

27 October 2017

ASX: ILU

# QUARTERLY REVIEW 30 SEPTEMBER 2017

# **KEY FEATURES**

- 2017 year-to-date zircon/rutile/synthetic rutile (Z/R/SR) production volumes were 25% higher than the same period in 2016 at 657 thousand tonnes mainly attributable to the inclusion of Sierra Rutile post acquisition, which contributed 129 thousand tonnes of Z/R production year-to-date.
- Group Z/R/SR production for Q3 of 204 thousand tonnes was 8% lower than Q2 due to planned maintenance work carried out at the Narngulu mineral separation plant.
- Sierra Rutile's rutile production for Q3 was 47 thousand tonnes, a 9% improvement on Q2.
- Full year production guidance of 795 thousand tonnes of Z/R/SR has been maintained.
- Continued favourable market conditions for both zircon and TiO<sub>2</sub> feedstocks, when compared to 2016:
  - weighted average received zircon standard and premium price up 14% to US\$923 per tonne;
  - weighted average received rutile price, excluding HYTI, up 5% to US\$772 per tonne;
  - Z/R/SR sales volumes up 31% excluding Sierra Rutile (up 54% including Sierra Rutile).
- Good progress in advancing offtake discussions with customers in respect of Cataby project.
- Likely impairment of the Metalysis investment in the 2017 full year accounts (carrying value of A\$32 million at 30 June 2017).
- Considering various remediation alternatives in the US with Iluka proactively engaging with regulatory agencies to assess potential changes to the nature and extent of the proposed rehabilitation program.
- Net debt reduced to \$212 million, down from \$305 million at 30 June 2017, and after payment of the \$25 million interim dividend during the quarter.

#### SUMMARY OF PHYSICAL AND FINANCIAL DATA

	Sep-16 Quarter	Jun-17 Quarter	Sep-17 Quarter	Sep-16 YTD	Sep-17 YTD	Sep-17 YTD vs Sep-16 YTD
	kt	kt	kt	kt	kt	%
Production						
Zircon	106.3	92.8	49.4	281.8	253.1	(10.2)
Rutile	29.0	82.0	96.0	85.7	245.8	186.8
Synthetic Rutile	56.7	46.1	58.1	158.9	157.7	(0.8)
Total Z/R/SR Production	192.0	220.9	203.5	526.4	656.6	24.7
Ilmenite	97.1	123.4	90.3	261.1	318.4	21.9
Total Mineral Sands Production	289.1	344.3	293.8	787.5	975.0	23.8

	Sep-16 Quarter	Jun-17 Quarter	Sep-17 Quarter	Sep-16 YTD	Sep-17 YTD	Sep-17 YTD vs Sep-16 YTD
	kt	kt	kt	kt	kt	%
<u>Sales</u>						
Zircon	68.7		110.8	223.2	308.2	38.1
Rutile	32.2		89.3	89.6	207.7	131.8
Synthetic Rutile	34.3		41.2	138.8	179.2	29.1
Total Z/R/SR Sales	135.2	250.8	241.3	451.6	695.1	53.9
Ilmenite	0	75.5	26.4	17.8	121.5	582.6
Total Mineral Sands Sales	135.2	326.3	267.7	469.4	816.6	74.0
Z/R/SR revenue \$ million	131.6	265.7	261.6	452.7	731.7	61.6
Ilmenite and other revenue \$ million	2.6	19.4	6.9	19.9	40.5	103.5
Mineral Sands Revenue \$ million	134.2	285.1	268.5	472.6	772.2	63.4
Revenue per tonne of Z/R/SR Sold \$/t	974	1,059	1,084	1,002	1,053	5.0
Average AUD:USD cents	75.8	75.1	78.9	74.2	76.6	3.2
Unit Cost of Goods Sold Z/R/SR \$/t <sup>1</sup>				692	743	7.4

# **PRODUCTION COMMENTARY**

Total zircon, rutile and synthetic rutile (Z/R/SR) production in the third quarter was 204 thousand tonnes inclusive of Sierra Rutile, which contributed 47 thousand tonnes of R/Z production being a 9% improvement from Q2. Group Z/R/SR was 8% lower than Q2 due to planned maintenance work carried out at the Narngulu mineral separation plant in Western Australia in August and September.

