RL3/2006 Copper Clays

Final Report

3rd Nov 2014 – 3rd Nov 2015

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Distribution:

MRT - Hobart
CMT - Queenstown

Date: 28th September 2015

CMT report no: T2015-001

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1. Introduction

RL 3/2006 is a $2km^2$ retention licence held by Copper Mines of Tasmania in the Linda Valley, adjoining the eastern boundary of the Mt Lyell mining lease 1M/95. The area is located within the land district of Montagu, in part covers the townships of Linda and Gormanston and is traversed by the Lyell Highway (Figure 1). The retention licence covers three known Cainozoic copper clays style copper deposits; Lyell Consols, Lyell Blocks and King Lyell.

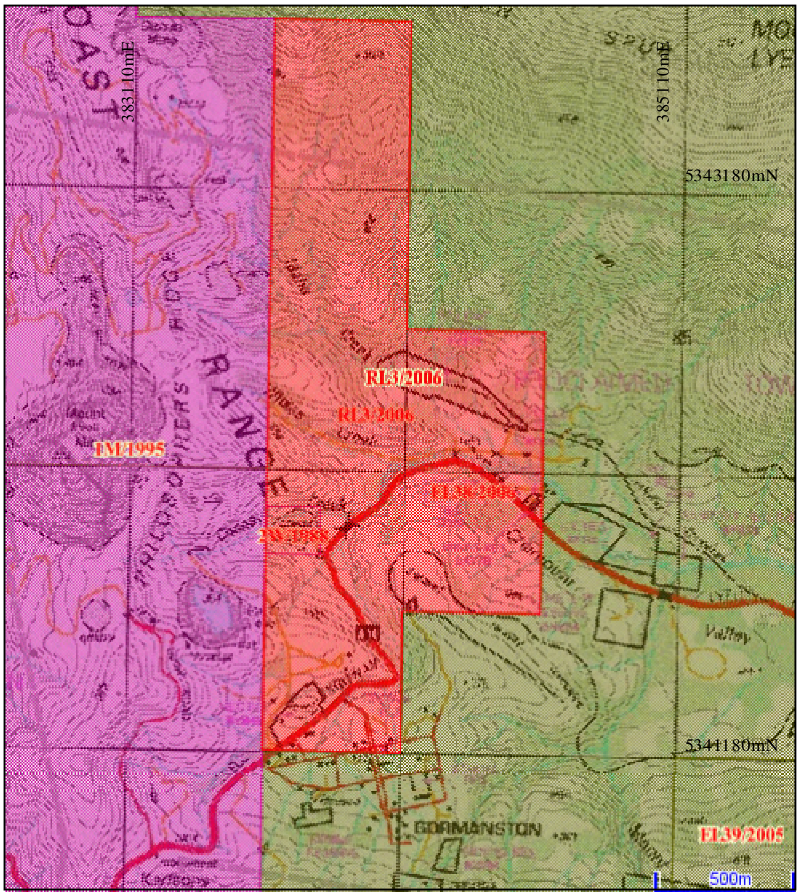

Figure 1. RL 3/2006 Location Map.

These are native copper and copper oxide deposits with substantially different mineralogy and metallurgical characteristics than the current production from the Prince Lyell underground mine. The King Lyell deposit has been assessed as the only deposit of potential tonnage to be considered for potential future mining (AMC, 2008) and all CMT exploration to date has been on King Lyell. Recent exploration has achieved sufficient drilling coverage to increase confidence for resource modelling and estimation. This report covers the current status of the King Lyell resource model and future options for the deposit.

2. Geology

The Copper Clays are hosted in highly deformed and intensely weathered limonitic and carbonaceous clays and concretionary iron hydroxides, derived from Gordon Group limestone and shale, altered by copper bearing acid waters draining from primary Mt Lyell copper sulphide mineralization up slope (Wills, 1995). The deposits are contained in tight, faulted Devonian synclines, which plunge to the east-southeast and strike parallel to the North Lyell Fault, forming part of the tectonic domain bounding the eastern edge of the Mt Lyell mineral field. King Lyell is overlain with up to 60m of glacial, periglacial and anthropogenic material in the east (Figure 2). The cover shallows towards the west where the host rock crops out.

