



Orion Minerals

ASX/JSE RELEASE: 1 September 2021

Multiple priority EM targets identified from recently completed Airborne Electromagnetic survey at the Okiep Copper Project

16 'late-time' EM targets revealed following initial review of data, highlighting the substantial exploration opportunity across the Okiep district

- ▶ **1,872km² high-powered SkyTEM™ airborne electromagnetic (EM) survey successfully completed over the Okiep Copper Project with 7,348 line-kms flown.**
- ▶ **The area surveyed encompasses 26 historical copper mines and approximately 150 known copper prospects within a world-class mining district which has produced +2Mt of copper from sulphide ore with associated phyrrotite.**
- ▶ **Despite its prolific production history and significant exploration potential, the Okiep district has never been previously covered by an airborne electromagnetic geophysical (AEM) survey.**
- ▶ **Sixteen 'late-time' electromagnetic targets have already been detected from an initial review of the data with, several conductors identified close to known copper deposits. These targets will now be prioritised and refined with ground-based EM surveys to finalise drilling targets.**

Orion's Managing Director and CEO, Errol Smart, commented:

"The completion of this extensive survey using the state-of-the-art high-powered SkyTEM™ system is a really exciting milestone for the Okiep Copper District. SkyTEM™ is capable of targeting mafic intrusive bodies with high magnetite content and detecting zones with conductive phyrrotite content, providing us with a strong vector to find new copper sulphide orebodies in an area with proven potential to host multiple high-quality deposits.

"As I've said before, it's hard to believe that this technique has never been used in the area before – and we always had high hopes about what it would reveal. While we are still processing the data, the initial results are outstanding – with 16 'late-time' anomalies identified, some located in close proximity to known deposits. These targets will now be ranked and further refined using ground EM before moving to the drilling stage.

"The early success of the AEM survey has vindicated our decision to employ this technology in parallel with drilling programs along the Koperberg-Carolusberg line that are about to commence. We expect that this survey will generate a strong pipeline of exploration targets at Okiep, complementing our more advanced resource-level and near-resource exploration opportunities."

Orion Minerals Ltd (**ASX/JSE: ORN**) (**Orion** or the **Company**) is pleased to advise that it has successfully completed the extensive SkyTEM™ helicopter-borne electromagnetic geophysical (**AEM**) survey at its Okiep Copper Project (**OCP**) in the Northern Cape, South Africa.

The regional survey covered a total area of 1,872km² with approximately 1,073 line-kms flown at 1km line spacing in conjunction with the Council for Geosciences and Orion's high-priority area of 857km² flown at 150m line spacing resulting in a total of 7,348 line-kms being flown.

