# 12 JANUARY 2015 ASX ANNOUNCEMENT



## Drilling confirms new Footwall Copper Zone at the Viscaria Project

## Highlights

- Recent drill hole VDD0182 into the A Zone Prospect intersects three zones of mineralisation:
  - > Upper Zone: 7.95m @ 0.4% Cu from 21 metres downhole;
  - Main Zone: 22.3m @ 0.7% Cu from 64.70 metres downhole, including 3.1m @ 2.1% Cu from 82.90 metres downhole;
  - New Footwall Zone: 10.55m @ 0.5% Cu from 125.45 metres downhole.
- Drill hole VDD0182 was drilled to test the theory that a previously undefined footwall mineralisation zone existed;
- The results from VDD0182 have proved that the new footwall copper zone exists and could potentially increase the A Zone Mineral Resource estimate;
- The new footwall copper zone has not been factored into previous Open Pit Mining Studies and therefore, could potentially add to open-pittable tonnes available at A Zone.

## ASX: AVI

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**Avalon Minerals Limited** ('**Avalon**' or '**Company**') (**ASX: AVI**) is pleased to announce the assay results of drill hole VDD0182, which targeted copper mineralisation at the south-western end of the A Zone Prospect on the Viscaria Copper-Iron Project (Figure 1 and 2). Drill Hole VDD0182 intersected three zones of mineralisation: Upper Zone: 7.95m @ 0.4% Cu from 21 metres downhole; Main Zone: 22.3m @ 0.7% Cu from 64.70 metres downhole, including 3.1m @ 2.1% Cu from 82.90 metres; and the New Footwall Zone: 10.55m @ 0.5% Cu from 125.45 metres downhole (Table 1; Figure 3 and 4).

Avalon's Managing Director, Malcolm Norris, said "This result is very encouraging as we have now proved the existence of a new copper zone in the footwall to the main A Zone ore body. This result could potentially add to the A Zone Mineral Resource, as well as add to the tonnes available for open pit mining at A Zone due to its relatively shallow depth."

VDD0182 was planned with multiple objectives: 1) Test the theory that another zone of copper mineralisation exists in the footwall within open pit mining depths, which could significantly influence the open pit mining inventory at A Zone; 2) Twin hole of D-7966: in order to check the veracity of the historic LKAB/Outokumpu assay results; and 3) Provide geotechnical data for A Zone within the proposed open pit area.

During a review of the previous drilling at A Zone it was identified that drill hole VRC0068 intersected 13m @ 0.5% Cu from 42m downhole in the footwall (west) of the main A Zone mineralisation. However, the mineralisation in VRC0068 had not been included in previous mineral resource estimates because not enough drilling had been completed in this area to fully determine its extent. This mineralisation was deemed significant enough to follow up because it was situated within the open pit shells generated during the previous Open Pit Mining Study announced on the 28 August 2014, where it was treated as waste rather than ore. So, if this mineralisation was found to extend at depth and laterally it has the potential to be a significant contributor to the open-pittable mineralisation at the A Zone Prospect.

The first hole drilled to test this theory was VDD0182, which intersected the new footwall copper zone at 125.45 metres downhole with the assay results of 10.55m @ 0.5% Cu. This intersection indicates that the new Footwall Mineralisation Zone extends at least 100 metres down-dip from VRC0068. Further drilling will be required to fully understand the lateral extent of this mineralisation zone but there is evidence from other historic drill holes along strike that this mineralisation could have significant lateral extent.

The upper intersection of 7.95m @ 0.4% Cu in VDD0182 will also be followed up as it is speculated that an intersection of that grade may not have been of interest, and therefore not sampled, during historical exploration that focussed on high grade underground opportunities. This interval is also within the proposed A Zone open pit.

