EL52/94 Linda Drilling Report

King Lyell (Copper Clays)

and

Chamounix Zinc Prospects

K. Morrison
15 October 1996

Executive Summary

Five RC percussion drill holes (299 metres) were completed on the King Lyell Copper Clays and Cemetery Creek Chamounix Zinc prospects within EL52/94, between 23 August and 28 August 1996.

Significant intersections were achieved and important questions about the geology controlling mineralisation were answered on both prospects, but the drilling method did not produce satisfactory sample size under the prevailing conditions of wet and clayey ground.

It is recommended that at Cemetery Creek, at least one further hole be drilled, to test the zinc mineralised black shales below base of weathering and to test air core and mud injection percussion drilling methods.

At King Lyell, mining, metallurgical and environmental input is required prior to a decision on whether to upgrade from a prospect to an evaluation project.

Introduction

Five holes (299 metres) of reverse circulation percussion drilling were completed at King Lyell and Cemetery Creek (Figure 1) between 23 August and 28 August 1996. The target areas are within the Copper Clays and Chamounix Zinc prospect areas respectively and the work was part of the EL52/94 licence year 2 exploration program.

Both prospects required orientation drilling with two aims.

(1) To follow up surface mapping and sampling which had encountered outcropping copper and zinc mineralisation at King Lyell and Cemetery Creek respectively.

(2) To test the percussion drilling method on the soft clay rich host rocks at both sites, in topographic settings predicted to produce substantial ground water flows.

This report discusses the methods and results of the drilling program.

Methods

(a) Drilling

Diamond Drilling Tasmania Pty Ltd (DDT) of Zeehan were contracted to drill all holes, using a track mounted UDR650 rig with a separate track mounted Sullair 350 psi/900cfm compressor.

Drill pad earthworks at Cemetery Creek were carried out during the rehabilitation of Costean -1, in March 1996. No site preparation was required at King Lyell and no mechanised rehabilitation was required at either site.

Precollars of 5-6 metres were rotary air drilled with a 6 inch tricone and cased with uncemented PVC, except in 96CZC-0001 which required 5 metres of steel casing cemented into the surficial gravels. A 4.75 inch TRC42 face sampling bit was used with the hammer drilling and a 4.5 inch Drillquip Kitbit (a non percussion blade type rotary RC method) was unsuccessfully tried in 96CZC-0002, for 6 metres.

The three King Lyell holes were vertical and the Cemetery Creek holes were both declined at 60° from horizontal.

All holes produced substantial ground water flows at shallow depths. Water injection and detergent foam was added to all holes to reduce blockages of the sample return system.

(b) Sampling, Assaying, Survey

Cyclone samples were collected every metre into polyweave sacks and ~ 1.5kg representative splits were taken by hand into calico bags, from every metre through potentially mineralised zones and as 2 metre composite splits in the unmineralised intervals.

Sample preparation and assaying were carried out by Analabs. Base metals were assayed by mixed acid digest - AAS and gold by fire assay fusion - AAS.

Drill logs and assay sheets are attached as Appendix 1 collar locations were surveyed by the mine survey section.

Results and Discussion

(a) King Lyell Copper Clays

Figures 2-4 show that all three holes drilled Gordon Group sandstones, siltstone (in part indurated to a flinty lithology) and decomposed black shale above Pioneer Beds basement, at depths of 60-70 metres. This confirmed the tight synclinal structure plunging east-south east as indicated by the surface geology and reconstruction of previous exploration and mining data by Kevin Wills.

Significant mineralisation (Table 1) is confined to a lower black clay unit which is overprinted by a yellow brown, red brown lateritic clay in holes 96KLC-0001 and 2. This unit correlates with outcropping copper clays further upslope and appears to pinch out abruptly to the south, being totally absent in 96KLC-0003.

Table 1
King Lyell Copper Clays - Significant Intersections

Prospect	Hole Id	From (m)	To (m)	Interval (m)	Grade	Cutoff Grade
King Lyell	96KLC-0001	48	56	8	1.27% Cu	0.5%
King Lyell	96KLC-0002	29	37	8	3.47% Cu	0.5%
King Lyell	96KLC-0003	No Intersections				

Figures 2 and 3 show high variability of grades so nugget effects will be important in estimating average grades.

Sand - granule sized particles of native copper together with probable crystalline chalcocite and earthy cuprite were logged through the ferruginous clay intervals. The native copper is metastable, converting entirely to blue grey earthy ? cuprite when samples are dried and allow to oxidise. This phenomenon was also observed in outcropping mineralisation at King Lyell where new precipitates of dendritic crystalline native copper are growing locally in wet ferruginous clay. A metallurgical study of the mineralogy is required prior to further exploration.

Drill sample recovery was a serious problem and needs attention. Some samples within the mineralised intervals were of reasonable size and there was no evidence of a pattern in the assays, controlled by sample size. Nevertheless future work needs to achieve higher sample recoveries. Abundant ground water and very soft clayey rocks result in much of the sample being converted to muddy water, some of which stays in the ground and some is circulated up to the cyclone. It is possible to catch and settle out all water returned to the cyclone but difficult to do in practice because of the large volumes of water to handle. Air coring is worth trying, although it would not penetrate the sandstone overburden so would require a change to a smaller diameter RC air core system at the top of the mineralised clays. The driller has subsequently suggested in writing that a 40-50 viscosity mud injection with percussion drilling may reduce sample wash without interfering with hammer performance.

