

## **Viscaria Copper-Iron Project**

### **Metallurgical Results indicate Oxide Copper Mineralisation at D Zone is amenable to leaching**

#### **Highlights**

- **Preliminary metallurgical test work on an oxide copper mineralised sample from the D Zone Prospect indicates that this mineralisation is amenable to acid leaching.**
- **This is a positive result and further metallurgical and mining studies will be completed to establish if an economically viable leaching operation could be established at Viscaria for the oxide zone.**
- **The D Zone oxide copper domain is open to the south and further drilling will be completed to define its extent.**
- **Further oxide zone drilling and metallurgical test work is scheduled for the final quarter of 2014.**
- **These results support the ongoing Options Study to assess project scope expansion opportunities beyond the 2013 Scoping Study.**

**Avalon Minerals Limited** ('Avalon' or 'Company') (**ASX: AVI**) is pleased to announce the results of a preliminary metallurgical investigation into oxide copper mineralisation from the D Zone Prospect of the Viscaria Copper-Iron Project (Figures 1 and 2). Assessment of the leach-by-size and leach-by-time results from the preliminary testing indicate a target copper extraction up to 75% may be readily achieved with moderate additional leach time over the seven days used for bottle roll testing at minus 13mm crushed size. Acid consumption is moderate (based on industry averages) at less than 3 kg per kg copper extracted. Therefore, this sample is considered amenable to acid leaching justifying further metallurgical studies and the Company will proceed with studies into whether an economically viable leaching operation could be established at Viscaria for the oxide zone. Avalon commissioned Ausenco Services Pty Ltd ('Ausenco'), recognised internationally as a specialist in minerals processing and independent to Avalon, to conduct this metallurgical investigation.

Avalon's Managing Director, Malcolm Norris, said "Demonstrating that the oxide copper mineralisation on the Viscaria Copper-Iron Project is amenable to acid leaching allows Avalon to consider other options for expanding the base case outlined in the Scoping Study announced on 9 July 2013.

This result gives Avalon the confidence to complete further drilling and metallurgical studies in order to understand the full impact this oxide copper mineralisation will have on the project economics. These results will also allow for reviews of project scheduling, capital cost allocation and Pre-Feasibility Study expansion opportunities."

#### **ASX: AVI**

##### **REGISTERED OFFICE**

Avalon Minerals Ltd  
ABN 68 123 184 412  
65 Park Road  
Milton Qld 4064 Australia  
P + 61 7 3368 9888  
F + 61 7 3368 9899  
[info@avalonminerals.com.au](mailto:info@avalonminerals.com.au)  
[www.avalonminerals.com.au](http://www.avalonminerals.com.au)

### Metallurgical Sample

The oxide copper metallurgical sample was taken from drill hole VMD0003, which was drilled into the D Zone Prospect. The details of the drill hole and intersection taken for metallurgical test work are shown in Table 1. The location of this drill hole relative to the D Zone Mineral Resource is shown in plan view and cross-section in Figure 3 and in long section in Figure 4. VMD0003 is also within the D Zone open pit shell from the Viscaria Copper-Iron Project Scoping Study as announced on 9 July 2013.

**Table 1: VMD0003 Drill Hole Details and interval of sample taken for metallurgical test work.**

Hole	Prospect	Easting (RT90, m)	Northing (RT90, m)	RL (RT90,m)	Azi. (°)	Dip (°)	From (down hole m)	To (down hole m)	Interval Width (down hole m)	End of Hole(m)
VMD0003	D Zone	1,680,664	7,537,139	510.6	130	-50	18.9	46.3	27.4	68.4

### Mineralogical Investigation

The copper minerals in the VMD0003 sample are predominantly malachite, cuprite and native copper with traces of remnant sulphides such as chalcopyrite and digenite. Figure 5 shows some characteristic photomicrographs. Magnetite, usually slightly oxidised to martite haematite is the dominant gangue mineral (approximately 70%) with abundant talc and minor chlorite.

### Head Assay Results

The first stage of the preliminary metallurgical investigation into the oxide copper mineralisation sample was to quantify the amount of copper that was acid soluble compared to the total copper within the sample. To analyse the acid soluble copper and total copper, the sample was pulverised and digested by a Sulphuric Acid Leach ( $Cu_{ACID\ SOL}$ ) and a Sodium Peroxide Fusion followed by a Hydrochloric Acid digestion ( $Cu_{TOTAL}$ ) respectively. The products of these digestions were then assayed and compared. The assay results are shown in Table 2.

