Orion Minerals

ASX/JSE RELEASE: 28 October 2021

Drilling intersects sulphide mineralisation adjacent to strong EM conductor at Boksputs, Northern Cape

Continuation of the conductor onto the Boksputs North Prospecting Right confirmed by ground EM with drilling of a follow-up wedge hole now underway vectoring towards increasing sulphide content

- **Two diamond drill holes completed, targeting the Boksputs B1 EM conductor (3000s – 6000s).**
- **Sulphide mineralisation intersected on the edge of the conductor.**
- **Down-hole EM survey confirms a strong conductor below the current hole.**
- **Drilling to test the most conductive central part of the anomaly currently in progress.**
- **Follow-up ground EM survey confirms that the conductor intensifies and continues onto the adjacent Boksputs North Prospecting Right.**
- **The EM anomaly remains open to the north.**

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

"The presence of sulphide mineralisation in the first two diamond drill holes completed to test the exciting 3000s – 6000s EM conductor at Boksputs is an important development, indicating a reducing deposition environment that is favourable for the deposition of VMS-style mineralisation.

"Due to underlying geotechnical conditions, the holes deviated off course at depth and only intersected the edges of the target anomaly – making this what exploration geologists like to call a 'near-miss' situation. After conducting down-hole EM in both the holes, the target has been further refined, and we are now continuing with a wedge hole off one of the parent holes to vector into the zone of highest conductivity. This is where we believe the strongest accumulation of sulphide mineralisation may occur.

"Current drilling incorporates the latest down-hole motor, directional drilling technology, greatly improving our ability to steer the hole to intersect the conductive high."

Orion Minerals Limited (**ASX/JSE: ORN**) (**Orion** or the **Company**) is pleased to advise that diamond drilling on Orion's Masiqhame Prospecting Right has intersected sulphide mineralisation up-dip of a high priority target detected by a recent fixed-loop survey electromagnetic (**FLEM**) survey over the Boksputs Project, located in the Northern Cape Province (refer ASX / JSE release 28 June 2021).

Orion notes that, in line with best-practice reporting of visual mineralisation results by AIG[1], visual estimates of sulphide mineral abundance should not be considered a proxy or substitute for laboratory analyses. More substantive and reliable data in the form of laboratory analyses are expected to be available in approximately three weeks.

[1] Waltho, A. (2015). "Reporting Sulphide Mineral Observations in Drilling Intersections". AIG News 122 pp46-47.

Down-hole electromagnetics (**EM**) has since confirmed a strong conductor located below the current drill holes. Additional preliminary surface FLEM data collected to the north of the previous survey on the newly acquired Boksputs North Prospecting Right confirms that the conductor intensifies and extends northwards, with potential to be present at shallower depths on the northern extension.

The Boksputs Project forms part of Orion's 1,790 km^2 regional exploration portfolio in the Areachap Province of the Northern Cape, and is located within the broader Masiqhame Project, located ~80 km north of its flagship Prieska Copper-Zinc Project.

Drill Results

Drill-holes OBPD002 and OBPD004 were planned to test a 6000s FLEM conductor located 2.5km north-west of drill-hole OBPD001, referred to as the B1 conductor (Figure 1). OBPD001 delivered encouraging copper-gold intersections including a best section of 5m at 1.09% Cu and 0.13g/t Au (refer ASX / JSE release 25 January 2021).

Both OBPD002 and OBPD004 intersected disseminated pyrrhotite in quartz-sericite-biotite-garnet schist but did not optimally test the B1 EM target as the holes deflected significantly despite the insertion of several directional wedges (Figures 2 and 3). No significant base metal assay results were recorded in the disseminated sulphide zone of OBPD002, where the drillhole intersected the edge of the target. The visible disseminated sulphides in OBPD002 are most prominent from 610.00m to 614.10m and consist almost exclusively of pyrrhotite reaching a maximum estimated content of 10% of rock volume, and are concentrated in bands aligned with foliation.

