

## **DR NICK OLIVER CONFIRMS POTENTIAL AT EL ROBLE**

**ASX ANNOUNCEMENT**

**21 NOVEMBER 2013**

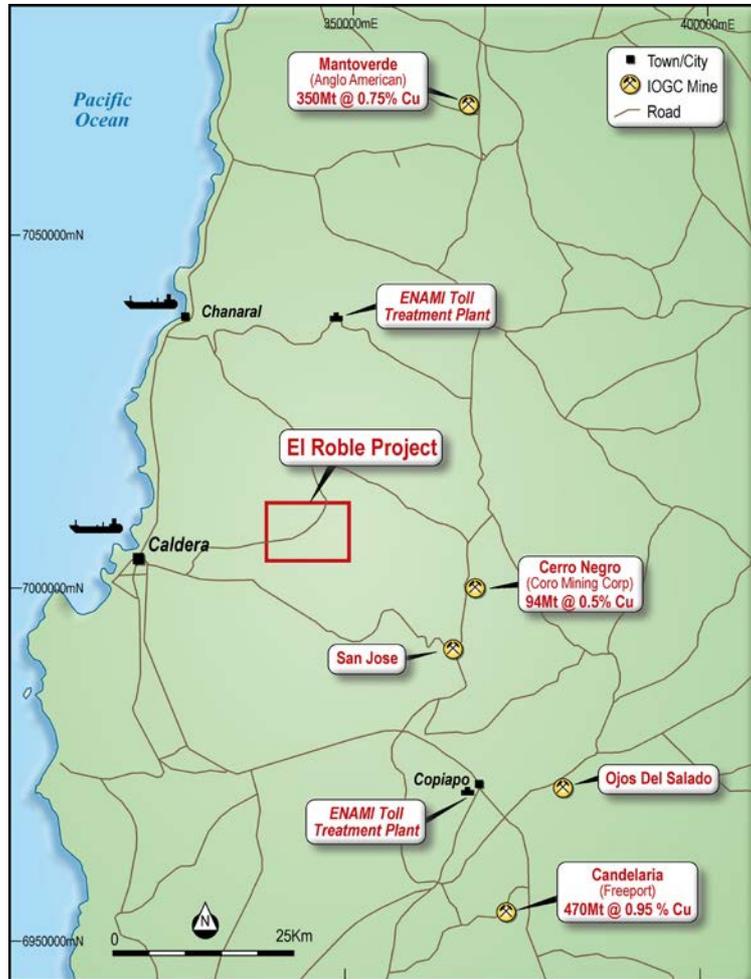
---

### **Highlights**

- **Dr Nick Oliver confirms high potential of El Roble to host significant copper and gold deposits**
- **Work identifies high priority structures with potential to host further high grade copper**
- **Similarities to regional deposits including Candelaria and Mantoverde identified**

**Mining Group Limited (ASX: MNE)** is pleased to announce that Dr Nick Oliver, from consultancy group HolcombeCoughlinOliver (HCO), has confirmed the potential of the El Roble Copper Project, which is located in the Coastal Cordillera Iron Belt of Chile, approximately 30km from the port of Caldera ("Project"), to host significant copper and gold mineralisation, and that the Project displays many similarities to other significant deposits in the region. Dr Oliver is an expert in copper-gold systems having extensive experience in the Mount Isa – Cloncurry Cu and IOCG-district of Queensland, Au-Cu vein and skarn systems in Armenia and the Philippines, some experience on IOCGs in the Iron Belt in Chile and in South Australia, and broad global experience on Au-, and U-REE vein and replacement deposits. He presented the invited keynote talk in the iron-oxide-copper-gold session at the biennial Society for Geology Applied to Mineral Deposits (SGA) meeting in Antafogasta, Chile, in 2011.

Mining Group has an exclusive option to acquire the Project, which covers approximately 6,000Ha and is currently being actively mined on a small scale by the current owner, with ore being trucked at grades in excess of 6% copper. Ore is treated at one of the two toll treatment plants located within 70km by road of the Project.



**Figure 1- El Roble Project location map showing proximity to two toll treatment plants**

Commenting on the work completed by Dr Oliver, Mining Group Managing Director, Mr Zeffron Reeves, said: “Dr Oliver has recently visited El Roble and has also assessed all the data we have been actively collecting since we signed the option in August.

