



## RELEASE OF TARGET'S STATEMENT IN RESPECT OF ERAMET'S OFFER

In compliance with Item 14 of section 633(1) of the *Corporations Act 2001* (Cth), Mineral Deposits Limited (**MDL** or the **Company**) releases its target's statement (**Target's Statement**) in response to the off-market takeover bid by Eramet S.A. (**Eramet**) for all the shares in MDL at A\$1.46 cash per share (**Offer**).

The Target's Statement sets out the MDL Board's reasons for unanimously recommending that MDL shareholders **REJECT** Eramet's Offer and other information that is material to shareholders in their assessment of Eramet's Offer. The Target's Statement includes an Independent Expert's Report prepared by Grant Samuel & Associates Pty Limited concluding that the Offer is **NEITHER FAIR NOR REASONABLE** and estimating the fair value of MDL shares to be in the range of A\$2.04 to A\$2.52.

The Target's Statement has been served on Eramet and lodged with the Australian Securities and Investments Commission today.

The Target's Statement will be dispatched shortly to MDL shareholders who received Eramet's Bidder's Statement.

Updates in relation to the Offer will be made available on MDL's website ([www.mineraldeposits.com.au](http://www.mineraldeposits.com.au)) and we encourage shareholders to call us directly to address any queries.

For further information please contact:

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MDL  
Nic Limb / Rob Sennitt  
Chairman / Managing Director  
(03) 9618 2500

**Media Advisers:**

Quay Advisers  
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Partners  
0418 708 663 / 0411 119 090

**Financial Advisers:**

Flagstaff Partners  
Michel Mamet  
Managing Director  
0457 771 733

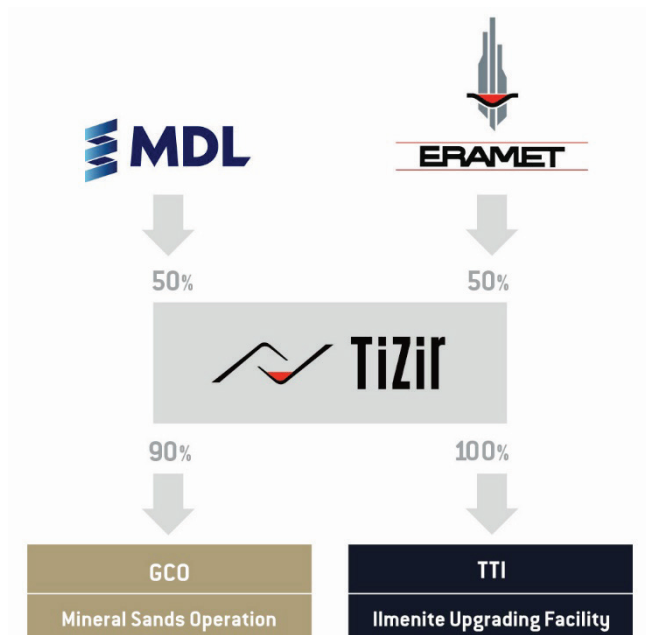
## About MDL

Mineral Deposits Limited (ASX: **MDL**) is an established, ASX-listed, integrated mining company which jointly owns and manages TiZir Limited (**TiZir**) in partnership (50/50) with Eramet of France.

The TiZir joint venture comprises two integrated, operating assets – the Grande Côte mineral sands operation (**GCO**) in Senegal, West Africa and the TiZir Titanium & Iron ilmenite upgrading facility (**TTI**) in Tyssedal, Norway.

GCO is a large-scale, cost competitive mineral sands operation that is fully integrated from mine-to-ship, using owned or controlled infrastructure. GCO commenced mining activities in March 2014 and, over an expected mine life currently projected to 2050, will primarily produce high-quality zircon and ilmenite. A majority of GCO's ilmenite is sold to TTI. GCO also produces small amounts of rutile and leucoxene. The government of the Republic of Senegal is a valued project partner, holding a 10% interest in Grande Côte Operations SA.

TTI upgrades GCO ilmenite to produce high-quality titanium feedstocks, primarily sold to pigment producers, and a high-purity pig iron, a valuable co-product, which is sold to ductile iron foundries. TTI benefits from access to cheap and clean power, and excellent logistics, in particular, year-round shipping capacity and customer proximity.



## Forward-looking statements

Certain information contained in this release, including any information on MDL's plans or future financial or operating performance and other statements that express management's expectations or estimates of future performance, constitute forward-looking statements.

Such statements are based on a number of estimates and assumptions that, while considered reasonable by management at the time, are subject to significant business, economic and competitive uncertainties. MDL cautions that such statements involve known and unknown risks, uncertainties and other factors that may cause the actual financial results, performance or achievements of MDL to be materially different from the Company's estimated future results, performance or achievements expressed or implied by those forward-looking statements. These factors include the inherent risks involved in mining and mineral processing operations, exploration and development of mineral properties, financing risks, changes in economic conditions, changes in the worldwide price of zircon, ilmenite and other key inputs, changes in the regulatory environment and other government actions, changes in mine plans and other factors, such as business and operational risk management, many of which are beyond the control of MDL.

Any past performance information given in this release is given for illustrative purposes only and is not necessarily a guide to future performance. No representation or warranty is made by any person as to the likelihood of achievement or reasonableness of any forward-looking statements, forecast financial information or other forecast. Nothing contained in this release is, or shall be relied upon as, a promise, representation, warranty or guarantee as to MDL's past, present or future performance.

Except as required by applicable regulations or by law, MDL does not undertake any obligation to publicly update, review or release any revisions to any forward-looking statements to reflect new information, future events or circumstances after the date of this release.

Information in this release should be read in conjunction with other announcements made by MDL to the ASX.

Nothing in this release should be construed as either an offer to sell or a solicitation to buy or sell MDL securities.

## Contact details

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 E [mdlmail@mineraldeposits.com.au](mailto:mdlmail@mineraldeposits.com.au)  
 W [mineraldeposits.com.au](http://mineraldeposits.com.au)

22 May 2018

Dear fellow MDL Shareholder,

## REJECT ERAMET'S OFFER OF A\$1.46 PER SHARE

I have had the opportunity to communicate with you a number of times since Eramet S.A. (**Eramet**) launched its conditional takeover offer of A\$1.46 per share (**Offer**) on 27 April 2018. I share your disappointment with Eramet's decision not to discuss its intentions with Mineral Deposits Limited (**MDL**) prior to announcing the Offer. In MDL's view, there is potential to create additional value for shareholders that could have been considered through a friendly and mature approach. Not engaging with a long-term 'valued' joint venture partner ultimately speaks to the credibility of Eramet's Offer.

As mentioned in my previous letter, your Directors view **Eramet's Offer** as **grossly inadequate**. I am pleased to say that the independent expert, Grant Samuel and Associates Pty Limited (**Grant Samuel**), provides support for your Board's view in concluding that **Eramet's Offer is NEITHER FAIR NOR REASONABLE**.

Your Directors will continue to work to ensure full value is delivered for your investment in MDL. **Grant Samuel has estimated the fair value of MDL Shares to be in the range of A\$2.04 to A\$2.52**. This independent valuation is well above the price Eramet is offering of A\$1.46 per Share. Commenting on its conclusions, Grant Samuel notes that 'even for very conservative (and in Grant Samuel's view unrealistically conservative) assumptions, the value of MDL is well above the Eramet Offer price.' A copy of the Grant Samuel report is included in this Target's Statement in Appendix 1.

It is particularly disappointing that Eramet has chosen to devalue our collective hard work that has resulted in the successful performance of GCO and TTI. Eramet has repeatedly joined MDL in praising TiZir's good performance in the past. Eramet now chooses to criticise TiZir in order to justify a lower price for your MDL Shares.

Your Directors encourage you to treat all statements made by Eramet with caution because Eramet's statements and actions have a **track record of inconsistency**. As outlined below, Eramet has used industry specialist TZ Minerals International Pty Ltd (**TZMI**) to support its views in the past but now chooses to criticise TZMI; Eramet endorsed the TiZir five-year plan during the bond refinancing process but now claims it has not approved the plan; and Eramet tells its own shareholders about TiZir's good performance but informs MDL Shareholders of TiZir's 'poor track-record'.<sup>2</sup>

I encourage you to read this Target's Statement in full and our more detailed reasons to reject the Offer below and on the following pages.

## REASONS TO REJECT ERAMET'S OFFER AND REASONS WHY ERAMET CANNOT BE BELIEVED

### 1. MDL's guidance is valid and appropriate

MDL stands by its guidance released to the ASX on 10 May 2018 and makes the following points in relation to Eramet's Second Supplementary Bidder's Statement:

- MDL's guidance was informed by TZMI pricing forecasts. TZMI's work supports investment decisions regarding many projects undertaken by peer mineral sands companies. Recent examples include Iluka Resources Limited (see ILU ASX release of 12 December 2017) and Sheffield Resources Limited (see SFX ASX release of 24 March 2017). On 17 May 2018, MDL released to the ASX details of a TZMI market study commissioned by MDL. You should review that market study when considering Eramet's statements.
- It is worth noting that Eramet approved the use of TZMI to provide market intelligence during the TiZir bond refinancing process (successfully completed in July 2017) and for the impairment assessment of TiZir's assets at 31 December 2017 (approved by the TiZir Board on 4 April 2018). Eramet also used TZMI information to assist with its evaluation of the creation of the TiZir Joint Venture. Despite criticising TZMI's pricing forecasts, Eramet has to date not provided MDL Shareholders with any alternative method to determine TiZir's future value – the benefit of which Eramet is seeking to acquire after years of MDL Shareholder investment.

<sup>1</sup> Page 7 of Eramet's *Second Supplementary Bidder's Statement* released to the ASX on 16 May 2018.

<sup>2</sup> Ibid, page 3.

- The financial information relating to TiZir's 2018 production and pricing contained in the TiZir Guidance is not 'volatile' or 'unpredictable'. Short-term volatility is significantly reduced as production is largely contracted for the remainder of the year. While pricing for titanium slag has been agreed for 2018, pricing for zircon is not committed in order to benefit from anticipated higher prices during the year.
- The operational and cost assumptions used by MDL to determine its 2018 and 2019 guidance have been assessed and validated by AMC Consultants Pty Ltd, who was engaged by Grant Samuel as the Independent Technical Specialist. A copy of the AMC Consultants' report is included in this Target's Statement in Appendix 1 (as Appendix 4 of the Independent Expert's Report). Furthermore, Eramet's statement that the 'five-year plan was not approved by the TiZir Joint Venture Board in 2017 or so far in 2018'<sup>3</sup> is surprising given that it was used by Eramet and MDL throughout the bond refinancing process.

You should take the time to read this Target's Statement in full and carefully consider our value based reasons to reject the Offer:

**REASON 1 >** Your Directors have determined that the Offer is **grossly inadequate**, and the Independent Expert has concluded that the Offer is **neither fair nor reasonable**

**REASON 2 >** TiZir's **strategically integrated assets** are **operating at or near record highs**, with **potential for future growth**

**REASON 3 >** If you accept the Offer, you will lose the option to participate in **any subsequent superior offer for your MDL Shares from any third party**, should one emerge

## 2. Eramet's statements are inconsistent with its actions

As an insider, Eramet is well aware of the potential opportunities presented by acquiring MDL and consolidating the TiZir Joint Venture. Eramet's statements are inconsistent with its actions for the following reasons:

- Investors in the resources sector are aware of potential commodity price volatility and are able to price in the risk of changes in economic circumstances and therefore are able to adjust for operational performance in making investment decisions. The Independent Expert has expressed a view regarding the value of MDL and has provided a detailed justification for its conclusions. Eramet has so far failed to provide any credible and objective value justification for its grossly inadequate Offer.
- Eramet has sought to portray TiZir as having a 'poor track-record',<sup>4</sup> despite highlighting TiZir's good performance in presentations to its own shareholders.
- Eramet should be aware of the nature of the industry and of TiZir's performance. Eramet's apparently now negative view on TiZir's operational performance has not been an obstacle to it launching an opportunistically timed bid as commodity prices improve. Shareholders should not rely on statements made by Eramet.

You should consider the information in this Target's Statement regarding our recent market performance and comments from our key Shareholders as a counterpoint to Eramet's statements:

**REASON 4 >** The price of **MDL Shares on the ASX** has **traded consistently higher than Eramet's Offer Price**

**REASON 5 >** **Key Shareholders** publicly **support your Directors' view** that the **Offer does not represent full value**

<sup>3</sup> Ibid, page 3.

<sup>4</sup> Ibid, page 3.

### 3. Eramet's approach to peer comparisons is inappropriate and misleading

MDL stands by its position on peer comparisons for the following reasons:

- Your Directors believe free cash flow multiples are the relevant supporting valuation metric as it is most reflective of the high cash flow conversion of the TiZir Joint Venture, supported by its low capital intensity and tax exemption period in Senegal. MDL's free cash flow guidance incorporates TiZir's external debt position, as TiZir's subordinated loans are payable to MDL and Eramet.
- Your Directors believe Iluka Resources Limited (ASX: ILU) is MDL's closest peer (albeit of different size) due to the similarity of their product suites and vertical integration. Eramet's alternatives of Base Resources Limited and Kenmare Resources plc are not appropriate comparators because of their highly differentiated product suites and lack of vertical integration.

You should consider the reasons to reject the Offer based on comparisons to our peers and the potential of MDL to generate further value:

**REASON 6 >** Eramet's **inadequate and opportunistic Offer would deprive MDL Shareholders of the full value** of their investment

**REASON 7 >** Eramet's A\$1.46 per Share Offer **does not reflect MDL's full value relative to peer market valuations** and premiums paid to Shareholders in comparable takeover transactions.

### NEXT STEPS

Your Directors will continue to pursue all opportunities, including with Eramet, that reflect the full value of your investment in MDL. If there is no superior offer, from Eramet or a third party, MDL is prepared to continue to work constructively with Eramet in the TiZir Joint Venture to see the benefit of higher commodity prices returned to MDL Shareholders through future dividends.

### TO REJECT ERAMET'S OFFER, SIMPLY IGNORE ALL DOCUMENTATION SENT TO YOU BY ERAMET

You should read this Target's Statement in its entirety. You should also carefully consider the Offer having regard to your own personal risk profile, investment strategy and tax position. You may also wish to seek independent legal, financial, taxation or other professional advice in relation to your overall assessment of the Offer.

Your Directors will continue to keep you updated on all material developments relating to the Offer. All company announcements are available on our website, [www.mineraldeposits.com.au](http://www.mineraldeposits.com.au). In the meantime, if you have any questions in relation to this Target's Statement, please call us directly on +61 3 9618 2500.

Yours sincerely,

**Nic Limb**  
Chairman,  
Mineral Deposits Limited

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#### For further information please contact:

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Contact Computershare directly if you have questions about your MDL shareholding:

T 1300 850 505 (within Australia)  
T +61 3 9415 4000 (outside Australia)

F +61 3 9473 2500  
E [web.queries@computershare.com.au](mailto:web.queries@computershare.com.au)



# TARGET'S STATEMENT

Financial Adviser

**FLAGSTAFF**

Legal Adviser

**MinterEllison**

YOUR DIRECTORS UNANIMOUSLY  
RECOMMEND THAT YOU



# REJECT

Eramet's Offer

To **REJECT** Eramet's Offer **DO NOTHING**

**THIS IS AN IMPORTANT DOCUMENT AND REQUIRES YOUR IMMEDIATE ATTENTION.**

If you are in any doubt as to how to deal with this document, please contact your legal, financial, taxation or other professional adviser.



 **MDL**

## CONTENTS

What do your Directors recommend?	1
Your Directors' reasons to reject the Offer	1
Important notices	2
Chairman's letter	3
1. Your Directors' evaluation of the Offer	6
2. Response to misleading statements made by Eramet	14
3. Frequently asked questions	18
3. Your choices as an MDL Shareholder	24
5. Information about the Offer & other important issues	26
6. Profile of MDL	34
7. Taxation consequences	43
8. Additional information	47
9. Glossary & interpretation	52
Appendix 1: Independent Expert's Report & Independent Technical Specialist's Report	56
Corporate Directory	

### KEY DATES

<b>Offer announced. Bidder's Statement lodged with MDL, ASIC and ASX</b>	<b>27 April 2018</b>
<b>Replacement Bidder's Statement lodged with MDL, ASIC and ASX</b>	<b>14 May 2018</b>
<b>Offer Period commenced</b>	<b>14 May 2018</b>
<b>Date of this Target's Statement</b>	<b>22 May 2018</b>
<b>Date for Eramet to provide Notice of Status of Conditions<sup>1</sup></b>	<b>13 June 2018</b>
<b>Offer Period closes (unless Offer is extended or withdrawn)</b>	<b>21 June 2018</b>

<sup>1</sup> If the Offer Period is extended, this date will be taken to be postponed for the same period.

# REJECT THE OFFER

To **REJECT** the Offer **DO NOTHING**

Ignore all documents sent to you by Eramet

## YOUR DIRECTORS' REASONS TO REJECT THE OFFER

- 1** Your Directors have determined that the Offer is GROSSLY INADEQUATE, and the Independent Expert has concluded that the Offer is NEITHER FAIR NOR REASONABLE
- 2** TiZir's strategically integrated assets are operating at or near record highs, with potential for future growth
- 3** If you accept the Offer, you will lose the option to participate in any subsequent superior offer for your MDL Shares from any third party, should one emerge
- 4** The price of MDL Shares on the ASX has traded consistently higher than Eramet's Offer Price
- 5** Key Shareholders publicly support your Directors' view that the Offer does not represent full value
- 6** Eramet's inadequate and opportunistic Offer would deprive MDL Shareholders of the full value of their investment
- 7** Eramet's A\$1.46 per Share Offer does not reflect MDL's full value relative to peer market valuations and premiums paid to shareholders in comparable takeover transactions

Section 1.2 of this Target's Statement elaborates on these key reasons.



## IMPORTANT NOTICES

### Target's Statement

This document is a Target's Statement dated 22 May 2018 and is issued by Mineral Deposits Limited ACN 064 377 420 (**MDL**) under Part 6.5 Division 3 of the Corporations Act. This Target's Statement sets out the MDL Board's formal response to the off-market takeover offer made by Eramet SA (**Eramet**) in its Bidder's Statement.

### ASIC and ASX disclaimer

A copy of this Target's Statement was lodged with ASIC and ASX on 22 May 2018. Neither ASIC, ASX nor any of their respective officers takes any responsibility for the content of this Target's Statement.

### Eramet information in this Target's Statement

The information in this Target's Statement in relation to Eramet has been prepared by MDL using publicly available information including the Bidder's Statement. MDL and its Directors are unable to verify the accuracy or completeness of that information. The information on Eramet in this Target's Statement should not be considered comprehensive. Accordingly, to the maximum extent permitted by law, MDL does not make any representation or warranty, express or implied, as to the accuracy or completeness of that information.

### Effect of rounding

A number of figures, amounts, percentages, prices, estimates, calculations of value and fractions in this Target's Statement are subject to the effect of rounding. Accordingly, their actual calculations may differ from the calculations set out in this Target's Statement.

### Charts, maps and diagrams

Any diagrams, charts, maps, graphs or tables appearing in this Target's Statement are illustrative only and may not be drawn to scale. Unless stated otherwise, all data contained in diagrams, charts, maps, graphs and tables is based on information available at the date immediately prior to the date of this Target's Statement.

### No account of personal circumstances

This Target's Statement does not take into account your individual investment objectives, financial situation or particular needs. It does not contain personal advice. MDL is not licensed to provide financial product advice in relation to MDL Shares or any other financial products. This Target's Statement should not be relied on as the sole basis for any investment decision in relation to MDL Shares or the Offer generally. The Directors encourage you to obtain independent legal, financial, taxation or other professional advice before deciding whether or not to accept the Offer.

### Mineral Resources and Ore Reserves

The information in this Target's Statement that relates to the Grande Côte Mineral Resource and Ore Reserve estimates as at 31 December 2017 was reported under the JORC Code in an announcement lodged with the ASX on 19 February 2018 entitled *Grande Côte Mineral Resource and Ore Reserve Update* and is available to view on MDL's website. The Competent Person named in that report was Mr Djibril Sow, a member of The Australasian Institute of Mining and Metallurgy and a full-time employee of Grande Côte Operations SA.

MDL confirms that it is not aware of any new information or data that materially affects the information included in that announcement and that all material assumptions and technical parameters underpinning the estimates in that announcement continue to apply and have not materially changed. MDL confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the original announcement.

Unless otherwise indicated or contained in information which was prepared by a different party, all references to estimates and derivations of the same in this Target's Statement are references to estimates by MDL and management estimates based on MDL's views at the date of this Target's Statement. Actual facts or outcomes may be different from those estimates.

### Forward-looking statements

Some statements in this Target's Statement are in the nature of forward-looking statements. You should be aware that these statements are predictions only and are subject to inherent risks and uncertainties.

Those risks and uncertainties include factors and risks specific to MDL as well as general economic conditions and conditions in the financial markets, exchange rates, interest rates and the regulatory environment, many of which are outside the control of MDL and its Directors. Actual events or results may differ materially from the events or results expressed or implied in any forward-looking statement.

None of MDL (nor any of its officers and employees) or any person named in this Target's Statement with their consent or anyone involved in the preparation of this Target's Statement makes any representation or warranty (either express or implied) as to the accuracy or likelihood of fulfilment of any forward-looking statement or any events or results expressed or implied in any forward-looking statement, except to the extent required by law. You are cautioned not to place undue reliance on those statements.

The forward-looking statements in this Target's Statement reflect views held only as at the date of this Target's Statement. MDL has no obligation to disseminate any updates or revisions to any statements to reflect any change in expectations in relation to those statements or any change in events, conditions or circumstances on which any of those statements are based unless it is required to do so under Division 4 of Part 6.5 of the Corporations Act to update or correct this Target's Statement (i.e. for certain matters that are material from the point of view of a Shareholder) or under its continuous disclosure obligations under the Corporations Act and the ASX Listing Rules.

### Responsibility for information

The Independent Expert has prepared and is responsible for the Independent Expert's Report for the purposes of this Target's Statement and takes responsibility for that report. The Independent Technical Specialist has prepared and is responsible for the Independent Technical Specialist's Report for the purposes of this Target's Statement and takes responsibility for that report.

None of MDL, or its subsidiaries, their respective officers, employees, advisers or the MDL Directors assume responsibility for the accuracy or completeness of the Independent Expert's Report or the Independent Technical Specialist's Report, except, in the case of MDL, in relation to the historical information which it has provided to the Independent Expert and Independent Technical Specialist.

### Privacy statements

MDL has collected your information from the MDL share registry for the purpose of providing you with this Target's Statement. The type of information MDL has collected about you includes your name, contact details and information on your MDL shareholding. The Corporations Act requires the name and address of Shareholders to be held in a public register.

### Shareholder enquiries

MDL encourages Shareholders to call us on +61 3 9618 2500 if you have any queries in relation to the Offer. We are available Monday to Friday between 9.00am and 5.30pm (AEST).

For queries regarding your MDL shareholding please contact MDL's share registry, Computershare Investor Services Australia:

T 1300 850 505 (within Australia)  
T +61 3 9415 4000 (outside Australia)  
F +61 3 9473 2500  
E [web.queries@computershare.com.au](mailto:web.queries@computershare.com.au)

### Defined terms

Certain terms used in this Target's Statement have defined meanings, as set out in Section 9 of this Target's Statement.

### No internet site is part of this Target's Statement

No internet site is part of this Target's Statement. MDL maintains an internet site ([www.mineraldeposits.com.au](http://www.mineraldeposits.com.au)).

Any references in this Target's Statement to this internet site are textual references only and the information contained on the site does not form part of this Target's Statement.

# CHAIRMAN'S LETTER

22 May 2018

Dear fellow MDL Shareholder,

## REJECT ERAMET'S OFFER OF A\$1.46 PER SHARE

I have had the opportunity to communicate with you a number of times since Eramet S.A. (**Eramet**) launched its conditional takeover offer of A\$1.46 per share (**Offer**) on 27 April 2018. I share your disappointment with Eramet's decision not to discuss its intentions with Mineral Deposits Limited (**MDL**) prior to announcing the Offer. In MDL's view, there is potential to create additional value for shareholders that could have been considered through a friendly and mature approach. Not engaging with a long-term 'valued'<sup>2</sup> joint venture partner ultimately speaks to the credibility of Eramet's Offer.

As mentioned in my previous letter, your Directors view **Eramet's Offer** as **grossly inadequate**. I am pleased to say that the independent expert, Grant Samuel and Associates Pty Limited (**Grant Samuel**), provides support for your Board's view in concluding that **Eramet's Offer is NEITHER FAIR NOR REASONABLE**.

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## REASONS TO REJECT ERAMET'S OFFER AND REASONS WHY ERAMET CANNOT BE BELIEVED

### 1. MDL's guidance is valid and appropriate

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# CHAIRMAN'S LETTER

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- Eramet has sought to portray TiZir as having a 'poor track-record',<sup>5</sup> despite highlighting TiZir's good performance in presentations to its own shareholders.
- Eramet should be aware of the nature of the industry and of TiZir's performance. Eramet's apparently now negative view on TiZir's operational performance has not been an obstacle to it launching an opportunistically timed bid as commodity prices improve. Shareholders should not rely on statements made by Eramet.

You should consider the information in this Target's Statement regarding our recent market performance and comments from our key Shareholders as a counterpoint to Eramet's statements:

**REASON 4 >** The price of **MDL Shares on the ASX** has traded consistently higher than Eramet's Offer Price

**REASON 5 >** **Key Shareholders** publicly support your Directors' view that the Offer does not represent full value

<sup>4</sup> Ibid, page 3.

<sup>5</sup> Ibid, page 3.

### 3. Eramet's approach to peer comparisons is inappropriate and misleading

MDL stands by its position on peer comparisons for the following reasons:

- Your Directors believe free cash flow multiples are the relevant supporting valuation metric as it is most reflective of the high cash flow conversion of the TiZir Joint Venture, supported by its low capital intensity and tax exemption period in Senegal. MDL's free cash flow guidance incorporates TiZir's external debt position, as TiZir's subordinated loans are payable to MDL and Eramet.
- Your Directors believe Iluka Resources Limited (ASX: ILU) is MDL's closest peer (albeit of different size) due to the similarity of their product suites and vertical integration. Eramet's alternatives of Base Resources Limited and Kenmare Resources plc are not appropriate comparators because of their highly differentiated product suites and lack of vertical integration.

You should consider the reasons to reject the Offer based on comparisons to our peers and the potential of MDL to generate further value:

**REASON 6 >** Eramet's **inadequate and opportunistic Offer would deprive MDL Shareholders of the full value** of their investment

**REASON 7 >** Eramet's A\$1.46 per Share Offer **does not reflect MDL's full value relative to peer market valuations** and premiums paid to Shareholders in comparable takeover transactions.

### NEXT STEPS

Your Directors will continue to pursue all opportunities, including with Eramet, that reflect the full value of your investment in MDL. If there is no superior offer, from Eramet or a third party, MDL is prepared to continue to work constructively with Eramet in the TiZir Joint Venture to see the benefit of higher commodity prices returned to MDL Shareholders through future dividends.

### TO REJECT ERAMET'S OFFER, SIMPLY IGNORE ALL DOCUMENTATION SENT TO YOU BY ERAMET

You should read this Target's Statement in its entirety. You should also carefully consider the Offer having regard to your own personal risk profile, investment strategy and tax position. You may also wish to seek independent legal, financial, taxation or other professional advice in relation to your overall assessment of the Offer.

Your Directors will continue to keep you updated on all material developments relating to the Offer. All company announcements are available on our website, [www.mineraldeposits.com.au](http://www.mineraldeposits.com.au). In the meantime, if you have any questions in relation to this Target's Statement, please call us directly on +61 3 9618 2500.

Yours sincerely,

**Nic Limb**  
Chairman,  
Mineral Deposits Limited

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# YOUR DIRECTORS' EVALUATION OF THE OFFER

# 1



# 1. YOUR DIRECTORS' EVALUATION OF THE OFFER

## 1.1 RECOMMENDATION

Your Directors unanimously recommend that you **REJECT** the Offer, for the reasons set out in Section 1.2 of this Target's Statement.

In evaluating the Offer, your Directors encourage you to:

- read the whole of this Target's Statement (including the Independent Expert's Report in Appendix 1 to this Target's Statement and the Independent Technical Specialist's Report in Appendix 4 of the Independent Expert's Report) and the Bidder's Statement;
- have regard to your individual risk profile, portfolio strategy, tax position and financial circumstances;
- consider the choices available to you and ensure you understand the consequences of those choices, as outlined in Section 4 of this Target's Statement;
- carefully consider Section 1.2 (Reasons why you should **REJECT** the Offer) and Section 5 (Information about the Offer & other important issues) of this Target's Statement; and
- seek independent financial, legal, taxation or other professional advice if you are in any doubt as to what you should do in response to the Offer.

Your Directors will keep you informed of any material developments relating to the Offer.

## 1.2 REASONS WHY YOU SHOULD REJECT THE OFFER

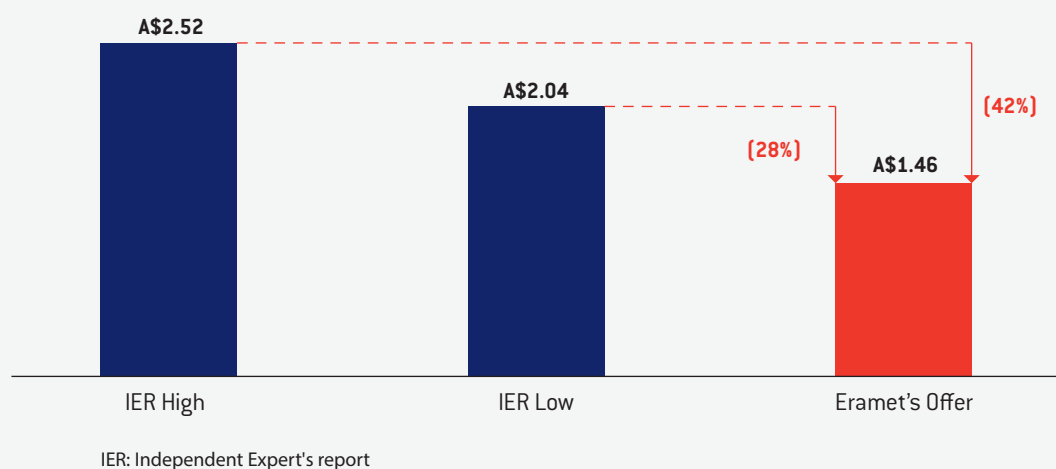
### 1. Your Directors have determined that the Offer is GROSSLY INADEQUATE, and the Independent Expert has concluded that the Offer is NEITHER FAIR NOR REASONABLE

**Eramet's Offer is neither fair nor reasonable**

Your Directors believe that Eramet's unsolicited and opportunistic Offer is grossly inadequate, given the TiZir Joint Venture's production and commodity pricing outlook.

The Board engaged Grant Samuel as the Independent Expert to prepare a report expressing an opinion as to whether or not the Offer is fair and reasonable for MDL Shareholders. The Independent Expert has assessed the full underlying value of MDL Shares to be in the range of A\$2.04 to A\$2.52 per Share. Accordingly, the Independent Expert has concluded that the Offer is **neither fair nor reasonable** to MDL Shareholders.

**Figure 1: Eramet's Offer is 28% to 42% below the Independent Expert's valuation range**





# 1. YOUR DIRECTORS' EVALUATION OF THE OFFER

Commenting on Eramet's Offer, the Independent Expert states:

*"Investors could reasonably hold a wide range of views on the value of MDL, depending on their expectations as to future mineral sands commodity prices. However, Grant Samuel's analysis suggests that even for very conservative (and in Grant Samuel's view unrealistically conservative) assumptions, the value of MDL is well above the Eramet Offer price. Grant Samuel has therefore concluded that the Eramet Offer is neither fair nor reasonable."*<sup>6</sup>

*"Adoption of TZMI's long term price forecasts would yield net present values ("NPVs") for GCO and TTI materially above Grant Samuel's valuation ranges for GCO and TTI. For example, using a discount rate of 10% and AMC's base case production forecasts, calculated NPVs would be approximately US\$1.168 billion for GCO and US\$763 million for TTI. These NPVs would imply values for MDL representing multiples of the Eramet Offer price."*<sup>7</sup>

*"The valuation incorporates modest synergies associated with head office cost reductions that should be achievable by any acquirer of MDL. It does not reflect any special value that may be available exclusively to Eramet, including the value for Eramet of acquiring 100% control of TiZir."*<sup>8</sup>

The Independent Expert's Report is included in full in Appendix 1 to this Target's Statement. You should read that report in its entirety, as part of your assessment of whether or not to accept the Offer.

## 2. TiZir's strategically integrated assets are operating at or near record highs, with potential for future growth

**The quality of MDL's assets is not reflected in Eramet's inadequate and opportunistic bid**

Your Directors believe that the Offer does not adequately recognise: the historical investment of MDL Shareholders in the TiZir Joint Venture; the strategic value of the assets; current and future operational performance; or potential for future growth. Specifically:

### Historical investment

- The TiZir Joint Venture has completed a significant capital expenditure program, including the c.US\$650 million development of GCO and the c.US\$70 million furnace upgrade and capacity expansion at TTI (adding to TTI's existing replacement value associated with its valuable intellectual property, cheap hydro-electric power and year-round access to deep water shipping facilities).
- Unlike many peer mineral sands producers, TiZir faces no major capital requirements to maintain current operating throughputs over GCO's 30+ year mine life.

### Strategic value

- The long life mine at GCO, TTI's proprietary smelting technology and the successful integration of these operations provide a unique investment in a rapidly improving mineral sands market.
- The vertical integration of GCO and TTI provides a number of advantages, including: securing offtake of GCO ilmenite, securing supply of feedstock for TTI and providing leverage to higher-value titanium dioxide product. The TiZir Joint Venture also benefits from operational flexibility (with TTI now having the capacity to move between sulphate and chloride slag production) and the cost efficiencies afforded by integration and advantageous logistics.

### Operational performance

- TiZir's 2018 production is on track to exceed previous records at its operations, currently estimated by your Directors at 68,000 tonnes of zircon at GCO (excluding medium grade zircon sands) and 200,000 tonnes of chloride-route titanium slag at TTI. Production of chloride slag is anticipated to be at the expanded capacity of 230,000 tonnes in 2019.
- On average over 2018 and 2019, MDL expects TiZir's revenue, driven largely by zircon and titanium slag, to generate a unit revenue per tonne sold of US\$535/t to US\$625/t which, together with a unit cash cost of production of US\$333/t to US\$341/t, reflects an implied cash margin of US\$202/t to US\$284/tonnes.<sup>9</sup>

<sup>6</sup> Page 2 of the cover letter of the Independent Expert's Report.

<sup>7</sup> Ibid, page 8.

<sup>8</sup> Ibid, page 7.

<sup>9</sup> Unit revenue per tonne sold and unit cash cost of production are calculated using sales and production volumes net of internal ilmenite sales and a weighted average of the revenues and cash costs over 2018 and 2019. Revenues and cash costs for 2018 and 2019 can be found in the *TiZir Financial and Operations Guidance for 2018 and 2019* released by MDL to the ASX on 10 May 2018.

- Mine and smelter optimisation projects are underway which your Directors expect will continue to improve production efficiencies in 2018 and beyond.

### Future growth

- After a period of ramp up and ongoing optimisation of the operations, the TiZir Joint Venture has established a strong platform to pursue value enhancing growth opportunities.
- On 26 April 2018, the TiZir Board was informed of future projects under consideration by TiZir management including a second mine at GCO and an expansion of TTI.

### 3. If you accept the Offer, you will lose the option to participate in any subsequent superior offer for your MDL Shares from any third party, should one emerge

**A data room is open and a process is underway to facilitate competing bids**

If you accept the Offer you will lose the option to participate in any superior offer that may emerge from a third party.

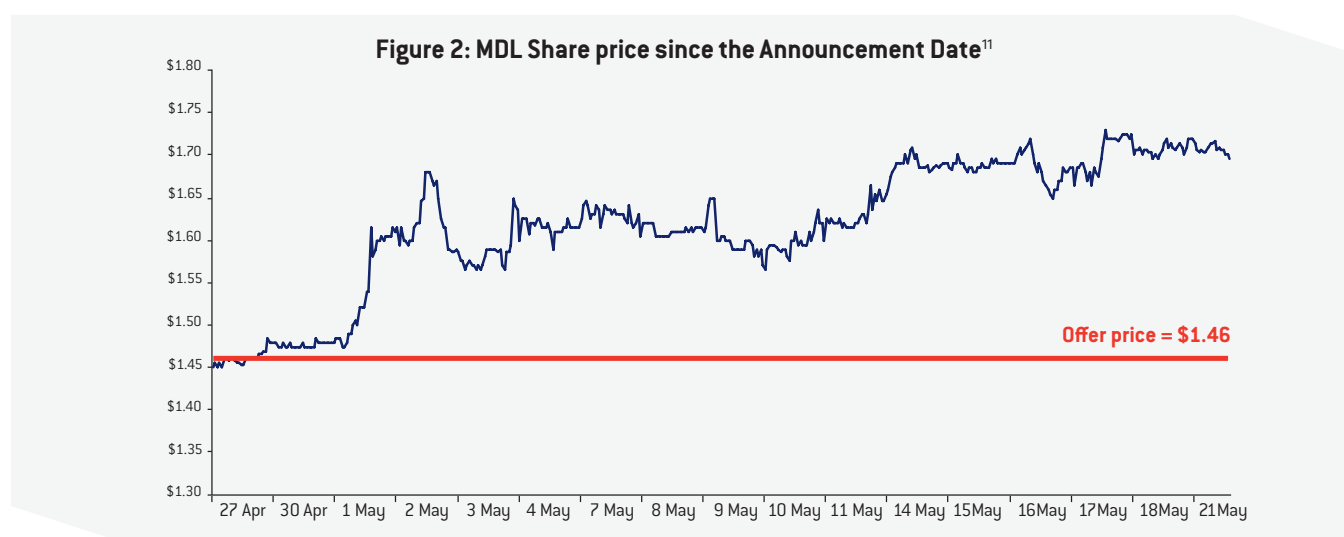
Since the announcement of the Offer, MDL has engaged with third parties regarding potential competing proposals to deliver greater value for the benefit of all MDL Shareholders. To that end, a data room has been opened and multiple international parties continue to engage in a process established by the MDL Board to facilitate competing bids. The summary in Eramet's Bidder's Statement of the Shareholders' Agreement governing the TiZir Joint Venture highlights a number of mechanisms for an acquiring party to achieve 100% control of TiZir Limited, including traditional pre-emption and tag-along rights, break up procedures and dispute resolution provisions.

