

ASX/JSE RELEASE: 12 December 2017

## Drilling Success Continues at Prieska Zinc - Copper Project

- ▶ **Drilling continues at the Prieska Zinc-Copper Project with assay results received for another 8 drill holes.**
- ▶ **44 intersections, including intersections for metallurgical test work have now been completed in the Deep Sulphide Target and its extensions since May 2017.**
- ▶ **Drilling continues to confirm the results from historic intersections and to identify promising extensions to mineralisation already anticipated in historic mine plans.**
- ▶ **Validation of electromagnetic targeting model to test strike extensions.**
- ▶ **Investigations into early mining of potentially significant remnant Zn-Cu mineralisation within accessible areas of existing mine infrastructure of the historic Prieska Mine has now been initiated.**

Orion Minerals NL (**ASX/JSE: ORN**) (**Orion** or **Company**) is pleased to announce that recent assay results received provide further encouragement for extensions to thick zones of Zn-Cu massive sulphide mineralisation beyond those presented in historic mine planning records at the Prieska Zinc - Copper Project (**Prieska Project**). These intersections build on the success of drilling conducted since May 2017 and have validated Orion's electromagnetic targeting model, with hole OCOD087 successfully testing a defined target. A total of 44 intersections have now been completed by Orion at vertical depths of 974m – 1193m below surface, including 11 intersections drilled for the collection of samples for confirmatory metallurgical test work.

New intersections include:

- Hole OCOD087 intersected 12.45m at 5.17% Zn and 1.12% Cu:
  - testing the second of two electromagnetic (**EM**) conductors detected from a down hole EM survey;
  - intersection is outside the boundaries of historic drilling and confirms further extensions to the wide zone of the historically modelled massive sulphide lens.
- Hole OCOD074 intersected 26.17m at 6.51% Zn and 1.31% Cu, including 11.41m at 7.69% Zn and 0.92% Cu confirming thick massive sulphide in south eastern deeps target;
- Hole OCOD080 intersected 12.60m at 4.23% Zn and 0.73% Cu confirming possible extensions of thick mineralisation to the west of north west target area;
- Hole OCOU076 drilled from underground to test the +105 Level Target (Open Pit) intersected thick, high grade copper mineralisation with 13.33m at 0.23% Zn and 3.08% Cu;
- Hole OCOD059\_D3 intersected 3.0m at 9.20% Zn and 0.13% Cu;
- Hole OCOD066\_D4 intersected 22.2m at 2.70% Zn and 1.69% Cu;
- Hole OCOD068\_D2 intersected 23.7m at 3.80% Zn and 1.02% Cu including 7.10m at 6.68% Zn and 0.99% Cu; and
- Hole OCOD072\_D3 intersected 16.05m at 2.71% Zn and 0.80% Cu including 3.00m at 7.16% Zn and 0.24% Cu.

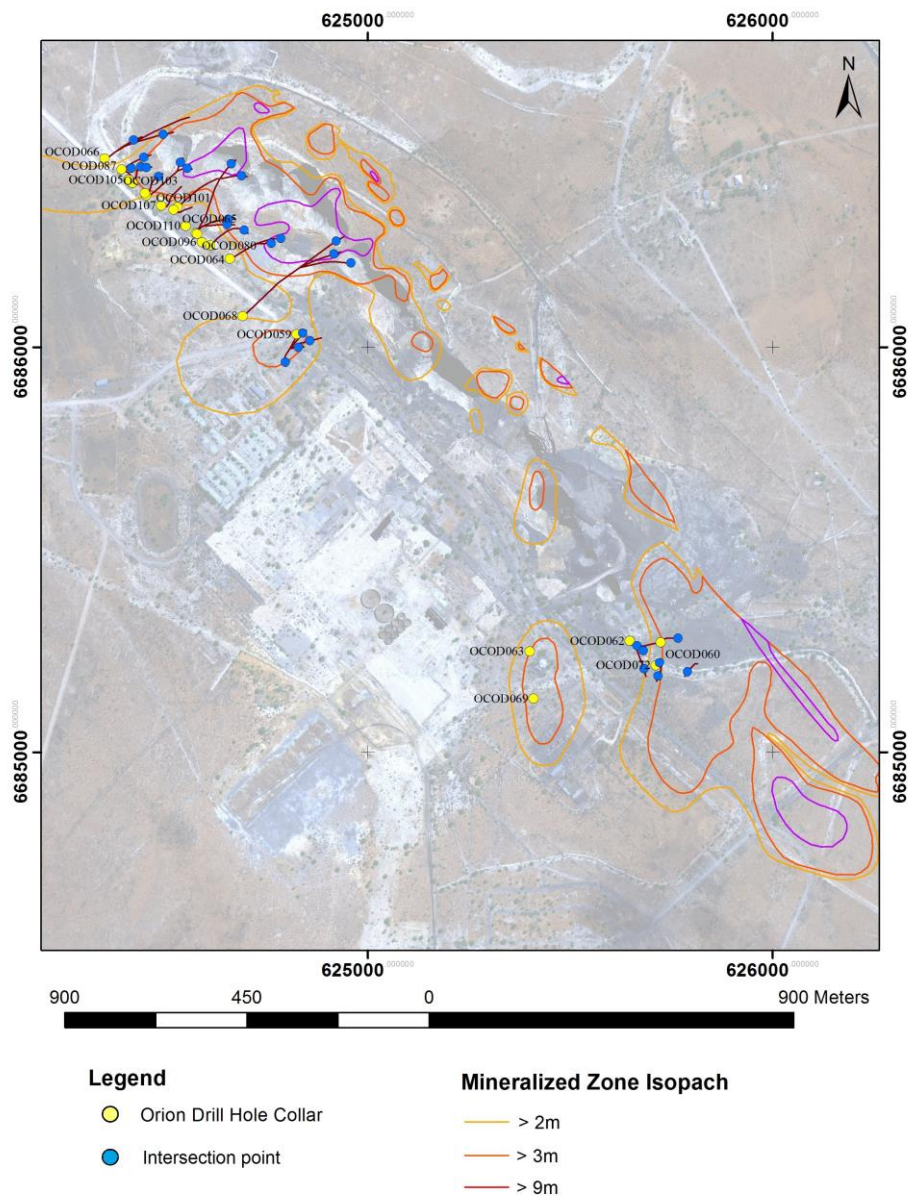
**Orion's Managing Director and CEO, Errol Smart, commented on the results:**

*"We continue to be pleased with drilling and exploration results at the Prieska Project. While drilling within the confines of historically drilled mineralisation continues to verify the grade and width as historically reported, drilling on strike and dip extensions is intersecting significant extensions to known mineralisation, which has potential to rapidly increase the tonnages to be included in the resource estimate and BFS currently underway. Most pleasing are the assay results from mineralisation associated with EM conductors, highlighting the potential for modern exploration techniques to make new discoveries both at the Prieska Project and in the Areachap Belt."*