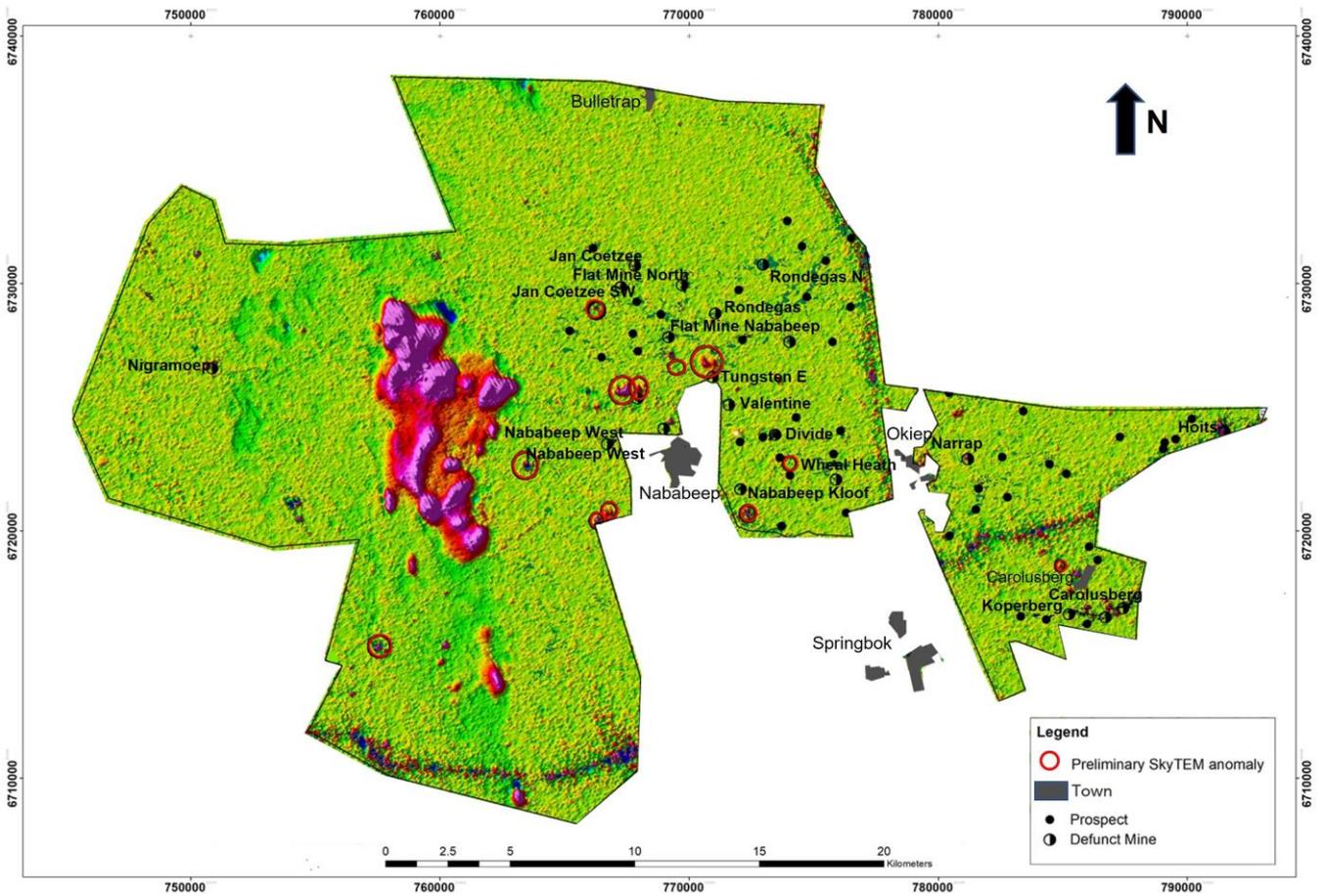


Figure 2: A Z-Channel 40 AEM image over the OCP area, with preliminary SkyTEM™ anomalies selected for follow-up.

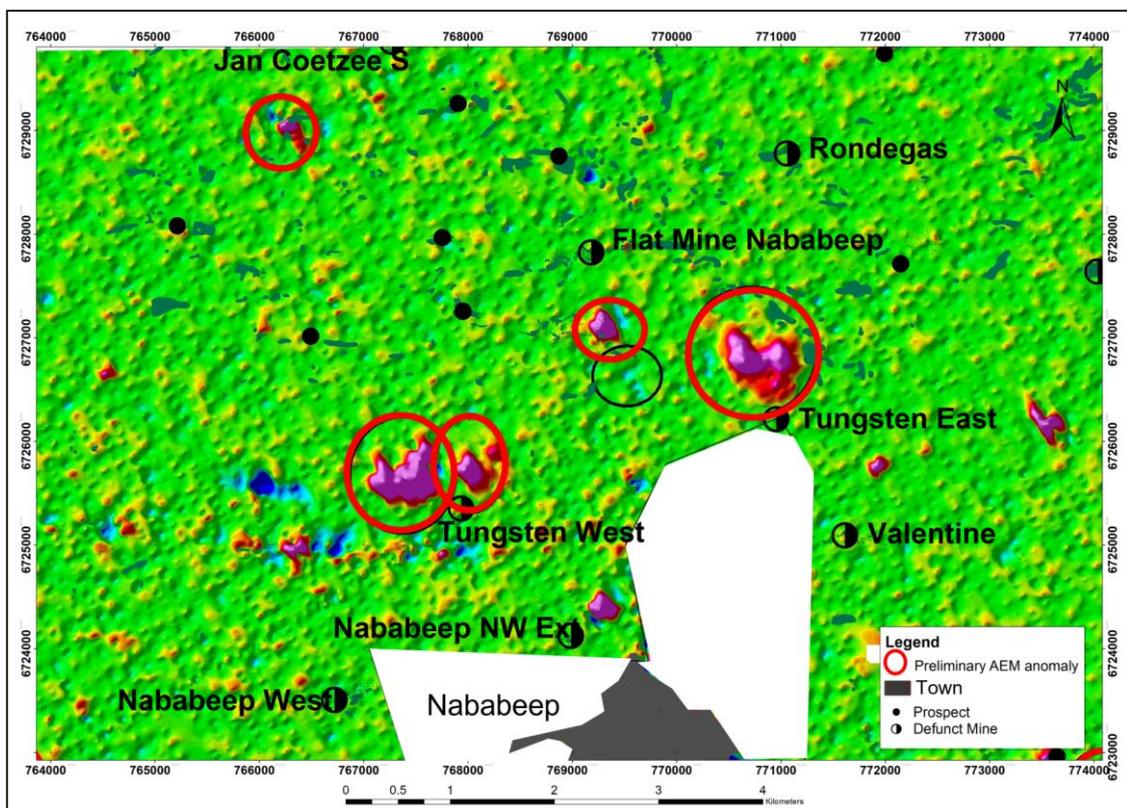
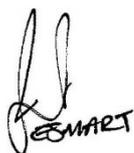