**The results indicate that the acid-soluble copper is 94% of the total copper.**

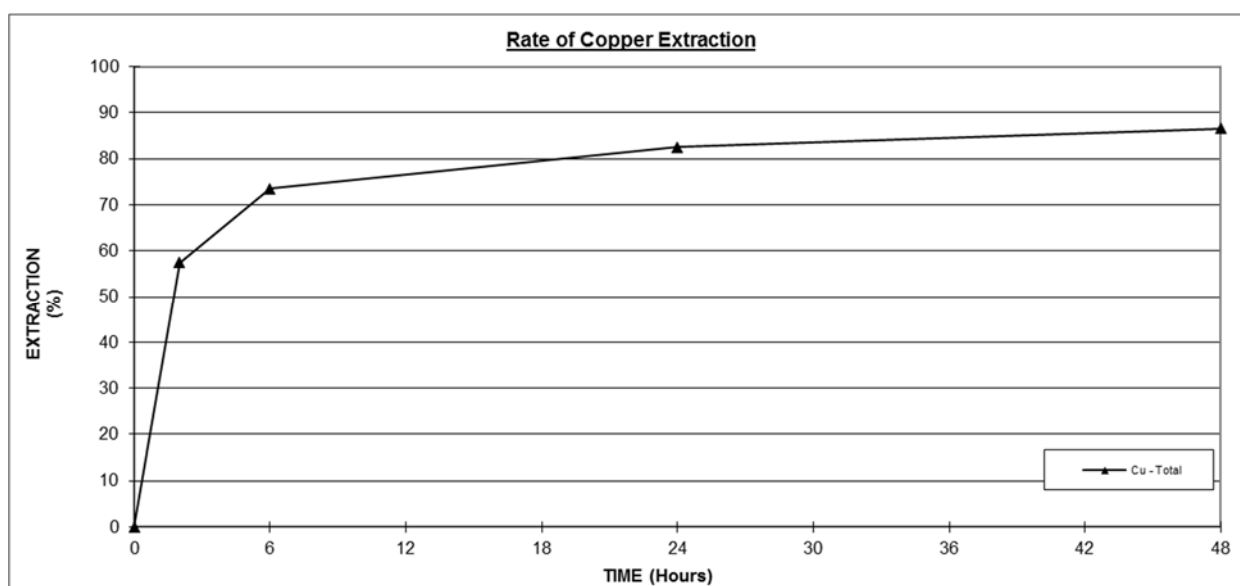
**Table 2: Head assay results of the oxide copper mineralisation sample.**

Analyte	Unit	AM007 [Oxide]
$Al_2O_3$	ppm	16,800
Ca	%	0.23
$Cu_{TOTAL}$	ppm	12,400
$Cu_{ACID\ SOL}$	ppm	11,672
Fe	%	44.3
MgO	ppm	78,000
S	%	<0.02
SiO2	ppm	208,000
Zn	ppm	325

### “Sighter” Agitated Leach Test Results

The second stage of the preliminary metallurgical investigation into the oxide copper mineralisation sample was to grind the sample to 80% passing 106µm and then leach with sulphuric acid in an agitated vessel (with stirring mechanism) for 48 hours. This “sighter” test identified that the theoretical maximum copper extraction from this type of processing was 86% copper extraction (Figure 6).

Figure 6 – Copper Extraction from “Sighter” Agitated Leach Tests (source ALS report).

