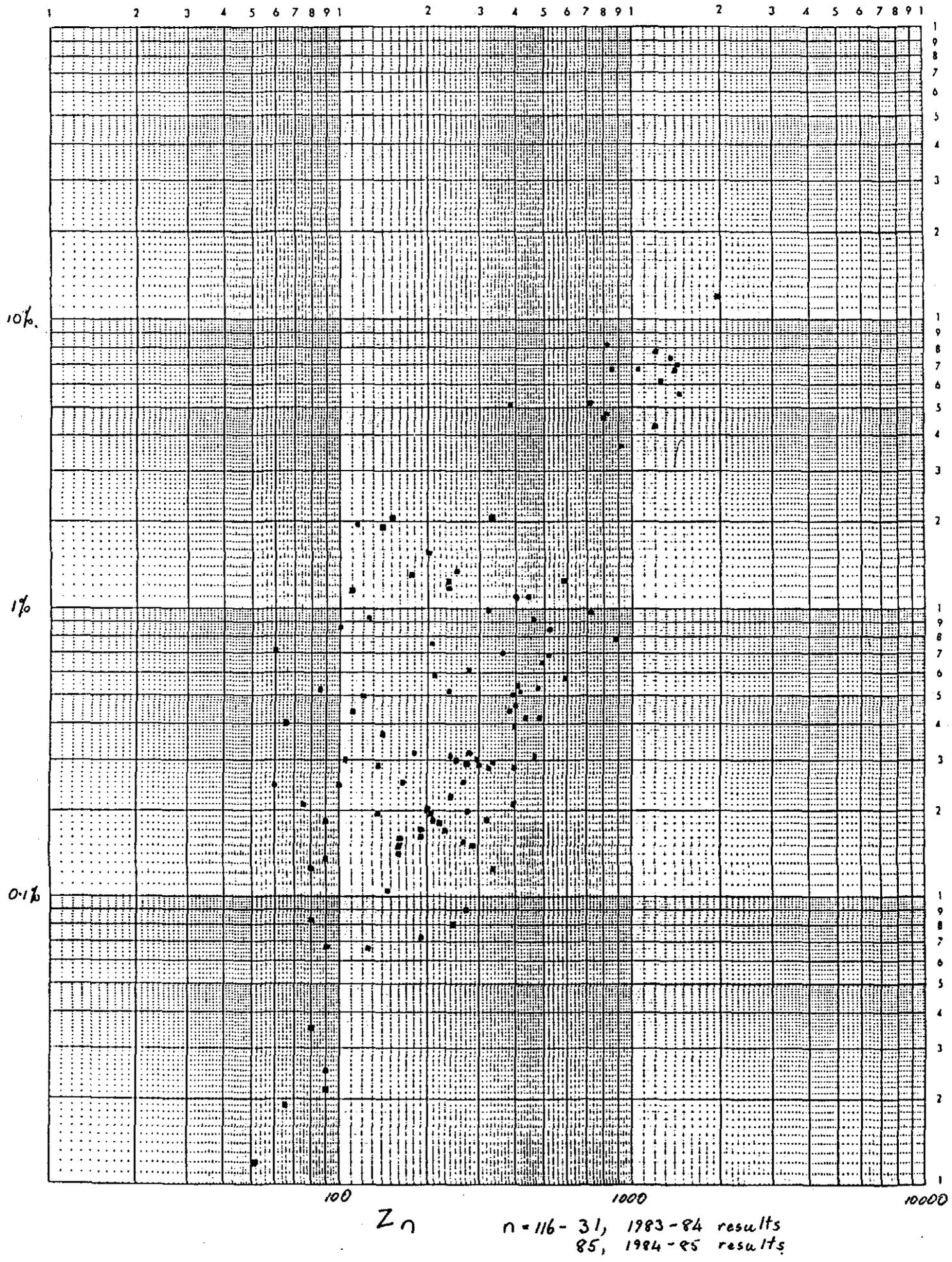


Fig. A3. - Correlation Diagram Mn and Zn - Princess River Stream Sediments

114018

3 Cycle by 4 Cycle Log-Log

018

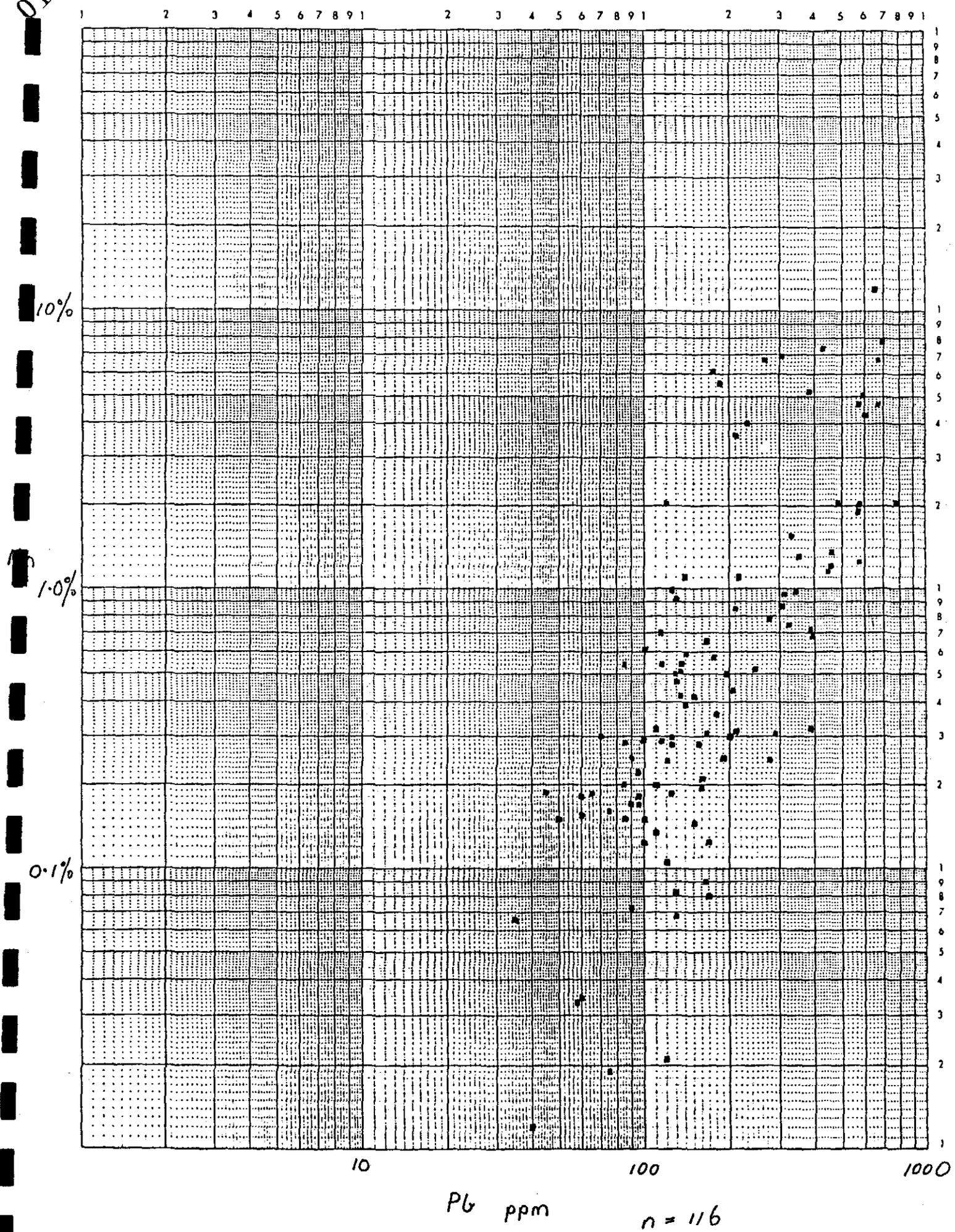
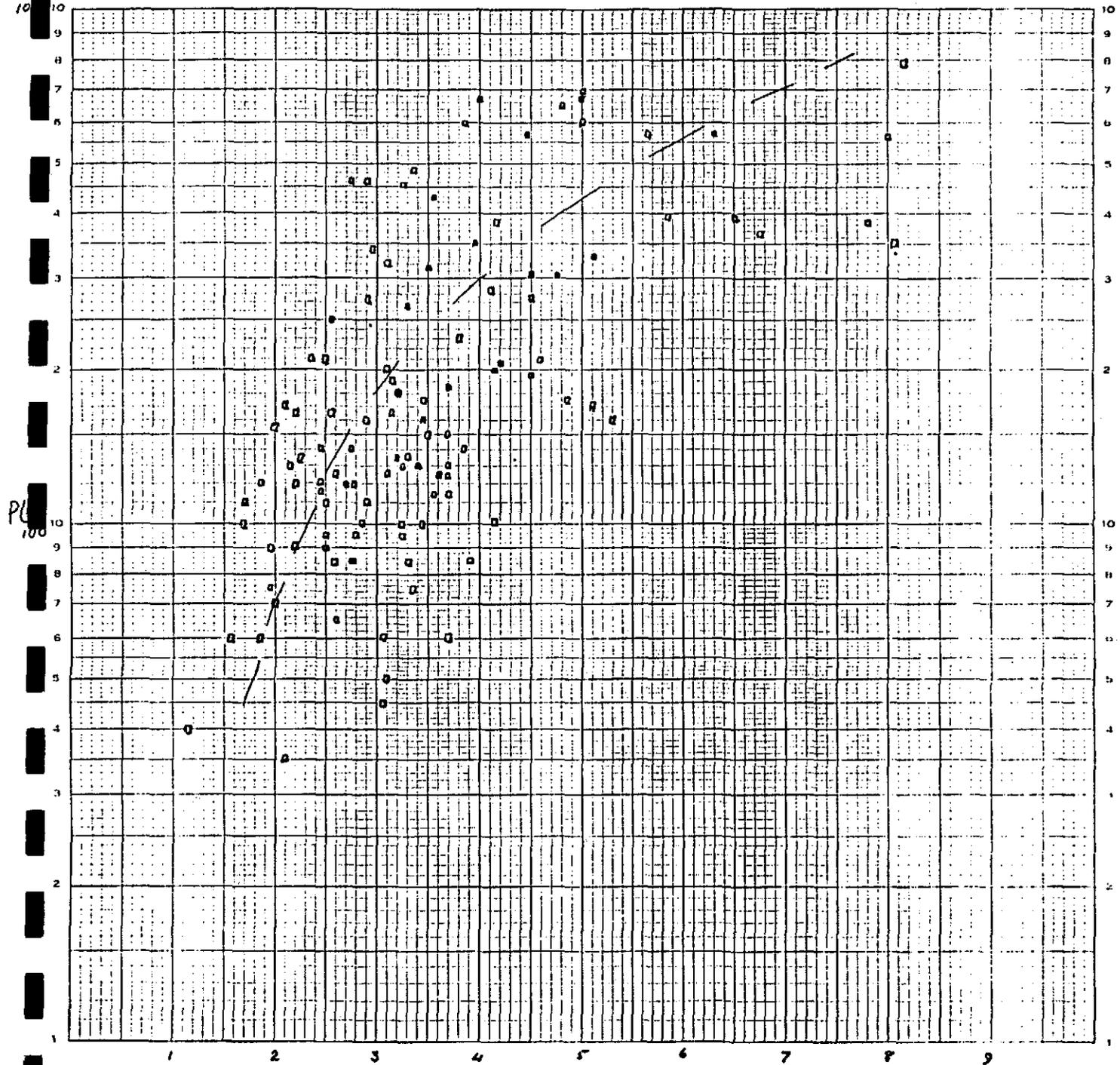


Fig. A4. - Correlation Diagram Mn and Pb - Princess River Stream Sediments.

019



Fe.      n = 116  
31, 1983-84 results  
85, 1984-85 results

ARCUS No. 5L

Fig. A5. - Correlation Diagram Pb and Fe - Princess River Stream Sediments

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APPENDIX

Stream Sediment Sample Data Sheets

Soil Sample Data Sheets

Deep Bedrock Sample Data Sheets

Rock Sample Data Sheets

petrological Report - C.M.S. 85/2/16

Heavy Mineral Descriptions - J.F. Gilfillan & Assoc. Report E3/81/275

Ground Magnetic profiles

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

GEOCHEMICAL SAMPLE DATA SHEET

PROJECT: *Conifer hst.*  
LOCALITY: *Phonass*  
GRID NAME: .....  
NOMINAL GRID AZIMUTH: .....

MATERIAL: Stream Sediments  
SAMPLE METHOD: .....  
SAMPLED BY: .....  
DATE: .....

SIZE FRACTION ANALYSED: *..80 mesh*  
ANALYSED BY: .....  
METHOD: *A.A.S. Sp. W. by X.R.F.*  
*~ Bn "*

SAMPLE NUMBER	SAMPLE LOCATION DATA			STREAM DATA			COMPOSITION DATA				METAL CONTENT (ppm unless specified)									
	GRID LINE NO.	A.M.G. CO-ORDINATES		Dir. Order Direction of Flow	Width	Active Stream Load	Clay	Sand	Rock Frag.	Organic	CONTAM.	Geology	Cu	Pb	Zn	Ag	Au	Fe	Mn	Ba
	GRID EASTING	NORTHING	EASTING																	
33	66035				1			103060					55	150	480	1.0		X 3.50%	4200	830
36	037				1			56030					40	110	275	0.5		X 2.90%	3200	940
35	038				1			106035					60	175	590	1.0		X 3.45%	5750	920
37	040				1			106035					45	125	330	1.0		X 3.10%	2950	940
38	041				1			56530					55	125	325	0.5		X 2.60%	2750	920
39	043				1			5050					45	115	300	1.0		X 2.45%	2850	890
27	045				1								85	395	520	0.5		X 5.85%	6900	460
28	047				1			5050					80	285	465		X	X 4.10%	3100	760
26	048				1			203050					120	340	720	1.0		X 2.95%	9700	900
25	050				1								175	600	1200		X	X 5.00%	4300	1350
24	051				1			107020					145	320	205	0.5		X 3.10%	7450	690
523	053				1			3070					55	115	360		X	X 3.70%	7000	880
52	056				1			56530					40	100	335	0.5		X 2.85%	1250	1150
53	057				1			106030					35	60	265	1.0		X 3.05%	1550	1200
51	060				1			56530					35	50	285	0.5		X 3.10%	1500	1300
50	062				1			5050					35	45	320	0.5		X 3.05%	11850	1280
9	065				4			105040					35	210	55		X	X 2.85%	7200	760
8	066				2			204040					55	315	80		X	X 3.45%	1200	824
7	069				1/2			101080					110	415	150		X	X 3.45%	245%	1190
6	071				1			101080					120	600	160		X	X 4.60%	365%	1280
504	073				1/2			10107010					95	430	75		X	X 3.60%	155%	1110
505	076				1/2			30105505					55	215	55		X	X 4.10%	5600	994
91	089				1/2			20106010					30	60	210		X	X 2.40%	560	1120
57	092				1/2			5207005					120	300	620		X	X 3.10%	300%	1360
RPT	1065												35	215	60		X	X 2.95%	7250	

022

E.Z. Co. Asia  
ROSEBERY, Tasmania

GEOCHEMICAL SAMPLE DATA SHEET

PROJECT: Gordon Res.  
LOCALITY: Princess  
GRID NAME:  
NOMINAL GRID AZIMUTH:

MATERIAL: Stream Sediments  
SAMPLE METHOD:  
SAMPLED BY: S. C. R. M., F. M., A. V. M.B.  
DATE:

SIZE FRACTION ANALYSED: -30 mesh  
ANALYSED BY:  
METHOD: A.A.S. So. W. by X.R.F.

