ASX MEDIA RELEASE

Havilah Resources
A New Mining Force in South Australia

9 May 2019

Positive Kalkaroo PFS Metallurgy Test Work

HIGHLIGHTS

- **Kalkaroo PFS supplementary metallurgical test work program nearing completion with positive outcomes achieved for the key objectives that were set.**
- **>90% gold recovery confirmed in saprolite gold ore using a cyanide leaching flowsheet and applying conventional copper management methods (vs 50% previously).**
- **Demonstrated low oxide milling costs based on attritioning and comminution testwork.**
- **Improved gold recoveries in lower grade sulphide ores.**
- **Pyrite concentrate, produced from the copper concentrate tailings is confirmed to contain appreciable levels of cobalt and gold with low penalty element levels.**
- **Marketing studies are in progress to determine the saleability of the pyrite and the payability of the contained cobalt and gold and payability terms for copper concentrates.**
- **Pyrite roasting and leaching testwork underway to determine the value opportunity of recovering cobalt and gold.**
- **Results will be incorporated in new trade-off studies and a revised economic model to be reported in an updated PFS.**

Havilah Resources Limited (Havilah) is pleased to advise that the metallurgical testwork program for the Kalkaroo prefeasibility study (**PFS**) update, being overseen by RPMGlobal, is on track for completion in the second half of 2019. The majority of key program objectives (refer to ASX announcement of 2 July 2018) have now been achieved, notably:

1. Improved gold recoveries in the oxidised saprolite gold ore type.
2. Confirmation of appreciable cobalt and gold grades in pyrite concentrates generated from the copper tailings.

These positive outcomes have the potential to significantly enhance project revenues that in turn may result in an expanded open pit and extended mine life.

Specific objectives and outcomes of the metallurgical program, which used samples primarily from three new diamond drillholes completed in August 2018 (refer ASX announcement 11 September 2018), are summarised in **Table 1**. Background of the metallurgical program including scope and key testwork is provided in **Appendix A**.

Table 1: Metallurgy Program Objectives and Outcomes

Objective	Outcomes
Determine the viability of use of cyanide leaching to improve gold recoveries to a target of 90% in oxide ore zones compared with approximately 50% achieved using flotation.	>90% gold recovery for average saprolite gold ore achieved with further variability testing being conducted.
Confirm milling requirements of attritioned saprolite oxide ore.	Materially lower milling requirements confirmed.
Evaluate the optimal gold recovery from low grade chalcocite ore (previously **extrapolated** to be as low as 30%).	Gold recoveries improved slightly.
Confirm pyrite concentrate production specifications produced from copper sulphide tailings.	Concentrate production confirmed with appreciable levels of contained gold and cobalt.
Determine potential of treating pyrite concentrates to produce refined cobalt and gold products.	Testwork in progress.

Summary of Metallurgical Results to Date

1. **Improvement of Oxide Ore Gold Recoveries**

Although Havilah's previous test work had demonstrated >90% gold recoveries in oxide ore material (saprolite gold ore) using conventional cyanide leaching, it did not address how to manage the considerable amount of copper that is also leached by the cyanide. To overcome this challenge flotation was used in the Wanbao Mining PFS, but at the expense of much lower gold recoveries in the order of 50%.

In an important breakthrough Havilah's present studies have shown that:

- Excessive copper is unlikely to be an issue when average grade saprolite gold ore is being treated provided adequate levels of carbon loading are achieved.
- As an alternative approach, an established method involving cold caustic cyanide solution is also effective in reducing copper to manageable levels.

Conclusion: Based on current testwork results the saprolite gold ore will be able to be treated by conventional cyanide leaching and so achieve measurably improved gold revenues.

2. **Confirmation of Oxide Milling Requirements**

The oxide ore types (saprolite gold and native copper) consist of both saprolite (clay) and relatively soft weathered rock, termed "saprock". Present studies have shown that although the majority of saprock requires grinding, this component is as low as a third of ore containing significant saprolite. Additionally, Bond Ball Mill Work index determinations have classified this material as being between 'very soft' and 'soft'.

Conclusion: The low grinding energy requirement and mass rejection prior to milling provides an opportunity to materially reduce milling costs for the oxide material.

3. Improvement of Chalcocite Ore Gold Recoveries

In order to obtain definitive recovery data on representative low grade chalcocite ore, a series of gravity-flotation tests and optical mineralogy to identify any potential mineralogical issues were conducted. Test results showed higher recoveries of gold than previously indicated by theoretical extrapolation from the higher grade ore samples. This was further enhanced with a finer primary grind of P_{80} of 75µm (80% of material passing through a 75 micron mesh screen) versus the previous assumed coarser grind of P_{80} of 106µm (80% of material passing through a 106 micron mesh screen).

Conclusion: The impact of additional costs associated with finer grind will be evaluated against improved gold recoveries.