Drill hole VDD0182 was also drilled adjacent (6m off-section to the northeast) to hole D-7966, which was drilled by Outokumpu during the operation of the historic Viscaria Copper Mine. D-7966 intersected 33.35m @ 0.6% Cu from 64.45m down hole, including 4.5m @ 1.6% Cu from 93 metres down hole along strike of the main A Zone mineralisation lense. When the assay result from VDD0182 is compared with the assay result of D-7966 it is observed that VDD0182 has a thinner but slightly higher grade mineralised zone than D-7966 but can be broadly correlated. As a consequence of the increased level of confidence, D-7966 will now be excluded from resource calculations in favour of VDD0182.



Hole	Prospect	Easting (RT90, m)	Northing (RT90, m)	Azi. (°)	Dip (°)	From (down hole m)	To (down hole m)	Interval Width (down hole m)	% Cu	End of Hole (m)
						21.00	28.95	7.95	0.4	
							ar	nd		
						64.70	87.00	22.30	0.7	
VDD0182	A Zone	1,680,844	7,536,265	310°	-55		Inclu	ıding		174.8
						82.90	86.00	3.10	2.1	
							ar	nd		
						125.45	136	10.55	0.5	

#### Table 1: VDD0182 Drill Hole Details.

#### Follow-up work to be completed

Avalon plans to drill more holes into the A Zone Prospect to better determine the extent of the new footwall copper zone. These results will then be followed up with the estimation of a new JORC compliant A Zone Mineral Resource and updated mining studies to determine the economic benefit of this newly defined mineralisation zone.

#### For further information please visit www.avalonminerals.com.au or contact:

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#### **Competent Persons Statement**

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



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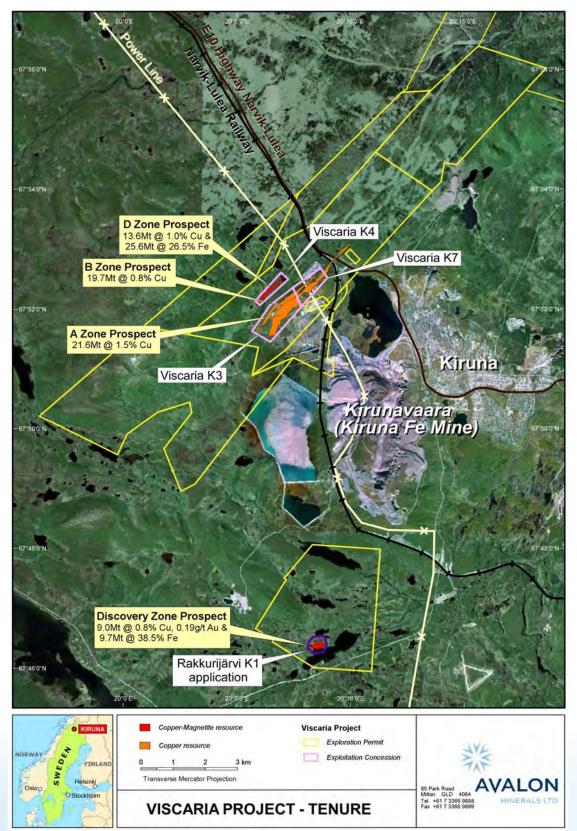
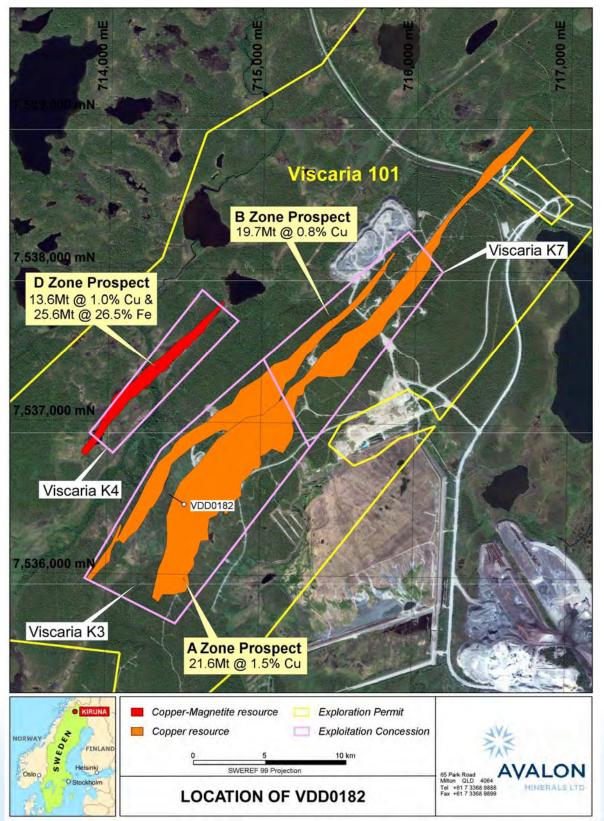