SAMPLE NUMBER	SAMPLE LOCATION DATA				STREAM DATA				COMPOSITION DATA				METAL CONTENT (ppm unless specified)									
	GRID LINE NO.				Str. Order	Direction of Flow	Width	Active Stream Load	Clay	Sand	Rock Frags.	Organic	CONTAM.	Geology	Cu	Pb	Zn	Ag	Au	Fe	Mn	Ba
	GRID EASTING	NORTHING	EASTING	N																		
57	65	940	1		15	N	5							80	125	1450	2.0		X3-70%	5.50%	2100	
51	0	941	1		20	N	5		55	50				75	570	115	0.5		X6-30%	1.95%	380	
1		943	1		20	N	10		55	55	0			70	350	175	0.5		X3-75%	1.30%	550	
2		944	1		25	N	10		55	55	0			70	305	1000	0.5		X4-50%	8600	750	
3		945	1		25	N	10		53	66	0			80	315	125	0.5		X3-50%	9300	770	
4		946	1		30	N	10		54	55	0			55	205	110	1.0		X4-20%	4600	1110	
5		947	1		30	N	10		54	55	0			60	180	140	0.5		X3-20%	3600	830	
6		948	1		21	N	5		55	55	0			75	250	85	X		X2-55%	5200	630	
7		949	1																			
87	66	001	1		20	N	10		55	65				85	306	850	2.0		X4-75%	6.85%	1900	
4	82	002	1		10	N	10		40	60				25	85	135	0.5		X2-75%	2850	510	
83		005	1		1	N	10		66	30				30	125	90	1.0		X3-60%	1850	710	
84		006	1		1	N	10		60	30				45	175	120	1.0		X4-50%	5000	930	
85		007	1		2	N	10		60	70				70	330	200	1.0		X5-10%	1.55%	950	
86		008	1		2	N	10		60	70				35	120	75	1.0		X2-70%	2100	800	
88		010	1		2	N	10		50	50				115	430	1350	1.5		X3-55%	7.40%	2650	
90		012	1		2	N	10		50	40				140	650	1950	2.0		X4-80%	12.0%	2600	
* 89		014	1		10	N	10		70	30				30	140	210	1.0		X2-75%	5850	640	
81		016	1						50	50				25	90	165	X		X2-20%	2500	520	
		018	1		1	N	10		60	30			X	20	35	125	0.5		X2-10%	660	410	
5	18	023	1						10	20	70			45	120	90	0.5		X2-75%	215	770	
19		024	1		3	N	10		70	20	0			45	85	475	0.5		X3-80%	5350	1050	
21		026	1		2	N	10		20	70	0			60	170	80	0.5		X5-10%	1250	580	
20		027	1		3	N	10							55	115	405	1.0		X3-55%	5400	970	
22		028	1						50	50				60	135	430	0.5		X3-20%	4200	760	
29		029	1		1	N	10		30	70				45	95	240	X		X2-50%	2250	1050	
30		030	1		4	N	10		55	45				50	95	220	0.5		X2-80%	1800	920	
31		031	1		2	N	10		55	30				45	135	235	X		X3-30%	5150	450	
32		033	1		2	N	10		60	30				50	200	250	0.5		X3-10%	3000	170	
34		034	1		X				60	40				35	65	210	1.0		X2-60%	1800	1000	

30

\* 6013 = 33489  
4

114023

023

PROJECT: Gordon Est.  
LOCALITY: Princess Est.  
GRID NAME:  
NOMINAL GRID AZIMUTH:  
MATERIAL: Stream Sediments  
SAMPLE METHOD:  
SAMPLED BY: W.M., S.C., F.M.  
DATE:  
SIZE FRACTION ANALYSED: <math>..-80\text{ mesh}</math>  
ANALYSED BY:  
METHOD: A.A.S., Sn. W. by X.R.F.

SAMPLE NUMBER	SAMPLE LOCATION DATA				STREAM DATA				COMPOSITION DATA				METAL CONTENT (ppm unless specified)									
	GRID LINE NO.		A.M.G. CO-ORDINATES		Str. Order	Dir. of Flow	Width	Active Stream	Clay	Sand	Rock Frags.	Organic	CONTAM.	Geology	Cu	Pb	Zn	Ag	Au	Fe	Mn	Ba
	N	E	NORTHING	EASTING																		
97	65	901	1			30m		W	50	50	0				20	90	190	0.5	X	1.95%	725	360
98		903	1			30m		W	50	50	0				45	125	320	1.5	X	3.70%	795	940
99		904	1			5m		W	50	50					30	90	230	0.5	X	2.50%	1700	690
500		905	1			6m		W	20	60	0				45	130	455	1.0	X	3.70%	9200	960
501		906	1			8m		W	50	60	0				40	100	275	1.0	X	3.45%	6100	930
502		909	1			5m		W	15	60	0	5			70	210	910	1.0	X	4.60%	365%	1900
503		910	1			4m		W	15	60	0	5			50	140	400	1.0	X	3.85%	110%	1100
96		911	1			5m		W	25	55	0				10	60	80	0.5	X	1.55%	355	360
95		912	1												5	60	55		X	1.15%	120	410
94		913	1			5m		W	15	60	0	5			10	60	90		X	1.85%	350	400
93		914	1			4m		W	15	60	0	5			25	120	145	0.5	X	2.20%	1050	350
92		916	1			30m		W	15	65	0				20	100	160	0.5	X	1.70%	1500	350
79		917	1			2m		W	15	60	0	5			30	120	100	1.0	X	1.85%	2450	440
78		918	1			2m		W	15	60	0	5			25	130	90	1.0	X	3.70%	1450	480
77		919	1			5m		W	15	60	0	5			35	150	160	1.0	X	3.70%	1450	480
480		922	1			2m		W	20	55	0	5			25	110	90	1.0	X	2.50%	1350	490
476		923	1			2m		W	20	55	0	5			5	75	65	1.0	X	1.95%	190	350
471		924	1			2m		W	10	20	0	5			110	565	140	1.0	X	8.00%	190%	340
472		925	1						20	10	0	10			50	230	65	0.5	X	3.80%	4000	480
470		926	1			2m		W	15	20	0	5			80	385	180	1.5	X	7.80%	3200	850
469		927	1			115	2m	W	30	50	0	5			305	695	1200	2.0	X	5.00%	7.80%	1300
468		929	1			060	2m	W	30	40	0	20			195	595	380	2.0	X	3.85%	5.05%	810
47		930	1			050	2m	W	30	40	0	20			60	385	60	1.0	X	4.15%	7150	510
43		931	1						30	30	0	10			120	570	235	1.5	X	5.65%	1.25%	780
44		932	1						10	40	0	10			60	275	60	0.5	X	4.50%	2450	650
45		933	1			150	2m	W	20	40	0	10			35	130	80	0.5	X	3.40%	830	640
46		934	1			2	2m	W	20	50	0	10			60	160	135	1.5	X	3.45%	11950	1150
54		936	1			085	1m	W	20	30	0	10			140	570	815	1.0	X	4.55%	4.75%	1440
58		937	1			160	5m	W	20	20	0	20			150	265	1400	1.5	X	3.30%	6.70%	2100
56		938	1			340	1m	W	10	30	0	10			135	670	800	1.0	X	4.00%	4.70%	1750
55		939	1			145	2m	W	20	40	0	10			165	670	1050	1.5	X	5.20%	6.75%	2000

114024

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ROSEBERRY, Tasmania

**GEOCHEMICAL SAMPLE DATA SHEET**

PROJECT: .GORDON.LIMESTONE MATERIAL: .....SOL..... SIZE FRACTION ANALYSED: ..WHOLE.....  
 LOCALITY: ..... SAMPLE METHOD: HAND AUGER ANALYSED BY: ..ANALABS.....  
 GRID NAME: PRINCESS RIVER... SAMPLED BY: ..G.B..... METHOD: ..A.A.S.....  
 NOMINAL GRID AZIMUTH: ..... DATE: .....4/85.....

SAMPLE NUMBER	SAMPLE LOCATION DATA			SAMPLE COMPOSITION DATA							Geology	METAL CONTENT (ppm unless specified)						
	GRID LINE NO.	A.M.G. CO-ORDINATES		DEPTH CM	COLOUR	Clay	Sand	Rock Frags.	Organic	CONTAM.		Cu	Pb	Zn	Ag	Au	Fe %	Mn
	43000N	NORTHING	EASTING															
64631	4660E			45	OR CR BR	35		5				20	25	X		4.59	140	
32	620			75	OR BR CR	30		10				15	30	X		6.44	5990	
33	4700			55	OR BR CR	95		5				5	10	X		2.99	80	
34	720			65	OR BR BS	5	10					15	30	X		6.89	1390	
35	740			115	GY BR OR	65	5	30				X	15	X		0.43	40	
36	760	"B"		140	BK GY	50	20	30				25	15	X		2.09	130	
37	780			50	BK BR	50	5	40	5			10	5	X		0.72	45	
38	4800			35	GY BR	35		5				X	50	X		1.09	60	
39	820			20	GY BR	65	5	30				5	40	X		1.24	30	
64640	840			0/C	PUBK			100				35	65	X		4.89	65	
41	860			20	GY BK CR	75	5	20				10	35	X		1.09	30	
42	880			0/C	BK			100				65	80	X		7.04	50	
43	4900			20	GY	85	5	10				X	10	X		0.95	20	
44	920			45	BR GY OR	70	5	25				X	20	X		3.04	45	
45	940	"B/C"		95	BR	35	5					5	15	X		3.79	80	
46	960			55	BR CR	30	5	5				5	5	X		2.59	15	
47	980			55	OR BR CR	30		10				X	5	X		2.24	10	
48	5000			15	GY BR BK	35	5	60				5	5	X		2.29	35	
64649	5020E			25	CR BR OR	75	5	20				80	35	X		7.69	45	

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 ROSEBERRY, Tasmania

**GEOCHEMICAL SAMPLE DATA SHEET**

PROJECT: *GORDON LIMESTONE* MATERIAL: *SOIL* SIZE FRACTION ANALYSED: *WHOLE*  
 LOCALITY: ..... SAMPLE METHOD: *HAND AUGER* ANALYSED BY: *ANALABS*  
 GRID NAME: *PRINCESS RIVER* SAMPLED BY: *G.B.* METHOD: *A.A.S.*  
 NOMINAL GRID AZIMUTH: ..... DATE: *4/85*

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
	43500N	GRID EASTING	NORTHING	EASTING															
64650	4000E				15	GYBR60	20	20					X	15	X			0.16	10
51	20				45	GY	60	20	20				X	10	X			0.19	15
52	40				25	GY	50	20	30				5	5	X			0.75	10
53	60				25	GYBR55	540						10	30	X			2.04	35
54	80				20	GYCRBK70	10	20					X	5	X			1.00	15
55	4100				100	GYBR55	540						5	20	15			1.24	60
56	120				01C	BR		100					35	55	X			1.00	30
57	140				85	GYBR75	520						15	35	25			1.49	85
64658	4160				01C	BR		100					40	30	X			3.99	45
64659	4220				15	GYBR80	10	5	5				20	60	X			1.29	25
60	240				75	ORGYBR95		5					5	20	X			1.84	40
61	260				15	GYBR90		5	5				5	40	X			0.32	30
62	280				15	GYBR90		5	5				25	50	X			0.60	30
63	4300				45	GYBR95		5					20	20	X			2.69	105
64664	4320				55	ORGYBR85	510						20	45	X			3.49	280

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GEOCHEMICAL SAMPLE DATA SHEET

PROJECT: GORDON LIMESTONE  
LOCALITY: .....  
GRID NAME: PRINCESS RIVER..  
NOMINAL GRID AZIMUTH: .....

MATERIAL: .....SOIL.....  
SAMPLE METHOD: HAND AUGER.....  
SAMPLED BY: .....S.B.....  
DATE: .....4/85.....

SIZE FRACTION ANALYSED: .....WHOLE.....  
ANALYSED BY: .....ANALAB.....  
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																
64665	4060E				120	CROR BR 95			5				5	40	X			1.09	105
66	80	"B/C"			135	GY BK 100							30	15	35			2.59	3090
67	4100				450	CR CR BK 95			5				5	15	X			0.90	40
68	120	"B/C"			25	GY WH 40 30 30							X	X	X			0.24	40
69	140				35	GY WH BR 85	5	10					5	5	X			1.69	175
64670	160	"B/C"			55	GY BK	5	10 40					10	15	X			0.70	90
71	180	"B/C"			85	BK	20	30 50					30	20	110			2.64	245
72	4200				50	GY BR 50 12 40							5	10	25			0.32	40
73	220	"B"			35	CR BK 70	5	25					5	20	100			1.09	70
74	240	"B/C"			35	CR OR BR 55	5	40					5	X	25			1.94	50
75	260				15	CR BR	70	30					5	5	5			0.32	55
76	280				35	OR BR 90		10					5	20	10			2.84	250
77	4300	"B/C"			450	CR CR BR 65	5	30					X	10	25			1.29	70
78	320	"B/C"			135	BR DK BR 95	5						10	20	X			3.09	4040
79	340				85	BR DK BR 95	5						25	45	X			7.54	6490
64680	360				50	BR BK 85		15					35	55	50			6.64	5.64%
81	380				100	GY BR 60		40					40	30	20			4.34	1.49%
82	4400				100	BK GY BR 45	5	50					45	35	50			4.24	1.34%
83	420				85	GY BK BR 35	5	60					40	30	25			3.84	1.39%
84	440				45	BK BR 35	5	60					50	35	50			3.79	2.64%
85	460				50	BK DK BR 75	5	20					50	35	645			3.39	22.5%
86	480				35	OR BR 80		20					25	45	X			3.59	3990
87	4500				90	BR CR BR 70		30					45	35	25			4.84	109%
88	520				65	DK BR BR 80		20					125	35	110			4.34	5.64%
89	540				90	BR BR 75		25					45	30	50			5.09	204%
64690	560				15	BK		100					65	35	270			18.39	21.5%
91	580				110	DK BR 40		60					50	35	25			6.09	3.34%
92	4600	"B/C"			80	DK BR 80		20					40	45	X			4.94	2.59%
93	620				130	DK BR GY 70		30					55	40	55			4.84	2.79%
64694	4640				95	DK BR 90		10					40	55	60			5.39	3.69%

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

**GEOCHEMICAL SAMPLE DATA SHEET**

PROJECT: GORDON LIMESTONE MATERIAL: .....SOIL..... SIZE FRACTION ANALYSED: .....WHOLE.....  
 LOCALITY: ..... SAMPLE METHOD: HAND. AVER. ANALYSED BY: .....ANALABS.....  
 GRID NAME: PRINCESS RIVER. SAMPLED BY: .....G.B..... METHOD: .....A.A.S.....  
 NOMINAL GRID AZIMUTH: ..... DATE: .....4/85.....