3. Review of Previous Work in the Modern Era

A major CMT desktop study reviewed the geology and mining potential of the copper clays deposits in 1995 (Wills, 1995). In 1996 CMT drilled part of the King Lyell deposit predicted from the Wills 1995 report to contain relatively high grade mineralization. It was also an opportunity to trial modern high air delivery RC percussion drilling on the copper clays, which are renowned as being difficult to effectively drill. The three hole program was moderately successful in terms of sample recovery and rate of penetration but the wet unconsolidated materials resulted in substantial vertical contamination and therefore reported grade intervals may not be very accurate (Morrison, 1996). A 1997 resource estimation of King Lyell, estimated 1.2 million tonnes at 1.37% Cu with a stripping ratio of 2.3:1 (Morrison and Knight, 1997). This estimate utilised wireframes created from cross-sections and a longitudinal section created from un-validated historical drilling and the 1996 CMT drilling results.

Further evaluations of the resource potential were conducted by CMT's senior Mining Engineer Tony Weston with a review of preliminary mine economics in 1997. The economics were not favourable and as the Mt Lyell operation temporarily closed in 1998, and subsequently changed hands, no further copper clays exploration was done until 2005.

Six diamond drill holes were drilled at King Lyell during 2005, aimed at testing the reproducibility of historical drilling results and to help define the outer boundaries of the deposit. Two of the six holes intersected mineralised clay, with the best intersection in 05KLD002 being 14m @ 0.51% Cu (Hill, 2006). These results were used to validate a nearby earlier RC hole (96KLC001) which reported values of 8m @1.27% Cu from a similar depth. McArthur Ore Deposit Assessments Pty Ltd conducted a mineragraphy study on core samples in September 2005, concluding that native copper was the most common copper mineral, but also present were cuprite (mainly rimming native copper, but also commonly liberated), covellite, chalcocite, bornite and chalcopyrite (McArthur, 2005). It is not clear whether the copper sulphide minerals are hosted in detrital rock fragments deposited as karst fill talus in the decomposed limestone.

AMC consultants were engaged by Copper Mines of Tasmania during 2007 to undertake a scoping study of the copper clays deposits. The study evaluated the deposits and determined that the King Lyell deposit was the only deposit that justified further attention. The scoping study was completed in February 2008 and covered a geological review, geotechnical and metallurgical assessments, mining options and costs, optimization, conceptual designs for open pit, waste dumps and scheduling, financial and risk analysis. The main conclusions of the scoping study underlined that the King Lyell deposit had sufficient potential to provide a significant minable resource for CMT. More drilling was recommended prior to a pre feasibility study (AMC, 2008). Surpac 3D modeling of King Lyell was conducted by CMT following the AMC report (Brown, 2008).

2014 resource modelling update

A resource drilling program consisting of 11 HQ vertical diamond drill holes was completed during 2011. All holes were rotary- mud pre collared and core recovery through the target sediments was better than on any previous copper clays drilling. Description of the drilling methods, logs and the geology of the sediments are covered in the 2011 and 2012 Annual Reports (Brown, 2011, Morrison, 2012).

Drilling data used in resource evaluation

Drilling data selected was from three programmes, the 1996 (three RC holes), 2005 (six diamond holes) and 2011 (11 combination rotary mud pre-collars with diamond tails) (Table 1). All data previous to these programmes has been not considered due to poor recoveries or unreliable surveys.

Hole ID	EOH Depth	Method	Year
96KLC0001	70	Reverse circulation	1996
96KLC0002	67	Reverse circulation	1996
96KLC0003	60	Reverse circulation	1996
05KLD001	32.2	Diamond (HQ3)	2005
05KLD002	72.2	Diamond (HQ3)	2005
05KLD003	42.4	Diamond (HQ3)	2005
05KLD004	48.8	Diamond (HQ3)	2005
05KLD005	46.6	Diamond (HQ3)	2005
05KLD006	93.7	Diamond (HQ3)	2005
DD11CMT007	90	Rotary mud pre-collars with Diamond HQ3 tails	2011
DD11CMT008	99.7	Rotary mud pre-collars with Diamond HQ3 tails	2011
DD11CMT009	87.1	Rotary mud pre-collars with Diamond HQ3 tails	2011
DD11CMT010	74.4	Rotary mud pre-collars with Diamond HQ3 tails	2011
DD11CMT011	87.7	Rotary mud pre-collars with Diamond HQ3 tails	2011
DD11CMT012	82.4	Rotary mud pre-collars with Diamond HQ3 tails	2011
DD11CMT013	68.5	Rotary mud pre-collars with Diamond HQ3 tails	2011
DD11CMT014	95.8	Rotary mud pre-collars with Diamond HQ3 tails	2011
DD11CMT015	59.4	Rotary mud pre-collars with Diamond HQ3 tails	2011
DD11CMT016	60.7	Rotary mud pre-collars with Diamond HQ3 tails	2011
DD11CMT017	51.5	Rotary mud pre-collars with Diamond HQ3 tails	2011

Table 1. Summary of drill holes used in resource evaluation.