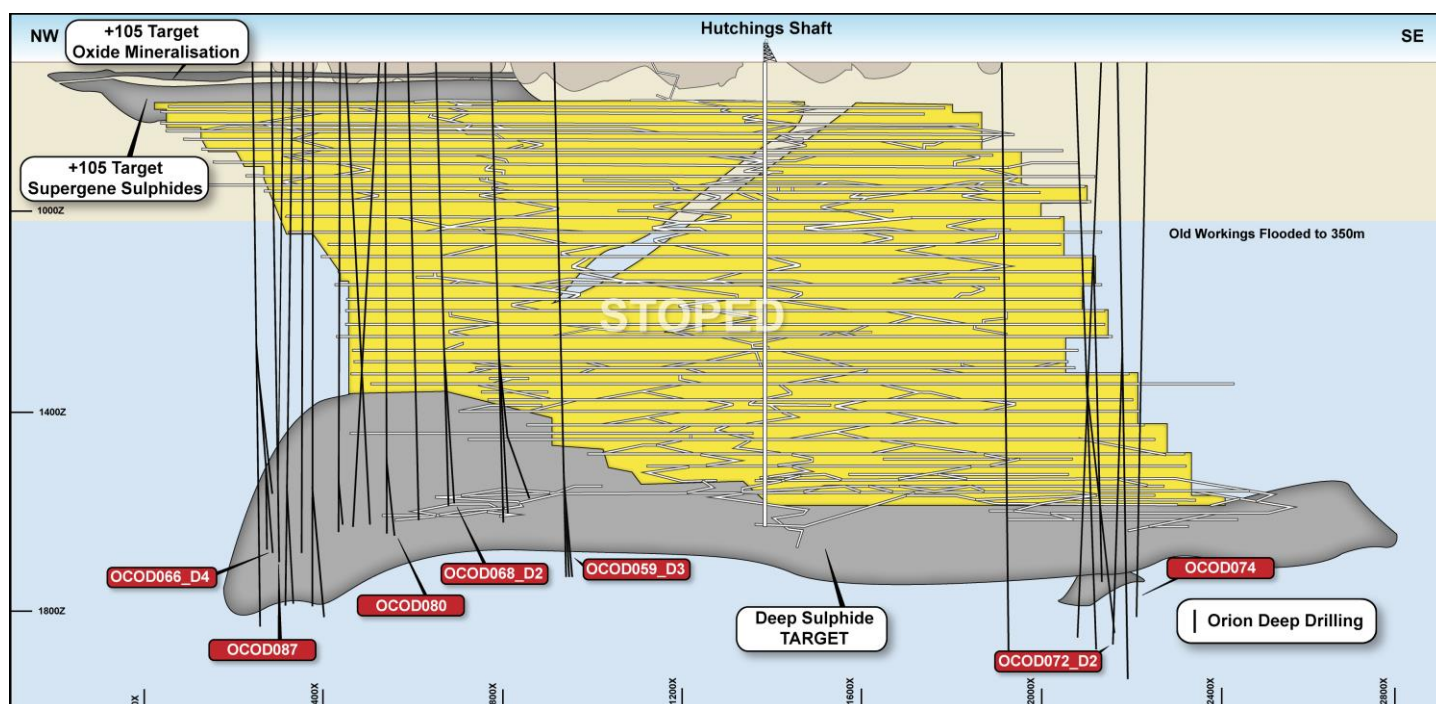
Errol further commented that *"The rapid deployment for and successful execution of a technically challenging drill program using cost effective local equipment, contractors and staff, attests to the benefits of operating in a sophisticated mining destination like South Africa."*

**Deep Sulphide Target Drilling Results**

Orion has now completed 44 intersections from 15 mother holes into the Deep Sulphide Target. The intersections have been achieved at vertical depths of 974m – 1,193m and have required 7,578m of percussion pre-collar and 30,715m of diamond drilling with 132 directional wedges set to steer the drilling to pre-determined target points.

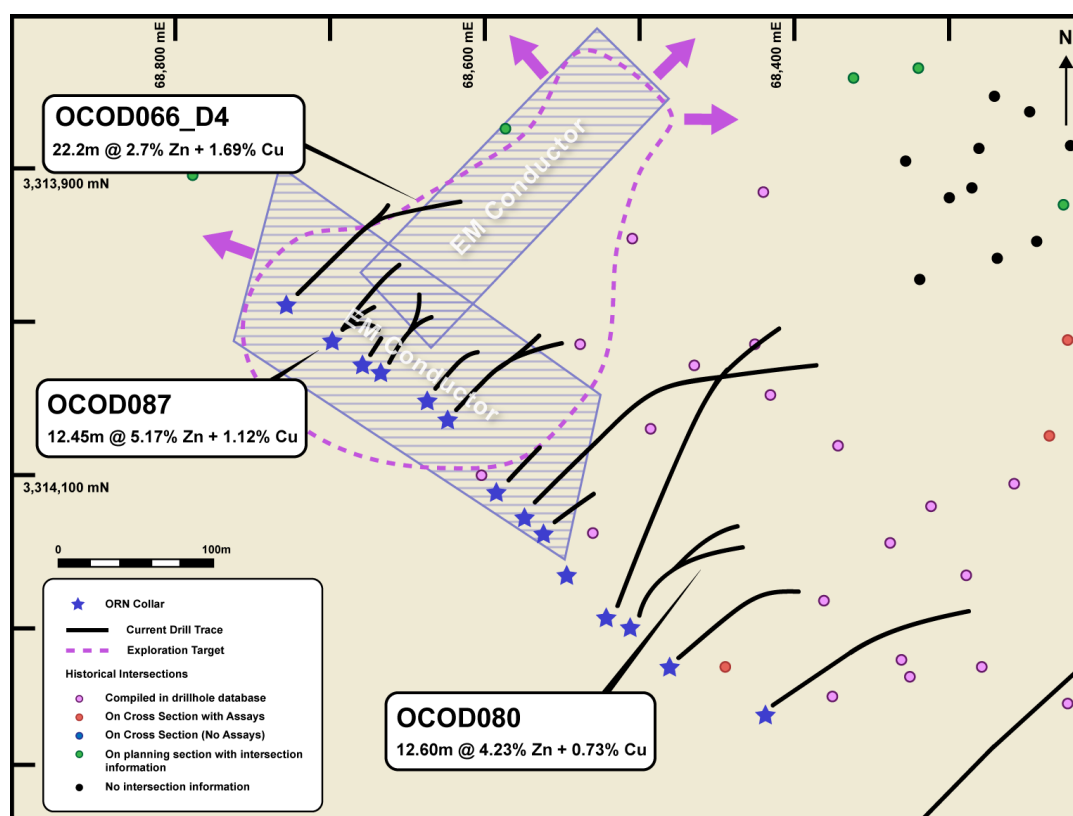


**Figure 1: Locality map showing drill hole collars with the historic isopach model map of the Deep Sulphide mineralisation overlain.**