SAMPLE NUMBER	SAMPLE LOCATION DATA				SAMPLE COMPOSITION DATA							METAL CONTENT (ppm unless specified)							
	GRID LINE NO.	A.M.G. CO-ORDINATES			DEPTH	COLOUR	Clay	Sand	Rock Frags.	Organic	CONTAM.	Geology	Cu	Pb	Zn	Ag	Au	Fe %	Mn
	GRID EASTING	NORTHING	EASTING	Geology															
64695	4660E				100	DKBR100							40	55	10			51.94	22.4%
64697	4720	"B/C"			135	BRDKBR95		5					45	50	35			6.09	1.94%
	93	740			135	BRBK95		5					40	45	30			5.04	1.74%
	99	760			20	BRBK30		70					55	60	30			4.24	2.54%
64700	780				20	KDKBR50		50					55	85	110			5.44	13.5%
66101	4800				80	BRBK	40	60					40	50	40			6.34	2.99%
	2	820			100	BRDKBR50		50					50	35	100			4.34	3.09%
	3	840			85	GYBR50		50					45	35	50			4.64	1.39%
	4	860			65	GYBRBK50		50					40	45	35			4.29	9.390
	5	880			90	GYBRBK70		30					30	35	20			3.74	5.390
	6	900	"B/C"		120	GYBRBK90		10					50	40	50			4.59	2.64%
66107	4920	"B/C"			130	BRDKBR95		5					55	45	80			5.39	2.44%
66108	5080				45	GYBK75		520					5	40	20			1.54	1.50

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GEOCHEMICAL SAMPLE DATA SHEET

PROJECT: ..... GOADBY LIMESTONE .....  
LOCALITY: ..... PRINCESS RIVER .....  
GRID NAME: .....  
NOMINAL GRID AZIMUTH: .....

MATERIAL: ..... BEDROCK .....  
SAMPLE METHOD: ..... WACKER .....  
SAMPLED BY: ..... NICK POLTOCK .....  
DATE: ..... APRIL 1985 .....

SIZE FRACTION ANALYSED: ..... WHOLE .....  
ANALYSED BY: ..... ANALABS .....  
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 m	COLOUR	Clay	Sand	Rock Frags.	Organic	Bed Rock	WEATHERED	Cu	Pb	Zn	Ag	Au	Fe %	Mn
	43000N	GRID EASTING	NORTHING															
65176	5040			12.0	BK			✓			✓	35	20	180			3.64	450
77	5060			5.9	BK			✓			✓	40	30	145			4.59	1240
78	5080			4.4	BKGN			✓			✓	40	30	135			4.49	3140
79	5100			8.8	BK	✓		✓			✓	40	35	170			4.24	2090
80	5120			9.7	BK	✓		✓			✓	40	30	150			3.74	1990
81	5140			15.0	BK	✓		✓			✓	35	30	135			3.99	2140
82	5160			14.8	BK	✓	✓	✓			✓	40	30	170			3.99	1990
83	5180			13.0	BK	✓		✓			✓	40	30	150			4.84	2940
84	5200			16.6	BK	✓		✓			✓	35	30	145			3.99	2390
85	5220			14.9	BK			✓			✓	30	30	110			3.84	2190
86	5240			15.3	BK	✓		✓			✓	30	25	100			3.84	1690
87	5260			15.1	BK	✓		✓			✓	40	25	140			4.04	2690
88	5280			16.1	BK	✓		✓			✓	35	30	100			3.79	2240
89	5300			13.4	BK	✓		✓			✓	30	20	80			3.64	2190
90	5320			11.8	BK	✓		✓			✓	35	30	100			3.54	1990
91	5340			12.7	TAN	✓		✓			✓	30	25	120			4.64	680
92	5360			12.8	BK			✓			✓	30	20	35			4.19	1440
93	5380			12.2	BK	✓		✓			✓	35	30	115			4.09	2290
94	5400			11.7	BK	✓	✓			NO	✓	35	30	130			4.09	2890
95	5420			14.4	BK	✓	✓			NO	✓	35	25	160			3.89	1490
96	5440			15.9	BK	✓		✓		NO	✓	40	35	170			4.29	2440
97	5460			17.2	BK	✓	✓	✓		NO	✓	30	30	125			3.79	95
98	5480			12.6	BK			✓			✓	50	45	345			7.44	280
99	5500			11.2	TAN			✓			✓	45	35	185			8.39	265
65200	5520			3.6	BK	✓		✓			✓	30	35	220			4.54	185
64401	5540			2.467	TAN			✓			✓	40	30	155			6.19	225

E.Z. Co. of A'Asia Ltd.,  
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GEOCHEMICAL SAMPLE DATA SHEET

PROJECT: GORDON LIMESTONE MATERIAL: BED ROCK SIZE FRACTION ANALYSED: WHOLE  
 LOCALITY: ..... SAMPLE METHOD: WACKER ANALYSED BY: ANALABS  
 GRID NAME: PRINCESS RIVER SAMPLED BY: POLTACK METHOD: A.A.S.  
 NOMINAL GRID AZIMUTH: ..... DATE: 4-85

SAMPLE NUMBER	SAMPLE LOCATION DATA				SAMPLE COMPOSITION DATA							METAL CONTENT (ppm unless specified)							
	GRID LINE NO.	A.M.G. CO-ORDINATES			DEPTH	COLOUR	Clay	Sand	Rock Frags.	Organic	Bad Rock	New Material	Cu	Pb	Zn	Ag	Au	Fe%	Mn
	43500N	GRID EASTING	NORTHING	EASTING															
64402	4860E				0.3	BKGY	✓		✓			✓	30	30	125			3.84	130
403	840				0.5	BK			✓			✓	25	10	20			3.09	60
404	820				14.8	BK	✓		✓			✓	35	25	120			3.49	2090
405	4800				4.2	BK	✓	✓	✓			✓	35	15	70			3.49	1640
406	780				3.8	BK			✓			✓	25	20	55			3.09	1840
407	760				0.8	BKBR	✓		✓			✓	45	30	35			3.09	120
408	740				0.7	BKBRGY	✓		✓			✓	40	30	45			3.94	125
409	720				8.3	BK			✓			✓	40	25	120			4.34	200
64410	4700				3.0	BKNGY			✓			✓	35	25	220			3.29	170
411	680				0.6	BK			✓			✓	30	50	25			3.44	95
412	660				0.5	BKBR			✓			✓	35	35	20			2.79	40
413	640				0.8	BK			✓			✓	10	25	10			1.39	100
414	620				0.5	BKBR			✓			✓	50	45	55			5.64	550
415	4600				1.4	BKGYGN			✓			✓	30	25	50			3.04	1390
416	580				3.4	BKLTGN			✓			✓	40	30	120			3.64	4290
417	560				6.2	BKBR			✓			✓	45	25	105			4.34	1290
418	540				1.3	GYBRBK			✓			✓	25	35	60			5.84	9490
419	520				2.4	BKBRCR			✓			✓	25	30	65			6.79	3890
64420	4500				1.2	BKBRCR			✓			✓	25	30	40			7.29	2790
421	430				1.5	BKBRCR			✓			✓	45	25	100			8.74	680
422	460				2.3	BKBRCR			✓			✓	30	25	35			3.94	5340
423	440				3.9	BK			✓			✓	50	25	35			3.54	460
424	420				3.7	BRGYCR			✓			✓	95	55	195			9.89	195
425	4A00				1.8	DKGYBR	✓		✓			✓	40	35	65			4.34	137
426	380				3.5	BRGYCR	✓		✓			✓	115	75	75			4.19	160
427	360				0.8	PKGYCR	✓		✓			✓	65	35	220			4.74	80
64428	4340E				12.4	PNGYCR	✓		✓			✓	30	40	180			3.54	195

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

GEOCHEMICAL SAMPLE DATA SHEET

PROJECT: GORDON LIMESTONE  
LOCALITY: .....  
GRID NAME: PRINCESS RIVER  
NOMINAL GRID AZIMUTH: .....

MATERIAL: BEDROCK  
SAMPLE METHOD: WACKER  
SAMPLED BY: P. O. TOLK  
DATE: 4-85

SIZE FRACTION ANALYSED: WHOLE  
ANALYSED BY: ANALABS  
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 M	COLOUR	Clay	Sand	Rock Frags.	Organic	Bedrock	Weathered	Cu	Pb	Zn	Ag	Au	Fe %	Mn	
	GRID EASTING	NORTHING	EASTING																
64429	5140E			7.8	DKGYBR	✓		✓			✓	35	25	80			3.79	355	
430	160			11.8	DKGYBR	✓		✓			✓	40	35	165			5.89	4440	
431	180			17.2	BR			✓		NO	✓	45	30	110			6.59	590	
432	5200			14.0	DKGYWH	✓				NO		40	25	220			6.14	2590	
433	220			13.0	DKGYWH	✓				NO		40	25	175			4.69	1940	
434	240			14.3	DKBRBK	✓		✓				30	30	80			2.84	865	
435	260			15.3	BRBR	✓				NO		45	35	240			4.29	3190	
436	280			13.7	DKBR	✓				NO		35	20	220			4.89	1190	
437	5300			13.2	GYBRWH	✓				NO		40	30	185			6.09	2290	
438	320			12.0	BR	✓		✓			✓	35	20	100			5.09	2140	
439	340			4.3	BR			✓			✓	25	25	85			4.49	1340	
64440	360			12.4	BR	✓		✓			✓	25	20	120			8.39	1240	
441	380			15.3	DKBRWH	✓				NO		35	25	200			4.74	590	
442	5400			16.3	DKBR	✓				NO		30	15	175			4.09	350	
443	5420			15.4	DKBRYL	✓				NO		35	30	190			5.14	1990	
64444	5460			15.6	DKBR	✓				NO		5	5	X			1.29	290	
445	5480			17.2	DKBR	✓				NO		5	10	X			1.04	190	
446	5500			16.2	GNDKBR	✓		✓			✓	20	10	15			1.99	135	
447	5520			10.7	BRBR	✓		✓			✓	35	20	65			4.84	190	
64448	5540E			5.2	BLTBR	✓		✓			✓	30	35	110			3.69	700	

Electrolytic Zinc Co. of A'asia Ltd. Rosebery, Tas.			ROCK SAMPLE LEDGER					PROJECT: GORDON LIMESTONE LOCALITY: Princess River COLLECTED BY: I.J. Matheson DATE: Apr. 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	Ba	Au
66080	46000	4105		Rusty white vein QUARTZ	QZ					x	x	5		0.43	600	66	<0.008
66081	46000	4370		Black jointed SILTSTONE	SLT					5	5	30		3.38	180	1670	
66082	46000	4615		Black porous mangamiferous WAD	WAD					70	20	330		4.68	6.55%	2310	
66083	46000	4870		Dark grey fine grained SANDSTONE	SST					5	x	30		2.33	360	2500	
66084	46010	5000		Black cherty SILTSTONE with quartz gashes + pods	SLT					40	30	85		5.93	620	1130	
66085	46000	5090		Fine grained Pyrite in black cherty SILTSTONE	SLT py					180	20	190		22.93	200	205	<0.008
66086	46000	5280		Dark grey laminated, black, and oxidized khaki SILTSTONE	SLT					30	20	120		5.48	275	1400	
66087	46000	5535		Black and dark grey SILTSTONE	SLT					40	10	60		4.68	1150	1680	
66088	46000	6340		Soft dark grey SILTSTONE, oxidizing tan	SLT					20	x	110		3.88	470	1710	
66090	46000	5715		Hard black SILTSTONE with minor pyrite	SLT					40	40	60		4.48	460	1450	
66091	46000	4950		Black porous mangamiferous WAD	WAD					10	5	900		11.43	22.0%	7560	
66093				Pyritic black cherty SILTSTONE	SLT py					50	50	120		20.93	2100	279	<0.008
66094				Brown clayey limonitic cement / WAD	WAD					145	x	360		9.73	3.9%	1620	
66095				Black porous mangamiferous WAD	WAD					25	x	600		9.78	13.5%	1.04%	
66096	45000	4560		Black porous crumbly mangamiferous WAD	WAD					50	10	340		25.93	21.5%	5150	

Smith Print No. 241822

Electrolytic Zinc Co. of A'asia Ltd. Rosebery, Tas.			ROCK SAMPLE LEDGER				PROJECT: Gordon Limestone		LOCALITY: Princess River								
							COLLECTED BY: I.J. Mathison, I.R. McDonald		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	Ba	Au
65907				Dark grey, cleaved, fg SANDSTONE to SILTSTONE, weathers yellow	SLT					30	45	175	x	2.72	345	1170	
65908				Grey f.g. micaceous SANDSTONE	SST					45	45	125	x	3.97	360	1490	
65920				Grey cleaved SILTSTONE, minor mica	SLT					20	60	60	0.5	4.62	135	740	
65921				Massive white vein QUARTZ	QZ vn					5	15	5	x	0.62	65	17	<0.008
66000				Black porous mangamiferous WAD in stream channel	WAD					65	190	2275	x	4.02	28.9%	7780	
65999				Interbedded black SILTSTONE and vfg dk. grey SANDSTONE	SLT + SST					35	45	120	x	4.87	105	1520	
65998				Cleaved black SILTSTONE	SLT					70	50	135	x	5.22	2630	1030	
65997				Black SILTSTONE with pyrite veinlets	SLT py					25	25	40	x	4.37	380	978	
65996				Dark grey cleaved SILTSTONE partially laminated	SLT					15	60	x	x	4.22	80	953	
65995				Black porous mangamiferous WAD in stream channel	WAD					75	255	490	x	8.42	13.49%	972	
65994				Black sooty SILTSTONE poorly cleaved	SLT	T Cowen	CMS	dark silty SHALE		25	30	45	0.5	2.02	1180	1620	
65993				Dark grey cleaved SILTSTONE staky, Fe staining on fractures	SLT		85/2/16			45	60	5	x	5.47	350	1690	
65992				Black porous mangamiferous WAD in stream channel	WAD					15	70	120	x	8.87	9.89%	2780	
65991				Dark grey SILTSTONE weathering brown, Fe-Mn stain on fractures	SLT					10	60	100	x	5.17	2.44%	2640	
65990				Dark grey cleaved SILTSTONE	SLT					40	50	95	x	5.02	230	1350	

Electrolytic Zinc Co. of A'asia Ltd. Rosebery, Tas.			ROCK SAMPLE LEDGER					PROJECT: Gordon Limestone		LOCALITY: Princess 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	Bg	Fe%	Mn	Ba	AU	
65989				Black porous manganeseiferous WAD in stream channel	WAD						50	235	375	x	7.97	22.99%	1130	
65988				White vein QUARTZ in tension gashes + veins	QZm						5	15	10	x	0.79	210	90	<0.008
65987				Dark grey - black cleaved SILTSTONE	SLT						15	40	x	x	1.57	105	1060	
65986				Dark grey cleaved and bedded SILTSTONE	SLT						35	40	20	x	2.92	45	1120	
65985				Black cleaved SILTSTONE	SLT						30	50	5	0.5	3.47	130	1270	
65984				Grey cleaved SILTSTONE weathers khaki	SLT						30	35	75	x	5.07	850	1670	
65983				Grey cleaved SILTSTONE weathers khaki	SLT						30	40	55	x	3.47	820	1590	
65982				White vein QUARTZ with clayey inclusions	QZ, vn						10	10	x	x	0.51	130	33	
65981				Oxidized siltstone BRECCIA cemented by manganeseiferous limonite	BX lim						85	55	200	x	6.12	5.09%	2360	<0.008
65980				Dark grey massive SILTSTONE	SLT						20	55	35	x	2.77	165	2010	
65979				Dark grey SILTSTONE, cross bedded and poorly cleaved	SLT	T	Cowan	CMS	carb	SLT	30	45	210	0.5	2.92	195	1920	
65978				Dark grey SILTSTONE, poorly cleaved	SLT						30	45	195	x	3.07	3880	2050	
65977				Sooty dark grey irregularly cleaved SILTSTONE	SLT						25	75	45	0.5	4.17	125	1340	
65976				Dark grey cleaved SILTSTONE	SLT						20	25	85	0.5	3.80	475	1500	
65975				Dark grey SILTSTONE - slaty cleavage, trace mica	SLT						25	15	35	x	4.95	770	1250	