(b) Chamounix Zinc

The two hole section on Figure 5 shows that barren fresh limestone underlies mineralised black clay/shale and that the contact has an apparent dip of 60° NE, somewhat steeper than the outcropping limestone 200 metres upstream from the drill sites.

The mineralisation (Table 2) appears to be stratabound but is associated with abundant brecciated vein quartz, so may be partly structurally controlled. Deeper drilling is needed to test the nature of the possible structure (fault or tight syncline) and to test whether higher zinc grades exist in the black shales below the weathered zone.

Table 2
Chamounix Zinc- Significant Intersections

Prospect	Hole Id	From (m)	To (m)	Interval (m)	Grade	Cutoff Grade
Chamounix Zinc	96CZC-0001	19	32	13	1.68% Zn	1%
Chamounix Zinc	96CZC-0002	12	24	12	2.43% Zn	1%

The Chamounix Zinc host rock is the same unit hosting the copper clays at King Lyell. Similar drilling problems were encountered at both sites, with soft clay and abundant ground water resulting in poor recovery of solids in the black shales at Cemetery Creek.

Cost Analysis

Table 3
Cost Reconciliation

Item	Budget Cost	Actual Cost	Variance
Drilling	$22000	$13400	-39%
Salaries	$5000	$4000	-20%
Assays	$8000	$3800	-52%
Contingencies	$5000		
TOTALS	$40000	$21200	-47%

The cost savings shown on Table 3 are mainly due to the fact that 299 metres were drilled compared to 450 metres budgeted, and the assay costs were slightly cheaper than predicted.

The actual drilling costs correspond to an average drilling cost of $44.80 per metre, including work time and consumables, but excluding mobilisation/demobilisation.

Drilling took six days as per budget, corresponding to 50 metres per shift including rig moves.

Personnel and consumables requirements were also as per budget. A reduction in metres required to test the targets, and lower average assay costs than predicted, result in a net cost 12% under budget, when costs are equated to actual metres drilled.

Conclusions and Recommendations

The drilling program successfully intersected significant mineralisation at both prospects and answered important questions about the stratigraphy and structure controlling mineralisation. This was achieved at 12% under budget.

The drilling method used was fast and show no signs of significant in-hole contamination but sample recovery was too small, due to the combined effects of ground water and injected water washing clays into a suspension slurry.

It is recommended that at King Lyell the next stage of work should be a metallurgical study on the outcropping copper clays, followed by a judgement on the likely economic and environmental feasibility of a copper clays project. If the answer is positive, King Lyell should be completely drilled out, followed by a project of mapping and drilling on the other known and potential copper clays targets.

Chamounix Zinc requires at least one further drill intersection of the mineralised black shale at Cemetery Creek, down dip from and less weathered than the 96CZC-0001 intersection. A vertical hole collared at 96CZC-0001 should intersect the limestone at about 70 metres. During the drilling of the upper half of this hole the aircore and mud injection percussion methods should be tested.

Zig Zag Hill

Agglomerate Hill

Lyell

Comstock

Sedgwick Creek

Valley

CROWN LAND

Sedgwick Valley

Dante

Rivulet

HEC

1199

MARSH

LYELL COMSTOCK CREEK

LONG

Cape Horn Spur

MOUNT LYELL

Crown Mine

West Queen River

East Queen River

QUEENSTOWN URBAN CONSERVATION AREA

Ridge

Roaring Creek

Whites Creek

Glover Creek

Philosophers

Mount Lyell Mine

open-cut mine

Iron Blow

RAILWAY STATION RESERVE

PROCLAIMED TOWN OF GORMANSTON

Linda

Chamouni Valley

TIMBER RESERVE

Linda Creek

KING RIVER

YELL HIGHWAY A10

GRAVEL RESERVE

CROWN RESERVE

REC RES

RAILWAY RES.