The Tutunup South mine in south-west Western Australia continued to operate at full capacity through the quarter. Mining at Jacinth-Ambrosia is scheduled to restart from December 2017, as previously announced. An operations update for Sierra Rutile is noted in a separate section below.

Across all Iluka operations, 164 thousand tonnes of heavy mineral concentrate (HMC) was produced and 301 thousand tonnes processed during the quarter. This reflects the continued draw down of HMC from the Jacinth-Ambrosia mine (currently idle) and the Woornack, Rownack, and Pirro mine (mining completed 2015).

Processing of all Murray Basin HMC was completed on 7 October 2017, and the plant has now been idled. Iluka undertook planned maintenance works at the Narngulu mineral separation plant in Western Australia in August and September. This work allowed further draw down of finished product inventories and is anticipated to reduce the length of future major maintenance outages. The timing of this work also coincided with suspension of Jacinth-Ambrosia heavy mineral concentrate shipments from the Port of Thevenard due to safety concerns at the port. Remedial works carried out by the port owner have now been completed and shipments recommenced in September.

The synthetic rutile kiln continued to operate at full capacity in the quarter.

Full year Z/R/SR production remains in line with 2017 guidance at 795 thousand tonnes.

<sup>&</sup>lt;sup>1</sup> During periods of draw-down from large inventory balances, a COGS based methodology is an appropriate way to forecast financials, including earnings.

## SIERRA RUTILE OPERATIONS UPDATE

# September quarterly production

Rutile production for the third quarter was 47 thousand tonnes, a 9% improvement on second quarter production of 43 thousand tonnes, reflecting the following factors:

- higher throughput, ore grade and runtime associated with the Gangama dry mining operation;
- higher throughput and runtime associated with the Dredge mining operation;
- opportunistic processing of minor rutile rich reject stockpiles;
- further adjustments to wet concentrator plant settings resulting in improved valuable heavy mineral recovery and higher HMC grades; and
- mineral separation plant recoveries continue to improve as a result of the higher grade HMC now being supplied by the wet concentrator plants.

A summary of SRL's recent production is provided below:

Sierra Rutile Key Operating Parameters	Mar-17 Quarter	Jun-17 Quarter	Sept-17 Quarter
	kt	kt	kt
Mining and Concentrating			
Spiral Plant Feed <sup>1</sup>	1,422	1,532	1,666
Heavy Mineral Concentrate (HMC) Produced	91	85	97
Valuable Heavy Mineral (VHM) in HMC Produced	55	61	80
Final Product <sup>2</sup>			
Zircon <sup>3</sup>	2.1	0.8	0.1
Rutile	35.7	43.3	47.2
Ilmenite	11.6	15.0	16.6

1. Ore mined less oversize and slimes (clay)

2. Finished product includes reprocessed material from heavy mineral concentrate (HMC) initially processed in prior periods.

3. Zircon production will now be processed under external arrangements.

As stated in Iluka's half year results in August, 2017 production guidance for Sierra Rutile is 155 thousand tonnes of rutile. This allows for lower production in Q4 in accordance with expectations as the mine plan moves through lower grade ore during the quarter.

# Sierra Rutile Major Projects Update

Project Overview	Update
Mobile mining unit	
The Lanti wet concentrator plant was commissioned in 2013 with a nameplate capacity of 500 tonnes per hour of ore (not yet achieved on a consistent basis). While the plant has been running closer to capacity in 2017, further improvement is expected.	Construction has commenced and project completion is on schedule to be completed by the end of 2017. Offsite fabrication and testing is completed and equipment is being transported to site.
A revised mining method involving a new mobile mining unit (comprising of an in-pit mineral sizer and ex-pit scrubber) is planned to debottleneck the ore feed process and reduce unit costs of production.	
Lanti dry and Gangama mine expansions	
As outlined previously, Iluka plans to double the capacity of both the Gangama and Lanti dry operations from 500 tonne per hour to 1,000 tonne per hour.	The preferred method of development has been selected with detailed engineering close to completion while construction planning has

commenced.