Smith Print No. 4182

Electrolytic Zinc Co. of A'asia Ltd. Rosebery, Tas.			ROCK SAMPLE LEDGER						PROJECT: GORDON LIMESTONE LOCALITY: PRINCESS (BULL RIVT)		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	Ag	Fe%	Mn	Ba	
65974				Dark grey to black SHALE slaty cleavage	SH						40	45	130	0.5	4.90	1430	1550
65973				Dark grey to black SHALE slaty cleavage	SH						25	30	120	0.5	4.05	910	2400
65972				Dark grey to black SHALE slaty cleavage	SH						30	60	45	1	3.20	45	2200
65971				Black SHALE slaty cleavage	BSH						20	30	15	x	3.35	155	2350
65970				Dark grey SILTSTONE slaty cleavage	SLT						15	30	10	x	3.95	650	1850
65969	43020	5520		Black - dark grey SILTSTONE slaty cleavage	SLT						25	5	100		3.53	315	896
65968	43000	4040		Dark grey - black SILTSTONE slaty cleavage	SLT						25	25	65		2.38	40	1470
65967	43000	4220		Dark grey - black SILTSTONE slaty cleavage	SLT						25	35	20		1.58	40	1450
65966	43000	4503		Dark grey SILTSTONE - slaty cleavage	SLT						25	15	40		1.93	140	1290
65965	43000	4605		Dark grey cleaved SILTSTONE	SLT						20	40	75		3.38	280	1260
65964	43000	4840		Sooty black micaceous SILTSTONE slaty cleavage - detrital mica	SLT						5	65	40		1.08	55	1060
65963	43000	5020		Dark grey SILTSTONE, minor cleavage	SLT						30	20	45		5.78	45	1930
65962	44000	4605		Dark grey dolomitic SILTSTONE	SLT						40	20	25		4.78	160	1250
65961	44000	4480		Black sooty SILTSTONE	SLT						25	20	60		2.48	200	1860
65960	44000	5130		Oxidized siltstone pebbles cemented by Mn + Fe oxides	WAD-CGL						35	10	140		9.83	2.25%	1450

Electrolytic Zinc Co. of A'asia Ltd. Rosebery, Tas.			ROCK SAMPLE LEDGER					PROJECT: GORDON LIMESTONE LOCALITY: Princess River		COLLECTED BY: I. J. Mathison		DATE: April 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	Ba	Au
65959	4400	4490		Black micaceous SILTSTONE to very fine grained SANDSTONE	SKT/SST					15	20	30		0.99	35	1750	
65958	4400	4410		Friable red poorly consolidated SANDSTONE - ? TERTIARY?	SST					60	25	25		20.93	550	961	
65957	4400	4410		Rounded oxidized siltstone pebbles cemented by limonite	CGW-WAD					40	40	70		18.93	300	1380	
65956	4400	4310		Cleaved black SILTSTONE weathering tan	SLT					5	45	45		2.08	125	1660	
65955	4400	3930		Thin bedded cleaved black SILTSTONE	SLT					55	45	35		5.08	85	1650	
65954	4350	4220		Cleaved black SILTSTONE with a trace of mica. Mnr Fe stng	SLT					50	40	30		6.28	80	1350	
65953	43480	4660		Black manganeseiferous WAD	WAD					50	190	515		3.98	29.5%	2730	
65952	43500	4640		Black, very fine grained, micaceous silty SANDSTONE	SST					25	35	35		1.23	80	1160	
65951	43500	4910		Dark grey laminated micaceous SILTSTONE	SLT					15	15	90		2.83	135	991	
65950	43500	5140		Sooty black laminated to thin bedded SILTSTONE - mnr Fe stng	SLT					20	40	80		2.78	60	1410	

South Print. Ph. 241022

037

Electrolytic Zinc Co. of A'asia Ltd. Rosebery, Tas.			ROCK SAMPLE LEDGER					PROJECT: Gordon Limestone		LOCALITY: Princess 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	Ba	Au	
66004				Dark grey laminated SILTSTONE	SLT							35	45	145	x	4.52	780	830
66009				Dark grey SILTSTONE	SLT							20	30	100	x	4.57	1630	927
66011				Dark grey SILTSTONE possible syngenetic pyrite	SLT							10	45	30	x	2.52	485	2600
66013				Dark grey SILTSTONE	SLT							20	50	10	x	2.67	1330	1560
66019				Dark grey SILTSTONE	SLT							10	30	50	x	3.77	125	685
66020				Dark grey SILTSTONE	SLT							15	35	40	x	4.07	130	720
66021				Dark grey SILTSTONE	SLT							15	25	60	x	3.47	95	633
66022				Dark grey SILTSTONE	SLT							20	35	80	x	4.07	175	688
66025				Dark grey SILTSTONE	SLT							15	50	25	0.5	4.17	75	1130
66032				Dark grey - black laminated SILTSTONE	SLT							25	30	110	x	3.92	1230	1050
66036				Black massive SILTSTONE	SLT	T Cowan	CMS	carb silty				30	20	100	x	3.87	655	1100
66039				Dark grey SHALE, Fe stain along cleavage	SH		85/2/16	SHALE py				40	30	155	x	4.92	730	1120
66042				Dark grey SILTSTONE	SLT							50	30	65	x	4.27	325	1310
66044				Dark grey SHALE	SH							35	25	185	x	4.27	1880	1050
66046				Black SHALE	RSH							30	20	120	x	3.47	1780	1270

Smith Print No. 41822

114038

Electrolytic Zinc Co. of A'asia Ltd. Rosebery, Tas.			ROCK SAMPLE LEDGER					PROJECT: Gordon Limestone LOCALITY: Princess River COLLECTED BY: D.L. Hopton, I.J. Matheson 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	Ba	Al		
66049				Grey - black SHALE	SH							40	40	145	x	4.57	595	1220	
66052				Black SHALE ? pyritic	SH							15	40	25	x	2.67	55	1040	
66055				Black pyritic SHALE with disseminat. and quartz vein pyrite	BSH py	T Cowan		CMS	carb SLT py			100	40	95	x	11.37	135	1060	<0.008
66058				Grey to black laminated SHALE, yellow weathering	SH	P		85/2/16	vanada pyrite			25	35	115	x	4.12	90	1790	
66061				Dark grey laminated SHALE	SH							25	40	20	x	4.12	95	2260	
66064				Black laminated SHALE minor Fe staining	SH							40	50	65	x	5.67	565	1570	
66067	44800	4050		Black porous manganeseiferous WAD	WAD							25	15	115		5.88	5.25%	2920	
66068	44810	4050		Dark grey rounded SILTSTONE	SLT							35	15	90		6.78	480	1660	
66070				Black porous manganeseiferous WAD	WAD							35	40	230		5.18	5.5%	2990	
66072				Dark grey jointed and cleaved SILTSTONE	SLT							25	25	60		2.98	245	1790	
66074				Black cherty SILTSTONE	SLT							25	15	70		2.13	625	1610	
66075				Black porous manganeseiferous WAD	WAD							45	25	290		4.78	14.0%	2170	
66077	46000	3910		Black porous manganeseiferous WAD as cement	WAD							25	50	180		4.08	7.3%	1780	
66078	46000	4050		White vein QUARTZ with some rusty vugs (rusty bits)	QZ							5	5	35		2.13	2000	96	<0.008
66079	46000	4105		Black cleaved SILTSTONE, weakly silicified with quartz veins	SLT							5	x	40		1.38	570	2530	

Smith Print. Ph. 441822

039

114040

Central Mineralogical Services



39 Beulah Road  
Norwood, S.A. 5067  
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Mr. I.J. Mathison  
Mineral Resources Division  
Electrolytic Zinc Co. of  
Australasia Ltd.  
West Coast Mines  
P.O. Box 21  
ROSEBERY / TAS. 7470

25th February, 1985

REPORT CMS 85/2/16

YOUR REFERENCE:	Order No. 900633
DATE RECEIVED:	20th February, 1985
SAMPLE NOS.:	5 Samples
SUBMITTED BY:	I.J. Mathison
WORK REQUESTED:	Petrology/Mineralogy

*H.W. Fander for*

H.W. Fander, M. Sc.

REPORT CMS 85/2/16

Five rock samples from the Bell Shale were received for brief petrological description. One sample was delineated for mineragraphic examination. Representative sections were prepared and examined together with the respective offcuts. Attached tabulated descriptions summarise the microscopic data and include interpretative comments.

Summary

This suite comprises incipiently regionally metamorphosed carbonaceous pelites with rather limited variations. Clastic components comprise quartz with varying proportions of ill-defined sericitic feldspar and detrital mica (largely muscovite). The typical pelite is a silty shale, "grading" into, and including, interbeds of argillaceous siltstone.

Pelites tend to be weakly dolomitic and weakly syngenetic-pyritic. Close examination revealed no detectable barite, or barium minerals in general.

Sample 66055 reflects quartz veining broadly early-syntectonic with respect to the weak slaty cleavage. Vein-hosted pyrite clusters are recrystallized-framboidal, at least in part. These features are accompanied by intraclasts of the host rock, and the partly bedding-conformable veinlets thus appear to have been controlled by relatively massive pyritic interbeds, at least in part. That is, the associated pyrite clusters may be interpreted as (recrystallized) mechanical inclusions rather than strictly secondary.

D. Cowan, B. Sc.

Sample No.	Classification - Composition	Fabric	Accessories	CENTRAL MINERALOGICAL SERVICES Comments
66036 (T.S. 52646)	Carbonaceous Pelite. Semi-sericitic white mica with pervasive ultrafine carbonaceous matter, slightly variable proportions of silt-sized splintery to subangular quartz, subordinate sericitic feldspar, minor muscovite flakes.	Weakly laminated, incipiently shale-parted silty shale. Very incipient concordant slaty cleavage.	Traces of dolomite, oxidised fine to ultrafine syngenetic pyrite.	Weakly dolomitic, pyritic, strongly carbonaceous silty shale. Sericitic splintery feldspar detritus is poorly diagnostic, but conceivably reworked tuffaceous.
66055	Carbonaceous Pelite. Carbonaceous silty shale (sim. 66036) with interbeds of carbonaceous, argillaceous, weakly (sericitic) feldspathic siltstone. Interspersed quartz veinlets with disseminations, clusters of pyrite.	Disharmonically folded pelite with bedding-controlled to irregularly stressed/comb-structured veinlets.	Minor vein-marginal pyrite disseminations. Rare fine to ultrafine dark green schorl in quartz veinlets.	Contorted carbonaceous pelite with partly bedding-controlled syn-deformational pyritic quartz veinlets, pyrite pressure-shadowed and stressed.
66055 OPAQUE	Exhibits vein-hosted clusters and vein-marginal about 200 $\mu$ . The pyrite exhibits thinly disseminated pyrite is evident in isolated pyrite crystals. Suggestive of (recrystallized) mechanical inclusions.	disseminations of sub-ordinated chalcopyrite and Vein-hosted clusters and inclusions.	to euhedral, variably rare sphalerite micro-are accompanied by ill-defined	poikilitic pyrite with a mean grainsize inclusions. Rare relict framboidal clots of carbonaceous matter,
66061	Carbonaceous Pelite. Semi-sericitic white mica with pervasive ultrafine carbonaceous matter, conspicuous silt-sized quartz, sericitic-indeterminate feldspar, minor muscovite flakes, fine to ultrafine pyrite.	Incipiently lenticular siltstone-parted silty shale. Weakly medium-angle discordantly cleaved.	Minor traces of clastic chlorite/chloritised biotite.	Close affinities with 66036, distinctly silty in comparison. Bedding weakly boudinaged along discordant slaty cleavage. Pyrite is weakly recrystallized syngenetic.
65979	Carbonaceous Pelite. Carbonaceous-sericitic quartzose, sericitic-feldspathic, micaceous siltstone with sporadic interbeds of relatively massive weakly carbonaceous siltstone.	Bedded on millimetric to centimetric scale. High-angle discordantly sheared.	Pervasively disseminated oxidised fine carbonate (?dolomite), traces of oxidised "syngenetic" pyrite.	Weakly sheared carbonaceous-argillaceous siltstone. Clastic components closely analogous to those in 66036, etc.
65994 (T.S. 52650)	Carbonaceous Pelite. Semi-sericitic white mica with pervasive ultrafine carbonaceous matter, pervasively disseminated silt-sized splintery to subangular quartz, minor sericitic feldspar, muscovite flakes.	Incipiently micro-lenticularly shale-parted silty shale. Weakly concordantly cleaved.	Rare detrital zircons.	Close affinities with 66036, non-dolomitic and non-pyritic in comparison. Similarly weakly concordantly sheared.

042

114043

**JOHN F. GILFILLAN & ASSOCIATES PTY. LIMITED**

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

Report No: E3/81/275

2nd April, 1985.

For: Electrolytic Zinc Company of Australasia Ltd.

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043

<u>Sample No.</u>	65902
<u>Description of Concentrate</u>	A mid brown coloured fine to medium grained sample with rare coarse grains also of brown material. Rare grains are strongly magnetic.

Thin Section. The grain size of this sample is strongly bimodal with the majority of fairly angular grains within the range 0.08 mm and 0.5 mm, and with a sparse coarser fraction comprising grains from about 0.6 mm up to almost 2 mm across. The sparse coarser grains include mainly opaque dark grey oxides with grain margins and patches converted to red-brown limonitic oxides. Certain of the coarser grains also are converted entirely to red-brown translucent limonitic oxides and these enclose granular patches and small angular chips of quartz ± sericite. Other subrounded lithic grains comprise dense weakly foliated fine grained sericite, stained by fine grained patches of almost opaque oxides and still other clasts are undisintegrated basic igneous aggregates of clinopyroxene and plagioclase, partly stained by yellow-brown limonitic oxides along cleavage and grain boundary surfaces.

the very abundant finer grained fraction of this sample comprises ubiquitous angular cleavage fragments of fresh clinopyroxene (pigeonite, with extremely small positive axial angle), certain grains of which exhibit very fine exsolution lamellae. Also present are subordinate angular grains of fresh olivine and sparse grains of orthopyroxene. Sparse accessory phases include subrounded to subhedral prismatic grains of pleochroic blue-green or pale yellow-brown tourmaline, pale pink well rounded grains of zircon, scattered grains of black opaque oxides (including magnetite), rare grains of a red-brown translucent spinel (?chromite), as well as green chlorite, and a single small sulphide grain which is partly converted to red-brown limonitic oxides marginally.

<u>Sample No.</u>	65915
<u>Description of Concentrate</u>	A mid brown coloured fine to medium grained concentrate with sparse coarse dark brown to red-brown grains. The sample is not magnetic.