Figure 2 – Location of Mineral Resources of the Viscaria Copper-Iron Project.

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Figure 3: Map showing the location of VDD0182 relative to the A Zone Mineral Resource.





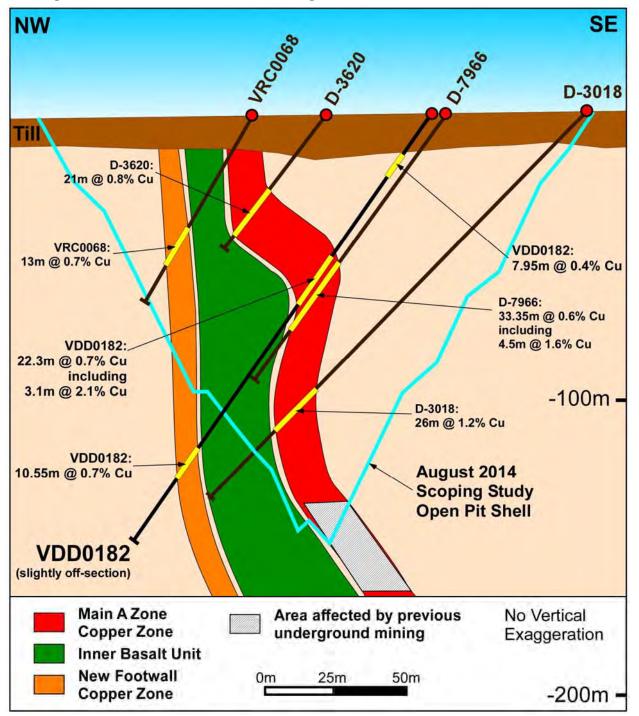


Figure 4: Schematic cross-section showing the mineralized intersection from VDD0182.

### APPENDIX 1 The following Table and Sections are provided to ensure compliance with the JORC Code (2012 Edition)

Criteria	JORC Code explanation	Commentary
Sampling techniques	• Nature and quality of sampling (e.g. cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as downhole gamma sondes, or handheld XRF instruments, etc.). These examples should not be taken as limiting the broad meaning of sampling.	• The results announced here are from diamond drill core samples. The sampling was carried out using half core, generally at one meter intervals except where adjusted to geological boundaries.
	• Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	• Not applicable.
	• Aspects of the determination of mineralisation that are Material to the Public Report. In cases where 'industry standard' work has been done this would be relatively simple (e.g. 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (e.g. submarine nodules) may warrant disclosure of detailed information.	• Diamond drill core was used to obtain 1m samples from which 3-5 kg was pulverised to produce a 250g sample. Then a 50g portion of this sample was then used for multi-element analysis.
Drilling techniques	• Drill type (eg core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (e.g. core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc).	• The diamond core was NQ in size (47.6 mm). The core was also oriented.
Drill sample recovery	• Method of recording and assessing core and chip sample recoveries and results assessed.	• Diamond core recovery data for this drilling was measured for each drill run and captured in a digital logging software package. The data has been reviewed and core recovery was predominatly to 100% throughout.
	• Measures taken to maximise sample recovery and ensure representative nature of the samples.	• As the ground conditions at A Zone are excellent, no extra measures were taken to maximise sample recovery.
	• Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.	• No relationship between sample recovery and grade has been established.