QUEENSTOWN

HEC

Conglomerate Creek

Karlsons Gap

GORMANSTON

Mount Owen

Moore Creek

North Owen

CROWN LAND

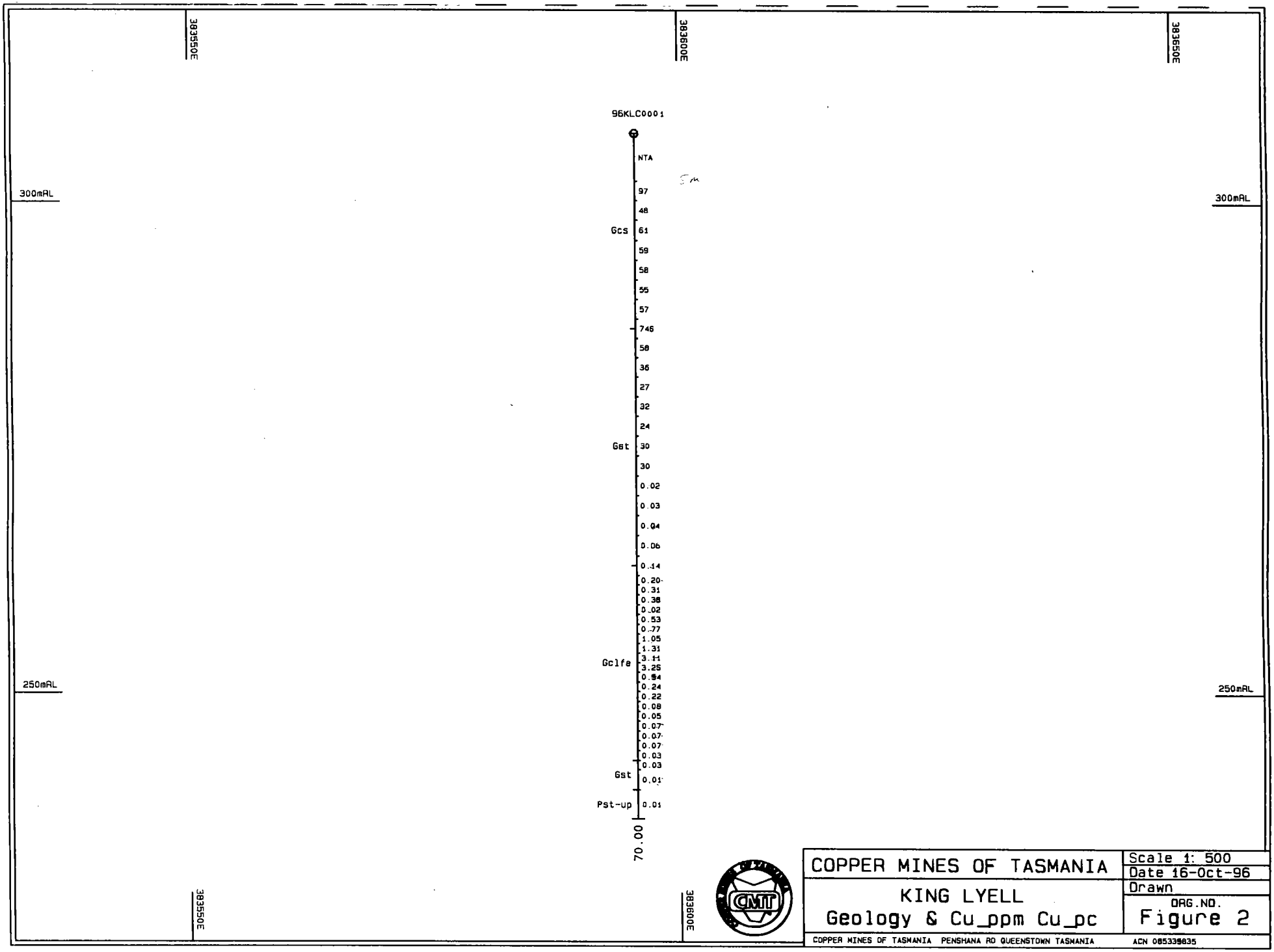
abandoned railway

proposed full supply level 235m

96KLC 1-3

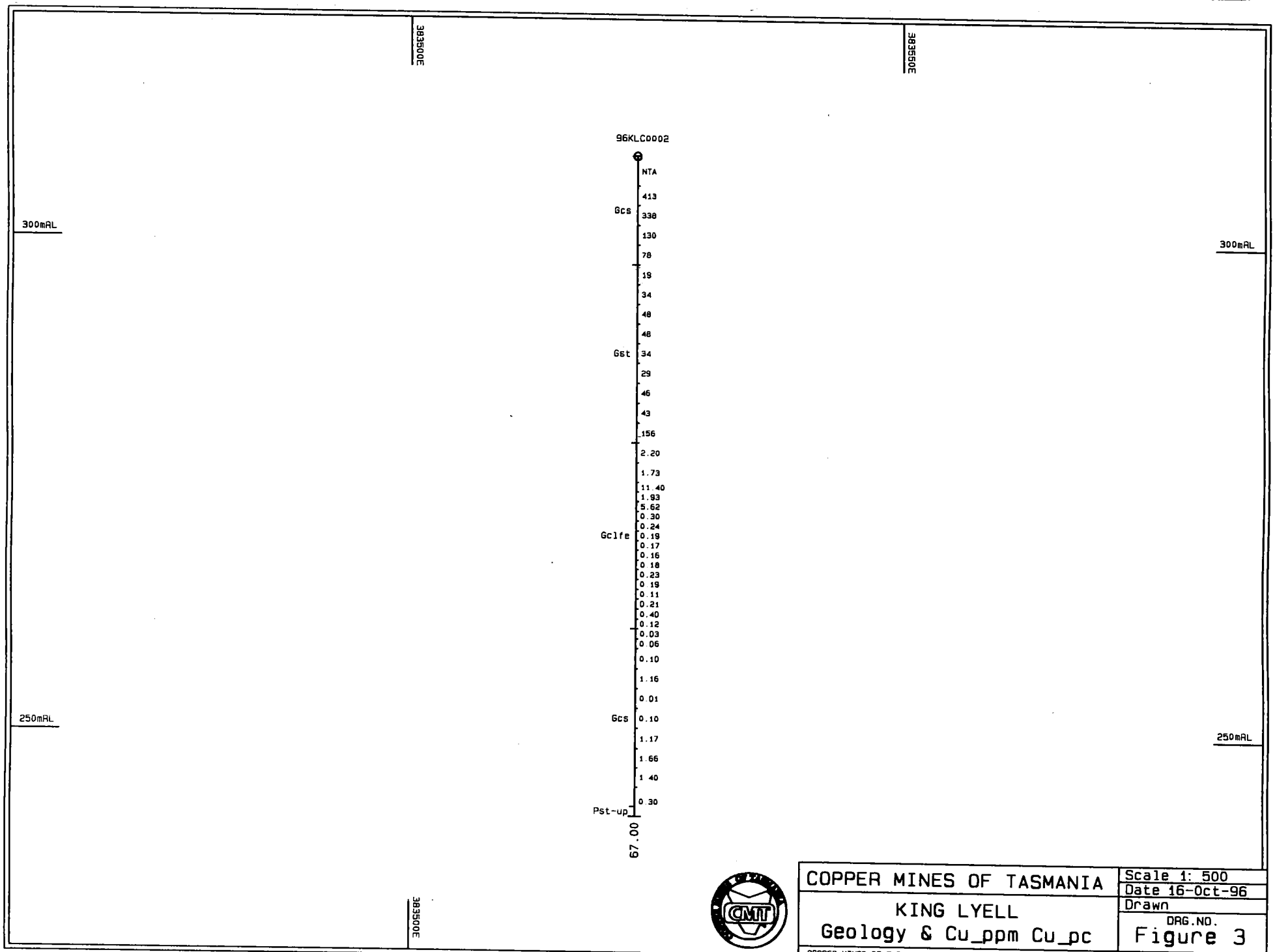
96CZC 1-2

Figure 1.



kinglyea.pf