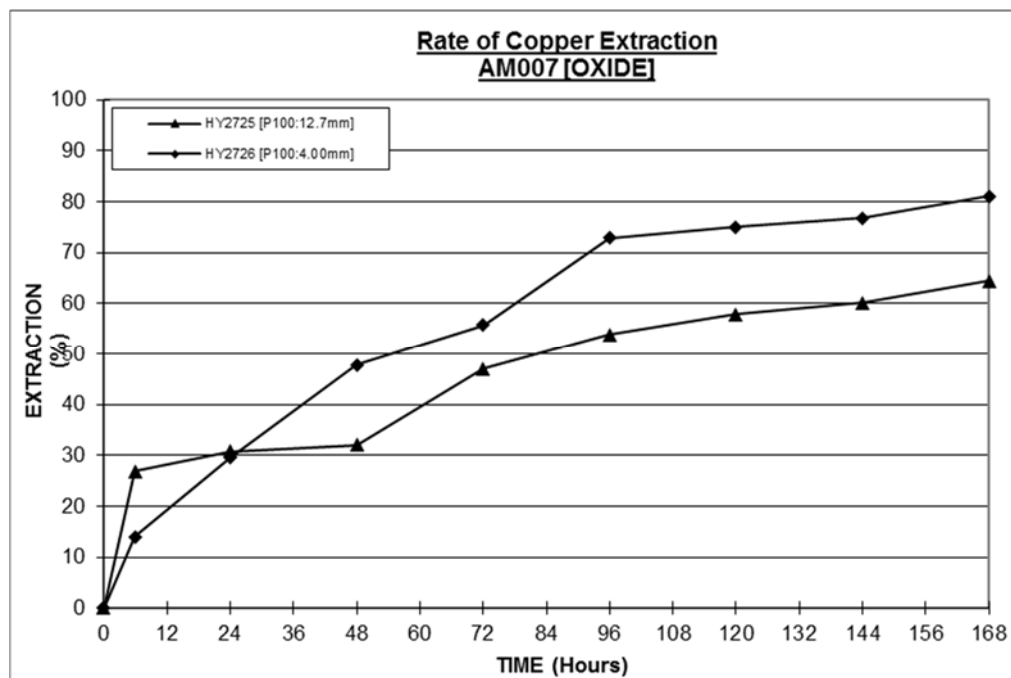


### Bottle Roll Acid Leach Test Results

The third stage of the preliminary metallurgical investigation into the oxide copper mineralisation sample was to complete Bottle Roll Leach Tests. This test involves splitting the sample into two representative parts and stage-crushing one part to minus 13mm (tertiary crushed product) and the other part to minus 4mm. The different crush sizes are used to assess the effect of particle size on copper extraction as well as leaching kinetics. The minus 13mm size material is considered to be indicative of the product size from a commercial three-stage crushing plant.

Figure 7 shows the percentage of copper extraction over time. After seven days (168 hours), the Bottle Roll Acid Leach testing of the crushed oxide copper mineralisation achieved 64% copper extraction at minus 13mm and 81% copper extraction at minus 4mm. Sulphuric acid consumption from the tests was moderate at 2.9 and 2.8 kg per kg of copper extracted, respectively. The leach rate was moderate at day 7 and further tests will determine the rate and extent of ongoing leaching over an extended time period.

Figure 7 – Copper Extraction from Bottle Roll Acid Leach Tests (source ALS report).



**Follow-up work to be completed**

Further metallurgical test work has been proposed to more fully understand the extent and kinetics of copper extraction, the influence of crush size, the corresponding acid consumption and the physical characteristics for treatment of this mineralisation using heap leach methods. In order to complete this test work, more drilling will need to be completed to obtain sufficient sample to ensure the metallurgical results are representative of all copper oxide mineralisation on the Viscaria Copper-Iron Project. The D Zone oxide copper domain is open to the south and further drilling will be completed to define its extent (see Figure 4).

Avalon plans to undertake this drilling in the final quarter of 2014.

**For further information please visit [www.avalonminerals.com.au](http://www.avalonminerals.com.au) or contact:**

Mr Malcolm Norris

Managing Director

Avalon Minerals Limited

Tel: 07 3368 9888

Email: [malcolm.norris@avalonminerals.com.au](mailto:malcolm.norris@avalonminerals.com.au)



**Competent Persons Statement**

The information in this report that relates to metallurgical results is based upon information reviewed by Edward McLean who is a Fellow of the Australasian Institute of Mining and Metallurgy. Mr McLean is a full-time employee of Ausenco Services Pty Ltd and has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the “Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves”. Mr McLean consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

The information in this report that relates to exploration results is based upon information reviewed by Dr Quinton Hills who is a Member of the Australasian Institute of Mining and Metallurgy. Dr Hills is a full-time employee of Avalon Minerals Ltd and has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the “Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves”. Dr Hills consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.