Thin Section. This is quite similar to the previous sample 65902. It comprises a very subordinate coarse fraction with sparse subrounded to irregular shaped grains mostly within the size range 0.5 mm up to 1.5 mm, which includes aggregates of undisintegrated clinopyroxene, olivine and plagioclase from a basic igneous source, well rounded grains of monazite crammed with opaque ?carbonaceous dust, rare grains of epidote-quartz-chlorite rock and pale blue-green actinolitic amphibole-quartz-plagioclase rock.

A voluminous finer grained fraction comprises mainly broken angular crystals and cleavage fragments ranging from approximately 0.1 mm up to 0.5 mm (very fine sand up to medium sand size), including dominant fresh clinopyroxene, including both pigeonite and ?augite, as well as orthopyroxene and common grains of fresh olivine, only partly stained along narrow fractures by red-brown limonitic oxides. Angular small black opaque oxide grains also are common while sparse titaniferous grains are now converted to clouded white leucoxene ± sphene, and rare grains of red-brown spinel possibly have compositions close to chromite. The remaining grains which are present only in trace proportions include blue-green amphibole, olive green tourmaline, rutile, chlorite, garnet and sphene.

<u>Sample No.</u>	65928
<u>Description of Concentrate</u>	A medium to coarse grained mid to dark brown concentrate only a few grains of which are magnetic.

Thin Section. This is a strongly oxidised and weathered concentrate which comprises mainly angular to subrounded grains ranging in size from less than 0.1 mm up to more than 2 mm across (very fine to very coarse sand size). Concretionary red- to yellow-brown translucent to almost opaque limonitic oxides greatly predominate and many grains enclose small angular silt and very fine sand-sized quartz chips. Also present are coarse subrounded grains which exhibit clear cellular textures

indicating an organic origin. Subordinate, but nevertheless common grains of black to dark grey opaque oxides appear to include magnetite as well as hematite and possibly other opaque spinel phases. These grains generally have narrow weathered rims of red-brown oxides and patches of dark grey oxides within certain of the black opaque grains.

Sparse transparent crystal debris comprises only about 10% of the total grains present in the thin section, and they include cleavage fragments of fresh clinopyroxene (including both pigeonite and ?augite), with subordinate ?orthopyroxene and minor fresh olivine from a nearby basic igneous source. Also present are sparse nodules of clouded monazite which are in the order of 0.3 mm to 0.6 mm across which account for about 3% of the grains present. Accessory very fine grained crystal debris includes grains of rutile, zircon, clouded sphene, very rare grains of anatase, epidote and tourmaline.

Sample No. 65935

Description of Concentrate A fine to coarse grained mid-brown concentrate containing about 5% of strongly magnetic grains.

Thin Section. This concentrate is fairly similar to the previous sample 65928 in that it comprises mainly oxidised subrounded to angular grains that are converted largely to red-brown translucent and almost opaque concretionary limonitic oxides. Opaque dark grey to black oxides have rather irregular shapes and invariably are converted marginally to red-brown limonitic oxides. Most of these grains are strongly magnetic and thus appear to include magnetite and hematite. Subrounded or else somewhat ragged grains (or nodules) of clouded monazite comprise about 8% of the grains represented in the thin section and these rarely exceed 0.5 mm across. Rare monazite nodules clouded by ?carbonaceous dust are enclosed within rims of a weakly foliated wispy sericite and quartz-bearing silty host lithology. Sparse accessory grains include cleavage fragments of clinopyroxene, ?orthopyroxene, brown to almost colourless pleochroic tourmaline, well rounded, almost colourless zircon crystals, chlorite and rutile.

NOTE: Strongly clouded, rounded monazite grains (nodules derived from the fine grained foliated quartz-sericite host lithology) account for approximately 20% of the grains of the finer grained fraction which is concentrated around the edges of the present thin section.

Sample No. 65942

Description of Concentrate A mid-brown concentrate comprising fine to very coarse sand-sized grains, only a few of which are magnetic.

Thin Section. The grains in this sample have a size variation mainly within the range 0.13 mm up to 1.5 mm (fine to very coarse grained sand). Many of the coarser grains within this range, as in the previous samples, comprise massive and concretionary dense red-brown translucent and almost opaque red-brown limonitic oxides, commonly enclosing sparse angular chips of silt and fine sand sized quartz. Also present are sparse recognisable lithic fragments of very fine grained, weakly foliated sericite-bearing quartz siltstone, as well as aggregates of fresh pyroxene and olivine from a proximal basic igneous source.

Smaller grains comprise mainly angular cleavage fragments of pyroxenes (both pigeonite and augite are present), as well as irregular shaped grains of fresh olivine (with red-brown limonitic oxides staining fracture surfaces), as well as sparse grains of orthopyroxene. Truly opaque oxides account for only about 5% of the total grains represented in thin section, and these almost certainly comprise the strongly magnetic grains that are only partly converted to translucent red-brown secondary oxides in patches and along narrow rims. Sparse accessory grains include fine grained clusters of pale blue-green actinolitic amphibole, rare grains of olive green tourmaline, rare grains of chlorite and equally rare grains of a very fine grained quartz-bearing sediment with wispy sericite enclosing "nodules" of clouded monazite. Grains of zircon and rutile are notably absent from this sample.

047

Sample No. 66003

Description of Concentrate A mid brown fine to medium grained sample containing a small proportion of very coarse dark brown oxidised grains. Only sparse very small grains are magnetic.

Thin Section. A subordinate coarse grained fraction with individual grains reaching about 1.5 mm across, accounts for only about 10% of grains represented in the present thin section. This coarser fraction again includes strongly oxidised translucent to almost opaque fine grained massive and concretionary limonitic oxides ± small patches and grains of quartz, as well as minor lithic clasts of very fine grained, weakly foliated quartz sericite rock, a single well rounded clast of fine grained, almost monomineralic pale green chlorite rock, undisintegrated aggregates of clinopyroxene and decussate small plagioclase laths from a basic igneous source, and sparse grains of very fine grained sericite quartz rock enclosing rounded nodules of clouded monazite. Sparse, large opaque oxide grains which are most likely magnetite have narrow red-brown oxidised rims.

The voluminous finer grained fraction is more or less even grained with an average grain size of about 0.25 mm (on the boundary between fine and medium sand sized grains). By far the majority of these grains comprise angular cleavage fragments of fresh pyroxenes and olivine from a nearby basic igneous source. The pyroxenes include mostly pigeonite (almost uniaxial positive), with fewer grains of orthopyroxene (commonly with exsolution lamellae), and augite (moderate positive axial angle). In addition are present sparse grains (or nodules) of monazite (less than 5% of the present sample), and sparse grains of fibrous pale blue-green actinolitic amphibole. Accessory crystal debris comprises rare grains of rutile, olive green tourmaline, a single garnet grain, <sup>and</sup> rare grains of translucent red-brown isotropic spinel (possibly with compositions close to chromite).

048

<u>Sample No.</u>	66015
<u>Description of Concentrate</u>	A medium to coarse grained mid-brown coloured sample in which there are only rare magnetic grains.

Thin Section. This sample has a grain size range from less than 0.1 mm up to more than 1.5 mm (very fine to very coarse sand sized grains), nearly all of which are angular, with only sparse subrounded grains. The coarser clasts tend to be lithic including mostly clinopyroxene, olivine and plagioclase-bearing types of basic igneous origin, as well as sparse types comprising patches of chlorite, set in a quartz-rich silty carbonaceous host rock, and other lithic clasts that are extremely fine grained, quite well foliated containing well oriented wispy sericite and barely recognisable patches of microgranular quartz. Still other clasts comprise microgranular quartz-rich types with minor wispy trails of sericite and large irregular patches of monazite crammed with dusty ?carbonaceous inclusions. Also present are fairly common grains of fine grained massive to concretionary red-brown limonitic oxides, certain of which enclose small angular quartz chips.

As in several previous samples the finer grained crystal fraction contains very abundant angular chips and cleavage fragments of fresh clinopyroxene (mostly pigeonite with subordinate ?augite and orthopyroxene), as well as numerous grains of olivine (only partly converted to limonitic oxides along curving fractures), sparse elongate dark grey (?titaniferous) opaque oxide grains, rare small grains of rutile, blue green actinolitic amphibole, equant black opaque oxide grains (?magnetite) and rare grains of chlorite. A very fine grained fraction which may be expected to contain such phases as zircon and rutile is conspicuously absent from this sample.

<u>Sample No.</u>	66017
<u>Description of Concentrate</u>	A medium to coarse grained mid-brown sample with sparse well rounded black grains. Rare grains are strongly magnetic.

Thin Section. Angular cleavage fragments of mafic silicate grains again predominate in this sample, which has an overall grain size range from less than 0.1 mm up to about 1.5 mm (very fine to very coarse sand size). The sparse coarser grains include dark grey to black opaque oxides, numerous angular coherent aggregates of clinopyroxene, olivine and plagioclase from a nearby basic igneous source, and subrounded aggregates of medium grained blue-green actinolitic amphibole.

The ubiquitous finer grained fraction consists almost exclusively of angular cleavage fragments of clinopyroxene (including mainly pigeonite), and orthopyroxene, with subordinate but common irregular shaped grains of partly stained and oxidised olivine and common grains of black opaque oxides. Sparse scattered grains of monazite strongly clouded by ?carbonaceous dust are generally enclosed within a very fine grained host comprising fine wispy foliated sericitic and microgranular quartz. Accessory grains include translucent dark red-brown isotropic ?chromite, very rare grains of rutile, garnet, clouded monazite, chlorite, and sphene. Zircon is conspicuously absent.

<u>Sample No.</u>	66054
<u>Description of Concentrate</u>	None remains except for sparse pale brown to pale grey medium grained fragments mounted in resin.

Thin Section. This sample exhibits a distinctly bimodal grain size distribution with about 25% of grains comprising a fraction coarser than 0.3 mm and ranging up to 1.5 mm across (medium to very coarse sand size). This coarser fraction includes heavily oxidised subrounded to well rounded grains, most of which are fairly massive to concretionary red-brown limonitic/oxides. Other clasts of dense red-brown limonitic oxides enclose silt and fine sand sized angular quartz chips. Still other well rounded lithic grains consist of exceptionally fine grained, weakly foliated sericite, also enclosing silt sized angular quartz chips.

The remaining abundant finer grained fraction contains very dominant nodules of monazite heavily clouded with opaque

dusty ?carbonaceous particles. These nodules invariably have rounded to elliptical shapes and rarely are enclosed within a very fine grained wispy sericite and quartz-rich, weakly foliated lithology. The monazite grains account for approximately 60% of the total grains represented in the thin section, and other sparse crystal debris includes cleavage fragments of fresh clinopyroxene and olivine from a basic igneous source. Scattered angular quartz grains are an accessory contaminant phase, but a very fine grained fraction of rutile and zircon grains is notably absent.

<u>Sample No.</u>	66059
<u>Description of Concentrate</u>	A mid-brown, mainly medium to coarse grained concentrate with sparse dark grey magnetic grains.
<u>Thin Section.</u>	A <u>coarser</u> fraction comprises the majority of this sample with angular to subrounded grains mostly within the size range 0.16 mm up to almost 2 mm, (fine up to very coarse sand sized grains). Once again these grains are very heavily oxidised translucent to almost opaque massive and concretionary limonitic oxides with somewhat variable proportions of angular silt and fine sand sized quartz chips.

The subordinate finer grained fraction accounts for approximately 20% of the total grains in the present thin section, and this fraction, as in the coarser fraction, contains dominant angular grains of red-brown limonitic oxides, and almost equally abundant transparent broken crystal debris. The latter includes mostly subrounded colourless to pale pink zircon grains, subrounded to irregular shaped grains of olive green tourmaline, common cleavage fragments of fresh colourless clinopyroxene, sparse rounded grains of strongly clouded monazite, truly opaque dark grey oxides (mostly magnetite), and rare grains of translucent red-brown isotropic chromite, epidote, green chlorite, subrounded rutile crystals and sparse pyritic sulphide grains with narrow weathered rims of red-brown limonitic oxides. Irregular shaped quartz grains are a rare contaminant phase.

114052

Sample No. 66063

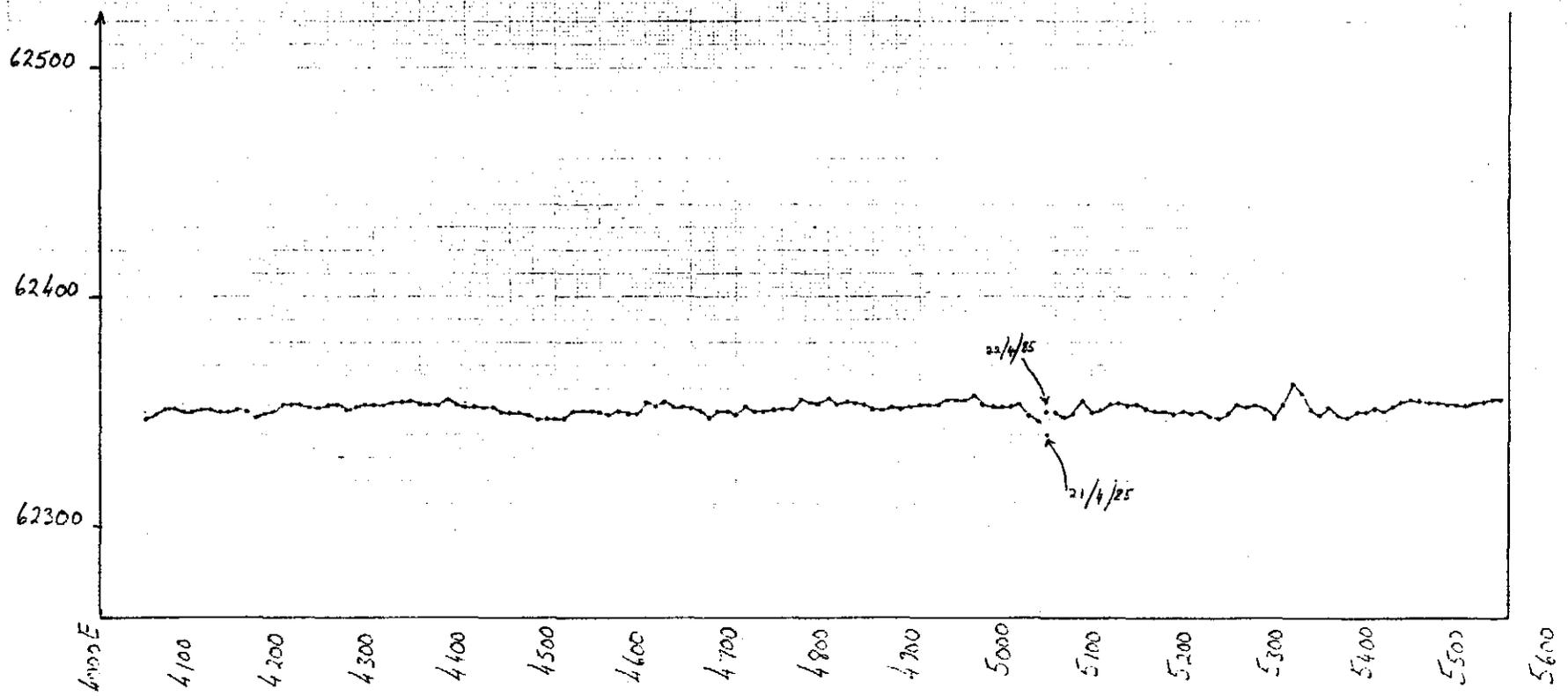
Description of Concentrate A medium to quite coarse grained sample comprising mainly mid-brown to dark brown grains with subordinate small dark grey grains. Only rare coarse sand sized red-brown grains are magnetic.