As at the date of this Target's Statement, no proposal has reached a stage where it is sufficiently progressed to be disclosed in this Target's Statement and your Directors can give no assurance that any competing proposal will emerge. Your Directors will continue to keep MDL Shareholders informed of any material developments in this regard.

### 4. The price of MDL Shares on the ASX has traded consistently higher than Eramet's Offer Price

The MDL Board believes there are compelling reasons why an acquirer of MDL should pay a higher price, as does the broader market, given MDL Shares have consistently traded above the Offer Price since the Offer was announced on 27 April 2018. As at the last trading date prior to the date of this Target's Statement, the VWAP of MDL Shares traded since Eramet announced its Offer is A\$1.60 per Share,<sup>10</sup> representing a premium of 10% to Eramet's Offer Price.

**The market expects that Eramet or a third party will pay more for your MDL Shares**



<sup>10</sup> Calculated using the cumulative volume and cumulative value of MDL Shares traded over the period from 27 April 2018 to 21 May 2018 inclusive (source: IRESS). Excludes the 15,666,507 shares acquired by Eramet through off-market purchases on 27 April 2018 and on-market purchases on 27 April 2018 of 147,023 MDL Shares at A\$1.46 per share and 12,802 MDL Shares at A\$1.455 per share as referenced in the Replacement Bidder's Statement.

<sup>11</sup> Trading price of MDL's Shares since Eramet's Offer on 27 April 2018 as per IRESS.

# 1. YOUR DIRECTORS' EVALUATION OF THE OFFER

Importantly, given Eramet has not declared its Offer as final, it is possible for Eramet to increase its Offer Price. Your Directors believe Eramet can and should pay more.

**Do not lock up your Shares** by accepting Eramet's conditional Offer, especially when you can sell your MDL Shares at a higher price on-market.<sup>12</sup>

Contrary to Eramet's view, your Directors believe that there is no certainty that, if the Offer is unsuccessful and no competing offer emerges, the MDL Share price will fall significantly from the Offer Price. This is principally because of the improving performance of the TiZir Joint Venture, current market dynamics and the pricing environment for the TiZir Joint Venture products.

The Independent Expert supports this reasoning, stating:

*"While MDL shares could trade at prices below the Eramet Offer price in the short term in the absence of the Eramet Offer, the MDL share price should be supported by the additional information provided in MDL's Target's Statement, expectations of strengthening commodity prices and, over time, improved financial performance. Moreover, it is likely that the MDL share price would be supported to some extent by market perceptions that MDL continued to be an attractive takeover target, not least to Eramet (assuming the continuation of current market conditions and no material changes in MDL's circumstances)."*<sup>13</sup>

## 5. Key Shareholders publicly support your Directors' view that the Offer does not represent full value

A number of MDL's major Shareholders, representing approximately 29.4% of MDL's issued capital, have publicly expressed dissatisfaction with Eramet's Offer. The views of these Shareholders were set out in the Chairman's Letter to Shareholders released by MDL to the ASX on 10 May 2018:

- "We remain a large and supportive shareholder. We have a lot of respect for Mineral Deposits' management and board and will look to them for guidance in this respect ... a situation where a transaction doesn't proceed is perfectly acceptable."<sup>14</sup>  
Simon Mawhinney, Allan Gray (13.41%)
- "I am very supportive of the company ... MDL has put their foot on a strategic resource, they have spent the capex, they are just coming into production, they are producing into a serious market [shortage]."<sup>15</sup>  
John Cathcart, Thorney Investments (5.44%)
- "Anyone who wants control of the joint venture needs to pay for that control ... the offer is substantially below [our estimate of] replacement cost of the joint venture's capital equipment."<sup>16</sup>  
Gabriel Radzyminski, Sandon Capital (2.7%)
- "[Eramet is being] highly opportunistic given that the target is emerging from a period of high but abnormal costs that have constrained financial performance over each of the past four quarters. Those problems have now been overcome, but [MDL] has never traded in the clear, so to speak."<sup>17</sup>  
Tim Robertson, Farjoy (7.82%)

**Anyone who wants control ... needs to pay for that control**

12 Based on current trading prices of MDL Shares as at the last trading day prior to the date of this Target's Statement.

13 Section 7.2.3, page 56 of the Independent Expert's Report.

14 Ker, P. (2018) 'MDL investors seek higher bid from French suitor', *The Australian Financial Review*, 29 April, <http://www.afr.com/business/mining/mdl-investors-seek-higher-bid-from-french-suitor-20180429-h0ze8d>.

15 Ibid, amendment to Thorney Investment's quote (insertion of 'shortage') made at Thorney Investments' request to the Company dated 21 May 2018.

16 Ibid, amendment to Sandon Capital's quote (insertion of 'our estimate of') made at Sandon Capital's request to the Company dated 21 May 2018.

17 Stevens, M. (2018) 'Bid pushback has Eramet on a Limb', *The Australian Financial Review*, 8 May, <http://www.afr.com/business/bid-pushback-has-Eramet-on-a-limb-20180508-h0zsq6>.

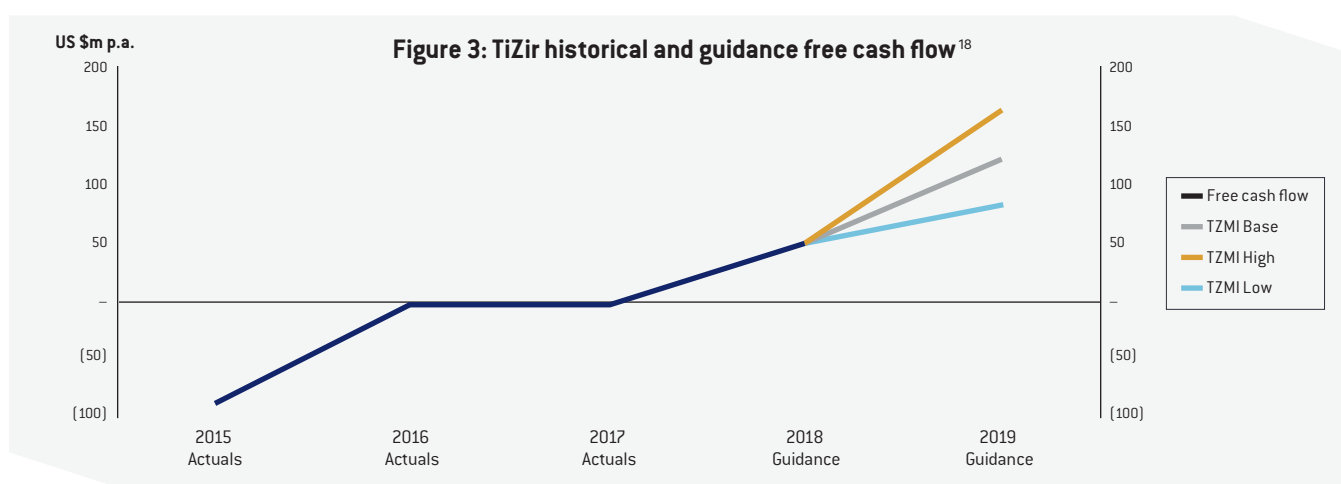
## 6. Eramet's inadequate and opportunistic Offer would deprive MDL Shareholders of the full value of their investment

Eramet's Offer comes at a time when prices for TiZir's zircon and chloride slag are at four year highs, particularly for zircon, where average prices are up more than 42% since 1Q 2017. Given its position as an insider in the TiZir Joint Venture, Eramet is well aware of the improving market and TiZir's potential for future free cash flow generation and profitability.

Your Directors expect this price momentum to continue due to underinvestment in the sector, ongoing resource depletion and other supply side disruptions emerging across the industry. This situation is best reflected in increased enquiries from current and potential customers to secure additional supply of TiZir products.

TiZir is well positioned to maximise the value of all its products with the successful integration of GCO and TTI. Your Directors believe that TiZir, and therefore MDL, is at the beginning of a strong period of free cash flow generation, debt reduction and subsequent cash distributions.

The following chart indicates the magnitude of TiZir's anticipated free cash flow for 2018 and 2019:



**TiZir is at the beginning of a period of strong free cash flow generation**

<sup>18</sup> Free cash flow (FCF) is defined as operating cash flow (after interest paid on external debt, tax paid and change in working capital) less investing cash flow. 2018 guidance has been prepared from the most recent joint venture forecast, as presented to the TiZir Board on 26 April 2018, and summarised in the *TiZir Financial and Operations Guidance for 2018 and 2019* released to the ASX by MDL on 10 May 2018. Cash flows are based on first quarter actuals, detailed mine planning, executed contracts and TiZir sales price targets. 2019 guidance is sourced from the current TiZir adopted five year plan, updated for latest reserve and resource estimates (released to the ASX on 19 February 2018) and other joint venture developments also summarised in the *TiZir Financial and Operations Guidance for 2018 and 2019*.

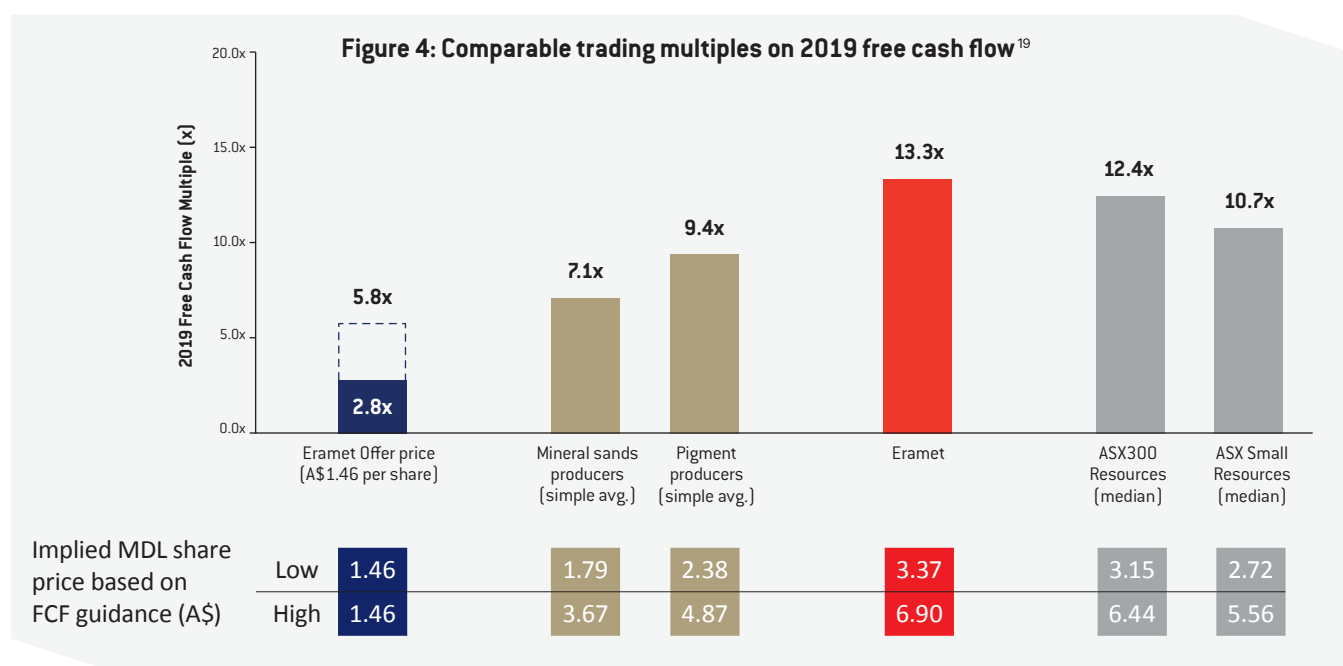
# 1. YOUR DIRECTORS' EVALUATION OF THE OFFER

## 7. Eramet's A\$1.46 per Share Offer does not reflect MDL's full value relative to peer market valuations and premiums paid to shareholders in comparable takeover transactions

In 2019, using TZMI low and high case price forecasts, your Directors expect the TiZir Joint Venture to generate free cash flow in the order of US\$82 million to US\$162 million. On a look-through-basis, the Offer Price of A\$1.46 per Share implies a price to free cash flow (P/FCF) multiple of ~2.8x to 5.8x for MDL Shares.

When compared with its peers, downstream pigment producers and comparably-sized ASX-listed miners, this multiple reflects a significant discount to market valuations.

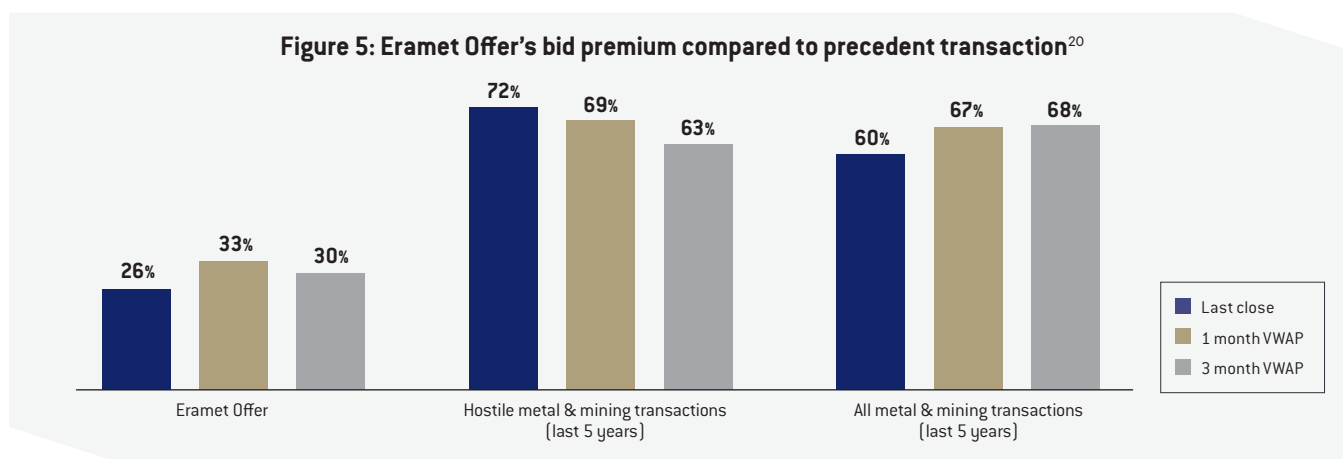
### Eramet is not offering an adequate premium to MDL Shareholders



<sup>19</sup> Market data and broker consensus as at 26 April 2018, i.e. the day prior to the announcement of the Offer. Market capitalisation based on outstanding shares, performance rights and in the money options, except for ASX 300 Resources Index and ASX Small Resources Index. P/FCF multiples represent market capitalisation over FY2019 FCF. MDL's market capitalisation is based on Eramet's Offer price of A\$1.46 per MDL Share and 200,026,574 Shares (including 196,985,649 outstanding Shares and 3,040,898 MDL Performance Rights, existing and 2018 Performance Rights). MDL's FY2019 FCF guidance range is calculated as MDL's 50% share of consolidated TiZir FY2019 FCF of US\$82 million – US\$162 million (based on TZMI low and high price forecast) less net MDL corporate costs of US\$2.8 million, converted from USD to AUD at an exchange rate of 0.7552 (AUD/USD closing price as at 26 April 2018, per IRESS). Mineral sands producers include: Iluka Resources, Base Resources and Kenmare Resources and the multiple is calculated as the simple average of each constituent's P/FCF multiple. Other listed mineral sand producers, who do not have forward estimates or whose last available broker report is more than six months old, have been excluded. Iluka's FY2019 broker mean consensus FCF as per FactSet has been adjusted for the forecast FY2019 FCF from Mining Area C (MAC; Iluka holds a royalty over iron ore produced from specific tenements of BHP Billiton's Mining Area C) to isolate Iluka's mineral sands operations, similar adjustment has been made to the market capitalisation for estimated net present value (NPV) value of MAC. MAC FCF is calculated as MAC EBITDA adjusted for 30% tax rate. MAC estimated FCF and NPV are based on an average of the following broker reports: Macquarie (19 April 2018), Credit Suisse (19 April 2018), UBS (19 April 2018), Deutsche Bank (27 February 2018) and Morgan Stanley (25 February 2018). Base Resources FCF is based on an average of the following broker reports: Hartleys (19 April 2018), RFC Ambrian (18 April 2018), Numis (18 April 2018) and Bell Potter (15 February 2018). The financial data has been calendarised to 31 December year end. Kenmare Resources FCF is based on an average of the following broker reports: Davy (11 April 2018), Hannam & Partners (11 April 2018) and Canaccord (11 April 2018). The P/FCF multiple for pigment producers includes Tronox, Chemours, Venator, Lomon Billions and Ishihara Sangyo Kaisha and is calculated as the simple average of each constituent's P/FCF multiple. Kronos is not included as no FY2019 FCF broker mean consensus was available as at analysis date. Tronox estimates are based on standalone financials before the proposed acquisition of Cristal and have been sourced from relevant research reports. Chemours, Venator and Ishihara Sangyo Kaisha's FY2019 broker mean consensus FCF are as per FactSet. Lomon Billions estimates are sourced from the following broker reports: Huatai Securities (24 April 2018), Sinolink Securities (8 April 2018) and Southwest Securities (3 April 2018). Financial data has been calendarised to a 31 December year-end. Eramet's FY2019 broker mean consensus FCF is based on FactSet. ASX300 Resources Index and ASX Small Resources Index includes constituents as at 26 April 2018 as per IRESS. Each constituent's market capitalisation and FY2019 broker mean consensus FCF is based on FactSet. In order to adjust for the outliers, the P/FCF multiple is based on the median P/FCF multiple for each constituent. Includes only constituents for which FactSet sources a broker forecast mean consensus for FY2019 FCF.

Furthermore, successful comparable public metals and mining market transactions (over the last five years) demonstrate that significantly higher premia have been paid than Eramet's Offer to MDL Shareholders.

Over the past five years, premia for public metals and mining transactions have averaged 60% to last close (72% to last close in hostile transactions) and 67% to one month VWAP (69% to one month VWAP in hostile transactions). By comparison, Eramet's Offer represents a premium of just 26% to last close and 33% to one month VWAP prior to the announcement.



Eramet has indicated in its Bidder's Statement that it has significant liquidity, with financial resources in the order of US\$3.3 billion (€2.8 billion). Eramet's share price trades at higher free cash multiples to MDL Shares (see Figure 4). On this basis, the Offer will be accretive to Eramet shareholders even at prices above the current Offer price of A\$1.46 per Share. Eramet can and should pay you fair value for your Shares.

**Eramet can and should pay more**

<sup>20</sup> Based on an average of completed Australian Metals and Mining public transactions with a A\$100 million to A\$1 billion implied transaction equity value, over the last five years. Excludes 'merger of equals' transactions. Market data based on IRESS and VWAP are calculated based on cumulative value and cumulative volume traded over the relevant period, where the premium is not stated in company filings.



# RESPONSE TO MISLEADING STATEMENTS MADE BY ERAMET

# 2



## 2. RESPONSE TO MISLEADING STATEMENTS MADE BY ERAMET

Following a detailed review of Eramet's original Bidder's Statement released on 27 April 2018 and especially given Eramet's position as an insider in the context of the TiZir Joint Venture, your Directors believed that there were information deficiencies in Eramet's original Bidder's Statement. Your Directors further believed that those information deficiencies disadvantaged MDL Shareholders and their capacity to make a fully informed decision as to whether or not to accept Eramet's Offer.

To address those information deficiencies, your Directors proactively raised their disclosure concerns with Eramet. As a result of that direct engagement, Eramet released a replacement Bidder's Statement on 14 May 2018 containing additional information and various corrections or clarifications. A marked-up version of Eramet's Bidder's Statement was also released.

The table below contains your Directors' response to inaccurate or misleading statements made by Eramet in its Bidder's Statement, to the extent that they were not sufficiently corrected or clarified by Eramet in its replacement Bidder's Statement. The table below also contains your Directors' response to the specific statements made by Eramet in its Second Supplementary Bidder's Statement (released to the ASX on 16 May 2018):

Eramet's claim	MDL's response
<b>Bidder's Statement</b>	
<b>1 Section 3.3 (c) – page 20:</b> Eramet's disclosure on the GCO tax audit	The TiZir Joint Venture is subject to a regular and scheduled audit every four years and the current audit is being undertaken as scheduled.
<b>2 Chairman's Letter – page 3:</b> Eramet's misleading commentary on MDL annual profit and dividends  <b>Reason 2 – page 6:</b> Eramet's misleading commentary on MDL's historical net losses after tax and dividends	<p>Eramet makes a number of comments regarding MDL's annual profit, net losses after tax and dividends history. Although those statements are true in strictly literal terms, they are materially misleading by omission because they fail to recognise the following countervailing facts:</p> <ul style="list-style-type: none"> <li>the TiZir Joint Venture spent more than three years (2011 – 2014) constructing the mine, ramping up production and thereafter utilising available funds towards optimising both GCO and TTI; and</li> <li>at the TiZir Joint Venture level, the TiZir Board (which includes representatives from Eramet) has either not been in a position to make a dividend payment or has made a decision not to make dividend payments to its two shareholders in favour of retaining cash for investment and working capital. Indeed, Eramet itself states that this is precisely the same strategy it would seek to encourage the MDL Board to pursue if Eramet only succeeds in acquiring less than 90% of MDL.</li> </ul> <p>The statements concerning the absence of any MDL dividends are also misleading because they omit any reference to MDL making a US\$474 million in-specie distribution to MDL Shareholders from the demerger of the Sabodala Gold Mine in 2010.</p> <p><b>In addition to Eramet's claims being misleading, it is worth noting that Eramet has not paid a dividend or made any other distribution to its shareholders since 2012</b></p>
<b>Second Supplementary Bidder's Statement</b>	
<b>3 Section 1 (a) – page 2:</b> Eramet's inaccurate commentary on MDL's TiZir Guidance as based on assumptions that are 'inherently volatile and unpredictable'	<p>The <i>TiZir Financial and Operations Guidance for 2018 and 2019</i> released by MDL to the ASX on 10 May 2018 (<b>TiZir Guidance</b>) was informed by TZMI pricing forecasts for 2019. TZMI's work supports investment decisions regarding many projects undertaken by peer mineral sands companies. Recent examples include Iluka Resources Limited (ILU ASX release of 12 December 2017) and Sheffield Resources Limited (SFX ASX release of 24 March 2017). On 17 May 2018, MDL released to the ASX details of a TZMI market study commissioned by MDL and the Company encourages its Shareholders to review that market study when considering Eramet's statements.</p> <p>It is worth noting that Eramet approved the use of TZMI to provide market due diligence in the TiZir bond refinancing process (successfully completed in 2017) and for the impairment assessment of TiZir's assets at 31 December 2017 (approved by the TiZir Board on 4 April 2018). Eramet also used TZMI information to assist with its evaluation of the creation of the TiZir Joint Venture. Those actions by Eramet are inconsistent with its statements in the Second Supplementary Bidder's Statement.</p>

## 2. RESPONSE TO MISLEADING STATEMENTS MADE BY ERAMET

	<p>The financial information relating to TiZir's 2018 production and pricing contained in the TiZir Guidance is not 'volatile' or 'unpredictable'. Short-term volatility is significantly reduced as production is largely contracted for the remainder of the year. While pricing for titanium slag has been agreed for 2018, pricing for zircon is not committed in order to benefit from anticipated higher prices during the year.</p> <p><b>MDL stands by the TiZir Guidance and trusts it is of assistance to its Shareholders in evaluating the Eramet Offer.</b></p>
<p><b>4 Section 1 (b) – page 2:</b> Eramet's misleading commentary on TiZir performance being 'vulnerable to unexpected shocks'</p>	<p>MDL reiterates its position that TiZir's historical performance reflects outcomes consistent with operations on a pathway to maturity and steady state production.</p> <p>While all resource companies are exposed to risks that might be described as 'unexpected shocks', Eramet fails to acknowledge the measures GCO and TTI have in place to mitigate such risks, including insurance.</p> <p>By describing TTI as an 'approximately 30 year old processing plant' Eramet implies that its age exposes it to vulnerability. By contrast, MDL considers TTI's long production history to be one of its key competitive advantages within the titanium feedstock industry and a risk mitigant due to factors such as long-term employee operational knowledge and established supplier and customer relationships. Furthermore, Eramet does not acknowledge the recent investments made to refurbish and expand capacity at TTI, which were proportionately funded by MDL Shareholders.</p> <p><b>Operational issues raised by Eramet have not deterred Eramet from making its Offer.</b></p>
<p><b>5 Section 1 (c) – page 3:</b> Eramet's inaccurate representation of TiZir's performance against internal targets</p>	<p>It is the case that TiZir has not met some of its historical internal targets. However, TiZir has demonstrated a positive trend in operational runtime, throughputs and profitability throughout a period of depressed market conditions. With growing operational experience at GCO and continued focus on operational optimisation at both GCO and TTI, TiZir is currently well placed to maintain the stability of future operations (the benefit of which Eramet is seeking to acquire).</p> <p>Furthermore, physical production and financial inputs for long-term planning have been assessed and validated by Independent Technical Specialist AMC Consultants Pty Ltd (as outlined in section 10 of the Independent Technical Specialist's Report, attached in Appendix 1 to this Target's Statement) before being included in the Independent Expert's valuation assessment of MDL.</p> <p><b>Again, Eramet's view of TiZir's performance has not deterred Eramet from making its Offer.</b></p>
<p><b>6 Section 1 (d) – page 4:</b> Eramet's further inaccurate comments on TiZir Guidance for 2019 describing it as 'meaningless'</p>	<p>In the TiZir Guidance, MDL did not provide pricing forecasts or guidance on price, but showed a balanced range of potential outcomes (ranging from low to high pricing cases) from which MDL Shareholders could draw their own conclusions.</p> <p>Additionally, MDL included 2019 guidance on TiZir's financial and operations performance in order to provide a line-of-sight to the cash flow potential of GCO and TTI based on a normalised full year of production under low and high price cases.</p> <p><b>MDL does not consider such guidance as 'meaningless' to its Shareholders in evaluating Eramet's Offer.</b></p>
<p><b>7 Section 1 (e) – page 4:</b> Eramet's opinion on MDL's 2017 capital raising disclosure</p>	<p>Eramet's comparative reference to MDL's non-disclosure of forward-looking guidance in its 2017 capital raising is misconceived. MDL's disclosure obligations for its 2017 capital raising presupposed what was then an undisturbed and continuing joint venture. Eramet's unsolicited and opportunistic Offer now fundamentally changes the disclosure context.</p> <p><b>MDL concluded that it was necessary and appropriate to release its forward-looking guidance on TiZir so that MDL Shareholders have all material information they need to assess Eramet's Offer.</b></p>

<p><b>8 Section 2 (a) and (b) – page 4 to 7:</b> Eramet’s inaccurate views on MDL’s methodology regarding mineral sands peer valuations describing them as ‘selective’</p>	<p>A range of methodologies can be applied when using market-based trading multiples for valuation purposes. MDL believes free cash flow multiples are the relevant supporting valuation metric as it is most reflective of the high cash flow conversion of TiZir, supported by its ongoing low capital intensity and tax exemption period in Senegal. The free cash flows incorporate TiZir’s external debt position, as the shareholder loans are payable to shareholders and are effectively equity in nature.</p> <p>Given variation in peer ore bodies, operational configuration and asset portfolios across the sector, MDL used a simple average instead of a capitalisation weighted average. MDL believes that this methodology is appropriate.</p> <p>Eramet suggests that specific peers are most comparable to MDL; however, MDL believes that Iluka Resources Limited (ASX: ILU) is MDL’s closest peer (albeit of different size) due to the similarity of their product suites (dominated by high-grade titanium feedstocks and zircon) and vertical integration. Base Resources Limited and Kenmare Resources plc are not appropriate comparators because of their highly differentiated product suites and lack of vertical integration.</p> <p>Eramet understates MDL’s share of production by omitting TiZir’s high-value slag production from MDL’s operational comparison (shown in Figure 1 page 5 of the Second Supplementary Bidder’s Statement). This omission misrepresents TiZir as producing a lower value product mix (similar to Base Resources Limited and Kenmare Resources plc) which have significantly different product suites.</p>
<p><b>9 Section 3 – Page 7:</b> Eramet’s inaccurate commentary about MDL’s ability to provide dividends and distributions to MDL Shareholders in the near term</p>	<p>Based on the TiZir Guidance, MDL expects that from mid-2019 onwards (and consistent with the terms of the TiZir senior secured bonds) TiZir could repay a portion of its shareholders loans which, in turn, <b>would potentially allow MDL to make distributions to its Shareholders in 2019.</b></p>
<p><b>10 Section 3 – Page 7:</b> Eramet’s commentary on the valued working relationship with MDL</p>	<p>Eramet notes that it ‘valued the positive working relationship with MDL’. However, Eramet elected to launch an unsolicited hostile takeover of MDL rather than first talking to its ‘valued’ partner, despite good faith provisions in the Shareholders’ Agreement. This approach sends a clear message to Eramet’s other joint venture partners.</p> <p><b>MDL takes its responsibility as custodian of the joint venture assets for its Shareholders seriously. Your Directors remain mystified as to why Eramet – given the strong working relationship enjoyed in the past – chose not to approach or consult with the Company to discuss an acceptable outcome for MDL Shareholders prior to launching its Offer.</b></p>
<p><b>11 Section 3 – Page 7:</b> Eramet’s inaccurate characterisation of MDL Shareholder’s support for the Offer</p>	<p>MDL wishes to correct misleading statements by Eramet as to the level of support Eramet has received from MDL Shareholders, among other issues. Eramet acquired 13.36% of shares on the day it announced its Offer, far short of the permitted maximum of 19.9%. In addition, a number of major MDL Shareholders have publicly stated their lack of support for the Offer.</p> <p><b>Your Directors understand that no inference of support can be drawn from portfolio decisions to sell MDL shares. Eramet’s characterisation of MDL Shareholder support for its Offer is misleading.</b></p>
<p><b>12 Section 3 – Page 7:</b> Eramet’s misleading description of its financial support to TiZir being greater than MDL’s</p>	<p>MDL rejects the claim that Eramet has provided a ‘disproportionate’ amount of financial support to the TiZir Joint Venture. Since establishment, the financial support provided to TiZir by its owners has always been 50/50.</p> <p>Eramet’s claim of disproportionate financial support appears to be based on the fact that Eramet was required to provide an establishment loan as one of the conditions of the establishment of the TiZir Joint Venture in order to address the value discrepancy between MDL’s higher-valued contribution (being GCO) relative to Eramet’s contribution (being TTI).</p> <p><b>MDL maintains that the establishment loan reflected the commerciality of the deal struck by MDL in the interests of its Shareholders at the commencement of the TiZir Joint Venture.</b></p>



# FREQUENTLY ASKED QUESTIONS

# 3



### 3. FREQUENTLY ASKED QUESTIONS

This Section answers some questions you may have about the Offer. It is not intended to address all relevant issues for Shareholders. This Section should be read in conjunction with all other parts of this Target's Statement.

Question	Answer
<b>The Offer</b>	
<b>What is Eramet offering for my MDL Shares?</b>	Eramet is offering A\$1.46 cash for every MDL Share you hold.
<b>Who is Eramet?</b>	<p>Eramet is the parent entity of the Eramet Group, incorporated in Paris, France.</p> <p>Eramet is MDL's joint venture partner in the TiZir Joint Venture.</p> <p>Eramet and MDL each hold a 50% interest in the TiZir Joint Venture.</p> <p>As at the date of announcing its Offer, Eramet had an interest in approximately 13.36% of MDL Shares.</p> <p>Eramet's relevant interest in 13.36% of MDL Shares includes its relevant interest in 5.33% of MDL Shares held by Ellerston Capital Limited. This parcel of shares is subject to the pre-bid acceptance deed entered into by Ellerston Capital Limited in favour of Eramet dated 27 April 2018, which was attached to Eramet's Form 603: notice of initial substantial holder dated 27 April 2018.</p> <p>Ellerston Capital Limited's acceptance obligations under the pre-bid acceptance deed will be suspended if: (a) (among other matters) a takeover bid for all of the ordinary shares in MDL is made by a party other than Eramet at a price or value per MDL ordinary share which is higher than the Offer Price and which is subject to defeating conditions no less favourable to MDL Shareholders than under the Offer; and (b) Eramet has not yet, by that date, given a notice requiring Ellerston Capital Limited to accept Eramet's Offer, which can occur at any time between 25 May 2018 and the day that is three business days before the end of the period the Offers remain open for acceptance.</p> <p>As at the date of this Target's Statement, Eramet had an interest in approximately 13.36% of MDL Shares.</p>
<b>Did MDL have any knowledge of Eramet's intention to make its Offer?</b>	No. The Offer was unsolicited and made without any prior notice to or consultation with MDL as its joint venture partner. Eramet first informed MDL of its intention to make the Offer just before Eramet lodged its original Bidder's Statement with ASX and ASIC on 27 April 2018.
<b>What choices do I have in response to the Offer?</b>	<p>As a Shareholder you have the following three choices in respect of your MDL Shares:</p> <ul style="list-style-type: none"> <li>• <b>REJECT</b> the Offer and remain an MDL Shareholder – to reject the Offer simply do nothing – ignore all documents sent to you by Eramet. This option is your Directors' unanimous recommendation;</li> <li>• sell your MDL Shares on the ASX (unless you have previously accepted the Offer). As at the date of this Target's Statement, the VWAP of MDL Shares since Eramet announced its Offer is A\$1.60 per Share,<sup>21</sup> representing a premium of 10% to Eramet's Offer Price since the Offer was announced; or</li> <li>• accept the Offer by following the instructions set out in section 1.2 of the Bidder's Statement.</li> </ul> <p>There are implications for you in relation to each of these choices. An outline of these implications is set out in Section 4 of this Target's Statement.</p>
<b>Will MDL remain listed on the ASX ?</b>	<p>That depends on the outcome of the Offer.</p> <p>If Eramet obtains greater than 75% of MDL, Eramet states that it will seek to delist MDL from ASX. Any proposal to delist MDL from ASX will require ASX's consent and may be subject to conditions imposed by ASX. See Section 5.5 for further details.</p>

21 Calculated using the cumulative volume and cumulative value of MDL Shares traded over the period from 27 April 2018 to 21 May 2018 inclusive (source: IRESS). Excludes the 15,666,507 shares acquired by Eramet through off-market purchases on 27 April 2018 and on-market purchases on 27 April 2018 of 147,023 MDL Shares at A\$1.46 per share and 12,802 MDL Shares at A\$1.455 per share as referenced in the Replacement Bidder's Statement.