SSI - AM*



COPPER MINES OF TASMANIA	Scale 1: 500
KING LYELL Geology & Cu_ppm Cu_pc	Date 16-Oct-96 Drawn DRG.NO. Figure 3
COPPER MINES OF TASMANIA PENSHANA RD QUEENSTOWN TASMANIA	ACN 065339835

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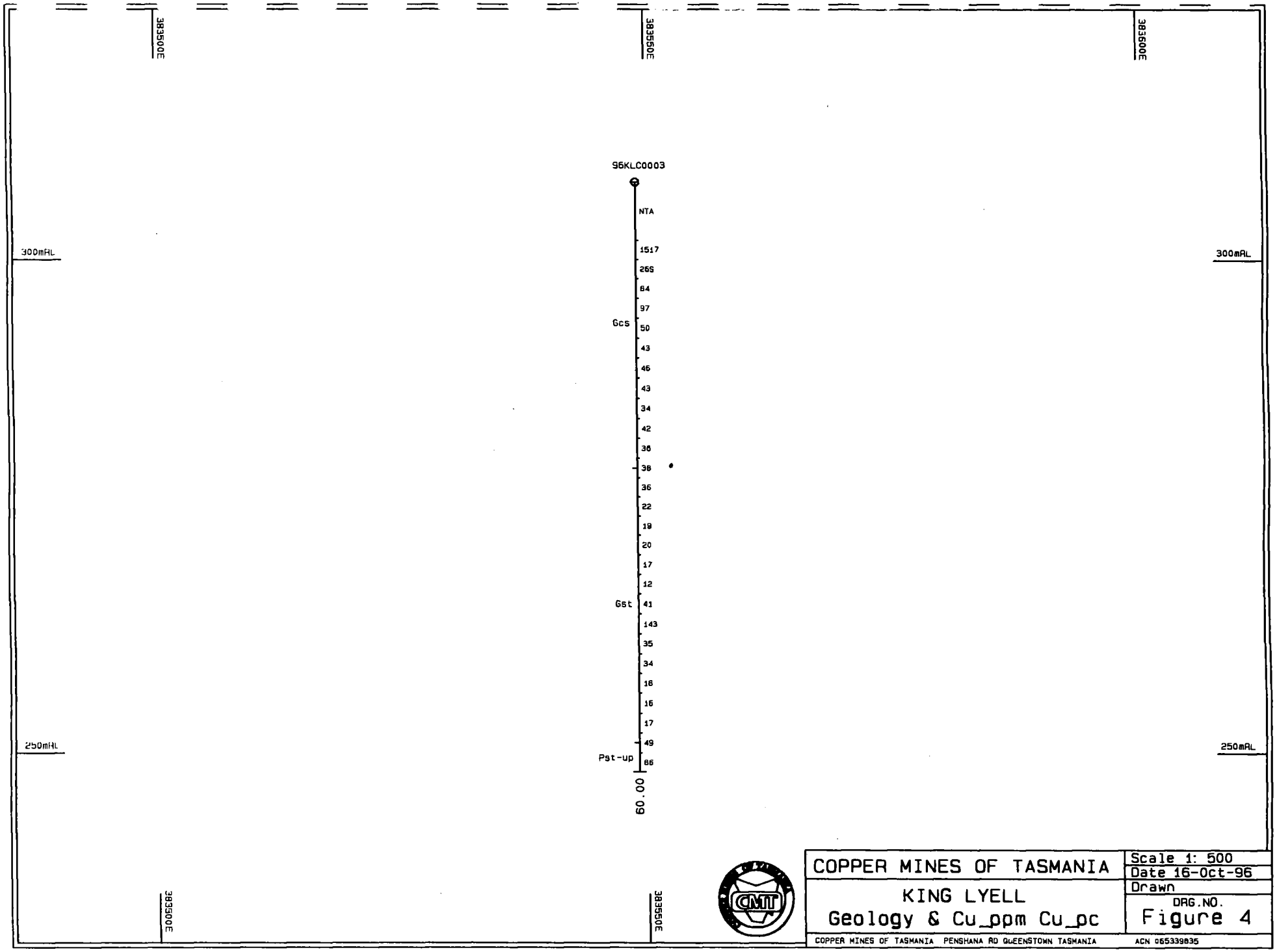