Importantly, in OBPD004 the visible sulphides are best developed over 19m from 824.00m, attaining up to 30% of rock volume over 6.09m from 838.25 to 843.34m down hole depth and are again composed almost exclusively of pyrrhotite with rare grains of sphalerite observed. The sulphides are concentrated in bands aligned with foliation. The increasing sulphide content provides an important vector and correlates with increased EM conductivity. The sulphide assemblage observed is consistent of what may be expected in distal margins of VMS deposits. Assay results for OBPD004 are awaited. A new deflection will be steered from hole OBPD004 from a depth of 480m to intersect the more conductive core of the anomaly as modelled from down hole EM surveys.

FLEM Results

A single line of surface FLEM was completed 100m north of the boundary on the recently granted Boksputs North Prospecting Right (refer ASX / JSE release 28 June 2021). This area covers the northern strike continuation of the B1 EM anomaly.

Initial results from the survey have confirmed that the EM conductor intensifies and extends onto the Boksputs North Prospecting Right (Figure 4). The anomaly remains open ended to the north and presents potential for shallower targets to be tested if significant base metals are intersected in the core of the existing anomaly.

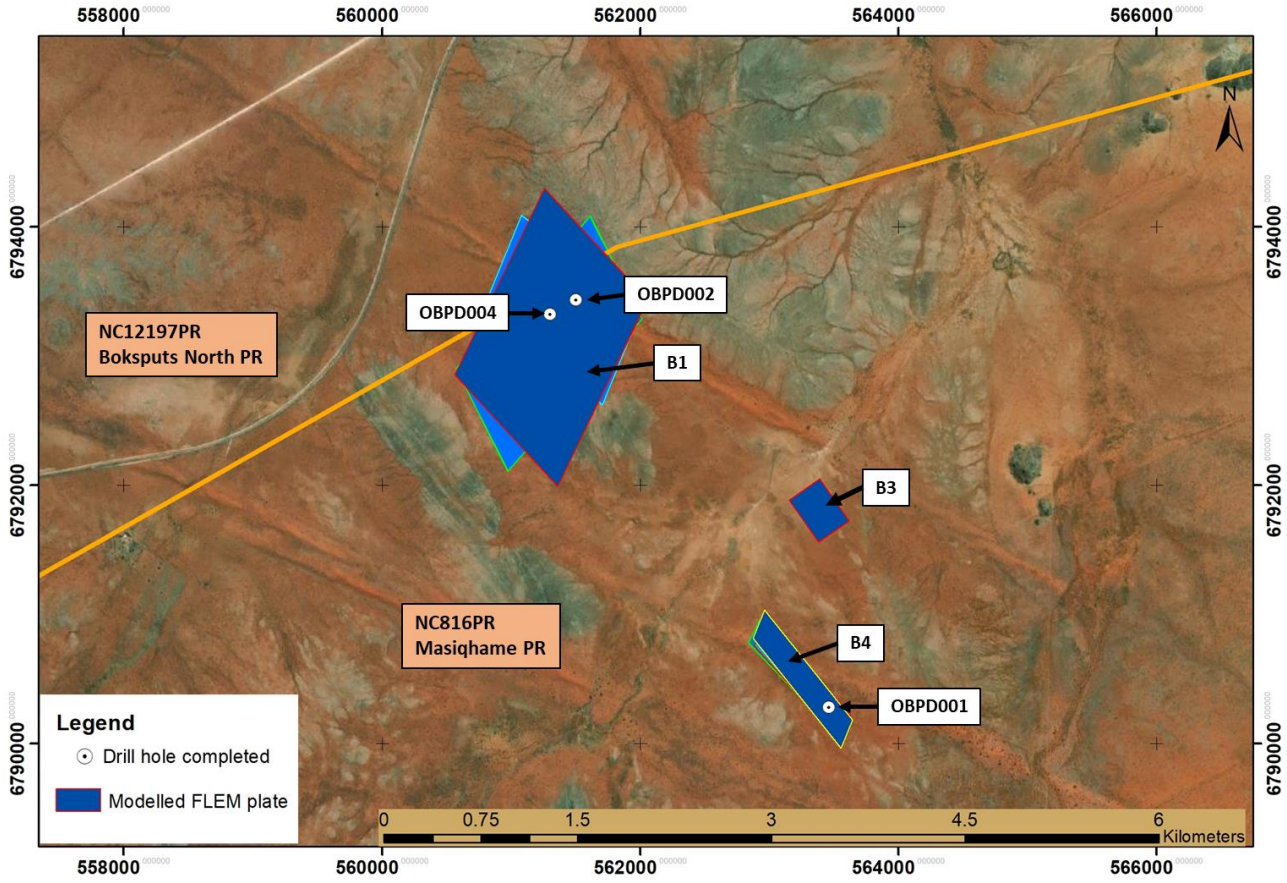


Figure 1: FLEM targets at Boksputs Prospect.

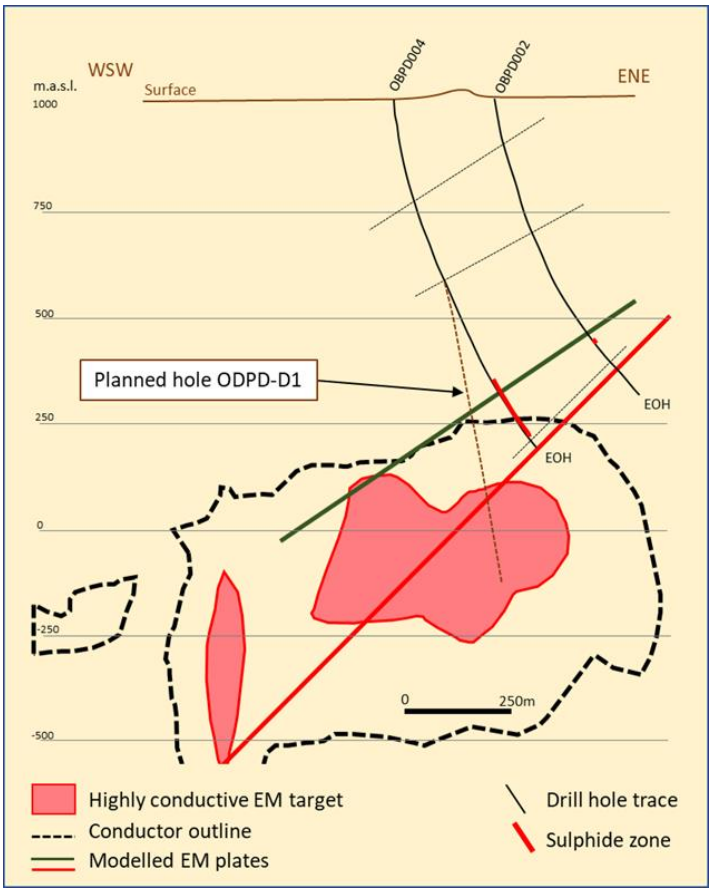


Figure 2: Drill holes OBPD002 and OBPD004, interpreted EM conductor and planned diamond drilling to test EM target.