Thin Section. This sample consists predominantly of medium and coarse sand sized grains within the range 0.25 mm and 2.0 mm, and as in many of the previous samples, this coarse fraction consists of subrounded to well rounded heavily oxidised grains. The latter include massive and concretionary types, many of which enclose angular silt sized chips of quartz, ranging up to very fine sand sized grains. Recognisable lithic fragments include extremely fine grained types with a dense carbonaceous matrix of wispy sericite, poorly aligned subparallel to a weak foliation enclosing silt sized angular quartz grains. Sparse lithic clasts consist of very fine grained pale green chlorite ± sericite ± patches of carbonaceous dust, while others are equally fine grained and consist of weakly foliated, strongly carbonaceous mudstone. Still others consist of microgranular quartz and patchy sericite stained by red-brown limonitic oxides. Rare grains with recognisable cell structures are of organic origin.

A very subordinate finer grained recognisable crystal fraction contains well rounded grains of colourless and pink zircon, yellow-brown pleochroic tourmaline, rare grains of a red-brown translucent isotropic spinel, (most likely close to chromite in composition), rare cleavage fragments of fresh clinopyroxene, rare grains of apatite, partly degraded ragged flakes of chlorite, traces of clouded monazite, and sparse ferric oxides (associated with patches of "shredded" quartz) which most likely once comprised sulphides. Rare angular grains of quartz contamination are accessory.

052

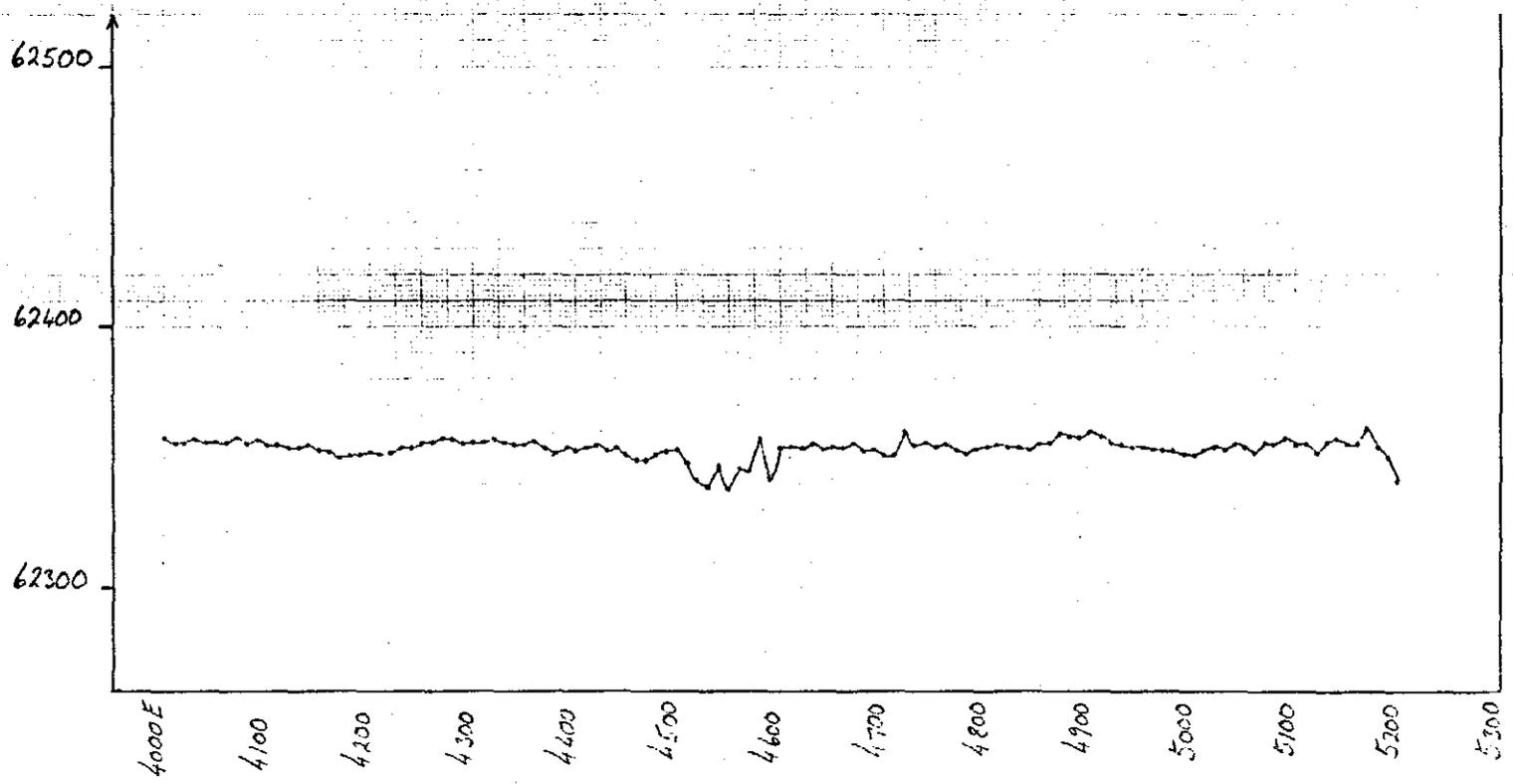
PRINCESS RIVER GRID.  
GROUND MAGNETIC PROFILE  
LINE 43000 N  
DATES - 21/4/85 (5,040E - 5540E)  
22/4/85 (4,050E - 5,040E)  
OPERATOR - MARK RICE PLOTTED BY M. RICE.  
INSTRUMENT - GEOMETRICS.



114053

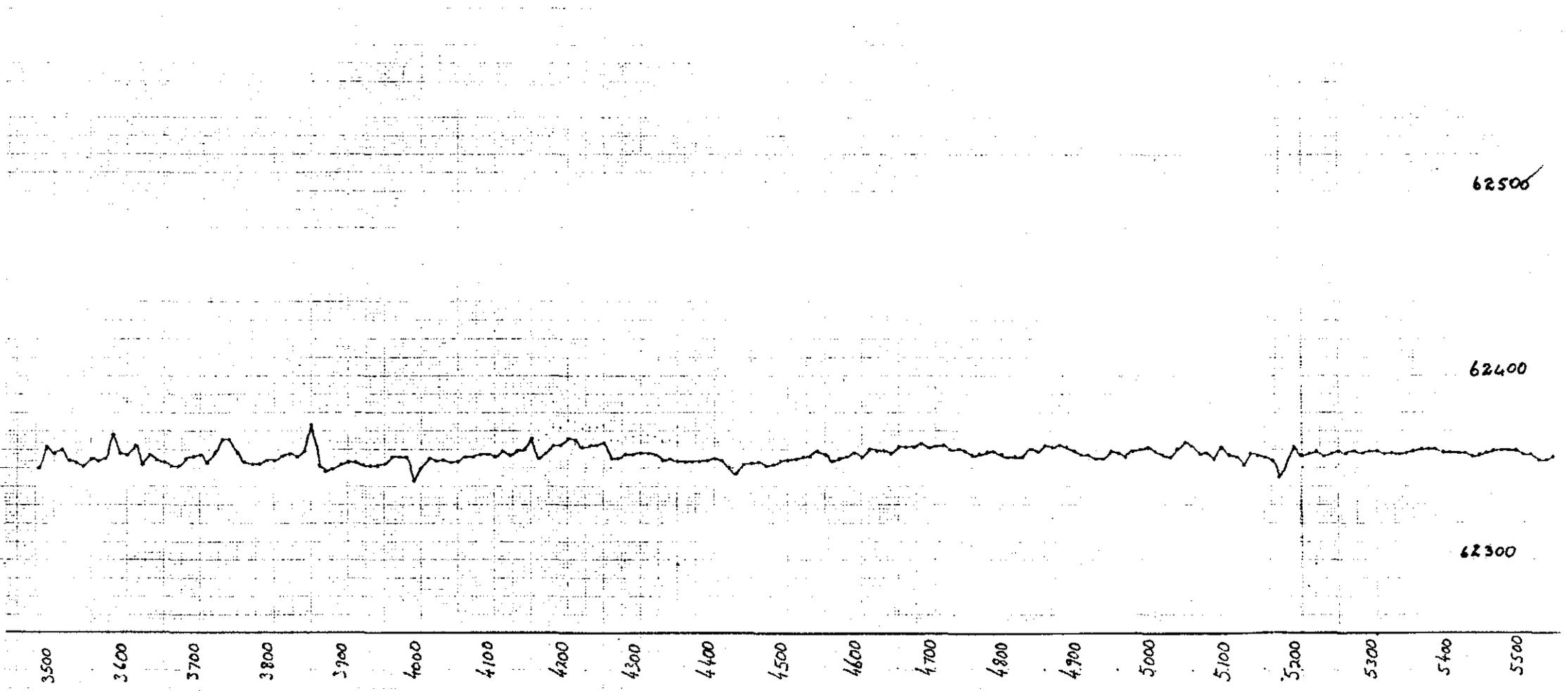
053

PRINCESS RIVER GRID  
GROUND MAGNETIC PROFILE (1:5000)  
LINE 43,500 N DATE - 21/4/85  
OPERATOR - MARK RICE PLOTTED BY - M. RICE  
INSTRUMENT - GEOMETRICS

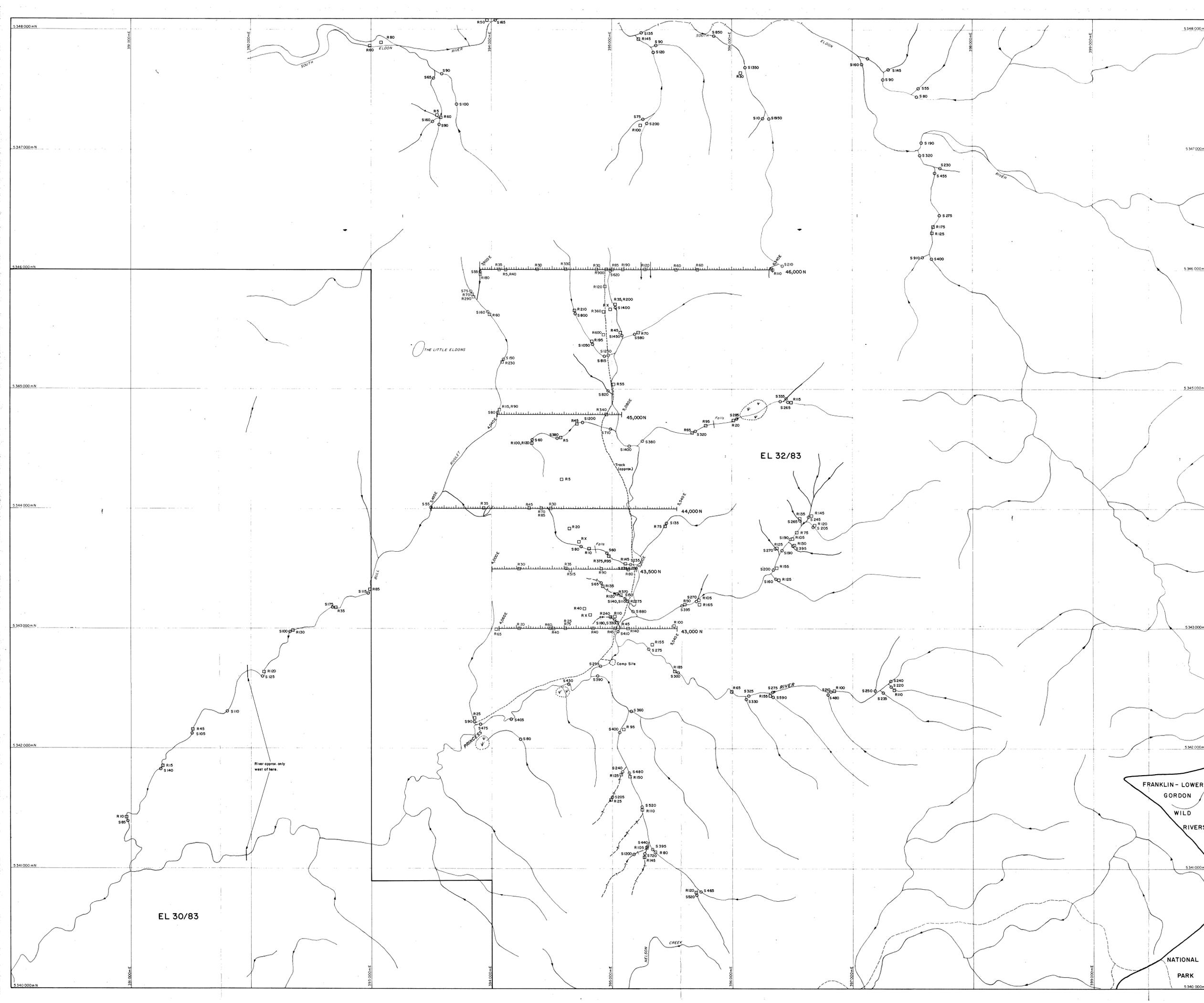


114054

PRINCESS RIVER GRID  
GROUND MAGNETIC PROFILE (1:5000)  
LINE - 44000 N DATE - 21/4/95  
OPERATOR - MARK RICE. PLOTTED E. M. RICE  
INSTRUMENT - GEOMETRICS







- Stream Sediment Sample  
Sample No - S 59221
  - Panned Concentrate - Stream Sediment Sample  
Sample No - P 59202
  - Rock Chip Sample  
Sample No - R 59298
- N.B. - ALL VALUES IN PPM.