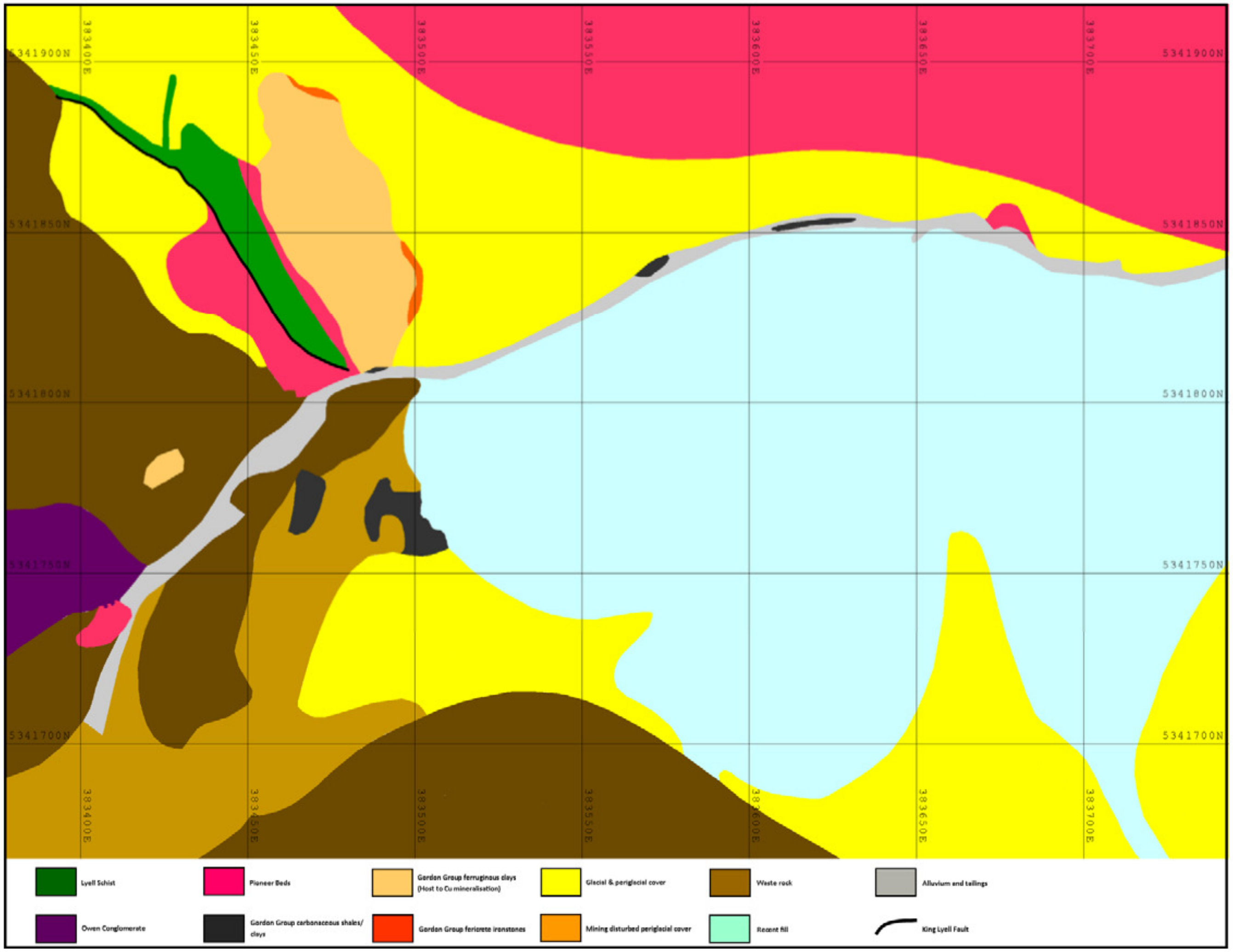

Figure 2. Surface geology map of the King Lyell area.

Resource evaluation – solid geology model

<u>King Lyell Fault</u>

Initially, the sub-vertical King Lyell Fault was extended under the cover to the south east to provide a southern boundary to mineralisation. Using this extrapolation as a boundary to mineralisation is a reasonable assumption due to absence of mineralisation found in drill holes 96KLC0003, 05KLD004, 05KLD006, DD11CMT016 and DD11CMT017 (south of boundary, Figure 3).

