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CC TAS, M.D.

COMINCO EXPLORATION PTY. LTD.

CLEVELAND TIN N.L.
GEOCHEMISTRY PROGRESS REPORT
E.L. 1/63

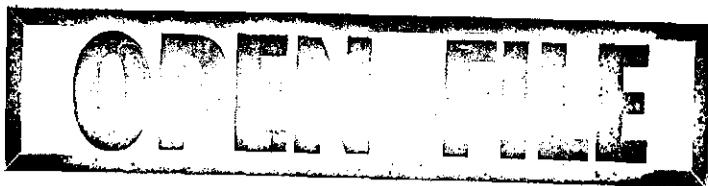
R.V. Sale
Geochemist

March 17 1972

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APPENDIX I

Geochemistry Progress Report

CLEVELAND TIN N.L.

R.V. Sale

March 17, 1972

A pitting and profiling programme has been completed on 8 lines at Cleveland. The aims were:

- i) to conduct an orientation survey over the mine proper and the northern so called low temperature zone mineralisation
- ii) to confirm and find a bedrock source for a previous extensive Cu-Zn soil anomaly to the south east of the mine.

No prior orientation data was available even though considerable areas away from known mineralisation have been covered with soil geochemistry.

Details of Work Done

Pick and shovel were used to dig pits to bedrock on cut lines surveyed to 25 m or 50 m intervals horizontal distance. Pit spacing was normally 5 m or 10 m if practicable. Normally 3 samples were collected in each pit, viz:

- A. shallow (1"-6") humic soil. This is assumed as being equivalent to material collected in previous soil programmes. The -80# fraction was analysed,
- B. C-horizon soil, i.e. normally decomposing rock and clays of a largely residual nature. The -80# fraction was analysed.
- C. weathered bedrock. Total sample pulverised for analysis.

Orientation Lines

Qa	100m W - 60m E	5m intervals	31 pits	92 samples
X	100m W - 98m E	10m intervals	20 pits	65 samples
W	100mW - 70m E	10m "	18 "	53 "

SE Prospecting Lines

AD	30m W - 50m E	5m intervals	16 pits	51 samples
AG	75m W - 50m E	5m "	26 "	84 "
AH	30m W - 70m E	5m "	21 "	66 "
AL	0 -110m E	5m "	23 "	72 "
AN	0 -105m E	5m "	22 "	74 "

Total 177 pits 557 samples

The work took 15 days, and approximately 40 man-days.

A hand specimen of bedrock from each pit was collected and the field identification confirmed with the mine geologist. These specimens have been stored at Cleveland.

Geochemical Environment:

The area is rain-forest covered, steep slopes in an area of cool to, cold temperatures, and a heavy rainfall of 85" p.a. All material was damp. A typical profile consist of a few inches of very dark brown or grey, humic rich clay, amongst a tangled network of fine roots, overlying clay and decomposing rock fragments. It was necessary to collect considerable humic material to obtain sufficient -80# material for assay.

The more resistant rocks in the area - cherts and sandstones - would often form a scree over the more deeply weathered, softer rock, e.g shales and the more tuffaceous sections of the volcanics.

In some cases it was difficult to decide whether the pit had fully penetrated scree to bedrock.

The deepest pit was nearly 8' through sandstone scree to weathered tuff. It has been suggested that deep residual soils develop on the broader ridges. The depth of oxidised sulphides varies from zero on the steeper slopes to a few feet on the gentler slopes where physical erosion has not outstripped oxidation.

Secondary dispersion is expected to be governed largely by down-slope physical transportation for the resistant minerals such as cassiterite and tourmaline. Down-slope solution transfer and physical transportation of gossanous material are expected for copper and zinc.

Discussion of Results

LINE QA (refer: Profile and Section)

Copper

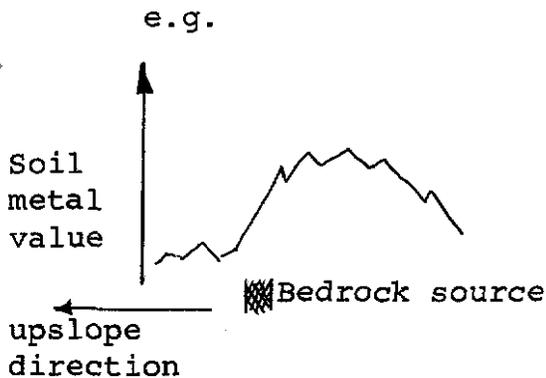
i) Bedrock

From a general background of approximately 100 ppm there is a single point value of 1600 ppm associated with visually obvious Hall's Lode gossan. A lesser 2 point anomaly of 1175 and 475 ppm occurs in sandstone vertically above Henry's Lode.

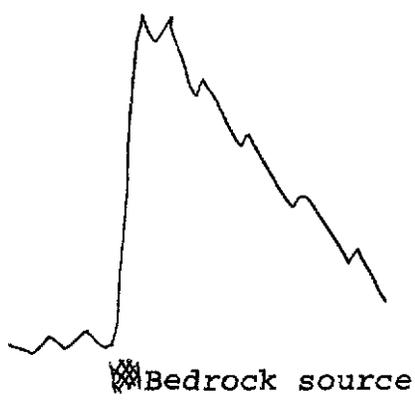
A single point bedrock kick to 260 ppm at 35m E in sandstone may be attributable to weak underlying mineralisation which was intersected in C49 and C39.

ii) Soils

The shallow, often highly humic, soil values were only slightly lower than those of the C-horizon clays, and with few exceptions showed the same trends. The marginally improved anomaly contrast for the C-horizon soil does not warrant the extra digging. The soil anomalies occur downslope from their bedrock source, with the source occurring beneath the first rise of the anomaly.



OR



The Cu near-surface soil values on line QA show a general background of approximately 50 ppm. The anomaly ascribed to Henry's Lode rises to a peak of 330 ppm 45m downslope. The +150 ppm anomaly is at least 50m wide.

The Hall's Lode soil anomaly is much more intense, rising to a maximum of 1200 ppm 5m downslope. The +200 ppm anomaly is at least 50m wide. The intensity of the Halls Lode soil anomaly is no doubt enhanced by the added mineralisation exposed to oxidation in the old workings and the road cutting along the mineralisation.

A surface soil kick to 580 ppm at 55m E may be due to underlying mineralisation which was intersected at depth in C39, but in view of the lack of support from both bedrock and C-horizon soil, it is more likely to be due to contamination from the C39, C37 drill site immediately above it.

Zinc

i) Bedrock

There is a general background of approximately 200 ppm. A three point anomaly of 920, 1500 and 870 ppm in weathered sandstone and chert with shale is attributable to Henry's Lode.

Halls Lode gossan on line QA is extremely low in zinc.

It is not certain whether this is a reflection of low zinc content in the primary sulphides or of intense leaching of zinc on oxidation. Small peaks on either side of the zinc trough may indicate primary zinc zoning around a copper tin core.

A single point zinc bedrock kick to 1025 ppm at 40m E is possibly attributable to the same source as the single point Cu anomaly at 35m E.

ii) Soils

Similar remarks as for Cu soils apply to both the position of the anomaly with respect to its bedrock source and the relative intensities of the anomalies in the shallow soils versus C-horizon soils.

The major feature for zinc surface soils is the broad anomaly downslope from Henry's Lode. Background appears to be less than 100 ppm.

The +150 ppm anomaly is 60m wide and reaches a maximum of 370 ppm 40m downslope from its source.

A one point kick to 300 ppm at 55m E is, like the copper soil value, most probably due to contamination from the C37, C39 drill site.

LINE W (refer: Profile; no Section available)

Copper

i) Bedrock

From a general background of approximately 100 ppm, there are 2 single point anomalies, both associated with weathered spilite. They are peaks of 980 ppm on Halls Reference Plane, and 230 ppm at 20m E.

At 60mE there is a single point anomaly to 575 ppm associated with visually obvious mineralised tuff.

Note that at 100m W there is a weak anomaly of 145 ppm in shale. The line should be extended westwards to see if this anomaly develops.

ii) Soils

The background for near-surface soils is approximately 50 ppm. A strong anomaly develops between 20m E and 30m E with a maximum value of 460 ppm at 30m E and a +100 ppm width of 45 m.

The source of the anomaly is interpreted to be near 25m E and this can be attributed to the vertical extension of mineralisation intersected in C74 and C45. Note that the 10m spaced weathered bedrock sampling did not detect this mineralisation, although it is suspected that 5m spacing would give a weathered bedrock anomaly at 25m E.

The rapid drop off in soil values downslope from the mineralisation detected in weathered bedrock at 60m E suggests this mineralisation may be fairly minor.

There is a very weak suggestion of a near surface soil anomaly developing at 100m W, however, the C-horizon soil shows a stronger trend.

Note that the soils do not reflect the anomalous copper in the weathered spilite on Halls Reference Plane. This is the area of deep ~~scree~~ scree cover. The fact that the C-horizon soil value is also very low suggests that the mineralisation is negligible rather than any failure of metal to penetrate the scree cover.

Zinc

i) Bedrock

Background is less than 150 ppm Zn. Anomalous bedrock

zinc is associated with both volcanics -

- 760 ppm spilite	HRP
485 ppm tuff	10m E
870 ppm spilite	20m E

- and also as a wide halo attributable to bedrock mineralisation interpreted at 25m E and detected mineralised tuff at 60m E. The maximum value is 1300 ppm at 30m E.

There is a broad, extremely low order, bedrock zinc anomaly peaking at 160 ppm at 50m W.

The relative distributions of weathered bedrock zinc and copper associated with mineralisation on this line give stronger support to the idea of a zinc halo around a copper (and tin) core.

ii) Soils

Near surface soils rise from a background of less than 100 ppm to a maximum of 560 ppm at 60m E. The source of this is undoubtedly the inferred mineralisation near 25m E. The +150 ppm anomaly is at least 45m wide.

LINE X (refer Profile - no Section available)

Sample spacing 10 metres.

Copper

i) Bedrock

The major feature is the one point anomaly to a peak of 8375 ppm at 85mE associated with visually mineralised shales and chert. A one point peak to 190 ppm at 45m E is attributable to weathered spilite. Two other one point peaks at 5m E (190 ppm) and 25m E (270 ppm) occur in weathered sandstone. However, there is very little soil metal increase downslope from these peaks and it is considered unlikely that these bedrock peaks are due to significant mineralisation.

The line should be extended to the west to test if an apparently developing bedrock anomaly at 100m W continues further.

ii) Soils

Surface soil values show a steady increase from less than 20 ppm to the west of 30m W to 95 ppm at 65m E irrespective of underlying rock type. This may be due to a progressive increase towards the east of subeconomic veinlet mineralisation.

The soil values rise more steeply to 170 ppm at 75m E suggesting possibly significant mineralisation in the vicinity of 70m E.

The very low soil values at 85m E are strange. (The zinc values also drop dramatically.) The log describes a very shallow, highly humic soil and possibly this may explain the low values.

The soil rise to 250 ppm at 98m E is no doubt due to downslope dispersion from the mineralised bedrock encountered at 85m E.

Zinc

i) Bedrock

The profile shows a general increase in zinc content irrespective of rock type east of 40m W, rising to a peak of 1650 ppm associated with visually mineralised shales and chert at 85m E. However, the value at the end of the line at 98m E is only marginally lower than the peak, and the line should be extended further to the east.

The anomalous value of 585 ppm at 45m E is associated with weathered spilite, but there is a similar value in sandstone and shale at 55m E, suggesting that the values in this region are not solely lithologically controlled. Rather, the bedrock zinc values are interpreted as a halo centred around mineralisation at 85m E or possibly further to the east.

There is a suggestion of a bedrock zinc anomaly developing to the west of 100m W. The line should be extended to the west to investigate this.

ii) Soils

The soil zinc profile behaves in a similar manner to the weathered bedrock in suggesting a broad zone of disseminated zinc mineralisation increasing in tenor to the east and beginning near 30m W. The gradient of the profile steepens between 55m E and 75m E suggesting the zinc mineralisation is becoming more significant. The low value at 85m E is puzzling and, as suggested in the discussion on copper soils, is probably due to a particularly high humic content. The steep rise to 850 ppm at 98m E is no doubt due to mineralisation at 85m E.

Manganese

It is understood that manganese geochemistry has been considered of some use in exploration for Cleveland type ore bodies. The manganese is reputedly an indication of carbonate, and that carbonate in turn is an indicator of mineralisation.

The manganese results from the 3 orientation lines show no simple relationship to the mineralisation, nor do they appear to follow similar trends to the copper and zinc results. Hence, adsorption of Cu and Zn onto manganese oxides does not appear to be operating to a significant extent.

On Line QA, the bulk of the sedimentary rocks appear to be carrying more manganese than the normal quoted in the literature:

Hawkes and Webb	- sandstone 385 ppm Mn
Rankama and Sahama	- shales and phyllites 890 ppm Mn

However, Halls Lode gossan (Halls Reference Plane) and the sandstone bedrock with anomalous copper ascribed to Henrys Lode of 55m W and 60m W occur in troughs in the Mn profile. The

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surface soil high Mn values are difficult to relate to high weathered bedrock Mn values upslope.

There is a high surface soil value (3025 ppm) over Halls Lode, but the values over Henrys Lode are low (800-900 ppm). There are very high surface soil values above some shales and cherts but not over others.

On line W, the bulk of sedimentary rocks have anomalous weathered bedrock Mn content. The volcanics have a particularly high Mn content with a maximum of 8750 ppm at 10m E c.f. Hawkes and Webb normal value for mafic igneous rocks of 2200 ppm. Compared to those on line QA, the surface soil Mn values on line W are much lower. The values increase to the east, reaching a maximum of 925 ppm at 50m E. Hence, the surface soil Mn values increase towards the mineralisation. However, in detail, there is no way of picking the interpreted Cu mineralisation at 25m E and the observed mineralisation at 60m E.

On Line X, the bulk of the sedimentary weathered bedrock values fall in the range 1200-2000 ppm, which is theoretically anomalous. The peak value of 7250 ppm is not associated with spilite but with shales and sandstones adjacent to spilite.

The soil values reach a maximum of 2460 ppm at 75m E in the vicinity of the observed mineralisation at 85m E. A surface soil single point high of 1160 ppm at 20m W does not coincide with any interpreted Cu or Zn mineralisation.

The general conclusion for manganese at this stage is that in a regional way, the surface soil Mn values are high in the vicinity of mineralisation of the Cleveland type. However, in detail, neither the soil peaks or the bedrock highs are necessarily coincident with weathered mineralisation. Both weathered spilite and basic tuff are rich in manganese.

It is worth continuing Mn analyses on near surface soils in reconnaissance work, although the Mn results are probably less discriminatory than those for Cu. Mn analyses in detailed follow up pitting programmes, both soil and bedrock, appear to introduce confusion and should not be used.

Spectrographic Scan

The orientation programme on lines QA, W and X showed that Cu and sometimes Zn could be used to detect Cleveland style Sn-Cu mineralisation. However, it was also shown that high Cu and Zn values could be obtained from basic volcanics. A semi-quantitative spectrographic scan was run on four gossanous samples in an attempt to find pathfinder elements more specific for the Sn-Cu mineralisation. The results are given in the following table. (page 8).

The following elements were present below the limit of detection for the method. This figure in ppm is given in brackets.

Ta (100)	Pd (10)	Ru (2)	Tl (1)	Nb (20)
Os (10)	Cd (3)	P (100)	Th (100)	Ir (2)
Au (3)	Hg (0.15)	Pt (10)	Ph (2)	Sb (30) Te (20)

Element	Detection Limit (ppm)	Hawkes & Webb Rankama Sahama normal values for sedimentary rocks	Halls'Lode Gossan Line QA - HRP Sample No. 99850	Gossanous chert & shale Line X - 85m E Sample No.99970	Gossanous tuff and chert Line W - 60m E Sample No.97306	Possible Gossan Line AG - 70m W Sample No.99699
Sn	(1)	40 Shale Shales Black shales	10,000	3,000	200	150
Cu	(0.5)	30-300 Shales Black shales	1,000	8,000	500	400
Zn	(20)	50-1000	200	1,000	600	100
Pb	(1)	20-400 Shales Black shales	10	800	30	100
Ag	(0.1)	0.4 - 50	10	50	0.1	0.1
As	(50)	4 - 225	300	100	50	300
W	(50)	2	500	-	50	50
Ga	(1)	2 - 7	20	10	10	5
Bi	(1)	1	30	100	10	20
Ge	(1)	3 - 7	1	1	-	-
Be	(1)	1 - 6	1	1	5	1
Mn	(10)	300 - 1000	150	1,500	1,000	10
V	(10)	10 - 2000	30	100	50	300
Cr	(20)	10 - 500	20	30	50	200
Ni	(5)	20 - 300	10	10	50	5
Co	(5)	1 - 50	-	10	10	-
Mo	(3)	1 - 300	-	-	-	3

Apart from the obvious use of Sn as a pathfinder, together with Cu and Zn, the results suggest that Ag, Bi, W, Ga and As offer some promise as potential pathfinders.