“He has made some key findings from this first phase of work which have accelerated our knowledge and understanding of the mineralising system at El Roble. He has identified some high priority areas for high grade vein-style copper-gold mineralisation, as well as locating zones which show potential for high tonnage, lower grade breccia- and disseminated IOGC targets. Additionally Dr Oliver has identified numerous similarities between El Roble and other significant deposits in the region including Candelaria/Punta del Cobre and Mantoverde.

“Dr Oliver’s work provides further evidence that El Roble can become a transformational asset for Mining Group with widespread evidence of high grade copper mineralisation and additional potential for a large IOGC style deposit.” added Mr Reeves.

An executive summary of Dr Oliver’s work is presented below.

**Executive Summary**

## El Roble Project

Nick Oliver (HCO Associates PL) Independent Consultant, BSc(Hons, Geol); PhD (Geol), Member and Geoscience Committee member AusIMM, Member SGA, Fellow SEG, Adjunct Professor Economic Geology James Cook University.

### Regional setting

The El Roble Cu-Au system is dominated by veins rich in copper sulphides and oxides, gold, and iron oxides, demonstrating bonanza copper grades over a wide area. The predominant mineralisation style is as fault-hosted veins typically 0.3 to 5m wide, forming a branching network of veins and faults linked to a strand of the Atacama fault (Figure 1).

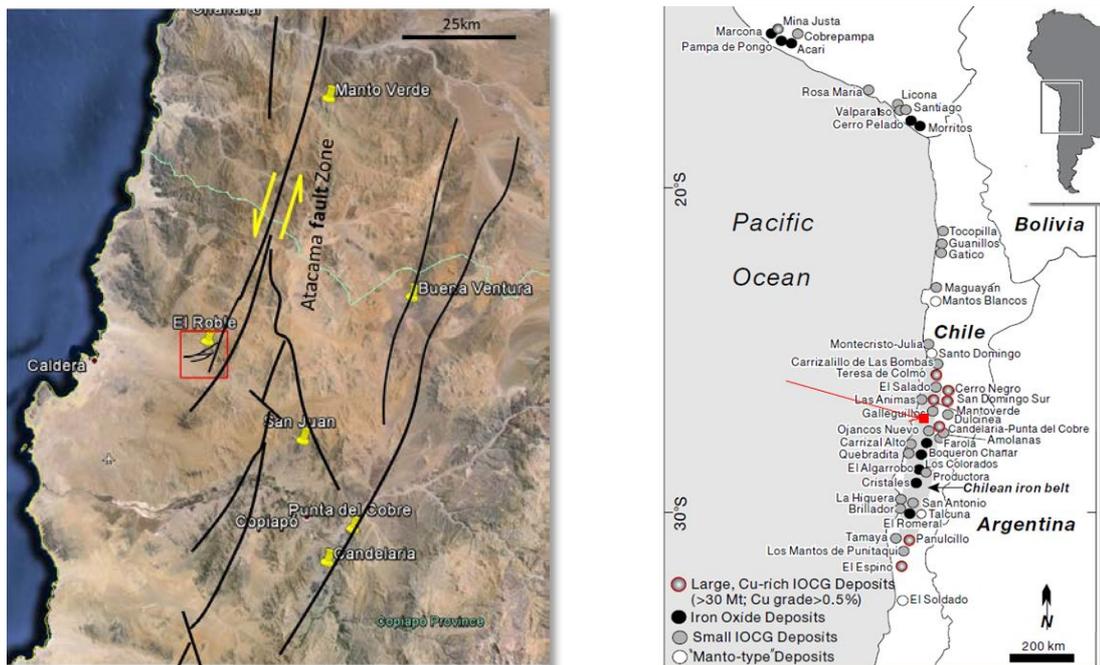


Figure 1: El Roble is situated roughly half way between the two world-class IOCG deposits of Candelaria and Mantoverde. Similar to these deposits, El Roble lies on a subsidiary structure on the flank of the Atacama Fault Zone. Major iron oxide- copper – gold deposits of the Chilean Iron Belt nearby are indicated, along with the regional setting, after Chen et al. (2013)

Although the specific relationship between the Atacama Fault branch and the El Roble veins has not yet been examined in detail, there are several indications of a genetic relationship, suggesting that El Roble most likely formed during mid-Cretaceous movement of the Atacama Fault. El Roble's position places it on the transition between a western domain of Late Jurassic IOCG deposits and an eastern domain of Early Cretaceous deposits which include Mantoverde and Candelaria/Punta del Cobre (Sillitoe 2003). Mantoverde has been interpreted as a subsidiary structure to the Atacama Fault, possibly a strike-slip duplex or relay ramp, and similar controls may have produced the El Roble veins.