## **TABLE 1 – Section 1: Sampling Techniques and Data**

Criteria	JORC Code explanation	Commentary		
Logging	• Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.	• Drill samples were logged for lithology, weathering, structure, mineralogy, mineralisation, colour and other features. Logging and sampling was carried out according to Avalon's internal protocols and QAQC procedures which comply with industry standards.		
	• Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.	• Logging was both qualitative in terms of color, lithology and weathering; and quantitative in terms of structure, mineralogy and mineralisation. Core is photographed both wet and dry and also after sampling.		
	• The total length and percentage of the relevant intersections logged.	• All drill holes are logged in full from start to finish of the hole.		
Sub-sampling techniques and	• If core, whether cut or sawn and whether quarter, half or all core taken.	• Half core was used to provide the samples that were assayed and reported here. Half core is left in the core trays.		
sample preparation	• If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.	• Not applicable.		
preparation	• For all sample types, the nature, quality and appropriateness of the sample preparation technique.	<ul> <li>Avalon samples were sent to the ALS Sample Preparation Facility in Pitea, Sweden for sample preparation. The standard ALS sample preparation for drilling samples is: drying the sample, crushing to size fraction 75% &gt;2mm and split the sample to 250g portion by riffle or Boyd rotary splitter. The 250g sample is then pulverised to 85% passing 75 microns and then split into two 50g pulp samples. Then one of the pulp samples was sent to the Vancouver ALS laboratory for base metal analysis.</li> <li>The sample preparation is carried out according to industry standard practices.</li> </ul>		
	• Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	<ul> <li>Avalon used an industry standard QAQC programme involving Certified Reference Materials "standards" (with Cu grades ranging from near cut-off, average resource grades and very high grades) and blank samples, which were introduced in the routine sample batches.</li> <li>Standards, blanks and duplicates were submitted at a rate of 1 in 20 samples or one standard, blank and duplicate per hole if the hole has less than 20 samples.</li> <li>The check assay results are reported along with the sample assay values in the preliminary and final analysis reports.</li> </ul>		
	• Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.	<ul> <li>For diamond core, the routine sample was always taken as the half/quarter core to the right of the orientation line (looking down hole) or the cut line (in cases where the orientation line was not reliable).</li> <li>The results from duplicate samples were compared with the corresponding routine sample to ascertain whether the sampling was representative. These</li> </ul>		

Criteria	JORC Code explanation	Commentary
		results indicated that there was no discernible bias between the routine sample and the duplicate.
	• Whether sample sizes are appropriate to the grain size of the material being sampled.	• Sample sizes are considered to be appropriate and correctly represent the style and type of mineralisation.
Quality of assay data and laboratory tests	• The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.	<ul> <li>Avalon used assay method was ME-ICP81, which involves sample decomposition by sodium peroxide fusion. The digests are then analysed by ICP-AES. The lower detection limit for copper using ME-ICP81 is 0.005% Cu and the upper detection limit is 50% Cu.</li> <li>This analysis technique is considered suitable for this style of mineralisation.</li> </ul>
	• For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.	No other measurement tools/instruments were used.
	• Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.	<ul> <li>The values of the standards range from low to high grade and were considered appropriate to monitor performance of values near cut-off and near the mean grade of the deposit.</li> <li>The check sampling results were monitored no performance issues were detected.</li> <li>The assay results from Avalon's check samples, as well as the ALS laboratory's own internal check samples indicated the drill core sample assay results were of a suitable accuracy and precision.</li> </ul>
Verification of sampling and	• The verification of significant intersections by either independent or alternative company personnel.	• Photographs of sampled interval taken and the Competent Person for exploration results for this announcement has viewed remaining core in trays.
assaying	• The use of twinned holes.	• Assay results from a twinned drill hole is reported in this announcement. The twinned hole results and the historic drill results are broadly correlatable, indicating the veracity of the historic assay results.
	• Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	• The sampling intervals and sample numbers are recorded/generated directly in the acQuire <sup>™</sup> database package. Then assay data directly from the laboratory is brought together with the sampling data and validated within the acQuire <sup>™</sup> database package.
	• Discuss any adjustment to assay data.	No adjustments or calibrations were made to assay data.