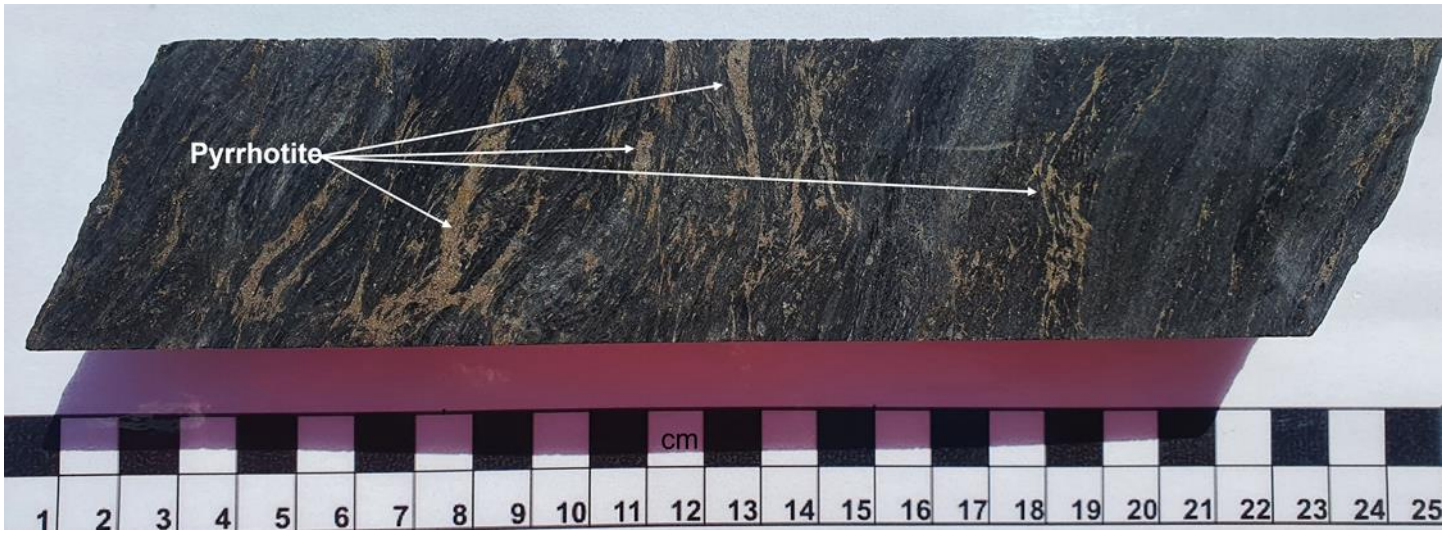


Figure 3: Sulphide mineralisation intersected in OBPD004 at 843.10m.

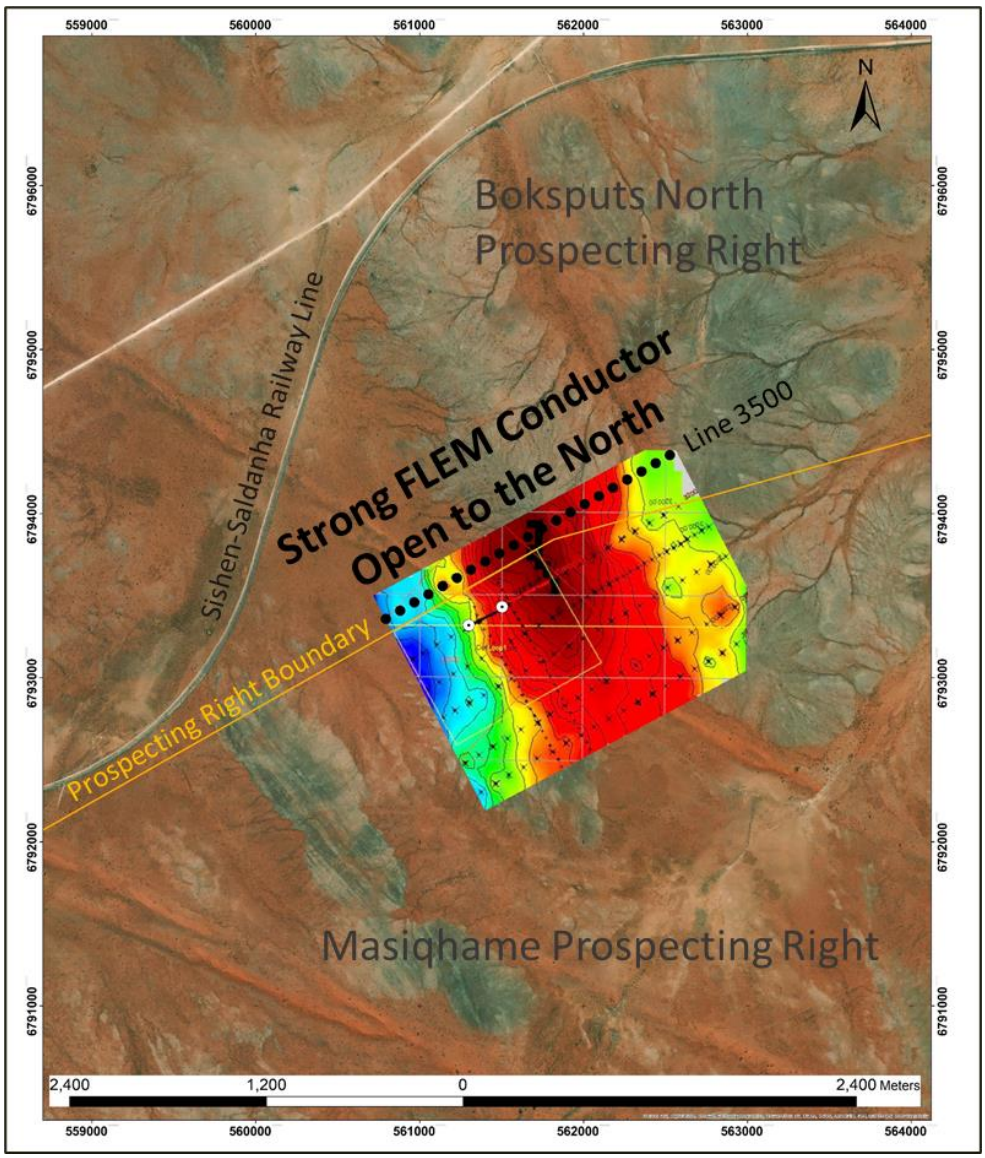
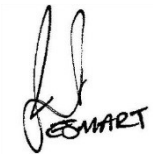