Because of the observed association of fluorite and tourmaline with the ore mineralisation, both fluorine and boron would also offer promise as pathfinders. However, they are difficult analytically.

Samples from the 3 orientation lines were analysed for Sn and As by CEPL using gallein colorimetry following NH_4I sublimation for Sn, and the Gutzeit method following KHSO_4 fusion for As. However, it is difficult to reconcile these results with those from the spectrographic scan and geological observations. These analyses are being checked externally by different techniques, but the results are not yet available.

S.E. Prospecting Lines

The previous soil Cu Zn anomalies in the SE prospecting area have been confirmed. Pitting has revealed that the source for these anomalies is within the basic volcanics, and in particular, the more tuffaceous zones. Line AD should be extended further to the east to investigate a strong developing soil anomaly (440 ppm Cu at 50m E).

None of the lines completely covered Halls Formation, and consideration should be given to extending the lines further to the west to cover Halls Formation.

CONCLUSIONS AND RECOMMENDATIONS

1. The orientation programme has shown that copper geochemistry can detect Cleveland type Sn-Cu lodes.
2. Because of its successful averaging effect in the conditions operating on the steep, shallow soil covered slopes of the orientation lines, near-surface soil sampling is a more powerful technique than weathered bedrock sampling in giving the overall tenor of the comparatively irregular mineralisation; e.g:

A weathered bedrock sample which happened to coincide with a thin, comparatively insignificant, veinlet, would give a high value, whereas a weathered bedrock sample which happened to coincide with a barren chert within rich mineralisation would give a low value.
3. Significant copper values can be obtained from the basic volcanics, and in particular the more tuffaceous horizons within the basic volcanics. Such copper anomalies are therefore of less interest in the search for Sn-Cu ore bodies. Attempts to eliminate basic volcanic anomalies by detecting the basic volcanics by Ni or simple hot perchloric acid extractable Cr geochemistry have been unsuccessful. Possibly magnetics could be used to locate the basic volcanics.

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4. The soil anomalies are quite broad and extend downslope from their source. Near-surface soil immediately below, and even including some humic material, gives adequate results in the areas covered. The extra digging to obtain a deeper C-horizon soil is not warranted in the reconnaissance stage. This may require modification in areas of deeper cover.
5. Recommendations for specific further testing:
 - i) Close up the pit spacing to 5m on lines W and X and extend them both to the east (to the major basic volcanics unit), and to the west to check possible developing anomalies.
 - ii) Extend line QA to the west to check a possible developing anomaly.
 - iii) Extend line AD to the east to investigate a strong developing soil anomaly.
 - iv) Extend the SE lines to the west to cover the whole of Halls Formation.
 - v) Continue a geochemical investigation of the area.

Attachments

				AH - Zinc, Copper-(bedrock)	1
Geochemical	Traverse	on	Line	AH - Copper, Zinc-(bedrock)	2
"	"	"	"	AE - Manganese	3
"	"	"	"	AG - Copper, Zinc-(bedrock)	4
"	"	"	"	AG - Manganese	5
"	"	"	"	AG - Zinc, Copper-(bedrock)	6
"	"	"	"	AD - Copper, Zinc-(bedrock)	7
"	"	"	"	AD - Zinc, Copper-(bedrock)	8
"	"	"	"	AD - Manganese	9
"	"	"	"	AN - Zinc, Copper-(bedrock)	10
"	"	"	"	AN - Copper, Zinc-(bedrock)	11
"	"	"	"	AN - Manganese	12
"	"	"	"	AL - Zinc, Copper-(bedrock)	13
"	"	"	"	AL - Copper, Zinc-(bedrock)	14
"	"	"	"	AL - Manganese	15
"	"	"	"	X - Zinc, Copper-(bedrock)	16
"	"	"	"	X - Copper, Zinc-(bedrock)	17
"	"	"	"	X - Manganese	18
"	"	"	"	X - Tin	19
"	"	"	"	QA - Copper, Zinc-(bedrock)	20
"	"	"	"	QA - Zinc, Copper-(bedrock)	21
"	"	"	"	QA - Manganese	22
"	"	"	"	QA - Tin (not included, this report)	23
"	"	"	"	W - Copper, Zinc-(bedrock)	24
"	"	"	"	W - Zinc, Copper-(bedrock)	25
"	"	"	"	W - Manganese (not included, this report)	26
"	"	"	"	W - Tin (not included, this report)	27
Section on line QA					111000 Qa/72

Signed: RV Sale
R.V. Sale
Geochemist
Cominco Exploration Pty. Ltd.

Dist: Cleveland Tin N.L. (1)
Department of Mines, Hobart (1)
CT 2600 File (1)

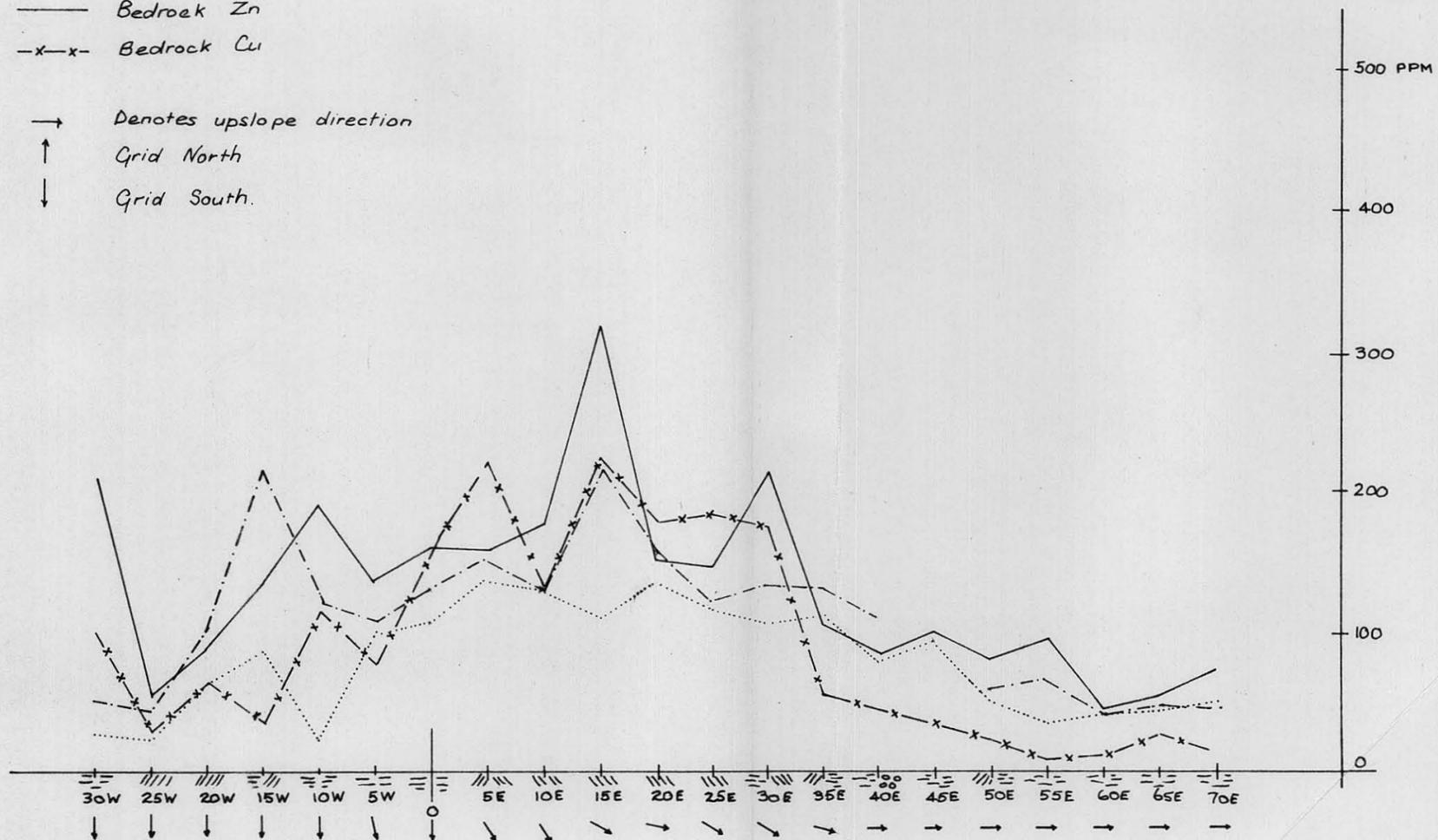
RVS:jb

LEGEND.

- ≡ Shale
- ⊙ Sandstone
- /// Chert
- Lode
- |||| Spilite
- ⊗ Tuff
- °° Agglomerate

- Near surface Zn -80*
- C-Horizon Zn -80*
- Bedrock Zn
- x-x- Bedrock Cu

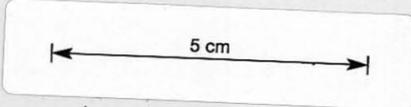
- Denotes upslope direction
- ↑ Grid North
- ↓ Grid South



NOTE: Sample interval as shown is 5 metres, which is an approximation.

Vertical Scale 1" = 100 PPM
Horizontal Scale 1:500 (metric)

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COMINCO EXPLORATION PTY. LTD.			
DRAWN BY JJB	TRACED BY	CLEVELAND TIN N.L.	
CHECKED BY	REVISED BY	E.L. 1/63	
REVISED BY	DATE	GEOCHEMICAL TRAVERSE LINE AH	
		3118	
		LJINA, TASMANIA	
Location code	K155-5-43	Scale	1" = 100 PPM 1:500 (Metric)
Date	MARCH 1972	Plate	1

LEGEND

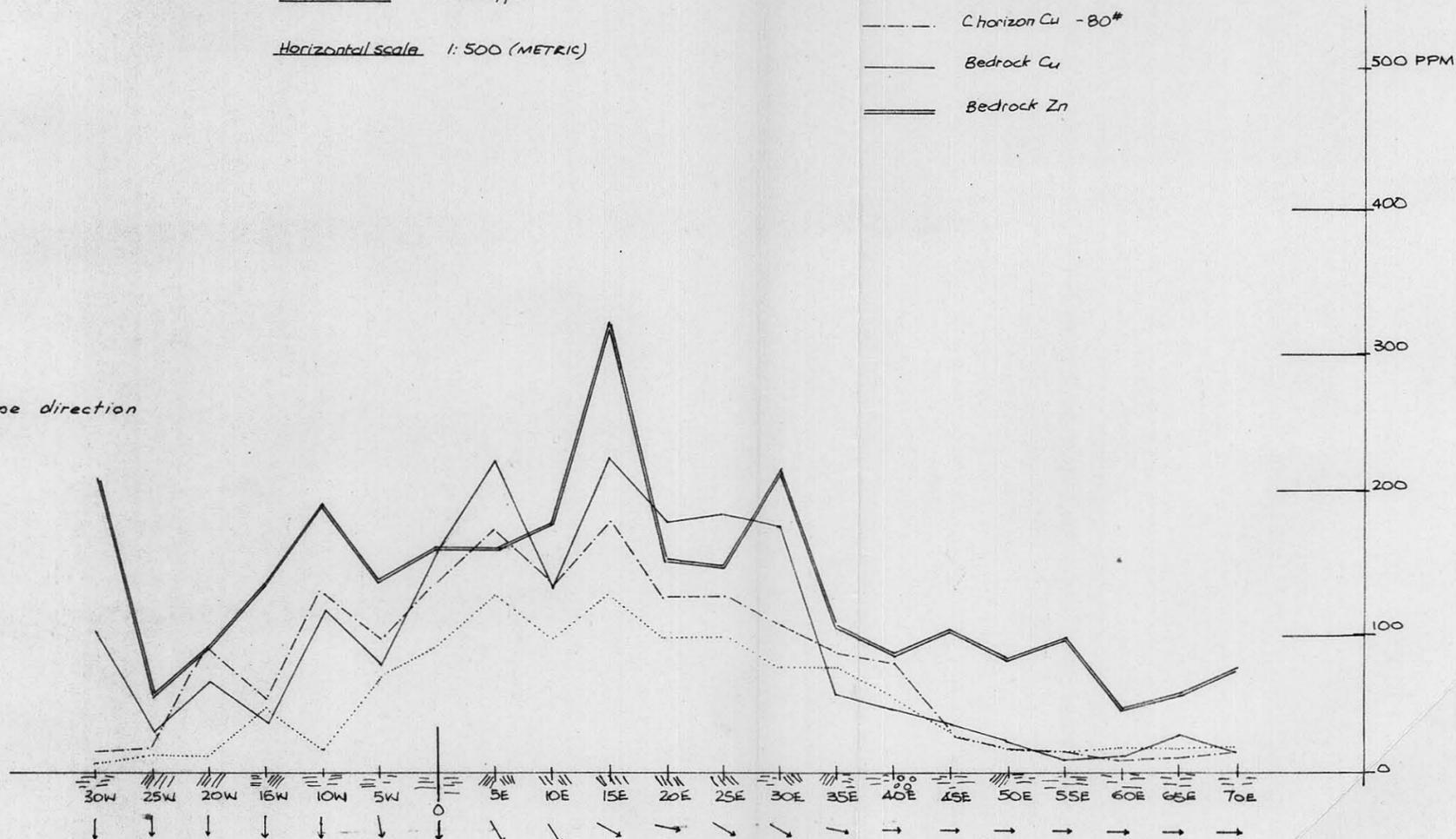
-  Shale
-  Sandstone
-  Chert
-  Lode
-  Spilite
-  Agglomerate

- Denotes upslope direction
- ↑ Grid North
- ↓ Grid South

Vertical scale 1" = 100ppm

Horizontal scale 1:500 (METRIC)

-  Near surface Cu - 80#
-  Chorizon Cu - 80#
-  Bedrock Cu
-  Bedrock Zn



NOTE: Sample interval is shown as 5 metres, which is an approximation

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5 cm

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COMINCO EXPLORATION PTY.LTD.

Drawn: JB	Traced:
Checked:	

CLEVELAND TIN N.L.
E.L. 1/63

GEOCHEMICAL TRAVERSE ON LINE AH 3119

LUINA, TAS.

Location code: K/55-5-43

Scale: $\frac{1}{8}$ 1" = 100ppm
1:500 (Metric)

Date: MARCH 1972

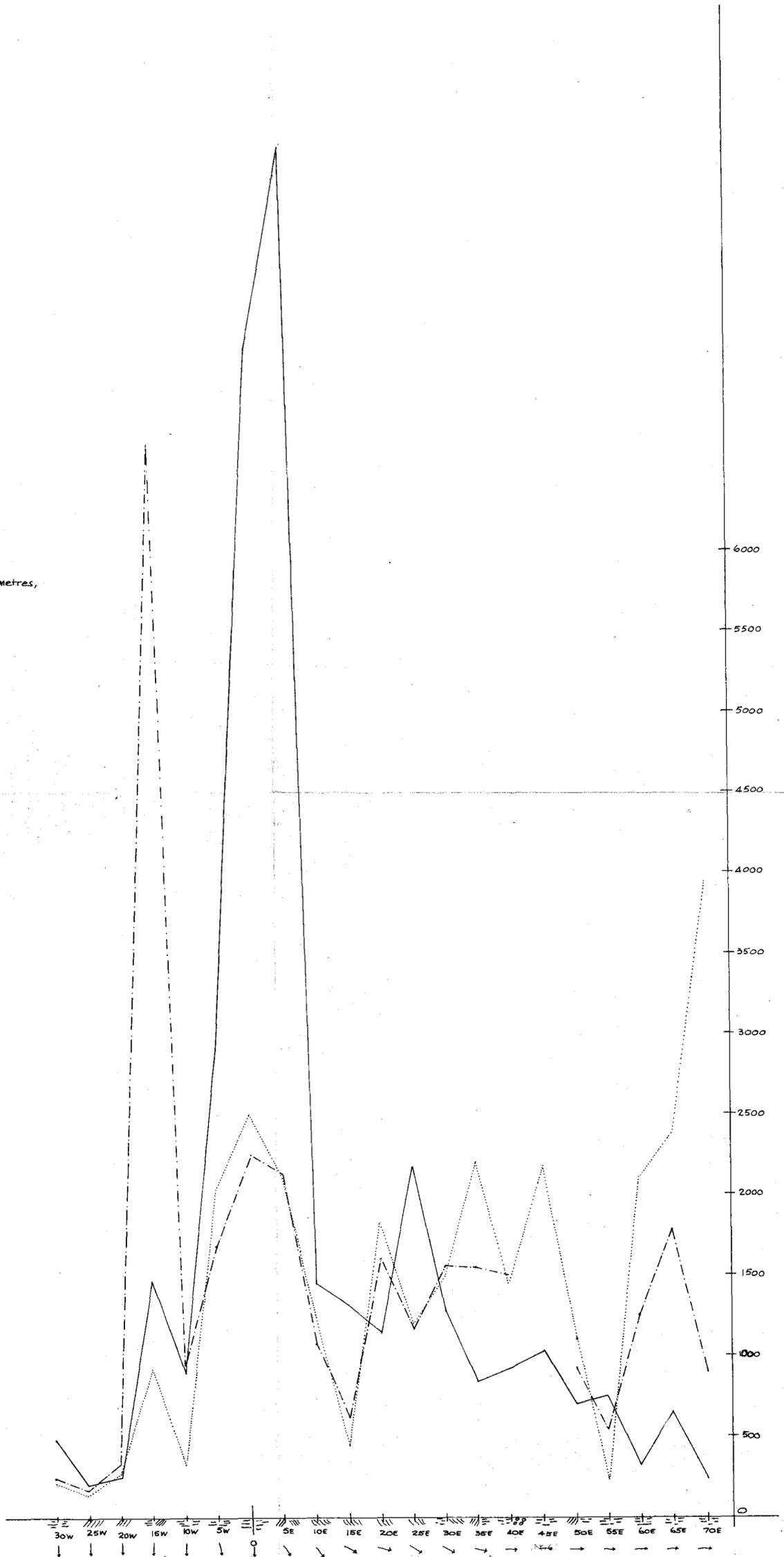
Plate 2

LEGEND

- ≡≡ Shale
- Sandstone
- //// Chert
- Lode
- |||| Spillite
- ⊙⊙ Agglomerate
- Denotes upslope direction
- ↑ Grid North
- ↓ Grid South
- Near Surface Mn -80*
- C-Horizon Mn -80*
- Bedrock Mn.