Figure 1 – Project Location

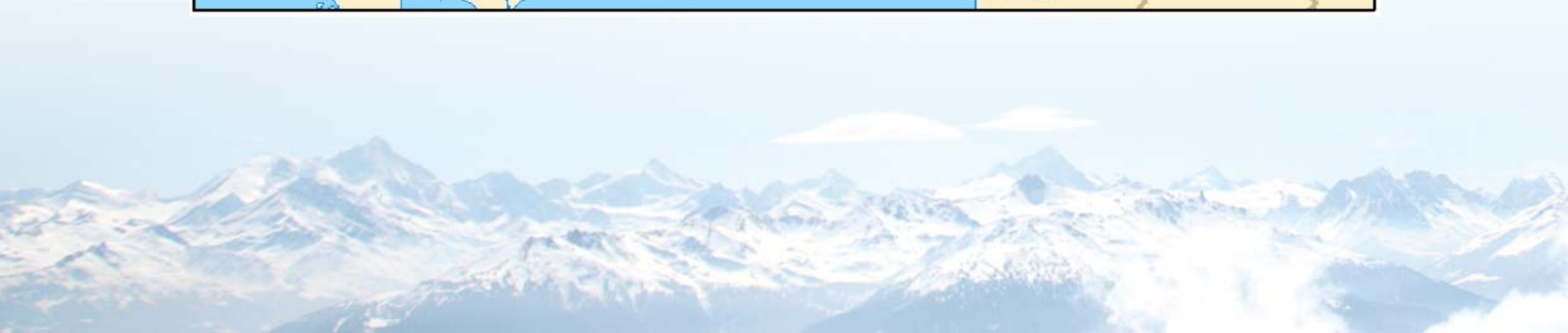