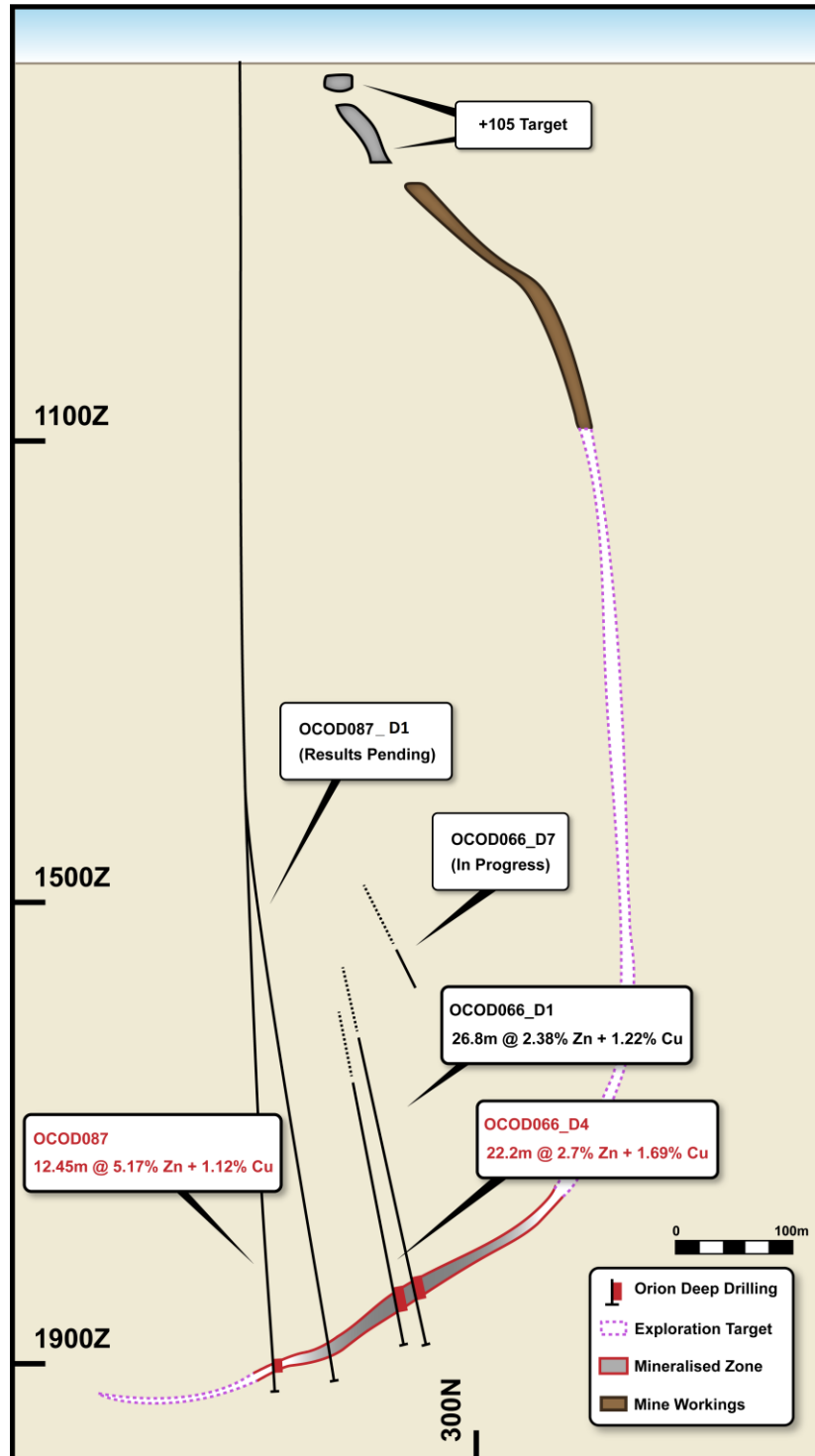


**Figure 2: Longitudinal projection of the Prieska Project showing Deep Sulphide Target drilling by Orion.**

Hole OCOD087 tested a northwest-southeast oriented EM plate modelled from an anomaly detected in a down hole EM survey of hole OCOD066 (Figure 3, refer ASX release 6 September 2017). The EM conductor suggested that mineralisation is developed down dip to the south east of the current zone and that additional drilling, if successful, would substantially increase the known extents of mineralisation at the project. Hole OCOD087 has confirmed this concept, intersecting 12.45m at 5.17% Zn, 1.12% Cu, 0.25g/t Au and 10.8g/t Ag (Figures 3 and 4). Drilling continues to further test the extents of the modelled conductor.



**Figure 3: Plan showing EM conductors and drill holes OCOD066\_D4, OCOD087 and OCOD080 at Prieska Project.**



**Figure 4: Section through drill holes OCOD087 and OCOD066\_D1 showing the target mineralisation up and down-dip.**

Hole OCOD066\_D4, drilled as a deflection from hole OCOD066 (refer ASX release 6 September 2017), twinned the intersection in hole OCOD066\_D1 (refer ASX release 8 November 2017). The holes successfully tested the EM conductor (refer ASX release 8 November 2017). Hole OCOD066\_D4 intersected mineralisation 10m from hole OCOD066\_D1 with 22.2m at 2.7% Zn, 1.69% Cu, 0.24g/t Au and 10.3g/t Ag being returned from 1076.90m (Figure 4). The results compare favourably with the intersection in hole OCOD066\_D1 (Table 1) and assist with important near-range variography determination.

HOLE ID	WIDTH (m)	FROM (m)	Zn (%)	Cu (%)	Au (g/t)	Ag (g/t)
OCOD066_D4	22.2	1076.90	2.70	1.69	0.24	10.3
OCOD066_D1	26.8	1072.20	2.38	1.22	0.23	9.29

**Table 1. Comparison of results between drill holes OCOD066\_D4 and OCOD066\_D1.**



Hole OCOD068\_D2, drilled as a deflection from hole OCOD068 (refer ASX release 9 October 2017), was designed as an infill hole and intersected mineralisation immediately up dip of an area historically prepared for stoping by previous mine operators (Figures 5 and 6). The hole intersected 23.7m at 3.8% Zn, 1.02% Cu, 0.22g/t Au and 11.9g/t Ag from 977m including 7.1m at 6.68% Zn, 0.99% Cu, 0.17g/t Au and 8.8g/t Ag from 978m and a second zone of 3.45m at 3.58% Zn, 0.93% Cu, 0.21g/t Au and 11g/t Ag from 1003.35m. The intersection validates historical intersections in the area. The closest historic drill hole, D348, drilled from underground, intersected the mineralised zone some 30m from hole OCOD068\_D2. A comparison between the two intersections is given in Table 2.

HOLE ID	WIDTH (m)	Zn (%)	Cu (%)	Au (g/t)	Ag (g/t)
OCOD068_D2	23.7	3.80	1.02	0.22	11.9
D348	23.86	5.58	1.51	Not reported	Not reported

Table 2. Comparison of results between drill holes OCOD068\_D2 and historic drill hole D348.

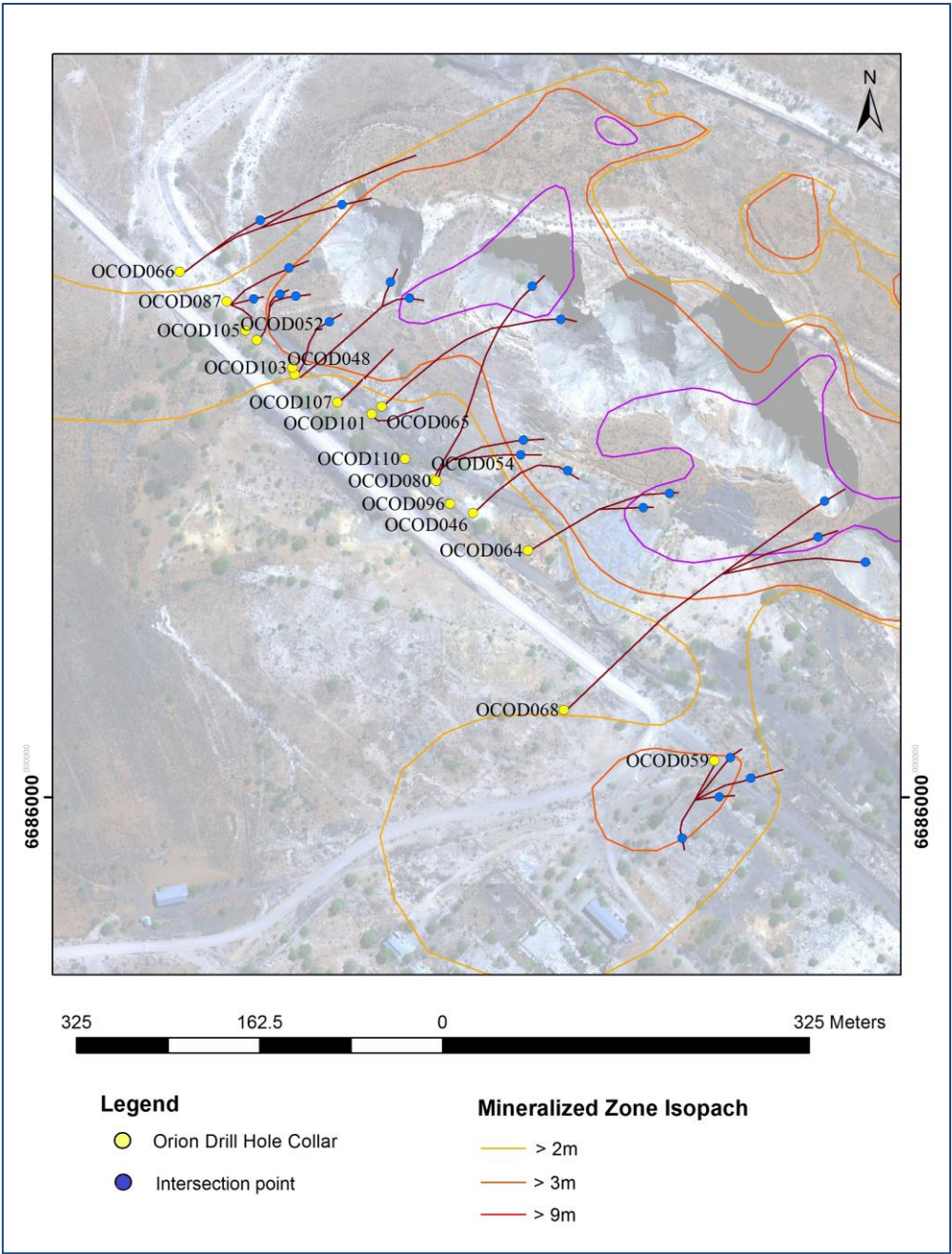
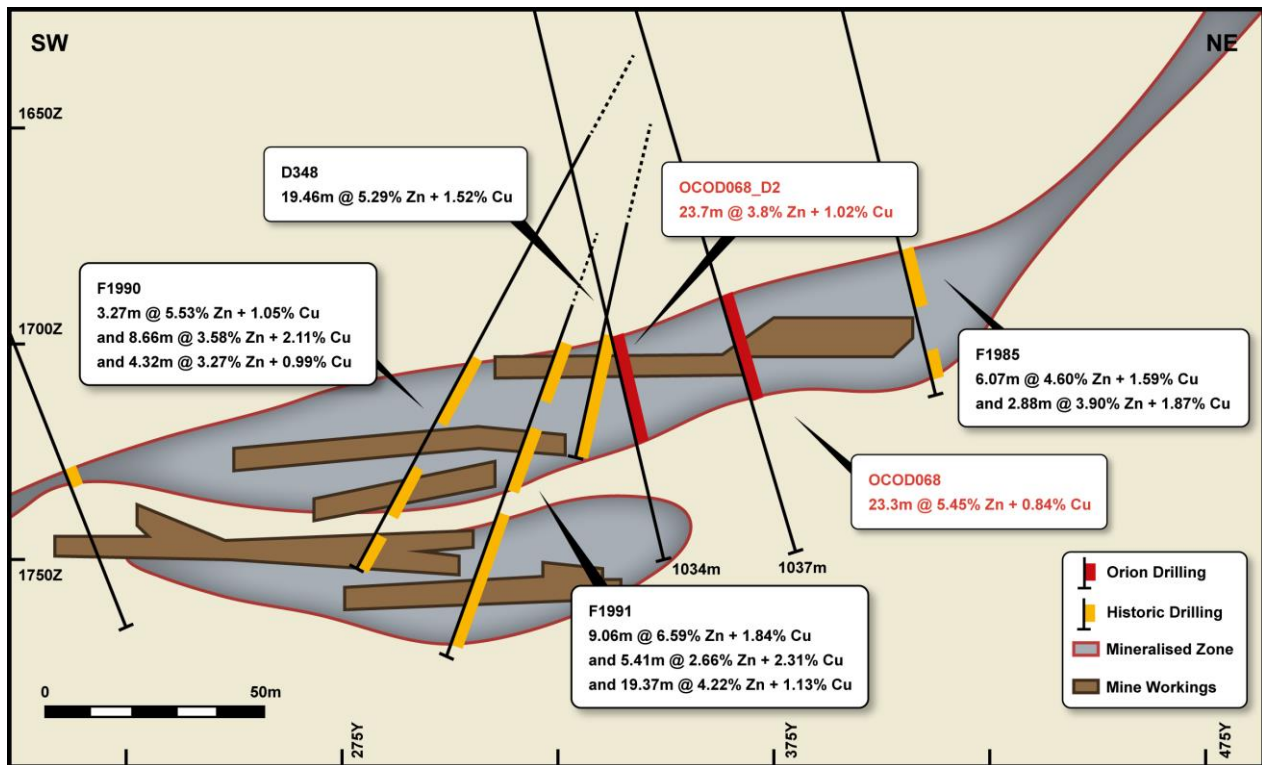