Vertical Scale 1" = 100 PPM
 Horizontal Scale 1:500 (Metric)

NOTE: Sample interval is shown as 5 metres, which is an approximation.



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5 cm

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COMINCO EXPLORATION PTY. LTD.			
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CHECKED BY	REVISED BY	DATE	3120
REVISED BY	DATE		GEOCHEMICAL TRAVERSE ON LINE AH
LJUNA, TASMANIA			
Location code	K55-5-43	Scale	1" = 100 PPM 1:500 (Metric)
Date	MARCH 1972	Plate	3

LEGEND

- ≡≡≡ Shale
- ⋯⋯ Sandstone
- //// Chert
- Lode
- |||| Spilite
- #### Tuff

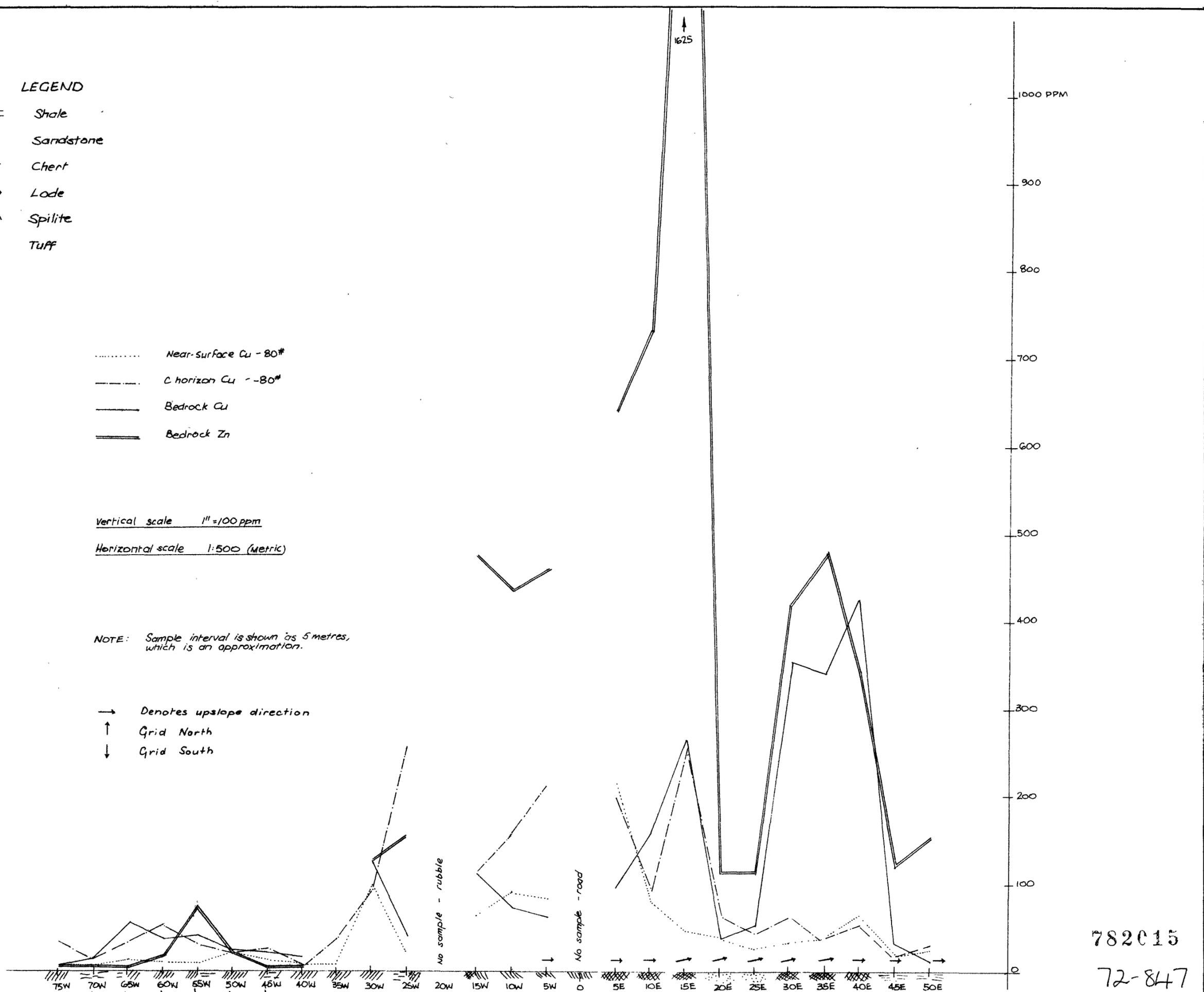
- ⋯⋯ Near-Surface Cu - 80'
- C horizon Cu - 80'
- Bedrock Cu
- == Bedrock Zn

Vertical scale 1" = 100 ppm

Horizontal scale 1:500 (metric)

NOTE: Sample interval is shown as 5 metres, which is an approximation.

- Denotes upslope direction
- ↑ Grid North
- ↓ Grid South



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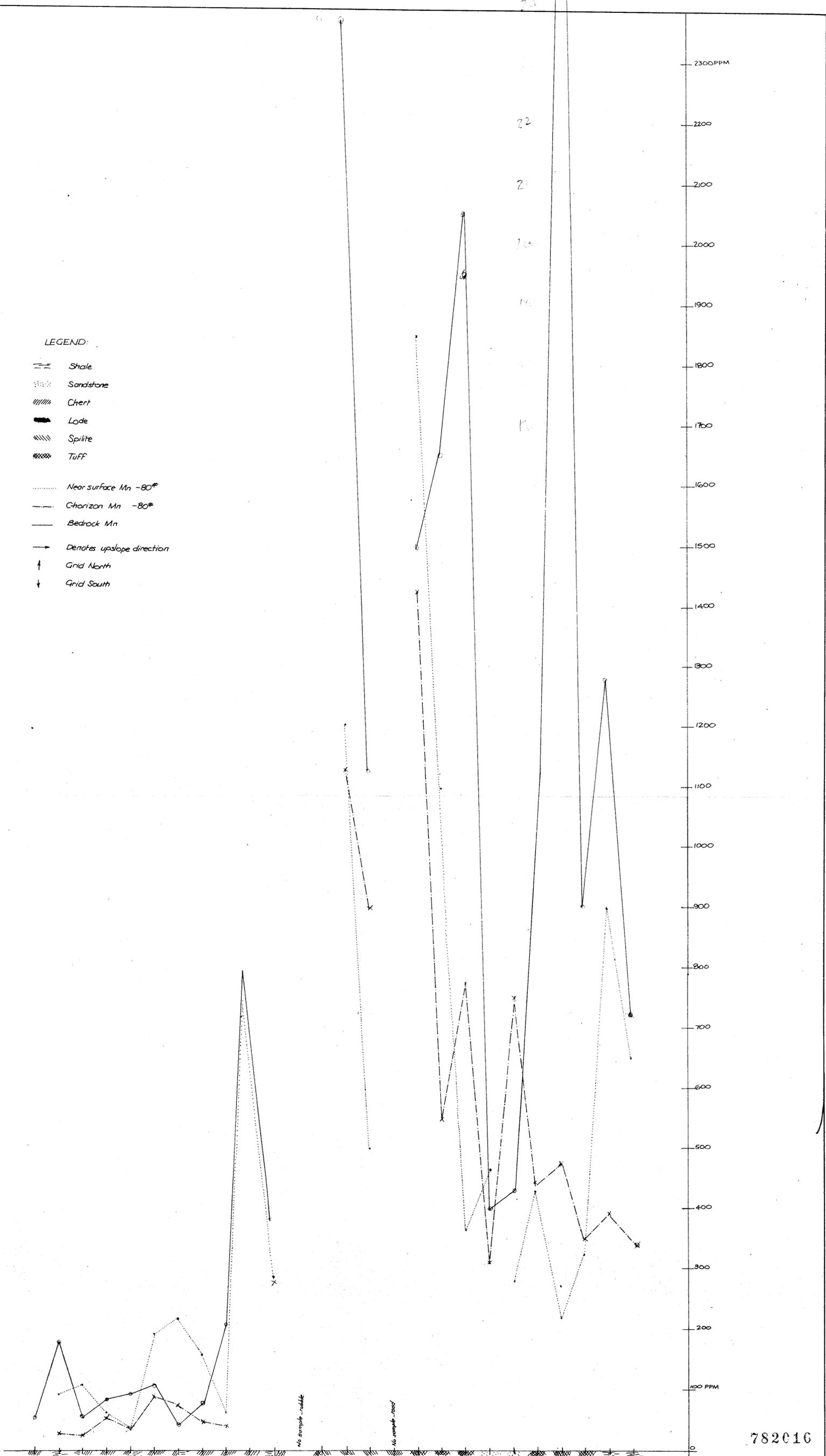
COMINCO EXPLORATION PTY. LTD.

Drawn by JB.	Traced by	CLEVELAND TIN N.L. E.L. 1/63	
Checked		3121	
		GEOCHEMICAL TRAVERSE ON LINE AG	
		LUINA TAS.	
Location code. W/85-5-43	Scale: $\frac{1}{H}$	1" = 100 ppm 500 (metric)	Date: MARCH 1972
			Plate: 4

5 cm

LEGEND:

-  Shale
-  Sandstone
-  Chert
-  Lode
-  Spilite
-  Tuff
-  Near surface Mn -80%
-  Chorizon Mn -80%
-  Bedrock Mn
-  Denotes upslope direction
-  Grid North
-  Grid South



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COMINCO EXPLORATION PTY. LTD.

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CHECKED BY		REVISED BY	
REVISED BY	DATE	REVISED BY	DATE

CLEVELAND TIN N.L.
E. L. 1/63

GEOCHEMICAL TRAVERSE ON LINE AG 3123

LUINA, TASMANIA

Location code K 55-5-43 Scale 1" = 100 PPM
H 1:500 (Metric) Date MARCH 1972 Plate 5

5 cm

LEGEND

- Shale
- Sandstone
- //// Chert
- Lode
- |||| Spilite
- xxxx Tuff

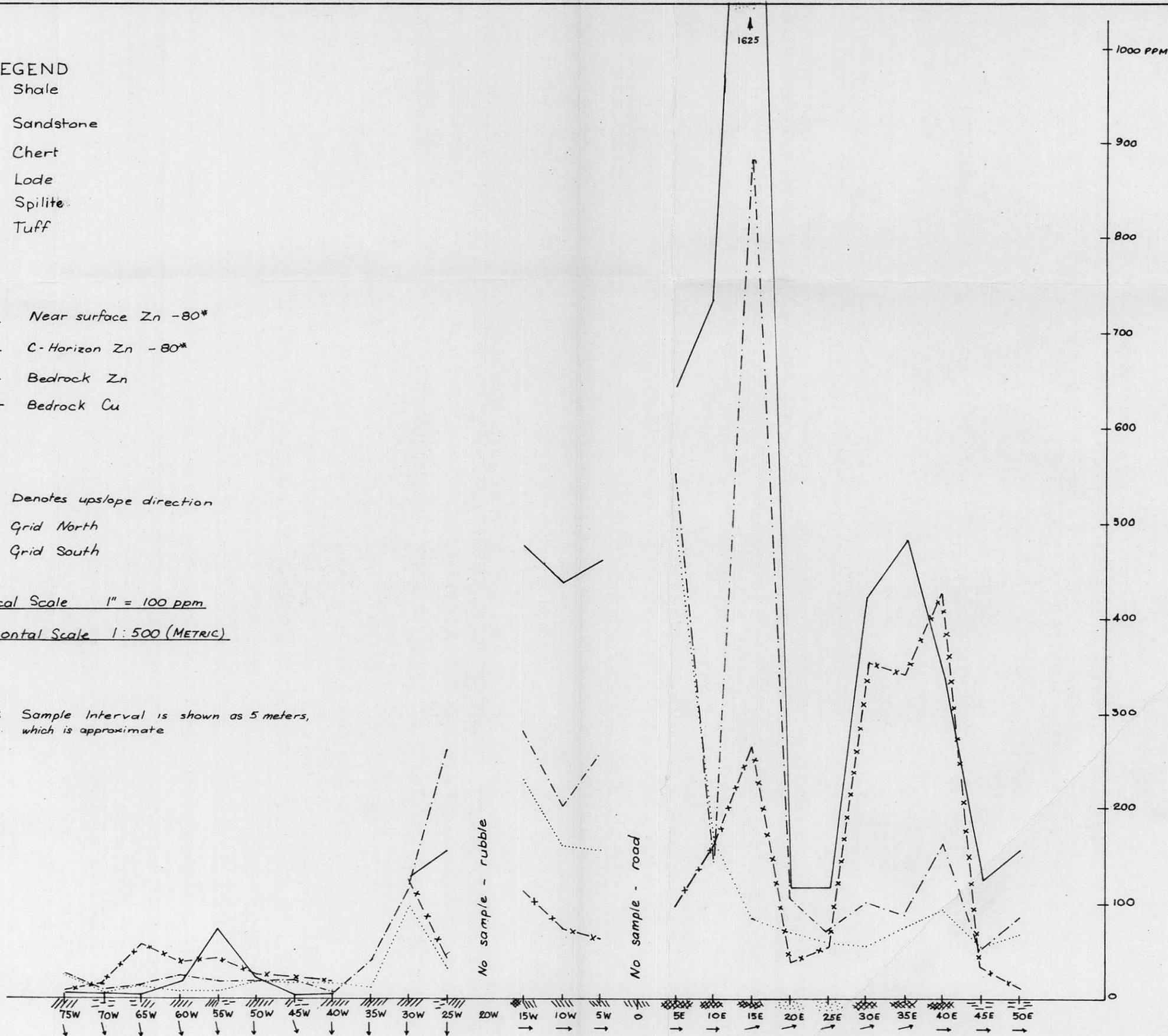
- Near surface Zn -80*
- C-Horizon Zn -80*
- Bedrock Zn
- x-x- Bedrock Cu

- Denotes upslope direction
- ↑ Grid North
- ↓ Grid South

Vertical Scale 1" = 100 ppm

Horizontal Scale 1:500 (METRIC)

NOTE: Sample Interval is shown as 5 meters, which is approximate



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COMINCO EXPLORATION PTY. LTD.