3

Mineral separation plant upgrade	
Mineral separation plant equipment and general site upgrades are required to meet the additional capacity that will be generated by the planned mine expansions. The upgrade will also assist in improving safety, operational and metallurgical efficiencies.	Assessment of the upgrade requirements is continuing.
Sembehun dry mine	
The Sembehun group of deposits are situated 20 to 30 kilometres north-west of the existing Sierra Rutile	The pre-feasibility engineering study is ongoing and environmental baseline studies have commenced.

A second audit of the tailings facilities was performed during the quarter. The intent of this follow-up audit was to visually inspect the existing facilities during the wet season to assess the impact of the rain on the facilities and provide additional insight into the water management systems across the site. The audit confirmed that the current facilities were structurally sound.

## CORPORATE

hour mine at these deposits.

operations. Iluka plans to develop a new 1,000 tonne per

#### Metalysis

Over the period since 2014, Iluka has invested £22 million in Metalysis Limited, an unlisted UK-based technology company focused on solid-state manufacturing of metal powder, including conversion of rutile and synthetic rutile directly to titanium alloy powders.

As at 30 June 2017, Iluka's investment in Metalysis was carried at A\$32 million. This investment is likely to be impaired in Iluka's 2017 full year accounts.

#### **Class Action**

On 24 March 2014 Iluka became aware that a litigation funder proposed to fund claims that current or former shareholders may have against the Company in respect of continuous disclosure obligations in 2012. The potential applicants sought an order from the Federal Court for pre-action discovery which was dismissed in July 2015 and which was subsequently appealed to the Full Federal Court. The Full Federal Court granted the appeal in June 2017. The Full Federal Court's decision was then appealed to the High Court of Australia. The High Court dismissed the appeal in October 2017, such that Iluka is now required to provide pre-action discovery.

Iluka has not received any substantive claim relating to the potential shareholder class action. Consistent with Iluka's announcement dated 24 March 2014, on receipt of any such substantive claim, Iluka will defend its position.

#### Hedging

During September, Iluka entered into foreign currency hedges in relation to 2017 and 2018 contracted sales. Iluka hedged US\$9 million at an average rate of 79.9 cents for the remainder of 2017 and US\$95 million at an average rate of 80 cents for 2018. As at 30 September 2017, Iluka held US\$149 million of AUD:USD forward contracts at a weighted average rate of 78.8 cents.

#### SUSTAINABILITY

Iluka's sustainability performance, based on the recently released 2017 Dow Jones Sustainability Index (DJSI), places Iluka in the top 30% of companies in the Australian grouping of the index.

In addition, the Australian Council of Superannuation Investors (ACSI) has reviewed the level of sustainability disclosure by Iluka and has assessed the company at a 'Leading' level.

## Update on Environmental Rehabilitation

Integral to Iluka's rehabilitation planning is a thorough ongoing review of closure obligations and stakeholder requirements. Iluka regularly assesses its rehabilitation approach and revises estimates on the basis of adopting the most effective method of completing the work and the latest available information.

The Virginia Operation in the United States was mined by Iluka and its predecessors from 1997 to 2015, and was officially closed this year. Iluka is now focused on remediation activities which involves restoring the land for pre-mining uses.

Detailed rehabilitation planning for the Virginia operation has identified potential additional obligations relating to past rehabilitation, and various remediation alternatives to be considered. Iluka is proactively engaging with regulatory agencies to assess the nature and extent of any change to its proposed rehabilitation program.

The cost of rehabilitating the Virginia Operation will largely depend on the rehabilitation program ultimately undertaken by Iluka, which can only be determined following engagement with the regulators. Once determined, Iluka will be in a position to reasonably assess the likely cost of rehabilitation and any increase required to its existing rehabilitation provision.