4. Definition of Pyrite Concentrate Production

Extensive flotation tests have been conducted in the current program to optimise the pyrite recovery in the copper tails stream while maximising the potentially valuable cobalt, gold and sulphur contents. Sulphide ore mineralogy has also been investigated to determine the practical limitations of producing clean pyrite concentrates. Intergrowths between copper minerals chalcopyrite and chalcocite with pyrite were found to be complex (see photomicrograph – **Figure 1**). To overcome this, flotation and milling conditions have been established to produce potentially saleable products.

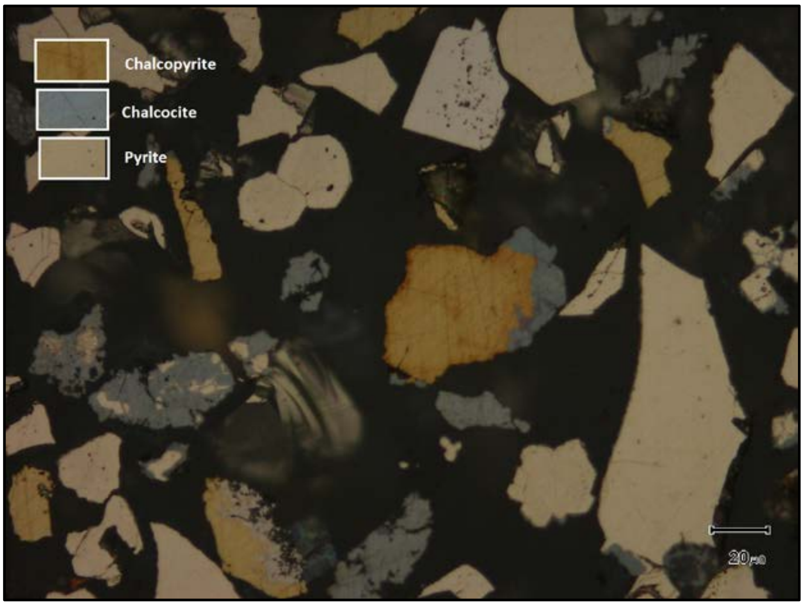

Figure 1 - Sulphide Intergrowth in Chalcocite Ore

The pyrite concentrate, containing a weighted average of approximately 2.5 g/t gold and 3,000 g/t cobalt, combined with low concentrations of penalty elements (e.g. arsenic), is a potentially saleable product. Accordingly, Havilah has engaged Shanghai Metals Market (**SMM**) under the guidance of RPMGlobal, to complete a comprehensive marketing study of the Kalkaroo sulphide concentrates using the specifications obtained from the metallurgical studies. The primary aim of the study is to identify Chinese operated smelting and roasting facilities that would accept the copper and pyrite concentrates and to define the respective metal payability, treatment and refining costs.

Conclusion: To date no value has been assigned to the pyrite concentrate, therefore any sales opportunities identified by the marketing studies has the potential to increase the project revenue.

5. Recovery of Copper, Cobalt and Gold from Pyrite Concentrates

Bulk pyrite concentrates have been produced for further testing to evaluate the potential of producing refined copper, cobalt and gold products. The testwork is currently in progress and builds on positive results from similar Mutooroo sulphide concentrates subjected to roasting and calcine leaching tests to recover both cobalt and gold, and North Portia pyrite concentrates tested for direct leaching of gold.

Conclusion: The high level value of the opportunity from potentially increased metal 'payabilities' from refined products has the potential to further increase project revenue.

Remaining Work to Complete the PFS Update

The final metal recoveries from the metallurgical test work and the outcomes of the marketing studies will be used to complete a range of trade-off studies. The objective of the trade-off studies is to ensure optimal processing and ore mining scheduling strategies are adopted as the basis for detailed mine optimisation, process engineering and economic modelling. This phase of the work will be supported by RPMGlobal. The outcomes of the trade-off studies will be incorporated into an updated PFS study to be completed in the second half of 2019 in accordance with the workflow summarised in the chart below.