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REVISED BY	DATE		

CLEVELAND TIN N.L.
EL. 1/63

GEOCHEMICAL TRAVERSE LINE AG

3122

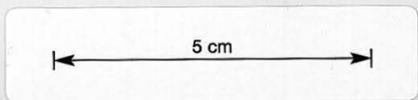
LUINA, TASMANIA

Location code K155-5-43

Scale V
H 1" = 100 PPM
1:500 (Metric)

Date MARCH 1972

Plate 6



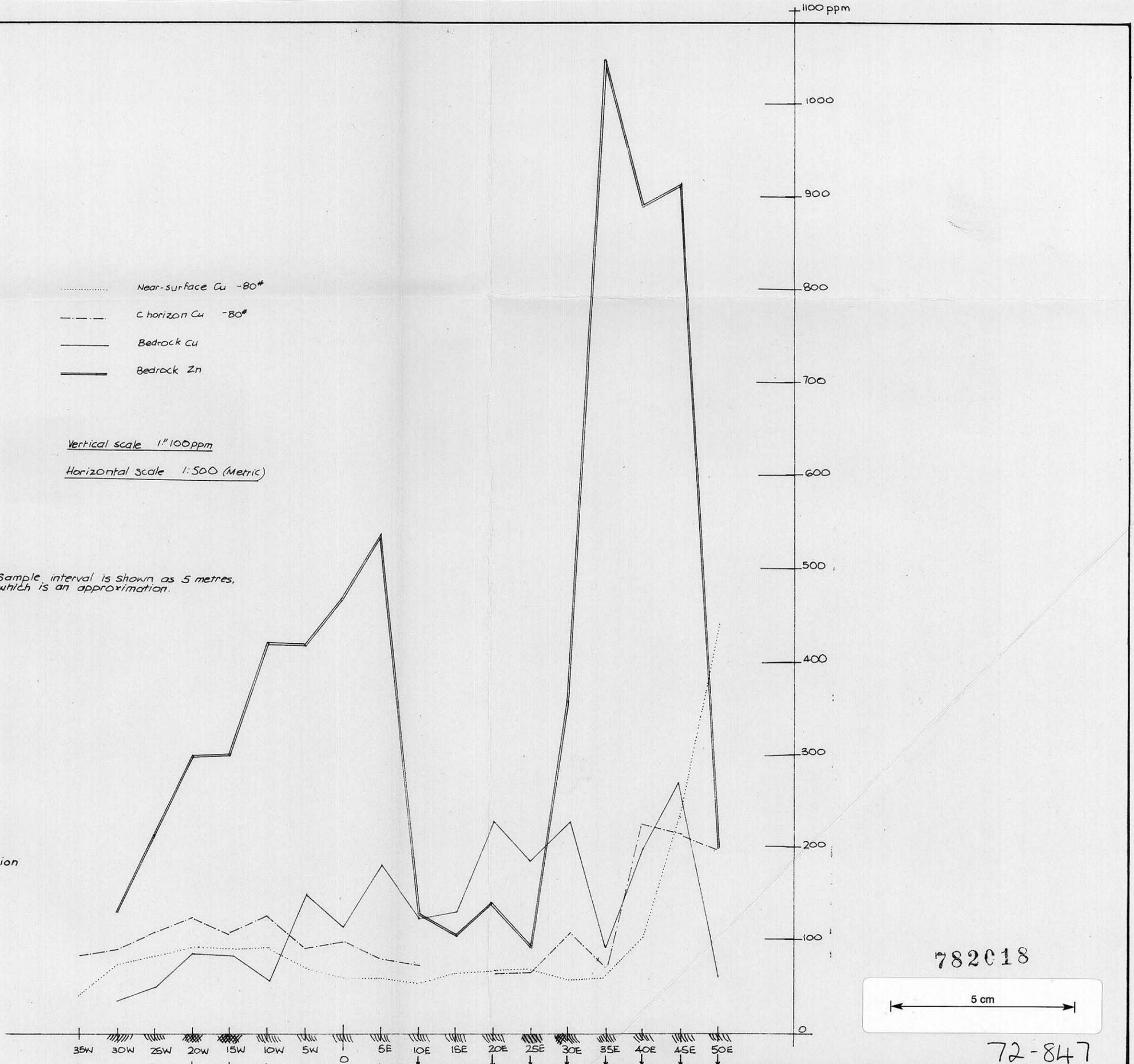
..... Near-surface Cu -80#
 - - - - - C horizon Cu -80#
 ——— Bedrock Cu
 ——— Bedrock Zn

Vertical scale 1" 100ppm
 Horizontal scale 1:500 (Metric)

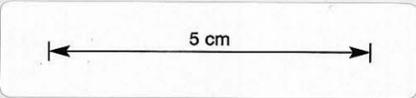
NOTE: Sample interval is shown as 5 metres, which is an approximation.

LEGEND

- - - Shale
- Sandstone
- ▨ Chert
- Lode
- ▨ Spilite
- ▨ Tuff
- Denotes upslope direction
- ↑ Grid North
- ↓ Grid South



782018



72-847

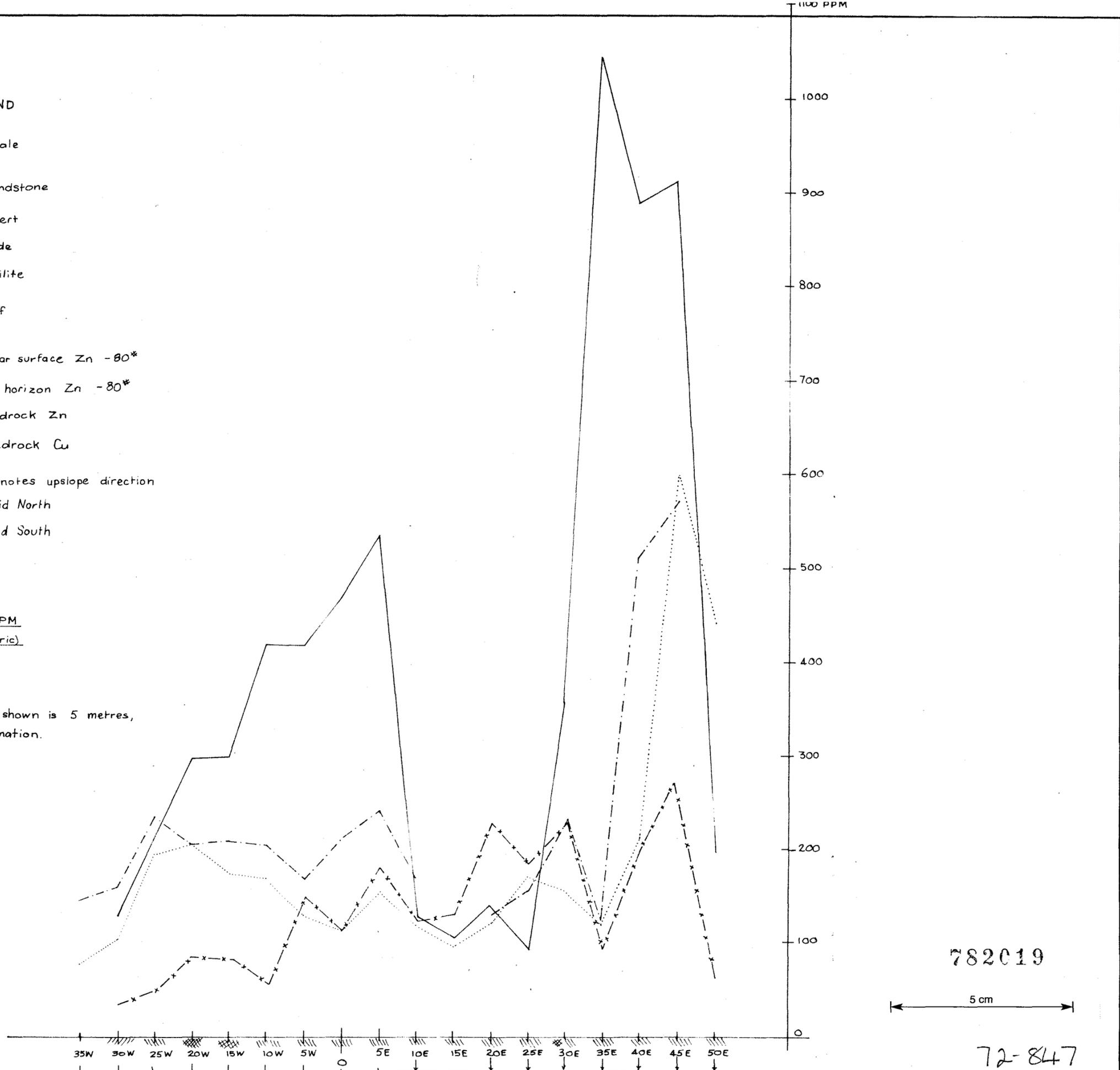
COMINCO EXPLORATION PTY. LTD.			
Drawn by JB.	Traced by	CLEVELAND TIN N.L. E.L. 1/63	3124
Checked by		GEOCHEMICAL TRAVERSE ON LINE AD	
		LUNNA, TASMANIA	
Location code K/55-3-43	Scale: 1" = 100 PPM 1:500 METRIC	Date MARCH 1972	Plate 7

LEGEND

-  Shale
-  Sandstone
-  Chert
-  Lode
-  Spilite
-  Tuff
-  Near surface Zn -80*
-  C horizon Zn -80*
-  Bedrock Zn
-  Bedrock Cu
-  Denotes upslope direction
-  Grid North
-  Grid South

Vertical Scale 1" = 100 PPM
 Horizontal Scale 1:500 (Metric)

NOTE: Sample interval as shown is 5 metres, which is an approximation.

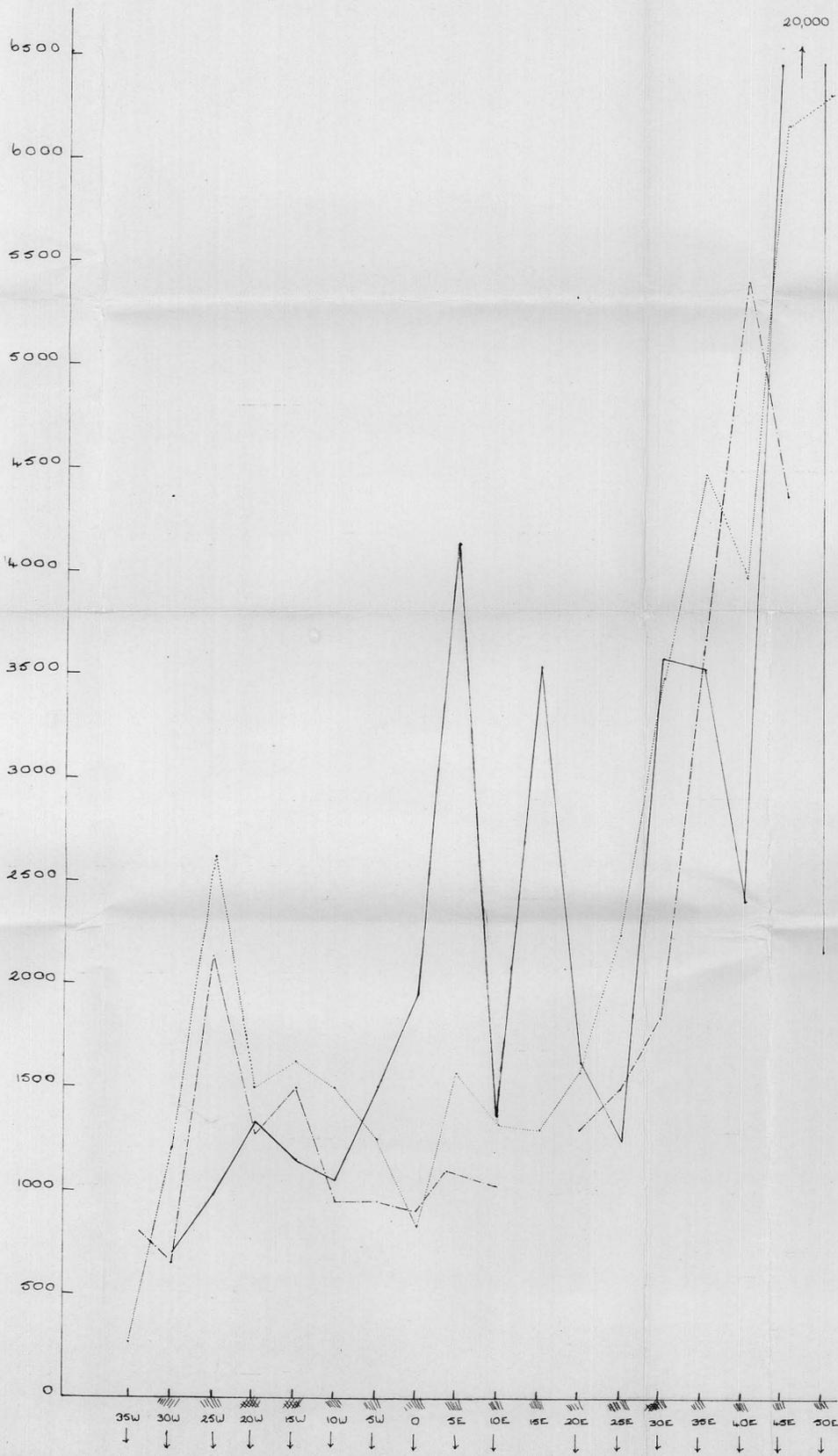


782019

5 cm

72-847

COMINCO EXPLORATION PTY. LTD.			
DRAWN BY JSB		TRACED BY	
CHECKED BY		REVISED BY	DATE
REVISED BY	DATE		
CLEVELAND TIN N.L.		3125	
E.L.1/63			
GEOCHEMICAL TRAVERSE LINE AD			
LUINA, TASMANIA			
Location code	K/55-5-43	Scale	1" = 100 ppm 1:500 (Metric)
Date	MARCH 1972	Plate	8



Vertical Scale 1" = 500 ppm
 Horizontal Scale 1:500 (metric)

→ Denotes Upslope direction
 ↑ Grid North
 ↓ Grid South

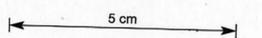
LEGEND

- ▨ Chert
- ▨ Spilite
- ▨ Tuff

- Near surface Mn - 80#
- - - C Horizon Mn - 80#
- Bedrock Mn

Note: Sample interval is shown as 5 metres which is an approximation.

782020



72-847

COMINCO EXPLORATION PTY LTD

DRAWN BY RM		TRACED BY		CLEVELAND TIN N.L.	
CHECKED BY		REVISED BY	DATE	EL. 1/63 3126	
REVISED BY	DATE			GEOCHEMICAL TRAVERSE ON LINE AD	
				LUINA, TASMANIA	
Location code	K-25-5-43	Date	MARCH 1972	Scale	V H 1" = 100 PPM 1:500 METRIC
				Plate	9

LEGEND

- ≡≡ Shale
- ⋯ Sandstone
- //// Chert
- Lode
- |||| Spilite
- ⊗ Tuff

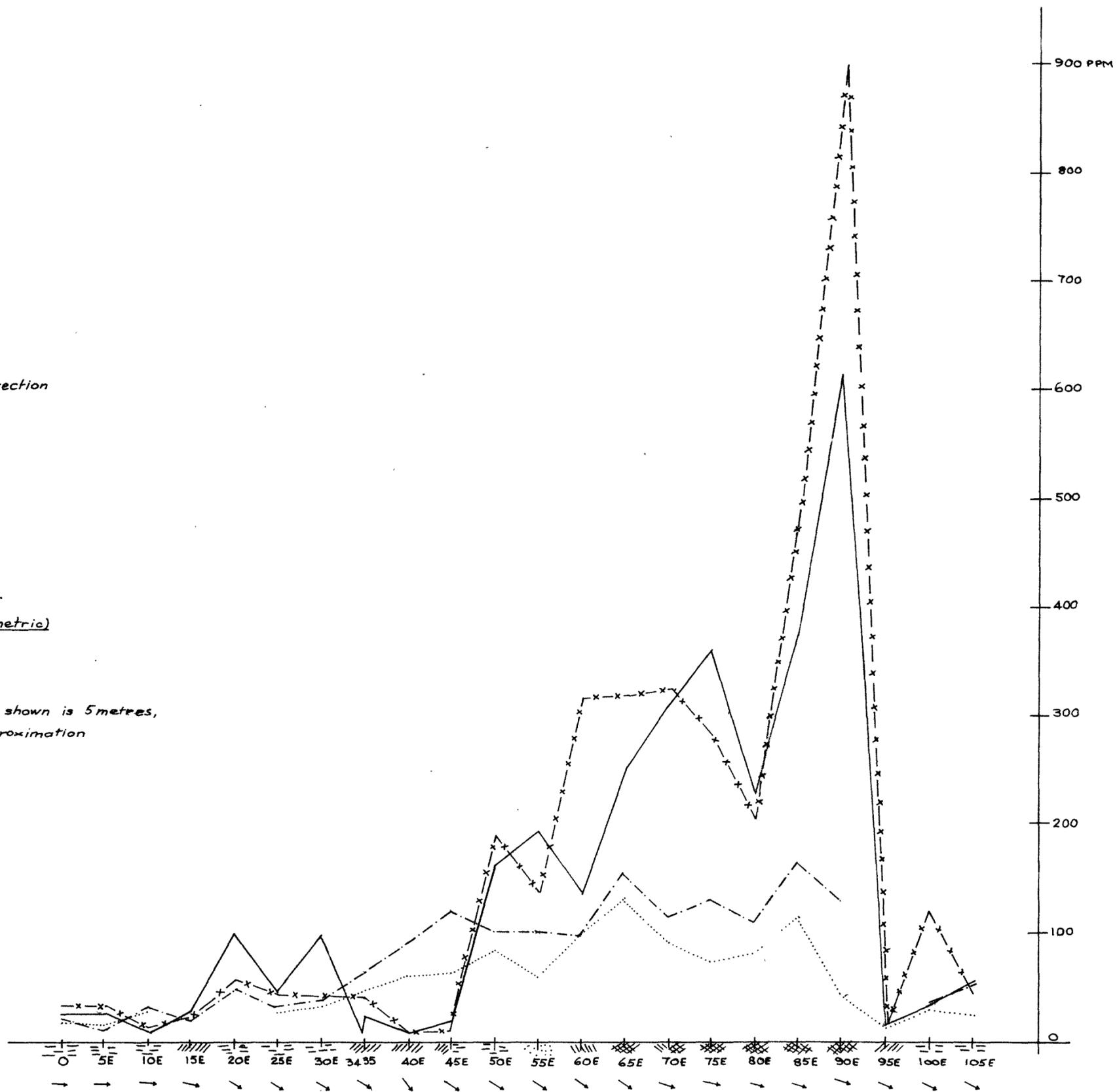
- Near surface Zn -80*
- - - C - Horizon Zn -80*
- Bedrock Zn
- x-x- Bedrock Cu

- Denotes upslope direction
- ↑ Grid North
- ↓ Grid South

Vertical Scale 1" = 100 p.p.m

Horizontal Scale 1:500 (metric)

NOTE: Sample interval shown is 5 metres, which is an approximation



782021

72-847

COMINCO EXPLORATION PTY. LTD.