Criteria		JORC Code explanation	Commentary		
Location data points	of	<ul> <li>Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.</li> <li>Specification of the grid system used.</li> </ul>	<ul> <li>ordinate system R to a high level of</li> <li>It has been stand collar points sinc the surface drill h</li> <li>These co-ordinate ordinates from th</li> <li>High quality Gyr</li> </ul>	2T90 gon vast (west accuracy (1-3cm). ard procedure to us e Avalon's involve coles at A Zone are uses were then con e historic mining for to down-hole surve ments for all Avalo	eyed by Differential GPS in Swedish co ) 2.5 by qualified local contract surveyor se the same contract surveyors to surve ment, so there is high confidence that a supported by accurate location data. verted into the existing mine grid co or resource estimation purposes. y equipment are used to collect dip an n diamond drill holes.
		- specification of the grad system used.	Parameter	Value	
			Reference Ellipsoid	Bessel 1841	
			Semi Major Axis	6377397.155 m	
			Inverse Flattening (1/f)	299.1528128	
			Type of Projection	Gauss-Krüger (Transverse Mercator)	
			Central Meridian:	E15°48'29.8" (2.5 gon West of the Stockholm Observatory)	
			Latitude of Origin	0°	
			Scale on Central Meridian	1	
			False Northing	0 m	
			False Easting	1500000 m	
			RT90 gon vast (v	west) 2.5 grid north	is situated 4.01° to the east of True North
		• Quality and adequacy of topographic control.	scanning) that we cadastral and lat metre square an	was purchased fro nd registration aut d is specified as a	ten from LIDAR data (airborne lase m Lantmäteriet (the Swedish mapping nority). Data point resolution is 0.5 pe ccurate to 20cm in elevation on distinc The level of accuracy of the LIDAR

Criteria	JORC Code explanation	Commentary
		topographic surface was considered adequate for the purposes of resource estimation. The LIDAR topographic surface has also been verified by the many Differential GPS collar survey co-ordinates.
Data spacing and distribution	• Data spacing for reporting of Exploration Results.	<ul> <li>Drill spacing was relatively regular on east-west aligned cross-sections, spaced 25m along the 4km strike. In some places underground, drill spacing was spaced at 12.5m or less. Data spacing was considered sufficient to establish continuity between drill holes.</li> <li>Sampling was generally taken over 1 meter intervals except when adjusted to geological boundaries. Short sample intervals were composited to 1m for estimation purposes.</li> </ul>
	• Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.	• Sufficient continuity in both geology and mineralisation has been established to support the classification of the Company's existing Mineral Resources under JORC Code2012.
	Whether sample compositing has been applied.	No sample compositing was done.
Orientation of data in relation	• Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.	• Drilling orientations were appropriate for the predominantly steep dip of the mineralisation providing representative samples.
to geological structure	• If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.	• The company does not believe that any sample bias had been introduced which could have a material effect on the resource model, particularly given the strong correlation of mineralisation between holes.
Sample security	• The measures taken to ensure sample security.	<ul> <li>Avalon sampling procedures indicate individual samples were given due attention.</li> <li>ALS is an internationally accredited laboratory that has all its internal procedures heavily scrutinised in order to maintain their accreditation.</li> </ul>
Audits or reviews	• The results of any audits or reviews of sampling techniques and data.	<ul> <li>Avalon's sampling techniques and data have been audited multiple times by independent mining consultants during the process of reporting a JORC Compliant Mineral Resource on the various mineral deposits that make up the Viscaria Copper Project (A Zone, B Zone, D Zone and Discovery Zone). These audits have always resulted in the conclusion that Avalon's sampling techniques and data are industry standard and suitable for the purposes of reporting a JORC Compliant Mineral Resource.</li> <li>All historical data has been validated and migrated into an acQuire<sup>™</sup> database. Checking was carried out at the data entry stage for interval error</li> </ul>