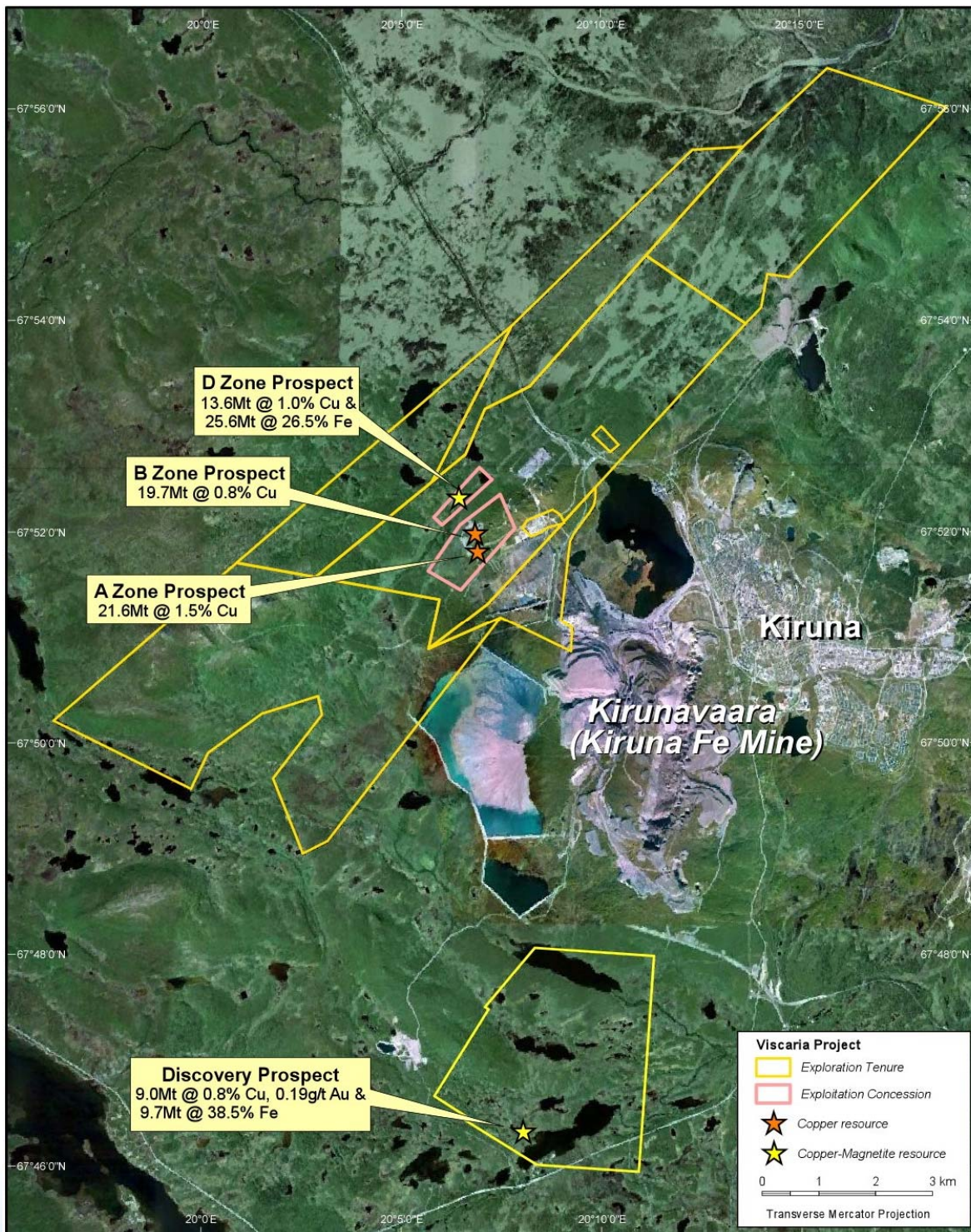
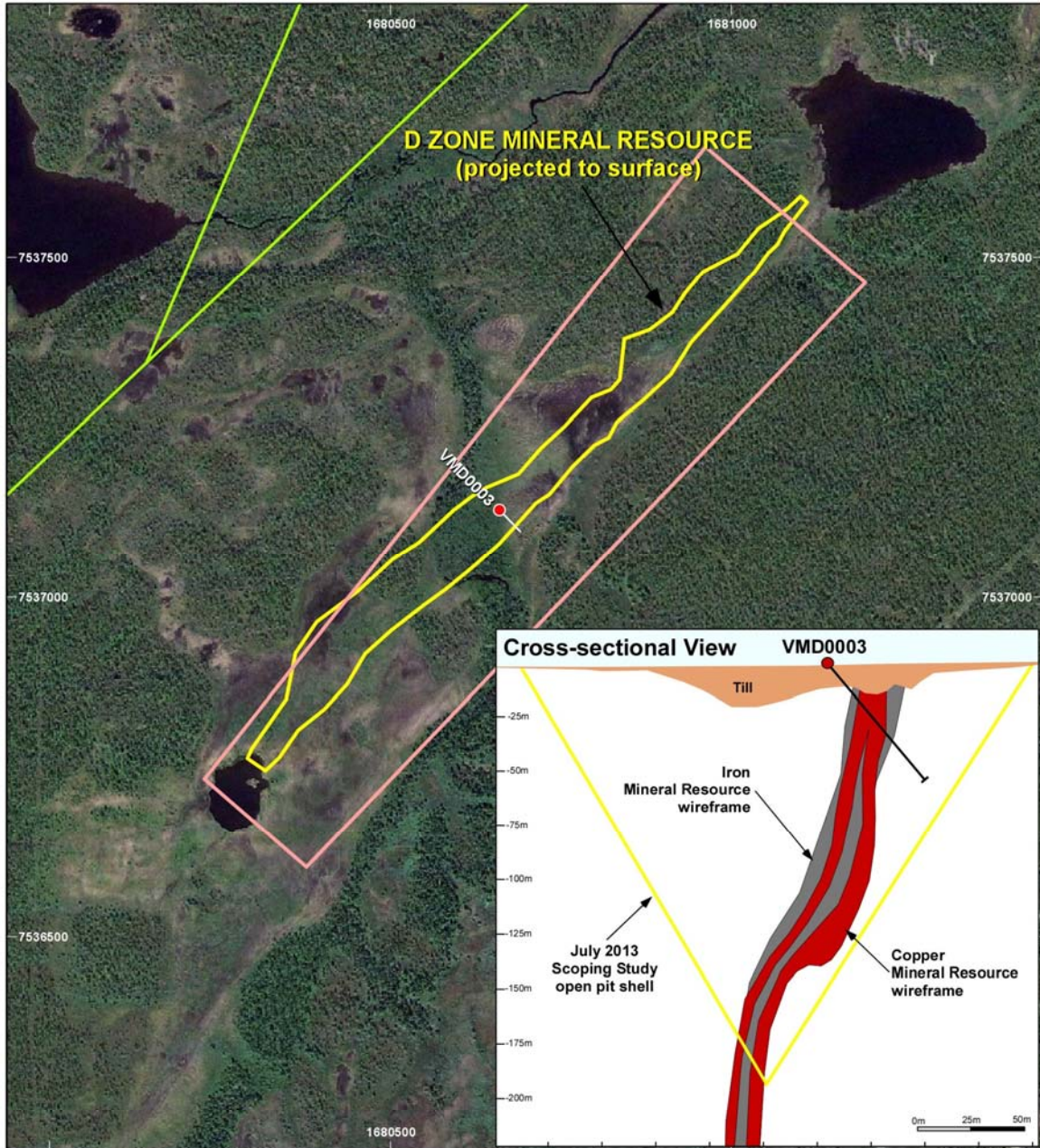