Figure 4: Results of the FLEM survey on Line 3500 confirming the EM anomaly to continue onto the Boksputs North Prospecting Right. The hot colours represent high conductivity measured in the late channels.

For and on behalf of the Board.



Errol Smart
Managing Director and CEO

ENQUIRIES

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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 Andre Vorster, a Competent Person, who is registered with the South African Council for Natural Scientific Professionals, a 'Recognised Professional Organisation (**RPO**). Mr Vorster is Exploration Consulting Geologist for Orion. Mr Vorster 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 Vorster consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

Disclaimer

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Appendix 1

Table 1: Drill Collar Table

Hole ID	Easting	Northing	Elevation	Azimuth	Dip	Final Depth (m)	Intersection		Weight %			
							From	To	Cu	Zn	Au	Ag
OBPD002	561503	6793431	1018	60	-80	791.52	N/A	N/A	N/A	N/A	N/A	N/A
OBPD004	561300	6793300	1018	60	-85	902.52	N/A	N/A	N/A	N/A	N/A	N/A

Appendix 2: The following tables are provided to ensure compliance with the JORC Code (2012) requirements for the reporting of Exploration Results for the Masiqhame Project and Boksputs North Prospect.

Section 1 Sampling Techniques and Data

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

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 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.	• In 2017 and 2018 Orion undertook a regional SkyTEM™ geophysical survey. The results are reported in ASX / JSE releases 1 February 2018 and 8 March 2018. • Airborne electromagnetic and magnetic survey at 200m line spacing and 800m tie line spacing carried out by SkyTEM™ Africa (Pty) Ltd (**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 cesium 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 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. • Ground fixed loop EM surveys were conducted in September 2018 as follow up to regional SkyTEM™ geophysical survey and again in May 2021, to further define results of 2018 ground EM survey. • Results of the 2018 ground fixed loop EM survey were reported in ASX / JSE release 24 September 2018.