## Structural controls on mineralisation

The El Roble vein field consists of multiple, branching strands with many veins having continuous strike lengths of 1000m or more, and in some cases up to several km (Fig. 2), although patchy sand cover hinders simple interpretations. The predominant host is a biotite-amphibole-bearing granodiorite to monzodiorite; some N-S and E-W trending andesite dykes are locally mineralised. The thickest mineralisation lies within composite fault zones, typically trending ENE to NE in strike, from which more regular, simple E-striking veins branch off. This configuration, along with near-horizontal striations on fault planes, is most consistent with these faults and veins forming during E-W directed shortening (Fig. 3).

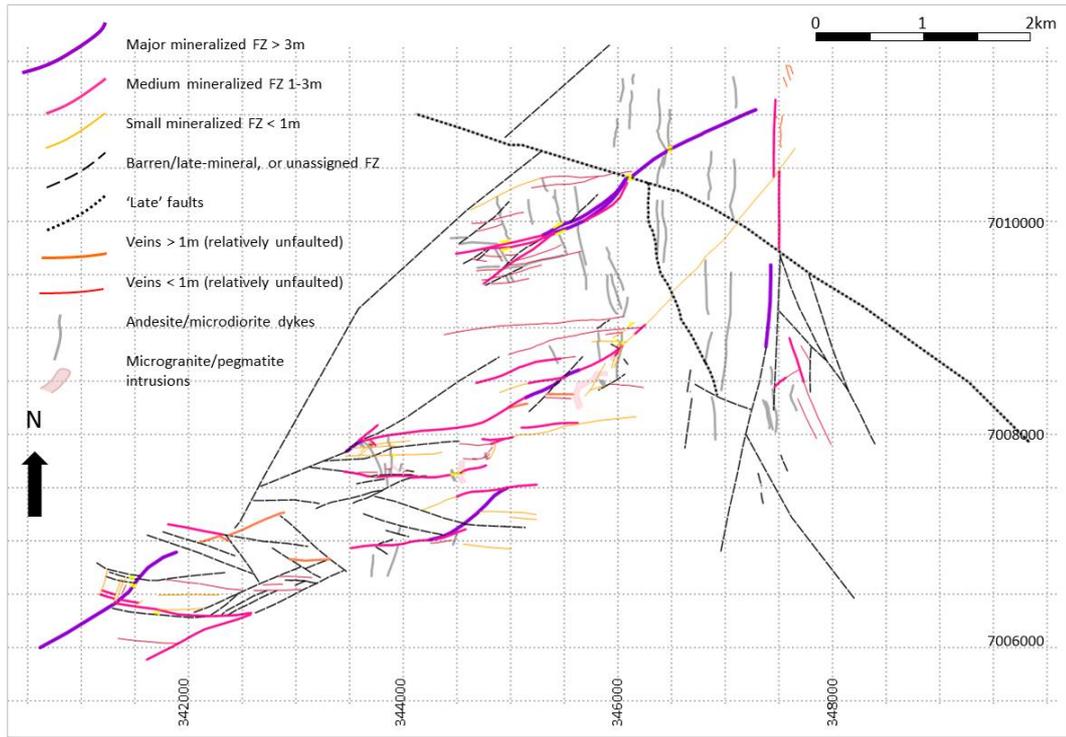
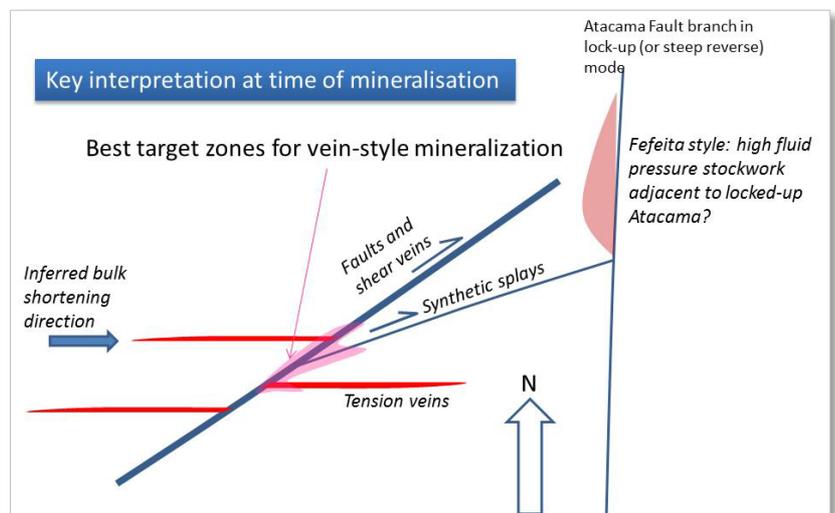