# MINERAL SANDS MARKETS

Both the zircon and titanium feedstock markets have experienced favourable conditions in 2017 compared to the corresponding period in 2016:

- Z/R/SR sales volumes up 54% to 695 thousand tonnes (inclusive of Sierra Rutile);
- excluding Sierra Rutile volumes, Z/R/SR sales volumes up 31%;
- weighted average received zircon standard and premium price up 14% to US\$923 per tonne; and
- weighted average received rutile price, excluding HYTI, up 5% to US\$772 per tonne.

# Zircon

Iluka's third quarter zircon sales volume of 111 thousand tonnes represents growth of 61% from the same period in 2016. Year-to-date zircon sales volumes are 38% above the same period in 2016. Iluka is of the view that underlying demand has been growing moderately, but the supply chain remains lean, following the destocking by some producers in 2016. As a result, customers continue to request additional material from Iluka as they seek to restock depleted supply chains. The Company's approach has been, and continues to be, to support genuine demand of its long-standing customers and sees no benefit to the industry as a whole in promoting speculative activity.

After 4 years of declining prices, Iluka has successfully implemented three price increases in 2017, with US\$50 per tonne implemented effective from 15 February 2017, US\$130 per tonne effective from 1 July 2017 and a further US\$130 per tonne effective for a six month period from 1 October 2017. Iluka's setting of a 6 month price over 4Q17 and 1Q18 is consistent with the company seeking a sustainable pricing strategy that allows appropriate returns to be generated in the industry.

Iluka's current Zircon Reference Price is US\$1,230 per tonne for a 2 tonne bag of Zircon Premium delivered into China.

Iluka remains of the view that, in the absence of a deterioration in global economic conditions, the demand outlook for zircon in the short to medium term remains for moderate growth.

#### High Grade Titanium Dioxide

Excluding the contribution of Sierra Rutile volumes, year-to-date rutile sales volumes have increased 21% compared to the same period in 2016. The inclusion of Sierra Rutile has contributed additional sales volumes of 99 thousand tonnes of rutile sales for the nine months to 30 September 2017, with the acquisition of Sierra Rutile having been completed in December 2016. Group rutile sales volumes have increased 44% from the previous guarter to 89 thousand tonnes.

The year-to-date weighted average rutile price of US\$772 per tonne has increased ~5% relative to 2016 levels. As noted previously, 40% of SRL's 2017 rutile production volumes (~60kt) were contracted at fixed prices for the whole of 2017. Iluka advised customers of a US\$70 to US\$100 per tonne price increase effective 1 July on uncontracted rutile volumes and this has been accepted. This represents 9% to 11% increases over the first half 2017 pricing and reflects the pricing differentials across market segments.

Sales of synthetic rutile of 179 thousand tonnes year-to-date have increased 29% relative to the same period in 2016. Iluka expects sales of Synthetic Rutile to exceed production in 2017 as inventory is drawn down. Synthetic rutile prices increased relative to 2016 levels, consistent with contractual arrangements and market conditions. The majority of Iluka's synthetic rutile sales volumes in 2017 are contracted.

Market conditions for pigment, the main end use sector for the high grade feedstocks of rutile and synthetic rutile, remain strong with demand for titanium dioxide pigment outpacing supply in all regions supporting continued price improvement each quarter.

Pigment inventories remain below seasonal norms, impacted by supply disruptions and continued environmental enforcement actions in China. Iluka estimates that Chinese environmental closures of pigment facilities have resulted in a reduction of 250 to 300 thousand tonnes of sulphate capacity. These closures, coupled with continued reduction in supply caused by European plant outages, support high industry capacity utilisation rates. Pigment producers continue to look for high grade feedstocks to improve plant yields and maximise production. Rutile and synthetic rutile are both preferred feedstocks for this purpose and this has increased demand for these two products against a backdrop of flat supply. Iluka has fully committed all of its High Grade Ore for the remainder of 2017 and expects supply to remain tight in 2018.