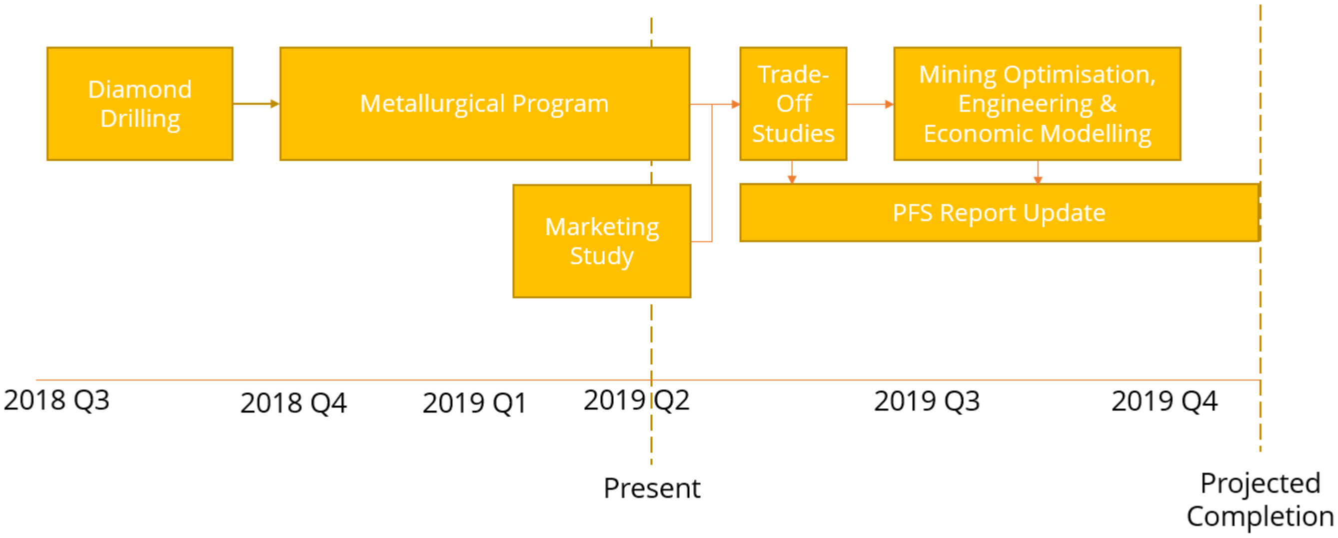

Figure 2 - Kalkaroo PFS Update Workflow

Commenting on the status and results of the metallurgical test program for the Kalkaroo PFS update, Havilah's Technical Director, Dr Chris Giles, said: "Our metallurgical test program is nearing completion and it is apparent that the key objective to improve gold recoveries in the saprolite gold ore was successful.

"We have also confirmed that there is appreciable gold and cobalt in the pyrite concentrates and marketing studies, now underway, will inform us of the terms and likely payability levels we can expect for these metals.

"This new and complete metallurgical information will flow through into trade-off studies and a revised economic model to be incorporated into an updated PFS for Kalkaroo," he said.

For further information visit www.havilah-resources.com.au

Contact: Dr Chris Giles, Technical Director, on (08) 8155-4500 or email: info@havilah-resources.com.au

Cautionary Statement
This announcement contains certain statements which may constitute "forward-looking statements". Such statements are only predictions and are subject to inherent risks and uncertainties which could cause actual values, performance or achievements to differ materially from those expressed, implied or projected in any forward looking statements. Investors are cautioned that forward-looking statements are not guarantees of future performance and investors are cautioned not to put undue reliance on forward-looking statements due to the inherent uncertainty therein.

Competent Persons Statement
The information in this announcement related to metallurgical results was reviewed by Dr. Andrew Newell. Dr. Newell is a member of the Australasian Institute of Mining and Metallurgy (AusIMM) and has sufficient experience relevant to the nature of the work and style of mineralisation under consideration to qualify as a Competent Person as defined in the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC) Code 2012. Dr Newell is a full time employee of mining consulting firm RPM Global and consents to the inclusion of the metallurgical matters based on his information in the form and context in which it appears. This information has been prepared to comply with the JORC Code 2012.
The information in this announcement that relates to geology, exploration and drilling results is based on data and information compiled by geologist, Dr. Chris Giles, a Competent Person who is a member of The Australian Institute of Geoscientists. Dr. Giles is Technical Director of the Company and is employed by the Company on a consulting contract. Dr. Giles has sufficient experience, which is relevant to the style of mineralisation and type of deposit under consideration and to the activities being undertaken to qualify as a Competent Person as defined in the 2012 Edition of 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Dr. Giles consents to the inclusion in the announcement of the matters based on his information in the form and context in which it appears. This information has been prepared to comply with the JORC Code 2012.

APPENDIX 1: BACKGROUND OF PFS UPDATE METALLURGICAL STUDY

The comprehensive metallurgical program reported here was scoped following a number of opportunities identified in the Wanbao Mining sponsored preliminary Kalkaroo PFS work, as summarised in **Table 2.** Composites used in the testwork are further described in **Appendix 3**.

Table 2: Metallurgy Program Overview

<table>
<tr><th>Objective</th><th>Testwork Scope</th><th>Composites Used</th><th>Key Testwork Details</th></tr>
<tr>
<td>1. Improve Oxide Ore Gold Recoveries.</td>
<td>
Select Life-of-Mine grade ore sample and samples to represent key areas of the ore body for testing.
Mineralogical investigation to determine copper speciation and confirm process requirements for management of cyanide leachable copper.
Cyanide leaching testwork (CIL) with aim to achieve 90% gold recovery while optimising process variables e.g. pulp density.
Carbon loading and cold-elution optimisation testwork to determine impact of excessive copper and the ultimate potential for gold doré production.
</td>
<td>Saprolite Gold 1 (Moderate grade)