Figure 3: AEM targets close to NababEEP illustrating the proximity of these targets to known deposits.

For and on behalf of the Board.



Errol Smart
Managing Director and CEO

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Competent Persons Statement

The information in this report that relates to Exploration Results has been compiled under the supervision of Mr Errol Smart, a Competent Person, who is registered with the South African Council for Natural Scientific Professionals, a 'Recognised Professional Organisation' (**RPO**). Mr Smart is the Managing Director and CEO of Orion. Mr Smart has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken 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 Smart consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

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This release may include forward-looking statements. Such forward-looking statements may include, among other things, statements regarding targets, estimates and assumptions in respect of metal production and prices, operating costs and results, capital expenditures, mineral reserves and mineral resources and anticipated grades and recovery rates, and are or may be based on assumptions and estimates related to future technical, economic, market, political, social and other conditions. These forward-looking statements are based on management's expectations and beliefs concerning future events. Forward-looking statements inherently involve subjective judgement and analysis and are necessarily subject to risks, uncertainties and other factors, many of which are outside the control of Orion. Actual results and developments may vary materially from those expressed in this release. Given these uncertainties, readers are cautioned not to place undue reliance on such forward-looking statements. Orion makes no undertaking to subsequently update or revise the forward-looking statements made in this release to reflect events or circumstances after the date of this release. All information in respect of Exploration Results and other technical information should be read in conjunction with Competent Person Statements in this release (where applicable). To the maximum extent permitted by law, Orion and any of its related bodies corporate and affiliates and their officers, employees, agents, associates and advisers:

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Appendix 1: The following tables are provided to ensure compliance with the JORC Code (2012) requirements for the reporting of Exploration Results for the Okiep Copper Project (Aeromagnetic Surveys).

Section 1 Sampling Techniques and Data

(Criteria in this section apply to all succeeding sections.)