### 3. FREQUENTLY ASKED QUESTIONS

<b>Does the Offer extend to MDL Performance Rights?</b>	<p>No.</p> <p>However, the Offer will extend to all new MDL Shares that are issued following the exercise or vesting of the MDL Performance Rights (including the 2018 Performance Rights).</p> <p>The impact of the Offer on MDL Performance Rights is set out in Section 5.8 of this Target's Statement.</p> <p>As at the date of this Target's Statement, there are 2,338,209 MDL Performance Rights on issue.</p>
<b>How to respond to the Offer</b>	
<b>What do your Directors recommend?</b>	<p>Your Directors unanimously recommend that you <b>REJECT</b> the Offer, for the reasons set out in Section 1.2 of this Target's Statement.</p> <p>If there is a change to this recommendation or any material developments in relation to the Offer, MDL will keep you fully informed.</p>
<b>What do your Directors intend to do with their own Shares?</b>	<p>Your Directors recommend to: <b>REJECT</b> the Offer. Each of your Directors intends, for all MDL Shares held by them or in which they otherwise have a relevant interest, to act in accordance with their recommendation from time to time to Shareholders.</p>
<b>What does the Independent Expert say?</b>	<p>The Independent Expert has concluded that the Offer is <b>NEITHER FAIR NOR REASONABLE</b>. The Independent Expert has assessed the full underlying value of MDL Shares to be in the range of A\$2.04 to A\$2.52 per Share. See further Section 1.2 (Reason 1). The Independent Expert's Report is included in Appendix 1 to this Target's Statement.</p> <p>As part of the preparation of the Independent Expert's Report, the Independent Expert engaged an Independent Technical Specialist, AMC Consultants Pty Ltd, to prepare an Independent Technical Specialist's Report. The Independent Technical Specialist's Report provides detailed information about the technical aspects of MDL's business (specifically, the TiZir Joint Venture). The Independent Technical Specialist's Report is included in Appendix 1 to this Target's Statement (as Appendix 4 of the Independent Expert's Report).</p>
<b>When do I have to make a decision?</b>	<p>If you wish to follow your Directors' recommendation to <b>REJECT</b> the Offer, you do not need to do anything. You should <b>IGNORE</b> all documents received from Eramet.</p> <p>If you wish to accept the Offer, you must do so before its scheduled closing date. Eramet has stated that its Offer remains open until 7.00pm (Sydney time) on 21 June 2018. Eramet has reserved the right to extend the Offer Period in accordance with the Corporations Act. In addition, the Offer Period may be extended automatically in certain circumstances. See Section 5.7 of this Target's Statement for details of the circumstances in which the Offer Period can be extended.</p>
<b>Will Eramet increase its Offer?</b>	<p>Eramet has not declared its Offer to be final. Accordingly, it remains open for Eramet to increase its Offer if it chooses.</p> <p>However, MDL cannot say whether Eramet will in fact increase its Offer as this is a matter for Eramet.</p>
<b>What happens if Eramet increases its Offer or another offer emerges?</b>	<p>If Eramet increases its Offer or another offer emerges, your Directors will carefully consider the revised offer and advise Shareholders accordingly.</p>

<b>What happens if I accept the Offer and a superior offer is subsequently made by a third party for my MDL Shares?</b>	<p>If you accept the Offer, you are only able to withdraw your acceptance before the Offer Period ends in one limited circumstance: you may withdraw your acceptance if Eramet varies its Offer in a way that postpones for more than one month the time by which Eramet must meet its obligations under its Offer, for example, if Eramet extends the Offer Period for more than one month while its Offer remains conditional.</p> <p>Accordingly, if you accept the Offer, you will be unable to accept any other superior offer that may emerge. Since the announcement of the Offer, MDL has engaged with third parties regarding potential alternative proposals to deliver greater value for the benefit of all MDL Shareholders. To that end, a data room has been established and multiple international parties continue to engage in a process that has been established by the MDL Board to facilitate superior bids. MDL will update MDL Shareholders on any material developments relating to this process.</p>
<b>What happens if I do nothing?</b>	<p>You will remain an MDL Shareholder.</p> <p>If Eramet acquires between 50% and 90% of MDL Shares and Eramet's Offer becomes unconditional, you will be a minority shareholder in MDL. The implications of this outcome are described in Section 5.4 of this Target's Statement.</p> <p>If Eramet acquires 90% or more of MDL's Shares, Eramet states that it intends to compulsorily acquire your MDL Shares. See Section 5.6 of this Target's Statement for more details.</p>
<b>What are the risks associated with continuing to hold MDL Shares?</b>	Those risks are outlined in Section 6.6 of this Target's Statement.
<b>If I accept the Offer now, can I withdraw my acceptance later?</b>	<p>Generally, no.</p> <p>You may only withdraw your acceptance before the Offer Period ends if Eramet varies its Offer in a way that postpones the period Eramet is required to satisfy its obligations by more than one month and Eramet's Offer is still subject to one or more Conditions. This circumstance will occur if Eramet extends the Offer Period by more than one month while Eramet's Offer is still subject to any Condition.</p>
<b>Can Eramet extend the closing date of its Offer?</b>	<p>Yes. Eramet has stated that its Offer remains open until 7.00pm (Sydney time) on 21 June 2018. Eramet has reserved the right to extend the Offer Period in accordance with the Corporations Act.</p> <p>In addition, the Offer Period may be extended automatically in certain circumstances. See Section 5.7 of this Target's Statement for details of the circumstances in which the Offer Period can be extended.</p>
<b>Can I be forced to sell my MDL Shares?</b>	<p>You cannot be forced to sell your MDL Shares unless Eramet is legally allowed to proceed to compulsory acquisition of MDL Shares. You may be forced to sell your shares if Eramet acquires at least 90% of all MDL Shares (under the Offer or otherwise) and elects to proceed to compulsorily acquire the outstanding MDL Shares.</p> <p>If Eramet does compulsorily acquire the outstanding MDL Shares, you will receive the same Offer Price for your MDL Shares that you would have received under the Offer, but it will take longer for you to receive the Offer Consideration.</p> <p>For more information about compulsory acquisition refer to Section 5.6 of this Target's Statement.</p>
<b>Can I accept the Offer for only some of my MDL Shares?</b>	No. The terms of the Offer allow you to accept the Offer for only <b>all</b> of your MDL Shares. Special rules apply to nominees and others holding shares for different accounts.

### 3. FREQUENTLY ASKED QUESTIONS

<b>When will I be paid if I accept the Offer?</b>	<p>It is important to understand that even if you accept Eramet's Offer, you will not receive any cash unless all of the Conditions are satisfied or waived.</p> <p>If Eramet's Offer becomes unconditional, you will receive your Offer Consideration by the earlier of:</p> <ul style="list-style-type: none"> <li>• one month after the date of your acceptance of Eramet's Offer or, if Eramet's Offer is subject to a Condition when you accept Eramet's Offer, within one month after the contract arising from your acceptance of Eramet's Offer becomes unconditional; and</li> <li>• 21 days after the end of the Offer Period.</li> </ul>
<b>Will I need to pay brokerage or stamp duty if I accept the Offer?</b>	<p>If your MDL Shares are registered in your name in an Issuer Sponsored Holding (your SRN starts with an 'I'), you will not incur any brokerage fees or pay stamp duty in connection with your acceptance of Eramet's Offer.</p> <p>If your MDL Shares are registered in a CHESS Holding (your HIN starts with an 'X'), or if you are a beneficial owner whose Shares are registered in the name of a broker, bank, custodian or other nominee, you will not pay stamp duty by accepting Eramet's Offer. However, you should ask your Controlling Participant (usually your broker) or nominee whether it will charge any transactional fees or service charges in connection with acceptance of Eramet's Offer.</p> <p>You may incur brokerage costs if you choose to sell your MDL Shares on the ASX.</p>
<b>Are there any taxation implications of accepting the Offer?</b>	<p>A general outline of the tax implications for certain Australian-resident MDL Shareholders of accepting the Offer is set out in Section 7 of this Target's Statement. As that outline is general in nature and does not take into account your individual circumstances, you should not rely on that outline as advice for your particular circumstances.</p> <p>You should seek your own independent advice on the taxation implications applicable to your specific circumstances.</p>
<b>Are there any conditions to the Offer?</b>	<p>Yes, Eramet's Offer is subject to a number of conditions:</p> <ul style="list-style-type: none"> <li>• 50.01% minimum acceptance condition (on a fully diluted basis);</li> <li>• no regulatory actions;</li> <li>• no material adverse change;</li> <li>• no material acquisitions, disposals and other matters; and</li> <li>• no prescribed occurrences.</li> </ul> <p>The Conditions are set out in full in section 9.7 of the Bidder's Statement.</p> <p>To receive the Offer Consideration, all of the Conditions must be satisfied or waived by Eramet before the Closing Date of Eramet's Offer.<sup>22</sup> Please refer to Section 5.2 of this Target's Statement for a discussion of the Conditions and their implications.</p>
<b>Are there any risks in accepting Eramet's Offer while it is still conditional?</b>	<p>Yes. If you accept Eramet's Offer now while Eramet's Offer is subject to Conditions, there are significant consequences for you including the following:</p> <ul style="list-style-type: none"> <li>• you will give up your right to sell your MDL Shares on the ASX or to otherwise deal with them (for example, by accepting any superior offer from another bidder if such an offer is made); and</li> <li>• you will relinquish control of your MDL Shares and the Rights attaching to them to Eramet with no guarantee of payment until Eramet's Offer becomes unconditional,</li> </ul> <p>subject in each case to your right to withdraw your acceptance of Eramet's Offer in the limited circumstance outlined above in response to the question 'If I accept the Offer now, can I withdraw my acceptance later?'.</p>

22 Or in the case of Condition 9.7(e) *No Prescribed Occurrences during the Offer Period*, by the end of three Business Days after the end of the Offer Period.

<b>What happens if I accept Eramet's Offer and the Conditions are not satisfied or waived?</b>	<p>If the Conditions are not satisfied and Eramet has not waived the Conditions before the end of the Offer Period,<sup>23</sup> Eramet's Offer will lapse and your acceptance of Eramet's Offer will be void and of no effect whatsoever. In this circumstance it means that:</p> <ul style="list-style-type: none"> <li>• you will not receive any payment for your MDL Shares from Eramet; and</li> <li>• you will continue to own your MDL Shares and you will then be free to deal with them.</li> </ul>
<b>How will I know if Eramet's Offer becomes unconditional?</b>	<p>Eramet is required to inform MDL, ASX and Shareholders as soon as any Conditions are satisfied or waived.</p> <p>Notices from Eramet will be available via MDL's ASX company announcements platform.</p> <p>Eramet has set 13 June 2018 as the date on which it will give MDL and ASX a notice required by law on the status of the Offer Conditions. This date will be extended if the Offer Period is extended.</p>
<b>What will happen to the TiZir Joint Venture while this is going on?</b>	<p>The TiZir Joint Venture will continue to operate as a joint venture, with the Joint Operating Committee (<b>JOC</b>) still monitoring its operational and financial performance as it has done since late 2017.</p> <p>There will be no change to its operations during the Offer Period.</p>
<b>If the takeover bid is not successful, how might this impact the joint venture relationship and the day-to-day management activities going forward?</b>	<p>TiZir will continue to operate as a joint venture, with the JOC still monitoring its operational and financial performance as it has done since late 2017.</p> <p>There will be no material change to its operations or corporate structure, unless agreed upon by the TiZir Board in accordance with the Shareholders' Agreement and the Articles of Association of TiZir.</p>
<b>What if I have further questions?</b>	<p>You should contact your legal, financial, taxation or other professional adviser. If you have any questions about Eramet's Offer or this document please call the MDL office directly on +61 3 9618 2500 (Monday to Friday between 9.00am and 5.30pm (AEST)) or via email <a href="mailto:mdlmail@mineraldeposits.com.au">mdlmail@mineraldeposits.com.au</a>.</p> <p>If you have questions about your MDL shareholding, please contact Computershare directly</p> <p>Phone: 1300 850 505 (within Australia)</p> <p>Phone: +61 3 9415 4000 (outside Australia)</p> <p>Fax: +61 3 9473 2500</p> <p>Email: <a href="mailto:web.queries@computershare.com.au">web.queries@computershare.com.au</a></p>

<sup>23</sup> Or in the case of Condition 9.7(e) *No Prescribed Occurrences during the Offer Period*, by the end of three Business Days after the end of the Offer Period.

# YOUR CHOICES AS AN MDL SHAREHOLDER

# 4



## 4. YOUR CHOICES AS AN MDL SHAREHOLDER

Your Directors unanimously recommend that you **REJECT** the Offer.

You have the following three choices available to you:

### 1. REJECT THE OFFER

To **REJECT** the Offer, you should do nothing. You are not required to take any action to reject the Offer. In particular, you should not complete or return the Acceptance Form that accompanied the Bidder's Statement nor should you respond to any documentation sent to you by Eramet or any other communication from Eramet (including telephone solicitation or canvassing by Eramet or its representatives).

If you decide to do nothing, you should be aware of the risks associated with rejecting the Offer, including the rights of Eramet to compulsorily acquire your MDL Shares in certain circumstances. For further information on these risks, refer to Section 5.3(a) of this Target's Statement.

### 2. SELL YOUR MDL SHARES ON THE ASX

During the Offer Period, you may sell your MDL Shares on-market through ASX at the prevailing market price for cash (less any brokerage), provided you have not already accepted the Offer for those Shares.

As at the date of this Target's Statement, the VWAP of MDL Shares since Eramet announced its Offer is A\$1.60 per Share,<sup>24</sup> representing a premium of 10% to Eramet's Offer Price since the Offer was announced.

The latest trading price for MDL Shares may be obtained from the ASX website [www.asx.com.au](http://www.asx.com.au) using the code MDL.

If you sell your MDL Shares on-market, you will receive the consideration for that sale of your Shares sooner than if you accept Eramet's Offer. If you sell your MDL Shares on-market, you:

- will lose the ability to accept Eramet's Offer and receive the Offer Consideration (and any possible increase in the Offer Consideration) in relation to those Shares;
- will lose the ability to accept any offer from a competing bidder if one eventuates;
- may incur a brokerage charge;
- will lose the opportunity to receive future returns from MDL in relation to those MDL Shares; and
- may receive consideration for your Shares the value of which is lower than the control value of your MDL Shares as assessed by the Independent Expert.

You should contact your broker for information on how to sell your MDL Shares through ASX and your tax adviser to determine your tax implications from such a sale.

### 3. ACCEPT THE OFFER

MDL Shareholders who accept Eramet's Offer:

- will not receive the Offer Consideration unless and until each of the Conditions of Eramet's Offer are satisfied or waived;
- will not be able to withdraw their acceptance and sell their MDL Shares, meaning that they would not be able to accept any offer from a competing bidder if one eventuates, except in certain limited circumstances. See Section 5.7 of this Target's Statement; and
- will exit their investment in MDL completely and will not benefit if the market price for MDL Shares on the ASX trades above the Offer Price.

If Eramet increases the Offer Consideration, all MDL Shareholders, whether or not they have already accepted Eramet's Offer before then, will be entitled to receive the increased Offer Consideration.

Refer to section 1.2 of the Bidder's Statement for directions on how to accept the Offer.

<sup>24</sup> Calculated using the cumulative volume and cumulative value of MDL Shares traded over the period from 27 April 2018 to 21 May 2018 inclusive (source: IRESS). Excludes the 15,666,507 shares acquired by Eramet through off-market purchases on 27 April 2018 and on-market purchases on 27 April 2018 of 147,023 MDL Shares at A\$1.46 per share and 12,802 MDL Shares at A\$1.455 per share as referenced in the Replacement Bidder's Statement.



# INFORMATION ABOUT THE OFFER & OTHER IMPORTANT ISSUES

# 5



## 5. INFORMATION ABOUT THE OFFER & OTHER IMPORTANT ISSUES

### 5.1 SUMMARY OF THE OFFER

<b>The Offer</b>	<p>Eramet is offering to acquire all of your MDL Shares.</p> <p>You may accept the Offer for only <b>all</b> of your MDL Shares. You cannot accept the Offer for <b>part</b> of your holding.</p>
<b>Offer Price</b>	<p>Eramet is offering A\$1.46 cash for every one MDL Share you hold.</p> <p>The Offer Consideration will only be received if all of the Conditions of Eramet's Offer are satisfied or waived.</p>
<b>Conditions</b>	<p>Eramet's Offer is subject to a number of Conditions. See Section 5.2 of this Target's Statement for further details of your Directors' assessment of these Conditions.</p> <p>The Offer Consideration will only be received if all of the Conditions of Eramet's Offer are satisfied or waived.</p>
<b>Eramet has not yet declared its Offer final</b>	<p>Eramet has not declared its Offer final. Accordingly, it remains open for Eramet to increase the Offer Consideration, which Eramet may at its discretion choose to do, following any negotiation with the MDL Board or in response to any competing takeover or other similar proposal being announced by a third party.</p> <p>If Eramet increases the Offer Consideration, all MDL Shareholders, whether or not they have already accepted Eramet's Offer before then, will be entitled to receive that increased Offer Consideration.</p> <p>Nevertheless, there are still substantial risks in accepting Eramet's Offer while it remains conditional. See Section 5.2 of this Target's Statement for further details.</p>
<b>Offer closing date</b>	<p>Eramet's Offer is scheduled to close at 7.00pm (Sydney time) on 21 June 2018 unless Eramet's Offer is extended or withdrawn.</p>
<b>Procedural aspects</b>	<p>The Offer Period may be extended by Eramet.</p> <p>The Offer Period may be required by law to be extended in certain circumstances.</p> <p>Eramet's Offer may be withdrawn in limited circumstances.</p> <p>Eramet must notify MDL and the ASX on the status of Conditions by a certain date.</p> <p>If you accept Eramet's Offer and all of the Conditions are satisfied or waived, Eramet is required to provide your Offer Consideration within a certain timeframe.</p> <p>These and other procedural aspects of Eramet's Offer are outlined in Section 5.7 of this Target's Statement.</p>

### 5.2 CONDITIONS OF ERAMET'S OFFER

Eramet's Offer is subject to a number of Conditions which are set out in full in section 9.7 of the Bidder's Statement.

Unless all of these Conditions are satisfied or waived by Eramet before the end of the Offer Period,<sup>25</sup> Eramet's Offer will lapse and no Offer Consideration will be received by any MDL Shareholders who have accepted Eramet's Offer. Furthermore, MDL Shareholders who accept Eramet's Offer will lose the ability to deal with their MDL Shares including accepting any potential higher competing offer, except in certain limited circumstances.

When considering how these Conditions might affect the prospects of success of Eramet's Offer, you should be aware of the following matters which are set out more fully in the table below:

- many of the Conditions are wholly or partly out of MDL's control;
- there is no certainty on whether the Conditions will be satisfied; and
- many of the Conditions require MDL to take (or refrain from taking) various actions, where satisfying those Conditions may not be in the interests of MDL Shareholders.

<sup>25</sup> Or in the case of Condition 9.7(e) *No Prescribed Occurrences during the Offer Period*, by the end of three Business Days after the end of the Offer Period.

## 5. INFORMATION ABOUT THE OFFER & OTHER IMPORTANT ISSUES

Condition (adopting the Condition numbering in section 9.7 of the Bidder's Statement) <sup>26</sup>	Likely to be satisfied?
<b>1 50.01% Minimum Acceptance Condition:</b> Eramet has a relevant interest in such number of Shares which represent at least 50.01% of all the Shares (on a fully diluted basis).	Unknown. This Condition is wholly outside MDL's control.
<b>2 No regulatory action:</b> there is no regulatory action by any Public Authority in consequence of or in connection with the Offer which restrains, prohibits or impedes the Offer.	Unknown. This Condition is in most circumstances outside MDL's control.
<b>3 No material adverse change:</b> no event, change, condition, matter or occurrence which results in or is reasonably likely to result in: <ul style="list-style-type: none"> <li>• a diminution in the value of the net assets of the MDL Group, taken as a whole, by at least A\$10 million;</li> <li>• a diminution in the value of the consolidated net assets of the TiZir Group, taken as a whole, by at least A\$20 million; or</li> <li>• a diminution in the value of the consolidated earnings before interest, tax, depreciation and amortisation of the TiZir Group, taken as a whole, by at least A\$8 million in any financial year of the TiZir Group.</li> </ul>	Unknown. Nothing has come to the attention of the MDL Board which indicates that this Condition will not be satisfied. However, unforeseen events may emerge during the Offer Period which are partially or wholly outside MDL's control and which may lead to a breach of this Condition.
<b>4 No material acquisitions, disposals or commitments:</b> MDL Group enters into any new material transactions (acquisitions, disposals or new commitments such as capital expenditure, subject to various exclusions that allow transactions below certain financial thresholds).	<p>Potentially not. MDL is not currently aware of any matters that have arisen since the Announcement Date, or which are reasonably likely to arise during the Offer Period, which are likely to breach this Condition.</p> <p>Nevertheless, while the MDL Board does not consider it appropriate to deliberately frustrate the Offer, given the overall extent to which this Condition restricts MDL's activities over a potentially lengthy period and the relatively low financial thresholds, your Directors consider that it is possible that by pursuing opportunities in the interests of MDL Shareholders this Condition could be breached in the future.</p> <p>MDL will make any decision to pursue such an opportunity, or take any other action, having regard to the best interests of MDL Shareholders, the fiduciary duties of MDL and its Directors and the applicable policies of the Takeovers Panel. In those circumstances, Eramet would then need to determine whether it will rely on a breach of this Condition.</p> <p>If Eramet decides to rely on a breach of this Condition, Eramet will not proceed with the Offer and any contract resulting from an acceptance will become void.</p>
<b>5 No prescribed occurrences:</b> No prescribed occurrences (being the occurrences listed in section 652C of the Corporations Act) happen	Unknown. Nothing has come to the attention of the Board which indicates that this Condition will not be satisfied.

<sup>26</sup> This table provides a summary of the Conditions only. The Conditions are set out in full in section 9.7 of the Bidder's Statement.

### 5.3 RISKS ASSOCIATED WITH THE OFFER

MDL Shareholders should be aware of the following key risks associated with the Offer.

#### **(a) Risks associated with rejecting the Offer**

If you choose to reject the Offer, you will not receive the Offer Price for your MDL Shares. Instead you will remain an MDL Shareholder and will continue to be subject to the risks associated with holding MDL Shares. A non-exhaustive summary of those risks is set out in Section 6.6 of this Target's Statement.

If you choose to reject the Offer and Eramet acquires less than 90% of MDL Shares, you will also be exposed to the minority shareholder risks described in Section 5.4 of this Target's Statement.

#### **(b) Risks associated with accepting the Offer**

If you accept Eramet's Offer you are only able to withdraw your acceptance in the following limited circumstance: if Eramet varies the Offer in a way that postpones for more than one month the time by which Eramet must meet its obligations under the Offer. This circumstance will occur if Eramet extends the Offer Period by more than one month and Eramet's Offer is still subject to Conditions.

Accordingly, if you accept Eramet's Offer now while it is conditional, some of the consequences include the following (subject to your right to withdraw your acceptance of Eramet's Offer in the limited circumstance described above):

- you will give up your right to sell your MDL Shares on the ASX or otherwise deal with them (relinquishing your right, for example, to participate in a superior offer should one eventuate); and
- you will relinquish control of your MDL Shares and the Rights attaching to them to Eramet with no guarantee of payment until Eramet's Offer becomes unconditional.

The effect of accepting Eramet's Offer is set out in section 9.5 of the Bidder's Statement. MDL Shareholders should read those provisions in full to understand the effect that acceptance will have on their ability to exercise the Rights attaching to their MDL Shares and the representations and warranties which they give by accepting Eramet's Offer.

In particular, MDL Shareholders should note that on Eramet's Offer, or any contract resulting from the acceptance of Eramet's Offer, becoming unconditional, Eramet will be entitled to attend meetings of MDL and vote on accepting MDL Shareholders' behalf in respect of their MDL Shares to defeat resolutions relating to competing offers which may adversely affect the success of Eramet's Offer.

In addition, if you accept the Offer, you will no longer be eligible to access the benefits of remaining an MDL Shareholder. Those benefits include the opportunity to participate in:

- the future value that your Directors expect will be created from MDL as a result of the maturity of the TiZir Joint Venture, the full value of which the Board considers has not yet been realised; and
- any potential increase in the MDL Share price above the Offer Price.

### 5.4 CONSEQUENCES OF ERAMET ACQUIRING LESS THAN 90% OF MDL

If Eramet acquires more than 50% but less than 90% of the MDL Shares then, assuming all Conditions to Eramet's Offer are satisfied or waived, Eramet will acquire a majority shareholding in MDL.

In those circumstances, MDL Shareholders who do not accept Eramet's Offer will become minority shareholders of MDL. This outcome has a number of possible implications, including:

- Eramet will be in a position to cast the majority of votes at a general meeting of MDL, enabling Eramet to control the composition of MDL's board of directors and senior management and the strategic direction of MDL and its subsidiaries;
- the MDL Share price may fall immediately following the end of the Offer Period although this may be mitigated by the underlying attractiveness of MDL's business;
- the liquidity of MDL Shares may be lower than at present, and there is a risk that MDL could be fully or partially removed from certain S&P/ASX market indices due to lack of free float and/or liquidity;
- if the number of MDL Shareholders is less than that required by the ASX Listing Rules to maintain an ASX listing then Eramet may seek to have MDL removed from the official list of the ASX. If this occurs, MDL Shares will not be able to be bought or sold on the ASX; and
- Eramet and MDL will not be able to form an income tax consolidated group.

## 5. INFORMATION ABOUT THE OFFER & OTHER IMPORTANT ISSUES

In addition, if Eramet acquires 75% or more of the MDL Shares it will be able to pass a special resolution at a meeting of MDL Shareholders which, among other things, would enable Eramet to pass amendments to MDL's constitution.

If Eramet's Offer lapses or if Eramet acquires less than 50% of MDL Shares, the trading price of MDL Shares may be higher or lower than the implied value of the Offer Consideration. If you remain an MDL Shareholder in this circumstance, you will continue to enjoy the rewards, and be subject to the risks, of being an MDL Shareholder.

### 5.5 POTENTIAL DELISTING

Eramet states in its Bidder's Statement that if it obtains greater than 90% of MDL, Eramet will seek to delist MDL from ASX. Alternatively, if Eramet obtains less than 90% of MDL, Eramet states that it will also seek to delist MDL from ASX. Therefore, there is a possibility of MDL being delisted following the Offer. If this occurs, MDL Shares will not be able to be bought or sold on the ASX.

As at the date of this Target's Statement, your Directors consider that it is **highly unlikely** that MDL faces imminent delisting. **Your Directors wish to emphasise the following important legal protections to Shareholders regarding any potential delisting of MDL:**

- Any decision to apply to the ASX to delist MDL would need to be made by the MDL Board, not by Eramet as the controlling Shareholder.
- The MDL Board, including nominee directors appointed by Eramet, could only decide to seek a delisting if the Board concludes that this action is in the best interest of MDL and its Shareholders as a whole, at the relevant time.
- Your Directors currently consider that the disadvantages for Shareholders of delisting outweigh any potential benefits. Therefore, your Directors' current intention would be to vote against any Board proposal to delist MDL (however, your Directors' views may change depending on future circumstances including the final level of control achieved by Eramet at the end of the Offer).
- Even if (a majority of) the Board resolved to delist MDL from ASX, this action would still require the ASX's consent and is likely to be subject to conditions imposed by ASX.
- ASX states<sup>27</sup> that it will use its discretion to ensure that the delisting of any entity is being sought for acceptable reasons. For example, ASX notes that a request to remove an entity from the ASX that is primarily or solely aimed at denying minority shareholders a market for their securities, in order to coerce them into accepting an offer from a controlling shareholder to buy out their securities, would be an unacceptable reason for requesting removal from the official list.
- The ASX applies a number of guidelines to safeguard the interests of minority shareholders in the context of any proposed delisting.
- A key ASX guideline is that the approval of MDL minority shareholders would most likely be needed for the ASX to allow delisting unless each of the following three conditions are met: (a) Eramet has at least 75% control of MDL at the time delisting is sought and (b) there are *fewer than 150* MDL Shareholders (excluding Eramet and its related bodies corporate) whose shareholding is worth at least A\$500. As at the date of this Target's Statement, MDL has approximately **2,414** Shareholders; and (c) the Offer remains open for at least an additional two weeks after Eramet attains at least 75% control of MDL.

If, despite the above procedural protections, MDL is ultimately delisted at some point in the future, any remaining Shareholders would be holders of unlisted shares. A delisting would result in a number of disadvantages for Shareholders such as:

- the absence of an orderly, transparent and timely mechanism for share trading.
- restricted information compared to that currently provided. MDL would no longer be subject to the continuous disclosure requirements of the ASX Listing Rules. If MDL remains a public company after delisting and has at least 100 members, MDL would still be required to disclose material information to ASIC. Nevertheless, the level of shareholder reporting in these circumstances could be diminished.
- the ceasing of various requirements and protections for minority shareholders under the ASX Listing Rules. Examples of provisions that would cease to apply include: restrictions on the issue of new securities, a governance framework for related party transactions and requirements to seek Shareholder approval for significant changes in the nature or scale of MDL's activities.

27 See ASX Guidance Note 33 which sets out ASX's policy in relation to a delisting request.



## 5.6 COMPULSORY ACQUISITION

### (a) Compulsory acquisition following the Offer

Eramet states in its Bidder's Statement that if it becomes entitled to proceed to compulsorily acquire outstanding MDL Shares at the end of the Offer Period under Part 6A.1 of the Corporations Act, it intends to do so.

If you choose to reject the Offer, you will only have your Shares compulsorily acquired if, by the end of the Offer Period, Eramet:

- increases its ownership interest from approximately 13.36% as at the date of this Target's Statement to at least 90%; and
- acquires at least 75% of the MDL Shares that Eramet offered to acquire (excluding MDL Shares in which Eramet had a relevant interest at the date of Eramet's Offer).

If these thresholds are met, Eramet will have one month after the end of the Offer Period within which to give compulsory acquisition notices to Shareholders who have not accepted Eramet's Offer.

In this regard, MDL's largest Shareholder, Allan Gray Australia Pty Ltd, owns 26,410,971 MDL Shares, representing 13.41% of all MDL Shares currently on issue. In addition, MDL's third largest Shareholder, L1 Capital Pty Ltd, owns 23,174,553, representing 11.76% of all MDL Shares currently on issue. If either Allan Gray or L1 Capital do not accept the Offer for their respective MDL Shares, it will be impossible for Eramet to proceed to compulsory acquisition under the current Offer.

### (b) Future compulsory acquisition by Eramet

Even if Eramet does not satisfy the compulsory acquisition threshold referred to in Section 5.6(a) of this Target's Statement, it is possible that Eramet will, at some time after the end of the Offer Period, become the beneficial holder of 90% of the MDL Shares. Eramet would then have rights to compulsorily acquire MDL Shares not owned by it within six months of becoming a 90% holder. The price for compulsory acquisition under this procedure would have to be considered in a report of an independent expert at the relevant time.

### (c) Challenging compulsory acquisition

MDL Shareholders have statutory rights to challenge any compulsory acquisition. However, a successful challenge will require the relevant MDL Shareholders to establish to the satisfaction of a court that the terms of the Offer do not represent *fair value* for the MDL Shares.

If MDL Shares are compulsorily acquired, Shareholders who have their MDL Shares compulsorily acquired are not likely to receive payment for their MDL Shares until at least one month after the compulsory acquisition notices are dispatched to them.

## 5.7 PROCEDURAL ASPECTS OF THE OFFER

<b>Extension of the Offer Period</b>	<p>Eramet may extend the Offer Period at any time before giving the Notice of Status of Conditions (referred to below) while Eramet's Offer is subject to Conditions.</p> <p>However, if Eramet's Offer becomes unconditional (that is, if all the Conditions are satisfied or waived), Eramet may extend the Offer Period at any time before the end of the Offer Period.</p> <p>In addition, there will be an automatic extension of the Offer Period if, within the last seven days of the Offer Period:</p> <ul style="list-style-type: none"><li>• Eramet improves the Offer Consideration; or</li><li>• Eramet's voting power in MDL increases to more than 50%.</li></ul> <p>If either of these two events occur, the Offer Period is automatically extended so that it ends 14 days after the occurrence of the relevant event.</p> <p>The maximum duration of the Offer Period is 12 months.</p>
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## 5. INFORMATION ABOUT THE OFFER & OTHER IMPORTANT ISSUES

<b>Notice of status of Conditions</b>	<p>Section 9.10 of the Bidder's Statement states that Eramet will give a Notice of Status of Conditions to the ASX and MDL on 13 June 2018.</p> <p>Eramet is required to set out in its Notice of Status of Conditions:</p> <ul style="list-style-type: none"> <li>• whether Eramet's Offer is free of any or all of the Conditions;</li> <li>• whether so far as Eramet knows, any of the Conditions have been satisfied; and</li> <li>• Eramet's voting power in MDL.</li> </ul> <p>If the Offer Period is extended by a period before the current date by which the Notice of Status of Conditions is to be given (13 June 2018), the date for giving the Notice of Status of Conditions will be taken to be postponed for the same period. In those circumstances, Eramet is required, as soon as practicable after the extension, to give a notice to the ASX and MDL that states the new date for the giving of the Notice of Status of Conditions.</p> <p>If a Condition is satisfied during the Offer Period, but before the date on which the Notice of Status of Conditions is required to be given, Eramet must as soon as practicable give the ASX and MDL a notice that states that the particular Condition has been satisfied.</p> <p>As at the date of this Target's Statement, Eramet had not given notice that any of the Conditions have been satisfied or waived.</p>
<b>Withdrawal of Offer</b>	<p>Eramet may withdraw its Offer at any time but only in limited circumstances with the written consent of ASIC and subject to the conditions (if any) specified in ASIC's consent.</p>
<b>Effect of acceptance</b>	<p>If you accept the Offer, then you will give up your right to sell your MDL Shares on-market or to sell your Shares to any other person who may make a takeover bid or to otherwise deal with your Shares in any manner.</p>
<b>Limited ability to withdraw your acceptance</b>	<p>If you accept Eramet's Offer, you only have limited rights to withdraw your acceptance.</p> <p>You may only withdraw your acceptance of Eramet's Offer if Eramet varies its Offer in a way that postpones, for more than one month, the time when Eramet needs to meet its obligations under the Offer. This will occur if Eramet extends the Offer Period by more than one month and the Offer is still subject to Conditions.</p>
<b>Timing for receipt of Offer Consideration if you accept</b>	<p>The terms of Eramet's Offer are that no Offer Consideration for any MDL Shares accepted into the Offer will be made by Eramet until the Offer becomes unconditional.</p> <p>If Eramet's Offer becomes unconditional, you will receive your Offer Consideration by the earlier of:</p> <ul style="list-style-type: none"> <li>• one month after the date of your acceptance of Eramet's Offer or, if the Offer is subject to a Condition when you accept the Offer, within one month after the contract arising from your acceptance of Eramet's Offer becomes unconditional; and</li> <li>• 21 days after the end of the Offer Period.</li> </ul> <p>Refer to section 9.6 of the Bidder's Statement for further details on when you will receive your Offer Consideration from Eramet.</p>
<b>Effect of an improvement in Offer Consideration for Shareholders who have already accepted</b>	<p>If Eramet increases the Offer Consideration, all MDL Shareholders, whether or not they have already accepted Eramet's Offer before then, will be entitled to receive that increased Offer Consideration.</p>
<b>Lapse of Eramet's Offer</b>	<p>Eramet's Offer will lapse if the Conditions are not satisfied or waived by the end of the Offer Period, in which case all contracts resulting from acceptance of Eramet's Offer and all acceptances that have not resulted in binding contracts are void. In that situation, you will remain an MDL Shareholder and will be free to deal with your MDL Shares as you see fit.</p>

## 5.8 EFFECT OF THE OFFER ON MDL PERFORMANCE RIGHTS PLAN

MDL operates a performance rights plan as part of its remuneration strategy for executives and employees, being the MDL Performance Rights Plan.

The objective of the MDL Performance Rights Plan is to reward employees through aligning this element of remuneration with accretion in long-term shareholder wealth.

Under the MDL Performance Rights Plan, senior executives and other employees may receive the issue of rights to acquire MDL Shares where certain performance hurdles determined by the Board are satisfied (**MDL Performance Rights**). Each MDL Performance Right entitles the holder to one share upon vesting and exercise. There is no exercise price pertaining to the MDL Performance Right and an MDL Performance Right carries no voting or dividend rights.

As at the date of this Target's Statement, the holders of MDL Performance Rights are as set out in the table below:

Rights Holder	Number of MDL Performance Rights
Robert Sennitt <sup>28</sup>	999,234
Jozsef Patarica	639,510
Gregory Bell	399,694
Michaela Evans	299,771
<b>Total</b>	<b>2,338,209</b>

In addition to the above, MDL has proposed to issue up to 702,689 MDL Performance Rights under the MDL Performance Rights Plan, further details of which are set out in MDL's notice of annual general meeting released to the ASX on 23 April 2018 (**2018 Performance Rights**).

In summary, the Offer will have the following consequences on the MDL Performance Rights:

Under the terms of the MDL Performance Rights Plan, all unvested MDL Performance Rights will automatically vest if a *Change of Control Event* occurs. A *Change of Control Event* is defined under the MDL Performance Rights Plan to include when a 'Takeover Bid' (as defined in the Corporations Act) is made for the MDL Shares that has the sufficient support of shareholders which results in the bidder acquiring a 'Relevant Interest' (as defined in the Corporations Act) in at least 50% of the Shares.

The Offer is a 'Takeover Bid' and, accordingly, if Eramet's relevant interest in MDL as a result of acceptances under the Offer increases to at least 50%, all unvested MDL Performance Rights will automatically vest on either the day on which the *Change of Control Event* occurs or, if the MDL Board determines that it expects a *Change of Control Event* to occur, the day determined by the Board.

The proportion of MDL Performance Rights held by a holder of MDL Performance Rights that will vest will depend on the Absolute Total Shareholder Return performance hurdle (**Absolute TSR hurdle**).

The Absolute TSR measures the compound annual growth rate (**CAGR**) of MDL from the date of issue of the MDL Performance Rights up to the date of vesting (in this instance, the date the *Change of Control Event* occurs). Under the Absolute TSR hurdle, vesting will occur on a proportionate straight-line basis depending on the level of CAGR. If a 25% CAGR is achieved, the MDL Performance Rights will vest on a 100% basis.

Based on the Offer Price of A\$1.46, the performance level of 25% CAGR will be achieved for all MDL Performance Rights on issue. Accordingly, all of the MDL Performance Rights on issue will vest on a 100% basis to the holder (i.e. there will be no proportionate vesting of MDL Performance Rights).

All vested MDL Performance Rights may then be exercised by a holder of MDL Performance Rights, following which new MDL Shares will be issued to the holders of the MDL Performance Rights. These new MDL Shares will then be allowed to participate in Eramet's Offer.

Any vested MDL Performance Rights that are not exercised will expire either five business days after the occurrence of a *Change of Control Event* or, if the MDL Board determines that it expects a *Change of Control Event* to occur, the day determined by the Board.