Saprolite Gold 2 (Low grade)</td>
<td>Saprolite Gold 1 and Saprolite Gold 2 composites were ground then subjected to cyanide Carbon-In-Leach bottle roll procedures. Final results at best conditions are described in the table below.
<table>
<tr><th></th><th>Saprolite Gold 1</th><th>Saprolite Gold 2</th></tr>
<tr><td>Feed Grade*</td><td>0.77 g/t Au</td><td>0.28 g/t Au</td></tr>
<tr><td>Recovery to carbon (48hrs)</td><td>94.5%</td><td>92.2%</td></tr>
<tr><td>Pulp density</td><td>50%</td><td>45%</td></tr>
<tr><td>Cyanide Concentration</td><td>500ppm</td><td>500ppm</td></tr>
<tr><td>Cyanide Consumption</td><td>0.59kg/t</td><td>0.60kg/t</td></tr>
</table>
*Calculated from product assays

The composites were also subjected to non-optimised triple contact carbon Carbon-In-Pulp loading tests to establish copper loading characteristics. Final carbon for Saprolite Gold 1 assayed 833ppm Au, 1,390ppm Cu while Saprolite Gold 2 carbon assayed 273ppm Au, 438ppm Cu.

Selected loaded carbon from CIL tests was tested to remove copper using room temperature 15g/L NaCN and 5g/L NaOH solution. Best results achieved were on final carbon where 97% of Cu was removed from final carbon reducing concentrations from 3,607ppm Cu to 114ppm Cu while removing only 0.45% of loaded gold.</td>
</tr>
</table>

<table>
<tr><th>Objective</th><th>Testwork Scope</th><th>Composites Used</th><th>Key Testwork Details</th></tr>
<tr>
<td>2. Confirm Oxide Ore Milling Requirements</td>
<td>Define and select test samples to cover range of expected ore lithologies.
Scrubbing amenability and comminution testwork to determine definitive milling requirements.</td>
<td>High Saprolite

Low Saprolite</td>
<td>High Saprolite and Low Saprolite composites, containing approximately 75% and 25% saprolite respectively were subjected to dry screen sizing followed by wet screen sizing to simulate a light attrition process and establish amenability. Further lab-scale attritioning and scrubbing testing was conducted on the High Saprolite composite. BBMWi determinations were conducted on the wet-screened +75µm fraction. Results are summarised in the table below.
<table>
<tr><th></th><th>High Saprolite</th><th>Low Saprolite</th></tr>
<tr><td>Wet screen +75µm mass</td><td>43.0%</td><td>78.7%</td></tr>
<tr><td>Scrubber +75µm mass</td><td>34.9%</td><td>N/A</td></tr>
<tr><td>Attritioner +75µm mass</td><td>31.4%</td><td>N/A</td></tr>
<tr><td>BBMWi of +75µm fraction</td><td>6.3KWh/t (Very soft)</td><td>8.7KWh/t (Soft)</td></tr>
</table>
</td>
</tr>
<tr>
<td>3. Improve Chalcocite Gold Recovery</td>
<td>Select low grade samples representative of the ore type for testing.
Mineralogical investigation to confirm liberation grind size.
(Gravity)-Flotation optimisation testwork followed by final locked cycle testing.</td>
<td>Chalcocite 4 (Low Copper & Gold grade)

Chalcocite 5 (Moderate Copper & Low Gold Grade)</td>
<td>Chalcocite 4 and Chalcocite 5 composites were subjected to a series of bench scale gravity-flotation tests to establish process conditions. Copper locked-cycle tests were conducted at final conditions. Key results are presented below.
<table>
<tr><th></th><th>Chalcocite 4</th><th>Chalcocite 5</th></tr>
<tr><td>Feed Grade*</td><td>0.23% Cu; 0.18g/t Au</td><td>0.45% Cu; 0.24g/t Au</td></tr>
<tr><td>Locked cycle test flotation (only) recovery</td><td>79.8% Cu, 49.8% Au</td><td>71.0% Cu, 56.1% Au</td></tr>
<tr><td>Potential additional gold recovery using gravity+flotation</td><td>9.41% Au</td><td>9.55% Au</td></tr>
</table>
*Calculated from locked cycle test product assays
</td>
</tr>
<tr>
<td>4. Define Pyrite Concentrate Production</td>
<td>Define test samples representative of domains across the Kalkaroo sulphide resource.
Mineralogical investigation to identify methods to optimise sulphide and metal recovery.
Gravity and flotation testwork optimisation to evaluate cost effective reagent schemes and flowsheets.</td>
<td>Chalcocite 1 (Kalkaroo West)

Chalcocite 2 (Kalkaroo Main)

Chalcocite 3 (Combined Kalkaroo West & Main)