Using this extrapolation as a fault for solid geology modelling is less robust due to lack of intercepts in drill holes and uncertainty in the geometry of the fault where mapped. Drill intercepts suggest that the Pioneer Beds are increasingly offset to east (south side up) across this zone. This could be a result of faulting or fold asymmetry.

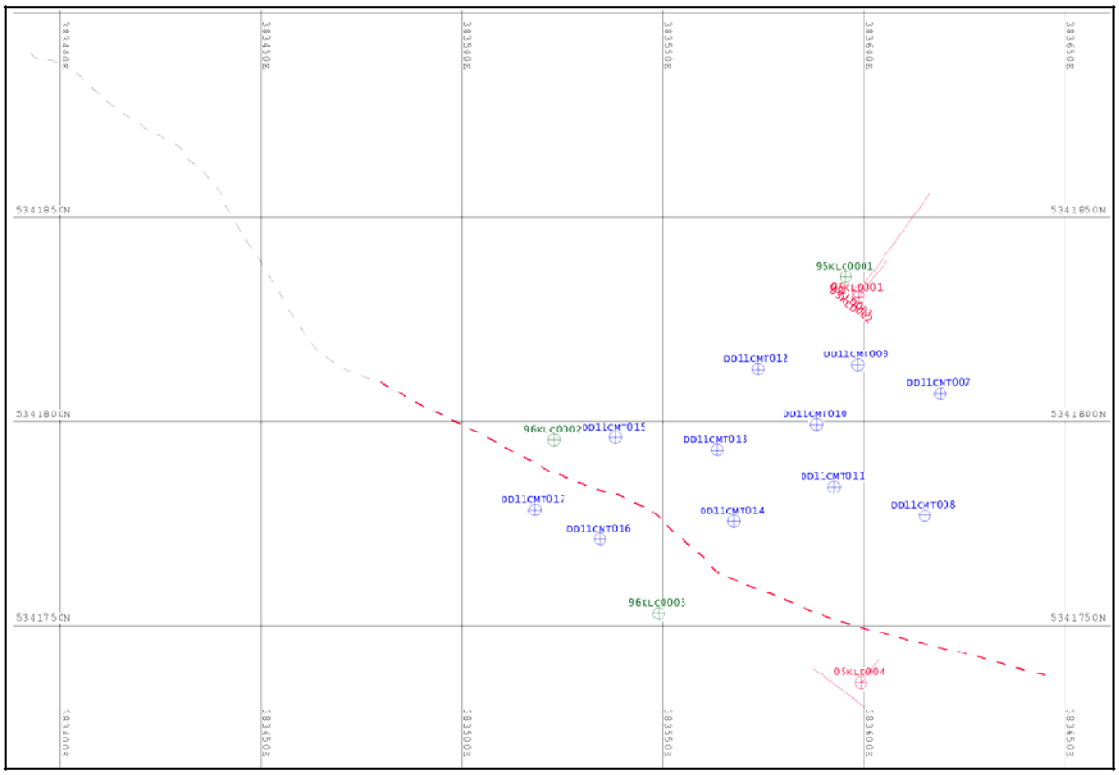

Figure 3. King Lyell Fault as mapped (grey dashed) and King Lyell Fault extension (red dashed). 1996 programme=green, 2005 programme=red, 2011 programme=blue collars.

<u>Pioneer Beds</u>

The top of the Pioneer Beds represent the lower surface of the Gordon Group and hence the lower limit of the King Lyell resource. The upper surface of the Pioneer Beds was modelled using a combination of drill-hole intercepts and surface geology. The model of the Pioneers beds took into account both the form of the tight Devonian folding and the extension of the King Lyell Fault. The geometry of the Pioneer Beds is well understood to the north, south and west, however, due to lack of drilling there remains some uncertainty to the east.

The results of the modelling are displayed in Figure 4. The Pioneer Beds have an overall east-west synclinal form that shallows to the west. There is a subtle antiformal east-west fold in the centre of the syncline. The surface is also modelled with a vertical offset of up to 25m at the eastern end of the King Lyell fault extension.

Copper Clays resource wireframe

The mineralised portion of the copper clays was modelled from both the drill-hole grade and lithology intercepts and the surface geology under the following constraints:

1) The wireframe was to include drill-hole intervals greater than 0.4 % Cu.

2) The wireframe was not to cross to the south of the King Lyell Fault boundary.

3) The wireframe was to remain above the Pioneer Beds surface.

4) The wireframe was to remain below topography.