Criteria	JORC Code explanation	Commentary
Sampling techniques	<ul style="list-style-type: none"> 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 down hole gamma sondes, or handheld XRF instruments, etc.). These examples should not be taken as limiting the broad meaning of sampling. Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used. 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. 	<ul style="list-style-type: none"> Detailed airborne electromagnetic and magnetic survey at 150m line spacing and 1,500m tie line spacing carried out by SkyTEM Africa (Pty) Ltd (SkyTEM™). Regional airborne electromagnetic and magnetic survey at 1,000m line spacing and 10,000m tie line spacing carried out by SkyTEM. Geophysical equipment deployed from a loop underslung from an Airbus AS350 B3 helicopter. Loop orientation is constantly monitored by two custom-designed Bjerre Technology inclination sensors. Electromagnetic measurements taken using SkyTEM™ Dual-Moment, Transient Electromagnetic (TEM) System, the 312HP system. Magnetic measurements taken using Geometrics G822-A caesium vapour magnetometer. Location of geophysical measurements determined using a Novatel OEMV-1 with DGPS post processing to ensure increased accuracy. Base station magnetometer installed to measure diurnal variations for use in data processing. Magnetometer used as base station is a GEM Systems GSM 19 Overhauser magnetometer. Two GPS base station installed to ensure accuracy of locational data. Equipment used is a Novatel OEMV-1. Second base station used as back-up system to ensure continuity. Measurement height determined by two MDL ACE IM3R laser altimeters mounted on loop. On line navigation conducted using SkyMap and proprietary SkyTEM™ navigation software.
Drilling techniques	<ul style="list-style-type: none"> Drill type (e.g. 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.). 	<ul style="list-style-type: none"> Not relevant for this data.
Drill sample recovery	<ul style="list-style-type: none"> Method of recording and assessing core and chip sample recoveries and results assessed. Measures taken to maximise sample recovery and ensure representative nature of the samples. Whether a relationship exists between sample recovery and grade 	<ul style="list-style-type: none"> Not relevant for this data.

Criteria	JORC Code explanation	Commentary
	<p><i>and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.</i></p>	
<p>Logging</p>	<ul style="list-style-type: none"> • <i>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.</i> • <i>Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.</i> • <i>The total length and percentage of the relevant intersections logged.</i> 	<ul style="list-style-type: none"> • Not relevant for this data.
<p>Sub-sampling techniques and sample preparation</p>	<ul style="list-style-type: none"> • <i>If core, whether cut or sawn and whether quarter, half or all core taken.</i> • <i>If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.</i> • <i>For all sample types, the nature, quality and appropriateness of the sample preparation technique.</i> • <i>Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.</i> • <i>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.</i> • <i>Whether sample sizes are appropriate to the grain size of the material being sampled.</i> 	<ul style="list-style-type: none"> • Not relevant for this data.
<p>Quality of assay data and laboratory tests</p>	<ul style="list-style-type: none"> • <i>The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.</i> • <i>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.</i> • <i>Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e. lack of bias) and precision have been established.</i> 	<ul style="list-style-type: none"> • The applied SkyTEM™ system 312 HP is calibrated at the Danish National Reference site Lyngby. Calibration includes measurements of the transmitter survey data repeated at a range of altitudes at the reference site. Hereby, it is documented that the instrumentation can reproduce the reference site with the same set of calibration parameters independent of the flight altitude. All processed data are corrected according to the calibration parameters. • A repeat line at the same location is flown once a day to document system repeatability. • The transmitted current should not be less than 220 A at any time on production lines. • The deviation from planned survey lines shall not exceed 50m over a distance of more than 1,000m. • The rough terrain of the area will cause terrain clearance to be variable and be in excess of 100m in portions of the survey. • Base station magnetometer installed to measure diurnal variations for use in data processing. The base station magnetic sensor will be placed in a low magnetic gradient area beyond the region of influence of any man made interference. The sensor is located close to the survey area at a logistically feasible location as determined by SkyTEM™. The base

Criteria	JORC Code explanation	Commentary
		<p>station magnetometer will be synchronised with the survey aircraft acquisition system and will be operated during all survey acquisition flights. The diurnal variations will be reviewed in-field on a daily basis.</p> <ul style="list-style-type: none"> The magnetic sensor is situated on the carrier (loop) frame away from the aircraft. No compensation of the magnetic data is necessary. Survey lines are re-flown if the magnetometer instrument peak to peak noise (measured as a 4th difference on the raw unfiltered uncompensated magnetometer signal) of +/-0.1 is exceeded over a distance of more than 5% of the line length or if non-linear diurnal variations between two points separated by 30 secs is greater than 2 nT as measured by the base station magnetometer.
Verification of sampling and assaying	<ul style="list-style-type: none"> The verification of significant intersections by either independent or alternative company personnel. The use of twinned holes. Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols. Discuss any adjustment to assay data. 	<ul style="list-style-type: none"> The acquired electromagnetic and magnetic data will be processed using SkyTEM™'s in-house processing and reduction software (SkyLab) as well as Geosoft's Oasis Montaj software. This software allows for full data pre-processing, repeatability and statistical analysis, as well as full quality analysis of the output datasets. Following reduction of the data, repeatability and QA procedures have been applied to both the positional, electromagnetic and magnetic observations. QA procedures are applied to all data on a daily basis and any measurements not conforming to contract specifications must be repeated.
Location of data points	<ul style="list-style-type: none"> 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. Specification of the grid system used. Quality and adequacy of topographic control. 	<ul style="list-style-type: none"> Location of flight paths determined using GPS instruments from Novatel with real time SBAS corrections and DGPS post-processing to ensure increased accuracy.
Data spacing and distribution	<ul style="list-style-type: none"> Data spacing for reporting of Exploration Results. 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. Whether sample compositing has been applied. 	<ul style="list-style-type: none"> Aeromagnetic line and tie line spacing is 150m and 1,500m and 1,000m and 10,000m respectively for detailed and regional surveys as this is believed appropriate for the level of precision required to interpret geological features and anticipated geophysical targets in the area.
Orientation of data in relation to geological structure	<ul style="list-style-type: none"> Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type. 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. 	<ul style="list-style-type: none"> As per standard industry practice, acquisition lines were flown on headings perpendicular to the strike of the known major mineralisation controlling structures. Tie lines were flown at 90° to the acquisition lines.