The Bidder's Statement states that the Offer extends to any new MDL Shares that are issued on the vesting and exercise of all MDL Performance Rights on issue as at the Register Date. This Offer also extends to any new MDL Shares that are issued as a result of the exercise or vesting of the 2018 MDL Performance Rights.

28 MDL is seeking Shareholder approval at its annual general meeting to be held on 25 May 2018 to grant a further 288,791 Performance Rights to Robert Sennitt.

# PROFILE OF MDL

# 6



## 6. PROFILE OF MDL

### 6.1 INTRODUCTION

MDL is an integrated mining company, which jointly owns and manages the TiZir Joint Venture.

MDL listed on the ASX in April 1997 and currently has approximately 2,414 Shareholders.

### 6.2 BUSINESS ACTIVITIES

MDL's principal asset is its 50% interest in the TiZir Joint Venture. The TiZir Joint Venture comprises two integrated operating assets, being the Grande Côte mineral sands operation in Senegal (**GCO**) (owned 90% by the TiZir Joint Venture), and the TiZir Titanium & Iron ilmenite upgrading facility in Norway (**TTI**) (owned 100% by the TiZir Joint Venture).

#### (a) GCO

GCO is a large-scale, cost competitive mineral sands operation that is fully integrated from mine-to-ship, using owned or controlled infrastructure. GCO commenced mining activities in March 2014 and, over an expected mine life currently projected to 2050, will primarily produce high-quality zircon and ilmenite. A majority of GCO's ilmenite is sold to TTI. GCO also produces small amounts of rutile and leucoxene. The government of the Republic of Senegal is a valued project partner, holding a 10% interest in Grande Côte Operations SA.

#### (b) TTI

TTI upgrades GCO ilmenite to produce high-quality titanium feedstocks, primarily sold to pigment producers, and a high-purity pig iron, a valuable co-product, which is sold to ductile iron foundries. TTI benefits from access to cheap and clean power, and excellent logistics, in particular, year-round shipping capacity and customer proximity.

### 6.3 DIRECTORS

Name	Title
Nic Limb	Non-Executive Chairman
Robert Sennitt	Managing Director
Martin Ackland	Non-Executive Director
Thomas Whiting	Non-Executive Director
Charles (Sandy) MacDonald	Non-Executive Director

A biography of each Director is provided in the 2017 Annual Report released to the ASX on 21 February 2018.

### 6.4 FINANCIAL INFORMATION

MDL's last published financial statements are for the calendar year ended 31 December 2017, as set out in its *Appendix 4E & Annual Report for the year ended 31 December 2017* announced on the ASX on 21 February 2018.

In addition, MDL published certain financial information provided at Section 6.5(a) to the ASX on 10 May 2018.

Except as set out in this Target's Statement and the Independent Expert's Report, your Directors are not aware of any material changes to the financial position of MDL since the release of the above financial information.



## 6. PROFILE OF MDL

### 6.5 MATERIAL INFORMATION ON THE TIZIR JOINT VENTURE

#### (a) TiZir Financial and Operations Guidance for 2018 and 2019

MDL published the following table in its *TiZir Financial and Operations Guidance for 2018 and 2019* announcement to the ASX on 10 May 2018.

##### Financial parameters

100% basis, year ended 31 December		2016	2017	Guidance 2018	Guidance 2019
Revenue	US\$m	161	225	317	345 – 456
EBITDA	US\$m	24	62	116	138 – 241
EBITDA margin	%	15%	28%	36%	40% – 53%
Sustaining capital	US\$m	21	10	16	~11
Free cash flow	US\$m	(2)	(6)	49	82 – 162
Unit revenue	US\$/t sold	345	418	482	594 – 787
Unit cash cost of production	US\$/t produced	277	293	330	335 – 353
Implied cash margin	US\$/t	67	124	151	259 – 434

##### Operational parameters

100% basis, year ended 31 December		2016	2017	Guidance 2018	Guidance 2019
<b>Mining</b>					
Ore mined	(kt)	39,203	45,063	50,000	55,000
Mining throughput rate	(tph)	6,214	6,381	6,634	7,000
Dredge runtime	(%)	73%	81%	85%	89%
Average grade mined	(%)	1.7%	1.7%	1.7%	1.5%
Heavy mineral concentrate produced	(t)	613,745	724,755	815,000	745,000
Heavy mineral concentrate processed	(t)	619,952	724,945	810,000	745,000
<b>Finished goods production</b>					
Ilmenite	(t)	416,349	492,440	530,000	510,000
Zircon	(t)	52,627	61,563	68,000	67,000
Medium grade zircon sands	(t)	-	20,187	30,000	14,000
Rutile & leucoxene	(t)	9,665	9,975	12,000	13,000
<b>Total GCO Production</b>	(t)	<b>478,641</b>	<b>584,165</b>	<b>640,000</b>	<b>604,000</b>
Titanium slag	(t)	103,634	181,134	200,000	230,000
High-purity pig iron	(t)	42,581	73,813	80,000	89,000
<b>Total TTI Production</b>	(t)	<b>146,215</b>	<b>254,947</b>	<b>280,000</b>	<b>319,000</b>

For explanatory notes, historical performance analysis and key assumptions in relation to the operational and financial performance outlined above, please see the Company's TiZir Guidance available on the Company's website.

#### (b) GCO Mineral Resource and Ore Reserves as at 31 December 2017

##### Mineral Resource estimate

The GCO Mineral Resource is a total of 26.2 million tonnes (Mt) of heavy mineral (HM) (Measured and Indicated and Inferred) at an average HM grade of 1.4% based on a 1.0% HM cut-off grade. The main HM deposits identified to date are Diogo, Fass Boye, Lompoul, Mboro, Mboro Hotel, Yodi and Noto. Both the dunes and the underlying marine sands contain HM, principally ilmenite, zircon, rutile and leucoxene. Zircon and ilmenite are the main HM of interest.

Changes from the previous estimate are due to depletion of 0.8Mt (46.8Mt at 1.7% HM) and exclusion of 0.05Mt (6.5Mt at 0.8% HM) of material resulting from mining activity undertaken between 1 January and 31 December 2017.

Based on the drilling undertaken and allowing for 2017 mining activity, the Mineral Resource estimate for the identified deposits is as follows:

Resource category	Estimate as at 31 December 2017							Estimate as at 31 December 2016						
				Assemblage							Assemblage			
	Tonnes Mt	In situ HM Mt	HM %	Ilm %	Zir %	Leu %	Rut %	Tonnes Mt	In situ HM Mt	HM %	Ilm %	Zir %	Leu %	Rut %
Measured	1,456	20.9	1.4	72.0	10.7	3.2	2.5	1,509	21.8	1.4	72.0	10.7	3.2	2.5
Indicated	350	4.8	1.4	72.0	10.7	3.2	2.5	350	4.8	1.4	72.0	10.7	3.2	2.5
Inferred	41	0.5	1.2	72.0	10.7	3.2	2.5	41	0.5	1.2	72.0	10.7	3.2	2.5
<b>Total</b>	<b>1,847</b>	<b>26.2</b>	<b>1.4</b>	<b>72.0</b>	<b>10.7</b>	<b>3.2</b>	<b>2.5</b>	<b>1,900</b>	<b>27.1</b>	<b>1.4</b>	<b>72.0</b>	<b>10.7</b>	<b>3.2</b>	<b>2.5</b>

Notes:

1. Quantities and grades were derived by accumulating the grades to six metres below the natural water table except for the Mboro Hotel and Yodi deposits, where the accumulation is to the natural water table.
2. A cut-off grade of 1.0% HM was applied to the accumulated grades.
3. Tonnes were rounded to the nearest 1,000,000.
4. Grades were rounded to one decimal place.
5. The mineral assemblage (ilmenite, zircon, rutile and leucoxene) is reported as a percentage of HM.
6. All Mineral Resources are inclusive of Ore Reserves.

Other deposits within the Mining Concession have been partially explored and there is potential to identify additional deposits beyond the limits of present drilling.

#### Ore Reserve estimate

The mine path and schedule have been optimised compared to the path design and schedule in the prior year's Ore Reserve estimate. Key optimisation changes include:

- Path geometry: frequent, acute turns have been simplified by straightening the mine path and the path width has been optimised
- Path location: areas with low-grade material and high potential of social or community risk have been diverted to simplify the mine path in these areas, and some areas previously excluded have now been included due to the lifting of community constraints
- Pond floor smoothing: water level optimisation adjustments and simplification of the pond water reference level

These optimisation changes resulted in an Ore Reserve increase of 3.8Mt HM before applying 2017 depletion.

Based on the 2017 depleted Mineral Resource and updated life of mine plan, the Ore Reserve estimate is as follows:

Classification	Estimate as at 31 December 2017							Estimate as at 31 December 2016						
				Assemblage							Assemblage			
	Ore Mt	HM Mt	HM %	Ilm %	Zir %	Leu %	Rut %	Ore Mt	HM Mt	HM %	Ilm %	Zir %	Leu %	Rut %
Proved	1,392	20.2	1.5	72.0	10.7	3.2	2.5	1,122	16.6	1.5	72.0	10.7	3.2	2.5
Probable	373	4.5	1.2	72.0	10.7	3.2	2.5	343	5.1	1.5	72.0	10.7	3.2	2.5
Proved & Probable	1,765	24.7	1.4	72.0	10.7	3.2	2.5	1,465	21.7	1.5	72.0	10.7	3.2	2.5

Notes:

1. The Ore Reserve estimate is based on Indicated and Measured Mineral Resource contained within the mine design.
2. A cut-off grade of 1.3% HM was applied for the first five years, with 1.0% HM thereafter.
3. The Ore Reserve estimate is the part of the Mineral Resource contained within the dredge path design and dozer push dry mining areas. It is inclusive of mining dilution and is based on the project's economics.
4. Ore tonnes were rounded to the nearest 1,000,000.
5. Grades were rounded to one decimal place.
6. The mineral assemblage (ilmenite, zircon, rutile and leucoxene) is reported as a percentage of HM.
7. All Mineral Resources are inclusive of Ore Reserves.

## 6. PROFILE OF MDL

The Mineral Resources and Ore Reserves estimates summarised above were reported under the JORC Code in an announcement lodged with ASX on 19 February 2018 entitled *Grande Côte Mineral Resource and Ore Reserve Update* and is available to view on the MDL's website at [www.mineraldeposits.com.au](http://www.mineraldeposits.com.au).

MDL confirms that at the date of this Target's Statement it is not aware of any new information or data that materially affects the information included in the 19 February 2018 report and that all material assumptions and technical parameters underpinning the estimates in the 19 February 2018 report continue to apply and have not materially changed. MDL confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the original market announcement.

### (c) Further information

As a result of MDL pro-actively engaging with Eramet following the release of Eramet's original Bidder's Statement on 27 April 2018, Eramet included further information in its replacement Bidder's Statement released on 14 May 2018 regarding the TiZir Joint Venture, including a summary of the material terms of the Shareholders' Agreement governing the TiZir Joint Venture (see section 3.3(D) of the Bidder's Statement).

MDL provides the following additional information and/or clarifications regarding the information on the Shareholders' Agreement set out in section 3.3(D) of the Bidder's Statement:

- **Management of the TiZir Joint Venture:** MDL advises that in 2017, MDL and Eramet agreed to establish a JOC to improve the management of the TiZir Joint Venture. The primary objective of the JOC is to provide clear leadership to both GCO and TTI while co-ordinating and communicating a joint position from the shareholders of the TiZir Joint Venture. The JOC has been empowered by the board of directors of TiZir to make decisions (within the limits of its delegated authority) regarding operations, sales and marketing, performance management, human resources, safety, information technology and sustainability.
- **Deadlock matters:** MDL advises that, in addition to a failure to agree to the approval of an annual business plan, a deadlock can also be triggered as a result of a failure to agree to any amendment or update to the initial five-year plan set out in the Shareholders' Agreement (as that plan may be amended from time to time in accordance with the Shareholders' Agreement).
- **Board:** All references to 'Board' in section 3.3(D) of Eramet's Bidder's Statement refers to the board of directors of TiZir Limited and not the board of directors of MDL.

### 6.6 KEY RISKS FACED BY MDL

Set out below is a summary of the key risks to which MDL Shareholders will continue to be exposed if they reject the Offer and retain their current investment in MDL Shares. The risks identified in this Section are not an exhaustive list of all of the risks relevant to MDL and its 50% equity investment in the TiZir Joint Venture. No assurances or guarantees are given as to MDL's future performance, profitability or dividend payments.

#### MDL specific risks

##### Current and future funding arrangements

TiZir's operations involve capital investment and financial risk.

Continuance of mining and mineral processing activities as well as MDL's realisation of the value of its investment in TiZir depends on TiZir's ability to obtain funding as and when required, whether through internal positive cash flows, debt financing, equity funding or other financing means. No assurance can be given that any financing arrangements will be available or available on terms acceptable to TiZir. If such alternatives are not available, MDL may be required to provide funding to TiZir or to deliver all or a portion of its assets to TiZir's lenders as satisfaction of any outstanding amounts due.

TiZir was successful in a US\$300 million bond refinancing in the Nordic bond market during 2017, indicating continued support for TiZir's debt financing requirements. However, financial market appetite and operational outcomes are subject to change and may impact upon TiZir's future ability to refinance in a similar manner.

<b>MDL cash flow risk</b>	<p>If TiZir is unable to meet its financial obligations either through cash flow generation or its ability to secure finance, it may need to seek financial support from its shareholders (including MDL).</p> <p>In addition to these general cash flow risks, certain specific risks outlined in this Section have the potential to generate a cash flow shortfall at the TiZir level that may require funding from third party financiers or its shareholders (including MDL). There can be no assurances that MDL will not be required to contribute further funding to TiZir to assist with meeting any cash flow shortfalls associated with these specific risks. Additionally, there is no guarantee that MDL will have sufficient capital to meet its ongoing joint venture obligations. MDL may need to raise additional funds, which would have a consequential impact on the share capital structure of MDL.</p>
<b>Commodity price risk</b>	<p>The prices for titanium feedstocks and zircon fluctuate widely and are affected by numerous factors beyond the control of MDL including, but not limited to: supply/demand balances, strategies of major producers, worldwide inflation and deflation, interest and currency exchange rates, price and availability of substitutes, actions taken by governments and global economic and political developments. Future production from MDL's mining and processing assets is primarily dependent upon the prices for titanium feedstocks and zircon being adequate to make these operations economic. There is no assurance that, even as commercial quantities of titanium feedstocks and zircon are produced, a profitable market will exist for them.</p>
<b>Demand fluctuations</b>	<p>MDL is reliant on demand for its joint venture products. Changes in demand due to economic downturn or key customers sourcing alternative suppliers, amongst other factors, could adversely impact financial performance.</p>
<b>Uncertainty of resource and reserve estimates</b>	<p>Mineral resource and reserve estimates are estimates only and no assurance can be given that: anticipated tonnages and grades will be achieved; the indicated level of recovery will be realised; or reserves can be mined or processed profitably. Assumptions informing reserve estimates may change over time resulting in revisions to their economic viability and a consequent need to restate.</p>
<b>Operational risks</b>	<p>The operations of both TTI and GCO are reliant on critical equipment, such as the furnace and pre-reduction kiln at TTI as well as the mineral sands dredge, wet concentrator plant, mineral separation plant and power plant at GCO. Equipment may incur downtime as a result of unanticipated failures or other events, such as fire, loss of power supply and the unavailability of spare parts. Any downtime, delays or difficulties in mining, processing and production, even whether covered in whole or in part by insurance, may adversely impact product delivery and production optimisation, thereby impacting on the financial performance of MDL.</p> <p>The operations in which MDL is invested are also vulnerable to a wide range of difficulties and interruptions, including:</p> <ul style="list-style-type: none"> <li>• natural events such as storm, flood, drought, fire, and the possible effects of climate change;</li> <li>• restricted access to key transport networks (reliable roads, rail, ports), power generation and transmission, and water supplies;</li> <li>• limitations or interruptions in transport, power or water infrastructure;</li> <li>• extended failure or damage to critical information technology infrastructure or systems;</li> <li>• a loss of process control that could lead to a release of hazardous materials; and</li> <li>• supply chain failures.</li> </ul> <p>Such events and their consequences, even whether covered in whole or in part by insurance, may be detrimental to MDL's activities and profitability.</p>

## 6. PROFILE OF MDL

<b>Asset realisation risk</b>	<p>MDL's capacity to realise the value of its investment in TiZir is dependent on GCO and TTI operating successfully and generating forecast cash flow.</p> <p>In the event that Eramet provides funding to TiZir on behalf of MDL to assist TiZir in meeting its obligations, there is an increase in the risk that MDL's investment in the joint venture could be diluted should MDL not be in a position to repay any financing made available under the terms of the TiZir Shareholders' Agreement.</p> <p>Dilution of MDL's investment in TiZir may have the following impacts including, but not limited to: loss of ability to influence TiZir's management and operations, potential delays in the timing and quantum of MDL's investment returns, and loss of equal voting rights on the strategic direction of the joint venture.</p>
<b>Earnings guidance</b>	<p>Any earnings guidance provided by MDL with respect to TiZir (or MDL) is based on certain key assumptions and forecasts, that – due to a range of factors, including known and unknown risks – may ultimately prove to be incorrect, with actual results differing materially. Earnings guidance reflects management's best estimates at the time of determination, and, as such, is not a guarantee of MDL's and TiZir's future performance. The eventuation of a risk factor identified in this Section or a combination of these risks may result in MDL not meeting its earnings guidance. Divergence from meeting earnings guidance may have an adverse impact on the price and value of MDL Shares.</p>
<b>Dependence on key personnel</b>	<p>MDL and TiZir and their business activities (including operations) are reliant on key personnel (either employed or engaged), the loss of whom may have a material adverse impact on operational and financial performance of both entities. Failure to recruit and retain qualified, high-performing personnel at MDL or at TiZir's operations may impact on MDL's performance.</p>
<b>Employment and labour relations</b>	<p>MDL and TiZir and their employees may be affected by changes in labour laws and regulations which may be introduced by governments in jurisdictions of operation. Such changes may adversely affect business activities. MDL and TiZir may experience difficulties in employing and retaining suitably qualified personnel, particularly given the location of current operations. Malaria and other infectious diseases represent a threat and an ongoing healthcare challenge to maintaining a skilled workforce in West Africa. Pandemics may also impact on operations and the ability to maintain sufficient numbers of a skilled workforce. Labour disputes, resulting in strike action or work stoppages, may result in decreased production and increased costs. Labour agreement renegotiations may also result in elevated operating costs.</p>
<b>Inadequate insurance coverage</b>	<p>MDL is exposed to a number of business risks and insurance may not be sought, obtainable or adequate for all risks. In addition, insurance coverage may not be sufficient to cover business interruption losses or liability. The manifestation of an inadequately insured risk could adversely impact MDL's business.</p> <p>Some key MDL assets, in particular GCO in Senegal, West Africa, are located in countries where political risks are potentially higher than in more developed regions. The MDL Board has considered the benefits and cost of political risk insurance and has determined that, at this time, MDL will not maintain political risk insurance on the equity component of its investment in TiZir or its interest in Senegal or any of its other assets or interests.</p> <p>In respect of MDL operational risks, insurance policies are entered into by TiZir, GCO and TTI rather than MDL.</p>
<b>Input costs, inflation and foreign exchange rates</b>	<p>Changes to input costs, inflation and foreign exchange rates could increase TiZir's operating and capital costs. While in some cases such cost increases may be controlled or offset by increased selling prices, there is no assurance that this will eventuate. Operating margins and necessary capital costs may be adversely impacted by a failure to contain unanticipated cost increases.</p>
<b>Repatriation of earnings</b>	<p>There is no assurance that Senegal, Norway or any other foreign country where MDL has interests will not impose restrictions on the repatriation of earnings to foreign entities.</p>
<b>Licences and permits</b>	<p>TiZir's exploration, mining and processing activities are dependent upon the granting, maintenance and renewal of appropriate licences, concessions, leases, permits and regulatory consents which may be withdrawn, not granted or made subject to limitations or new conditions. Risks regarding licences and permits that may impact on TiZir may have a material adverse impact on MDL.</p>



<b>Health, safety, security, environment and community</b>	<p>MDL and TiZir's sustainable development policies and activities, covering health, safety, security, environment and community issues, are subject to government laws, regulations and standards as well as stakeholder expectations. These regulatory frameworks and expectations may change over time and may have a material adverse effect on MDL's operations and reputation.</p> <p>Failure to comply with applicable health, safety, security, environment and community laws, regulations and permitting requirements may result in enforcement actions including fines, penalties, compensation claims, corrective measures requiring capital expenditure, or the ceasing of operations, amongst others.</p> <p>Environmental hazards may exist on MDL and/or TiZir properties which are currently unknown and which could have been caused by previous owners or operators. It is possible that MDL and/or TiZir would be required to remedy such hazards or that such hazards may affect MDL's future operations.</p>
<b>Closure, reclamation and rehabilitation costs</b>	<p>While currently expected closure, reclamation and rehabilitation works necessary to return operating sites to local communities are budgeted for, where required, changes over time to legislation, standards and techniques or the introduction of new legislation, standards and techniques may result in unanticipated or higher than expected costs. Over time, events may arise or changes may occur that vary the life of an operation and, consequently, the timing of expenditure with respect to closure, reclamation and rehabilitation of operating sites may also change.</p> <p>Time and cost to relinquishment of MDL's former mineral processing site in New South Wales is uncertain and subject to negotiation with appropriate regulatory bodies and other relevant stakeholders.</p>
<b>Political and foreign operations risks</b>	<p>The operations of TiZir are currently conducted in Senegal and Norway and, as such, are exposed to various levels of political, economic and other natural and man-made risks and uncertainties over which MDL has limited or no control.</p> <p>These risks and uncertainties may include, but are not limited to: economic, social or political instability; terrorism; hostage taking; military repression; labour unrest; community disputes; the risks of war or other forms of civil unrest; expropriation and nationalisation; renegotiation, nullification or adoption of new laws or regulations concerning existing concessions, licences, permits and/or contracts; high rates of inflation; changes in taxation policies; restrictions on foreign exchange and repatriation; validity of export rights and payment of duties; changing political conditions; currency controls; customs regulations policies; changes or adoption of new laws affecting foreign ownership; government participation or control of working conditions; changes to regulations associated with greenhouse gas emissions and the introduction of carbon pricing mechanisms; and governmental regulations that favour or require the awarding of contracts to local contractors or require foreign contractors to employ citizens of, or purchase supplies from, a particular jurisdiction.</p> <p>Failure to comply strictly with applicable laws, regulations and local practices relating to mineral rights applications and tenure could result in the loss, reduction or expropriation of entitlements. The occurrence of these various factors and uncertainties cannot be accurately predicted and, even whether covered in whole or in part by insurance, could have an adverse effect on the operations of TiZir or profitability of MDL.</p>
<b>Joint venture risks</b>	<p>A breakdown in the joint venture relationship with Eramet or a contravention of the TiZir Shareholders' Agreement could have a material adverse effect on MDL's investment in the joint venture. Additionally, the joint venture structure impacts on MDL's capacity to manage, mitigate or avoid TiZir's risks independently.</p>
<b>Litigation risks</b>	<p>MDL may be the subject of complaints or litigation by customers, suppliers, employees or officers, shareholders, government agencies, regulatory authorities or other third parties. Changes in laws and regulations can heighten litigation risk. Litigation and other proceedings may be taken against MDL that could divert management's attention from the business and materially adversely affect the business or financial performance or condition of MDL. If such proceedings were brought against MDL, considerable time and cost may be incurred to defend those proceedings (even if successful), with the potential for damages and costs awarded against MDL if unsuccessful.</p>

## 6. PROFILE OF MDL

<b>Reputational risks</b>	MDL may suffer financial and other losses stemming from its and/or TiZir's exposure to reputational risks, including but not limited to unsafe work practices, environmental incidents, community disputes, unethical business practices, and divergence from expected operational, financial and market performance.
<b>Constraints on capital growth</b>	MDL's ability to grow its existing capacity and extend the life of TiZir's operations is dependent on a number of factors which may or may not materialise as expected or planned. Additionally, MDL competes with other companies for future business opportunities.
<b>Strategic investments, acquisitions or divestitures</b>	No assurance can be given that MDL's current or possible future investments, acquisitions or divestitures can or will be completed successfully or favourably. MDL may be liable for past acts as well as anticipated and unanticipated liabilities procured through MDL's acquisition or investment activities.
<b>General risks</b>	
<b>General economic climate</b>	Factors such as inflation, currency fluctuations, interest rates, legislative changes, political decisions and industrial disruption have an impact on operating costs. MDL's future income, asset values and share price can be affected by these factors and, in particular, by the market price for any products or services that MDL may acquire or sell.
<b>Government policy changes</b>	Any material adverse changes in government policies or legislation of any countries in which MDL may operate may affect the viability and profitability of MDL.
<b>Foreign currency and exchange rate fluctuations</b>	Revenue, expenditure, interest, dividends and loan receipts of MDL may be domiciled in currencies other than Australian dollars and, as such, expose MDL to foreign exchange movements which may have a positive or negative influence on the Australian dollar. MDL will appropriately monitor and assess such risks and may from time to time implement measures, such as foreign exchange currency hedging, to assist managing these risks. However, the implementation of such measures may not eliminate all such risks and the measures themselves may expose MDL to related risks.
<b>Taxation</b>	<p>Future changes in Australian taxation laws, including changes in interpretation or application of laws by the courts or taxation authorities in Australia, may affect taxation treatment of an investment in MDL Shares, or the holding and disposal of those shares. Further changes in tax law or changes in the way tax law is expected to be interpreted in the various jurisdictions in which MDL, TiZir, GCO and/or TTI operates, may impact the future tax liabilities of MDL.</p> <p>GCO is currently the subject of a tax audit by the Senegalese tax authorities. GCO is subject to a regular and scheduled audit every four years and this audit is being undertaken as scheduled (as opposed to the audit arising from a previous investigation or specific compliance concern). Therefore, this tax audit may or may not result in any liability for the TiZir Joint Venture. In many instances the audit does not result in a notification of an amended assessment and, if such a notification is received, it is open to contest the notification.</p>
<b>Stock market conditions</b>	MDL Shares are quoted on the ASX, where their price may rise or fall. The market price of MDL Shares may fluctuate due to various factors including the risk factors outlined above. These factors are not an exhaustive list of risks faced by MDL or by investors in MDL. The above factors, and others not referred to in this Section, may in the future materially affect the financial performance of MDL. The market for mining industry securities has historically experienced significant fluctuations in price and trading volumes which may be unrelated to the performance of individual companies. MDL securities carry no guarantee in respect of profitability, dividends, return of capital, liquidity or the price at which they may trade on the ASX. The stock market has in the past and may in the future be affected by a number of matters including: market confidence; supply and demand for money; and currency exchange rates.

# TAXATION CONSEQUENCES



## 7. TAXATION CONSEQUENCES

### 7.1 INTRODUCTION

This Section provides a summary of the Australian income tax, goods and services tax (**GST**) and stamp duty implications for MDL Shareholders on disposing of their MDL Shares (through acceptance of the Offer or having them compulsorily acquired by Eramet) in return for cash consideration.

This Section is relevant for Australian resident and foreign resident MDL Shareholders that hold their MDL Shares on capital account. This information relates only to MDL Shares, and not to other rights held over MDL Shares or the Performance Rights. This Section does not consider the Australian tax consequences for MDL Shareholders:

- who hold their MDL Shares as trading stock or as revenue assets;
- who hold their MDL Shares as assets used in carrying on a business or as part of a profit-making undertaking or scheme;
- who acquired their MDL Shares through an employee share, option or rights scheme;
- who are taken for capital gains tax purposes to have acquired their MDL Shares before 20 September 1985;
- who are Australian tax residents but who hold their MDL Shares as part of an enterprise carried on, at or through a permanent establishment in a foreign country;
- who are foreign resident shareholders who hold their MDL Shares in carrying on a business through a permanent establishment in Australia;
- that are financial institutions, insurance companies, partnerships, tax exempt organisations, trusts (except where expressly stated), superannuation funds (except where expressly stated) or temporary residents; or
- who are subject to the taxation of financial arrangements rules in Division 230 of the *Income Tax Assessment Act 1997* in relation to gains and losses on their MDL Shares.

The information in this Section is based on the Australian taxation law and practice in effect as at the date of this Target's Statement. It is not intended to be an authoritative or complete statement or analysis of the taxation laws applicable to the particular circumstances of every MDL Shareholder. MDL Shareholders should seek independent professional advice regarding the taxation consequences of accepting the Offer and disposing of their MDL Shares. MDL Shareholders who are tax residents of a country other than Australia (whether or not they are also residents or temporary residents of Australia for tax purposes) should also take into account the tax consequences under the laws of their country of residence.

### 7.2 TAXATION CONSEQUENCES OF DISPOSAL OF MDL SHARES BY AUSTRALIAN RESIDENTS

The below is a summary of the income tax consequences relevant for Australian resident MDL Shareholders who dispose of their MDL Shares (through acceptance of the Offer or having them compulsorily acquired by Eramet).

#### **MDL Shareholders who accept the Offer**

MDL Shareholders who accept the Offer will dispose of their MDL Shares by way of transfer to Eramet in exchange for the Offer Price. The disposal of MDL Shares to Eramet under the Offer will constitute a capital gains tax (**CGT**) event for MDL Shareholders. The CGT event will happen at the time MDL Shareholders accept the Offer.

#### **Compulsory acquisition**

If an MDL Shareholder does not accept the Offer and their MDL Shares are compulsorily acquired by Eramet, the MDL Shareholder will be treated as having disposed of their MDL Shares for CGT purposes at the time at which the MDL Shares are acquired by Eramet.

#### **Calculation of capital gain or capital loss**

MDL Shareholders will:

- make a capital gain if the capital proceeds received on the disposal of their MDL Shares are more than the cost base of those MDL Shares; or
- make a capital loss if the capital proceeds received on the disposal of their MDL Shares are less than the reduced cost base of those MDL Shares.

The capital proceeds received by an MDL Shareholder that accepts the Offer (or has their MDL Shares compulsorily acquired by Eramet) will be equal to the Offer Price.

Where a capital gain is made, the cost base of MDL Shares in the hands of the MDL Shareholders will be broadly the original amount paid to acquire their MDL Shares, any non-deductible incidental costs associated with the acquisition of the MDL Shares and any non-deductible incidental costs associated with the disposal of the MDL Shares to Eramet. Where a capital loss is made, the reduced cost base of the MDL Shares is determined in a similar manner.

MDL Shareholders may be entitled to reduce any capital gain on the disposal of their MDL Shares by applying the CGT discount (discussed below).

### CGT Discount

The CGT discount should be available to MDL Shareholders who are individuals, trusts or complying superannuation funds and have held their MDL Shares for at least 12 months before the time of the CGT event resulting in the disposal of the MDL Shares by accepting the Offer (or having their MDL Shares compulsorily acquired).

Broadly, the CGT discount rules enable the MDL Shareholders to reduce their capital gain (after the application of any current year or prior year capital losses) by 50% for individuals and trusts and 33 1/3% for complying superannuation funds.

The CGT discount is not available to MDL Shareholders that are companies.

The application of the CGT discount rules to an MDL Shareholder that is a trustee of a trust is complex, particularly where distributions to beneficiaries of the trust are attributable to discounted capital gains. The ultimate access to the CGT discount may depend on a beneficiary's entitlement to the CGT discount. MDL Shareholders that are trustees of trusts should obtain specific tax advice.

### Net capital gains or losses

If an MDL Shareholder makes a capital gain from the disposal of their MDL Shares, that capital gain will be combined with any other capital gains that the MDL Shareholder has made for the income year. Any available capital losses will then be applied against the total capital gains made for the income year, following which the CGT discount (if available) is applied to any remaining discount capital gains. A resulting net capital gain will be included in the MDL Shareholder's assessable income for the income year.

A resulting net capital loss cannot be deducted against other income for income tax purposes, but may be carried forward to offset capital gains made in future income years (before taking into account the CGT discount, if available). Specific loss recoupment rules apply to companies to restrict their ability to utilise capital losses in future years in some circumstances. MDL Shareholders should seek their own tax advice in relation to the operation of these rules.

## 7.3 TAXATION CONSEQUENCES OF DISPOSAL OF MDL SHARES BY FOREIGN RESIDENTS

Generally, an MDL Shareholder who is a foreign resident for Australian income tax purposes and who does not carry on business in Australia at or through a permanent establishment should be exempt from CGT on the disposal of their MDL Shares, unless, broadly:

- the foreign resident MDL Shareholder (together with its associates) hold 10% or more of the issued shares in MDL at the time of the CGT event resulting from the disposal of the MDL Shares or for any continuous twelve month period within two years preceding the time of the CGT event (**non-portfolio interest**); and
- more than 50% of the market value of MDL is represented by direct or indirect interests in Australian real property (broadly, land situated in Australia and mining rights in respect of certain resources located in Australia) (**principal asset test**),

(collectively, the **TARP Test**).

The MDL Board is currently of the view that the MDL Shares do not satisfy the TARP Test as not more than 50% of the market value of MDL is represented by direct or indirect interests in Australian real property (that is, the principal asset test limb of the TARP Test is not satisfied). Nevertheless, MDL recommends that foreign resident MDL Shareholders seek their own advice on the Australian CGT implications of a disposal of their MDL Shares, particularly if they hold a non-portfolio interest.

Foreign resident MDL Shareholders who are subject to CGT on the disposal of their MDL Shares will not be entitled to the CGT discount in relation to that portion of the capital gain which relates to the period after 8 May 2012.

Foreign resident MDL Shareholders should note that the Australian tax consequences from the disposal of MDL Shares may be affected by any double tax agreement between Australia and their country of residence. Foreign resident MDL Shareholders should obtain specific tax advice, including in their country of residence.



## 7. TAXATION CONSEQUENCES

### 7.4 FOREIGN RESIDENT CGT PAYMENT RULES

In respect of certain types of transactions entered into on or after 1 July 2016, and subject to certain exceptions, bidders in an off-market takeover are required to pay an amount equal to 12.5% of the offer consideration to the ATO (broadly referred to as the foreign resident CGT payment rules).

Eramet has this obligation if the MDL Shares acquired from an MDL Shareholder satisfy the TARP Test and Eramet either:

- knows that the MDL Shareholder is a foreign resident; or
- reasonably believes that the MDL Shareholder is a foreign resident; or
- does not reasonably believe that the MDL Shareholder is an Australian resident and either:
  - the MDL Shareholder has an address outside Australia; or
  - Eramet is authorised to make payment of the Offer Price to a place outside Australia (whether to the MDL Shareholder or to anyone else).

MDL currently believes that the MDL Shares do not satisfy the TARP Test. As such, MDL currently does not expect that Eramet should withhold any amount from consideration payable to foreign resident MDL Shareholders. This expectation is consistent with Eramet's indication at in section 7 of the Bidder's Statement.

Nevertheless, foreign resident MDL Shareholders should obtain independent tax advice as to the potential implications to them of the foreign resident CGT payment rules.

### 7.5 STAMP DUTY

No Australian stamp duty will be payable by an MDL Shareholder on the transfer of their MDL Shares under the Offer.

### 7.6 GST

The disposal of MDL Shares by an MDL Shareholder to Eramet pursuant to Eramet's Offer should either be GST-free or an input taxed financial supply (if the MDL Shareholder is registered for GST), or an out-of-scope supply (if the MDL Shareholder is not registered for GST). In any case, no GST should be payable.

MDL Shareholders may be charged GST on costs (such as brokerage and advisor fees) that relate to their participation in Eramet's Offer. MDL Shareholders may not be entitled to claim full input tax credits for the GST included in such costs that relate to the disposal of their MDL Shares. MDL Shareholders should seek independent advice in relation to the impact of GST in their individual circumstances.

# ADDITIONAL INFORMATION

# 8



## 8. ADDITIONAL INFORMATION

### 8.1 YOUR DIRECTORS' INTERESTS AND DEALINGS IN MDL SHARES

#### (a) Interests in MDL securities

As at the date of this Target's Statement, the MDL Directors and their respective interests in MDL Shares are set out in the table below:

Name	Position	MDL Shares held by or on behalf of Director
Nic Limb	Non-Executive Chairman	1,738,718
Robert Sennitt	Managing Director	148,750
Martin Ackland	Non-Executive Director	583,122
Thomas Whiting	Non-Executive Director	525,000
Charles (Sandy) MacDonald	Non-Executive Director	175,000
<b>Total</b>		<b>3,170,590</b>

In addition, Robert Sennitt holds 999,234 MDL Performance Rights. The approval of MDL Shareholders will be sought at MDL's annual general meeting on 25 May 2018 for a further grant of up to 288,791 MDL Performance Rights to Mr Sennitt.

#### (b) Dealings in MDL Shares

No MDL Director has acquired or disposed of a relevant interest in any MDL Shares in the four months ending on the date immediately before the date of this Target's Statement.

#### (c) Intentions in relation to the Offer

Your Directors recommend to: **REJECT** the Offer. Each of your Directors intends, for all MDL Shares held by them or in which they otherwise have a relevant interest, to act in accordance with their recommendation from time to time to Shareholders.

### 8.2 YOUR DIRECTORS' INTERESTS AND DEALINGS IN ERAMET SECURITIES

#### (a) Interests in Eramet securities

As at the date of this Target's Statement, no Director has a relevant interest in any securities of Eramet.

#### (b) Dealings in Eramet securities

No MDL Director has acquired or disposed of a relevant interest in any securities of Eramet in the four months ending on the date immediately before the date of this Target's Statement.