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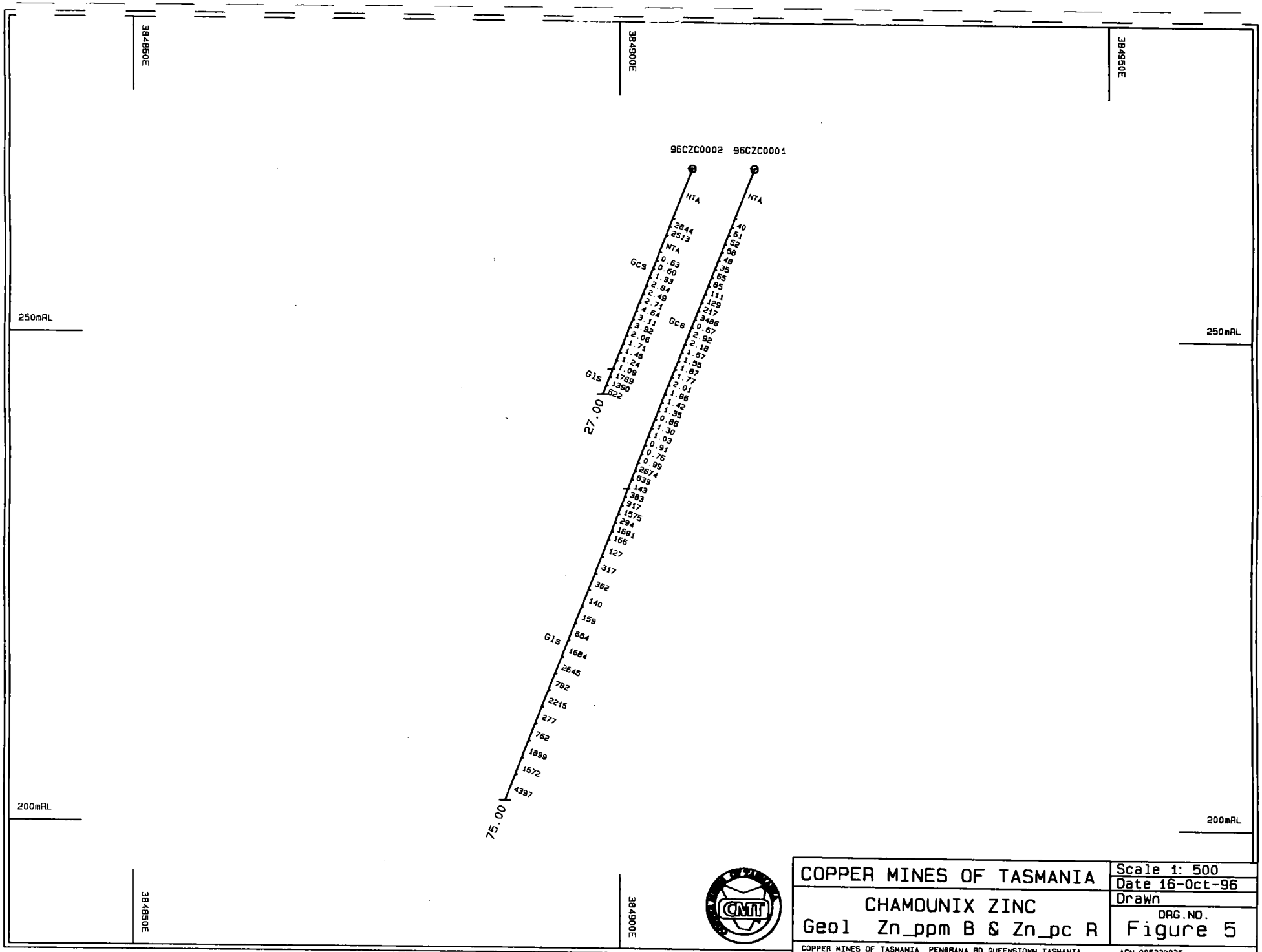