Chalcocite 6A/6B (Previous Sample)</td>
<td>Initial gravity-flotation bench scale tests were conducted on each Chalcocite 1, Chalcocite 2, Chalcopyrite 1 and Chalcopyrite 2 composites to establish processing similarity of ore from recent drillholes to early work. Final testwork was conducted on 2 composites, a Chalcocite blend and Chalcopyrite blend which is described in the table below.
<table>
<tr><th colspan="2">Chalcocite Blend</th><th colspan="2">Chalcopyrite Blend</th></tr>
<tr><td>Composite</td><td>%</td><td>Composite</td><td>%</td></tr>
<tr><td>Chalcocite 1</td><td>25.0</td><td>Chalcopyrite 1</td><td>16.7</td></tr>
<tr><td>Chalcocite 2</td><td>25.0</td><td>Chalcopyrite 2</td><td>16.7</td></tr>
<tr><td>Chalcocite 3</td><td>25.0</td><td>Chalcopyrite 3</td><td>16.7</td></tr>
<tr><td>Chalcocite 6A</td><td>12.5</td><td>Chalcopyrite 4</td><td>50.0</td></tr>
<tr><td>Chalcocite 6B</td><td>12.5</td><td></td><td></td></tr>
<tr><td>Total</td><td>100</td><td>Total</td><td>100</td></tr>
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</td>
</tr>
</table>

<table>
<tr><th>Objective</th><th>Testwork Scope</th><th>Composites Used</th><th>Key Testwork Details</th></tr>
<tr><td></td><td>Sulphidisation process testing to increase recovery of ‘weathered’ pyrite.
Locked cycle flotation testing to confirm final product recovery and grade.</td><td>Chalcopyrite 1 (Kalkaroo West)

Chalcopyrite 2 (Kalkaroo Main)

Chalcopyrite 3 (Combined Kalkaroo West & Main)

Chalcopyrite 4 (Previous Sample)</td><td>Testwork on the blended composites included bench scale gravity-flotation optimisation tests to establish final flowsheets. Bulk (12kg) open-circuit gravity-flotation tests were then conducted to produce copper tailings on which locked-cycle pyrite flotation tests were conducted. Key results from these locked cycle tests are provided below.

<table>
<tr><th></th><th>Chalcocite Blend</th><th>Chalcopyrite Blend</th></tr>
<tr><td>Feed grade* (copper tailings)</td><td>0.18% Cu
100 g/t Co
0.20 g/t Au
3.37% Fe
1.65% S</td><td>0.03% Cu
80 g/t Co
0.08 g/t Au
2.91% Fe
0.90% S</td></tr>
<tr><td>Pyrite conc. grade</td><td>1.98% Cu
2,870 g/t Co
3.73 g/t Au
41.6% Fe
48.2% S
0.1% As</td><td>0.58% Cu
3,380 g/t Co
2.45 g/t Au
41.6% Fe
48.4% S
0.1% As</td></tr>
<tr><td>Pyrite conc. Recovery</td><td>26.4% Cu
49.2% Co
44.8% Au
30.4% Fe
71.93% S</td><td>25.4% Cu
66.0% Co
43.8% Au
21.5% Fe
91.9% S</td></tr>
</table>
*Calculated from product assays</td></tr>
<tr><td>5. Define Recovery of Copper, Cobalt and Gold from Pyrite Concentrates</td><td>Production of bulk pyrite concentrates for detailed analysis and testing.
Direct leaching of the concentrates to determine the viability of producing copper and gold products e.g. gold doré.
Roasting of the concentrate using a range of process conditions including temperature, followed by leaching to extract copper, cobalt and gold.</td><td>Chalcocite 1 (Kalkaroo West)
Chalcocite 2 (Kalkaroo Main)
Chalcocite 3 (Combined Kalkaroo West & Main)
Chalcocite 6A/6B (Previous Sample)
Chalcopyrite 1 (Kalkaroo West)
Chalcopyrite 2 (Kalkaroo Main)
Chalcopyrite 3 (Combined Kalkaroo West & Main)
Chalcopyrite 4 (Previous Sample)</td><td>Open-circuit, bulk flotation tests at best conditions were conducted on 75kg of the Chalcocite Blend and 125kg of the Chalcopyrite Blend to produce separate pyrite concentrates of approximately 1,900g each for leach and roast-leach testwork which is not finalised.</td></tr>
</table>

APPENDIX 2: DIAMOND DRILL HOLE DATA

Sample for the metallurgical testwork program was derived exclusively from diamond drillholes described in **Table 3** and locations as shown in **Figure 3**.

Table 3: Metallurgical Diamond Drillhole Data

Hole_ID	AMG_E	AMG_N	AHD_RL	Az_amg	Dip	EOH_depth	Core_Size
KKDD0146	455798.1	6489691.9	117.4	199	-75	161.0	PQ3
KKDD0147	454710.0	6488802.8	119.4	130	-62	212.2	HQ
KKDD0150	455206.0	6489741.2	117.4	148	-75	225.0	HQ
KKDD0152	454863.1	6489047.9	118.8	136	-70	232.8	PQ3
KKDD0154	455175.0	6489769.4	117.5	145	-75	270.0	HQ
KKDD0155A	455821.4	6489809.9	117.2	195	-75	275.6	HQ
KKDD0171	455493.6	6489848.7	117.2	180	-75	254.5	HQ
KKDD0174	455064.6	6489642.3	117.8	127	-75	295.0	HQ
KKDD0175	454936.5	6489407.8	118.6	107	-75	279.0	HQ
KKDD0307	454498.5	6488828.4	120.0	155	-58	306.1	HQ
KKDD0486	454436.8	6488712.7	120.1	154.5	-70	163.2	PQ3
KKDD0487	455180.0	6489644.0	117.7	146.0	-75	130.9	PQ3
KKDD0488	455703.4	6489784.3	117.7	193.0	-75	189.3	PQ3
Datum: AGD66 Zone 54							