### 8.3 BENEFITS AND AGREEMENTS

#### (a) Directorships

As at the date of this Target's Statement, no Director of MDL is a director of Eramet.

#### (b) Benefits in connection with retirement from office

As a result of the Offer, no person has been or will be given any benefit (other than a benefit which can be given without member approval under the Corporations Act) in connection with the retirement of that person, or someone else, from a board or managerial office of MDL.

#### (c) Agreements connected with or conditional on the Offer

There are no agreements made between any Director and any other person in connection with, or conditional on, the outcome of the Offer other than in their capacity as a holder of MDL Shares.

#### (d) Benefits from Eramet

No Director has agreed to receive, or is entitled to receive, any benefit from Eramet which is conditional on, or is related to, the Offer, other than in their capacity as a holder of MDL securities as outlined in Section 8.1(a) of this Target's Statement.

#### (e) Material interests of Directors in contracts with Eramet

No Director has any interest in any contract entered into by Eramet.

## 8.4 MATERIAL LITIGATION

Your Directors do not believe that MDL is involved in any litigation or dispute which is material in the context of MDL and the MDL group of companies taken as a whole.

## 8.5 ISSUED CAPITAL

As at the date of this Target's Statement, MDL's issued capital comprises 196,985,649 MDL Shares. As at the date of this Target's Statement, MDL also has 2,338,209 MDL Performance Rights on issue.

## 8.6 SUBSTANTIAL HOLDERS

As at the date of this Target's Statement, the following persons held an interest in MDL Shares of more than 5% as disclosed in substantial holding notices provided to the ASX:

Name	Number of MDL shares	Percentage of MDL Shares
Allan Gray Australia Pty Ltd	26,410,971	13.41%
Eramet SA <sup>29</sup>	26,321,094	13.36%
L1 Capital Pty Ltd	23,174,553	11.76%
Farjoy Pty Ltd	15,395,823	7.82%
Morgan Stanley/Mitsubishi UFJ Financial Group, Inc	12,139,407	6.16%
TIGA Trading Pty Ltd	10,725,000	5.44%
Ellerston Capital Limited <sup>30</sup>	10,494,762	5.33%

## 8.7 ASX ANNOUNCEMENTS

MDL is a *disclosing entity* under the Corporations Act and therefore has continuous disclosure obligations under that legislation and also under the ASX Listing Rules. MDL is required to immediately disclose to the market through ASX any information concerning it that a reasonable person would expect to have a material effect on the price or value of MDL Shares.

MDL is in compliance with its continuous disclosure obligations under the Corporations Act and the ASX Listing Rules. MDL's announcements are available free of charge from the ASX website at [www.asx.com.au](http://www.asx.com.au) (ASX code: MDL).

The most recent financial information regarding MDL is set out in the following documents:

- *Appendix 4E & Annual Report for the year ended 31 December 2017* announced to the ASX on 21 February 2018 and
- *TiZir Financial and Operations Guidance for 2018 and 2019* announced to the ASX on 10 May 2018.

Copies of these documents are also available free of charge from MDL on request and is also available on MDL's website at [www.mineraldeposits.com.au](http://www.mineraldeposits.com.au)

## 8.8 TAKEOVER RESPONSE COSTS

The Offer will result in MDL incurring expenses that would not otherwise have arisen in 2018. These include legal, financial and other expenses from advisers engaged by MDL to assist in responding to the Offer. The total cost of the takeover response depends on the outcome of the Offer, the duration of the Offer and required response activities, as well as the complexity of the issues addressed in the response. Therefore, it is difficult to estimate the likely total cost to MDL. These defence costs will be reflected in MDL's financial results for the financial year ending 31 December 2018.

29 Eramet's relevant interest in 13.36% of MDL Shares includes its relevant interest in 5.33% of MDL Shares held by Ellerston Capital Limited. This parcel of shares is subject to the pre-bid acceptance deed entered into by Ellerston Capital Limited in favour of Eramet dated 27 April 2018, which was attached to Eramet's Form 603: notice of initial substantial holder dated 27 April 2018.

30 Ellerston Capital Limited's relevant interest in 5.33% is subject to the pre-bid acceptance deed in favour of Eramet dated 27 April 2018, which was attached to Eramet's Form 603: notice of initial substantial holder dated 27 April 2018.

## 8. ADDITIONAL INFORMATION

### 8.9 CONSENTS

Flagstaff Partners has consented to being named in this Target's Statement as the financial adviser to MDL and has not withdrawn that consent at the date of this Target's Statement.

MinterEllison has consented to being named in this Target's Statement as the legal adviser to MDL and has not withdrawn that consent at the date of this Target's Statement.

Computershare Investor Services Pty Ltd has consented to being named in this Target's Statement as MDL's share registry and has not withdrawn that consent at the date of this Target's Statement.

Grant Samuel has given, and has not, before the date of this Target's Statement, withdrawn its consent, to:

- be named in this Target's Statement as the independent expert engaged by MDL;
- the inclusion of the Independent Expert's Report and statements noted next to its name, and the references to that report or statements, in the form and context in which they are included in the Target's Statement; and
- the inclusion of other statements in this Target's Statement that are based on or referable to statements made in the Independent Expert's Report.

AMC Consultants Pty Ltd has given, and has not, before the date of this Target's Statement, withdrawn its consent, to:

- be named in this Target's Statement and the Independent Expert's Report as the technical expert engaged by MDL;
- the inclusion of the Independent Technical Specialist's Report and statements noted next to its name, and the references to that report or statements, in the form and context in which they are included in the Target's Statement and the Independent Expert's Report; and
- the inclusion of other statements in this Target's Statement and the Independent Expert's Report that are based on or referable to statements made in the Independent Technical Specialist's Report.

TZ Minerals International Pty Ltd has given, and has not, before the date of this Target's Statement, withdrawn its consent, to be named in this Target's Statement as the source of mineral sands pricing information.

Mr Djibril Sow of Grande Côte Operations SA has given, and not withdrawn before the lodgment of this Target's Statement with ASIC, his written consent to be named in this Target's Statement in the form and context he is so named.

The MDL Shareholders referred to in Section 1.2 of this Target's Statement (Reasons why you should reject the Offer – Reason 5) have each given and have not withdrawn before the lodgment of this Target's Statement with ASIC, their respective written consent to be named and for the inclusion of the statements attributable to each of them, in the form and context in which they are included in this Target's Statement.

Each person named in this Section 8.9 of this Target's Statement as having given its consent to the inclusion of a statement or to being named in this Target's Statement:

- has not authorised or caused the issue of this Target's Statement;
- does not make, or purport to make, any statement in this Target's Statement or any statement on which a statement in this Target's Statement is based other than a statement included in this Target's Statement with the consent of that person; and
- to the maximum extent permitted by law, expressly disclaims and takes no responsibility for any part of this Target's Statement, other than a reference to its name and, in the case of a person referred to above as having given their consent to the inclusion of a statement, any statement or report which has been included in this Target's Statement with the consent of that party.

### 8.10 RELIANCE ON ASIC CLASS ORDERS

As permitted by ASIC Class Order 13/521, this Target's Statement contains statements which are made, or based on statements made, in documents lodged with ASIC or given to the ASX. In accordance with this class order, the consent of Eramet or the ASX (respectively) is not required for the inclusion of such statements in this Target's Statement. Any MDL Shareholder who would like to receive a copy of any of those documents may obtain a copy (free of charge) during the Offer Period by contacting MDL.

As permitted by ASIC Corporations (Consents to Statements) Instrument 2016/72, this Target's Statement may include or be accompanied by certain statements:

- fairly representing a statement by an official person; or
- from a public official document or published book, journal or comparable publication.

In addition, as permitted by ASIC Corporations (Consents to Statements) Instrument 2016/72, this Target's Statement contains share price trading and financial data sourced from IRESS, FactSet and certain equity research reports from Thomson One platform by Thomson Reuters and Bloomberg, without their consent.

### 8.11 NO OTHER MATERIAL INFORMATION

This Target's Statement is required to include all the information that MDL Shareholders and their professional advisers would reasonably require to make an informed assessment whether or not to accept the Offer but:

- only to the extent to which it is reasonable for investors and their professional advisers to expect to find this information in the Target's Statement; and
- only if the information is known to any of your Directors.

Your Directors are of the opinion that the only information that MDL Shareholders and their professional advisers would reasonably require to make an informed assessment whether to accept the Offer is:

- the information contained in the Bidder's Statement (to the extent that the information is not inconsistent or superseded by information in this Target's Statement);
- the information contained in releases by MDL to the ASX before the date of this Target's Statement; and
- the information contained in this Target's Statement.

Your Directors have assumed, for the purposes of preparing this Target's Statement, that the information in the Bidder's Statement is accurate (unless expressly indicated otherwise in this Target's Statement). However, your Directors do not take any responsibility for the content of the Bidder's Statement and is not to be taken as endorsing, in any way, any or all statements contained therein.

In deciding what information should be included in this Target's Statement, your Directors have had regard to:

- the nature of MDL Shares;
- the matters MDL Shareholders may reasonably be expected to know;
- the fact that certain matters may reasonably be expected to be known to the professional advisers to MDL Shareholders;
- the nature of the Offer; and
- the time available to MDL to prepare this Target's Statement.

### 8.12 APPROVAL OF TARGET'S STATEMENT

This Target's Statement has been approved by a resolution passed by your Directors.

Signed for and on behalf of MDL by:



Nic Limb  
Chairman  
Date: 22 May 2018



# GLOSSARY & INTERPRETATION

# 9



## 9. GLOSSARY & INTERPRETATION

### 9.1 GLOSSARY

<b>2018 Performance Rights</b>	up to 702,689 unlisted performance rights proposed to be issued by MDL under the MDL Performance Rights Plan, further details of which are set out in MDL's notice of annual general meeting released to the ASX on 23 April 2018
<b>Absolute TSR hurdle</b>	as defined in Section 5.8 of this Target's Statement
<b>AEST</b>	Australian Eastern Standard Time
<b>AMC</b>	the Independent Technical Specialist
<b>Announcement Date</b>	27 April 2018
<b>ASIC</b>	the Australian Securities and Investments Commission
<b>associate</b>	has the same meaning as given to that term for the purposes of Chapter 6 of the Corporations Act (as modified by ASIC from time to time) as if section 12(1) of that Act included a reference to this Target's Statement and MDL was the designated body
<b>ASX</b>	ASX Limited ABN 98 008 624 691 or, where the context otherwise requires, a financial market operated by it known as the Australian Securities Exchange
<b>ASX Listing Rules</b>	the listing rules of ASX, as amended or replaced
<b>AUD or A\$</b>	Australian dollars
<b>Eramet</b>	Eramet SA (French company No. 632 045 381)
<b>Bidder's Statement</b>	the bidder's statement by Eramet dated 27 April 2018 setting out the terms and other information in relation to the Offer, as updated by the replacement bidder's statement by Eramet dated 14 May 2018 and read in conjunction with Eramet's Second Supplementary Bidder's Statement
<b>CAGR</b>	compound annual growth rate
<b>CGT</b>	capital gains tax
<b>Conditions</b>	each defeating condition to which Eramet's Offer is subject, as set out in section 9.7 of the Bidder's Statement
<b>Corporations Act</b>	<i>the Corporations Act 2001 (Cth)</i>
<b>Director</b>	a director of MDL
<b>EBITDA</b>	earnings before interest, tax, depreciation and amortisation
<b>FCF</b>	free cash flow
<b>FY</b>	financial year, which for MDL is the calendar year ending 31 December
<b>GCO</b>	Grande Côte mineral sands operation in Senegal, West Africa
<b>GST</b>	goods and services tax
<b>HM</b>	heavy mineral
<b>Independent Expert or Grant Samuel</b>	Grant Samuel & Associates Pty Limited ACN 050 036 372
<b>Independent Expert's Report</b>	the report of the Independent Expert as commissioned by MDL and set out in Appendix 1 to this Target's Statement
<b>Independent Technical Specialist</b>	AMC Consultants Pty Ltd ACN 008 129 164
<b>Independent Technical Specialist's Report</b>	the report of the Independent Technical Specialist commissioned by the Independent Expert and set out in Appendix 1 to this Target's Statement (as Appendix 4 of the Independent Expert's Report)
<b>JOC</b>	joint operating committee

## 9. GLOSSARY & INTERPRETATION

<b>JORC Code</b>	the 2012 Edition of The Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves prepared by the Joint Ore Reserves Committee of The Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Minerals Council of Australia
<b>kt</b>	kilotonnes
<b>MDL or the Company</b>	Mineral Deposits Limited ACN 064 377 420
<b>MDL Board or Board</b>	the board of directors of MDL
<b>MDL Group</b>	MDL and each of its subsidiaries and the TiZir Group and MDL Group Member means any member of the MDL Group
<b>MDL Performance Right</b>	an unlisted performance right issued under the MDL Performance Rights Plan
<b>MDL Performance Rights Plan</b>	the MDL Performance Rights Plan (which was approved by MDL Shareholders on 20 May 2016 and as amended by MDL Shareholders on 4 May 2017) described in Section 5.8 of this Target's Statement
<b>MDL Share or Share</b>	a fully paid ordinary share in the capital of MDL
<b>MDL Shareholder or Shareholder</b>	a holder of MDL Shares
<b>Mt</b>	million tonnes
<b>Offer</b>	the off-market takeover bid by Eramet for all MDL Shares other than those already owned by Eramet, as described in the Bidder's Statement
<b>Offer Consideration</b>	the consideration due to you as a result of your acceptance of the Offer, being the Offer Price multiplied by your MDL Shares accepted into the Offer
<b>Offer Period</b>	the period during which the Offer will remain open for acceptance in accordance with section 9.2 of the Bidder's Statement
<b>Offer Price</b>	the consideration offered by Eramet under the Offer. As at the date of this Target's Statement, the Offer Price is A\$1.46 cash for each MDL Share
<b>P/FCF</b>	price to free cash flow
<b>Public Authority</b>	any government or any governmental, semi-governmental, statutory or judicial entity, agency or authority, whether in Australia or elsewhere, including, without limitation) any self-regulatory organisation established under statute or otherwise discharging substantially public or regulatory functions, and ASX or any other stock exchange
<b>Register Date</b>	the date set by Eramet under section 633(2) of the Corporations Act, being 2 May 2018.
<b>relevant interest</b>	has the meaning given in sections 608 and 609 of the Corporations Act
<b>Second Supplementary Bidder's Statement</b>	Eramet's second supplementary bidder's statement dated 16 May 2018
<b>Shareholders' Agreement</b>	shareholders' agreement governing the TiZir Joint Venture between MDL, MDL (Mining) Limited, Eramet, Erallloys Holding Limited, and TiZir Limited dated 25 October 2011 (as amended). For further details, see section 3.3(D) of the Bidder's Statement and Section 6.5(c) of this Target's Statement
<b>Rights</b>	all accreditations, rights or benefits of whatever kind attaching to or arising from MDL Shares directly or indirectly at or after the Announcement Date (including, but not limited to, all dividends, distributions and all rights to receive them or rights to receive or subscribe for shares, notes, bonds, options or other securities declared, paid or issued by the MDL Group after that date) but excluding any franking credits attached to a dividend or other distribution
<b>t</b>	tonne or tonnes
<b>Target's Statement</b>	this document, being the statement of MDL under Part 6.5 of the Corporations Act in response to the Offer

<b>TARP Test</b>	as defined in Section 7.3 of this Target's Statement
<b>TiZir Board</b>	the board of directors of TiZir Limited
<b>TiZir Joint Venture or TiZir</b>	<p>the incorporated joint venture between MDL and Eramet comprising their respective 50% interest in the TiZir Group.</p> <p>TiZir Limited is the holding company for the joint venture's 90% interest in GCO and its 100% interest in TTI.</p> <p>MDL's interest in TiZir Limited is held through its wholly owned subsidiary, MDL (Mining) Limited and Eramet's interest in TiZir Limited is held through its wholly owned subsidiary Erallloys Holding AS.</p>
<b>TiZir Limited</b>	TiZir Limited, a private limited company registered in the Register of Companies for England and Wales under company number 07727671
<b>TiZir Group</b>	TiZir Limited, TiZir Mauritius Limited, Grande Côte Operations SA, TiZir Titanium & Iron AS and each of TiZir Limited's Subsidiaries and TiZir Group Member means any member of the TiZir Group
<b>TiZir Guidance</b>	the <i>TiZir Financial and Operations Guidance for 2018 and 2019</i> released by MDL to the ASX on 10 May 2018
<b>tph</b>	tonnes per hour
<b>TTI</b>	the TiZir Titanium & Iron ilmenite upgrading facility in Tyssedal, Norway
<b>TZMI</b>	TZ Minerals International Pty Ltd ACN 003 492 519
<b>USD or US\$</b>	United States dollars
<b>voting power</b>	has the meaning given in section 610 of the Corporations Act
<b>VWAP</b>	volume weighted average price

## 9.2 INTERPRETATION

In this Target's Statement, unless the context otherwise requires:

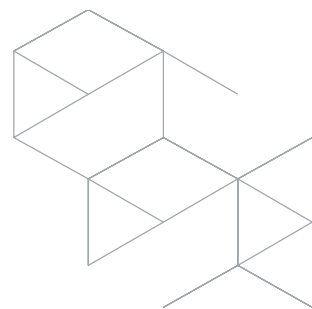
- the singular includes the plural and vice versa and words importing one gender include other genders;
- terms defined in the Corporations Act as at the date of this Target's Statement have the meanings given to them in the *Corporations Act 2001* (Cth) at that date;
- a reference to dollars, A\$, AUD, \$ and cents is a reference to Australian currency;
- a reference to a statute of any parliament or any section, provision or schedule of a statute of any parliament includes a reference to any statutory amendment, variation or consolidation of the statute, section, provision or schedule and includes all statutory instruments issued under the statute, section, provision or schedule;
- a reference to a person includes any company, partnership, joint venture, association, corporation or other body corporate and vice versa;
- a reference to a Section is a reference to a section of this Target's Statement;
- a reference to time is a reference to Melbourne time; and
- headings and bold type are used for reference only.



## INDEPENDENT EXPERT'S REPORT



# GRANT SAMUEL



21 May 2018

The Directors  
Mineral Deposits Limited  
Level 17  
530 Collins Street  
Melbourne VIC 3000

Dear Directors

## Takeover offer by ERAMET

### 1 Introduction

Mineral Deposits Limited (“MDL”) is an Australian minerals sands company. MDL’s major asset is a 50% interest in TiZir Limited (“TiZir”), which in turn owns and operates the Grande Côte Mineral Sands Operation (“GCO”), a large integrated mineral sands mining operation in Senegal, and the TiZir Titanium & Iron ilmenite smelter (“TTI”) in Norway. Listed on the Australian Securities Exchange (“ASX”), as of 26 April 2018 MDL had a market capitalisation of approximately A\$227 million.

ERAMET SA (“ERAMET”) owns the remaining 50% of, and is effectively MDL’s joint venture partner in, TiZir. In addition, ERAMET has substantial global operations in nickel and manganese mining and refining, and produces special steels and alloys. ERAMET’s shares are listed on the Euronext Paris and it had a market capitalisation of approximately €3,935 million as of 26 April 2018.

On 27 April 2018, ERAMET announced an all cash off-market takeover offer for all the shares in MDL, at a price of A\$1.46 per share (“Offer” or “ERAMET Offer”). ERAMET also announced that it had acquired a relevant interest in 13.3% of MDL. The ERAMET Offer is subject to a 50.1% minimum acceptance condition.

The directors of MDL have engaged Grant Samuel & Associates Pty Limited (“Grant Samuel”) to prepare an independent expert’s report setting out whether, in Grant Samuel’s opinion, the ERAMET Offer is fair and reasonable to MDL shareholders. A copy of the report will be included in the Target’s Statement to be sent by MDL to its shareholders. This letter contains a summary of Grant Samuel’s opinion and main conclusions.

GRANT SAMUEL & ASSOCIATES PTY LIMITED

ABN 28 050 036 372 AFS Licence No 240985  
Level 6, 1 Collins Street Melbourne VIC 3000 T +61 3 9949 8800 F +61 3 9949 8838

GRANTSAMUEL.COM.AU





## 2 Summary of Opinion

Grant Samuel has valued MDL in the range A\$2.04-2.52 per share. The ERAMET Offer price of \$1.46 per share is well below the bottom end of this valuation range. Accordingly, in Grant Samuel's opinion, the ERAMET Offer is neither fair nor reasonable.

TiZir is MDL's sole asset and, accordingly, valuation of MDL is essentially based on an assessment of the underlying value of TiZir.

TiZir's improving operational performance and, in particular, a significant strengthening in mineral sands commodity prices are set to transform TiZir's profitability and free cash flow generation. TiZir reported strong growth in earnings for FY17<sup>1</sup>, as GCO production continued to build towards name plate capacity and TTI production rebounded after an operational incident in late 2016. TiZir's FY17 EBITDA<sup>2</sup> was US\$62 million, up from US\$23.1 million for the preceding year. MDL is forecasting strong earnings growth for TiZir for FY18, with EBITDA expected to increase to US\$116 million<sup>3</sup>. Increased production levels at TTI and full exposure to prevailing commodity prices (particularly titanium slag prices) underpin expectations of further strong earnings growth for TiZir for FY19.

TiZir's increasing profitability is expected to result in significant free cash flow generation across the remainder of FY18 and through FY19. The consequence will be a substantial deleveraging and material improvement in the financial position of TiZir.

The value of TiZir is critically dependent on assumptions regarding future mineral sands commodity prices. Industry analysts and participants are predicting that the recent strengthening in commodity prices will continue, with increases in supply predicted to fall short of continued demand growth. The key questions relate to the extent and duration of further commodity price increases over the short to medium term. Grant Samuel's valuation reflects an assumption that following a period of sharply stronger prices through to 2022, supply side responses or other factors will result in a rapid price reversion to longer term historical averages.

Grant Samuel's valuation range takes account of production risks at both GCO and TTI (reflecting that neither has yet achieved nameplate capacity) and sovereign risks associated with GCO's Senegalese location.

Valuation of TiZir (and MDL) is ultimately subjective, given the need to make judgements regarding future variables (principally commodity prices) that are intrinsically uncertain. Investors could reasonably hold a wide range of views on the value of MDL, depending on their expectations as to future mineral sands commodity prices. However, Grant Samuel's analysis suggests that even for very conservative (and in Grant Samuel's view unrealistically conservative) assumptions, the value of MDL is well above the ERAMET Offer price.

Grant Samuel has therefore concluded that the ERAMET Offer is neither fair nor reasonable.

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<sup>1</sup> FY17 refers to the 12 months ended 31 December 2017. FYXX refers to the 12 months ended 31 December 20xx.

<sup>2</sup> EBITDA means Earnings before interest, tax and depreciation

<sup>3</sup> Forecast FY18 EBITDA represents actual performance for the three months to 31 March 2018 and forecast performance for the nine months to 31 December. The FY18 forecast was presented to the TiZir Board before the announcement of the Offer. The key assumptions underpinning forecast EBITDA for FY18 are set out in more detail in the MDL Chairman's Letter to shareholders dated 10 May 2018.



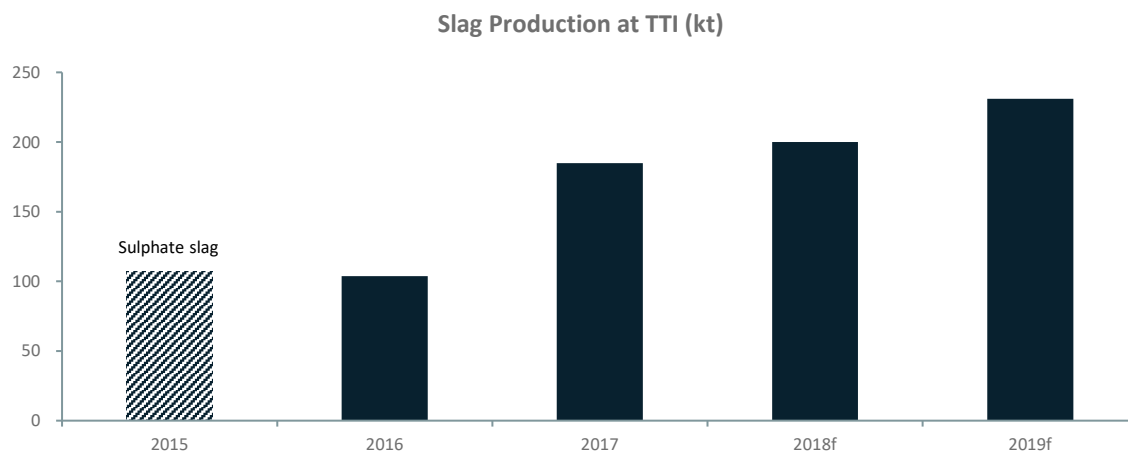
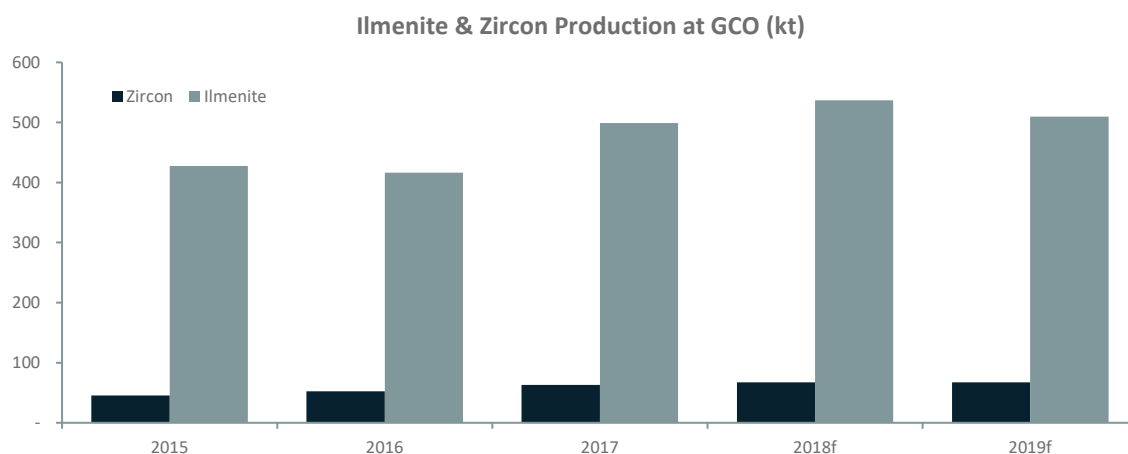
### 3 Key Conclusions

- **Notwithstanding a number of ramp-up issues, TiZir has delivered significant improvements in operational performance**

After more than two years of construction, mining commenced at GCO in 2014. Despite various teething issues, production has increased steadily, and is forecast to achieve nameplate capacity in 2019. The TTI smelter underwent a major refit in 2015 to convert it to chloride titanium slag production (although it retains sulphate slag production capability), re-starting production in January 2016. In August 2016, a major operational incident damaged the roof of the furnace at the smelter, resulting in the closure of the facility for repairs until production re-commenced in January 2017. Production volumes grew rapidly and averaged around 87% of nameplate capacity across the second, third and fourth quarters of FY17. For the first half of the first quarter of FY18, TTI production rates approached its expanded production capacity of 230,000 tonnes per annum.

Unscheduled maintenance following a gearbox failure then resulted in a reduction in production through to mid-April. Overall TTI production for FY18 is expected to be 10% higher than for FY17, and is then expected to approach nameplate capacity for FY19.

The following chart(s) show historical and expected operating performance at GCO and TTI from 2015 to 2019:



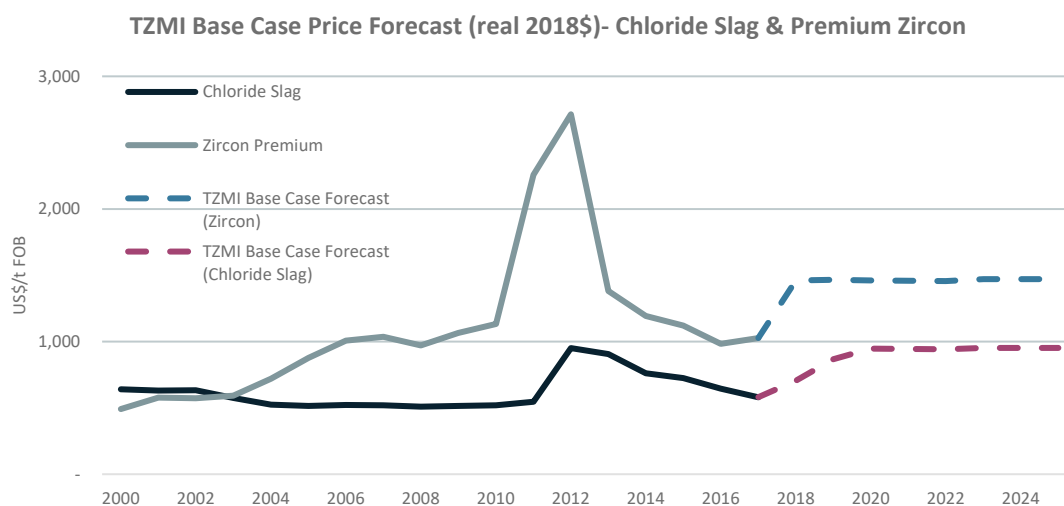


- **Mineral sands commodity prices have recently strengthened and further increases are expected over the short to medium term.**

TiZir's major products are ilmenite (most of which is transferred for processing by TTI) and zircon (both produced by GCO) and chloride ilmenite slag, produced by TTI. None of these products is sold in exchange traded markets. Rather, these products are typically sold under bespoke contractual arrangements with customers. In relation to titanium slag in particular there is a limited number of customers that specialise in chloride based titanium pigment production. The overall market for minerals sands products is concentrated, with relatively few producers and consumers. Accordingly, there is little equity market analyst or commodity analyst coverage of the relevant commodity markets. Historical pricing is opaque and there are few credible forecasts of future commodity prices.

MDL has engaged TZ Minerals International Pty Ltd ("TZMI"), a specialist consultant in the mineral sands industry, to provide advice regarding future mineral sands commodity pricing.

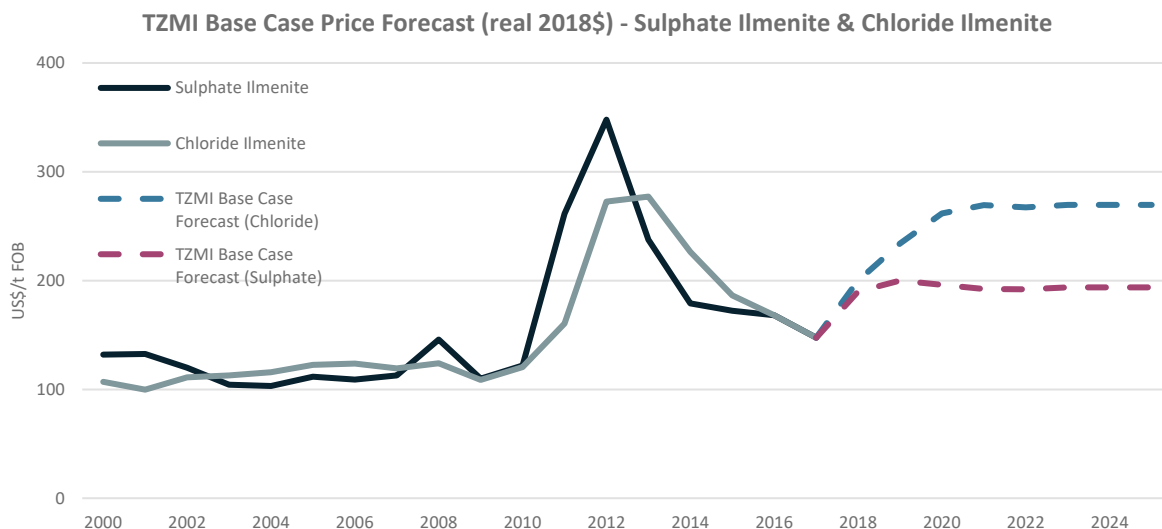
The following charts illustrates TZMI's price forecasts for TiZir's key products:



Source: TZMI, February 2018 Forecast<sup>4</sup>

<sup>4</sup> Where necessary, Grant Samuel has adjusted prices (both historical and forecast) to be expressed in real 2018 terms (at a rate of 2.5%)

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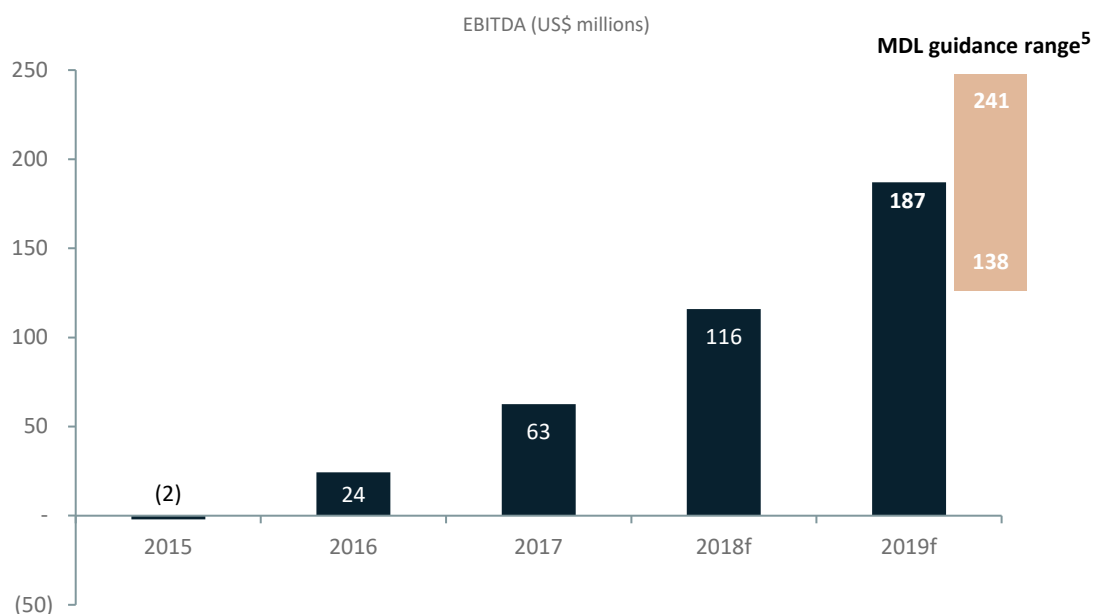


Source: TZMI, February 2018 Forecast

TZMI is forecasting substantial price increases for all mineral sands products through to 2022. TZMI's longer term forecasts for the period after 2022 are for mineral sands product prices to remain at historically elevated levels, reflecting continued growth in demand and ongoing supply constraints, with limited new minerals sands projects forecast to come on stream. The forecast price increases are most significant for premium zircon and chloride slag, TiZir's major products.

- **TiZir is expected to deliver substantial growth in earnings and free cash flow across FY18 and FY19.**

The combination of increasing production levels and sharply higher commodity prices is expected to result in substantial earnings growth for TiZir, as illustrated in the following chart:



<sup>5</sup> The MDL Chairman's Letter to shareholders dated 10 May 2018 contained a guidance range for TiZir EBITDA for FY19 of US\$138-241 million. This guidance range was based on low case and high case minerals sands commodity price forecasts by TZMI. TZMI's base case commodity price forecasts imply FY19 EBITDA for TiZir of \$187 million.

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Forecast FY18 EBITDA represents an 86% increase on FY17 EBITDA, although it understates MDL's run-rate earnings, given that:

- approximately half of MDL's titanium slag sales for FY18 will be delivered into contracts established during FY16, at prices significantly lower than current prices; and
- as a result of the mechanical issues experienced by TTI in early 2018, TTI titanium slag production for FY18 is forecast to be approximately 200,000 tonnes, approximately 30,000 tonnes lower than projected long term steady state production rates.

Earnings for FY19 are expected to grow strongly, reflecting further increases in commodity prices, full exposure of slag sales to prevailing market prices and growth in TTI production volumes.

As at 31 December 2017, TiZir had external net debt of US\$333 million and loans from shareholders totalling US\$232 million. Based on the material uplift in EBITDA expected for FY18 and FY19, TiZir is projected to generate significant free cash flows, allowing substantial debt reduction.

■ **Grant Samuel has valued MDL in the range A\$2.04-2.52 per share.**

Grant Samuel has valued MDL in the range A\$408-503<sup>6</sup> million, which corresponds to a value of A\$2.04-2.52 per share. The valuation represents the estimated full underlying value of MDL and includes a premium for control. The value exceeds the price at which, based on current market conditions, Grant Samuel would expect MDL shares to trade on the ASX in the absence of a takeover offer.

The valuation is summarised below:

	Value Range US\$m)	
	LOW	HIGH
GCO	800	900
TTI	275	325
TiZir corporate costs	(22)	(18)
<b>TiZir enterprise value (100%)</b>	<b>1,053</b>	<b>1,207</b>
Less: External net debt	(333)	(333)
Less: Shareholder loans	(232)	(232)
<b>TiZir equity value (100%)</b>	<b>489</b>	<b>643</b>
<b>TiZir equity value (50%)</b>	<b>244</b>	<b>321</b>
Value attributed to MDL's 50% shareholding in TiZir	220	290
MDL shareholder loan to TiZir	87	87
Net cash	13	13
Head office costs (net of savings)	(14)	(13)
<b>MDL equity value (US\$)</b>	<b>306</b>	<b>377</b>
<b>MDL equity value (A\$)</b>	<b>408</b>	<b>503</b>
Fully diluted MDL shares on issue (millions)	200	200
<b>MDL Value per share (A\$)</b>	<b>2.04</b>	<b>2.52</b>

The valuation is principally based on discounted cash flow ("DCF") analysis.