DRAWN BY JJB		TRACED BY		CLEVELAND TIN N.L. E.L. 1/63		3128	
CHECKED BY		REVISED BY	DATE				
REVISED BY	DATE						
				GEOCHEMICAL TRAVERSE ON LINE AN			
				LUINA, TASMANIA			
Location code K/53-5-43		Scale	V H 1" = 100 ppm 1:500 (metric)	Date	MARCH 1972	Plate	10

5 cm

LEGEND.

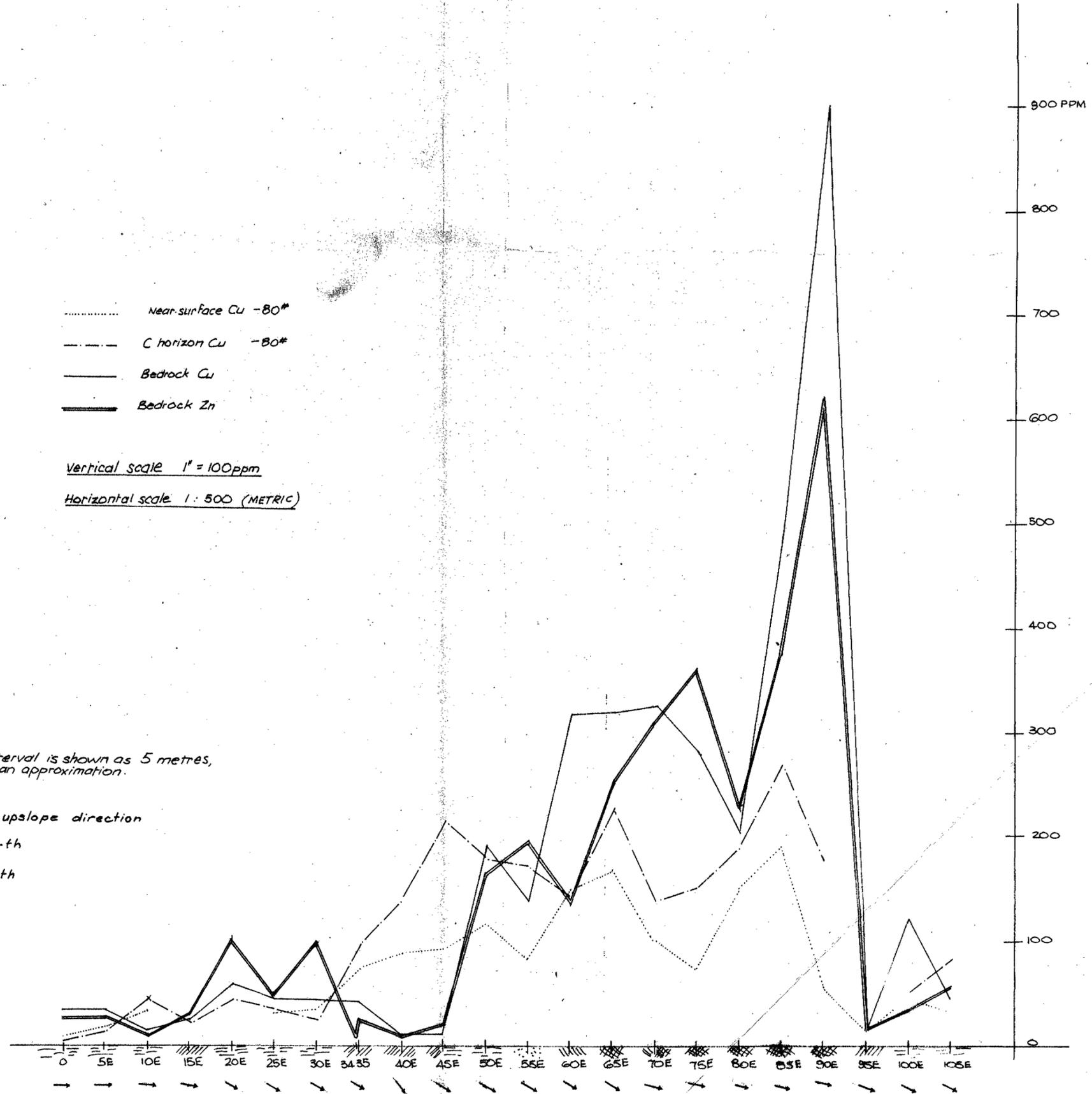
- Shale
- Sandstone
- Chert
- Lode
- Spilite

- Near-surface Cu -80#
- C horizon Cu -80#
- Bedrock Cu
- Bedrock Zn

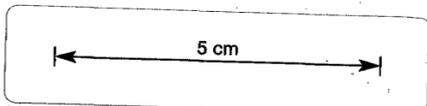
Vertical scale 1" = 100ppm
 Horizontal scale 1:500 (METRIC)

NOTE: Sample interval is shown as 5 metres, which is an approximation.

- Denotes upslope direction
- ↑ Grid North
- ↓ Grid South



782022
72-847

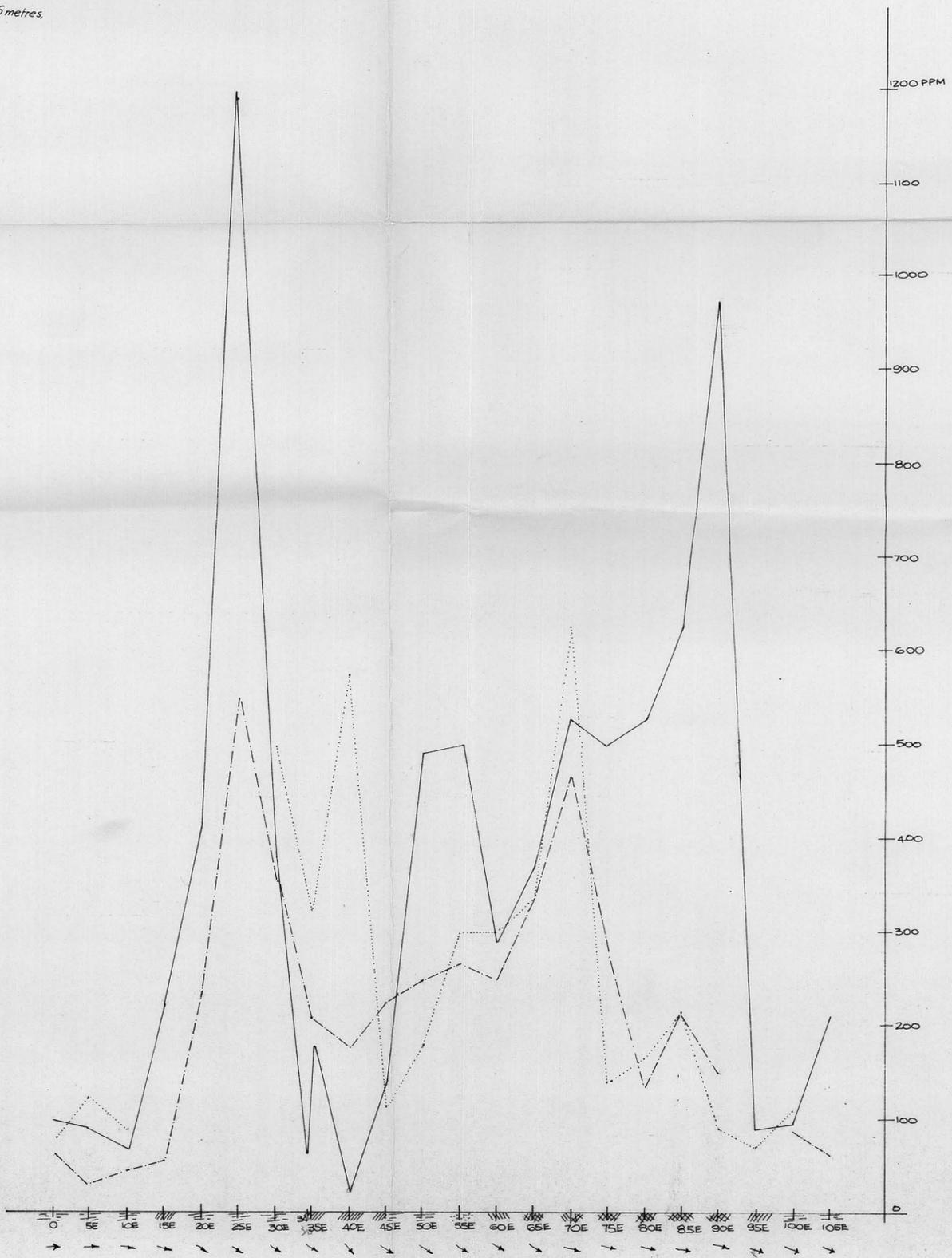


COMINCO EXPLORATION PTY. LTD.			
Drawn by B	Traced by:	CLEVELAND TIN N.L. E.L. 1/63	
Checked:		3127	
		GEOCHEMICAL TRAVERSE ON LINE AN	
		LUINA, TAS.	
Location code: K/53-5-43	Scale: $\frac{1}{4}$	1" = 100ppm 1:500 (Metric)	Date MARCH 1972 Plate: 11

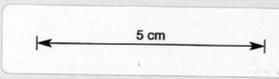
LEGEND:

- ≡≡≡ Shale → Upslope direction
- ⋯⋯⋯ Sandstone ↑ Grid North
- ////// Chert ↓ Grid South
- Lode
- ||||| Spillite
- Near surface Mn -80*
- - - - C-horizon Mn -80*
- Bedrock Mn

NOTE: Sample interval is shown as 5metres which is an approximation



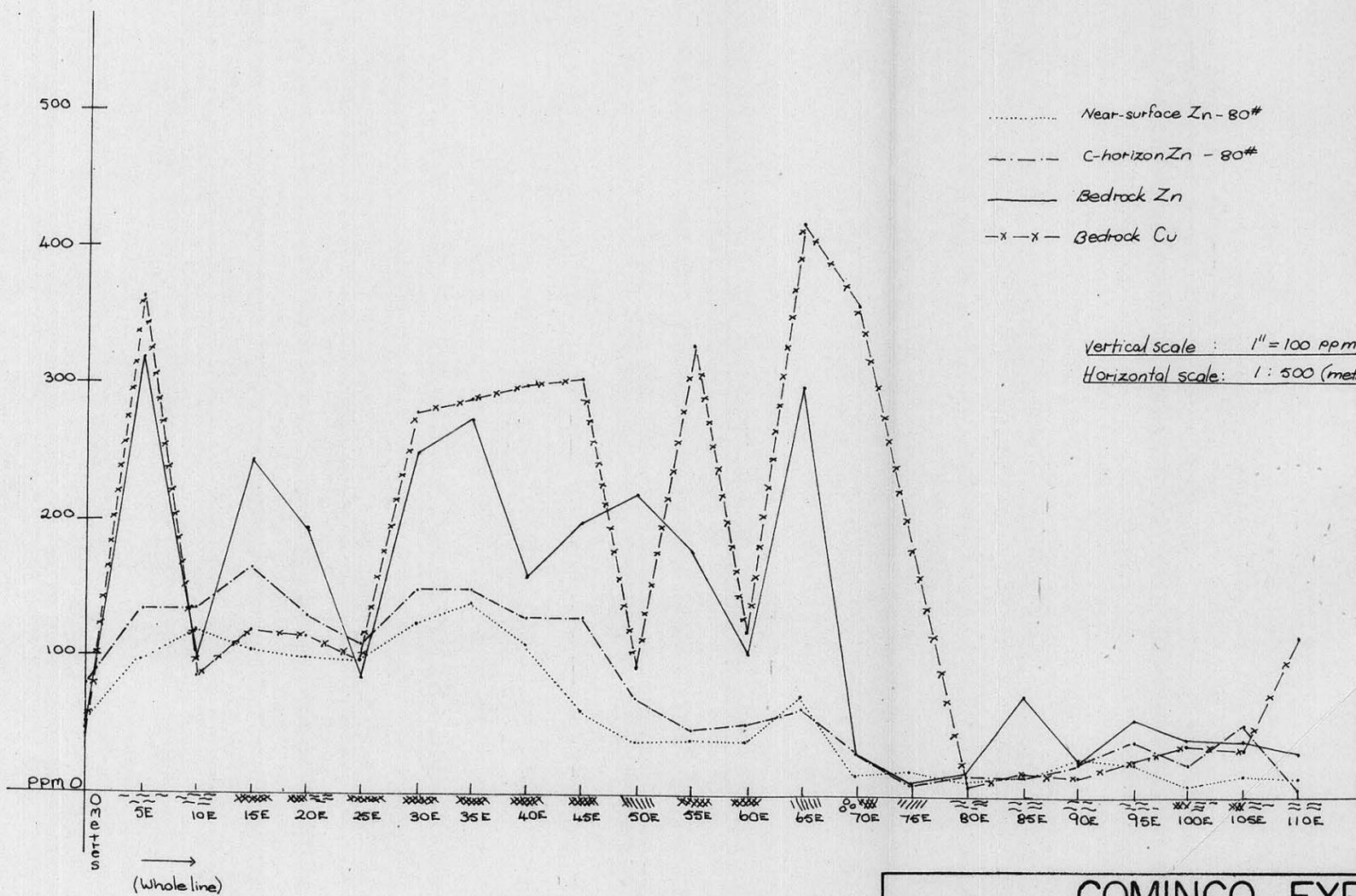
782023
72-847



COMINCO EXPLORATION PTY. LTD.		CLEVELAND TIN N.L.	
DRAWN BY		TRACED BY	
CHECKED BY		E.L. 1/63	
		GEOCHEMICAL TRAVERSE ON LINE AN 3129	
		LUINA, TASMANIA	
Location code	K 55-5-43	Scale	V 1" = 100 PPM H 1:500 (metric)
		Date	MARCH 1972
		Plate	12

LEGEND

- - - Shale
- ||||| Sandstone
- ||||| Chert
- █ Lode
- ||||| Spilite
- xxxxx Tuff
- o o o Agglomerate



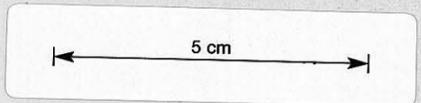
NOTE: Sample interval is shown as 5 metres which is an approximation

- Near-surface Zn - 80#
- - - C-horizon Zn - 80#
- Bedrock Zn
- x-x- Bedrock Cu

- Denotes uplope direction
- ↑ Grid North
- ↓ Grid South

Vertical scale : 1" = 100 ppm
Horizontal scale: 1:500 (metric)