The increase in ilmenite sales largely reflects Sierra Rutile volumes, with the majority of Iluka's existing ilmenite consumed internally in the production of synthetic rutile.

#### Mineral Sands Weighted Average Received Prices

The following table provides weighted average received prices for Iluka's main products compared to 2016. The Iluka Review, available at www.iluka.com contains further historical mineral sands price information.

	Full Year 2016	Sept YTD
Weighted Average Price US\$/tonne FOB		
Zircon Premium and Standard	810	923
Zircon (all products, including zircon in concentrate) <sup>1</sup>	773	905
Rutile (excluding HYTI) <sup>2</sup>	731	772
Synthetic rutile	Refer Note 3	Refer Note 3

Notes:

1: Zircon weighted average prices reflect the prices for zircon premium and zircon standard, as well as for all zircon materials, including zircon-in-concentrate. The prices for each product vary considerably, as does the mix of such products sold period to period. For the 2016 full year the split of premium, standard and concentrate by zircon sand-equivalent was approximately: 47%:33%:20%.

2: Excluded from rutile sales prices is a lower value titanium dioxide product, HYTI that typically has a titanium dioxide content of 70 to 90%. This product sells at a lower price than rutile, which typically has a titanium dioxide content of 95%.

3: Iluka's synthetic rutile sales are, in large part, underpinned by commercial offtake arrangements. The terms of these arrangements, including the pricing arrangements are commercial in confidence and as such not disclosed by Iluka. Synthetic rutile, due to its lower titanium dioxide content than rutile, is priced lower than natural rutile.

## **GROUP MINERAL SANDS PRODUCTION**

						Sep-17
	Sep-16 Quarter	Jun-17 Quarter	Sep-17 Quarter	Sep-16 YTD	Sep-17 YTD	Sep-16 YTD
	kt	kt	Kt	kt	kt	%
Zircon <sup>1</sup>						
Eucla/Perth Basin (SA/WA)	95.9	73.2	24.2	250.9	188.6	(24.8)
Murray Basin (VIC)	10.4	17.6	25.1	30.9	54.6	76.7
Australia	106.3	90.8	49.3	281.8	243.2	(13.7)
Sierra Leone	-	0.8	0.1	-	3.0	n/a
Virginia (USA)	-	1.2	-	-	6.9	n/a
Total Zircon Production	106.3	92.8	49.4	281.8	253.1	(10.2)
<u>Rutile</u>						
Eucla/Perth Basin (SA/WA)	12.0	11.0	4.3	35.9	30.8	(14.2)
Murray Basin (VIC)	17.0	27.7	44.5	49.8	88.8	78.3
Australia	29.0	38.7	48.8	85.7	119.6	39.6
Sierra Leone	-	43.3	47.2	-	126.2	n/a
Total Rutile Production	29.0	82.0	96.0	85.7	245.8	186.8
Synthetic Rutile (WA)	56.7	46.1	58.1	158.9	157.7	(0.8)
		-			-	
TOTAL Z/R/SR PRODUCTION	192.0	220.9	203.5	526.4	656.6	24.7
Ilmenite – Saleable &						
Upgradeable						
Eucla/Perth Basin (SA/WA)	86.6	62.9	51.8	230.9	198.1	(14.2)
Murray Basin (VIC)	10.5	45.5	21.9	30.2	77.1	155.3
Australia	97.1	108.4	73.7	261.1	275.2	5.4
Sierra Leone	-	15.0	16.6	-	43.2	n/a
Total Ilmenite	97.1	123.4	90.3	261.1	318.4	21.9
PRODUCTION	289.1	344.3	293.8	787.5	975.0	23.8
TOTAL MINERAL SANDS PRODUCTION	289.1	344.3	293.8	787.5	975.0	

The above table details Iluka's total production by product group, with the source of that production attributed to the regional operating mines and basins. Processing of final product occurs in Australia at one of two mineral separation plants at Hamilton, Victoria and Narngulu, Western Australia. Iluka also has a mineral separation plant in Virginia, United States (now closed) and one in Sierra Leone. Appendix 1 provides details of the physical flows from mining operations to mineral processing facilities.