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Copper [illegible] c. Tasmania - RC Percussion Drill Log

Project:	Copper Clays	**Prospect:**	King Lyell			**Hole Number:**	96KLC-0001
Tenement:	EL52/94	**Survey:**	5,341,835.374m	**N**		**Total Depth:**	70m
Logged By:	K. Morrison		383,595.607m	**E**		**Water Table:**	1m, 19m
Log Date:	23 August 1996		307.217m	**RL**		**Base of Oxid'n:**	67m
Drilled By:	DDT - Tony Cherry		Vertical	**AZM** 90°	**DEC'N**	**Sample No's:**	H0585-H0616, H0684-H0701
Drilled Date:	23 August 1996					**Sample Sub No:**	C0526, C0527

DEPTH		CODE	DESCRIPTION	RESULTS					
FROM	TO			ppm/% Cu					
0	5		Gravel, Fill	N/A					
5	7		Black clay, shale, mud - Tr. dissem. fine pyrite	97					
7	9		Black clay, mud, Tr. pyrite - contam. from cyclone, damp moderate size	48					
9	11		A/A	61					
11	13		A/A - Foam injection	54					
13	15		Black damp clay, minor contam. Tr. pyrite, good sample size	58					
15	17		A/A	55					
17	19		Dk green grey clay, Tr. fine pyrite Water flow 19m	57					
19	21		Black mud, clay, minor grey sltst - wet	76					
21	23		Grey mud, Qutz sst - small wet sample	58					
23	25		Indurated lt bm grey sltst, grey clay - Tr. pyrite	36					
25	27		A/A - hard broken rock, small wet sample	27					
27	29		A/A	32					
29	31		Grey sltst, mud, clay - small wet sample	24					
31	33		A/A - frequent cyclone, pipe blockages	30					
33	35		A/A	30					
35	37		A/A	0.02					
37	39		Brn indurated sltst, mud - small wet samples	0.03					

DEPTH FROM	DEPTH TO	CODE	DESCRIPTION	RESULTS					
39	41		Brn. ferrug. clay - wet, moderate size sample, frequenct blocking of inner pipe, cyclone	0.04					
41	43		Grey qutz sst, bm. clay, mud - small wet sample	0.06					
43	45		Grey sltst, sst, bm clay - wet large sample	0.12					
45	46		Bm. ferrug clay, minor grey siltstone - wet large sample	0.20					
46	47		Yell. bm. clay - Tr native Cu - wet large sample	0.31					
47	48		A/A	0.28					
48	49		A/A	0.62					
49	50		Black clay with ferrug. laterit. clay overprint - Tr. native Cu	0.53					
50	51		A/A	0.77					
51	52		Lateritic ferricrete, ferrug clay - abund. native Cu - small wet	1.05					
52	53		A/A	1.31					
53	54		Yell. bm ferrug clay overprinting black clay - common native Cu	2.01					
54	55		A/A	3.25					
55	56		A/A Tr V. Qutz - small wet samples (no min.)	3.50					
56	57		A/A	3.30					
57	58		Yell. bm, grey black clay, V. Qutz - small wet samples	3.32					
58	59		A/A	4.00					
59	60		A/A	4.35					
60	61		A/A	5.7					
61	62		A/A	6.07					
62	63		A/A	6.37					
63	64		A/A	6.32					
64	65		Yell. bm, grey black clay, V. Qutz - small wet sample	6.07					
65	67		Part Oxid. grey green cream fine qutz sst - small wet samples	6.51					
67	70		Grey, green Qutz sst with fuchsite, detrital spinel (Pioneer Beds)	6.81					
EOH									

Copper Mines of Tasmania - RC Percussion Drill Log

Project:	Copper Clays	**Prospect:**	King Lyell			**Hole Number:**	96KLC-0002
Tenement:	EL52/94	**Survey:**	5,341,795.377m	**N**		**Total Depth:**	67m
Logged By:	K. Morrison		383,523.011m	**E**		**Water Table:**	3m
Log Date:	24 August 1996		308.656m	**RL**		**Base of Oxid'n:**	66m
Drilled By:	DDT - Tony Cherry		Vertical	**AZM** 90°	**DEC'N**	**Sample No's:**	H0617-H0656
Drilled Date:	24 August 1996					**Sample Sub No:**	C0526, C0527

DEPTH		CODE	DESCRIPTION	RESULTS					
FROM	TO								
0	1		Quarry gravel	N/R					
1	2		Mixed fill						
2	3		Alluvial sand, gravel						
3	5		Black clay, mud - wet moderate size sample	413					
5	7		A/A Tr. pyrite	378					
7	9		Black dk grey clay, mud, Tr. pyrite - moderate size wet samples	130					
9	11		A/A	78					
11	13		Grey clay, lt bm. flinty indurated sst sltst - small wet samples	19					
13	15		A/A	34					
15	17		A/A	63					
17	19		Grey Qutz sst, sltst - large wet samples	28					
19	21		A/A	30					
21	23		A/A	29					
23	25		A/A	45					
25	27		A/A - small wet samples	63					
27	29		Lt bm grey flinty sltst, cherty, Qutz sst, grey clay - moderate size	168					
29	31		Grey, yell bm ferrug. clay - frequent water/foam injection	220					
31	33		A/A Tr. native Cu	179					