Figure 2 – Location of Mineral Resources of the Viscaria Copper-Iron Project.





**Figure 3:** Schematic diagram showing the location of VMD0003 relative to the D Zone Mineral Resource in plan view and cross-section.



0 100 200 300m

Transverse Mercator Projection  
RT90 gon vast 2.5 (standard)

- Exploration Permit
- Exploitation Concession
- Resource Zone boundary (surface projection)
- Drill hole

65 Park Road  
Milton QLD 4064  
Tel +61 7 3368 9888  
Fax +61 7 3368 9899

**AVALON**  
MINERALS LTD

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**FIGURE 3**

**D ZONE PROSPECT - VISCARIA PROJECT, SWEDEN  
LOCATION OF VMD0003**



**Figure 4:** Schematic diagram showing a D Zone long section and the outline of oxide zone material (above the green dashed line) within the broader D Zone resource. Drillhole VMD0003 is circled. Squares are pre-2012 drilling; Circles 2012-13 drilling. Yellow indicates moderate copper intersection, orange good intersection, red very good intersection; green is below copper cut-off grade

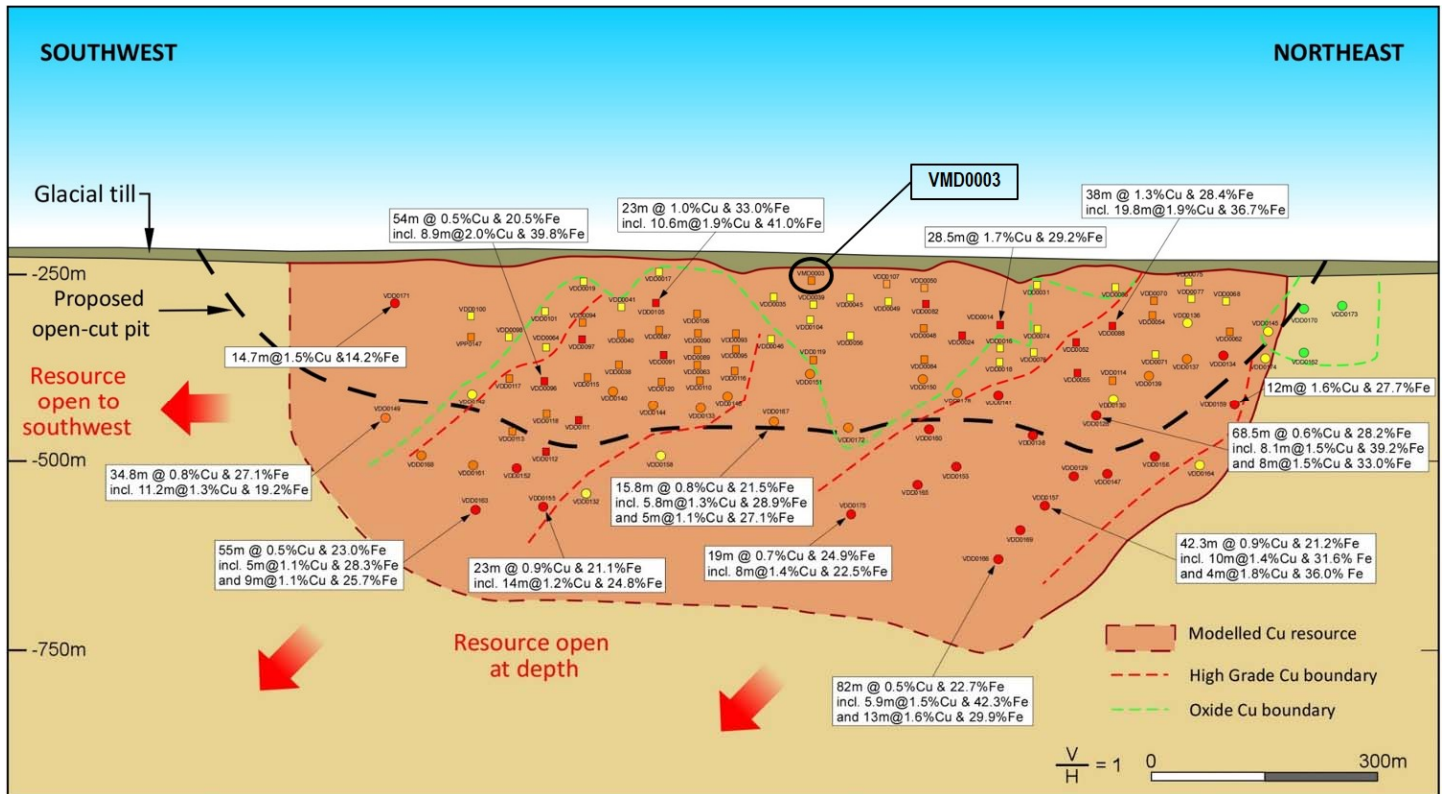
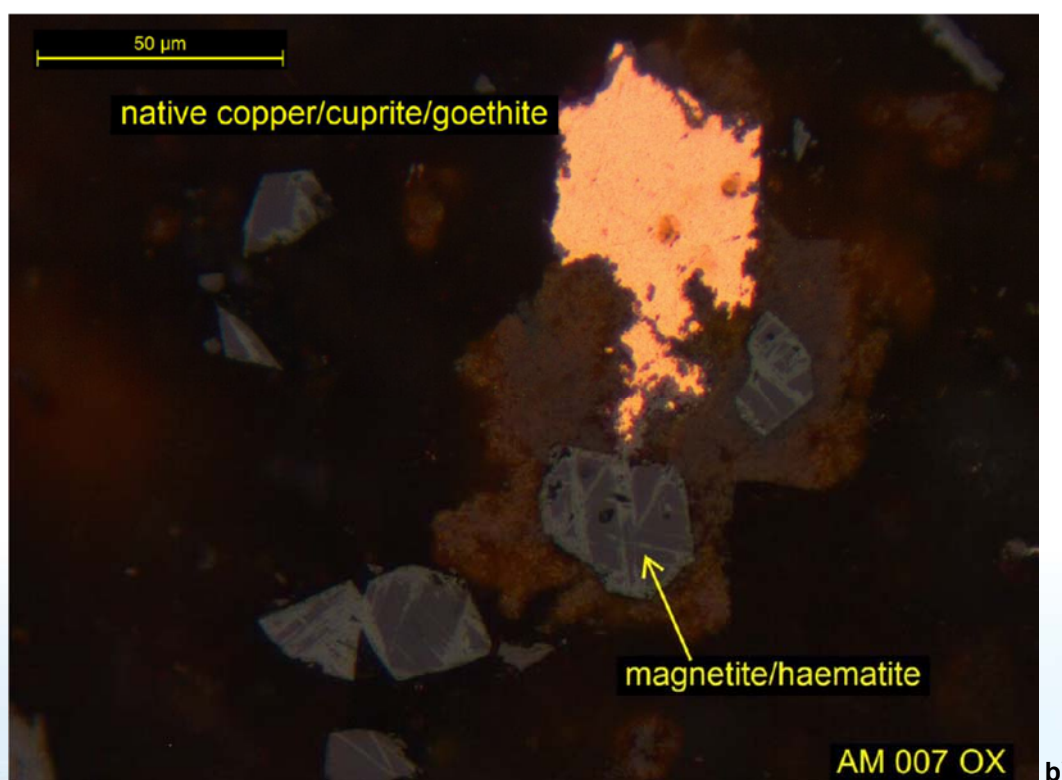
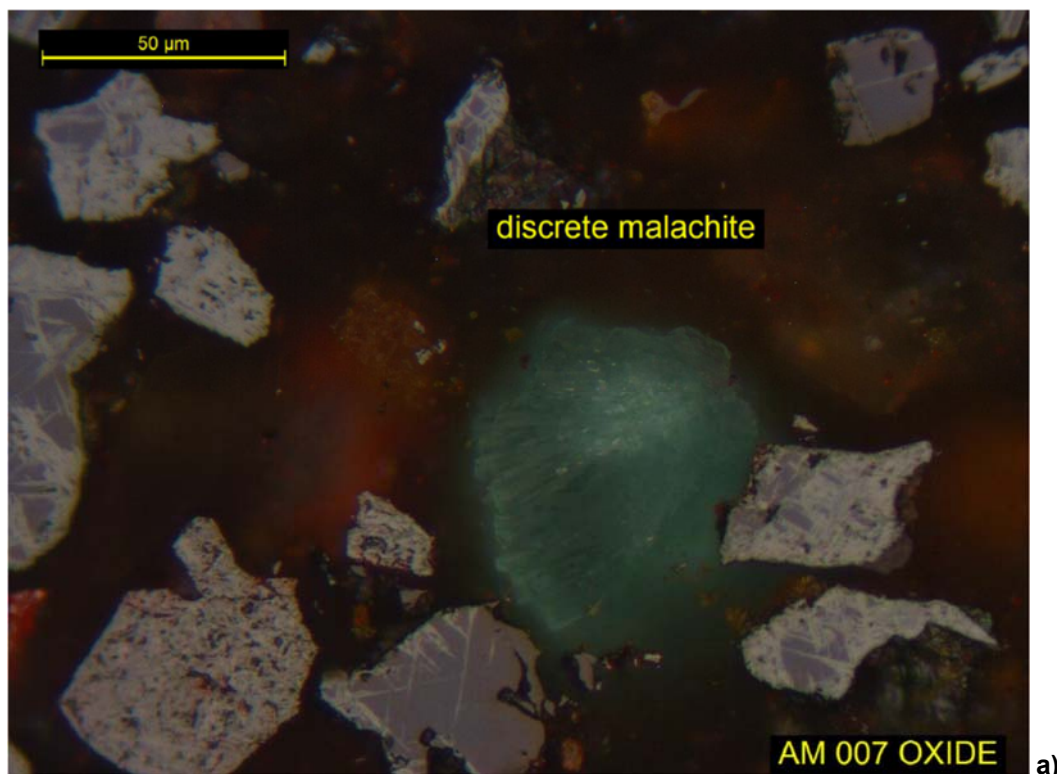