5) The wireframe was to include surface mapped copper bearing clays.

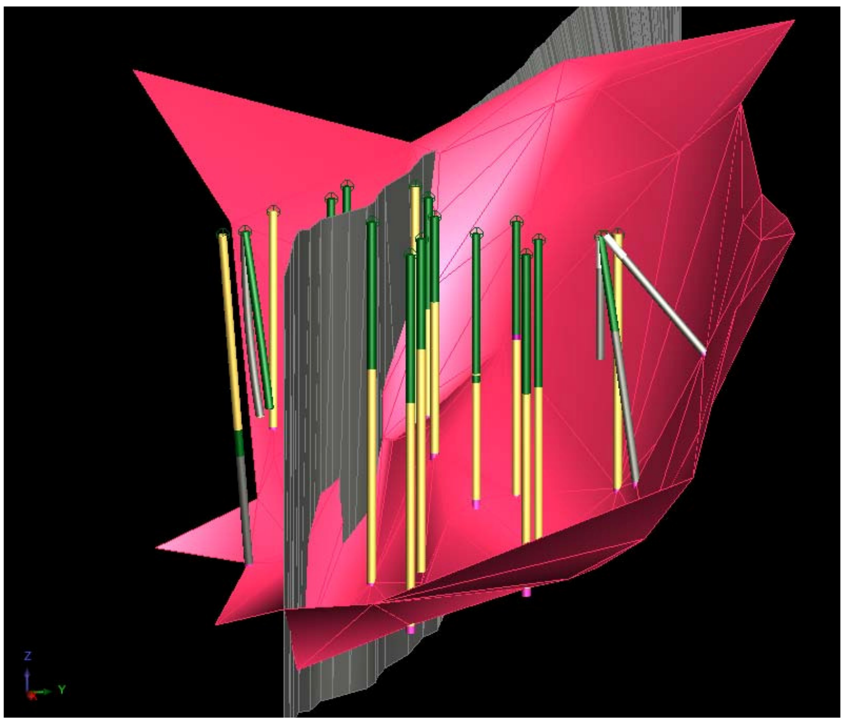

Figure 4. Modelled Pioneer Beds surface (Pink) and King Lyell Fault extension (grey) looking west. Drill holes displayed (Pioneer Beds = pink, Gordon Group clays = tan, Undifferentiated clays = dark grey, Alluvium and tailings = light grey, Recent fill = green).

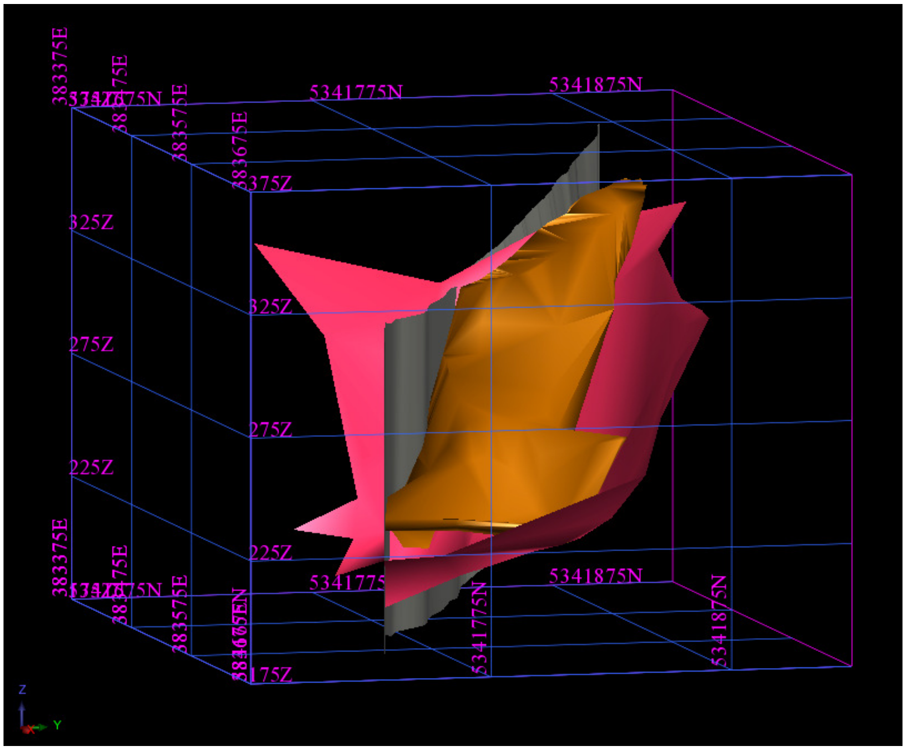

Figure 5. **Modelled mineralised wireframe (brown), constrained by Pioneer Beds (pink) and King Lyell Fault extension (grey).**