DEPTH FROM	DEPTH TO	CODE	DESCRIPTION	RESULTS					
33	34		Yell red bm ferrug. wet clay - abund. native Cu						
34	35		A/A - minor native Cu						
35	36		A/A - minor native Cu, cuprite, ?chalcocite						
36	37		Yell, cream bm. ferrug. clay - very wet sample						
37	38		A/A - very wet small sample						
38	39		A/A						
39	40		A/A minor V. Qutz						
40	41		Mottled yell. bm cream ferrug. clays - very wet, small						
41	42		A/A	0.18					
42	43		A/A						
43	44		A/A	0.15					
44	45		A/A						
45	46		Mottled yell. bm. cream clays, frags, ferricrete laterite - small wet						
46	47		A/A						
47	48		Grey yell bm clay - small wet sample						
48	49		Mainly dk grey clay, mud						
49	50		A/A	0.05					
50	52		A/A	0.10					
52	54		Black, grey clay, mud - wet small samples	1.16	?				
54	56		Grey clay silt - Wet v. small sample	0.01					
56	58		A/A - Tr. native Cu						
58	60		Grey cream silty clay, mud - small wet sample		?				
60	62		Yell bm ferrug clay, Tr. laterite frags, Tr. native Cu	1.55	?				
62	64		A/A Tr. Native Cu	1.03	?				
64	67		Grey clay, ferrug clay, hard hematit. Qutz sst (Pioneer Beds)						
EOH									

Hole Number: 96KLC-0002 **Page** 2 **of** 2

Copper [illegible] - RC Percussion Drill Log

Project:	Copper Clays	**Prospect:**	King Lyell			**Hole Number:**	96KLC-0003
Tenement:	EE52/94	**Survey:**	5,341,753.238m	**N**		**Total Depth:**	60m
Logged By:	K. Morrison		383,549.045m	**E**		**Water Table:**	30m
Log Date:	25 August 1996		308.034m	**RL**		**Base of Oxid'n:**	57m
Drilled By:	**DDT** - Tony Cherry		Vertical	**AZM** 90°	**DEC'N**	**Sample No's:**	H0657 - H0683
Drilled Date:	25 August 1996					**Sample Sub No:**	C0527

DEPTH		CODE	DESCRIPTION	RESULTS					
FROM	TO								
0	1		Quarry gravel	N/A					
1	3		Mixed fill	N/A					
3	4		No return	N/A					
4	6		Fill, Gravel - Hammer from 6m	N/A					
6	8		Black clay, damp, minor dissem. pyr. - good sample size	157					
8	10		A/A	260					
10	12		A/A	82					
12	14		A/A	97					
14	16		A/A	50					
16	18		A/A	43					
18	20		A/A	46					
20	22		A/A	43					
22	24		A/A	34					
24	26		Black, grey clay, trace pyrite, moist - good sample size	42					
26	28		A/A	36					
28	29		A/A	38					
29	30		Grey med-fine Qutz sst, grey clay - water flow	38					
30	32		Lt bm, grey indurated Qutz sst, grey shale, mud, trace pyrite - wet small sample, foam in - 31m	36					

DEPTH FROM	DEPTH TO	CODE	DESCRIPTION	RESULTS					
32	34		A/A	22					
34	36		Indurated sst A/A, minor black shale - wet small sample	14					
36	38		Lt grey, bm indurated fine Qutz sst, sltst - moderate sample	20					
38	40		Lt bm, grey flint, conchoidal fractured cherty siltstone	17					
40	41		A/A	12					
41	42		A/A Tr. pyrite	12					
42	43		Lt bm. grey flinty sltst, fine Qutz sst, black shale/clay	41					
43	44		Cavities, small return of Qutz sst, sltst	41					
44	46		A/A	143					
46	48		Lt bm. grey indurated fine sst, sltst, black slate, V. Qutz - part oxid.	35					
48	49		Flinty sst, sltst, pyritic, abund. V. Qutz, minor black slate, shale - large sample	34					
49	50		A/A	34					
50	52		Part oxid. fine-med Qutz sst, minor black clay	8					
52	54		Part oxid. sst A/A	16					
54	56		Part oxid. Qutz sst sltst, black shale, Tr. V. Qutz - large sample	17					
56	57		A/A	14					
57	60		Fresh grey fine-med Qutz sst, very pyritic, in part orthoquartzite common green ?fuchsite, black detrital spinel - Pioneer Beds	80					
EOH									