<sup>&</sup>lt;sup>1</sup> Iluka's zircon production figures include volumes of zircon processed under external arrangements.

#### PROJECT DEVELOPMENT

#### Cataby, Western Australia

The Cataby mineral sands deposit, located north of Perth, is a large chloride ilmenite deposit from which lluka plans to produce ilmenite as a feed source for synthetic rutile production, as well as material volumes of zircon and rutile. Cataby is expected to have an economic life of approximately 8.5 years.

The definitive feasibility study has been completed and various pre-execute activities continue. The decision to proceed with the project is dependent on securing appropriate offtake arrangements and in this regard good progress was made during the quarter in advancing discussions with major chloride pigment customers and other potential off-take partners.

## Balranald, Murray Basin, New South Wales

Balranald and Nepean are two rutile-rich mineral sands deposits in the northern Murray Basin, New South Wales.

Work on the unconventional mining development at Balranald has continued in 2017. Work on testing an improved mining head to assess suitability has been completed and is currently being assessed. A decision will be made on whether to proceed with a final field trial in 2018.

#### Puttalam (PQ), Sri Lanka

The Puttalam Quarry (PQ) mineral sands deposit is a large sulphate ilmenite deposit, located approximately 30 kilometres north of the town of Puttalam in the North Western Province of Sri Lanka and approximately 170 kilometres from the capital, Colombo.

PQ project work is focussed on legal and investment terms for the development and includes securing surface access rights, ministerial and other governmental approvals. Discussions with the Sri Lankan Government continue on establishing a pathway towards lluka securing a binding Development Agreement. Iluka has submitted a revised and comprehensive project proposal and joint working group meetings continue with the appropriate government ministries.

A pre-feasibility study is being undertaken on the PQ deposit with in-country consultants being engaged to progress various engineering, environmental, hydrogeological and infrastructure work packages.

Refer Iluka's website (<u>www.iluka.com</u>) – Section: Company Overview, Projects, for more detail on these projects.

#### EXPLORATION

Expenditure on exploration and evaluation charged to the profit and loss account to the end of the third quarter was \$8 million (of which \$3 million was spent in the third quarter), compared with \$17 million in the same period of 2016.

#### Kazakhstan

The regional air-core drill program continued on GIN1<sup>1</sup> and GIN2 with 269 holes completed over 7,929 meters in the quarter. The targeted marine sand geological formation is widely present, at various depths, across the project area. A total of 1,389 samples were taken for laboratory analysis. Drilling will progress into GIN3, with program completion in October with technical assessment to follow.

## Figure 2 Northern Kazakhstan



#### Canada

Iluka continued to fund exploration activity at the rutile and ilmenite focussed Foothills and Grand Duc Projects in Quebec, Canada. Field teams completed glacial sampling and mapping. Results were combined with available geophysical data to prioritise specific targets and broader regions for first pass drill testing in the next quarter.

<sup>&</sup>lt;sup>1</sup> In Kazakhstan, a GIN is a geological investigation licence. Iluka has the exclusive rights (in conjunction with Kazgeology) to explore for titanium minerals, zircon and tin within these licences



# Figure 3 Grand Duc & Foothills Projects, Quebec, Canada

# Investment market and media inquiries:

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# Teleconference

lluka will be holding a teleconference on 27 October 2017 at 11:00am to 11:45am Australian Eastern Standard Time. This teleconference reflects a move towards a more fulsome guarterly update on the business.