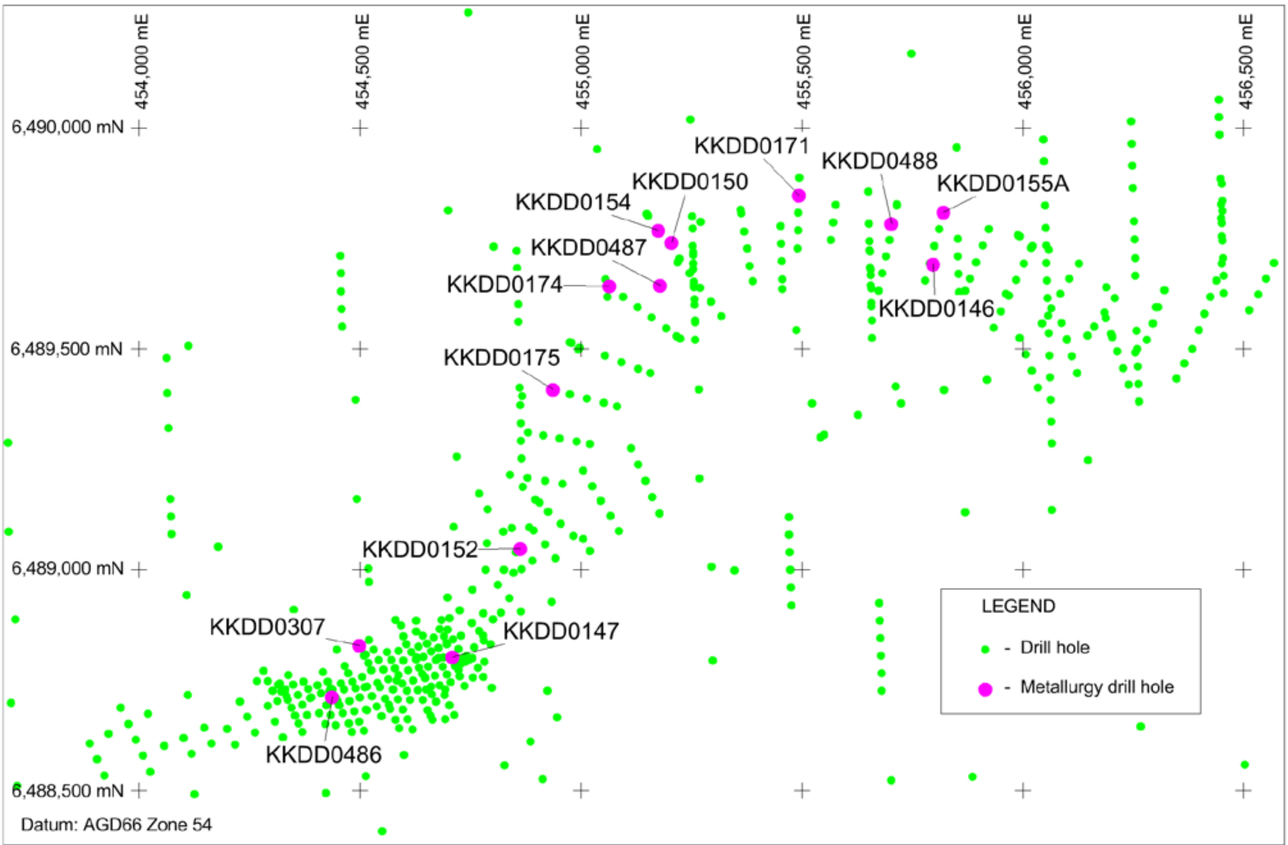

Figure 3 – Metallurgical Diamond Drillhole Locations

APPENDIX 3: METALLURGICAL COMPOSITE DETAILS

Table 4: Metallurgical Composite Data

Composite	Ore Type	Drillhole	Interval**	Composite Mass
Saprolite Gold 1 0.78g/t Au, 0.17% Cu (Moderate grade)	Saprolite Gold - Oxide	KKDD0486 KKDD0487 KKDD0488	67-88m 80-113m 95-108m	49kg
Saprolite Gold 2 0.40g/t Au, 0.20% Cu (Low grade)	Saprolite Gold - Oxide	KKDD0486 KKDD0487 KKDD0488	68-83m 79-114m 96-100m	36kg
High saprolite Comminution Sample – not assayed	Oxide	KKDD0486 KKDD0487 KKDD0488	56-63m 86-91m 110-114m	28kg
Low saprolite Comminution Sample – not assayed	Oxide	KKDD0486 KKDD0487 KKDD0488	114-116m 116-120m 119-121m	22kg
Chalcocite 1 0.42g/t Au, 0.62% Cu, 230g/t Co (Kalkaroo West)	Chalcocite - Sulphide	KKDD0486	123-141m	38kg
Chalcocite 2 1.14g/t Au, 0.91% Cu, 140g/t Co (Kalkaroo Main)	Chalcocite - Sulphide	KKDD0487 KKDD0488	124-129m 128-151m	31kg
Chalcocite 3 0.67g/t Au, 0.62% Cu, 120g/t Co (Combined Kalkaroo West & Main)	Chalcocite - Sulphide	KKDD0486 KKDD0487 KKDD0488	129-143m 126-127m 126-150m	31kg
Chalcocite 4 0.21g/t Au, 0.25% Cu, 110g/t Co (Low Copper & Gold grade)	Chalcocite - Sulphide	KKDD0486 KKDD0487 KKDD0488	141-142m 127-128m 148-149m	15kg
Chalcocite 5 0.25g/t Au, 0.53% Cu, 140g/t Co (Moderate Copper & Low Gold Grade)	Chalcocite - Sulphide	KKDD0486 KKDD0487 KKDD0488	134-142m 125-127m 130-133m	13kg
Chalcocite 6A 0.36g/t Au, 1.55% Cu, 210g/t Co (Previous Kalkaroo Main)	Chalcocite - Sulphide	KKDD0146 KKDD0150 KKDD0155A KKDD0171 KKDD0175	113-119m 125-126m 155-176m 131-146m 124-128m	45kg
Chalcocite 6B 0.67g/t Au, 0.57% Cu, 225g/t Co (Previous Kalkaroo West)	Chalcocite - Sulphide	KKDD0147 KKDD0307	121-132m 178-237m	62kg

Composite	Ore Type	Drillhole	Interval**	Composite Mass
Chalcopyrite 1 0.36g/t Au, 0.43% Cu, 190g/t Co (Kalkaroo West)	Chalcopyrite - Sulphide	KKDD0486	143-160m	36kg
Chalcopyrite 2 0.50g/t Au, 0.54% Cu, 70g/t Co (Kalkaroo Main)	Chalcopyrite – Sulphide	KKDD0488	168-188m	38kg
Chalcopyrite 3 0.39g/t Au, 0.41% Cu, 80g/t Co (Combined Kalkaroo West & Main)	Chalcopyrite – Sulphide	KKDD0486 KKDD0488	145-147m 155-176m	38kg
Chalcopyrite 4 0.28g/t Au, 0.66% Cu, 165g/t Co (Previous Kalkaroo Main & West)	Chalcopyrite - Sulphide	KKDD0150 KKDD0154 KKDD0155A KKDD0171 KKDD0174 KKDD0175 KKDD0147 KKDD0152	169-215m 168-247m 211-244m 203-209.7m 145-235.5m 181-213m 141-161m 190-197m	467kg

**Intervals described do not contain all metre intervals

APPENDIX 4: TABLE 1 OF THE 2012 EDITION OF THE JORC CODE

The table below is a description of the assessment and reporting criteria for the Kalkaroo metallurgical program results, in accordance with Table 1 of The Australasian Code for the Reporting of Exploration Results, Mineral Resources and Ore Reserves

Section 1 Sampling Techniques and Data

Criteria	Commentary