Figure 2: Map of El Roble veins, generated by field mapping, geochemical and vein width data, and interpretation of Google earth and ground magnetics images. The thickest veins lie with fault zones ("FZ"), mostly striking ENE, with sub-vertical to steep northerly dips. In the east, the northerly trending faults are a branch of the Atacama Fault as indicated on Fig. 1; some of these are mineralised. Dashed black lines in the western half of the area are mostly interpreted from ground magnetics; many of these are likely to be mineralised based on their geophysical similarity to exposed veins.

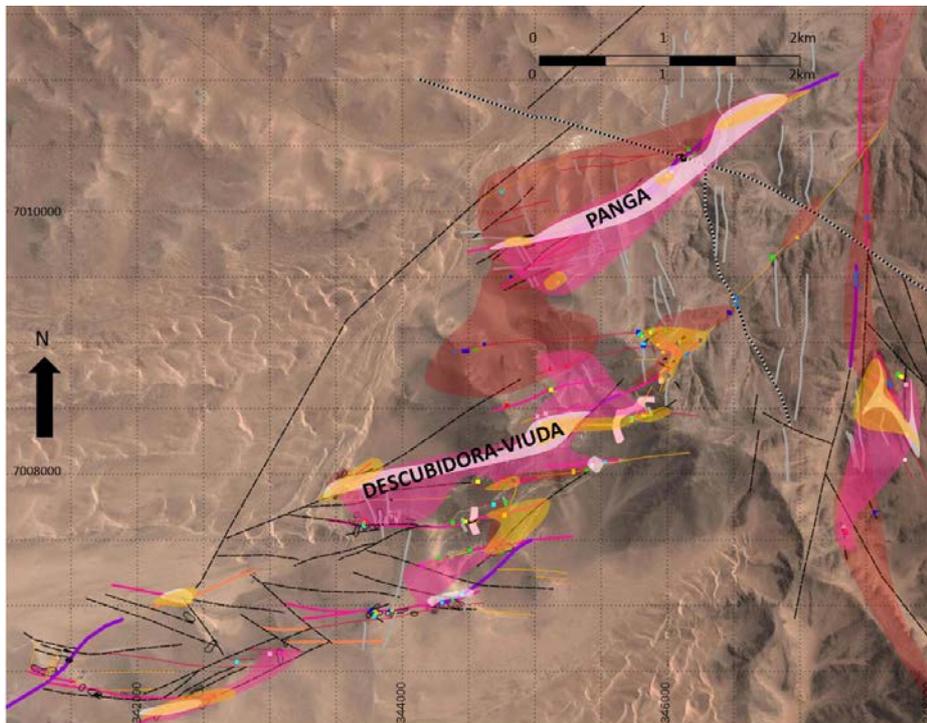
Figure 3 (right): Cartoon summarizing key structural controls on vein-style mineralisation at El Roble. Two types of high priority targets are the intersection of faults and veins as indicated, and the flanks of magnetic highs with high tonnage potential, particularly where they intersect faults. "Fefeita-style" is an IOCG-style stockwork of hematite-calcite veins with elevated Cu and Au.

## Alteration and geochemistry

There is a broad zonation within the Cu-Au-Fe veins towards more iron and gold-



rich in the north-east, although there is also a suggestion that gold-rich zones flank the copper-rich zones (Figure 4). This is interpreted as the main north-striking Atacama Fault branch providing mineralising fluids and the fluid chemistry changing during mineral precipitation to give this zonation.