<sup>6</sup> Converted from USD to AUD at 0.75

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Grant Samuel appointed AMC Consultants Pty Ltd (“AMC”) as technical specialist to review the GCO minerals sands mining operation. AMC’s role included a review of reserves, development plans, production profiles and capital and operating costs. AMC’s report is attached to Grant Samuel’s report.

Grant Samuel’s financial analysis was based on valuation scenarios prepared in conjunction with AMC, reflecting AMC’s judgements regarding the range of assumptions as to production rates, capital costs and operating costs that could reasonably be adopted for valuation purposes. Net present values (“NPVs”) for TiZir’s future cash flows were estimated in US\$ terms using nominal discount rates of 9.0-11.0%. Grant Samuel’s valuations of GCO and TTI are at a discount to calculated NPVs, reflecting the production risks and (in GCO’s case) sovereign risks to which the operations are exposed.

The valuation of TiZir is based on a number of important assumptions, including assumptions regarding future mineral sands commodity prices, exchange rates and future operating performance. Commodity prices, exchange rates and expectations regarding future operating performance can change significantly over short periods of time. Such changes could have a significant impact on the value of TiZir’s assets. Given TiZir’s gearing, changes in the value of TiZir’s operating assets could materially affect the value of TiZir’s equity and, therefore, the value of MDL.

Grant Samuel has valued MDL’s 50% interest in TiZir at a discount to its see-through share of the estimated full underlying value of TiZir. The extent of this discount is essentially judgemental. The discount reflects the limits to MDL’s control over TiZir, its inability to directly access TiZir cash flows and constraints on its ability to optimise TiZir’s financing arrangements.

The valuation incorporates modest synergies associated with head office cost reductions that should be achievable by any acquirer of MDL. It does not reflect any special value that may be available exclusively to ERAMET, including the value for ERAMET of acquiring 100% control of TiZir.

MDL’s value per share has been converted to an Australian dollar equivalent at a spot exchange rate of A\$1.00 = US\$0.75.

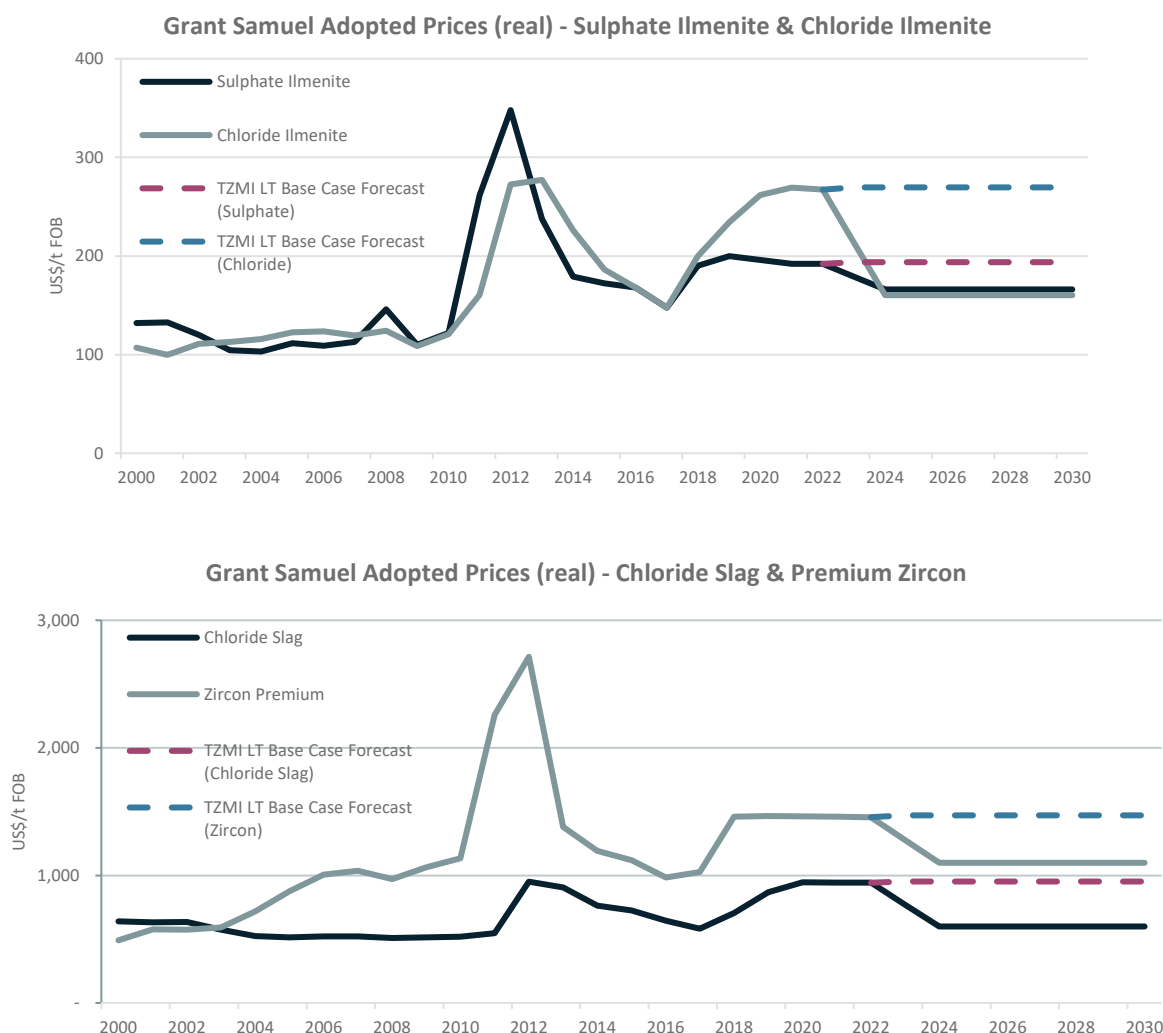
- **Judgements regarding the value of MDL are fundamentally based on judgements regarding future mineral sands commodity prices.**

Grant Samuel’s valuation of MDL in the range A\$2.04-2.52 cents per share reflects Grant Samuel’s estimate of the current market value of MDL’s 50% interest in TiZir. While TiZir production volumes (both at GCO and TTI) have not yet achieved full name-plate capacity, and there have been various unexpected production interruptions, the operations have shown steady progress. Over the medium term, production volume variability is unlikely to be the key issue for TiZir. Rather, the fundamental driver of value for TiZir is commodity prices. Accordingly, judgements regarding the value of MDL are ultimately primarily dependent on judgements regarding future prices for, in particular, chloride titanium slag, ilmenite and zircon.

TZMI is forecasting significant price increases through to 2022. TZMI’s longer term forecasts beyond 2022 are for mineral sands commodity prices to remain at elevated levels. Grant Samuel has adopted TZMI’s price forecasts for the period 2018-2022. However, as shown on the charts below, Grant Samuel has adopted long term price assumptions that are significantly lower than those of TZMI.



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Grant Samuel's long term price assumptions, while materially lower than the long term price forecasts of TZMI, are consistent with historical real terms median pricing. The adoption of these lower long term price assumptions notionally reflects a more significant supply side response than that assumed by TZMI, substitution effects or other factors. However, Grant Samuel's long term price assumptions are essentially subjective. They reflect a judgement that industry participants and investors are unlikely to be prepared to pay a price for mineral sands assets based on long term price forecasts that are materially higher than historical prices.

Adoption of TZMI's long term price forecasts would yield net present values ("NPVs") for GCO and TTI materially above Grant Samuel's valuation ranges for GCO and TTI. For example, using a discount rate of 10% and AMC's base case production forecasts, calculated NPVs would be approximately US\$1.168 billion for GCO and US\$763 million for TTI. These NPVs would imply values for MDL representing multiples of the ERAMET Offer price. On the other hand, even for commodity price assumptions significantly more conservative than those adopted by Grant Samuel, the estimated values for MDL are still well above the ERAMET Offer price. It must be acknowledged that there is fundamental uncertainty in relation to future mineral sands commodity prices. Shareholders could hold a wide range of views on future prices and, therefore, the value of MDL. However, in Grant Samuel's opinion, for any reasonable set of commodity price assumptions, assessments of the value of MDL are likely to yield valuations well above the ERAMET Offer price.



- **The premium implied by the ERAMET Offer is broadly consistent with takeover premiums in the Australian market place. However, premium analysis is not indicative of value.**

The ERAMET Offer of \$1.46 per share represents the following premiums relative to MDL's pre-offer share price:

MDL – IMPLIED PREMIUMS OVER PRE-ANNOUNCEMENT SHARE PRICES		
PERIOD	SHARE PRICE	PREMIUM
26 April 2018 – pre-announcement price	1.16	26%
1 week prior 26 April 2018 - VWAP <sup>7</sup>	1.15	27%
1 month prior to 26 April 2018 - VWAP	1.10	33%
3 month prior to 26 April 2018 - VWAP	1.13	30%

Source: IRESS and Grant Samuel analysis

The premiums implied by the ERAMET Offer price are broadly consistent with the range of premiums typically regarded as the benchmark for successful change of control transactions in the Australian market (20-35%).

However, in the context of MDL and the ERAMET Offer the premiums are not in any sense determinative of value, nor do they provide any useful evidence as to value. The premiums are no more than the difference between the offer price and the pre-bid trading price for MDL shares. In any event, there are good reasons to believe that the pre-bid MDL share price did not reflect the fair market value of MDL shares, including:

- MDL has experienced a lengthy and sometimes frustrating build-up towards full production capacity. As a result, share market investors may have had a somewhat jaundiced view in relation to MDL's operational performance;
- MDL has a modest share market capitalisation and limited share liquidity, and is followed by relatively few equity analysts. In these circumstances it is to be expected that limited and irregular analysis of the company and its prospects would be imputed into the share price;
- MDL's market releases have provided only high level information on the underlying performance of TiZir, with MDL's ability to make detailed disclosures constrained by its TiZir joint venture obligations; and
- perhaps most importantly, the opaque nature of the markets for mineral sands products and limited understanding of TiZir's existing pricing arrangements will have made it difficult for investors to fully understand TiZir's leverage to the significant increase in commodity prices that is expected to unfold in the short to medium term.

Accordingly, while the ERAMET Offer does represent a significant premium to MDL's pre-offer share price, premium analysis is not particularly meaningful in relation to assessment of the ERAMET Offer.

- **MDL shares have traded at prices well above the ERAMET Offer price in the weeks following the announcement of the ERAMET Offer.**

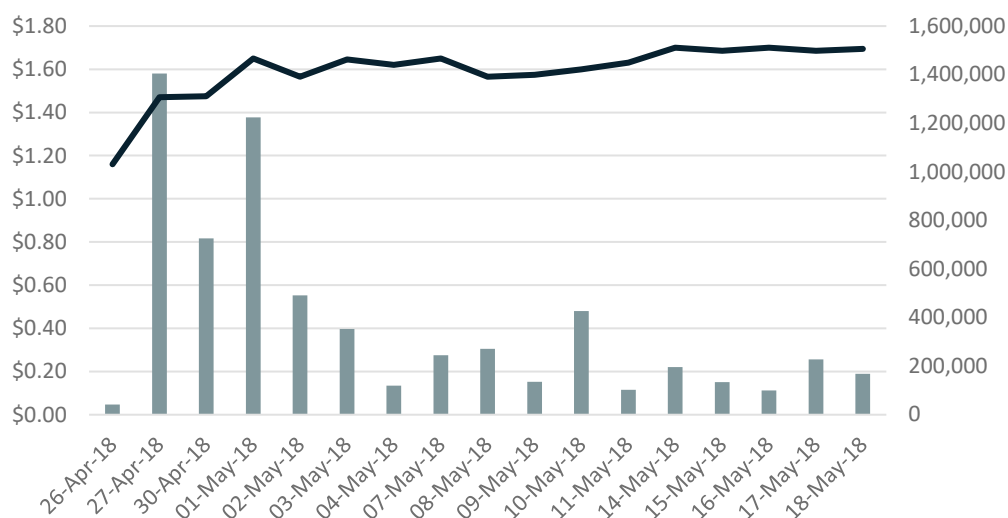
The following chart shows the trading performance (share price and trading volumes) for MDL shares from the day before the announcement of the ERAMET Offer to 18 May 2018.

<sup>7</sup> VWAP refers to volume weighted average prices

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### MDL Trading Performance - Post Offer



Between the announcement of the ERAMET Offer and 18 May 2018, MDL shares have generally traded well above the offer price. For the period 30 April 2018 (the first trading day after the announcement of the ERAMET Offer on 27 April) to 18 May 2018, 8,293,328 shares were traded, in the range \$1.47-1.73, at a volume weighted average price of \$1.62.

#### ■ The ERAMET Offer is not fair.

The ERAMET Offer price of \$1.46 per share is well below Grant Samuel's valuation range of A\$2.04-2.52 per share. Accordingly, the ERAMET Offer is not fair.

#### ■ The ERAMET Offer is not reasonable.

In some circumstances there are reasons for shareholders to consider accepting a takeover offer, even if that offer is not fair. In particular, that may be the case if shareholders have little prospect of realising value in excess of the offer price if they do not accept the offer (for example, where the bidder already controls the target). In Grant Samuel's view, the following factors should be considered in considering whether the ERAMET Offer is reasonable, notwithstanding that it is not fair:

- the ERAMET Offer price of A\$1.46 per share is substantially lower than Grant Samuel's valuation range for MDL of A\$2.04-2.52 per share;
- ERAMET's interest in MDL (13.36% as at 14 May 2018) is not an impediment to some alternative change of control transaction involving MDL. MDL's three largest shareholders other than ERAMET collectively hold approximately 33% of the shares in MDL and would be in a position to deliver control of MDL to an alternative bidder. However, it must be recognised that any material increases in ERAMET's shareholding would potentially represent a deterrent to an alternative bid for MDL;
- while MDL shares could trade at prices below the ERAMET Offer price in the short term in the absence of the ERAMET Offer, the MDL share price should be supported by the additional information provided in MDL's Target's Statement, expectations of strengthening commodity prices and, over time, improved financial performance. Moreover, MDL would clearly remain an attractive takeover target, not least to ERAMET, providing further support for the MDL share price. ERAMET's current shareholding should not affect the liquidity of MDL shares, given that it essentially represents the acquisition of existing substantial shareholdings;

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- MDL has no pressing need to raise capital and as TiZir's debt balance is reduced from free cash flows there is a reasonable prospect of meaningful dividends being paid in due course;
- since the announcement of the ERAMET Offer, MDL shares have generally traded at prices above the ERAMET Offer price of \$1.46 per share. MDL shareholders have had an opportunity to realise cash value well in excess of the ERAMET Offer price through selling their shares on market. For as long as MDL shares continue to trade at prices above the ERAMET Offer price, MDL shareholders have no incentive to sell their shares into the ERAMET Offer.

Overall, having regard to the above, Grant Samuel has concluded that the ERAMET Offer is not reasonable.

Accordingly, in Grant Samuel's view the ERAMET Offer is neither fair nor reasonable.

#### 4 Other Matters

This report is general financial product advice only and has been prepared without taking into account the objectives, financial situation or needs of individual MDL shareholders. Accordingly, before acting in relation to their investment, shareholders should consider the appropriateness of the advice having regard to their own objectives, financial situation or needs. Shareholders should read the Target's Statement issued by MDL in relation to the ERAMET Offer.

A decision as to whether to accept the ERAMET Offer is a matter for individual shareholders, based on their own views as to value, their expectations about future market conditions and their particular circumstances including risk profile, liquidity preference, investment strategy, portfolio structure and tax position. Shareholders who are in doubt as to the action they should take in relation to the Offer should consult their own professional adviser.

Similarly, it is a matter for individual shareholders as to whether to buy, hold or sell securities in MDL. This is an investment decision upon which Grant Samuel does not offer an opinion and is independent of a decision as to whether to accept the ERAMET Offer. Shareholders should consult their own professional adviser in this regard.

Grant Samuel has prepared a Financial Services Guide as required by the Corporations Act, 2001. The Financial Services Guide is included at the beginning of the full report.

This letter is a summary of Grant Samuel's opinion. The full report from which this summary has been extracted is attached and should be read in conjunction with this summary.

The opinion is made as at the date of this letter and reflects circumstances and conditions as at that date.

Yours faithfully

**GRANT SAMUEL & ASSOCIATES PTY LIMITED**



FINANCIAL SERVICES GUIDE  
AND  
INDEPENDENT EXPERT'S REPORT  
IN RELATION TO THE OFFER BY ERAMET SA

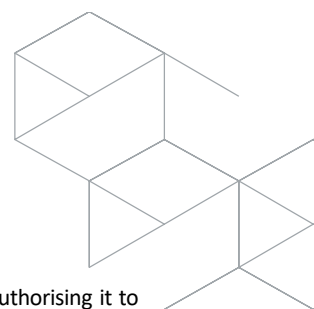
GRANT SAMUEL & ASSOCIATES PTY LIMITED  
ABN 28 050 036 372

21 MAY 2018





## FINANCIAL SERVICES GUIDE



Grant Samuel & Associates Pty Limited ("Grant Samuel") holds Australian Financial Services Licence No. 240985 authorising it to provide financial product advice on securities and interests in managed investments schemes to wholesale and retail clients.

The Corporations Act, 2001 requires Grant Samuel to provide this Financial Services Guide ("FSG") in connection with its provision of an independent expert's report ("Report") which is included in a document ("Disclosure Document") provided to members by the company or other entity ("Entity") for which Grant Samuel prepares the Report.

Grant Samuel does not accept instructions from retail clients. Grant Samuel provides no financial services directly to retail clients and receives no remuneration from retail clients for financial services. Grant Samuel does not provide any personal retail financial product advice to retail investors nor does it provide market-related advice to retail investors.

When providing Reports, Grant Samuel's client is the Entity to which it provides the Report. Grant Samuel receives its remuneration from the Entity. In respect of the Report for MDL in relation to all cash off-market takeover offer by ERAMET SA ("ERAMET") for all the shares in MDL at a price of A\$1.46 per share (the MDL Report), Grant Samuel will receive a fixed fee of A\$300,000 plus reimbursement of out-of-pocket expenses for the preparation of the Report (as stated in Section 8.3 of the MDL Report).

No related body corporate of Grant Samuel, or any of the directors or employees of Grant Samuel or of any of those related bodies or any associate receives any remuneration or other benefit attributable to the preparation and provision of the MDL Report.

Grant Samuel is required to be independent of the Entity in order to provide a Report. The guidelines for independence in the preparation of Reports are set out in Regulatory Guide 112 issued by the Australian Securities & Investments Commission on 30 March 2011. The following information in relation to the independence of Grant Samuel is stated in Section 8.3 of the MDL Report:

*"Grant Samuel and its related entities do not have at the date of this report, and have not had within the previous two years, any business or professional relationship with MDL or ERAMET or any financial or other interest that could reasonably be regarded as capable of affecting its ability to provide an unbiased opinion in relation to the ERAMET Offer.*

*Grant Samuel had no part in the formulation of the ERAMET Offer. Its only role has been the preparation of this report.*

*Grant Samuel will receive a fixed fee of \$300,000 for the preparation of this report. This fee is not contingent on the conclusions reached or the outcome of the ERAMET Offer. Grant Samuel's out of pocket expenses in relation to the preparation of the report will be reimbursed. Grant Samuel will receive no other benefit for the preparation of this report".*

Grant Samuel has internal complaints-handling mechanisms and is a member of the Financial Ombudsman Service, No. 11929. If you have any concerns regarding the MDL Report, please contact the Compliance Officer in writing at Level 19, Governor Macquarie Tower, 1 Farrer Place, Sydney NSW 2000. If you are not satisfied with how we respond, you may contact the Financial Ombudsman Service at GPO Box 3 Melbourne VIC 3001 or 1300 780 808. This service is provided free of charge.

Grant Samuel holds professional indemnity insurance which satisfies the compensation requirements of the Corporations Act, 2001.

Grant Samuel is only responsible for the MDL Report and this FSG. Complaints or questions about the Disclosure Document should not be directed to Grant Samuel which is not responsible for that document. Grant Samuel will not respond in any way that might involve any provision of financial product advice to any retail investor.



## TABLE OF CONTENTS

1	Details of the Offer	1
2	Scope of the Report	2
2.1	Purpose of the Report	2
2.2	Basis of Evaluation	2
2.3	Sources of the Information	3
2.4	Limitations and Reliance on Information	3
3	The Mineral Sands Industry	6
3.1	Overview	6
3.2	Feedstock Processing Technologies	7
3.3	Feedstock Consumption	8
3.4	Feedstock Production	9
3.5	TiO <sub>2</sub> Feedstock Prices	12
3.6	Feedstock Co-Products	14
3.7	Pigment Processing Technologies	16
4	Profile of MDL	18
4.1	Background	18
4.2	Financial Performance	20
4.3	Financial Position	21
4.4	Capital Structure and Ownership	22
4.5	Share Price Performance	23
5	TiZir	26
5.1	Grande Côte Mineral Sands Operation	26
5.2	TiZir Titanium & Iron Ilmenite Upgrading Facility	30
5.3	Financial Performance	33
5.4	Financial Position	34
5.5	Cash Flow	35
5.6	Taxation Structure	36
6	Valuation of MDL	37
6.1	Summary	37
6.2	Methodology	40
6.3	Valuation Assumptions	41
6.4	TiZir Valuation	44
6.5	Corporate Costs/ Head Office Costs	54
6.6	MDL Net Borrowings	54
7	Evaluation of the Offer	55
7.1	Fairness	55
7.2	Reasonableness	55



# GRANT SAMUEL



7.3	Shareholder Decision	58
8	Qualifications, Declarations and Consents	59
8.1	Qualifications	59
8.2	Disclaimers	59
8.3	Independence	59
8.4	Declarations	59
8.5	Consents	60
8.6	Other	60

## Appendices

- 1 Market Evidence - Transactions
- 2 Market Evidence - Comparable Listed Companies
- 3 Selection of Discount Rate
- 4 Report by AMC Consultants Pty Ltd





## 1 Details of the Offer

On 27 April 2018, ERAMET SA (“ERAMET”) announced an unsolicited off-market takeover offer for all the shares in Mineral Deposits Limited (“MDL”) that ERAMET does not already own of A\$1.46 per share (“Offer” or “ERAMET Offer”). ERAMET also announced that it had acquired a relevant interest in 13.3% of MDL’s shares on issue, with 5% subject to a pre-bid agreement.

On the same date, the Board of MDL advised MDL shareholders to take no action in relation to the Offer.

The Bidder’s Statement was lodged with the Australian Securities and Investments Commission (“ASIC”) and sent to the Australian Securities Exchange (“ASX”) and MDL on 27 April 2018. A replacement Bidder’s Statement was lodged with ASIC and sent to the ASX and MDL on 14 May 2018 and dispatched to MDL shareholders on the same date. A Second Supplementary Bidder’s Statement was lodged with ASIC and sent to the ASX and MDL on 16 May 2018.

ERAMET and MDL each holds a 50% interest in TiZir Limited (“TiZir”), a joint venture which operates an integrated mineral sands (titanium dioxide and zircon) business in Senegal and Norway.

ERAMET, a French incorporated company, is a global mining and metallurgical business, which produces manganese, nickel, alloys and other non-ferrous metals. With its shares listed on the Euronext Paris exchange, ERAMET had a market capitalisation of €4 billion (approximately A\$6.4 billion)] as at 26 April 2018, the day before the announcement of the ERAMET Offer.

The Offer extends to all shares issued before the end of the Offer period pursuant to the exercise of MDL performance rights but ERAMET is not offering to acquire any of the MDL performance rights.

The Offer is subject to certain conditions that are set out in full in the Bidder’s Statement. In summary, these include:

- that, by the end of the offer period, ERAMET has a relevant interest in at least 50.1% of MDL shares on issue<sup>1</sup>;
- that there is no “regulatory action” (as defined in the Bidder’s Statement);
- that there is no “material adverse change” (as defined in the Bidder’s Statement);
- conditions in relation to material acquisitions or disposals and other matters;
- that there are no “prescribed occurrences” for MDL (as defined in the Bidder’s Statement);

The Offer opened on 14 May 2018, and will close on 21 June 2018 unless withdrawn or extended prior to closing.

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<sup>1</sup> Including MDL shares that may be issued on vesting of MDL performance rights



## 2 Scope of the Report

### 2.1 Purpose of the Report

Although there is no requirement in the present circumstances for an independent expert's report to be prepared under the Corporations Act or the Australian Securities Exchange ("ASX") Listing Rules, the directors of MDL have engaged Grant Samuel & Associates Pty Limited ("Grant Samuel") to prepare an independent expert's report setting out whether, in its opinion, the Offer is fair and reasonable to MDL shareholders and to state reasons for that opinion. A copy of the report will accompany the Target's Statement to be sent to shareholders by MDL.

This report is general financial product advice only and has been prepared without taking into account the objectives, financial situation or needs of individual MDL shareholders. Accordingly, before acting in relation to their investment, shareholders should consider the appropriateness of the advice having regard to their own objectives, financial situation or needs. Shareholders should read the Bidder's Statement issued by ERAMET and the Target's Statement issued by MDL in relation to the Offer.

Whether or not to accept the Offer is a matter for individual shareholders based on their views as to value and business strategy, their expectations about future economic and market conditions and their particular circumstances including risk profile, liquidity preference, investment strategy, portfolio structure and tax position. Shareholders who are in doubt as to the action they should take in relation to the Offer should consult their own professional adviser.

Similarly, it is a matter for individual shareholders as to whether to buy, hold or sell securities in MDL or ERAMET. These are investment decisions upon which Grant Samuel does not offer an opinion and independent of a decision on whether to accept the Offer. Shareholders should consult their own professional adviser in this regard.

### 2.2 Basis of Evaluation

The term "fair and reasonable" has no legal definition although over time a commonly accepted interpretation has evolved. However, the Australian Securities & Investments Commission ("ASIC") has issued Regulatory Guide 111 ("RG111") which establishes guidelines in respect of independent expert's reports. RG111 differentiates between the analysis required for control transactions and other transactions. In the context of control transactions (whether by takeover bid, by scheme of arrangement, by the issue of securities or by selective capital reduction or buyback), the expert is required to distinguish between "fair" and "reasonable".

Fairness involves a comparison of the offer price with the value that may be attributed to the securities that are the subject of the offer based on the value of the underlying businesses and assets. For this comparison, value is determined assuming 100% ownership of the target and a knowledgeable and willing, but not anxious, buyer and a knowledgeable and willing, but not anxious, seller acting at arm's length. Reasonableness involves an analysis of other factors that shareholders might consider prior to accepting an offer such as:

- the offeror's existing shareholding;
- other significant shareholdings;
- the probability of an alternative offer; and
- the liquidity of the market for the target company's shares.

An offer could be considered "reasonable" if there are valid reasons to accept the offer notwithstanding that it is not "fair".



Fairness is a more demanding criteria. A “fair” offer will always be “reasonable” but a “reasonable” offer will not necessarily be “fair”. A fair offer is one that reflects the full market value of a company’s businesses and assets. An offer that is in excess of the pre-bid market prices but less than full value will not be fair but may be reasonable if shareholders are otherwise unlikely in the foreseeable future to realise an amount for their shares in excess of the offer price. This is commonly the case where the bidder already controls the target company. In that situation the minority shareholders have little prospect of receiving full value from a third party offeror unless the controlling shareholder is prepared to sell its controlling shareholding.

Grant Samuel has determined whether the Offer is fair by comparing the estimated underlying value range of MDL with the Offer price. The Offer will be fair if the Offer price falls within the estimated underlying value range. In considering whether the Offer is reasonable, the factors that Grant Samuel has considered include:

- the estimated value of MDL compared to the offer price;
- the existing shareholding structure of MDL;
- the likelihood of an alternative offer and alternative transactions that could realise fair value;
- the likely market price and liquidity of MDL shares in the absence of the Offer; and
- other advantages and disadvantages for MDL shareholders of accepting the Offer.

## 2.3 Sources of the Information

The following information was utilised and relied upon, without independent verification, in preparing this report:

### Publicly Available Information

- the Bidder’s Statement, First Supplementary Bidder’s Statement and Second Supplementary Bidder’s Statement;
- the Target’s Statement (including earlier drafts);
- annual reports of MDL for the three years ended 31 December 2017;
- press releases, public announcements, media and analyst presentation material and other public filings by MDL including information available on its website;
- brokers’ reports and recent press articles on MDL and the mineral sands industry;
- sharemarket data and related information on Australian and international listed companies engaged in the mineral sands industry and on acquisitions of companies and businesses in this industry; and
- information relating to the Australian and international mineral sands sector including supply/demand and price forecasts.

### Non Public Information provided by MDL

- detailed cash flows models including projections for MDL’s business operations; and
- other confidential documents, board papers, presentations and working papers.

In preparing this report, representatives of Grant Samuel visited the Grand Côte mineral sands mining operation in Senegal (“GCO”). Grant Samuel has also held discussions with, and obtained information from, senior management of MDL and its advisers.

## 2.4 Limitations and Reliance on Information

Grant Samuel believes that its opinion must be considered as a whole and that selecting portions of the analysis or factors considered by it, without considering all factors and analyses together, could create a misleading view of the process employed and the conclusions reached. Any attempt to do so could lead to



## GRANT SAMUEL



undue emphasis on a particular factor or analysis. The preparation of an opinion is a complex process and is not necessarily susceptible to partial analysis or summary.

Grant Samuel's opinion is based on economic, sharemarket, business trading, financial and other conditions and expectations prevailing at the date of this report. These conditions can change significantly over relatively short periods of time. If they did change materially, subsequent to the date of this report, the opinion could be different in these changed circumstances.

This report is also based upon financial and other information provided by MDL and its advisers. Grant Samuel has considered and relied upon this information. MDL has represented in writing to Grant Samuel that to its knowledge the information provided by it was then, and is now, complete and not incorrect or misleading in any material respect. Grant Samuel has no reason to believe that any material facts have been withheld.

The information provided to Grant Samuel has been evaluated through analysis, inquiry and review to the extent that it considers necessary or appropriate for the purposes of forming an opinion as to whether the Offer is fair and reasonable to MDL shareholders. However, Grant Samuel does not warrant that its inquiries have identified or verified all of the matters that an audit, extensive examination or "due diligence" investigation might disclose. While Grant Samuel has made what it considers to be appropriate inquiries for the purposes of forming its opinion, "due diligence" of the type undertaken by companies and their advisers in relation to, for example, prospectuses or profit forecasts, is beyond the scope of an independent expert.

Accordingly, this report and the opinions expressed in it should be considered more in the nature of an overall review of the anticipated commercial and financial implications rather than a comprehensive audit or investigation of detailed matters.

An important part of the information used in forming an opinion of the kind expressed in this report is comprised of the opinions and judgement of management. This type of information was also evaluated through analysis, inquiry and review to the extent practical. However, such information is often not capable of external verification or validation.

Preparation of this report does not imply that Grant Samuel has audited in any way the management accounts or other records of MDL. It is understood that the accounting information that was provided was prepared in accordance with generally accepted accounting principles and in a manner consistent with the method of accounting in previous years (except where noted).

AMC Consultants Pty Ltd ("AMC") was appointed as technical specialist to review GCO for Grant Samuel. AMC's review included a review of GCO's reserves, development plans, production schedules, operating costs, capital costs and potential reserve extensions. The report prepared by AMC is attached to and forms part of this report (see Appendix 4).

The information provided to Grant Samuel and AMC included mine development plans, forecasts and feasibility studies for GCO and a detailed cash flow model. MDL is responsible for the information contained in the mine development plans, forecasts, feasibility studies and the cash flow model ("the forward looking information"). Grant Samuel and AMC have considered and, to the extent deemed appropriate, relied on this information for the purpose of their analysis. For the purposes of defining production scenarios for valuation purposes, AMC has recommended various changes to the information provided by MDL.

Subject to these changes, on the basis of the information provided to Grant Samuel and AMC, and the review conducted by Grant Samuel and AMC of such information, Grant Samuel and AMC have concluded that the forward looking information was prepared appropriately and accurately based on the information available to management at the time and within the practical constraints and limitations of such forward looking information. Grant Samuel and AMC have concluded that the forward looking information does not reflect any material bias, either positive or negative. Grant Samuel has no reason to believe otherwise. However, the achievability of the forward looking information is not warranted or guaranteed by Grant Samuel. Future

## GRANT SAMUEL



profits and cash flows are inherently uncertain. They are predictions by management of future events that cannot be assured and are necessarily based on assumptions, many of which are beyond the control of the company or its management. Actual results may be significantly more or less favourable. Moreover, the forward looking information provided by MDL was not originally generated for, and may not be appropriate in the context of, a valuation of the assets of MDL.

As part of its analysis, Grant Samuel has developed cash flow models on the basis of the technical valuation assumptions deemed appropriate by AMC. Grant Samuel has reviewed the sensitivity of net present values to changes in key variables. The sensitivity analysis isolates a limited number of assumptions and shows the impact of the expressed variations to those assumptions. No opinion is expressed as to the probability or otherwise of those expressed variations occurring. Actual variations may be greater or less than those modelled. In addition to not representing best and worst case outcomes, the sensitivity analysis does not, and does not purport to, show all the possible variations to the business model. The actual performance of the business may be negatively or positively impacted by a range of factors including, but not limited to:

- changes to the assumptions other than those considered in the sensitivity analysis;
- variations to the assumptions considered in the sensitivity analysis greater or lesser than those modelled; and
- combinations of different assumptions may produce outcomes different to those modelled.

Grant Samuel has also considered, and used as a cross-check to its valuation conclusions, guidance of EBITDA for TiZir for the financial years ending 31 December 2018 (FY18) and 31 December 2019 (FY19) (“Earnings Guidance”). This guidance were prepared by MDL and included in a letter from the Chairman of MDL to its shareholders dated 10 May 2018 and released to ASX. The assumptions in relation to production volumes, capital and operating costs that underpin the Earnings Guidance as they relate to GCO are consistent with the forward looking information reviewed by AMC and deemed appropriate for valuation purposes. The commodity prices assumed in the Earnings Guidance (which are in a range) are prices recommended by TZ Minerals International Pty Ltd, a specialist consultant in the global minerals sands industry appointed by MDL.

In forming its opinion, Grant Samuel has also assumed that:

- matters such as title, compliance with laws and regulations and contracts in place are in good standing and will remain so and that there are no material legal proceedings, other than as publicly disclosed;
- the assessments by MDL and its advisers with regard to legal, regulatory, tax and accounting matters relating to the transaction are accurate and complete;
- the information set out in the Target’s Statement sent by MDL to its shareholders is complete, accurate and fairly presented in all material respects;
- the publicly available information relied on by Grant Samuel in its analysis was accurate and not misleading;
- the Offer will be implemented in accordance with its terms; and
- the legal mechanisms to implement the Offer are correct and will be effective.

To the extent that there are legal issues relating to assets, properties, or business interests or issues relating to compliance with applicable laws, regulations, and policies, Grant Samuel assumes no responsibility and offers no legal opinion or interpretation on any issue.



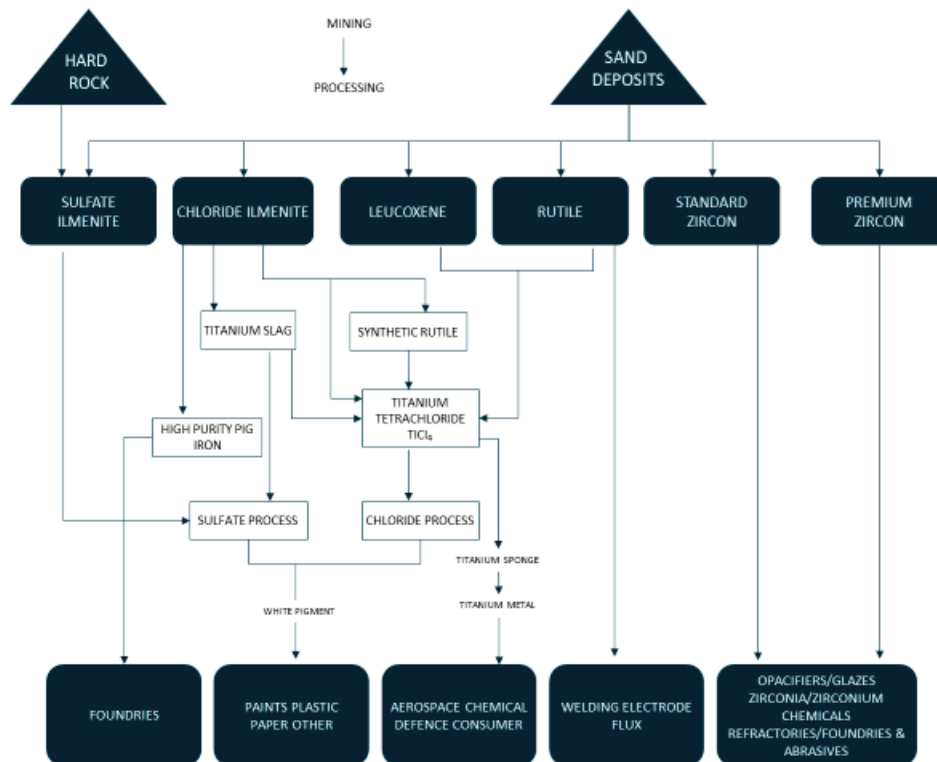
### 3 The Mineral Sands Industry

#### 3.1 Overview

'Mineral sands' refers to deposits of heavy minerals such as ilmenite, zircon, rutile and leucoxene. Some mineral sands deposits are located along old coastal regions where wind action concentrates the heavier minerals. The main mineral sands mining regions are Australia, Sub-Saharan Africa, North America, and India.