FRANKLIN - LOWER  
GORDON  
WILD  
RIVERS

114057  
Fig. PR 2  
ELECTROLYTIC ZINC CO. OF ASIA LTD.  
PROJECT: PRINCESS RIVER EL 32/83/TAS  
**85-2458**  
GEOCHEMISTRY  
Zn  
5 cm

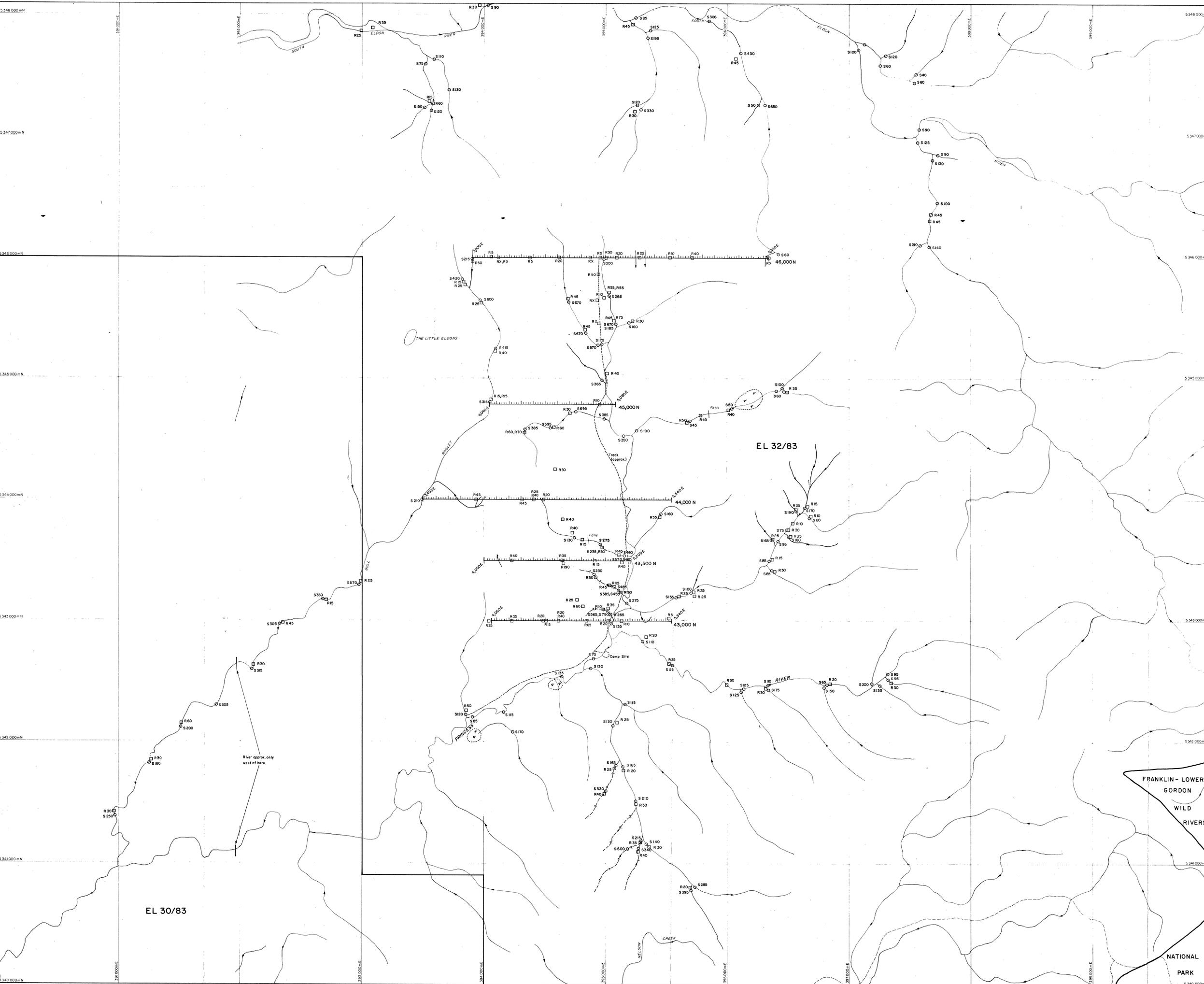
Scale: 1:10,000	Survey: I MAT	Revised:
Reference: LD 8013	Date: 13-1-84	Ref. No.
Drawn: R. J. R.	Checked: L. W. LMAT	AO-531-1002

EL 30/83

EL 32/83

River approx. only  
west of here.

NATIONAL  
PARK



- Stream Sediment Sample  
Sample No - S 59221
  - Panned Concentrate - Stream Sediment Sample  
Sample No - P 59202
  - Rock Chip Sample  
Sample No - R 59298
- N.B. - ALL VALUES IN PPM.

114008  
**85-2458**

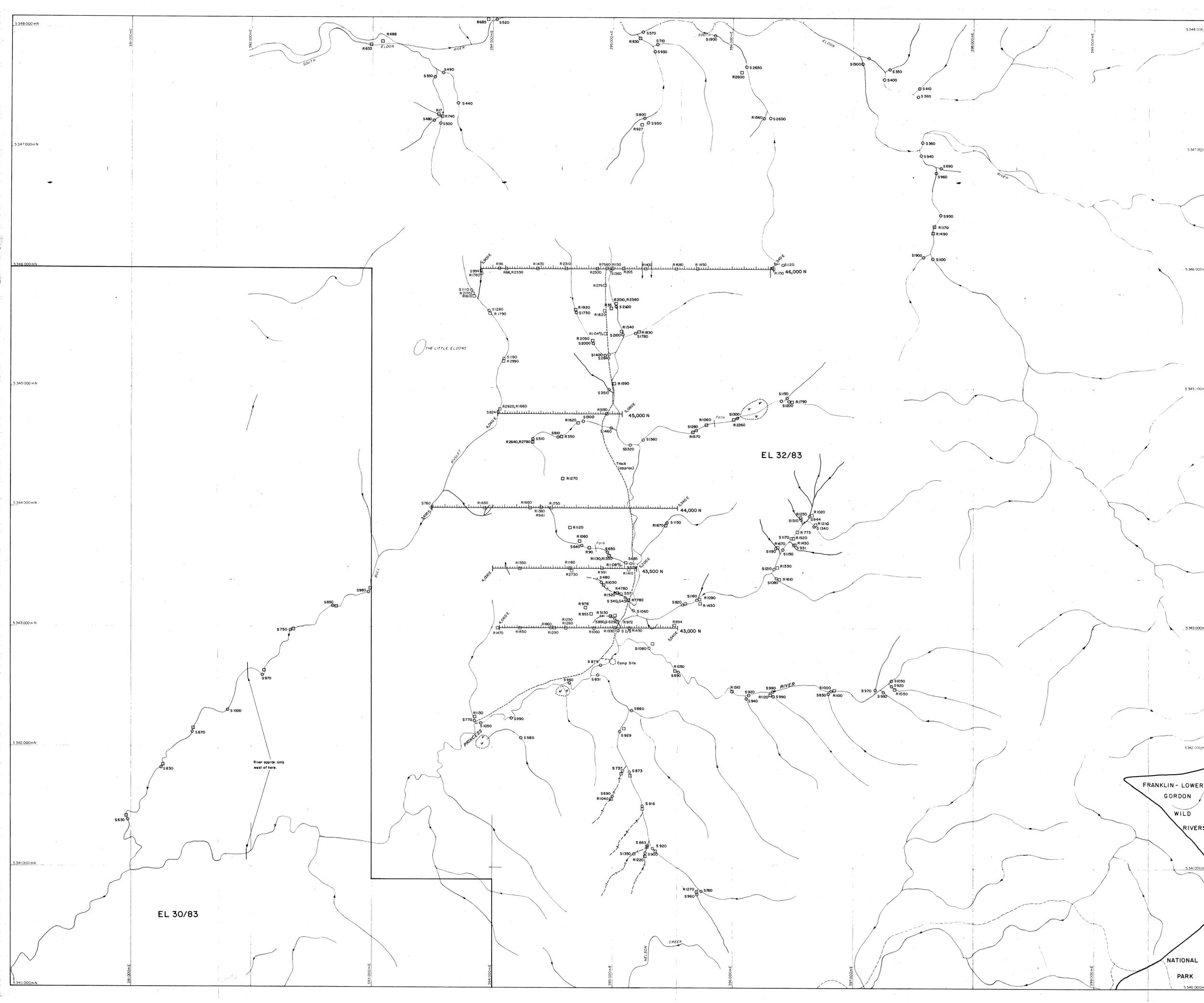
Fig. PR 3

**ELECTROLYTIC ZINC CO. OF ASIA LTD.**  
 PROJECT: PRINCESS RIVER EL 32/83, T.S.

**GEOCHEMISTRY**

Pb 003

Scale: 1:10000	Survey: I.MAT	Revised:
Reference: LD 8013	Date: 13-1-'84	Ref. No.
Drawn: R.J.R.	Checked: L.W., I.MAT.	AO-531-1003



- Stream Sediment Sample  
Sample No - S 59221
- Panned Concentrate - Stream Sediment Sample  
Sample No - P 59202
- Rock Chip Sample  
Sample No - R 59298

FRANKLIN - LOWER  
GORDON  
WILD  
RIVERS

114059  
**85-2458**  
Fig. PR 4

ELECTROLYTIC ZINC CO. OF ASIA LTD.  
PROJECT: PRINCESS RIVER EL32/83/TAS

5 cm  
**GEOCHEMISTRY**  
**Ba** 004

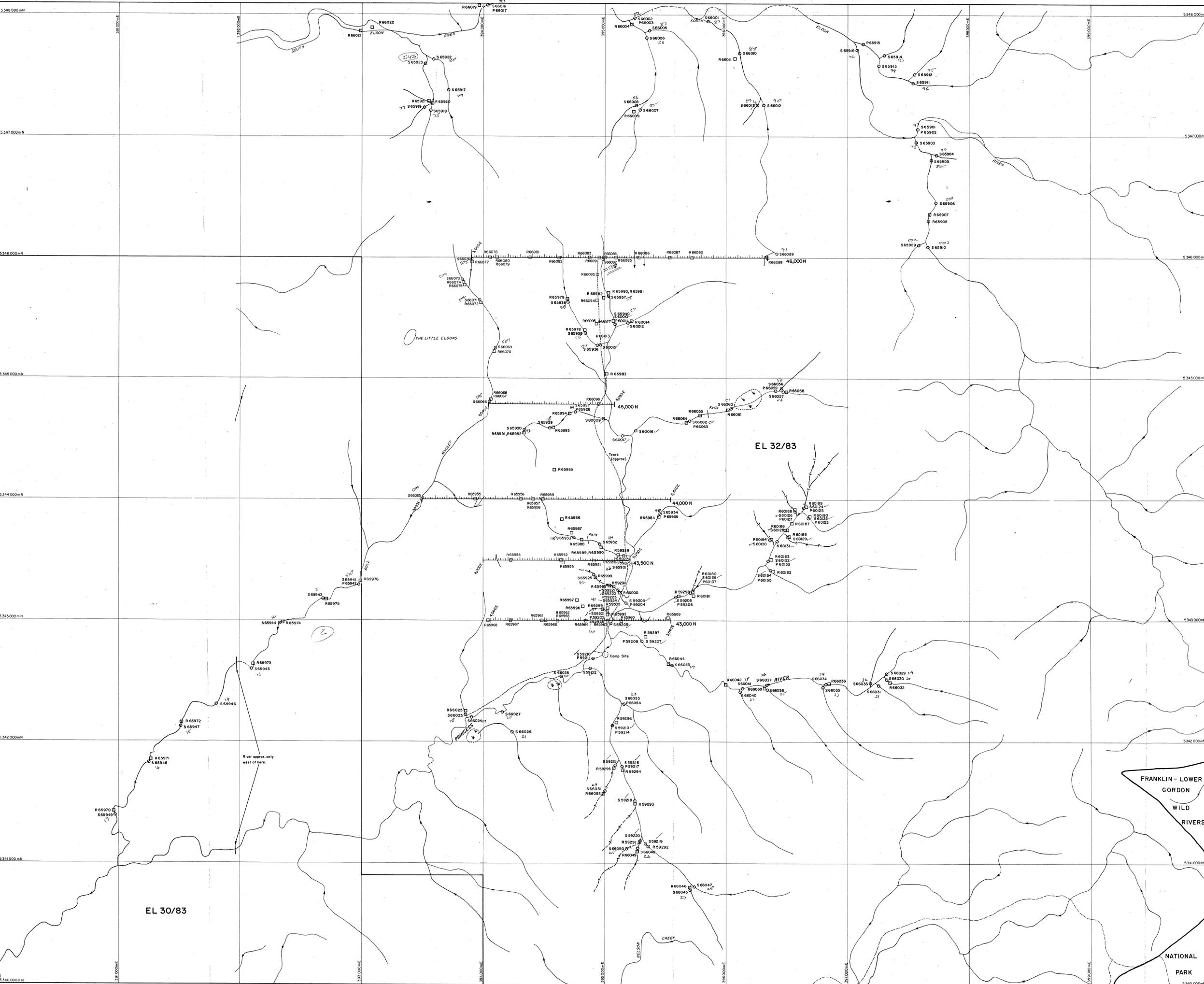
Scale: 1:10000	Survey: 1 MAT	Revised:
Reference: LD 8013	Date: 13-1-84	Ref. No.
Drawn: R J R	Checked: L W	AO-531-1004

EL 30/83

EL 32/83

NATIONAL  
PARK

River approx. only  
west of here.



- Stream Sediment Sample  
Sample No - S 59221
- Panned Concentrate - Stream Sediment Sample  
Sample No - P 59202
- Rock Chip Sample  
Sample No - R 59298

114060  
 85-2458

Fig. PR 5

ELECTROLYTIC ZINC CO. OF ASIA LTD.  
 PROJECT: PRINCESS RIVER EL32/83TAS.

SAMPLE LOCATIONS,  
 NUMBERS and TYPES

005

Scale: 1:10000	Survey: I.M.A.T.	Revised:
Reference: LD 8013	Date: 13-1-84	Ref. No.
Drawn: R.J.R.	Checked: L.W./MAT.	AO-531-1005

FRANKLIN - LOWER  
 GORDON  
 WILD  
 RIVERS

NATIONAL  
 PARK

EL 30/83

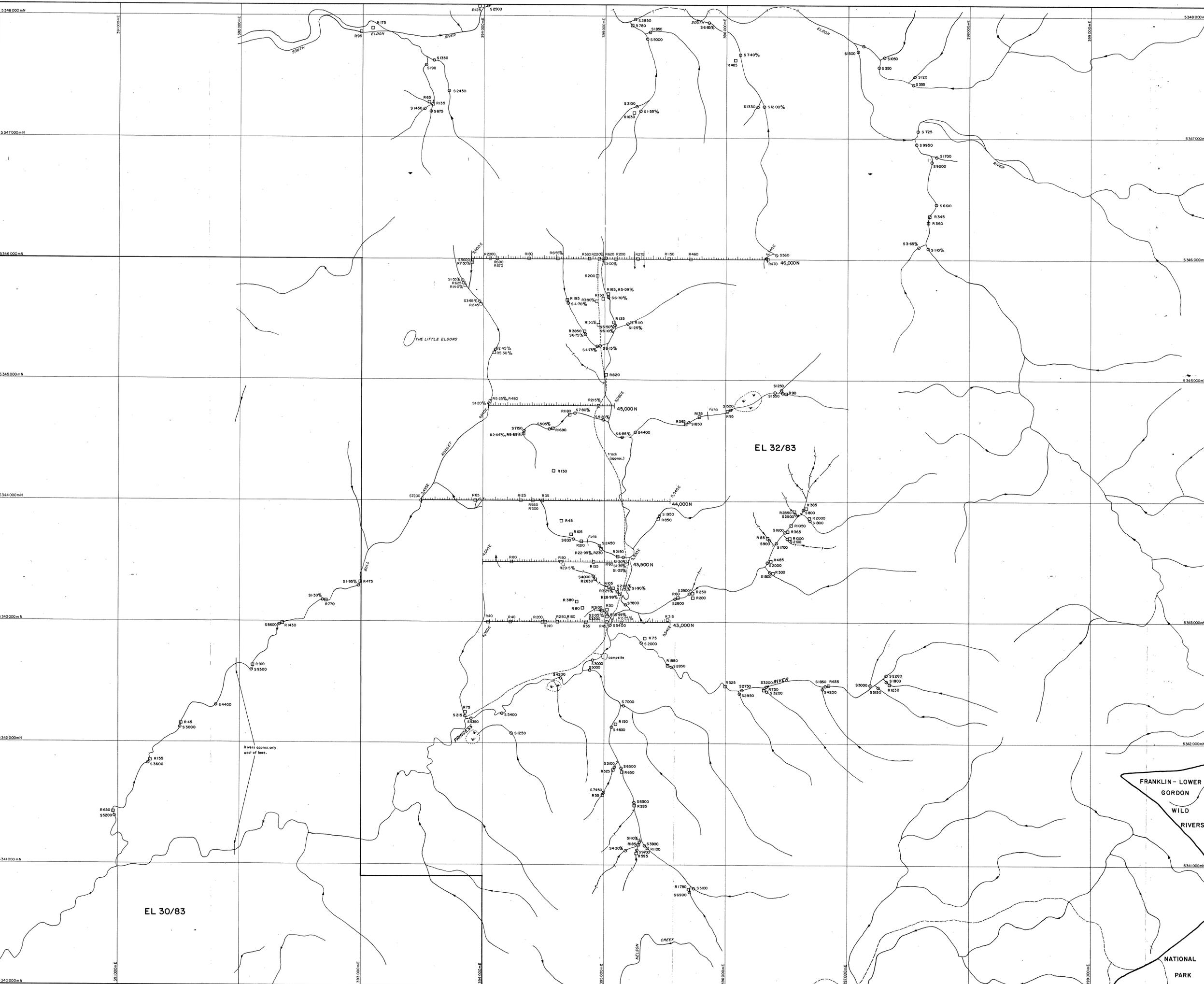
EL 32/83

River approx. only  
 west of here.