Figure 5: Map showing drill hole collar positions in the North West Target Area.



**Figure 6: Cross section through hole OCOD068\_D2 showing the intersection position relative to the historic mine development workings and other intersections.**

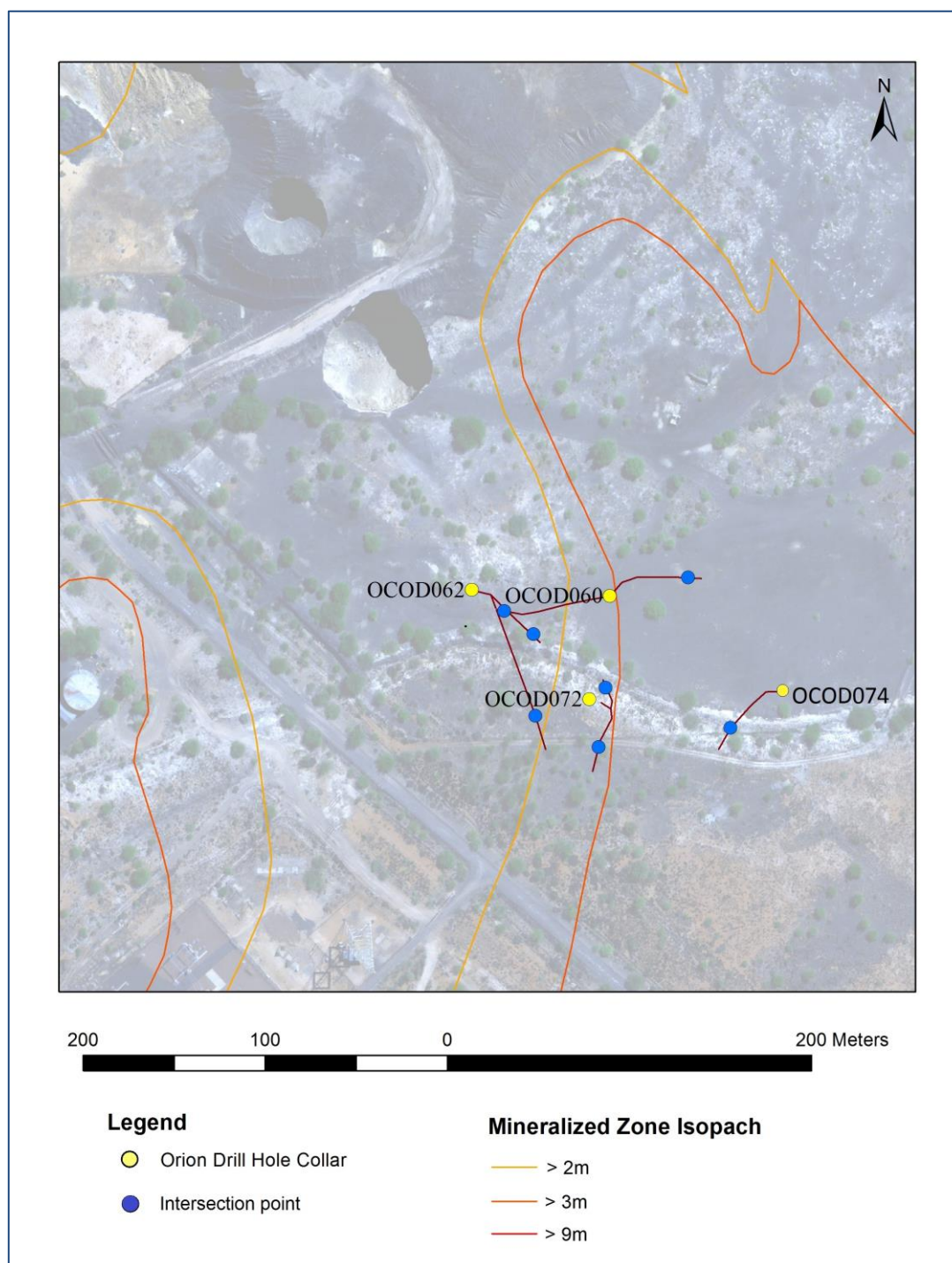
Hole OCOD080 was drilled as an infill hole between drill holes OCOD046 and historic drill hole D395 (drilled from underground) and intersected 12.60m at 4.23% Zn, 0.73% Cu, 0.20g/t Au and 9.9g/t Ag from 1034.3m. The intersection is 75m from hole OCOD046 (refer ASX release 5 October 2017) and the thickness and grades correlate well with that of hole OCOD046 (Table 3).

Hole ID	Width (m)	Zn (%)	Cu (%)	Au (g/t)	Ag (g/t)
OCOD046	10.65	4.19	0.80	0.15	5.72
OCOD080	12.60	4.23	0.73	0.20	9.9

**Table 3. Correlation of grade and width between holes OCOD080 and OCOD046.**

Hole OCOD059\_D3 intersected high grade Zn mineralisation in an area south west of the main Deep Sulphide Target where there is little historic drill information (Figures 1,2 and 5). The hole intersected 3m at 9.2% Zn, 0.13% Cu, 0.08g/t Au and 2g/t Ag and confirms the exploration potential in the mineralised zone towards the south western limb of the Deep Sulphide Synform.