Figure 5: a) Photomicrograph of a discrete grain of malachite from the oxide copper mineralisation sample (AM007); b) Photomicrograph of the relationship between cuprite-goethite and native copper from the oxide copper mineralisation sample (AM007).



**Appendix One – Assessment of resource estimation (JORC 2012 Table 1, relevant sections 1 and 2)**

Criteria	Assessment
Sampling techniques	The intersection taken for metallurgical test work was whole core.
Drilling techniques	HQ diamond core.
Drill sample recovery	Average of 80% sample recovery throughout entire sampled interval. Some drill runs were as low as 50% sample recovery and therefore further drilling will need to be completed with a Triple Tube System.
Logging	Geology logged according to established procedures consistent with known industry practice. Procedures sighted by competent person.
Sub-sampling techniques and sample preparation	Whole core taken for test work.
Quality of the assay data and laboratory tests	The metallurgical test work was completed by a reputable laboratory, ALS Metallurgy in Perth and reviewed by consultant from Ausenco Services Pty Ltd ('Ausenco'), recognised internationally as a specialist in minerals processing and independent to Avalon. The Competent Person for metallurgical results for this announcement has used this laboratory successfully on many occasions. All the results from the different tests completed all corresponded within expectations when compared.
Verification of sampling of assaying	Photographs of sampled interval taken and the Competent Person for exploration results for this announcement has viewed remaining core in trays.
Location of data points	Licensed contract surveyors surveyed the collar co-ordinates to high accuracy (1-3cm). High quality down-hole dip and azimuth survey data collected by a gyroscope.
Data spacing and distribution	This drill hole intersection represents one sample of the oxide copper mineralization for the D Zone Prospect. Further drilling and metallurgical test work is needed to fully understand the distribution of oxide copper mineralization in the D Zone Prospect; as well as the extent and kinetics of copper extraction, the influence of crush size, the corresponding acid consumption and the physical characteristics for treatment of this mineralisation using heap leach methods. Therefore, these results are preliminary in nature and cannot be extrapolated in any way to define ore reserves.
Orientation of the data in relation to geological structure	Drilling orientation provides high angle mineralised intersections consistent with appropriate and representative sampling.
Sample security	Due attention has been given and tamper proof bags used when shipping core to the laboratory.
Audits and review	No other company has published metallurgical results from the copper oxide mineralization found at the D Zone Prospect.
Mineral Tenement and Land tenure status	The D Zone Prospect is contained with a granted Exploitation Concession, Viscaria K nr 4.

<b>Exploration done by other parties</b>	No other company has published metallurgical results from the copper oxide mineralization found at the D Zone Prospect.
<b>Geology</b>	The D Zone Prospect is composed of magnetite-chalcopyrite mineralization that is variably oxidised.
<b>Drill Hole Information</b>	All drill hole information has been detailed in the body of this announcement.
<b>Data aggregation methods</b>	No data aggregation methods were used. The head assays were obtained from a homogenised sample of the entire mineralised interval from drill core.
<b>Relationship between mineralization widths and intercept lengths</b>	The orientation of VMD0003 is at a high angle to the mineralization at the D Zone Prospect indicating that the length of the mineralized intersection sent for metallurgical test work is approximately 90% of the true thickness of the mineralization.
<b>Diagrams</b>	Plan view and cross-section of VMD0003 included in the body of this announcement.
<b>Balanced Reporting</b>	No other substantive exploration results are known at this stage.
<b>Further Work</b>	Further drilling and metallurgical test work is needed to fully understand the distribution of oxide copper mineralization in the D Zone Prospect; as well as the extent and kinetics of copper extraction, the influence of crush size, the corresponding acid consumption and the physical characteristics for treatment of this mineralisation using heap leach methods.
<b>Site visits</b>	Competent Person for exploration results has visited site.