The mineral sands industry involves the mining of zircon and titanium dioxide ("TiO<sub>2</sub>" or "titanium dioxide") minerals (ilmenite, rutile and leucoxene). TiO<sub>2</sub> minerals are used as direct inputs or processed into upgraded titanium dioxide feedstocks which, in turn, are used in the production of pigments, titanium metal, welding fluxes and other specialised products.

The processing flows for the production of mineral sands are illustrated below:



Source: TZMI

There are two main mining methods in the mineral sands industry: dredging and dry mechanical (ie. open-cut) mining. A third mining method is hydraulic mining. Dredging is a wet mining method used for deposits that are principally sand based. Dredging produces a slurry which requires further processing through a wet concentrator plant and mineral separation plant. Open-cut mining is a dry mining method used for deposits containing moderately hard materials and involves the use of conventional excavators, bulldozers and trucks. Dry mining is the preferred method for higher grade deposits and where the ore body is in a confined area. The heavy mineral ore extracted through the dry mining method also requires further processing through a wet concentrator plant and mineral separation plant.

The processing method adopted depends on the physical properties of the contained minerals. Valuable heavy minerals are separated from lighter waste material using gravity separation. Magnetic separation is used to separate 'magnetic' ilmenite from the 'non-magnetic' zircon, rutile and leucoxene. Further,



electrostatic separation separates the non-conductive minerals such as zircon and monazite from conductive minerals such as rutile, leucoxene and any residual ilmenite.

Ilmenite, rutile and leucoxene are either used directly as  $\text{TiO}_2$  feedstocks or are upgraded to produce manufactured feedstocks in the form of titanium slag or synthetic rutile. Rutile and leucoxene have a high content of  $\text{TiO}_2$  and are therefore suitable for use as a direct  $\text{TiO}_2$  feedstock. Similarly, high grade ilmenite (typically 58-65%  $\text{TiO}_2$ ) can be used directly as a  $\text{TiO}_2$  feedstock in some applications. Lower grade ilmenite generally requires processing to upgrade to a titanium slag or synthetic rutile. Titanium slag is produced by smelting ilmenite in an electric arc furnace at high temperatures. Synthetic rutile is produced by pyrometallurgical and chemical upgrading of ilmenite.

Titanium dioxide pigment is the largest end use of  $\text{TiO}_2$  feedstocks, accounting for around 90% of consumption globally. Titanium dioxide pigments are used in paints and coatings, plastics, paper, inks, fibres, food and cosmetics to provide brightness, whiteness and opacity. Other uses include printing inks, textiles, rubber, linoleum, and roofing. Titanium dioxide pigments are produced via two alternative methods: the sulphate and chloride processes. The sulphate process uses sulphuric acid as a liberating agent and the chloride process uses chlorine as the liberating agent.

Other non-pigment applications, representing approximately 10% of total  $\text{TiO}_2$  consumption, consist largely of the supply of rutile and high-grade ilmenite as feedstock to produce titanium sponge (an intermediate product in the production of titanium metal), welding electrode fluxes and other specialised products. Titanium metal is used in the aeronautical and electronics industries due to its high strength-to-weight ratio, melting point and resistance to corrosion. Other markets for titanium metal include the medical devices industry, for example for use in equipment for hip replacements and pacemakers.

Zircon is a highly resilient substance that provides strength and durability as well as bright white finishes. Zircon is also chemically inert and has high heat conductivity, making it suitable for use in moulds for very hot metals and components used in refractories to produce steel and glass.

The main end-use segments for zircon can be broadly categorised as ceramics, specialty chemicals & materials, refractories and foundry casting.

'Ceramics' (mostly tiles, sanitary ware such as toilets and baths, and tableware) is the major end use segment accounting for approximately 50% of global zircon consumption. In ceramics, zircon is primarily used to enhance the appearance of the surface finish and impart brilliant whites and colours to the glaze of a tile.

'Specialty chemicals and materials' is the fastest growing of all the zircon end-use sectors, accounting for approximately 18% of total global zircon demand. Zircon, in the form of zirconia, zirconium chemicals and zirconium metal, is used in a range of specialty chemicals and materials.

High-Purity Pig Iron ("HPPI") is a significant by-product in the production of titanium slag and is used in the production of ductile iron. Ductile iron is a premium product free of a number of impurities including silicon, manganese, sulphur and phosphorous. Ductile iron is used in the automotive industry, iron pipes and general engineering.

Historically, commodity prices of titanium feedstocks and associated by-products have been strongly correlated with global GDP growth rates and urbanisation, as demand for titanium feedstocks is closely aligned to significant economic growth contributors such as commercial construction, residential housing and manufacturing.

### 3.2 Feedstock Processing Technologies

$\text{TiO}_2$  pigment producers refine titanium dioxide feedstocks into a range of pure  $\text{TiO}_2$  products. A significant challenge for pigment producers is minimising the waste disposal costs generated from the  $\text{TiO}_2$  refining process and pigment producers consequently have an inherent preference for higher  $\text{TiO}_2$  content feedstocks.



As a result, while ilmenite (with a  $\text{TiO}_2$  content averaging around 50%) accounts for over 90% of total titanium ore mined, approximately 47% of ilmenite is first upgraded to titanium slag (with a  $\text{TiO}_2$  content of 80 to 87%) or synthetic rutile (90 to 95%  $\text{TiO}_2$ ) by extraction of iron from the ilmenite before being utilised as a feedstock by pigment producers.

Titanium slags are produced by smelting ilmenite in electric arc furnaces in the presence of coal or coke at temperatures of approximately  $1,800^\circ\text{C}$ . The smelting process generally produces HPPI as a valuable by-product.

The sulphate process for the production of  $\text{TiO}_2$  pigment involves digestion of the feedstock in sulphuric acid, while the chloride process is based on chlorination of the feedstock in fluidised bed reactors. In addition to the totally different chemistry, the two processes use different raw materials and produce different quantities and types of waste products.

The sulphate pigment segment uses two feedstocks: ilmenite and sulphate grade slag, with the slag users mainly situated in China and Europe. The chloride pigment segment primarily uses 'high grade  $\text{TiO}_2$ ' feedstocks, comprising mainly chloride grade slag, rutile and synthetic rutile, as well as some ilmenite (containing higher grades of  $\text{TiO}_2$ ). Chloride pigment producers are primarily located in North America and Europe, with China beginning to focus on the use of this technology in preference to sulphate technology.

For sulphate pigment plants, the use of sulphate grade slag instead of sulphate ilmenite can significantly reduce the volume of waste by-products, due primarily to the substantial difference in  $\text{TiO}_2$  content. For chloride pigment plants, chloride grade slag is generally a more cost effective feedstock than rutile and synthetic rutile given the lower level of  $\text{TiO}_2$  content. A critical factor in the production of chloride pigment is particle sizing and the level of impurities in the feedstock.

There are high barriers to entry into the  $\text{TiO}_2$  slag industry due to the proprietary nature of slag processing technology. World slag production is limited to four producers, Rio Tinto Limited ("Rio Tinto"), Tronox Limited ("Tronox"), TiZir and more recently Lomon Billions in China. The two major producers are Rio Tinto which controls QIT-Fer et Titane Inc ("QIT") and its Sorel slag plant in Canada, and has a 74% interest in the Richards Bay Minerals slag plant in South Africa and Tronox which produces slag from its two South African smelters, one in Saldanha Bay and the other at its KZN Sands operation in Empangeni, near Richards Bay. Only Rio Tinto and TiZir sell chloride slag to third party customers. Tronox and Lomon Billions utilise internally produced chloride slag in their own production processes.

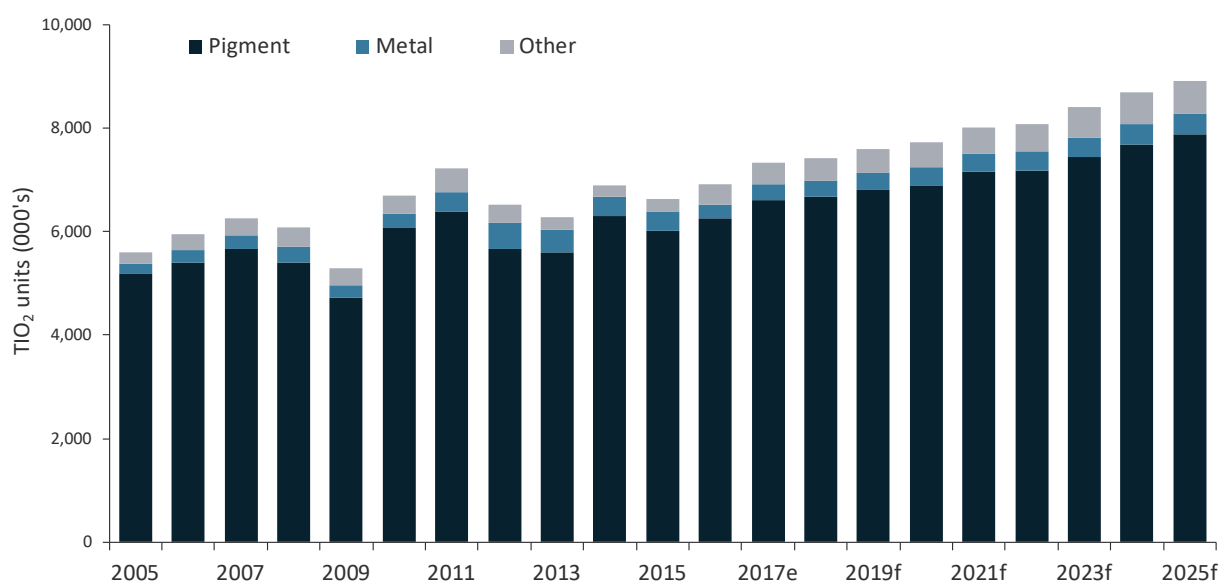
### 3.3 Feedstock Consumption

Titanium dioxide feedstocks are primarily used in the production of  $\text{TiO}_2$  pigment, titanium metal, titanium based welding fluxes and other specialised titanium based products. Demand for titanium feedstocks is closely correlated to global GDP and urbanisation, with increases in consumption largely driven by improvements in global economic fundamentals.

A summary of world titanium dioxide demand by end use segment since 2005 is summarised below:



GLOBAL DEMAND FOR TITANIUM FEEDSTOCKS BY END-USE SEGMENTS:2005-2025



Source: TZMI, February 2018 Forecast

Titanium dioxide consumption grew at an average rate of 1.7% per annum between 2005 and 2016. Minor fluctuations were largely attributable to changing demand for and supply constraints on TiO<sub>2</sub> pigment, which represents approximately 90% of total TiO<sub>2</sub> consumption. TiO<sub>2</sub> pigment is largely used in the paint (57%), plastic (25%) and paper (8%) industries to produce products that are whiter, brighter and more opaque.

TiO<sub>2</sub> consumption is projected to grow at a rate of approximately 2.8% CAGR between 2016 and 2025. TiO<sub>2</sub> consumption generally increases as disposable income increases, with consumption growth particularly sensitive to increases in urban populations in emerging markets.

Other specialised end-use markets represent the remaining 10% of total TiO<sub>2</sub> consumption. These markets consist largely of the supply of rutile as feedstock for titanium sponge and welding electrode fluxes. Rutile is the main feedstock for these markets due to its high TiO<sub>2</sub> content and low impurity level. High quality TiO<sub>2</sub> feedstock is particularly important for the manufacture of titanium metal. This specialist market has had an increasing share of total TiO<sub>2</sub> consumption since 2011, and demand from titanium metal manufacturers is expected to grow at a rate of 5.7% CAGR from 2016 to 2025.

### 3.4 Feedstock Production

#### Natural Feedstocks

The principal naturally occurring TiO<sub>2</sub> feedstocks are summarised in the following table:

NATURAL TITANIUM DIOXIDE FEEDSTOCKS

MINERAL	COMPOSITION	TYPICAL CONTENT	COMMENT
Ilmenite	FeO, TiO <sub>2</sub>	35-65% TiO <sub>2</sub>	The most abundant mineral with economic quantities of TiO <sub>2</sub> but containing varying levels of iron that must be removed during processing
Rutile	TiO <sub>2</sub>	92-96% TiO <sub>2</sub>	A red or reddish-brown mineral that in its pure state would contain 100% TiO <sub>2</sub>
Leucoxene	FeO, TiO <sub>2</sub>	66-91% TiO <sub>2</sub>	A yellow or brown mineral A natural alteration product of ilmenite with varying levels of impurities

Source: TZMI



## GRANT SAMUEL



There are substantial global reserves of ilmenite and rutile. Global ilmenite reserves are estimated at around 770 million tonnes, while rutile reserves are estimated at approximately 59 million tonnes. Global resources of ilmenite and rutile total more than 2 billion tonnes.

Australia is a leading producer and exporter of mineral sands. Australia has 19% of total world ilmenite reserves and 46% of total world rutile reserves. Other countries with large reserves of ilmenite and rutile include China, Mozambique, India, South Africa, Senegal, Kenya and Norway.

### Manufactured Feedstocks

Manufactured feedstocks include synthetic rutile (TiO<sub>2</sub> content 90-95%), chloride grade slag (TiO<sub>2</sub> content 85-91%), upgraded slag known as UGS (TiO<sub>2</sub> content 95%) and sulphate grade slag (TiO<sub>2</sub> content 75-86%). TiO<sub>2</sub> slags and synthetic rutile represent approximately 60% of total titanium feedstock supply.

### Production Levels

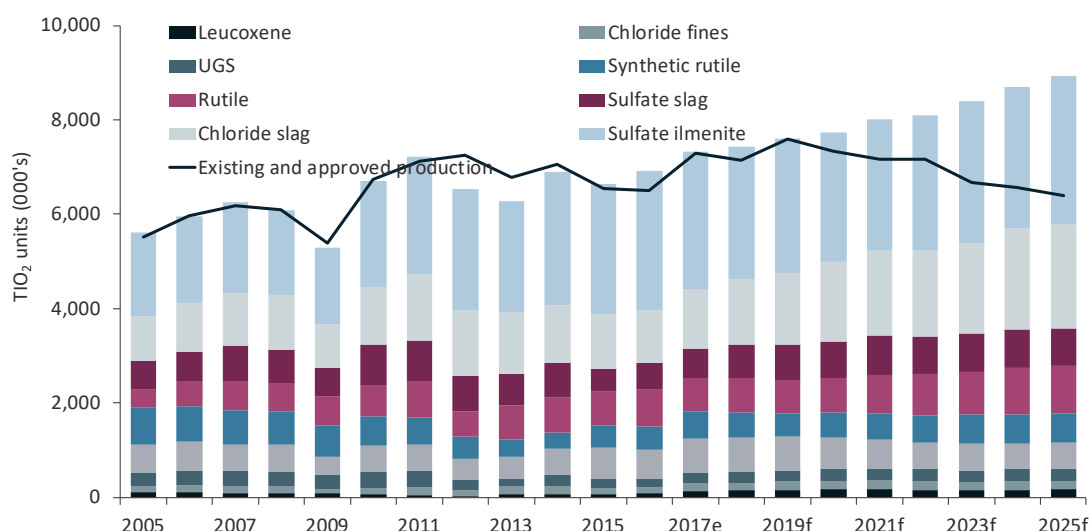
The major world titanium dioxide feedstock producers are set out in the table below:

MAJOR CHLORIDE SLAG PRODUCERS

COMPANY	OWNERSHIP	LOCATION	PRINCIPAL PRODUCTS	TiO <sub>2</sub> FEEDSTOCK PRODUCTION CAPACITY (KT)
Richards Bay Minerals	76% Rio Tinto 24% Blue Horizon	South Africa	Chloride slag Sulphate slag Rutile	1,000kt slag 100kt rutile
QIT	100% Rio Tinto	Canada	Chloride slag Sulphate slag	1,100kt slag
Australia Sands	100% Tronox	Australia	Synthetic rutile	230kt synthetic rutile 106kt rutile
Namakwa Sands	100% Tronox	South Africa	Chloride slag Rutile	190kt slag 31kt rutile
KZN Sands	100% Tronox	South Africa	Chloride slag Rutile	220kt slag 30kt rutile
Lomon Billions	Listed on Shenzhen Exchange	China	Chloride slag Rutile	150kt slag
TiZir	50% MDL 50% ERAMET	Norway	Chloride slag	230kt slag

Source: TZMI

World TiO<sub>2</sub> feedstock production broken down by feedstock type is illustrated in the following chart:

PRODUCTION AND DEMAND ('000 TIO<sub>2</sub> UNITS<sup>2</sup>)

Source: TZMI, February 2018 Forecast

Trends in the supply of TiO<sub>2</sub> feedstocks over the last decade include:

- a surge in the TiO<sub>2</sub> feedstock market in 2010 as global growth recovered after the global financial crisis of late 2007 and 2008; and
- the increase in sulphate ilmenite driven by growth in Chinese sulphate pigment plant production.

TiO<sub>2</sub> feedstock production forecasts beyond 2017 contemplate a shift towards the introduction of new chloride-route capacity rather than new sulphate-route plants, reflecting the relative environmental advantages of the chloride-route process by comparison with the sulphate-route process. Sulphate ilmenite demand is expected to remain flat as Chinese pigment producers respond to tightening environmental regulations by using sulphate slag instead of ilmenite in their production process. Sulphate ilmenite is a lower TiO<sub>2</sub> grade product and produces more waste than the processing of sulphate slag.

### New Projects

A number of greenfields and brownfields mineral sands projects are currently being considered. Not all of these projects are expected to proceed. A summary of the main development projects under consideration is set out in the following table:

#### PLANNED/PROPOSED TIO<sub>2</sub> FEEDSTOCK PROJECTS

PROJECT	COMPANY	LOCATION	EXPANSION TYPE	TIO <sub>2</sub> UNITS CAPACITY (KTPA)	STAGE
<b>Committed Projects</b>					
Motronovsk	Group DF	Ukraine	Greenfield	90	Construction underway
SILL 80	Australian Ilmenite Resources	Australia	Brownfield	80	Enhancing existing plant
Cataby	Iluka Resources	Australia	Greenfield	220	Executed
Boonanarring and Atlas	Image Resources	Australia	Greenfield	65	First production targeted for early 2018
<b>Total Committed</b>				<b>455</b>	

<sup>2</sup> One TiO<sub>2</sub> unit is equal to one tonne of contained TiO<sub>2</sub>



Select Proposals					
Atlas Campaspe	Cristal Mining	Australia	Greenfield	125	Investment decision expected in 2018
Avonbank	WIM Resources	Australia	Greenfield	140	Pre-Feasibility Study completed
Bolshoi Seym	IRC Limited	Russia	Brownfield	96	Under consideration to develop as a new project or leverage existing infrastructure
Chibuto	Anhui Foreign Economic Construction Group	Mozambique	Greenfield	500	Currently resettling residents off the deposit
Coburn Zircon	Strandline Resources	Australia	Greenfield	60	On hold, Strandline is seeking a strategic partner for funding support
Eucla Basin Extension	Iluka Resources	Australia	Brownfield	-	Pre-Feasibility study completed, no further work has taken place
Engelbø	Nordic Mining	Norway	Greenfield	85	Completing a Bankable Feasibility Study
Thunderbird	Sheffield Resources	Australia	Greenfield	224	Finalising financing
<b>Total Select Proposals Capacity</b>				<b>1,230</b>	
<b>Total Other Proposals Capacity</b>				<b>2,601</b>	
<b>Total Committed/Proposed Capacity</b>				<b>4,286</b>	

Source: TZMI

Additional TiO<sub>2</sub> feedstock supply is expected to be limited in the short term. However, market analysis of likely new supply suggests that a number of projects could collectively add 1,000 ktpa of TiO<sub>2</sub> units to global supply by 2025.

### 3.5 TiO<sub>2</sub> Feedstock Prices

There is no organised exchange for TiO<sub>2</sub> feedstocks. Prices are negotiated between the supplier and the consumer and typically remain confidential. Feedstocks are typically sold in export markets on an FOB<sup>3</sup> basis with the exception of zircon, rutile and leucoxene, which can also be quoted on a CIF<sup>4</sup> basis.

Prior to 2010, TiO<sub>2</sub> feedstock supply contracts were typically long term (5-10 years) and subject to annual price negotiations, escalated in line with the US consumer price index. These pricing arrangements reflected the strong negotiating position of pigment producers, given plentiful supply of TiO<sub>2</sub> feedstock.

From mid 2012 to late 2015, feedstock pricing declined sharply from the historic highs realised in 2011. Pricing during this period reflected:

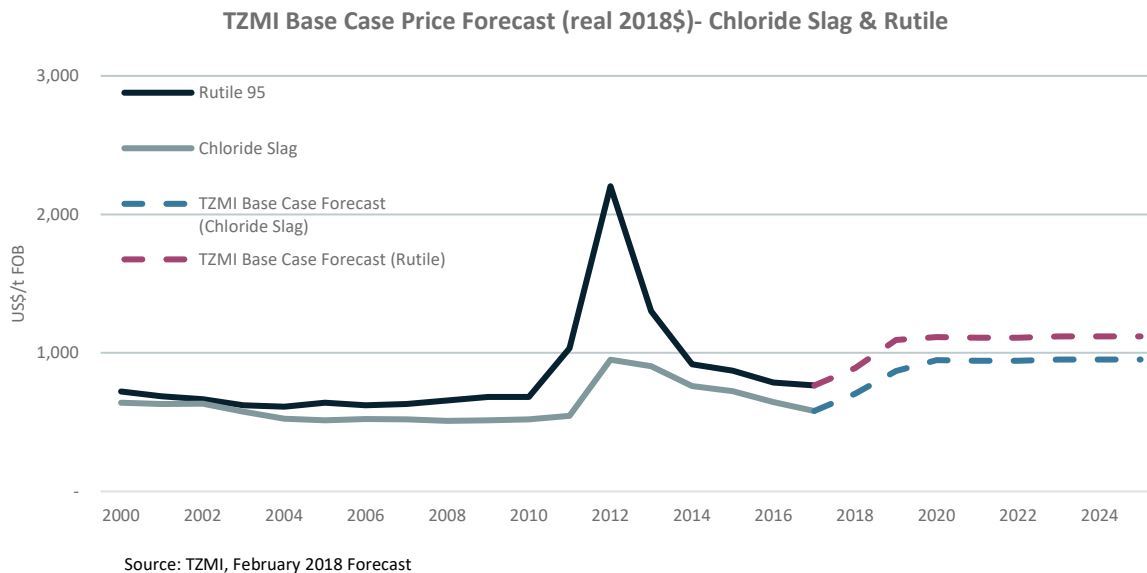
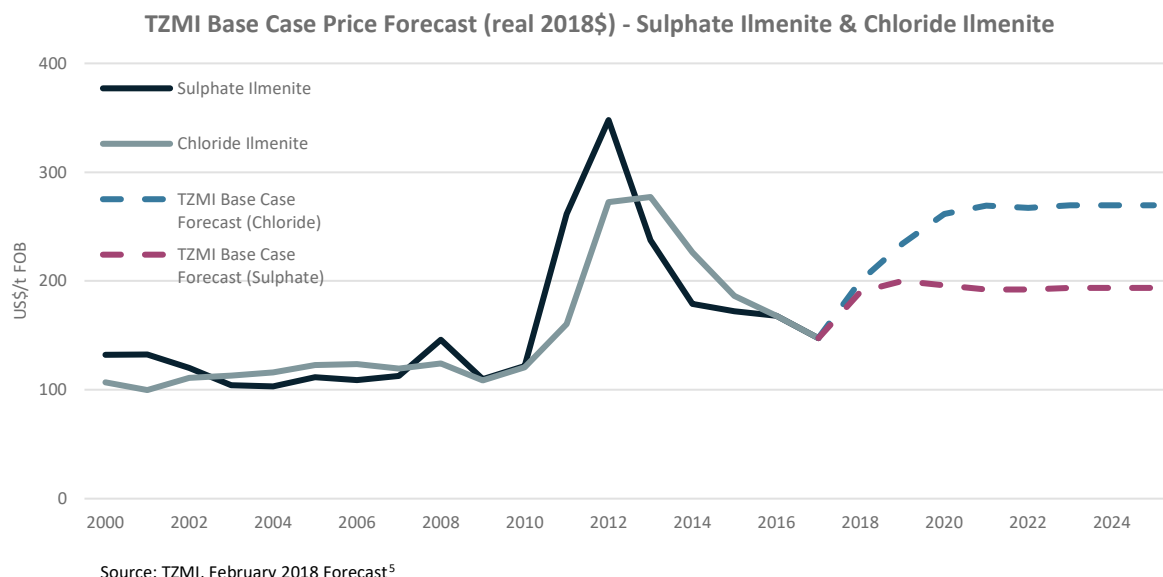
- an extended period of reduced demand for TiO<sub>2</sub> feedstocks as a result of lower than normal pigment plant utilisation rates and elevated pigment inventory levels;
- deferred or abandoned investment in new feedstock capacity as prices remained below levels required to induce new supply; and
- the emergence of China as an important consumer of feedstock.

<sup>3</sup> FOB means Free on Board. Selling on an FOB basis means that the seller places product sold on the transportation mode and the buyer assumes the transportation costs

<sup>4</sup> CIF means Cost, Insurance and Freight. Selling on a CIF basis means that the seller assumes the transportation costs.



The result has been a reduction in contract durations and an increase in the frequency of price negotiations. Many suppliers are targeting, or have implemented, one year contracts with some products also being subject to six-monthly and quarterly pricing negotiations. It is expected that TiO<sub>2</sub> feedstock producers will maintain and potentially strengthen their negotiating power in the medium term due to the lack of new supply expected to enter the market.



Titanium feedstock pricing began to stabilise in 2016 with increased volumes traded. This trend has continued in 2017, with price increases announced by major producers consistent with increased demand. Feedstock demand was expected to continue to increase in 2018, with major producers Rio and Tronox having announced plans to restart smelting assets and ramp-up to near full capacity by the end of 2017. However, the restart of Rio furnaces has been delayed due to industrial actions.

<sup>5</sup> Throughout this report, where necessary, Grant Samuel has adjusted prices (both historical and forecast) to be expressed in real 2018 terms (at a rate of 2.5%)



### 3.6 Feedstock Co-Products

Mineral sands deposits also contain non-titanium minerals, principally zircon and iron. Other by-products are generally treated as waste.

#### Zircon

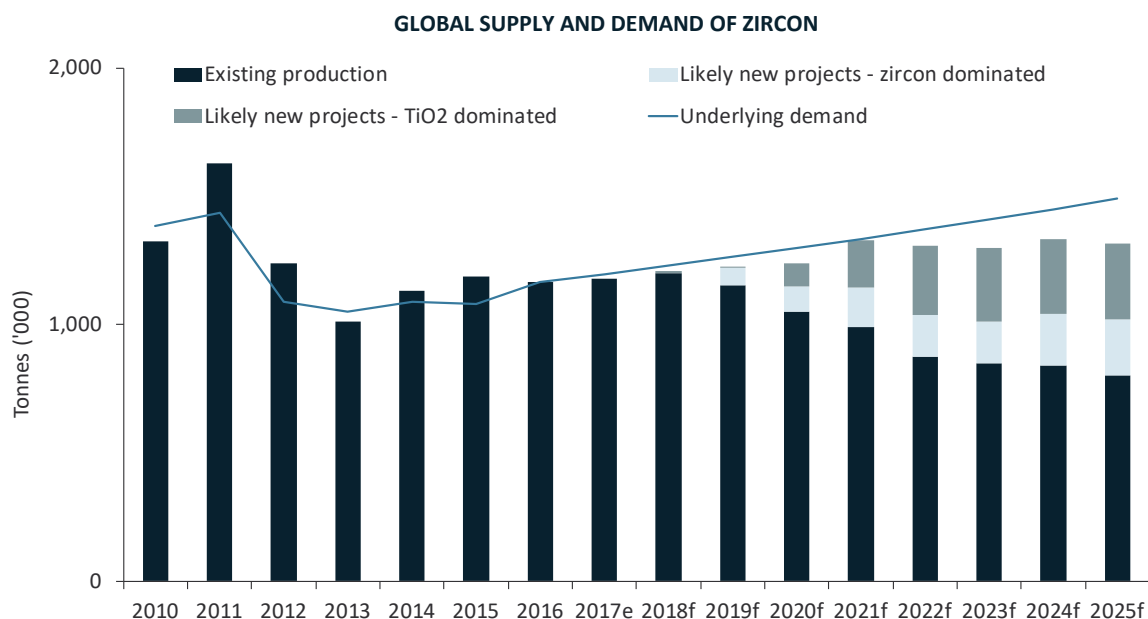
Zircon (zirconium silicate { $\text{ZrSiO}_4$ }) is a grey-brown mineral commonly found in mineral sands deposits in conjunction with ilmenite and rutile.

Zircon is principally used as an opacifier in ceramic glazes for floor and wall tiles, sanitary ware and other ceramic bodies. Premium grade zircon is used for the production of zircon flour and micronized zircon, which are used in specialty applications such as foundry mould coatings, refractories and friction products.

Zircon is also the feedstock material for zirconia and zirconium chemicals and metals. Due to its extreme hardness and high melting point, zirconium metal is predominantly used in the manufacture of fuel rod casing in nuclear reactors.

Zircon's quality is defined by its  $\text{ZrO}_2$  content, which can vary between 65 and 67%, grain sizing and the presence of impurities such as uranium and thorium. Generally speaking, zircon is less abundant than  $\text{TiO}_2$  minerals and the economics of extraction are generally contingent on revenue from  $\text{TiO}_2$  minerals.

Global supply and demand for zircon are summarised below:



Source: TZMI, February 2018 Forecast

World zircon production has declined significantly from 1.3 million tonnes in 2012 to 1.2 million tonnes in 2016. The fall in supply was largely due to a rapid output cut by Iluka Resources in 2012, when it halved its production in response to poor market conditions. South African production has also decreased over the period, with total country production of around 400,000 tonnes in 2011 falling to 300,000 – 320,000 in 2016, largely due to reductions in output by Richards Bay Minerals. Supply from the United States has also decreased due to the closure of the Virginia operations of Iluka Resources.

The major zircon producers are Iluka Resources, Richards Bay Minerals and Tronox, which collectively have a market share of 52%. No other producer has an individual market share of more than 10%.

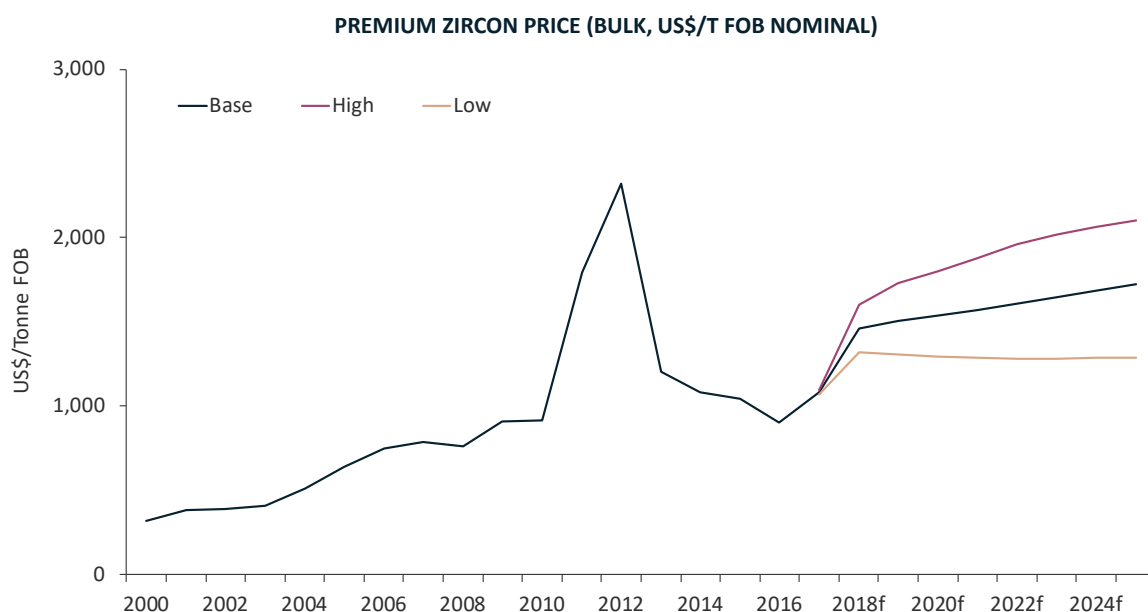
Global zircon supply is projected to fall by approximately 145,000 tonnes between 2016 and 2021 as developed zircon reserves deplete through ongoing extraction. It may fall further depending on the



strategies of key producers. As a result, a shortfall in supply is starting to emerge in 2018 until such time as new projects come to market.

The key geographical markets contributing to zircon demand in 2016 were China (45% of total demand) and Europe (22%). Chinese demand is forecast to grow slowly over the next five years, with its share of total demand increasing to 47% in 2021. Europe's share of total demand is expected to decline to 20% in 2021. The highest rates of demand growth are expected to come from India, the Middle East and Africa, with India increasing from 7% of the market in 2016 to 9% in 2021. Average demand growth between 2016 and 2021 is expected to be 3%, while supply over the same period is forecast to decrease by an average of 4 - 5% per year.

Historical and prospective prices for premium zircon are set out in the chart below:



Source: TZMI, February 2018 Forecast

Following the global financial crisis, demand for zircon surged on the back of economic stimulus measures in China. Producers began to control the market, maintaining inventory levels and limiting supply to foster price increases. In 2012, high prices and a tightening of credit policy by the Chinese government began to discourage demand, which declined by 24% over the year and put downward pressure on prices. Since then, prices have remained relatively flat, reflecting surplus production and an inventory overhang. However, market dynamics have improved and are expected to strengthen in the short to medium term with expectations of falling supply and growing demand in European and North American markets resulting in price strengthening.

### Pig Iron

Iron is a significant co-product in the production of titanium slag, with iron sales often contributing 20-25% of total revenue. HPPI is used in the production of ductile iron and the main competitor to HPPI in ductile iron applications is high purity blast furnace iron from Russia and Brazil. Ductile iron is a cast, ferrous alloy with a lower freezing temperature than steel. Applications for ductile iron include uses in the automotive industry, iron pipes and in general engineering. Ductile iron castings are replacing forged steel in many applications.

HPPI is generally sold on a delivered basis in Euros under short-term contracts or on a spot basis. There is no organised exchange for HPPI. The price benchmark for HPPI is the price of quality scrap, which can be volatile. The margin of HPPI over quality scrap is also variable, ranging from US\$80-120/tonne.





### 3.7 Pigment Processing Technologies

The sulphate process for the production of  $\text{TiO}_2$  pigment involves fine grinding of feedstocks, acid leaching using sulphuric acid, separation from impurities, hydrolysis precipitation of  $\text{TiO}_2$  precipitate, calcination and fine grinding of  $\text{TiO}_2$  pigment. The sulphate process has been in use since the 1920s and generally uses low  $\text{TiO}_2$  content feedstocks (down to 35%) such as ilmenite and higher  $\text{TiO}_2$  content feedstocks such as sulphate grade slag. Feedstocks such as leucoxene, synthetic rutile and rutile are unsuitable for use in the sulphate process because they are insoluble in sulphuric acid.

The chloride process for the production of  $\text{TiO}_2$  pigment utilises chlorination and oxidation technology. It involves high temperature chlorination of feedstocks followed by high temperature oxidation and rapid cooling. While the chloride process has been in use since the 1960s, very few producers have mastered the technology. The chloride process generally requires high  $\text{TiO}_2$  content feedstocks (minimum 85%) such as rutile, synthetic rutile or chlorinatable titanium slag. Ilmenite is not generally used for the chloride process due to its low  $\text{TiO}_2$  content. However, Chemours has the ability to treat low-grade feedstocks (down to 58%  $\text{TiO}_2$ ) such as ilmenite and leucoxene in addition to the higher-grade feedstocks.

The choice between the sulphate and chloride processing routes is principally a function of access to technology, feedstock quality and environmental considerations. While chloride processing technologies are currently available to relatively few producers and chloride grade feedstocks are more costly, increasing environmental regulation and costs of waste disposal are driving a shift toward chloride processing in some locations.