Hole OCOD072\_D3 intersected 16.05m at 2.71% Zn, 0.80% Cu, 0.2g/t Au and 13.80g/t Ag from 1105.95m, including 3.00m at 7.16% Zn, 0.24% Cu, 0.08g/t Au and 5.0g/t Ag from 1110.41m on the periphery of the south east section of the Deep Sulphide Target. The mineralised zone was intersected in an area where historic data suggested the width of mineralisation to be between 2 and 3m wide. The intersection confirms potential for more substantial thicknesses of mineralisation in the south east section. (Figure 7).



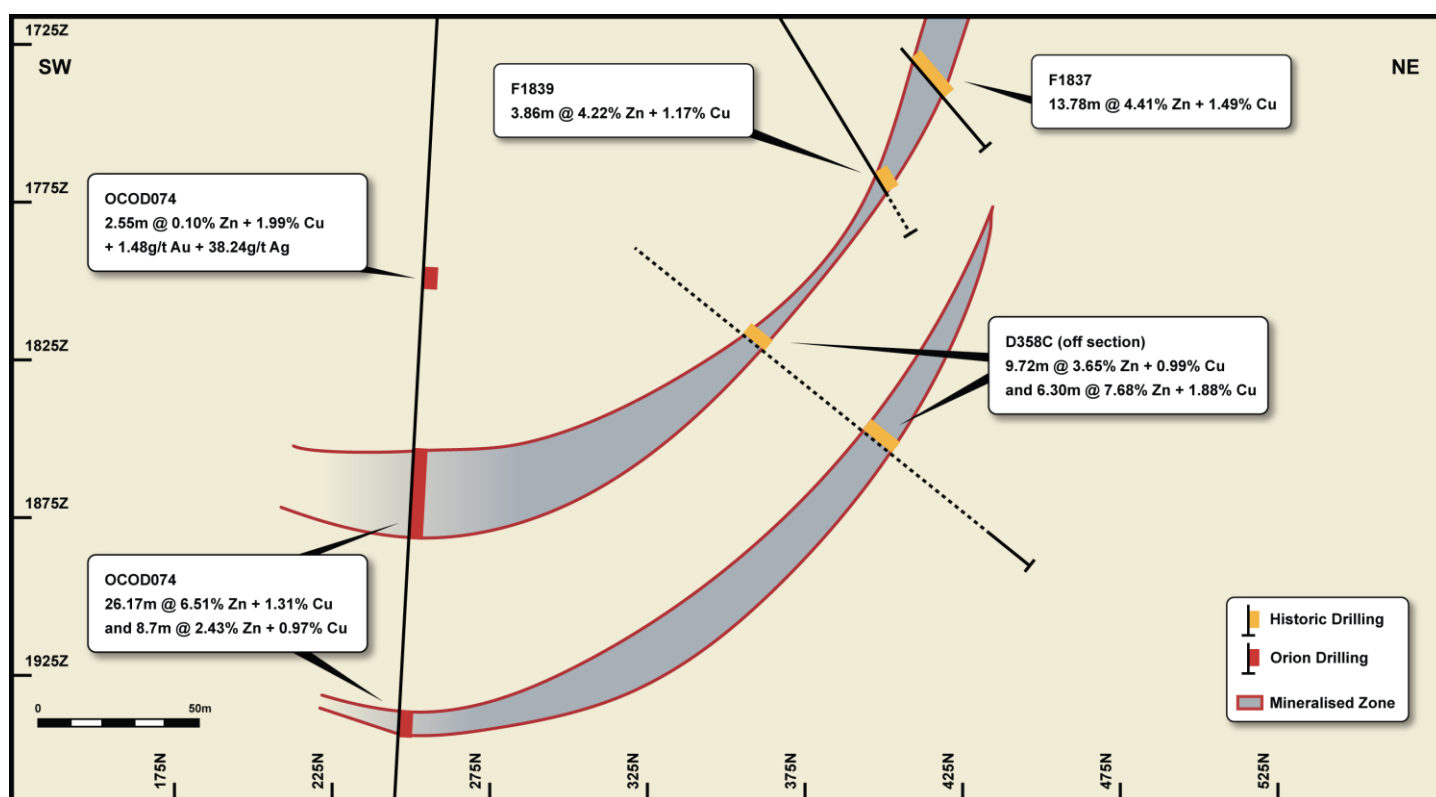
**Figure 7: Map showing the historic isopachs and drill hole collars in the South East Section.**

Hole OCOD074, also drilled in the south eastern section of the Deep Sulphide Target, intersected 3 zones of mineralisation 60m down dip and 120m south east (along strike) of historic intersections. Wide high grade massive sulphide mineralisation was intersected in the Main Zone of mineralisation with 26.17m at 6.51% Zn, 1.31% Cu, 0.26g/t Au and 13.8g/t Ag from 1103.63m including 11.41m at 7.69% Zn, 0.92% Cu, 0.19g/t Au and 9.3g/t Ag from 1103.63.

A second zone of mineralisation, the Lower Zone, was intersected 55m below the Main Zone. The Lower Zone reported 8.7m at 2.43% Zn, 0.97% Cu, 0.21g/t Au and 22.3g/t Ag from 1184.7m. The Lower Zone was not always intersected in historic drill holes as holes were stopped short of this zone. The intersection confirms promising continuity of the Lower Zone and highlights the potential for a parallel mineralised zone in the Deep Sulphide Synform (Figure 8).



Importantly, a narrow intersection of 2.55m at 0.10% Zn, 1.99% Cu, 1.48g/t Au and 38.22g/t Ag from 1084.10 was intersected above the main zone. This mineralisation with relatively high grade Cu, Au and Ag content was intersected in the stratigraphic footwall of the overturned stratigraphic package and has characteristics suggestive of a possible feeder zone to the exhalative massive sulphides. This intersection merits further investigation as a potential mineralised channel at high angle to the main massive sulphide, which is bedding parallel.



**Figure 8: Cross section through drill hole OCOD074 showing the correlation of the Main and Lower Zones with historic intersections up dip.**

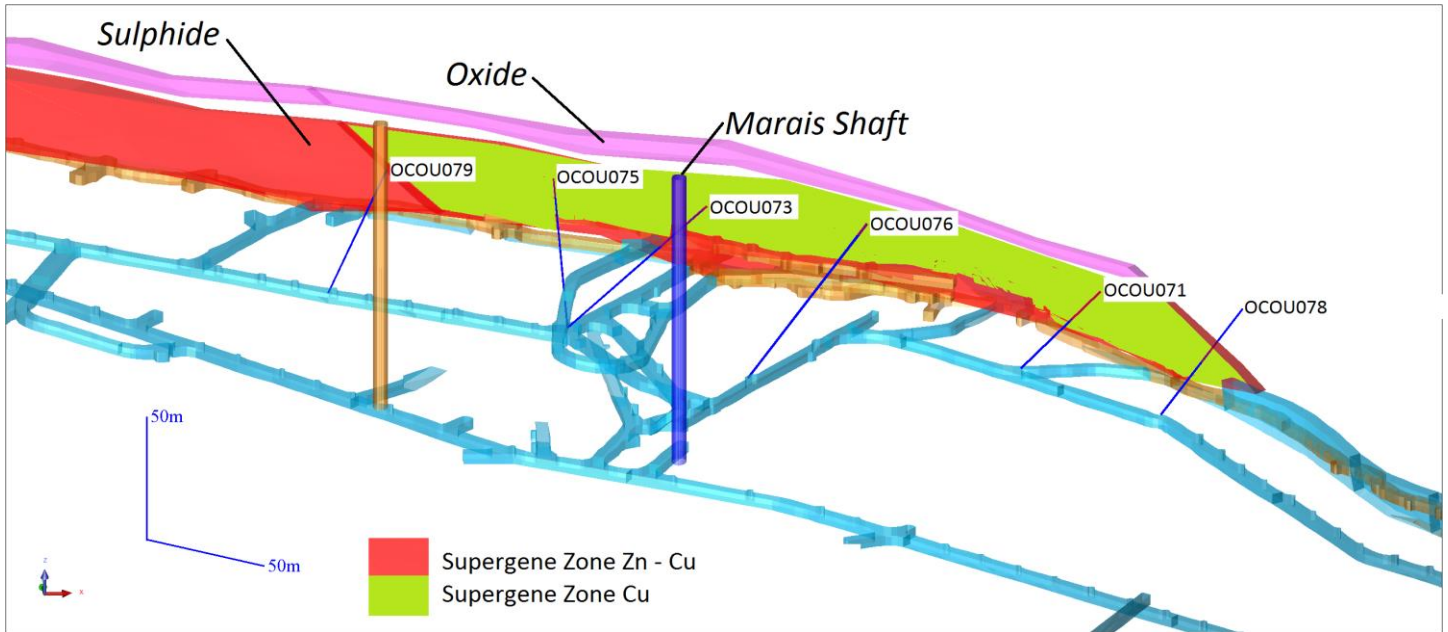
All significant intersections from surface drilling at the Deep Sulphide Target have been released in ASX releases of 8 November 2017, 9 October 2017, 5 October 2017, 19 September 2017, 6 September 2017, 27 July 2017 and 17 July 2017 with historical drilling detailed in ASX release of 18 November 2015. New significant intersections are included as Appendix 1. All intersections quoted for the Deep Sulphide Target are length and specific gravity weighted, following the procedure detailed in Appendix 3.