Criteria	JORC Code explanation	Commentary
		• The 2021 fixed loop EM survey was conducted with a tri-axial fluxgate electromagnetic (**EM**) receiver manufactured by Electromagnetic Technologies based in Perth, Western Australia. The current source is a custom-built, Time Domain Electro-magnetic (TDEM) transmitter, capable of transmitting 140 Amps into a 1km-by-1km aluminium wire loop with very low resistance (2-3 ohms). The system can detect moderate to super-conductors to depths of approximately 1,000m. Readings are taken every 50-100m on grid-lines spaced 200m apart. • Down-Hole Time Domain Electromagnetic surveys were undertaken using a Digi-Atlantis EM receiver. The source is a custom-built high power Time Domain Electromagnetic transmitter, capable of transmitting 140 Amps into the 700m x 800m aluminum wire loop. The survey was undertaken at station intervals of 20m. Data are quality controlled prior to modelling.
Drilling techniques	• *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.).*	• Diamond core drilling was undertaken. • HQ and NQ size core was drilled. • Drill holes were drilled at -80 and -85 degrees. • Core was not orientated. • Conventional directional wedges were installed to steer hole OBPD004.
Drill sample recovery	• *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 and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.*	• The drill cores were fitted together and recovered length was measured. • Core recovery was found to be excellent (>98%) within the mineralised zone.

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.* • *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.* • *The total length and percentage of the relevant intersections logged.*	• Core of the entire hole length was geologically logged by qualified geologists. • Geological logging was qualitative and was carried out using a standard sheet with a set of standard codes to describe lithology, structure and mineralisation. The logging sheet allows for free-form description to note any unusual features. • Geological logs were captured electronically. • All cores were photographed before and after sampling.
Sub-sampling techniques and sample preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken.* • *If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.* • *For all sample types, the nature, quality and appropriateness of the sample preparation technique.* • *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.* • *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.* • *Whether sample sizes are appropriate to the grain size of the material being sampled.*	• BQ and NQ core cut at core yard and half core taken as sample. • With core samples, the entire sample length is cut and sampled. • Sample preparation is undertaken at ALS Laboratory Johannesburg, an ISO accredited laboratory. ALS utilises industry best practise for sample preparation for analysis involving drying of samples, crushing to <5mm if required and then pulverising so that +85% of the sample passes 75 microns. • CRM's, blanks and replicates are inserted every 30 samples and analysed with each batch. • Lab supplied CRM's, blanks and replicates are analysed with each batch. • Specific gravity measurements are made over the full length of each individual sample on split core where possible. Where not possible due to crushed or broken core, a minimum of 80% of the core sample is used. The specific gravity is determined by measuring and subtracting the wet weight from the dry weight using an electronic density scale. Care is taken to clean and zero the scale between each weighing. • The sample is first weighed in air and the weight recorded. The sample is then weighed, while completely submerged in clean water within a measuring beaker. The mass of beaker and water are deducted for net submerged weight and volume displacement read on measuring beaker. • The sample is then removed and placed back into the core tray in the correct position and orientation. The procedure is repeated for each geological sample interval. • The data is recorded in the Specific Gravity Data Sheet. The specific gravity is calculated for each sample using the

Criteria	JORC Code explanation	Commentary
		formula: SG = weight of sample (weight of sample in air minus the weight of the sample in water)
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.* • *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.* • *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.*	• Samples from drilling were submitted to ALS Chemex in Johannesburg. Samples were analysed for base metals using a four acid digest and ICP-OES and for gold by fire assay with AAS finish. • External quality assurance of the laboratory assays is monitored by the insertion of blanks, duplicates and certified reference materials (CRM). • Three CRMs are alternated through the sample stream and where possible matched to the material being drilled. • Two blanks are used (pulp and chips). • No external laboratory checks have been carried out at this stage.
Verification of sampling and assaying	• *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.*	• Orion's senior geologist is personally supervising the drilling and sampling. • The senior geologist has reviewed the raw laboratory data. • No adjustment to data has been done.
Location of data points	• *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.*	• Collar positions of the holes were surveyed using a hand-held Garmin GPS. • The data are recorded using the WGS84 datum, UTM Zone 34S. • For SkyTEM™ the location of datapoints for geophysical measurements were determined using a Novatel OEMV-1 with DGPS post processing to ensure increased accuracy. • On-line navigation conducted using SkyMap and proprietary SkyTEM™ navigation software • Downhole EM survey was undertaken at station intervals of 20m using a calibrated, metered winch. • The fixed loop EM stations were located using a hand-held Garmin GPS.
Data spacing and distribution	• *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*	• For the fixed loop EM readings are taken every 100m on grid-lines spaced 200m apart. • Downhole EM readings are taken every 20m down the hole.