*Figure 4: Results of surface channel sampling superimposed on the mapping were used to generate this map of vein chemistry (the shaded areas refer to veins within those areas, not the whole area). Veins with > 0.5 Au ppm (yellow) sit peripheral to the high copper zones (pink, > 1.5%) and both appear connected to the eastern Atacama Fault branch via zones of elevated iron (> 18%, brown). White zones indicate the areas of greatest combined vein width and Cu+Au found in exposed rock (> 2.5 Cu% equivalent metres). Dashed black veins are under cover and have not been tested.*

The metal zonation described above corresponds to variations in the inferred ratio of iron oxides, copper ( $\pm$  iron) sulphides and oxides, gold and iron sulphides within the veins themselves. In the east, for example, there are stockworks of specular hematite veins with abundant calcite and high Cu + Au; in the west, at depth in some veins and in recent drill results, chalcopryite, pyrite, chalcocite and quartz predominate in vein-hosted breccias. High potential also exists along the contacts between the host intrusive rocks and the adjacent volcanics in the eastern parts of the lease.

Alteration around the veins is dominated by an association of K-feldspar, actinolite, magnetite, quartz and local disseminated sulphides, extending a few cm to several metres away from the main veins, and commonly overprinted by late kaolinite (during fault reactivation). This association, together with the high iron contents, is closely analogous to many other IOCG vein systems recorded in northern Chile (Sillitoe 2003) and is very similar to alteration at Candelaria (biotite-quartz-magnetite-K-feldspar-actinolite, Marschik & Fontbote 2001). The mineralisation style in the east is distinctively IOCG-like in character (hematite-calcite-copper-gold breccia and stockwork), whereas veins in the west show secondary iron oxides near surface but are dominated by primary, very high grade copper – (iron) sulphides - gold at depth. There are zones of disseminated magnetite-pyrite-K-feldspar alteration around some of the western veins which correspond to geophysical anomalies, but their distribution is not yet fully understood. The ongoing plan for comprehensive geochemistry and petrographic studies combined with geophysics will assist determination of regional and local alteration zonation and target generation.

## Geophysics

Because  $\sim$  50% of the El Roble area is covered in sand, ground magnetics have been highly useful in delineating the structures shown in Figures 2 and 4. This geophysics also reveals broader areas of highly magnetic rocks, which have potential to be either magnetite-rich alteration or veined zones with Cu-Au potential, or magnetic intrusive rocks which may have a genetic connection to the Cu-Au. Sillitoe (2003) notes the presence of syn-mineralisation dykes and bodies of diorite in many of the major IOCG deposits in the surrounds. Andesite and microdiorite dykes here mostly trend N-S and are cut by mineralised veins;

however some run more easterly and appear to be synchronous with mineralisation, another feature noted elsewhere in the IOCG district. Very few of the geophysical targets extending from known workings under sand have yet been tested.

### Drilling results and initial plans for mining

Diamond drilling into and around the Descubidora veins has intersected numerous zones of massive, vein-style and breccia-hosted copper sulphides, together with quartz and local calcite, surrounded by distinctive alteration containing K-feldspar, quartz, magnetite and local sulphides.



Figure 5: Left RCPDH00002 – 130.80- 137.50m, near massive chalcopyrite/pyrite plus quartz/calcite mineralisation within strongly potassic feldspar altered diorite with up to 10% sulphide. Right - RCPDH00002 – 129.30m, chalcopyrite, quartz, calcite vein.

Current small-scale mining also confirms the depth extent of many of the veins. Mining Group is assessing numerous underground areas across the property with a view to commence small scale mining of high grade copper and gold bearing vein sets. Mining Group will focus on targets generated by this phase of work, particularly at zones of vein/fault intersection and anomalous vein orientations, which are coincident with thicker and locally richer Cu + Au intersections. It is envisaged that if Mining Group can commence mining on a 5000T/month rate with ore trucked to the nearby toll treatment plants, cash flows generated will be used to further explore for further high grade ore sources as well as large-tonnage Cu-Au targets. The preliminary structural model for the El Roble veins has a predictive capacity which Mining Group is using, along with the geophysics, to generate specific drill targets. The two main styles of mineralisation, bonanza sulphide-rich veins and iron oxide – Cu-Au breccias and stockworks, along with the related alteration and geophysical signals and structural controls, point strongly towards a genetic connection with major IOCG style deposits in the region.