#### **+105 Level Target (Open Pit) and +370 BSC (Below Shaft Collar) Sulphides**

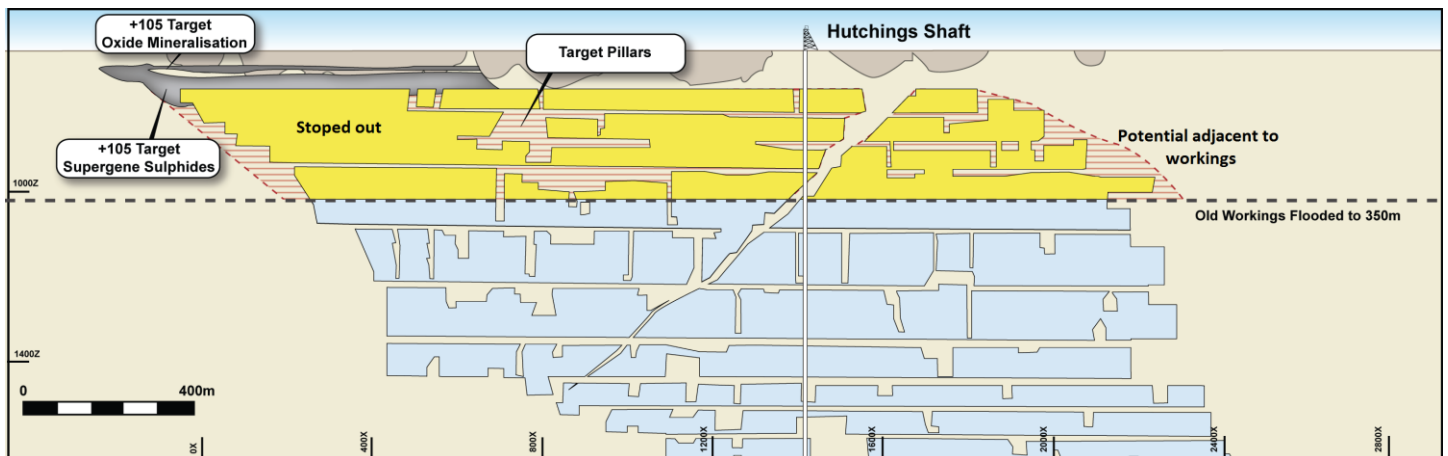
Hole OCOU076 intersected 13.33m at 0.23% Zn, 3.08% Cu, 0.17g/t Au and 6.34g/t Ag (the intersections had a 72% core recovery). The intersection confirmed the presence of a high grade Cu zone within the supergene zone in the south eastern most part of the + 105 deposit (Figure 9).

Orion has now initiated the evaluation for potential sulphide mineralisation above the water level (-370m level) which could present a potential upside source of valuable early cashflow to be considered in the bankable feasibility study currently underway (**+370 BSC Target**). Potential exists to outline Zn – Cu mineralisation within reach of existing and accessible underground development, including extensions immediately adjacent to the stoped areas on the north west and south east strike extensions of the historic Prieska Mine (Figure 10), where a 3m mining width cut-off, on optimised Cu grades was historically applied. As a first stage in this investigation, historic mine plans and longitudinal sections are being used to identify and calculate the tonnage potential of intact mineralisation. This will be followed up by underground verification, geotechnical appraisal and drill planning for underground drill testing.





**Figure 9: 3D view of the +105 underground drilling showing the mine workings on and above the 105 mine level.**

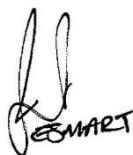


**Figure 10: Schematic longitudinal projection of the Prieska Project based on historic mine plans. Red hatched areas are +370 BSC Target blocks.**

All significant intersections from surface and underground drilling at the +105 Level Target (Open Pit) have been released in ASX releases of 19 September 2017 and 6 September 2017. New significant intersections are included as Appendix 2. All intersections quoted for the +105 Level Target (Open Pit) are length weighted, following the procedure detailed in Appendix 3.

### Data Assimilation and Resource Estimation

Orion has recently succeeded in locating and reaching an agreement to recover a large volume of historic hard copy and digital data for the Prieska Project from the previous owners. The data recovered is thought to include important information, including digital mine planning records, that may assist in Mineral Resource estimation and evaluation of the new +370 BSC Target. Given the new data acquisition and the ongoing positive extensional drilling, the maiden Mineral Resource estimates for the +105 Level Target (Open Pit) and North West Deep Sulphide Target are now scheduled for CQ1 2018. Drilling will continue on strike extensions into 2018, with final BFS Mineral Resource estimates expected mid 2018.



Errol Smart  
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## Competent Persons Statement

The information in this report that relates to Orion's Exploration Results at the Prieska Project complies with the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (**JORC Code**) and has been compiled and assessed under the supervision of Mr Errol Smart, Orion Minerals Managing Director. Mr Smart (PrSciNat) is registered with the South African Council for Natural Scientific Professionals, a Recognised Overseas Professional Organisation (ROPO) for JORC purposes and 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 JORC Code. Mr Smart consents to the inclusion in this announcement of the matters based on his information in the form and context in which it appears. The Exploration Results are based on standard industry practises for drilling, logging, sampling, assay methods including quality assurance and quality control measures as detailed in Appendix 3.

## Disclaimer

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. 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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- disclaim all responsibility and liability for these forward-looking statements (including, without limitation, liability for negligence).

**Appendix 1: Table of intersections from Deep Sulphide Target drilling at the Prieska Project in this release.**

Drill hole	East (UTMz34S)	North (UTMz34S)	From (m)	To (m)	Length (m)	Cu (%)	Zn (%)	Au (g/t)	Ag (g/t)
OCODO59_D3	624576	6686282	984.25	1037.30	7.85	0.16	0.65	0.07	3.5
			1044.00	1047.00	3.00	0.13	9.20	0.08	2.0
OCOD066_D4	624350	6686466	1076.90	1099.10	22.20	1.69	2.70	0.24	10.3
OCOD068_D2	624691	6686077	977.00	1000.70	23.70	1.02	3.80	0.22	11.9
	including		978.00	985.10	7.10	0.99	6.68	0.17	8.8
			1003.35	1006.80	3.45	0.93	3.58	0.21	11.0
OCOD072_D3	625712	6685214	1105.95	1122.00	16.05	0.80	2.71	0.20	13.8
	including		1110.41	1113.41	3.00	0.24	7.16	0.08	5.0
OCOD074	625815	6685218	1084.10	1086.65	2.55	1.99	0.10	1.48	38.2
			1103.63	1129.80	26.17	1.31	6.51	0.26	13.8
	including		11036.63	1115.04	11.41	0.92	7.69	0.19	9.3
			1184.70	1193.40	8.70	0.97	2.43	0.21	22.3
OCOD080	624578	6686280	1034.30	1046.90	12.60	0.73	4.23	0.20	9.9
OCOD087	624392	624392	1121.20	1124.00	2.80	0.25	1.36	0.16	4.7
			1129.90	1142.35	12.45	1.12	5.17	0.25	10.8

**Appendix 2: Table of intersections from +105 Level Target (Open Pit) drilling at the Prieska Project in this release.**

Drill hole	East (UTMz34S)	North (UTMz34S)	From (m)	To (m)	Length (m)	Cu (%)	Zn (%)	Au (g/t)	Ag (g/t)
OCOU076	624843	6686231	49.67	63.00	13.33	3.08	0.23	0.17	6.34

1. All significant intersections > 1m and >0.3% copper or > 0.5% zinc are quoted.
2. Holes prefixed with OCOD are drilled from surface; those with the prefix OCOU have been drilled from underground.
3. It is recommended that the supporting information contained in Appendix 3 is read in conjunction with these results.