782024



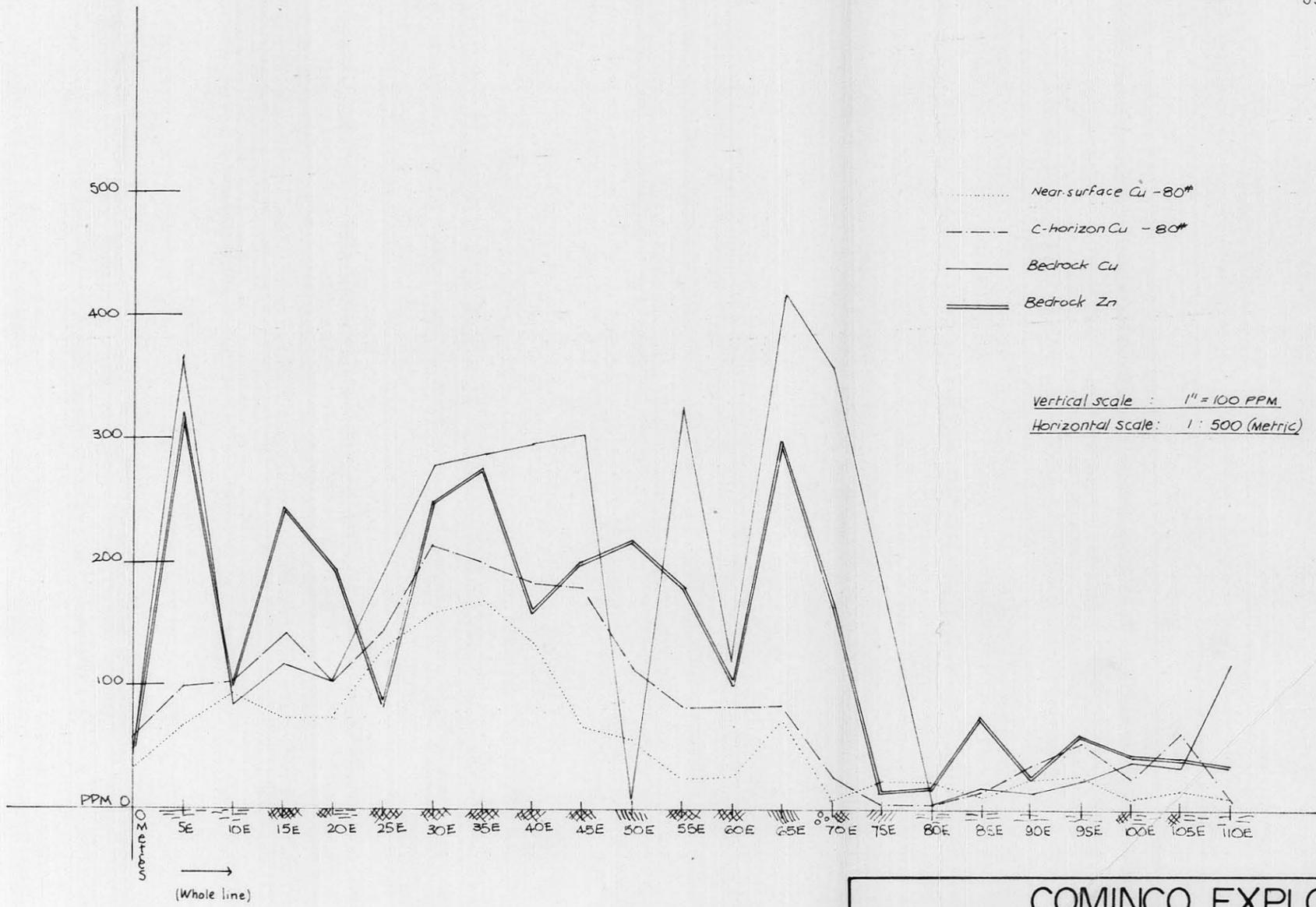
72-847

COMINCO EXPLORATION PTY. LTD.			
DRAWN BY		TRACED BY	
CHECKED BY		REVISED BY	DATE
REVISED BY	DATE		
Location code		Scale	Date
			Plate 13

CLEVELAND TIN N.L.
E.L. 1/63
GEOCHEMICAL TRAVERSE LINE AL **3130**
LUINA, TASMANIA

LEGEND

-  Shale
-  Sandstone
-  Chert
-  Lode
-  Spilite
-  Tuff
-  Agglomerate



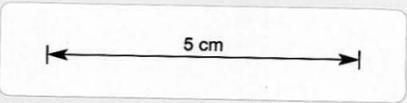
..... Near-surface Cu -80*
 - - - - C-horizon Cu -80*
 ——— Bedrock Cu
 = = = Bedrock Zn

NOTE: Sample interval is shown as 5 metres, which is an approximation

→ Denotes upslope direction
 ↑ Grid North
 ↓ Grid South.

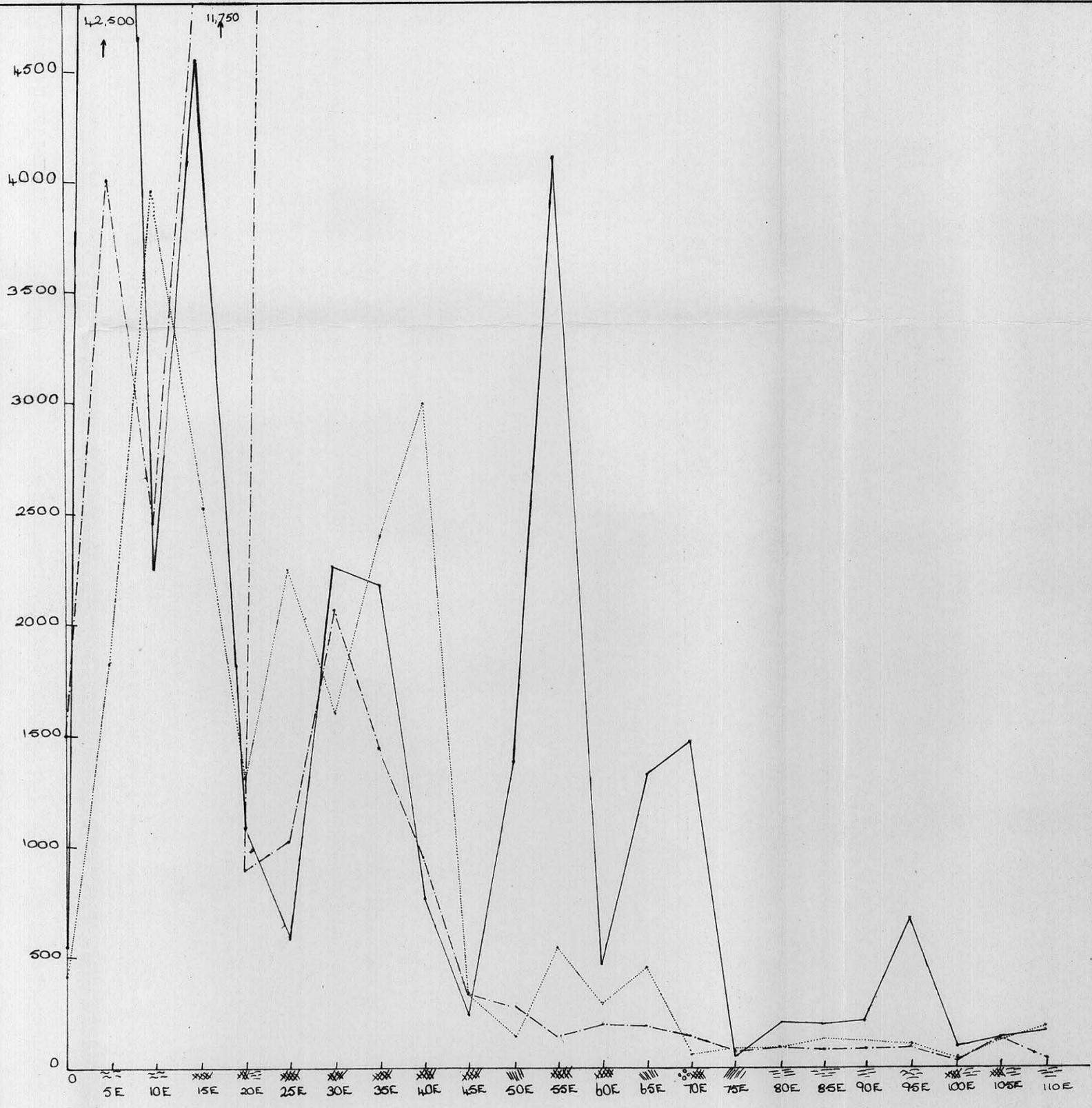
Vertical scale : 1" = 100 PPM
 Horizontal scale : 1 : 500 (Metric)

782025



72-847

COMINCO EXPLORATION PTY. LTD.			
Drawn: JB	Traced:	CLEVELAND TIN N.L. E.L. 1/63	3131
Checked:		GEOCHEMICAL TRAVERSE ON LINE AL	
		LUINA, TAS.	
Location code: K/53-5-43	Scale: $\frac{V}{H}$ 1" = 100ppm 1 : 500 (Metric)	Date: MARCH 1972	Plate: 14



(Whole line)

- LEGEND**
- ~ Shale
 - Sandstone
 - ▨ Chert
 - Lode
 - ▤ Spilite
 - ⊞ Tuff
 - ⊞ Agglomerate

Note: Sample interval is 5 metres which is an approximation.

← Denotes upslope direction

↑ Grid North

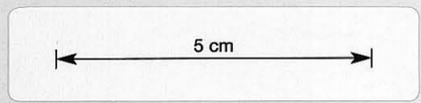
↓ Grid South

- Near surface Mn - 80#
- 'C' Horizon Mn - 80#
- Bedrock Mn

Vertical scale 1" = 500 p.p.m

Horizontal scale 1:500 (metric)

782026



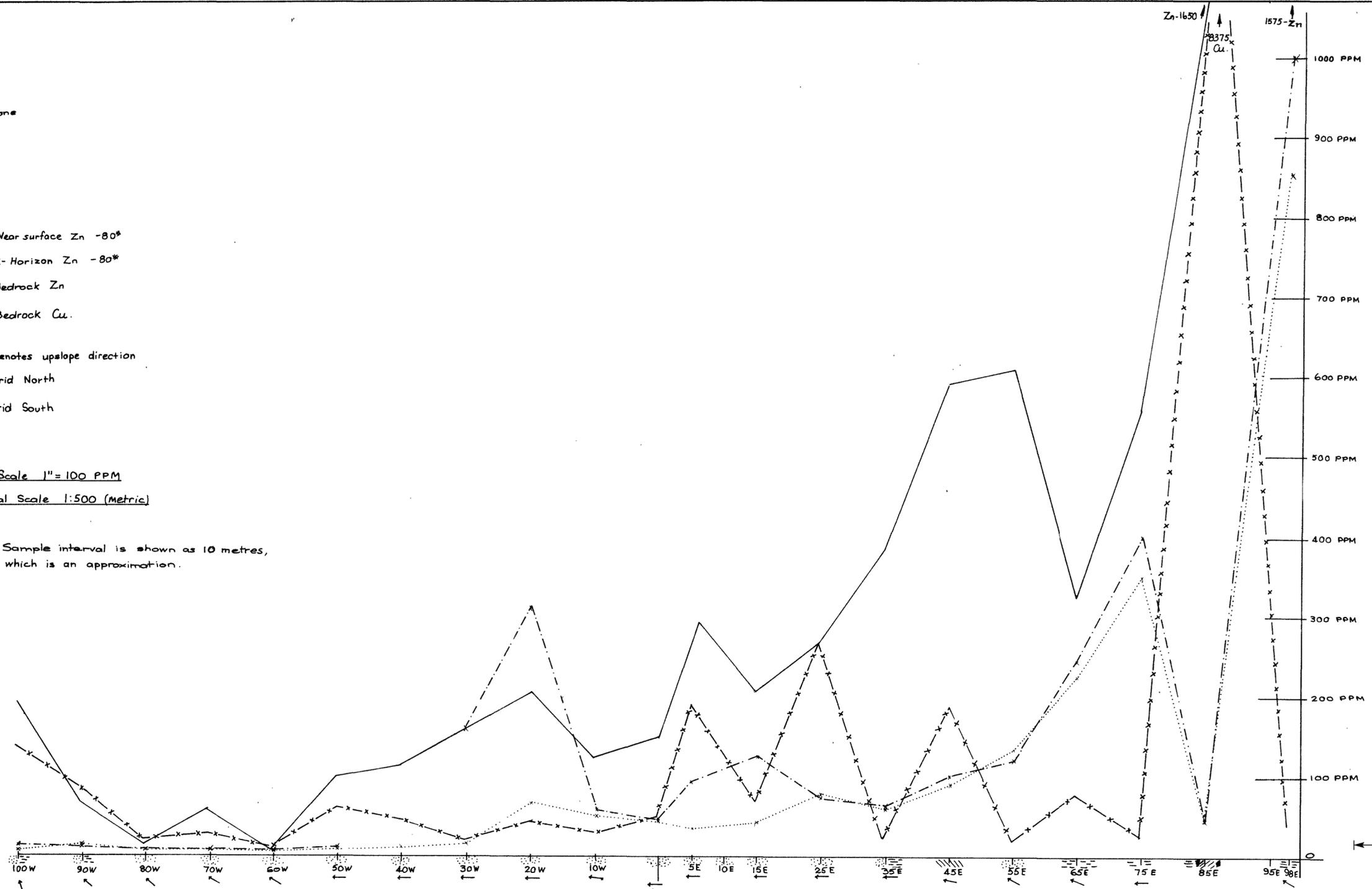
72-847

COMINCO EXPLORATION PTY. LTD.					
DRAWN BY			TRACED BY		
CHECKED BY			REVISED BY	DATE	
REVISED BY	DATE				
Location code			K/55-5-43		
Scale		1" = 100 PPM 1:500 (Metric)		Date	MARCH 1972
CLEVELAND TIN N.L. E.L.1/63				3132	
GEOCHEMICAL TRAVERSE ON LINE AL					
LUINA, TASMANIA					
				Plate	15

- LEGEND**
- ≡ Shale
 - ⋯ Sandstone
 - /// Chert
 - Lode
 - |||| Spillite
 - ⊘ Tuff
 - Near surface Zn -80*
 - - - - C-Horizon Zn -80*
 - Bedrock Zn
 - x-x- Bedrock Cu.
 - Denotes upslope direction
 - ↑ Grid North
 - ↓ Grid South

Vertical Scale 1" = 100 PPM
 Horizontal Scale 1:500 (Metric)

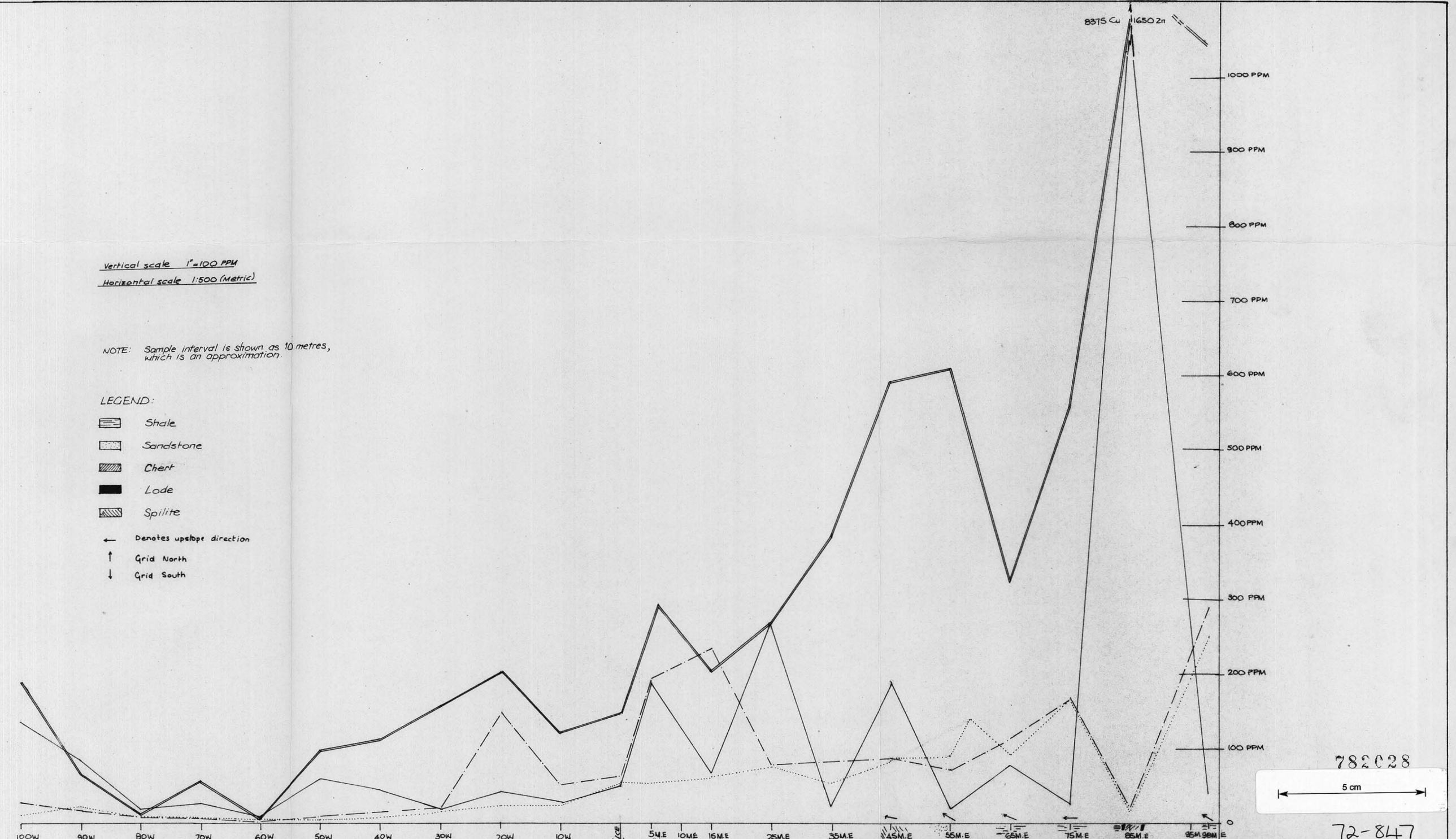
NOTE: Sample interval is shown as 10 metres, which is an approximation.