### References

Chen H, Cooke DR, Baker MJ (2013) Mesozoic Iron Oxide Copper-Gold Mineralization in the Central Andes and the Gondwana Supercontinent Breakup. *Economic Geology*, 2013, 108: 37-44

Marschik M, Fontboté L (2001) The Candelaria-Punta del Cobre Iron Oxide Cu-Au(-Zn-Ag) Deposits, Chile. *Economic Geology*, 2001, 96: 1799-1826

Sillitoe RH (2003) Iron oxide-copper-gold deposits: an Andean view. *Mineralium Deposita* 38: 787–812

For further information please contact:

Zeffron Reeves

Managing Director

[zreeves@mininggroup.net.au](mailto:zreeves@mininggroup.net.au)

+ 61 8 9322 6424

### Investors

Ronn Bechler

Market Eye

[ronn.bechler@marketeye.com.au](mailto:ronn.bechler@marketeye.com.au)

P: +61-400 009 774

## **About Mining Group Limited**

Mining Group Limited (ASX: MNE) is an ASX listed, Australian based exploration company established to explore, evaluate and acquire commercially significant resource projects in Australia and overseas.

Mining Group seeks to develop the Comval Copper Gold Project in the Philippines and establish near term production at its Chilean copper project El Roble. Further, it continues to evaluate the prospective Western Australian based Boorara and Teutonic Projects.

Mining Group has a strong Board and management team with considerable technical, commercial and corporate experience in the resources sector.

For more information visit the Mining Group website at [www.mininggroup.net.au](http://www.mininggroup.net.au)

The information in this report that relates to Exploration Results is based on information compiled by Dr Nick Oliver BSc(Hons, Geol); PhD (Geol), Member and Geoscience Committee member AusIMM, Member SGA, Fellow SEG, Adjunct Professor Economic Geology James Cook University and is a consultant to the Company. Dr Oliver has sufficient experience that 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 Oliver consents to the inclusion in this report of the matters based on this information in the form and context in which it appears.

**APPENDIX 2: JORC Table 1, Section 1 Sampling Techniques and Data**

Criteria	Explanation
Sampling techniques	<ul style="list-style-type: none"> <li>• Drill core samples are half core samples cut longitudinally down core axis</li> <li>• Minimum sample interval was 0.25m and maximum of 1.00m are collected from core, sampled to geological boundaries.</li> <li>• Samples sent to ALS Laboratories, Copiapo, Chile</li> <li>• Samples were pulverised to obtain a 30g charge for fire assay for gold</li> <li>• A 0.5g charge was digested by four acid near total digest and analyses using ICP-OES for multi-element analysis, including copper</li> <li>• Ore grade copper samples over 10,000ppm (10%) were re-assayed using AAS</li> </ul>
Drilling techniques	<ul style="list-style-type: none"> <li>• Diamond Drilling method has been used recovering HQ diameter drill core</li> </ul>
Drill sample recovery	<ul style="list-style-type: none"> <li>• Drill sample recovery is generally 100% and is recorded for every meter of core recovered.</li> <li>• Minor core loss was encountered but is not deemed material</li> </ul>
Logging	<ul style="list-style-type: none"> <li>• All drill holes are geologically logged by qualified geologists.</li> <li>• Geological data is recorded in the Company's geological database.</li> <li>• Logging is qualitative in nature and describes lithology, alteration, structure and mineralisation visually observed by the logging geologist.</li> <li>• Total length of each sample interval has been logged.</li> </ul>
Sub-sampling techniques and sample preparation	<ul style="list-style-type: none"> <li>• The sample collection and preparation technique is deemed suitable and industry standard for drill core sampling.</li> <li>• Samples are coarse crushed to 70% passing 2mm and then split produce a 30g sample for gold assay and 0.5g sample for multi-element assay. Sub samples are then pulverised to 85% passing 75 microns prior to assay.</li> <li>• No duplicate samples have been carried out.</li> <li>• Sample size is deemed appropriate.</li> </ul>
Quality of assay data and laboratory tests	<ul style="list-style-type: none"> <li>• Assay techniques are deemed suitable and accurate for the elements being tested.</li> <li>• Standard reference materials have been submitted in each sample run every 20 samples.</li> <li>• Blank reference materials are submitted in each sample run every 50 samples.</li> </ul>
Verification of sampling and assaying	<ul style="list-style-type: none"> <li>• All significant intersections have been calculated using weighted averaging to sample length.</li> <li>• All significant intersections have been checked by alternative company geological personnel.</li> <li>• No duplicate sampling or twinned holes have been completed</li> <li>• All data collected is done so in accordance with the Company's written data collection procedures and is kept within the Company's electronic database. Original sample logs and written data collection forms are also retained in the Company's data library.</li> <li>• No adjustment to data has been done.</li> </ul>
Locations of data points	<ul style="list-style-type: none"> <li>• All drill holes have been surveyed using a differential GPS instrument with appropriate control points used and referenced to ensure accuracy of survey information.</li> <li>• Co-ordinates have an error of +/-10cm..</li> <li>• Co-ordinates are recorded in WGS84 co-ordinate system</li> </ul>
Data spacing and distribution	<ul style="list-style-type: none"> <li>• The current drill spacing is deemed appropriate for the current early stage of exploration</li> </ul>
Orientation of data in relation to geological structure	<ul style="list-style-type: none"> <li>• Wherever possible drill holes have been planned to intersect mineralised structures perpendicular to the structure.</li> <li>• Drill Hole intercepts are downhole widths and do not indicate true widths of any mineralised structure.</li> </ul>
Sample security	<ul style="list-style-type: none"> <li>• All sampling was conducted under the supervision of an independent geology consultant who conducted sample collection and the chain of custody from the drill to the sample preparation and logging facility is continually monitored by the consultant. Samples are shipped to the lab by qualified couriers or Company personnel under locked bags.</li> </ul>
Audits or reviews	<ul style="list-style-type: none"> <li>• No audit or review has been conducted due to the early stage exploration nature of the work.</li> </ul>