Teleconference dial-in details	5		
Conference ID: 2597209			
Australia (toll-free)	1800 123 296	Hong Kong (toll-free)	800 908 865
Japan (toll-free)	0120 477 087	Singapore (toll-free)	800 616 2288
New Zealand (toll-free)	0800 452 782	United States (toll-free)	1855 293 1544
United Kingdom (toll-free)	0808 234 0757	Canada (toll-free)	1855 5616 766
China (toll-free)	4001 203 085	Any other country or mobile phone	+61 2 8038 5221

# APPENDIX 1 - OPERATING MINES – PHYSICAL DATA 9 Months to 30 September 2017

	Jacinth- Ambrosia	Murray Basin	Western Australia	Australia Total	Sierra Leone <sup>1</sup>	Virginia	Group Total
Mining							
Overburden Moved kbcm	-	-	194	194	11	-	205
Ore Mined kt	-	-	1,283	1,283	8,527	-	9,810
Ore Grade HM %	-	-	13.5	13.5		-	n/a
VHM Grade %	-	-	13.3	13.3		-	n/a
Concentrating							
HMC Produced kt	-	-	205	205	273	-	478
VHM Produced kt	-	-	181	181	196	-	377
VHM in HMC Assemblage %	-	-	88.4	88.4	71.8	-	78.9
Zircon	-	-	16.2	16.2	3.9	-	9.2
Rutile	-	-	5.1	5.1	50.3	-	30.9
Ilmenite	-	-	67.2	67.2	17.5	-	38.8
HMC Processed kt	342	216	192	750	264	-	1,014
Finished Product <sup>2</sup> kt							
Zircon	172.2	54.6	16.4	243.2	3.0	6.9	253.1
Rutile	26.6	88.8	4.2	119.6	126.2	-	245.8
Ilmenite	90.8	77.1	107.3	275.2	43.2	-	318.4
Synthetic Rutile Produced kt			157.7	157.7	-		157.7

#### **Explanatory Comments on Terminology**

Overburden moved (bank cubic metres) refers to material moved to enable mining of an ore body.

Ore mined (thousands of tonnes) refers to material moved containing heavy mineral ore.

Ore Grade HM % refers to percentage of heavy mineral (HM) found in a deposit.

VHM Grade % refers to percentage of valuable heavy mineral (VHM) - titanium dioxide (rutile and ilmenite), and zircon found in a deposit.

**Concentrating** refers to the production of heavy mineral concentrate (HMC) through a wet concentrating process at the mine site, which is then transported for final processing into finished product at one of the company's two Australian mineral processing plants, or the Virginia mineral processing plant.

HMC produced refers to HMC, which includes the valuable heavy mineral concentrate (zircon, rutile, ilmenite) as well as other non-valuable heavy minerals (gangue).

VHM produced refers to an estimate of valuable heavy mineral in heavy mineral concentrate expected to be processed.

VHM produced and the VHM assemblage - provided to enable an indication of the valuable heavy mineral component in HMC.

HMC processed provides an indication of material emanating from each mining operation to be processed.

**Finished product** provides an indication of the finished production (zircon, rutile, ilmenite) attributable to the VHM in HMC production streams from the various mining operations. Finished product levels are subject to recovery factors which can vary. The difference between the VHM produced and finished product reflects the recovery level by operation, as well as processing of finished material/concentrate in inventory. Ultimate finished product production (rutile, ilmenite, and zircon) is subject to recovery loss at the processing stage – this may be in the order of 10 per cent.

Ilmenite is produced for sale or as a feedstock for synthetic rutile production.

Typically, 1 tonne of upgradeable ilmenite will produce between 0.56 and 0.60 tonnes of synthetic rutile. Iluka also purchases external ilmenite for its synthetic rutile production process.

<sup>&</sup>lt;sup>1</sup> HM and VHM grade are unavailable for Sierra Rutile at this time.

<sup>&</sup>lt;sup>2</sup> Finished product includes material from heavy mineral concentrate (HMC) initially processed in prior periods.

An explanation of the Iluka's physical flow information can be obtained from Iluka's Briefing Paper - Iluka Physical Flow Information on the company's website. The nature of the Iluka operations base means that HMC from various mining locations can be processed at various mineral separation plants.

#### **APPENDIX 2 – PRODUCTION SUMMARIES**

Zircon



Rutile



2017

Synthetic Rutile



Ilmenite





Annual Ilmenite Production