Criteria	JORC Code explanation	Commentary
Sample security	<ul style="list-style-type: none"> The measures taken to ensure sample security. 	<ul style="list-style-type: none"> All data acquired by SkyTEM™ was reported to the Company's representatives.
Audits or reviews	<ul style="list-style-type: none"> The results of any audits or reviews of sampling techniques and data. 	<ul style="list-style-type: none"> No audits or reviews have been carried out at this stage beyond standard data Quality Control assessments.

Section 2 Reporting of Exploration Results

(Criteria listed in the preceding section also apply to this section.)

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	<ul style="list-style-type: none"> 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 security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area. 	<ul style="list-style-type: none"> The mineral rights to the properties are vested in the State and the Minerals and Petroleum Resources Development Act, 2002, (MPRDA) regulates the exploration and mining industry in South Africa. A prospecting right, NC30/5/1/1/2/11125PR, in accordance with section 17 of the MPRDA was granted to NababEEP Copper Company (Pty) Ltd (NCC) to prospect for a period of five years effective from 8 November 2017. The prospecting right was granted for copper and tungsten ore for portion of Portion 3 of the farm NababEEP No 134, remainder of the farm Platjiesfontein No 135, portions 2,3,4 and 7 of the farm Nigramoep No 136, portion RE of the farm Schaap Rivier No 208, RE and Portion 1 of Farm No 610 and Portion 9 of the farm Ezelsfontein No 214, situated within the administrative district of Namaqualand. The total area measures 18 475Ha in extent. Section 102 applications are in process with the authorities to add land to bring the total extent to approximately 33 900Ha; and add 26 minerals including gold and silver. The area was mined historically for copper. Orion, recently acquired 100% of the project through the NCC-Orion Acquisition Agreement (refer ASX release 2 August 2021). A prospecting right, NC30/5/1/1/2/12357PR, in accordance with section 17 of the MPRDA was granted to Bulletrap Copper Co (Pty) Ltd (BCC) to prospect for a period of five years effective from 14 January 2021. The prospecting right was granted for the minerals copper and tungsten ore in respect of the farms portion of Portion 10, portion of Portion 9 and Portion 11 of the farm Brakfontein No. 133, portion of Portion 1 and portion of Portion 23 of the farm Melkboschkuil No 132, situated within the administrative district of Namaqualand. The total Area measures 2 547,0791Ha in extent.