## JORC Table 7: Section 2 Reporting of Exploration Results

Criteria	Explanation
Mineral tenement and land tenure status	<ul style="list-style-type: none"> <li>• Mining Group does not own any of the properties sampled or mapped and sampling and mapping completed was done so as part of a due diligence process in order to assess the properties.</li> <li>• Mining Group has an exclusive option to acquire the properties under the contemplated transaction described in ASX Announcement dated 15<sup>th</sup> August 2013.</li> </ul>
Exploration by other parties	<ul style="list-style-type: none"> <li>• No information has been used in this report from exploration by other parties.</li> </ul>
Drill hole information	<ul style="list-style-type: none"> <li>• Details of hole locations, depth and intercept depths are contained within this announcement.</li> </ul>
Geology	<ul style="list-style-type: none"> <li>• The El Roble Project consists of quartz and iron oxide veins, containing copper and gold mineralisation. The veins are hosted within intrusive dioritic and andesitic volcanic rocks of the Chilean Cretaceous Belt.</li> </ul>
Data aggregation methods	<ul style="list-style-type: none"> <li>• Intercept widths are along channel widths, intercept calculated by length weighted average for all samples and no internal dilution was used, where length is the along channel length for each sample interval</li> <li>• Intercepts comprise of aggregated length weighted average for all samples taken in each channel. Length weighted averages have been calculated using the following formula assuming 3 samples were taken from the channel, where: A=sample interval, B=sample assay value <ol style="list-style-type: none"> <li>1) <math>A1 \times B1 = C1</math>, <math>A2 \times B2 = C2</math>, <math>A3 \times B3 = C3</math></li> <li>2) <math>A1 + A2 + B2 = \text{total interval}</math></li> <li>3) <math>(C1 + C2 + C3) / \text{total interval} = \text{length weighted grade average}</math></li> </ol> </li> <li>• No metal equivalent values have been used.</li> </ul>
Relationship between mineralization widths and intercept lengths	<ul style="list-style-type: none"> <li>• Drill holes were designed to be installed perpendicular to the interpreted strike of the mineralized structures unless stated.</li> <li>• Intercept widths are along downhole widths and are not true geological widths.</li> </ul>
Diagrams	<ul style="list-style-type: none"> <li>• Pertinent maps, plans and sections are within this announcement</li> </ul>
Balanced Reporting	<ul style="list-style-type: none"> <li>• No assaying of the current drill program has yet been undertaken and this announcement contains information pertaining to visual mineralisation only.</li> </ul>
Other substantive exploration data	<ul style="list-style-type: none"> <li>• No other data other than that presented has been used or relied upon.</li> </ul>
Further work	<ul style="list-style-type: none"> <li>• Further exploration work including mapping, sampling and drilling is required, on areas throughout the property.</li> <li>• These areas will be identified in the future through further analysis and interpretation of results.</li> <li>• Diagrams cannot be provided until areas for future exploration have been identified, other than what is presented within this notice.</li> </ul>