782027
 5 cm
 72-847

COMINCO EXPLORATION PTY. LTD.			
DRAWN BY JJB		TRACED BY	
CHECKED BY		REVISOR BY	DATE
REVISOR BY	DATE		
Location code K/55-5-43		Scale $\frac{V}{H}$	1" = 100 PPM 1:500 (Metric)
		Date MARCH 1972	Plate 16

CLEVELAND TIN N.L.
 EL. 1/63
 3133
 GEOCHEMICAL TRAVERSE ON LINE X
 LUINA, TASMANIA



Vertical scale 1"=100 PPM
 Horizontal scale 1:500 (Metric)

NOTE: Sample interval is shown as 10 metres, which is an approximation.

- LEGEND:
- Shale
 - Sandstone
 - Chert
 - Lode
 - Spillite
 - ← Denotes upslope direction
 - ↑ Grid North
 - ↓ Grid South

782028

5 cm

72-847

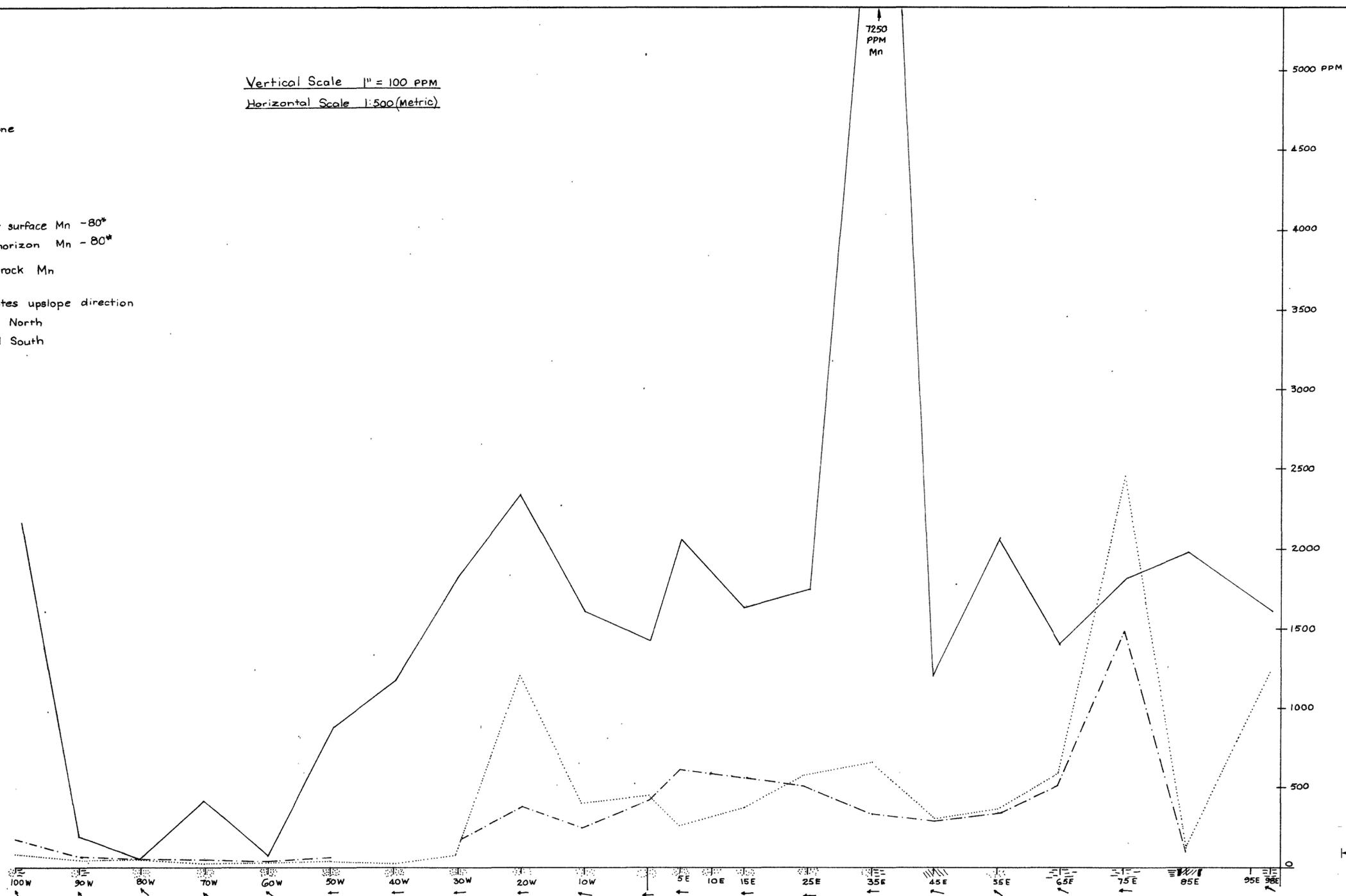
COMINCO EXPLORATION PTY. LTD.	
Drawn: JB	Traced:
Checked:	
CLEVELAND TIN N.L. E.L. 1/63	
GEOCHEMICAL TRAVERSE ON LINE X	
LUINA, TAS.	
Location code: K/55-5-43	Scale: 1" = 100 PPM 1:500 (Metric)
Date: MARCH 1972	Plate: 17

..... Near-surface Cu -80#
 - - - C horizon Cu -80#
 ——— Bedrock Cu
 ——— Bedrock Zn

LEGEND

- Shale
- Sandstone
- Chert
- Lode
- Spilite
- Near surface Mn -80*
- C-horizon Mn -80*
- Bedrock Mn
- Denotes upslope direction
- Grid North
- Grid South

Vertical Scale 1" = 100 PPM
 Horizontal Scale 1:500 (Metric)



782029

72-847

Note: Sample interval is shown as 10 Metres, which is an approximation.

HALLS REFERENCE

COMINCO EXPLORATION PTY. LTD.			
DRAWN BY JSB		TRACED BY	
CHECKED BY		REVISOR	
REVISOR	DATE	DATE	DATE
Location code K55-5-43		Scale $\frac{V}{H}$ 1" = 100 PPM 1:500 (Metric)	Date MARCH 1972
		Plate	18

CLEVELAND TIN N.L.
E.L. 1/63 3135

GEOCHEMICAL TRAVERSE ON LINE X
LUINA, TASMANIA

PPM 2000

1800

1600

1400

1200

1000

800

600

400

200

0

100W 95W 90W 85W 80W 75W 70W 65W 60W 55W 50W 45W 40W 35W 30W 25W 20W 15W 10W 5W 0 5E 10E 15E 20E 25E 30E 35E 40E 45E 50E 55E 60E 65E 70E 75E 80E 85E 90E 95E 100E

HALL'S REF. LINE

↑
7000 PPM

LEGEND.

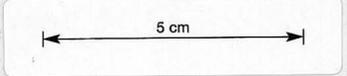
- ≡ Shale
- ⋯ Sandstone
- /// Chert
- Lode
- |||| Spilite
- ← Denotes upslope direction.
- ↑ Grid North
- ↓ Grid South
- ⋯ Near surface Sn (X.R.F)
- - - 'C' Horizon Sn (X.R.F)
- Bedrock Sn (X.R.F)

NOTE:- Sample interval is shown as 5 metres which is an approximation.

Vertical Scale 1" = 200 PPM.
Horizontal Scale 1:500 (Metric)

*effectively in collar of hole cut probably 30m W of SP anom. (?)
one sample*

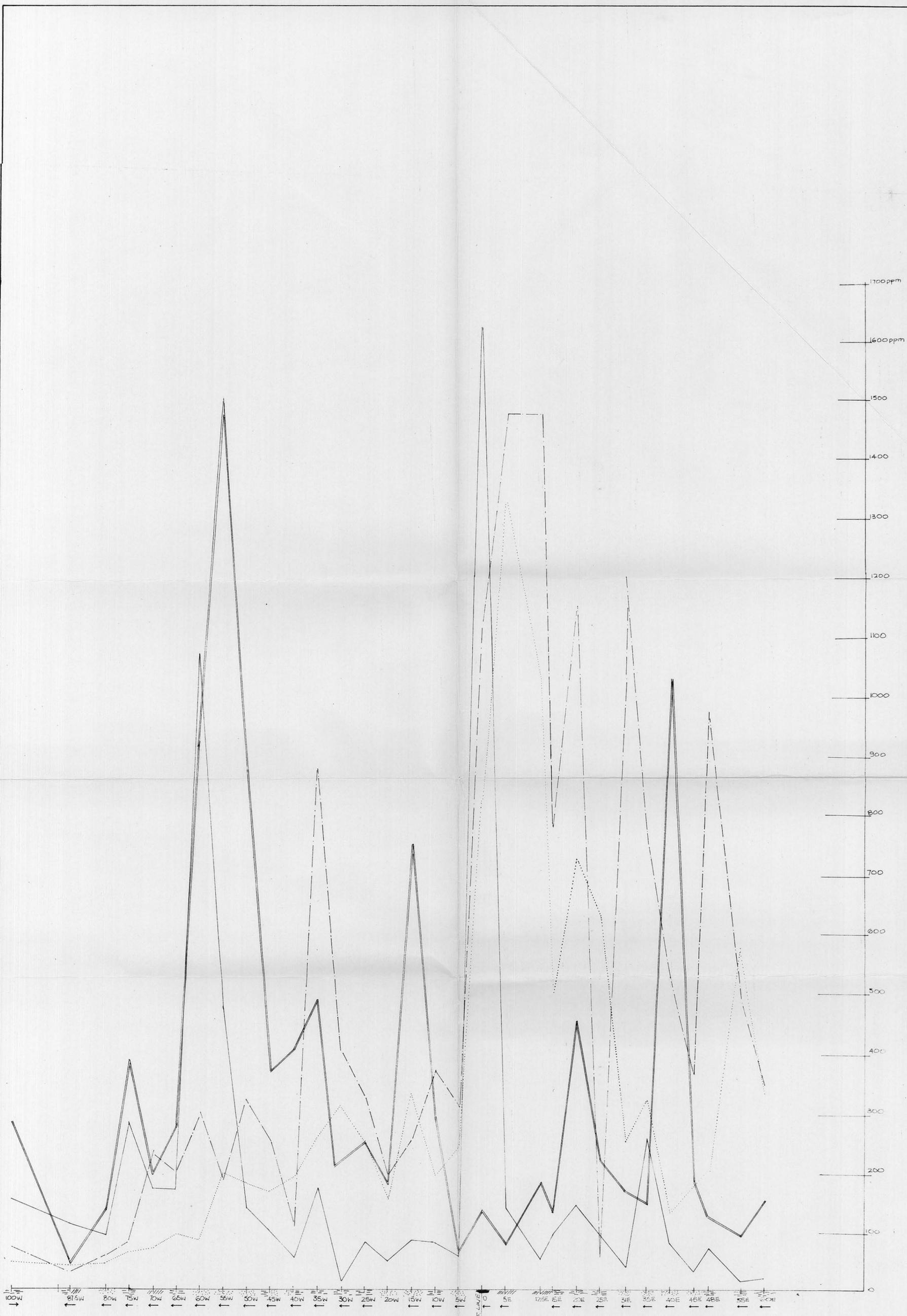
782030



72-847

COMINCO EXPLORATION PTY. LTD.			
DRAWN BY JJB		TRACED BY	
CHECKED BY		REVISOR BY	DATE
REVISOR BY	DATE		
Location code K55-5-43		Scale V = 1" = 200 PPM H 1:500 (Metric)	Date MARCH 1972 Plate B

CLEVELAND TIN N.L.
E.L. 1/63
3136
GEOCHEMICAL TRAVERSE ON LINE X
LUIINA, TASMANIA



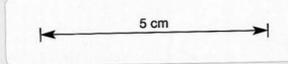
NOTE: Sample interval is shown as 5 metres, which is an approximation.

- LEGEND:
- Shale
 - Sandstone
 - Chert
 - Lode
 - Spilite

..... Near surface Cu -80°
 - - - C horizon Cu -80°
 ——— Bedrock Cu
 ——— Bedrock Zn

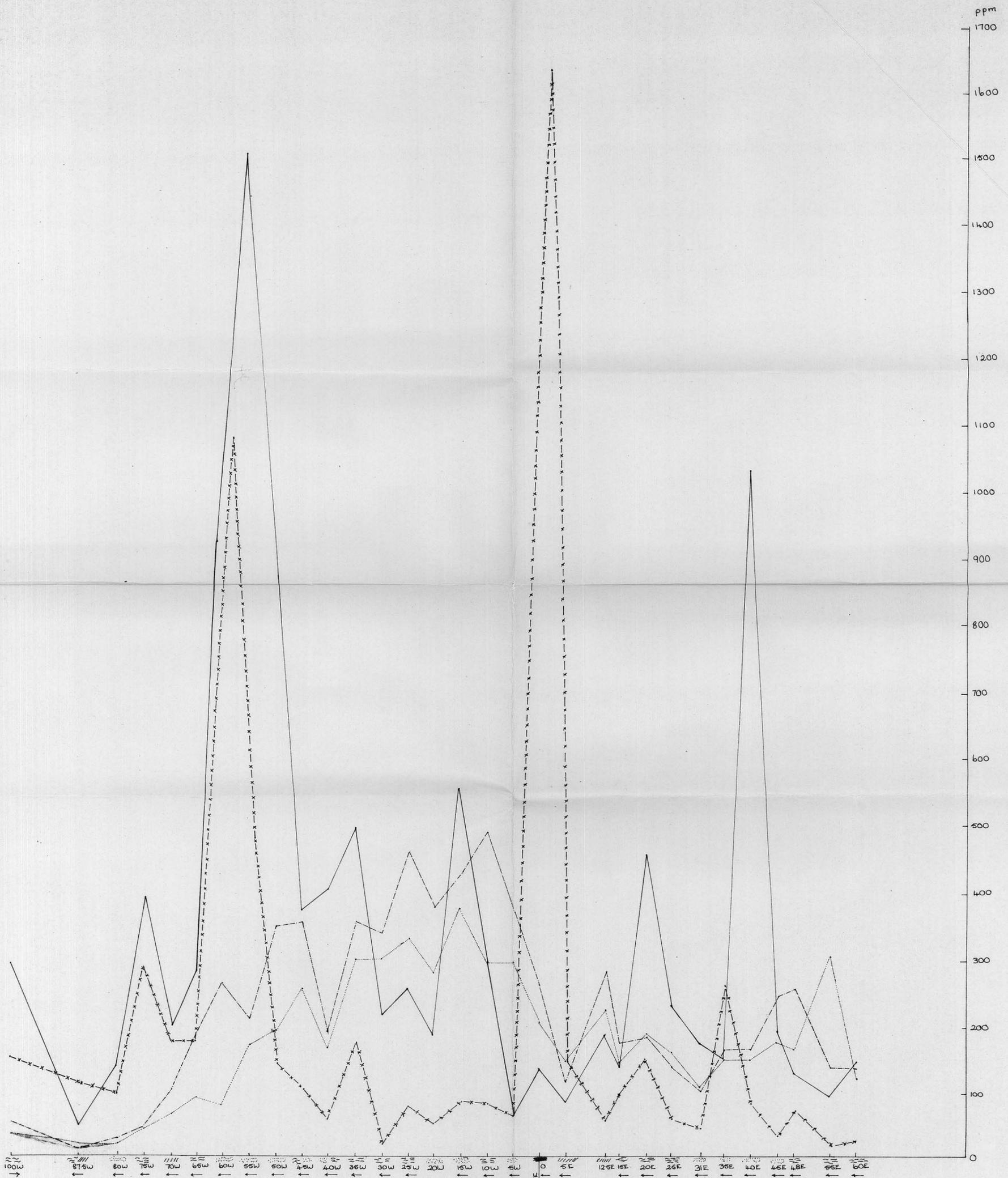
Vertical scale 1" = 100 PPM
 Horizontal scale 1:500 (metric)

← Denotes upslope direction
 ↑ Grid North
 ↓ Grid South



782031
72-847

COMINCO EXPLORATION PTY.LTD.			
Drawn: <i>B</i>	Traced:	CLEVELAND TIN N.L. E.L. 1/63	
Checked:		GEOCHEMICAL TRAVERSE ON LINE QA 3137	
		LUINA, TASMANIA	
Location code: <i>K/55-5-43</i>	Scale: $\frac{V}{H}$ 1" = 100ppm 1:500 (Metric)	Date: <i>MARCH 1972</i>	Plate: <i>20</i>



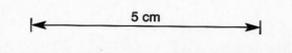
NOTE: Sample interval is shown as 5 metres, which is an approximation

LEGEND:

- ~ Shale
- ▨ Sandstone
- ▩ Chert
- Lode
- ▨ Spilite

- Near surface Zn - 80"
- - - C horizon Zn - 80"
- Bedrock Zn
- - - Bedrock Cu

Vertical scale 1" = 100 ppm
 Horizontal scale 1:500 (metric)
 ← Denotes upslope direction
 ↑ Grid North
 ↑ Grid South



782032 72-847

COMINCO EXPLORATION PTY. LTD.