Criteria	JORC Code explanation	Commentary
	Resource and Ore Reserve estimation procedure(s) and classifications applied. • *Whether sample compositing has been applied.*	• Airborne electromagnetic and magnetic survey was conducted at 200m line spacing and 800m tie line spacing.
Orientation of data in relation to geological structure	• *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.*	• The drilling was guided by the orientation of the modelled EM conductors and drill holes were designed to ensure intersections of the conductors at depth.
Sample security	• *The measures taken to ensure sample security.*	• Chain of custody is managed by the Company. Samples were stored on site in a secure locked building and then freighted directly to the lab.
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	• No audits or reviews were carried out to date.

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	• *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.*	• The mineral rights to the properties are vested in the State and the Minerals and Petroleum Development Act, 2002, (MPRDA) regulates the exploration and mining industry in South Africa. • A prospecting right, NC30/5/1/1/2/816PR, in accordance with section 17 of the MPRDA was granted to Masiqhame Trading 855 (Pty) Ltd (Masiqhame) to prospect for a period of five years effective from 12 March 2014. The prospecting right renewal application was timeously submitted in 2018 and in terms of the MPRDA, the right remains active. The prospecting right was granted in respect of the farms Koegrabe 117 comprising Portions RE, 2 – 12; Boksputs 118 Portions RE,1,7,8,9,10; Kantien Pan 119 Portions RE, 1 and 2; Van Wyks Pan Portions RE,1-5; and Zonderpan Portions RE,1,5,6,7,8 situated in the Magisterial District of Kenhardt, Northern Cape Province. The total Area measures 98,435.8548Ha in extent. Orion, through a subsidiary, currently owns 50% of the project through an earn-In agreement. • A prospecting right, NC30/5/1/1/2/12197PR, in accordance with

Criteria	JORC Code explanation	Commentary
		section 17 of the MPRDA was granted to Orion Exploration No. 1 (Pty) Ltd (**OE1**) to prospect for a period of five years effective from 14 January 2021. The prospecting right was granted in respect of the farms Gemsbok Bult 120 Portion 2; Klein Begin 115 Portions RE and 2 and Zand Ruggens 116 Portions 1-4 and 9 situated in the Magisterial District of Kenhardt, Northern Cape Province. The total Area measures 34,419.4000Ha in extent. Orion, through its subsidiary OE1, currently owns 70% of the project with 30% HDSA equity ownership in compliance with Mining Charter 2018 (20% HDSA entrepreneur, 5% community trust and 5% employee trust).
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• N/A.
Geology	• *Deposit type, geological setting and style of mineralisation.*	• Mineralisation at Boksputs is reported to be of the Volcanogenic Massive Sulphide (**VMS**) type. • Mineralisation occurs in the Proterozoic Areachap Group that also hosts other VMS deposits including Areachap, Kielder, Kantienpan and Prieska. • The mineralisation is strata-bound with disseminated sulphides.

Drill hole Information	• *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:*
	  ○ *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.*
	• *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.*
		• No significant base metal intersections were made in OBPD002 as the drillhole intersected the edge of the target.
		• Assay results for OBPD004 are pending.
		• Refer Table 1, Appendix 1.

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.* • *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*	• N/A.

Criteria	JORC Code explanation	Commentary
	such aggregations should be shown in detail. • *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	
Relationship between mineralisation widths and intercept lengths	• *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').*	• This release reports on the progress made vectoring in on a highly conductive EM target. It does not include materially new Exploration Results and grades.
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.*	• Refer to figures in text.
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 avoiding misleading reporting of Exploration Results.*	• This release reports on the progress made vectoring in on a highly conductive EM target. It does not include materially new Exploration Results and grades.
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.*	• Refer to text for geophysical data and results.
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).* • *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	• About 600m diamond drilling is underway on OBPD004 employing directional drilling technology. It is planned to pull back about halfway in hole OBPD004 (the current hole) and steer the hole towards the centre of the large conductor. The new wedged off section is OBPD004-D1.