Criteria	JORC Code explanation	Commentary
		<ul style="list-style-type: none"> • Section 102 applications are in process with the authorities to add 26 minerals including gold and silver. • The Goegap Nature Reserve lies to the south and outside of the area. The area was mined historically for copper. • Orion, recently acquired 100% of the project through the BCC-Orion Acquisition Agreement (refer ASX release 2 August 2021). • A mining right, NC30/5/1/2/2/10150MR, in accordance with section 22 of the MPRDA; applied for in the name of Southern African Tantalum Mining (Pty) Ltd (SAFTA) to mine for a period of fifteen (15) years was accepted by the authorities on 4 March 2019. • The application is for copper and tungsten ore for a portion of portion 3, a portion of portion 13, a portion of portion 14 and a portion of portion 21 of the farm Nababeep No 134 within the administrative district of Namaqualand. The total area measures 1 214Ha in extent. • A prospecting right application NC30/5/1/1/2/12850MR in accordance with section 16 of the MPRDA was submitted to the authorities for the same area as the mining right application for 5 years for 26 additional minerals including gold and silver. The application was accepted on 21 July 2021. • A prospecting right, NC30/5/1/1/2/12755PR, in accordance with section 16 of the MPRDA; applied for in the name of SAFTA to prospect for a period of five years was accepted by the authorities on 12 May 2021. • The application is for copper and tungsten ore for the Farm Nababeep 134 for a portion of portion 3, portion of portion 10, portion of portion 13, portion of portion 14, portion 15, portion 16, portion of portion 21 and Okiep Township Plot 2086 situated within the administrative district of Namaqualand. The total Area measures approximately 7 100Ha in extent. • A prospecting right application NC30/5/1/1/2/12848PR in accordance with section 16 of the MPRDA was submitted to the authorities for the same area as the prospecting right application for 5 years for 26 additional minerals including gold and silver. The application was accepted on 15 June 2021. • The area was mined historically for copper. • Orion, recently acquired 56.3% of the project through the SAFTA-Orion Acquisition Agreement (refer ASX release 2 August 2021). The remaining 43.7% is held by the Industrial Development Corporation (IDC).
Exploration done by other parties	<ul style="list-style-type: none"> • <i>Acknowledgment and appraisal of exploration by other parties.</i> 	<ul style="list-style-type: none"> • Previous explorers in the region include Anglovaal, Anglo America, Iscor, Newmont, Gold Fields of SA and Africa Nickel. Exploration was

Criteria	JORC Code explanation	Commentary
Geology	<ul style="list-style-type: none"> • <i>Deposit type, geological setting and style of mineralisation.</i> 	<p>aimed at Zn, Cu and Ni.</p> <ul style="list-style-type: none"> • The tenements are located over the Central and Western parts of the Okiep Copper District (OCD). The style of mineralisation is mafic hosted orogenic Cu-mineralisation. • Copper mineralisation is primarily associated with irregular, elongated and steeply dipping Koperberg Suite mafic intrusives. • The Koperberg Suite intrusives are mainly restricted to so-called "Steep Structures" of extensive strike lengths and generally steeply dipping to the north. • The Koperberg Suite consists of anorthosite, diorite and norite intermediate to mafic rock types. • Mineralisation usually occurs as blebs to disseminated Cu mineral assemblages bornite > chalcopyrite > chalcocite and less pyrite and pyrrhotite. • The more mafic and magnetite-rich lithologies generally host the bulk of and higher-grade mineralisation. • The OCD has a long exploration and mining history, and the geology is well known and understood.
Drill hole Information	<ul style="list-style-type: none"> • <i>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:</i> <ul style="list-style-type: none"> ○ easting and northing of the drill hole collar ○ elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar ○ dip and azimuth of the hole ○ down hole length and interception depth ○ hole length. • <i>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.</i> 	<ul style="list-style-type: none"> • Not relevant for this data.
Data aggregation methods	<ul style="list-style-type: none"> • <i>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.</i> • <i>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.</i> • <i>The assumptions used for any reporting of metal equivalent values should be clearly stated.</i> 	<ul style="list-style-type: none"> • Not relevant for this data.

Criteria	JORC Code explanation	Commentary
Relationship between mineralisation widths and intercept lengths	<ul style="list-style-type: none"> • These relationships are particularly important in the reporting of Exploration Results. • If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported. • 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'). 	<ul style="list-style-type: none"> • Not relevant for this data.
Diagrams	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Not relevant for this data.
Balanced reporting	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Not relevant for this data.
Other substantive exploration data	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • The Company's previous ASX releases have detailed exploration works.
Further work	<ol style="list-style-type: none"> 1. The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling). 2. Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive. 	<ul style="list-style-type: none"> • The Company plans to follow up these results with ground geophysical surveys test targets which may arise from the survey reported here.