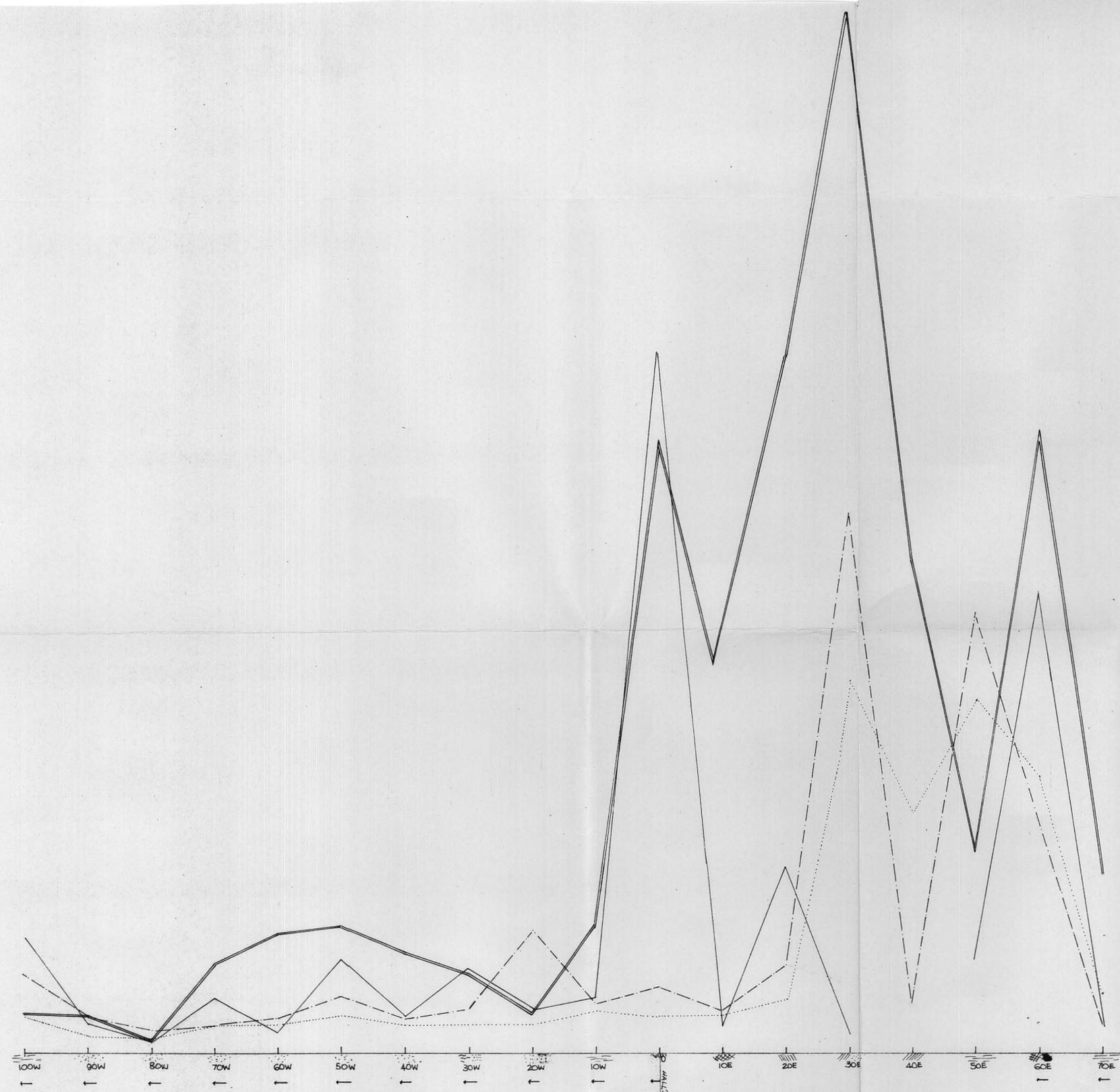
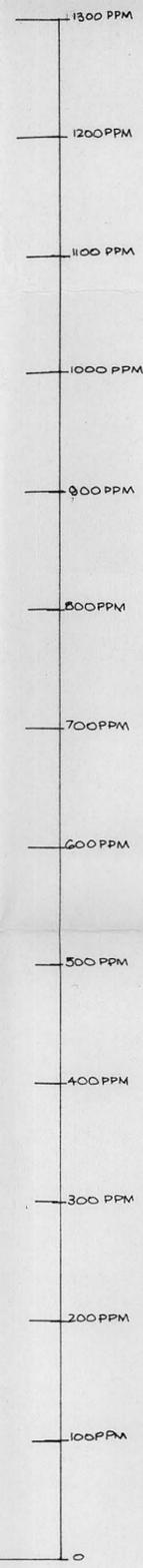
DRAWN BY RM	TRACED BY
CHECKED BY	REVISED BY DATE
REVISED BY DATE	

CLEVELAND TIN N.L.
 E.L. 1/63

3138

GEOCHEMICAL TRAVERSE ON LINE QA

LUINA, TASMANIA



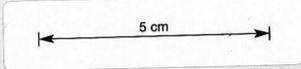
NOTE: Sample interval is shown as 10 metres, which is an approximation.

- Shale
- Sandstone
- Chert
- Lode
- Spilite
- Tuff

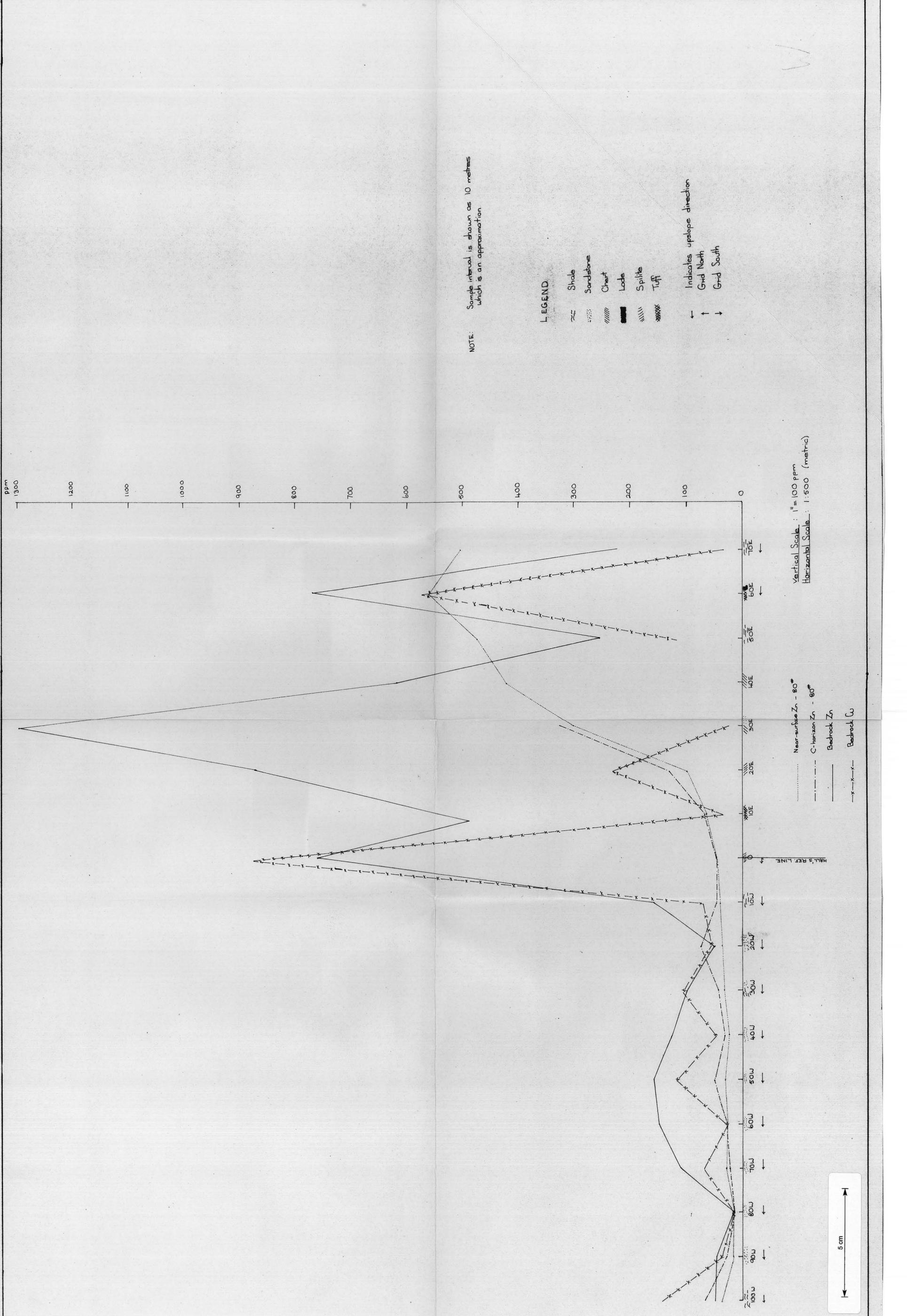
- Indicates upslope direction
- Grid North
- Grid South

- Near-surface Cu -80*
- C-horizon Cu -80*
- Bedrock Cu
- Bedrock Zn

VERTICAL SCALE: 1" = 100PPM
 HORIZONTAL SCALE: 1:500 (METRIC)



COMINCO EXPLORATION PTY. LTD.	
Drawn: JB	Traced:
Checked:	
Location code: K153-S-43	
CLEVELAND TIN N.L. E.L. 1/63	
GEOCHEMICAL TRAVERSE ONLINE W	
LUINA, TAS.	
Scale: 1" = 100PPM	
Date: MAR 1972	
Plate: 24	
782034	72-847
3140	



NOTE: Sample interval is shown as 10 metres which is an approximation

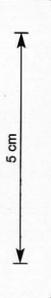
LEGEND

- Shale
- Sandstone
- Chert
- Lode
- Spilite
- Tuff

Indicates upslope direction
 Grid North
 Grid South

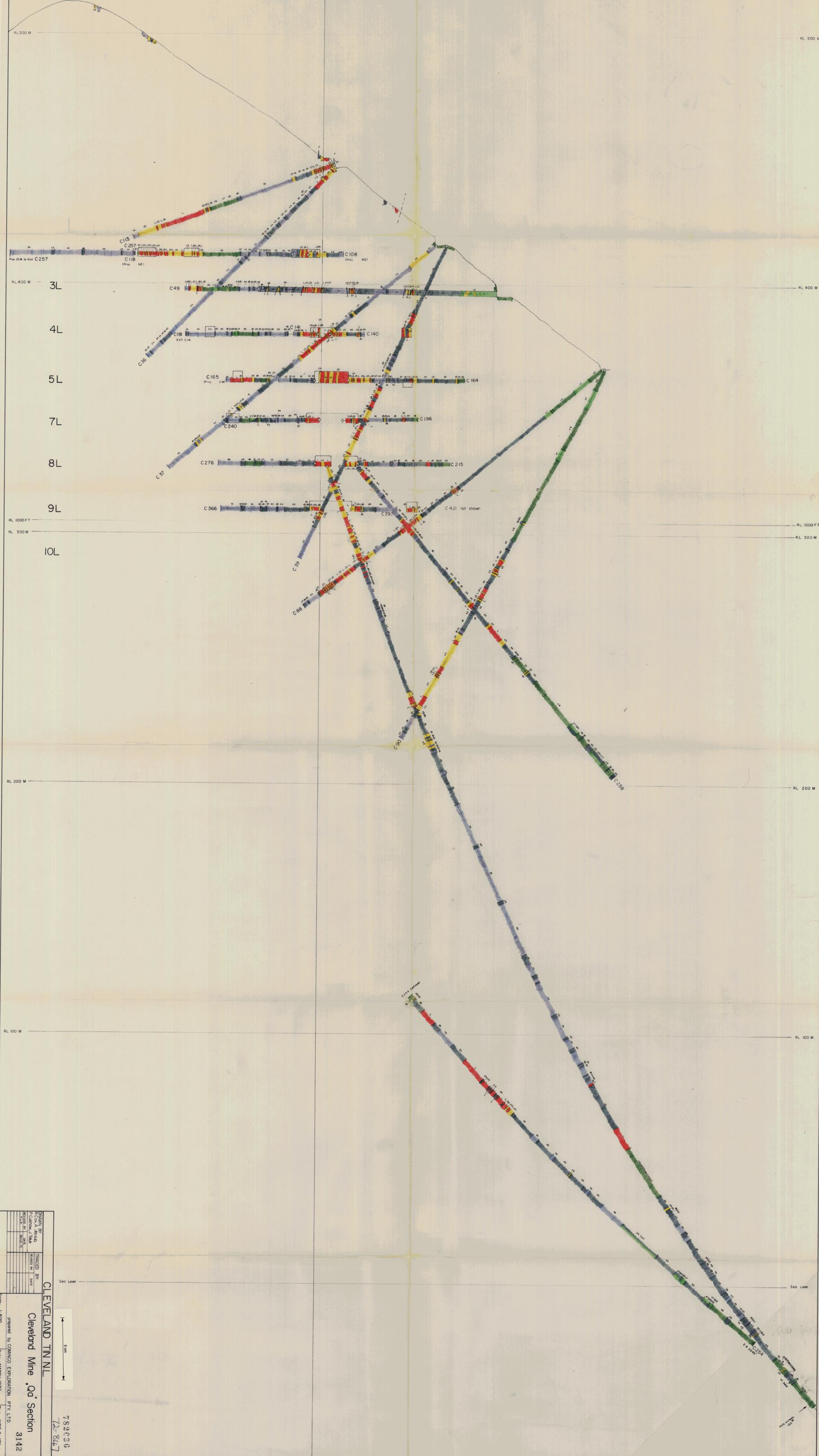
Vertical Scale: 1" = 100 ppm
 Horizontal Scale: 1:500 (metric)

..... Near-surface Zn - 80m
 - - - - C-horizon Zn - 80m
 _____ Bedrock Zn
 -x-x-x- Bedrock Cu



782035 72-847

COMINCO EXPLORATION PTY. LTD.			
DRAWN BY REM		TRACED BY	
CHECKED BY		REVISED BY	DATE
REVISED BY	DATE		
CLEVELAND TIN N.L. E.L. 1/63			
GEOCHEMICAL TRAVERSE ON LINE W			3141
LUINA, TASMANIA			
Location code	K/55-5-43	Scale	1" = 100ppm 1:500(Metric)
Date	MARCH 1972	Plate	25



Drawn By	Checked By
Project No.	Scale
Author	Date
Revised By	Revised Date
Approved By	Approved Date
Checked By	Checked Date
Drawn By	Drawn Date

CLEVELAND TIN NL
 Cleveland Mine Qd Section
 3142
 Proposed by COMMO EXPLORATION PTY LTD
 Date: MARCH 1972
 Scale: 1:500
 Paper: 1100 00/72

782036
72-847