Copper Mines of Tasmania - RC Percussion Drill Log

Project:	Chamounix Zinc	**Prospect:**	Cemetery Creek			**Hole Number:**	96CZC-001
Tenement:	EL52/94	**Survey:**	5,341,364.268m	**N**		**Total Depth:**	75m
Logged By:	K. Morrison		384,913.776m	**E**		**Water Table:**	6m Down Hole
Log Date:	27 August 1996		267.369m	**RL**		**Base of Oxid'n:**	-
Drilled By:	DDT - Tony Cherry		223 AMG **AZM** 60°	**DEC'N**		**Sample No's:**	H0704-H0750, H0801-H0806
Drilled Date:	26 August 1996					**Sample Sub No:**	C0527

DEPTH		CODE	DESCRIPTION	RESULTS					
FROM	TO								
0	6		Gravel, glacial till - steel casing 0-5.5						
6	7		Gravel, black humic mud - small wet sample						
7	8		Black shale, humic mud, V. Qutz - abund. water, small sample						
8	9		A/A						
9	10		A/A						
10	11		A/A - minor gravel contam. - small wet sample						
11	12		A/A						
12	13		A/A						
13	14		Black humic mud, gravel contam. - small wet sample						
14	15		A/A, V. Qutz						
15	16		Humic mud, black shale, V. Qutz - small wet sample						
16	17		A/A						
17	18		A/A minor pyr, sphal.						
18	19		A/A						
19	20		A/A + Galena						
20	21		Black shale, mud, Tr. V. Qutz - small wet sample						
21	22		A/A						
22	23		A/A						

DEPTH FROM	DEPTH TO	CODE	DESCRIPTION	RESULTS					
23	24		Black shale, humic staining, Tr. V. Qutz - small wet sample						
24	25		A/A - larger sample						
25	26		A/A - small wet sample						
26	27		A/A - trace fine sulphides						
27	28		A/A - very small sample (no min)						
28	29		A/A						
29	30		A/A						
30	31		A/A - mainly black mud						
31	32		A/A						
32	33		A/A						
33	34		Part oxid. black shale, mud, V. Qutz - moderate size wet sample						
34	35		A/A						
35	36		A/A - slaty cleavage in shale, Tr. pyrite						
36	37		A/A - shale becoming harder						
37	38		A/A						
38	39		Blue grey fresh crystalline micritic lmst; calcite veining - abrupt contact						
39	40		A/A - large sample size						
40	41		A/A Tr. dissem. pyrite - slow drilling, large wet samples						
41	42		A/A						
42	43		A/A						
43	44		A/A						
44	46		A/A						
46	48		A/A						
48	50		A/A						
50	51		Black shale, powdered, dry, large sample						

DEPTH FROM	DEPTH TO	CODE	DESCRIPTION	RESULTS					
51	52		Black shale, Dk grey lmst, fresh, dry large sample						
52	53		Limestone shale interbeds - Large wet sample						
53	54		Fresh, hard dk blue grey lmst, calcite veins - large wet sample						
54	56		A/A						
56	58		A/A						
58	60		A/A						
60	62		A/A						
62	64		A/A						
64	66		A/A						
66	68		A/A						
68	70		Fresh, dk, lt micritic lmst, vein calcite, Tr. dissem. pyr. minor pink, white Qutz (probable gravel contam) - abund. water, large wet sample						
70	72		A/A						
72	75		A/A						
EOH									

Hole Number: 96CZC-0001 **Page** 3 **of** 3

Upper Cones Trasm... - R... erc... a D... Log

Project:	Chamounix Zinc	**Prospect:**	Cemetery Creek	**Hole Number:**	96CZC-0002
Tenement:	EL52/94	**Survey:**	5,341,353.023m **N**	**Total Depth:**	27m
Logged By:	K. Morrison		384,907.426m **E**	**Water Table:**	6m Down Hole
Log Date:	28 August 1996		267.348m **RL**	**Base of Oxid'n:**	-
Drilled By:	DDT - Tony Cherry		223AMG AZM 60° **DEC'N**	**Sample No's:**	H0807 - H0828
Drilled Date:	28 August 1996			**Sample Sub No:**	C0527

DEPTH		CODE	DESCRIPTION	RESULTS					
FROM	TO								
0	6		Gravel, glacial till - PVC casing to 5.5						
6	7		Gravel, black mud - v. small wet sample						
7	10		Black shale, black mud, gravel contam. v. small wet sample - kitbit 5 - 11m, change to hammer 11m						
10	11		Black shale, black mud - small wet sample						
11	12		A/A Tr. pyrite, common V. Qutz						
12	13		Black mud, shale, V. Qutz - moderate sample size						
13	14		A/A - small sample, part oxid.						
14	15		A/A						
15	16		A/A						
16	17		Black shale, mud, abund, V. Qutz, minor coarse sphal. fine pyrite - large wet sample						
17	18		Oxid, humic stained black shale, mud, abund. V. Qutz, minor sphal. galena, pyr. - small wet samples						
18	19		V. Qutz, black shale, mud - moderate sample size						
19	20		Grey black shale, clay - moderate sample size						
20	21		A/A						
21	22		A/A						
22	23		Black shale, clay, mud - moderate sample size						
23	24		A/A						

DEPTH FROM	DEPTH TO	CODE	DESCRIPTION	RESULTS					
24	25		Fresh blue grey micritic lmst, vein calcite						
25	26		A/A						
26	27		A/A						
EOH									