Criteria	JORC Code explanation	Commentary
		and any significant data issues were resolved. Procedures exists to standardise data entry and senior geological staff from Avalon regularly reviews sampling procedures.

## **TABLE 1 – Section 2: Exploration Results**

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.	• The A Zone Prospect is covered by Exploration Permit Viscaria nr 101. The A Zone Mineral Resource is also covered by Exploitation Concession Viscaria K nr 3 in the southwest and Exploitation Concession Viscaria K nr 7 in the northeast.
	• The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.	• Exploration Permit Viscaria nr 101 is valid till the 16/10/2015. Exploitation Concession Viscaria K nr 3 is valid till the 16/01/2037 and Exploitation Concession Viscaria K nr 7 is valid till the 27/11/2039.
Exploration done by other parties	• Acknowledgment and appraisal of exploration by other parties.	• The historic drilling at the A Zone Prospect was completed by LKAB prospecting until 1985 and then by Viscaria AB (owned by Outokumpu OY) from 1985 till 1997.
Geology	• Deposit type, geological setting and style of mineralisation.	• The A Zone deposit is interpreted to be a VHMS-type ore system. This deposit has subsequently been strongly attenuated by shearing associated with a lower amphibolite facies metamorphic event. Subsequent to the lower amphibolite facies metamorphism and associated deformation, these rocks have been overprinted by locally constrained shear zones displaying retrograde, greenschist metamorphic mineralogy (chlorite, epidote, actinolite, and talc).

Criteria	JORC Code explanation	Commentary
Drill hole Information	<ul> <li>A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes: <ul> <li>a. easting and northing of the drill hole collar</li> <li>b. elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar</li> <li>c. dip and azimuth of the hole</li> <li>d. down hole length and interception depth</li> <li>e. hole length.</li> </ul></li></ul>	• Details of the drill holes discussed in this announcement are in the body of the text.
	• If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.	• Not applicable.
Data aggregation methods	• In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated.	• Weighted Averaging method used to calculate drill hole intersections for copper grade. The mineralised sections were delineated using a 0.3% Cu cut-off for the broadest/low grade intersections and a 0.5% Cu cut-off for the thinner/high grade intersections. No high grade copper top-cut was used.
	• Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.	• Not applicable.
	• The assumptions used for any reporting of metal equivalent values should be clearly stated.	Metal Equivalents have not been used.
Relationship between mineralisation widths and	• If the geometry of the mineralisation with respect to the drill-hole angle is known, its nature should be reported.	• The orientation of VDD0182 is at a high angle to the mineralization at the A Zone Prospect indicating that the length of the mineralized intersection assayed is as close to true width as possible given drilling constraints. As the mineralisation is anastomosing it is difficult to determine the exact true width but it is estimated at approximately 85% of the down hole intersection.
intercept lengths	• If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (e.g. 'down hole length, true width not known').	Not Applicable.
Diagrams	• Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported. These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.	• See Figures for maps and cross-sections showing distribution of drill collars.

Criteria	JORC Code explanation	Commentary
Balanced reporting	• Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.	
Other substantive exploration data	• Other exploration data, if meaningful and material, should be reported) including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.	• Not applicable.
Further work	• The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling).	<ul> <li>Sample collected will be used for metallurgical analysis.</li> <li>Exploration for further extensions of the A Zone Mineral Resource is currently being planned.</li> <li>Further drilling for metallurgical sample is currently being planned.</li> </ul>
	• Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	See A Zone Cross-section Figure 4.