**Appendix 3: The following tables are provided to ensure compliance with the JORC Code (2012) requirements for the reporting of Exploration Results for the Prieska Project.**

**Section 1 Sampling Techniques and Data**

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

Criteria	JORC Code explanation	Commentary
<b>Sampling techniques</b>	<ul style="list-style-type: none"> <li>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.</li> <li>Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.</li> <li>Aspects of the determination of mineralisation that are Material to the Public Report.</li> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>Diamond core cut at core yard and half core taken as sample.</li> <li>Diamond core sampled on 1m intervals where possible, sample lengths adjusted to ensure samples do not cross geological boundaries or other features.</li> <li>Drilling at the Deep Sulphide Target carried out aiming to define an approximate 100m x 100m pattern by use of "mother" holes and deflections from these holes.</li> <li>Drilling at the +105 Level Target carried out aiming to define an approximate 45m x 45m pattern.</li> <li>Percussion / reverse circulation pre collars (where used) sampled on a composite basis.</li> <li>Mineralised zones are drilled using core drilling.</li> <li>Sampling carried out under supervision using procedures outlined below including industry standard QA/QC.</li> <li>Samples submitted for analysis to ALS is pulverised in its entirety at ALS and split to obtain a 0.2g sample for digestion and analysis.</li> <li>Downhole EM survey carried out using standard techniques.</li> </ul>
<b>Drilling techniques</b>	<ul style="list-style-type: none"> <li>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.).</li> </ul>	<ul style="list-style-type: none"> <li>Diamond core drilling using NQ and BQ sized core.</li> <li>Pre collar drilled using percussion drilling on certain holes (above mineralisation).</li> </ul>
<b>Drill sample recovery</b>	<ul style="list-style-type: none"> <li>Method of recording and assessing core and chip sample recoveries and results assessed.</li> <li>Measures taken to maximise sample recovery and ensure representative nature of the samples.</li> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>All mineralised intersections are done with core drilling.</li> <li>Core stick-ups reflecting the depth of the drill hole are recorded at the rig at the end of each core run.</li> <li>A block with the depth of the hole written on it is placed in the core box at the end of each run.</li> <li>At the core yard, the length of core in the core box is measured for each run. The measured length of core is subtracted from the length of the run as recorded from the stick-up measured at the rig to determine the core lost.</li> <li>No grade variation with recovery noted.</li> </ul>

Criteria	JORC Code explanation	Commentary
<b>Logging</b>	<ul style="list-style-type: none"> <li>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.</li> <li>Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.</li> <li>The total length and percentage of the relevant intersections logged.</li> </ul>	<ul style="list-style-type: none"> <li>All percussion holes are logged on 1m intervals using visual inspection of washed drill chips and both full. Core is logged by geology and recorded between geological contacts by qualified geologists.</li> <li>Qualitative logging of colour, grainsize, weathering, structural fabric, lithology, alteration type and sulphide mineralogy carried out.</li> <li>Quantitative estimate of sulphide mineralogy and quartz veining.</li> <li>Logs are recorded at the core yard and entered into digital templates at the project office.</li> </ul>
<b>Sub-sampling techniques and sample preparation</b>	<ul style="list-style-type: none"> <li>If core, whether cut or sawn and whether quarter, half or all core taken.</li> <li>If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.</li> <li>For all sample types, the nature, quality and appropriateness of the sample preparation technique.</li> <li>Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.</li> <li>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.</li> <li>Whether sample sizes are appropriate to the grain size of the material being sampled.</li> </ul>	<ul style="list-style-type: none"> <li>BQ and NQ core cut at core yard and half core taken as sample.</li> <li>Samples from percussion pre collars are collected by spear sampling.</li> <li>Sampling on site aims to generate a &lt; 2kg sub sample to enable the entire sample to be pulverised without further splitting.</li> <li>Water is used in the dust depression proses during percussion drilling, resulting in wet chip samples.</li> <li>With core samples, the entire sample length is cut and sampled.</li> <li>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 &lt;5mm if required and then pulverising so that +85% of the sample passes 75 microns.</li> <li>CRM's, blanks and replicates are inserted every 30 samples and analysed with each batch.</li> <li>Lab supplied CRM's, blanks and replicates are analysed with each batch.</li> <li>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.</li> <li>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.</li> <li>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.</li> <li>The data is recorded in the Specific Gravity Data Sheet. The specific gravity is calculated for each sample using the formula:</li> </ul>

Criteria	JORC Code explanation	Commentary
		$SG = \frac{\text{weight of sample}}{(\text{weight of sample in air minus the weight of the sample in water})}$
<b>Quality of assay data and laboratory tests</b>	<ul style="list-style-type: none"> <li>The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.</li> <li>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.</li> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>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.</li> <li>External quality assurance of the laboratory assays is monitored by the insertion of blanks, duplicates and certified reference materials (<b>CRM</b>)</li> <li>Coarse field duplicates consisting of a split sub-sample of the original crushed sample material.</li> <li>Three CRMs are alternated through the sample stream and where possible matched to the material being drilled.</li> <li>Two blanks are used (pulp and chips).</li> <li>No external laboratory checks have been carried out at this stage.</li> <li>Down hole EM surveys are carried out using a 3 component Digi-Atlantis probe and ultra high power transmitter.</li> <li>Loop size of 1800m x 600m are used with continuous measurements taken as the probe travels into the hole and out again.</li> <li>Surface TDEM surveys are carried out using a Supracon Jesse Beep squid sensor and ultra high power transmitter with a Smartem 24 receiver.</li> </ul>
<b>Verification of sampling and assaying</b>	<ul style="list-style-type: none"> <li>The verification of significant intersections by either independent or alternative company personnel.</li> <li>The use of twinned holes.</li> <li>Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.</li> <li>Discuss any adjustment to assay data.</li> </ul>	<ul style="list-style-type: none"> <li>Orion's executive geologist is personally supervising the drilling and sampling along with a team of experienced geologists.</li> <li>The Managing Director and the executive geologist have reviewed the raw laboratory data and confirmed the calculation of the significant intersections.</li> <li>For the EM survey, data is collected on site and validated by a geophysical technician daily. Data (raw and processed) is sent to a consultant geophysicist for review and quality control.</li> </ul>
<b>Location of data points</b>	<ul style="list-style-type: none"> <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> <li>Quality and adequacy of topographic control.</li> </ul>	<ul style="list-style-type: none"> <li>Collar data has been laid out using a handheld GPS and these coordinates are reported here.</li> <li>All of the Orion drill hole collars are surveyed by a qualified surveyor using a differential GPS which may result in minor adjustments to coordinate data.</li> <li>Downhole surveys are completed using a North-Seeking Gyro instrument.</li> <li>The historic mine survey data is in the old national Clarke 1880 coordinate system. All data is collected the surveyor is in Clarke 1880 and in UTM WGS84 Zone 34 (Southern Hemisphere). UTM WGS84 Zone 34 coordinates are reported above.</li> </ul>