The resulting wireframe representing the King Lyell resource had a maximum dimensions 220m NW-SE, 90m NE-SW and a maximum thickness of ~20m (Figure 5.). The deposit dips at 30° towards 120° and has antiformal structure, mirroring the subtle antiform of the underlying Pioneer Beds. In the centre of the antiform, the wireframe sits above the top of the Pioneer Beds. The volume of the wireframe is 131,166m^3. It is important to note that the eastern end of the wireframe was modelled entirely on grade due to lack of drill-hole data.

Resource evaluation – Resource estimation

Resource estimation was carried out in the 315_GRL mine grid.

Block model parameters

	Y	X	Z
Minimum coordinates	6900	3500	2300
Maximum coordinates	7600	5000	2700
User block size	10	10	2
Sub blocking	5	5	1
Rotation bearing	70		
Rotation dip	-30		
Rotation plunge	0		

Estimation parameters

The inverse distance squared method was used for grade estimation inside the mineralised wireframe.

The search directions were oriented along strike and down dip.

Parameter	Magnitude		
	Pass 1	Pass 2	Pass 3
Min number of samples	4	4	2
Max number of samples	30	30	20
Max search radius	50	100	200
Max vertical search distance	10	20	100
Search ellipsoid bearing	160	160	160
Search ellipsoid plunge	-30	-30	-30
Search ellipsoid dip	0	0	0
Ellipsoid Major/semi-major	2	2	2
Ellipsoid Major/minor	4	4	4

Bulk density

Bulk density was estimated using Pass 3 Cu grade search parameters. As the bulk densities measured for the clays has varied dramatically in past studies (from 1.9 t/m^3 to 2.6 t/m^3), two tonnage calculations will be made when stating the resource. The first will be the estimated value by inverse distance squared and the second will be the value AMC assigned (2.2 t/m^3) in the 2008 scoping study.

Results

Pass 3 model is the only model that completely fills the mineralised wireframe with grade (Figure 7). It is expected that the Pass 3 model be accurate for volume, but slightly overestimate grade due to the extrapolation of high grades in northern most drill-holes.
It is reasonable to assume that Pass 1 represents an inferred resource.

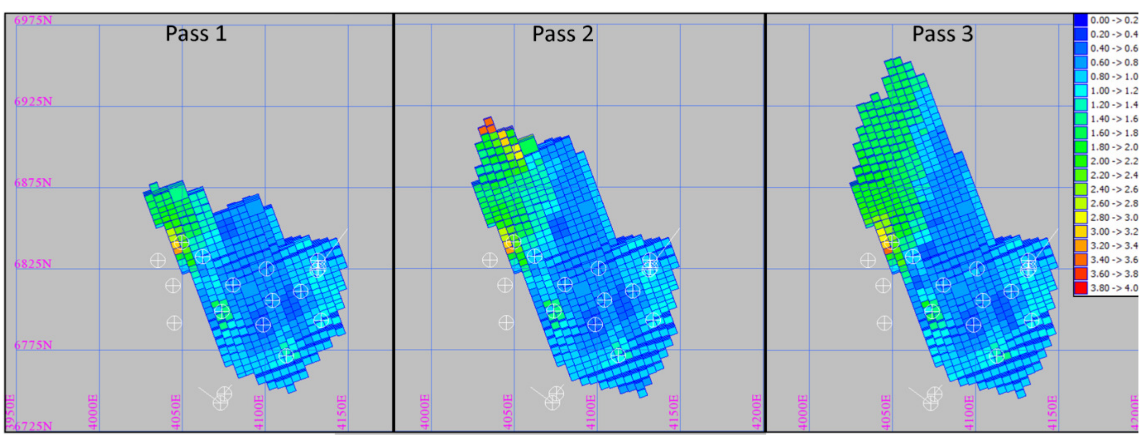

Figure 6. Plan view of results of Pass 1, 2 and 3 search parameters. Drill-hole collars in white. Inset - copper grade legend.