Sampling techniques	• The metallurgical studies used 1 metre intervals of half and quarter PQ diamond drill core to produce a total of 12 composite samples of oxide and sulphide ore. These were composited from diamond drill holes completed and described in Havilah's Announcement dated 11 September 2018 (KKDD0486, KKDD0487, KKDD0488). • An additional 3 composite samples were made using a selection of half PQ and half HQ diamond drill core intervals from drilling completed in 2008. These samples were used for additional definition of pyrite production in sulphide ore. • Intervals for compositing were selected based on drill hole location, assay data and geological logging. • Composite samples weighed between approximately 15kg and 470kg, described in **Table 4**.
Drilling techniques	• Recent diamond drill holes (KKDD0486, KKDD0487, KKDD0488) were of PQ3 size (83mm diameter) using triple tube to maximize recovery. • Remaining diamond drill holes used a mixture of PQ3 and HQ diameter coring, as described in **Table 3.** • Orientation marking was only partially successful in the soft saprolite material, but accurate where marks were obtained. It was generally very good in saprock and fresh rock.
Drill sample recovery	• Triple tube coring was employed to maximize core recoveries. • Sample recoveries were continuously monitored by the geologist on site in order to effect adjustments to drilling methodology to optimize sample recovery and quality if necessary. • On occasions core fell out of the barrel, but in almost all cases it was recovered and modifications were made to minimize this occurrence. • In general, core recoveries were very good, close to 100%.
Logging	• The drill core was logged in detail by an experienced geologist directly into a digital logging system with data uploaded directly into an Excel spreadsheet. • Logging is semi-quantitative and 100% of reported intersections have been logged and photographed. • Logging is of a sufficiently high standard to support any subsequent interpretations, resource estimations and mining and metallurgical studies.
Sub-sampling techniques and sample preparation	• Metallurgical separation testwork composite samples were stage crushed using jaw and rolls crushers to minus 3.35 mm. • Composite samples for attritioning testwork were crushed to minus 12.5 mm using a jaw crusher. Oversize from attritioning testwork was crushed to minus 3.35 mm using a rolls crusher for further comminution testing. • All composite samples were suitably homogenized using a rotary splitter by experienced laboratory technicians to produce test charges weighing between 1 kg and 12.5 kg. • Ore samples were ground to a p80 of between 75 µm and 150 µm in a rod mill, shortly prior to separation testwork to ensure representative ore behaviour. • Flotation and leaching procedures used established metallurgical techniques to ensure products are homogenized for assay sampling. o Solution and slurry samples were taken while agitating pulp; o Solids samples were dried, passed through a screen of nominal aperture of between 300 µm and 500 µm then blended by multiple passes through a box riffle.
Quality of assay data and laboratory tests	• All samples are prepared at the ALS Global laboratory in Adelaide and assayed interstate. The total assay methods are standard ALS procedure and are considered appropriate at the metallurgical reporting stage.