Criteria	JORC Code explanation	Commentary
<b>Data spacing and distribution</b>	<ul style="list-style-type: none"> <li>Data spacing for reporting of Exploration Results.</li> <li>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.</li> <li>Whether sample compositing has been applied.</li> </ul>	<ul style="list-style-type: none"> <li>At the Deep Sulphide Target drill holes aim to intersect mineralisation on approximately 100m x 100m spacing with infill drilling to be carried out in areas of interest as determined by results.</li> <li>At the +105 Level Target drill holes aim to intersect mineralisation on approximately 45m x 45m spacing with infill drilling to be carried out in areas of interest as determined by results.</li> <li>Variography studies were carried out on the historic data set for both Targets to determine the drill spacing for Mineral Resource estimates.</li> </ul>
<b>Orientation of data in relation to geological structure</b>	<ul style="list-style-type: none"> <li>Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.</li> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>Drilling is oriented perpendicular, or at a maximum achievable angle to, the attitude of the mineralisation.</li> <li>As a result most holes intersect the mineralisation at an acceptable angle.</li> <li>Where surface access or geotechnical conditions do not allow access to optimal drill collar positions, holes may be inclined.</li> <li>The intersections will be corrected once the mineralised zone is modelled in three dimensions and local attitude can be accurately determined.</li> <li>No sampling bias is anticipated as a result of hole orientations.</li> <li>EM surveys are completed in an orientation perpendicular to the interpreted or intersected mineralisation.</li> </ul>
<b>Sample security</b>	<ul style="list-style-type: none"> <li>The measures taken to ensure sample security.</li> </ul>	<ul style="list-style-type: none"> <li>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.</li> </ul>
<b>Audits or reviews</b>	<ul style="list-style-type: none"> <li>The results of any audits or reviews of sampling techniques and data.</li> </ul>	<ul style="list-style-type: none"> <li>No audits or reviews have been carried out at this stage.</li> </ul>

## Section 2 Reporting of Exploration Results

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

Criteria	JORC Code explanation	Commentary
<b>Mineral tenement and land tenure status</b>	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>The Prospecting Right is held by a subsidiary company of Agama Exploration and Mining (Pty) Ltd (<b>Agama</b>), which is a wholly owned subsidiary of Orion. As such, Orion effectively holds a 73.33% interest in the project.</li> <li>The Prospecting Right covers a strike of 2200m for the Deep Sulphide mineralisation out of a total interpreted strike of 2800m.</li> <li>The Prospecting Right covers the complete known strike of the +105 Level Target.</li> <li>All of the required shaft infrastructure and lateral access underground development is available within the Prospecting Right.</li> </ul>

Criteria	JORC Code explanation	Commentary
<b>Exploration done by other parties</b>	<ul style="list-style-type: none"> <li>Acknowledgment and appraisal of exploration by other parties.</li> </ul>	<p><u>Deep Sulphide Target</u></p> <ul style="list-style-type: none"> <li>All exploration and life of mine drilling (V, D and F holes) was done by Anglovaal, resulting in a substantial amount of hard copy data from which the Company has been able to assess the prospectivity of the remaining mineralisation.</li> <li>The Anglovaal exploration resulted in the delineation and development of a large mine.</li> </ul> <p><u>+105 Level Target</u></p> <ul style="list-style-type: none"> <li>The 2012 drilling of the NW section of the +105 Level Target was carried out by the previous owners of the Subsidiary (Orion acquired the subsidiary in March 2017).</li> </ul>
<b>Geology</b>	<ul style="list-style-type: none"> <li>Deposit type, geological setting and style of mineralisation.</li> </ul>	<ul style="list-style-type: none"> <li>The Copperton deposit is a Volcanogenic Massive Sulphide deposit. The deposit is contained in the Areachap Group, which also hosts the Boks Puts, Areachap, Kielder, Annex Vogelstruisbult and Kantienpan deposits.</li> <li>The historically mined section of the deposit is confined to a tabular, stratabound horizon in the northern limb of a refolded recumbent synform which plunges at approximately 45° to the southeast. It is hosted within deformed gneisses of the Copperton Formation, which have been dated at 1285 Ma and forms part of the Namaqualand Metamorphic Complex.</li> <li>The mineralised zone outcrop has a strike of 2400m, was oxidised and / or affected by leached and supergene enrichment to a depth of approximately 100m, and outcrops as a well_Developed gossan. It has a dip of between 55° and 80° to the northeast at surface and a strike of 130° to the north. The width of the mineralised zone exceeds 35m in places but averages between 7m and 9m. The mineralised zone persists to a depth of 1100m (as deep as 1200m in one section) after which it is upturned.</li> <li>The +105 Level Target area comprises the oxide / supergene / mixed zone (and a zone of remnant primary sulphides) situated from above the upper limit of mining at approximately 100m depth up to surface.</li> </ul>
<b>Drill hole Information</b>	<ul style="list-style-type: none"> <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 style="list-style-type: none"> <li>easting and northing of the drill hole collar</li> <li>elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar</li> <li>dip and azimuth of the hole</li> <li>down hole length and interception depth</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>All Significant Intersections, location data and other drill hole information is tabulated in Appendix 1 and Appendix 2.</li> </ul>

Criteria	JORC Code explanation	Commentary
	<ul style="list-style-type: none"> <li>○ hole length.</li> <li>• 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.</li> </ul>	
<b>Data aggregation methods</b>	<ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> <li>• The assumptions used for any reporting of metal equivalent values should be clearly stated.</li> </ul>	<ul style="list-style-type: none"> <li>• Significant Intersections for the Deep Sulphide Target are calculated by average of assays result &gt; 0.3% copper or 0.5% zinc and weighted by the sample width and specific gravity of each sample.</li> <li>• Significant Intersections for the +105 Level Target are calculated by average of assays result &gt; 0.3% copper or 0.5% zinc and weighted by the sample width of each sample only.</li> <li>• In general, the significant intersections correspond strongly to geological boundaries (massive sulphides) and are clearly distinguishable from country rock / surrounding samples.</li> <li>• No truncations have been applied at this stage for either Target.</li> </ul>
<b>Relationship between mineralisation widths and intercept lengths</b>	<ul style="list-style-type: none"> <li>• These relationships are particularly important in the reporting of Exploration Results.</li> <li>• If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.</li> <li>• 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').</li> </ul>	<ul style="list-style-type: none"> <li>• All intersection widths quoted are down hole widths.</li> <li>• Most holes intersected the mineralisation perpendicular or at high angle to the attitude of the mineralisation.</li> <li>• The mineralisation has complex geometry and mineralisation widths need to be estimated based on interpretation of surrounding intercepts.</li> </ul>
<b>Diagrams</b>	<ul style="list-style-type: none"> <li>• 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.</li> </ul>	<ul style="list-style-type: none"> <li>• Appropriate diagrams (plan, cross section and long section) are shown in the announcement text.</li> </ul>
<b>Balanced reporting</b>	<ul style="list-style-type: none"> <li>• 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.</li> </ul>	<ul style="list-style-type: none"> <li>• All drill hole results referred to in the announcement, are listed in Appendix 1 and 2. All other drill holes, including those with no mineralisation, have been detailed in previous announcements as detailed in the text.</li> </ul>
<b>Other substantive exploration data</b>	<ul style="list-style-type: none"> <li>• 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.</li> </ul>	<ul style="list-style-type: none"> <li>• Hardcopy maps are available for a range of other exploration data. This includes mine survey plans, geological maps, airborne magnetics, ground magnetics, electromagnetics, gravity and induced polarisation. All available exploration data has been viewed by the Competent Person.</li> <li>• The mine operated from 1972 to 1991 and is reported to have milled a total of 45.68 Mt of ore at a grade of 1.11% copper and 2.62% zinc, recovering 0.43 Mt of copper and 1.01 Mt of zinc. Detailed production and metallurgical results are available for the life of the mine.</li> <li>• In addition, 1.76 Mt of pyrite concentrates and 8,403 t of lead</li> </ul>



Criteria	JORC Code explanation	Commentary
		<p>concentrates as well as amounts of silver and gold were recovered.</p> <ul style="list-style-type: none"> <li>• Copper and zinc recoveries averaged 84.9% and 84.3% respectively during the life of the mine.</li> </ul>
<b>Further work</b>	<ul style="list-style-type: none"> <li>• <i>The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling).</i></li> <li>• <i>Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.</i></li> </ul>	<ul style="list-style-type: none"> <li>• Drilling is ongoing to test the Deep Sulphide Target.</li> <li>• Downhole and surface EM surveys are also in progress aimed at delineating targets away from the historically drilled areas.</li> </ul>