The global resources (inside mineralised wireframe, 0.01 % Cu cut-off) are as follows:

	Interpolated density model			AMC density (2.2 t/m^3)		
	Tonnes	**Cu %**	**Cont Cu (t)**	**Tonnes**	**Cu %**	**Cont Cu (t)**
Pass 1	320,134	0.82	2625	230,890	0.82	1893
Pass 2	379,622	0.85	3226	272,250	0.84	2286
Pass 3	402,134	0.91	3659	287,870	0.90	2590

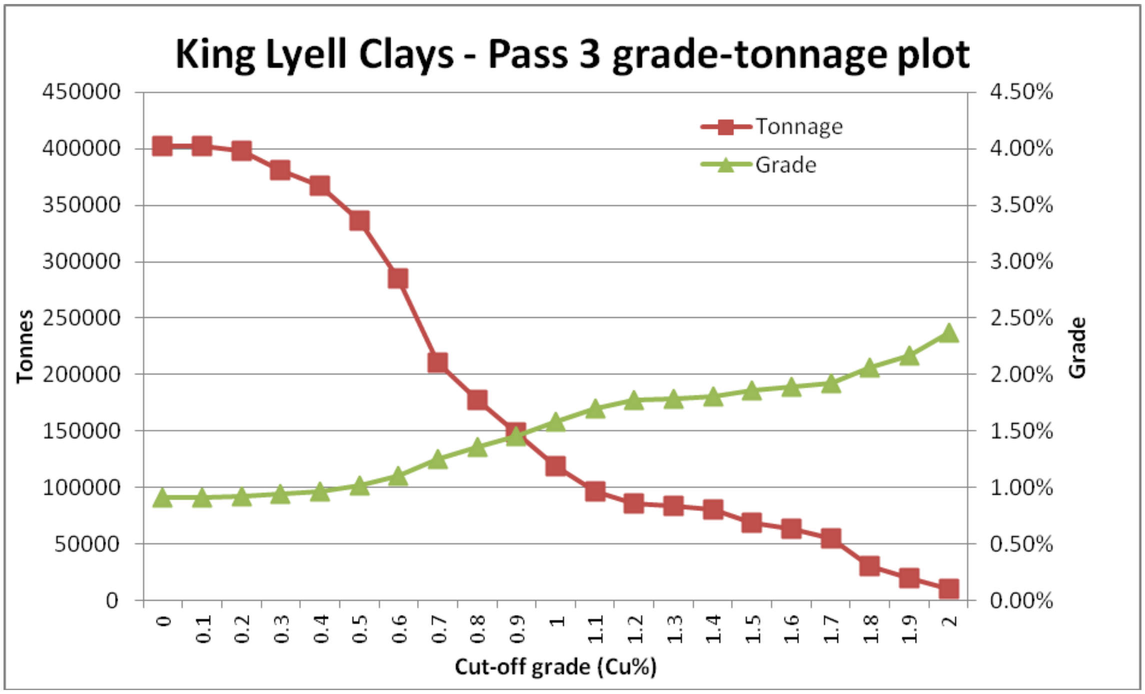

Figure 7. **Grade-tonnage plot for Pass 3 search ellipse (Interpolated density values used).**

Comparison with previous estimations

Due to the results of the 2011 drilling programme, the tonnage of the King Lyell Clays deposit has been dramatically reduced (Table 2).

Year	Author	Model type	Density (t/m^3)	Tonnes (Mt)	Grade (Cu%)	Cont Cu (kt)
1998	CMT		2.55	1.2	1.37	16.4
2008	AMC	Upside model	2.20	2.9	1.07	31.0
2008	AMC	Conservative model	2.20	2.5	0.90	22.5
2013	CMT	Pass 3 (Upside) model	Interpolated	0.4	0.91	3.6

Table 2. **Comparison of estimations for the King Lyell Copper Clays.**

This reduction in tonnage (volume) in the most recent model is due to the change in the volume of the mineralised wireframe. The change in volume is due to:

1. Previous models have used the assumption that holes without mineralisation have not drilled deep enough and the wireframe has been modelled to pass underneath these holes (Figure 8). The 2011 drilling of two holes that were both absent of mineralised clay and ended in Pioneer Beds provided closure for the current model on the west and south-west margins of the deposit (315_GRL relative).

2. Previous models have utilised drilling data from 1901 that has performed poorly in validation drilling. In these models, a large area of mineralisation has been interpreted on the southern, south-eastern and north western margins (315_GRL relative). Due to the age and questionable validity, these results have not been used in the current modelling/estimation process.