2

45 33476 -

006



- Stream Sediment Sample.  
Sample No. S 59221
  - Panned Concentrate - Stream Sediment Sample.  
Sample No. P 59202
  - Rock Chip Sample.  
Sample No. R 59298
- N.B. - ALL VALUES IN PPM, UNLESS OTHERWISE SHOWN.

85-248

114061 Fig. PR. 6

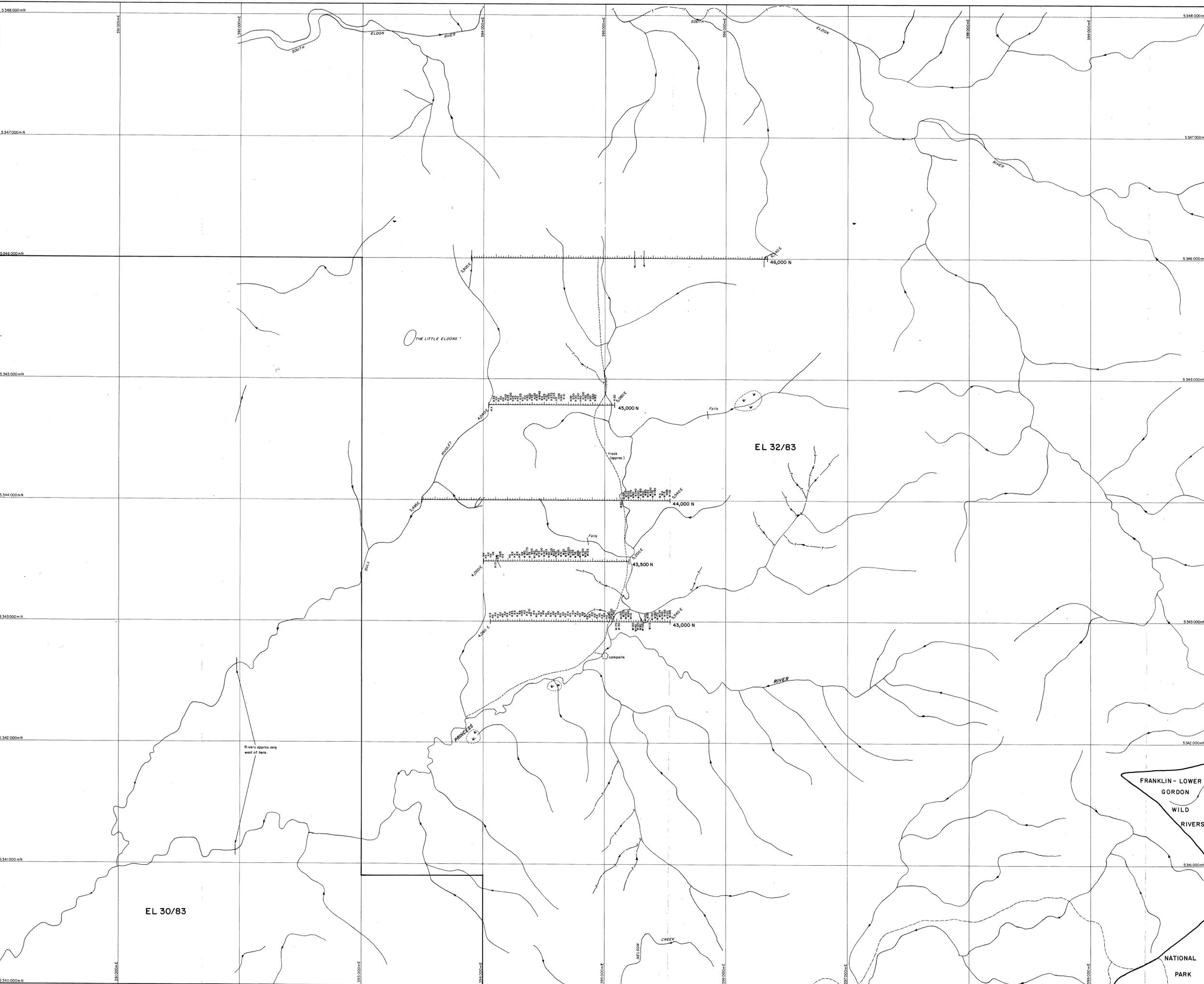
ELECTROLYTIC ZINC CO. OF ASIA LTD.  
PROJECT: PRINCESS RIVER EL32/83TAS.

5 cm		
<b>GEOCHEMISTRY</b>		
Mn		006
Scale: 1:10,000	Survey: I.MAT	Revised:
Reference: LD 8013	Date: 21-3-85	Ref. No.
Drawn: R.J.R.	Checked: I.MAT	AO-531-1008

EL 30/83

FRANKLIN - LOWER  
GORDON  
WILD  
RIVERS

NATIONAL  
PARK



EL 30/83

EL 32/83

W = Walker Bedrock Samples.  
 H = Hand Auger Soil Samples.  
 X = Results Below 5 ppm.  
 N.B. - All results are ppm.

85-2458

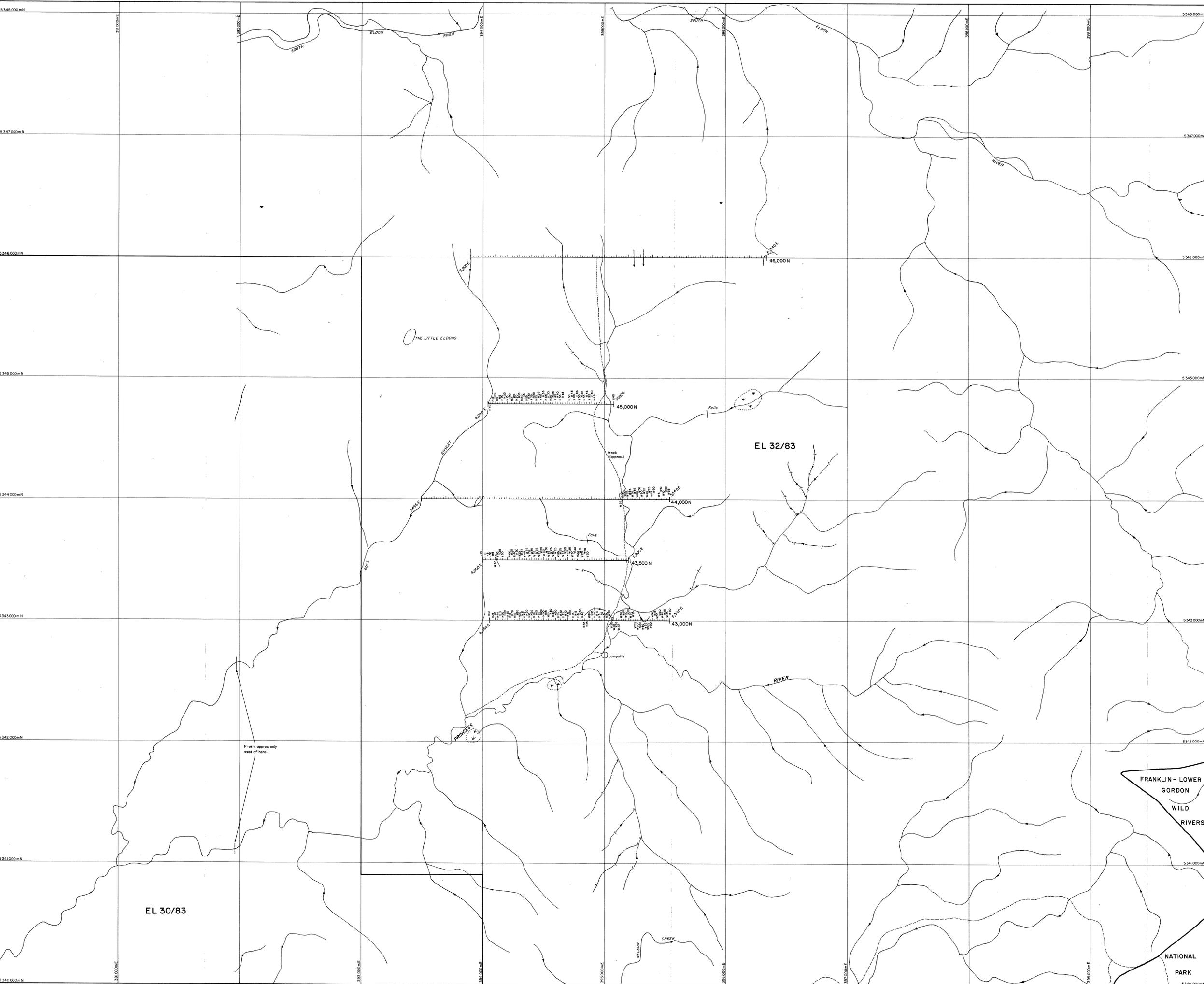
Fig. PR.7

ELECTROLYTIC ZINC CO. OF ASIA LTD.  
 PROJECT: PRINCESS RIVER EL32/83TAS.

5 cm		
<b>GEOCHEMISTRY</b>		
Zn		
114062		
Scale: 1:10000	Survey: I.M.A.T.	Revised:
Reference: LD 8013	Date: 23-5-85	Ref. No.
Drawn: R. J. R.	Checked:	AO-531-1009

NATIONAL PARK

5340 000mN



W = Wacker Bedrock Samples.  
 H = Hand Auger Soil Samples.  
 X = Results Below 5ppm.  
 N.B. - All results are ppm.

85-2106

Fig. P.R. 8

ELECTROLYTIC ZINC CO. OF ASIA LTD.  
 PROJECT: PRINCESS RIVER EL32/83.TAS.

5 cm

GEOCHEMISTRY

008

Pb  
 114063

Scale: 1:10000	Survey: I.M.A.T.	Revised:
Reference: LD 8013	Date: 23-5-'85	Ref. No.
Drawn: R.J.R.	Checked:	AO-531-1010

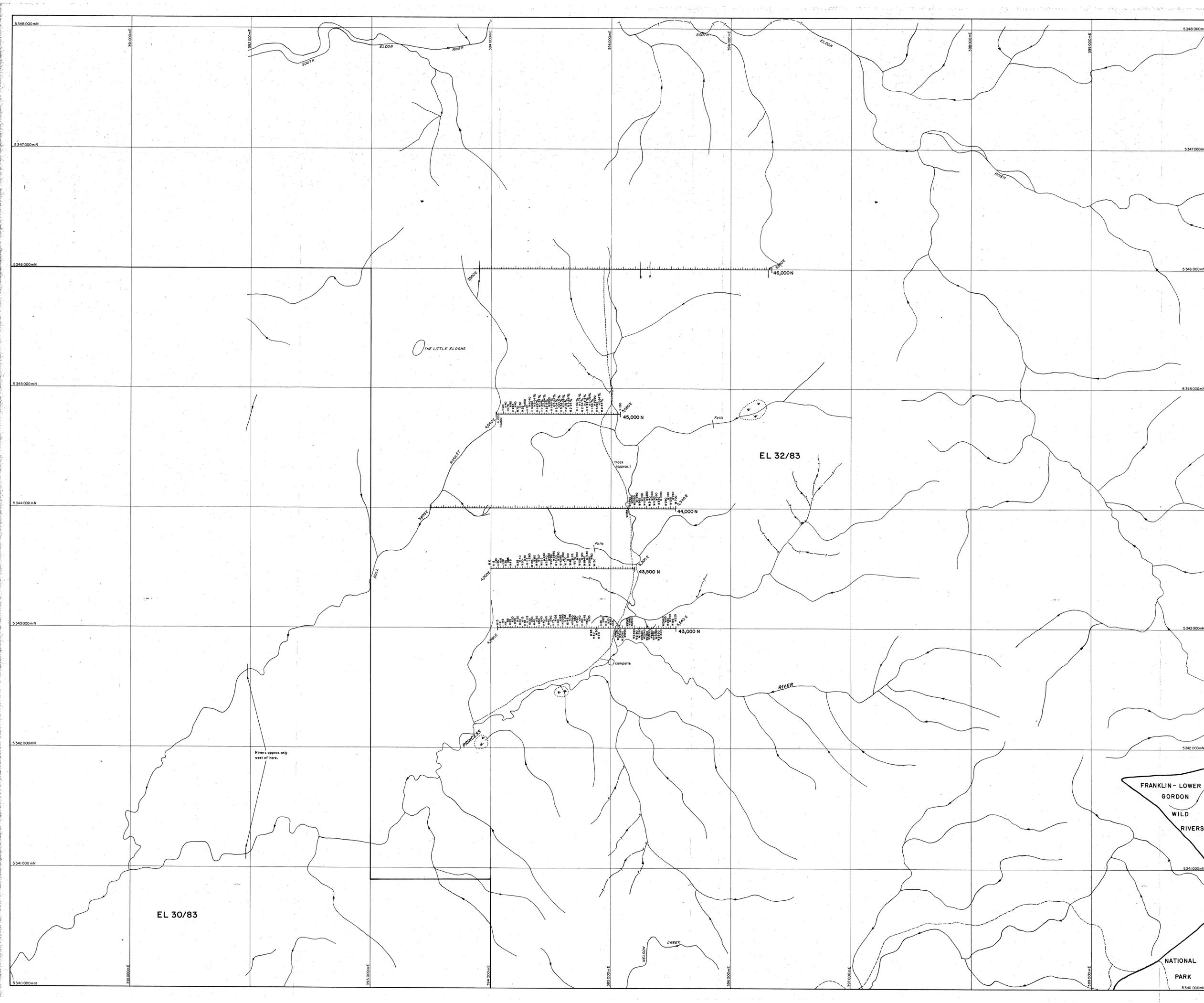
EL 30/83

EL 32/83

NATIONAL  
 PARK

FRANKLIN - LOWER  
 GORDON  
 WILD  
 RIVERS

009



W = Wacker Bedrock Samples.  
 H = Hand Auger Soil Samples.  
 X = Results Below 50cm.

N.B. - All results are ppm - unless otherwise shown.

85-2458

Fig. PR. 9

ELECTROLYTIC ZINC CO. OF ASIA LTD.  
 PROJECT: PRINCESS RIVER EL32/83TAS.

5 cm

GEOCHEMISTRY

Mn 009  
 114064

Scale: 1:10000	Survey: I.MAT	Revised:
Reference: LD 8013	Date: 23-5-85	Ref. No.
Drawn: R. J. R.	Checked:	AO-531-1011

NATIONAL PARK