Criteria	Commentary
	• XRF was used for assay analysis of solid samples for elements including copper, cobalt, sulphur, molybdenum, silica, arsenic and iron. • Leach solution assays were determined using ICP. • All gold was determined using fire assay with ICP finish. • Tailings copper assays (less than 0.1% copper) were determined using ICP. • Fluorine was determined using selective ion probe. • Other elements were analysed by a combination of XRF and multi-element digest methods with ICP finish.
Verification of drilling sampling and assaying	• The diamond drill core bulk sample was collected under the supervision of an experienced Havilah geologist. • Rigorous internal QC procedures were followed to check all assay results against expected QC/QA samples. • All data entry is under control of an experienced metallurgists and laboratory operators, who were responsible for data management, storage and security.
Location of drillholes	• Locations of the diamond drillholes sampled are shown in **Figure 3** and drillhole data is summarised in **Table 3**. • Drillhole collars were located using a differential GPS system with an x:y:z accuracy of 20cm:20cm:40cm and are quoted in AGD66 datum coordinates. • Drill holes KKDD0486 to KKDD0488 were located by tape and compass from previous nearby holes that were surveyed in UTM coordinates using a differential GPS system in the AGD66 datum.
Data spacing and distribution	• The objective of the diamond coring programs were to obtain representative samples for metallurgical test work. • Hence drill spacing was not a consideration but placing of holes to obtain representative samples from the deposit was the main consideration.
Orientation of data in relation to geological structure	• The drillhole azimuth and dip was chosen to intersect the mineralized zones as nearly as possible to right angles and at the desired positions to maximize the value of the drilling data. • At this stage, no material sampling bias is known to have been introduced by the drilling direction.
Sample security	• The core samples were placed directly into pre-numbered calico bags by trusted Havilah personnel. • Several calico bags were placed into each polyweave bag which were then sealed with cable ties. The samples were transported to the metallurgical lab by Havilah personnel at following the completion of drilling and core cutting. • There is minimal opportunity for systematic tampering with the samples as they were not out of the control of Havilah until they are delivered to the metallurgical lab where sample inventory is recorded. • This is considered to be a secure and reasonable procedure and no known instances of tampering with samples have occurred since drilling commenced.
Audits, reviews	QAQC data is reviewed internally by ALS Global to ensure quality of assays and procedures.

Section 2 Reporting of Exploration Results

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

Criteria	Commentary
Mineral tenement and land tenure status	• Drilling took place on Havilah Resources 100% owned Kalkaroo Exploration Licence EL 5800.
Exploration done by other parties	• Significant aircore, rotary mud, reverse circulation (RC) and diamond drilling was carried out on the prospect between 1990 and 2003, by previous explorers Placer, Newcrest and MIM.
Geology	• Structurally controlled, stratabound primary Cu-Au sulphide deposit, overlain by supergene enriched Cu-Au sulphide zone and oxidised Native Cu and Au cap in saprolite. Overlain by a cover sequence of 15 to 50m of Tertiary clay with minor sand layers, then by~15m of Quaternary-Recent sands, clay and gravel.
Drill hole Information	• See separate table in this report (**Table 3**).
Data aggregation methods	• Intercepts are calculated using the length-weighted averages of individual samples. Minimum grade truncations are applied. Local geology is also used as an input. • Where much higher grades exist, a separate high grade sub-interval may be reported.
Relationship between mineralisation widths and intercept lengths	• Down-hole lengths are reported. Drillholes are always oriented with the objective of intersecting mineralisation as near as possible to right angles, and hence down-hole intersections in general are as near as possible to true width. • For the purposes of the geological interpretations and resource calculations the true widths are always used.
Diagrams	• Figure showing the location of the drillholes in relation to the deposit (**Figure 3**) and a table of drillhole data (**Table 3**).
Balanced reporting	• Only meaningful potentially economic grade intervals are reported.
Other substantive exploration data	• Relevant geological observations are reported in this and previous announcements. Other data not yet collected or not relevant.
Further work	• At this stage no further drilling is planned.