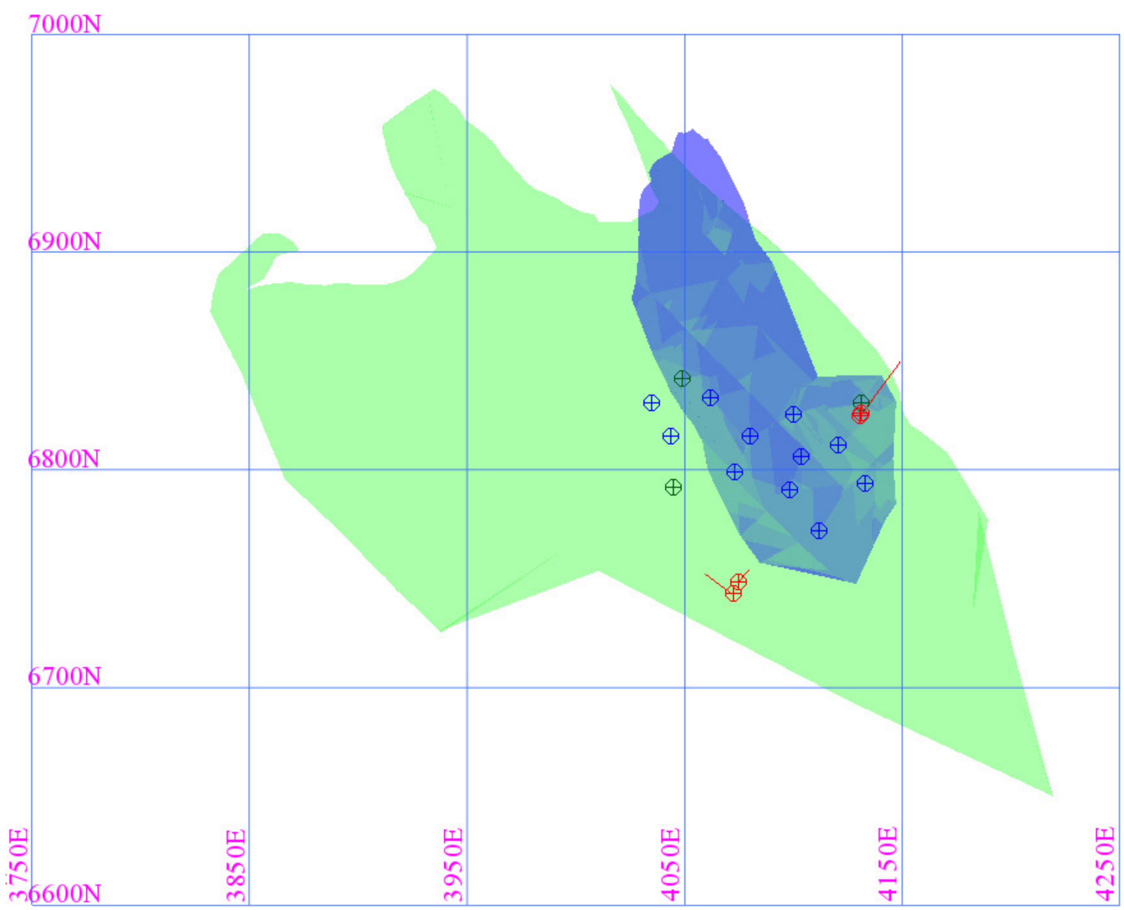

Figure 8. Comparison of previous wireframe (green) and current mineralised wireframe (blue) (plan view). Drill collars shown (1996 programme=green, 2005 programme=red, 2011 programme=blue collars). Note position of the two 2005 and one 1996 drill holes outside the 2013 wireframe. The AMC modelled wireframe passes below these holes.

It is recognised that due to the scarcity of reliable drilling data in the south-east and north-west (GRL relative), that the deposit it open in these directions. It is unlikely that drilling in the north-east will greatly increase the volume of the deposit due to the shallowing nature of the footwall anticline. However, drilling in the south-east may extend the deposit.

The current modelling and resource estimation demonstrates that previous modelling of King Lyell was too optimistic in terms of predicting a much larger tonnage resource than can be supported with an acceptable level of confidence, based on the drilling and surface mapping data available. It is unlikely that Ling Lyell will be viable to mine unless a major increase in copper price occurs.

4. Exploration Completed During the Report Period

No activities related to the retention licence were conducted during the reporting period.

5. Environment

No environmental impact or work occurred during the reporting period.

6. Proposed Works for the 2014-2015 Licence Year

No further drilling or feasibility study is warranted at the current copper price.

Marketing studies will be undertaken in the 2015-2016 licence year.

7. Expenditure

RL 3/2006 Expenditure 3rd Nov 2014 - 3rd Nov 2015

No exploration expenditure was committed during the term.

8. References

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