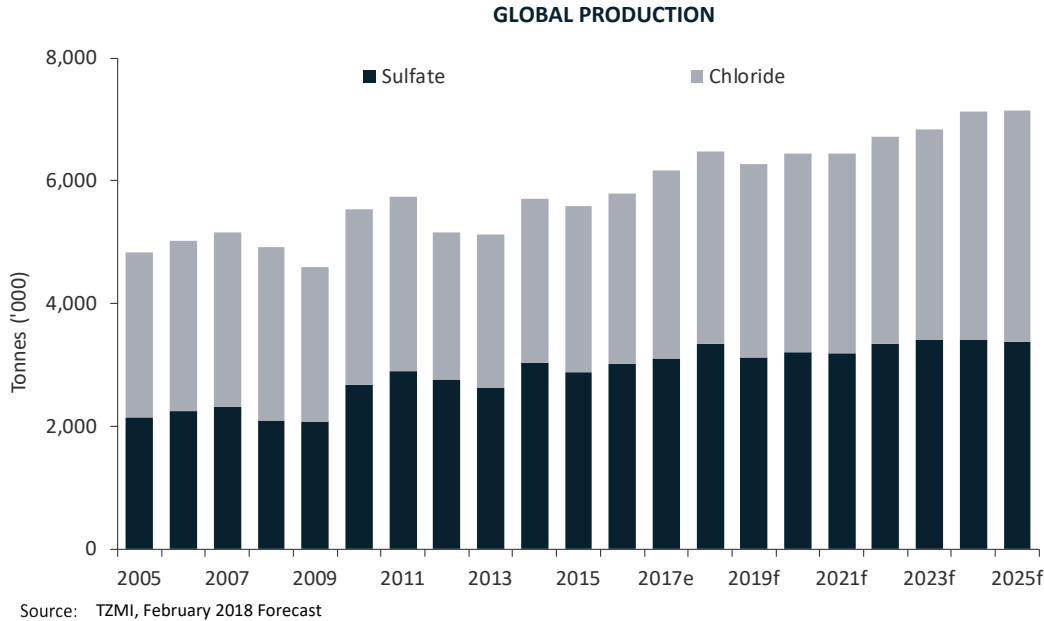
#### Pigment Production

Typically,  $\text{TiO}_2$  pigment production is designed to utilise a specific quality of feedstock. This has driven a degree of vertical integration best illustrated by Tronox, a major producer of both titanium feedstocks and  $\text{TiO}_2$  pigment. Several  $\text{TiO}_2$  pigment producers have their own feedstock supply for at least a portion of their production. Pigment producers that do not produce enough feedstock for their own needs or do not have their own feedstock supply typically establish long-term contracts with feedstock producers to ensure consistent supply of feedstock quantity and quality.

There is significant overlap in the range of end uses for  $\text{TiO}_2$  pigment produced by the chloride and sulphate processes, particularly for products with low to medium quality requirements such as paints in emerging economies, primer coats, traffic paint, commodity plastic applications and paper. Durable applications often require chloride product, including for automobile coatings, higher end plastics and premium paint formulations. Sulphate pigment is used for commodity applications such as paints and plastics, high end applications such as inks, fibres and nano applications as well as rubber, ceramics, food and pharmaceuticals.

At a global level, total pigment production is approximately equally divided between the sulphate and chloride processes. However, the pigment production market is regionally specific with producers located near their end user markets. The largest markets are China, Western Europe and North America. China's production mix for 2016 was approximately 95% sulphate. New capacity is expected to marginally favour chloride pigment production. Western Europe's production for 2016 was split approximately equally between the two production methods, with chloride production forecast to marginally increase its share. The North American market almost completely comprises chloride production.

The chart below sets out historical and forecast pigment production, by production type:



China is the largest producer of TiO<sub>2</sub> pigment, with 33% of global production in 2016. North America produced around 23% and Western Europe approximately 20% of global production.



## 4 Profile of MDL

### 4.1 Background

Mineral Deposits Limited (“MDL”) is an Australian mining company focussed on the mineral sands sector. MDL’s principal asset is a 50% interest in TiZir Limited (“TiZir”), which operates an integrated mineral sands mining operation in Senegal and an ilmenite upgrading smelter in Norway. Listed on the ASX, MDL had a market capitalisation of approximately A\$215 million as at April 2018.

Established in 1994, MDL initially focussed on the exploration and evaluation of base metal prospects. In 1997, the company diversified and acquired the Hawks Nest mineral sands operation near Newcastle in New South Wales, and the right to use the ‘Mineral Deposits Limited’ name from BHP Titanium Minerals Pty Ltd. The ‘Mineral Deposits’ brand traces its history to the Mineral Deposits Syndicate – a pioneer of Australia’s mineral sands industry – which started operations in Southport, Queensland in 1940. MDL closed its operations at Hawks Nest in 2003.

More recently, the company has focused its operations in Senegal, West Africa. In the early 2000s, MDL acquired rights to develop the Sabodala gold mine (“Sabodala”) in south eastern Senegal and the Grande Côte mineral sands project (“GCO”), north of Dakar along Senegal’s coastline.

MDL successfully progressed Sabodala in south eastern Senegal from exploration to construction and into operation between 2004 and 2009. At the time of its construction, Sabodala was the second major mining operation in Senegal’s history.

During 2010, MDL announced its intention to separate its two core assets and demerge Sabodala into a separate newly incorporated Canadian company named Teranga Gold Corporation (“Teranga”). The demerger involved the transfer of the entities and assets associated with Sabodala to Teranga in exchange for 200 million shares in Teranga (of which 160 million shares were distributed to MDL shareholders) and C\$50 million cash. Teranga was dual listed on the Toronto Stock Exchange and Australian Stock Exchange.

In October 2011, MDL announced that it had agreed to form the 50/50 TiZir incorporated joint venture with ERAMET S.A. (“ERAMET”) based in London, United Kingdom. The joint venture combined MDL’s 90% interest in GCO and ERAMET’s Tyssedal titanium slag and iron plant in Norway (“TTI”).

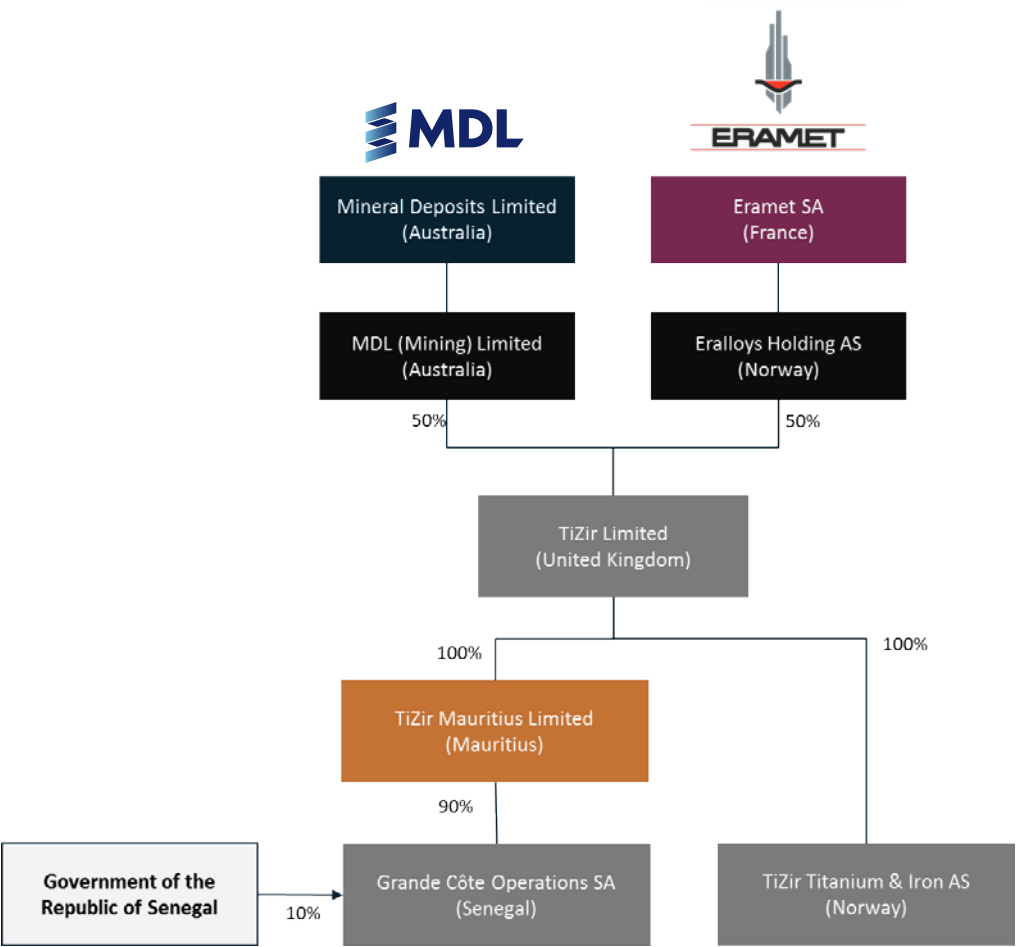
In addition to the smelter, ERAMET contributed US\$30 million in cash and provided a US\$45 million unsecured, subordinated debt facility to TiZir. The effect of the joint venture was to create a globally significant vertically integrated mineral sands player, secure offtake for the majority of GCO’s ilmenite production, provide a new source of ilmenite for the Tyssedal plant (giving expansion and product diversification opportunities) and ensure that funding of GCO would be shared with a major mining group.

In 2014, after more than two years of construction and total investment of approximately US\$650 million, mining commenced at GCO. TTI has been in operation since 1986. The plant was upgraded in 2015 at a cost of approximately US\$70 million to enable it to produce a chloride slag from GCO ilmenite. It previously produced a sulphate slag utilising a local Norwegian ilmenite. TTI produced its first chloride slag using GCO ilmenite in January 2016.

TiZir is managed jointly by MDL and ERAMET, with the TiZir board comprising equal numbers of directors from MDL and ERAMET.

The ownership structure of TiZir is set out below:

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Source: MDL



## 4.2 Financial Performance

The financial performance of MDL for the three years ended 31 December 2017 is summarised below:

**MDL - FINANCIAL PERFORMANCE (US\$<sup>6</sup> MILLIONS)**

	YEAR TO 31 DECEMBER		
	2015	2016	2017
<b>Share of net loss of equity accounted joint venture</b>	<b>(46.3)</b>	<b>(31.9)</b>	<b>(16.1)</b>
Administration expenses	(3.6)	(3.9)	(4.4)
<b>Operating loss before tax</b>	<b>(49.9)</b>	<b>(35.8)</b>	<b>(20.5)</b>
Finance income/(expenses) (net)	2.7	3.5	5.5
Other income/(expenses) (net)	0.8	1.0	0.8
Foreign exchange gains/(losses) (net)	6.4	0.9	(6.4)
Significant and non-recurring items	(2.0)	3.4	-
Depreciation and amortisation	(0.1)	(0.1)	-
<b>Loss for the year before tax</b>	<b>(42.0)</b>	<b>(27.1)</b>	<b>(20.6)</b>
Income tax expense	-	-	-
<b>Loss for the year attributable to MDL shareholders</b>	<b>(42.0)</b>	<b>(27.1)</b>	<b>(20.6)</b>

Source: MDL and Grant Samuel analysis

MDL's primary asset is a 50% interest in the TiZir joint venture. Its share of TiZir's profit or loss is accounted for on an equity accounting basis in accordance with International Financial Reporting Standards.

In relation to the financial performance of MDL:

- TiZir's losses, and MDL's share of those losses, declined over the period, reflecting the successful ramp up of production at GCO. The steady improvement in profitability was achieved despite production shutdowns at TTI, with a planned three month furnace reline in 2015 followed by an operational incident in late 2016. TiZir's earnings performance improved significantly in the 12 months to 31 December 2017, as GCO achieved record levels of production and TTI ramped up production following the smelter restart in January 2017. The result was that for the period TiZir generated positive earnings before interest and tax for the first time since the commencement of mining at GCO;
- depressed commodity prices for 2015 and 2016 affected MDL's financial performance. An impairment of US\$26.7 million was recognised against TiZir's investment in GCO in 2015. This impairment flowed through to the Company's investment in TiZir through joint venture equity accounting, reducing MDL's profit for the year ended 31 December 2015 by US\$12.0 million. Higher commodity prices through FY17 contributed to an improvement in MDL's financial performance, reducing the loss for the year ended 31 December 2017 by US\$6.5 million relative to the prior year;
- administration expenses primarily comprise remuneration expenses for staff employed by MDL and administrative costs such as office rent, insurance and utilities;
- finance income primarily comprises interest on the subordinated shareholder loans to TiZir; and
- significant and non-recurring items include the disposal of MDL's interest in World Titanium Resources Limited for US\$3.4 million in 2016.

<sup>6</sup> Unless otherwise stated, all amounts in this report are expressed in USD. Both MDL and TiZir report in USD.



### 4.3 Financial Position

The financial position of MDL as at 31 December 2016 and 31 December 2017 is summarised below:

**MDL - FINANCIAL POSITION (US\$ MILLIONS)**

	AS AT 31 DECEMBER 2016	AS AT 31 DECEMBER 2017
Debtors and prepayments	0.4	0.1
Inventories	-	-
Trade and other payables	(1.2)	(1.5)
Provisions	(0.2)	(0.2)
<b>Net working capital</b>	<b>(1.0)</b>	<b>(1.6)</b>
Property, plant and equipment (net)	0.3	0.3
Investment in joint venture	172.1	158.0
Other	0.1	0.1
Loans to TiZir	80.7	90.3
Provisions (non-current)	(0.0)	(0.0)
<b>Total funds employed</b>	<b>252.1</b>	<b>247.1</b>
Cash and deposits	4.9	12.6
Loans and convertible bonds	(13.8)	-
<b>Net cash/(borrowings)</b>	<b>(8.9)</b>	<b>12.6</b>
<b>Net assets</b>	<b>243.2</b>	<b>259.7</b>
<b>Equity attributable to MDL shareholders</b>	<b>243.2</b>	<b>259.7</b>
<b>Statistics</b>		
<i>Shares on issue at period end (million)</i>	<i>103.7</i>	<i>197.0</i>
<i>Net assets per share</i>	<i>\$2.35</i>	<i>\$1.32</i>
<i>NTA<sup>7</sup> per share</i>	<i>\$2.35</i>	<i>\$1.32</i>
<i>Gearing<sup>8</sup></i>	<i>n/a</i>	<i>n/a</i>

Source: MDL and Grant Samuel analysis

The following should be noted in relation to MDL's financial position:

- MDL raised approximately A\$40 million in early 2017 via an institutional placement and entitlement offer. The proceeds were used to restore the Company's cash balance (US\$12.6 million at 31 December 2017) and extinguish debt due to ERAMET (US\$14.1 million) relating to funding provided by ERAMET since December 2015;
- investment in joint venture relates to the carrying value of the company's 50% interest in TiZir and is based on an accounting carrying value for 100% of TiZir of US\$316 million. This investment is stated net of external joint venture debt and shareholder loans; and
- MDL and ERAMET have funded the ongoing operations (and negative cash flows) of TiZir via shareholder loans. MDL's loan to TiZir increased by almost US\$10 million to US\$90.3 million at 31 December 2017. The increase reflected a further advance of funds (US\$3.5 million) under the subordinated loan agreement, and accrued interest over the period.

As at 31 December 2017, MDL disclosed the following contingent liabilities:

- potential rehabilitation obligations in relation to its New South Wales exploration and mining tenements; and

<sup>7</sup> NTA is net tangible assets, which is calculated as net assets less intangible assets.

<sup>8</sup> Gearing is net borrowings divided by net assets plus net borrowings.





- indirectly, as a result of its 50% interest in TiZir:
  - ongoing payments in respect of GCO including US\$200,000 per year on social development of local communities; and
  - US\$25,000 per year for training and logistical support to the technical services of the Ministry for Mines.

In its Bidder's Statement dispatched to MDL shareholders on 14 May 2018, ERAMET disclosed that GCO is currently the subject of a tax audit by the Senegalese tax authorities. No notification has been made and the outcome of the investigation remains uncertain. Accordingly, this tax audit may or may not result in any liability for TiZir.

At 31 December 2017, MDL had 55.4 million of Australian carried forward income tax losses and 109.4 million of carried forward Australian capital losses and no franking credits.

MDL has no other material assets or liabilities not reflected in the company's financial position as at 31 December 2017.

#### 4.4 Capital Structure and Ownership

As at 26 April 2018, MDL has the following securities on issue:

- 196,985,649 ordinary shares; and
- 2,338,209 performance share rights<sup>9</sup> over unissued ordinary shares.

At 26 April 2018, there were approximately 2,591 registered shareholders in MDL and the top 20 shareholders accounted for approximately 87% of the ordinary shares on issue.

At 14 May 2018, MDL had received the following substantial shareholder notices:

##### MDL – SUBSTANTIAL SHAREHOLDERS

SHAREHOLDER	DATE OF NOTICE	NUMBER OF SHARES	PERCENTAGE
Allan Gray Australia Pty Ltd	27 April 2018	26,410,971	13.41%
ERAMET	14 May 2018	26,321,094 <sup>10</sup>	13.36%
L1 Capital Pty Ltd	4 May 2018	23,174,553	11.76%
Farjoy Pty Ltd	27 March 2017	15,395,823	7.82%
Morgan Stanley Australia Securities/ Mitsubishi UFJ Financial Group	9 May 2018	12,139,407	6.16%
TIGA Trading Pty Ltd	30 January 2018	10,725,000	5.44%
Ellerston Capital Limited	27 April 2018	10,494,762 <sup>10</sup>	5.33%

Source: MDL and ASX announcements

<sup>9</sup> In MDL's notice of annual general meeting released to ASX on 23 April 2018, MDL announced that it proposes to issue up to 702,689 new performance rights to its employees including, subject to shareholder approval, 288,791 performance rights to Robert Sennitt

<sup>10</sup> 10,494,762 shares in which Ellerston Capital Limited has a relevant interest are subject to the pre-bid acceptance agreement between Ellerston and ERAMET. These shares are also included in the 26,321,094 shares in which ERAMET has a relevant interest.



## 4.5 Share Price Performance

A summary of the share price and trading history of MDL since 1 January 2011 is set out below:

**MDL - SHARE PRICE HISTORY**

SHAREHOLDER	SHARE PRICE (A\$)			AVERAGE WEEKLY VOLUME (000'S)	AVERAGE WEEKLY TRANSACTION S
	HIGH	LOW	CLOSE		
<b>Year ended 31 December</b>					
2011	7.06	3.64	4.81	1,157	3,516
2012	6.27	2.90	3.64	1,167	5,223
2013	4.17	1.60	2.65	1,113	4,117
2014	2.65	0.57	0.71	1,124	1,545
2015	0.95	0.19	0.19	820	401
2016	0.59	0.17	0.46	1,346	148
<b>Quarter ended</b>					
31 March 2017	0.55	0.39	0.44	742	126
30 June 2017	0.68	0.45	0.67	1,340	294
30 September 2017	0.89	0.66	0.85	1,441	379
31 December 2017	1.09	0.78	1.04	1,393	305
<b>Month ended</b>					
31 January 2018	1.20	1.02	1.17	1,786	261
28 February 2018	1.19	1.00	1.14	3,090	706
31 March 2018	1.22	1.03	1.12	1,673	852
30 April 2018	1.50	0.99	1.12	1,673	852

Source: IRESS

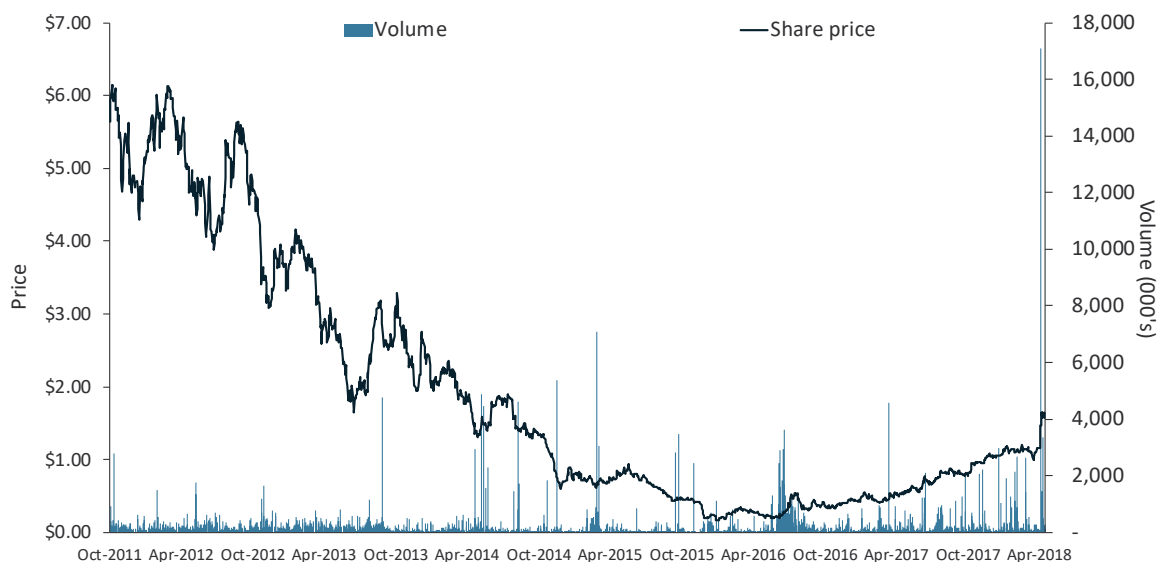
MDL is a relatively illiquid stock with average weekly volume over the twelve months prior to the announcement of the Offer representing approximately 0.75% of average shares on issue or annual turnover of around 39% of total average issued capital.

The following graph illustrates movements in the MDL share price and trading volumes since October 2011:

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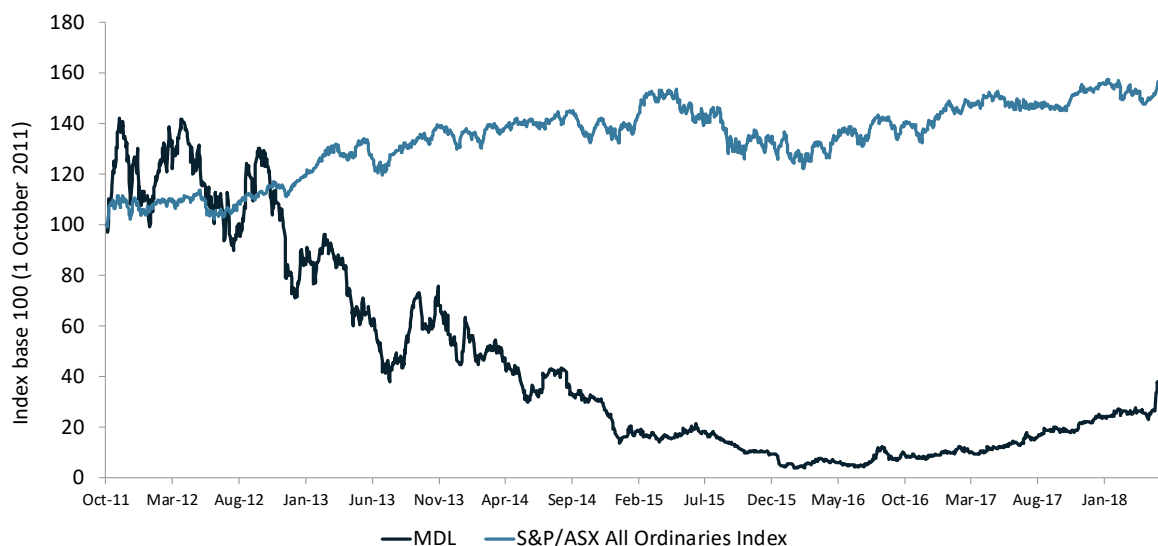
## MDL- SHARE PRICE (A\$) AND TRADING VOLUME (OCTOBER 2011 - MAY 2018)



Source: IRESS

The following graph illustrates the performance of MDL relative to the S&P ASX All Ordinaries Index since 1 October 2011:

## MDL VS. S&P/ASX ALL ORDINARIES INDEX (OCTOBER 2011 - MAY 2018)



Source: IRESS

MDL shares have significantly underperformed the S&P ASX All Ordinaries index over the period. Between the formation of the TiZir joint venture in October 2011 and late 2012, the MDL share price fluctuated between approximately A\$3.80 and A\$6.10. During 2013, titanium and zircon prices weakened significantly from their 2012 peaks, with a fall of around 50%. Challenging market conditions and investor perceptions of GCO construction risk placed downward pressure on the company's share price, which fell to A\$1.64 in July 2013.

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The share price recovered somewhat for the remainder of 2013 and, on 27 March 2014, MDL announced the commencement of mining at GCO. However, continued subdued market conditions, GCO commissioning issues and a shutdown at TTI for the furnace reline and capacity expansion project, resulted in a steady decline in the MDL share price for the following two and a half years. The share price closed at A\$0.17 on 21 January 2016, its lowest level over the period.

An operational incident at TTI in August 2016 resulted in an extended production shutdown. Despite this setback, from mid 2016 the share price began to rise on the back of operational improvements, recapitalisation of the MDL balance sheet, refinancing of the TiZir debt in 2017 and improvements in the commodity price outlook across the mineral sands sector. The company achieved several production and sales milestones at GCO, and TiZir reported improved earnings for the financial year ended 2017. The MDL share price closed at A\$1.16 immediately before the announcement of the Offer on 26 April 2018.



## 5 TiZir

Established as a 50/50 joint venture between MDL and ERAMET in 2011, TiZir is a vertically integrated mineral sands business that owns and operates the Grande Côte mineral sands operation in Senegal and the TiZir Titanium & Iron upgrading facility in Norway.

TiZir mines ilmenite, zircon, rutile and leucoxene at GCO and produces titanium slag and high-purity pig iron at TTI. Headquartered in London, TiZir benefits from MDL's development and technical mineral sands mining expertise and experience.

Commissioning of GCO commenced in 2014, with its first shipment of ilmenite taking place in August 2014. The TTI facility was upgraded in 2015, to allow for chloride slag production and to increase capacity by around 15% to 230ktpa. Following the successful restart of the TTI furnace in December 2015, the original strategy underlying the creation of TiZir was realised, with the first shipments of chloride grade titanium slag processed from GCO ilmenite taking place in March 2016.

Capital expenditure programs at both assets are complete, with c.US\$650 million spent to construct the GCO mine and c.US\$70 million spent at TTI to upgrade and expand the smelter.

### 5.1 Grande Côte Mineral Sands Operation

#### Overview

The Grande Côte Mineral Sands Operation ("GCO") is located on a coastal, mobile dune system starting approximately 50 kilometres north of Dakar, Senegal, and extending northwards for more than 100 kilometres. GCO is the largest single mineral sands dredge operation in the world and is fully integrated from mine to ship, using owned or controlled infrastructure.



Source: MDL

TiZir owns 90% of GCO and is managed by a joint operating committee comprising representatives from ERAMET and MDL. The Government of the Republic of Senegal holds a 10% free carried interest in GCO, which will accrue dividends once TiZir has recovered its capital invested.

Senegal gained independence from France in 1960, and generally enjoys a stable and investor friendly political and social environment. It is a democratic republic based on the French civil law system. Considered



one of the most stable democracies in the region, Senegal is the country of choice for many embassies, consulates and international banks as their headquarters in West Africa.

### Geology and mineralisation

GCO is located within a belt of mobile coastal dunes forming part of the Senegal-Mauritanian Basin, which covers most of Senegal. The dunes range between 5 and 35 metres in height and the mineralised zone averages around 15 metres thick.

The GCO project is approximately 50 kilometres north-east of Dakar, Senegal, and stretches north for around 100 kilometres. The GCO mineralised dune system averages 4 kilometres in width and covers an area of almost 450km<sup>2</sup>.

The deposit comprises a linear series of Aeolian sand dunes containing a heavy mineral assemblage concentrated by winds. The main heavy mineral deposits identified to date are Diogo, Fass Boye, Lompoul, Mboro, Mboro Hotel, Yodi and Noto. The mineral assemblage as a percentage of heavy minerals consists of ilmenite (72.0%), zircon (10.7%), leucoxene (3.2%) and rutile (2.5%).

### Mineral Resources and Ore Reserves

GCO's resources and reserves as at 31 December 2017 are as follows:

#### GCO – MINERAL RESOURCES AND ORE RESERVES AS AT 31 DECEMBER 2017 (100% BASIS)

	MEASURED			INDICATED			INFERRED			TOTAL		
Mineral Resources	Ore Mt	In situ HM Mt	HM (%)	Ore Mt	In situ HM Mt	HM (%)	Ore Mt	In situ HM Mt	HM (%)	Ore Mt	In situ HM Mt	HM (%)
	1,456	20.9	1.4	350	4.8	1.4	41	0.5	1.2	1,847	26.2	1.4

	PROVED			PROBABLE			TOTAL		
Ore Reserves	Ore Mt	In situ HM Mt	HM (%)	Ore Mt	In situ HM Mt	HM (%)	Ore Mt	In situ HM Mt	HM (%)
	1,392	20.2	1.5	373	4.5	1.2	1,765	24.7	1.4

Source: MDL

GCO has an expected mine life of approximately 33 years. At full production, GCO is expected to mine approximately 55Mt of sand per annum for annual production of 75,000 tons of zircon (excluding MGZS), 15,000 tons of rutile and leucoxene and 570,000 tonnes of ilmenite.

### Mining and Processing

Mining consists of dredging a continuous canal through the mobile sand dune system. The dunes contain no overburden and only minor vegetation, which is cleared in advance of dredging to create the mine path.

The simplicity of the orebody allows for conventional dredging using a floating cutter suction dredge, at times, supplemented by dozer push of high grade material into the mine path. Dredging is a bulk mining method, meaning it is not possible to selectively mine higher grade ore only.

As part of the Reserve and Resource Estimate released by MDL to ASX on 22 February 2017, the mine path has been optimised. The dredge path is advancing north from the current Diogo area and then turns back south following the depletion of the ore body in the north.

The dredge floats in an artificial pond above the area's shallow water table. The dredge operates 24 hours a day, pumping sand from the front of the dredge pond and delivering the material to the accompanying floating wet concentrator plant ("WCP"). The WCP separates the valuable heavy mineral concentrate from the lighter sand through a staged spiral gravity separation process. The non-valuable sand is deposited out the back of the WCP, re-filling the mined canal and restoring the landscape.





The heavy mineral concentrate is transported to the Mineral Separation Plant (“MSP”), located on site currently a short distance from the dredge pond. Magnetic, electrostatic and gravity processes separate the heavy mineral concentrate into its various minerals components, relying on the unique physical properties of each mineral.

The wet high intensity magnetic separation plant (“WHIMS”) separates the magnetic ilmenite from the non-magnetic zircon and co-products rutile and leucoxene. Following wet processing, the materials undergo dry processing to further separate and clean the minerals. GCO produces two ilmenite grades, 54% and 58% TiO<sub>2</sub> content, two grades of high quality zircon (premium and standard) and a medium grade zircon sands (MGZS).

Power for the operation is provided by an onsite 36 megawatt power station, operated primarily on heavy fuel oil or diesel, but also capable of consuming natural gas.

### **Logistics and sales**

Heavy mineral concentrate is pumped from the wet concentrator plant to an HMC stacker and is then carted to the MSP by truck.

GCO owns or otherwise controls the rail system that transports the mineral products from the MSP to the port in Dakar, a distance of approximately 130 km. GCO has been granted a 25 year concession on the railway line from the Government of Senegal, largely for its exclusive use.

The mineral products are railed using GCO owned locomotives. GCO has its own warehousing and ship loading facilities as well as exclusive use of a mole for ship loading under a 25 year concession from the Government.

After processing, zircon is shipped to customers worldwide. GCO’s high-quality zircon is sold to producers for use in a wide range of industrial and domestic products.

The majority of the ilmenite produced at GCO is the 54% grade, which is largely shipped to TTI. At TTI, the 54% ilmenite is upgraded to titanium slag, which is sold to producers of high-quality chloride pigment. The 58% ilmenite is sold directly to global customers for use as titanium feedstock.

### **Operating performance**

GCO’s sales and production volumes for the four years ended 31 December 2017 are shown below:

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## GCO – ANNUAL SALES AND PRODUCTION

	YEAR ENDED 31 DECEMBER			
	2014	2015	2016	2017
<b>Mining</b>				
Sand mined (kt)	14,263	34,759	39,203	45,062
Heavy mineral concentrate produced (kt)	184.1	632.9	613.7	724.8
<b>MSP Production</b>				
Ilmenite (t)	100,590	427,690	416,349	492,441
Zircon (t)	9,040	45,248	52,627	61,562
Medium grade zircon (t)	-	-	-	20,187
Rutile & leucoxene (t)	663	5,311	9,664	9,975
<b>Sales Volume</b>				
Ilmenite (t)	74,924	420,417	410,915	463,876
Zircon (t)	7,053	41,855	53,101	60,697
Medium grade zircon (t)	-	-	-	18,313
Rutile & leucoxene (t)	162	4,611	8,819	10,258

Source: MDL

The increase in production and sales volume over the period largely reflects the continued ramp up and optimisation of the operation. The recent focus of GCO has been to optimise its mining operations, implementing a number of initiatives in relation to the dredge, MSP and WCP. In line with increased production, sales volume for FY17 was significantly higher than FY16, with ilmenite increasing by 12.9%, zircon by 14.3% and rutile and leucoxene by 16.3%.

## GCO – QUARTERLY PRODUCTION

	3Q16	4Q16	1Q17	2Q17	3Q17	4Q17	1Q18
<b>Mining</b>							
Sand mined (kt)	8,071	11,258	11,661	11,793	11,234	10,374	10,900
HMC produced (kt)	140.0	194.1	140.5	204.2	196.4	183.7	189.5
Throughput rate (tph)	5,653	6,027	6,499	6,802	6,246	5,911	6,357
<b>MSP Production</b>							
Ilmenite (t)	96,503	119,882	99,400	126,030	140,713	126,298	104,104
Zircon (t)	11,844	16,462	11,688	16,203	17,271	16,400	15,805
Medium grade zircon (t)	-	-	7,179	2,927	5,235	4,846	6,599
Rutile & leucoxene (t)	2,192	3,042	2,152	2,384	3,047	2,392	2,737

Source: MDL

The mining operation has performed consistently over several quarterly periods, on the back of sustained steady runtimes and throughput rates. Since the third quarter of 2016, GCO has been cash flow positive. A mine optimisation study was completed in 2016 which focused on delivering a mine path that maximises recovery of resources and cashflow.

Production was affected in the first quarter of 2017 due to a necessary crossover of the mine path through a previously mined area. In the second quarter of 2017, continued focus on mine optimisation initiatives had a positive impact on performance, with GCO achieving record production of total sand mined, heavy mineral concentrate produced and ilmenite production. In the fourth quarter of 2017, ore mined was lower than previous quarters due to reduced power capacity following a mechanical failure in the power station at GCO. In the first quarter of 2018, mining rates improved however finished goods production was negatively impacted by rail disruptions.



## Outlook

Finished goods production is expected to increase by 10% in 2018 to 640,000 tonnes on the back of improvements in dredge throughput, an increase in wet concentrator plant utilisation and slight increase in heavy mineral recovery. However, a decline in feed grade in 2019 is expected to result in an overall decline in finished goods production to 604,000 tonnes.

No expansions<sup>11</sup> are planned in the near term but continued optimisation initiatives are being undertaken to increase production efficiencies. A mine optimisation team is in place at GCO tasked with delivering a number of initiatives, including:

- improvements in the runtime, throughput and recovery of the WCP; and
- introduction of supplementary feedstock to make use of the excess capacity at the MSP and potential to commence additional brownfields mining activity.

## 5.2 TiZir Titanium & Iron Ilmenite Upgrading Facility

### Overview

The TiZir Titanium & Iron (“TTI”) ilmenite upgrading smelter is located near the end of the Hardangerfjord in Tyssedal, on the west coast of Norway. TTI is the largest employer in the Tyssedal village. TTI is a well established operation, producing titanium slag and high purity pig iron since operations commenced in 1986. It is the only facility of its kind in Europe and one of only six in the world. TiZir owns 100% of TTI.



Source: MDL

Norway has a relatively small population and high standard of living with the third highest GDP per capita in the world. With a highly educated workforce, Norway has built strong industrial and service sectors whilst maintaining traditional Norwegian industries such as timber and fisheries.

Norway has not joined the European Union (“EU”) or adopted the Euro.

<sup>11</sup> On 10 May 2018, MDL announced in its Chairman’s Letter to shareholders that TiZir management was considering a second mine at GCO as a future project



## Operations

TTI upgrades ilmenite to produce high quality titanium feedstocks, primarily sold to pigment producers, and a high-purity pig iron that is sold to ductile iron foundries. The facility has access to clean, cheap power on a long-term contract basis. It has the ability to produce either a chloride or sulphate slag, subject to the nature of the feedstock it acquires. Currently it produces a chloride slag utilising the ilmenite raw material sourced from GCO.

The ilmenite, together with coal, is added to a rotary kiln, where the iron oxide is reduced to achieve high metallisation of the iron within pelletised ilmenite. Gasses and fine particles produced in the kiln are removed in cyclones and electrostatic precipitators.

In a three phase electric arc furnace, the pre-reduced feedstock is smelted to separate the high purity pig iron from the titanium rich slag. The primary purpose of this process is to increase the titanium dioxide content from approximately 54% in the ilmenite to approximately 87% in the titanium slag, with pig iron a valuable co-product in the process.

Both the titanium slag and the pig iron are processed further to obtain the required quality specifications. Iron is tapped from the furnace into 80 tonne ladles and refined to specific qualities before being cast into ingots. After crushing and screening, the titanium slag is stored in concrete silos with total capacity of 43,000 metric tons.

In 2015, TiZir embarked on a furnace upgrade and expansion project at TTI at a cost of approximately US\$70 million. The furnace upgrade included the addition of a water-cooled copper-ceramic roof which increased smelting capacity by approximately 15% and improved maintenance performance by lengthening periods between scheduled shutdowns.

However, the key strategic rationale behind the project was to convert the facility to allow for the production of chloride slag, while retaining optionality to alternate between sulphate and chloride slag production depending on the demand and supply dynamics within the market. TiZir is now one of only two companies, alongside Rio Tinto, that produce and sell to third parties a titanium slag suitable for use in the chloride process <sup>12</sup>.

There are several key advantages to TTI producing a chloride titanium slag:

- GCO ilmenite is best suited to the production of a chloride slag
- chloride slag generally sells at a premium to sulphate slag;
- TTI is ideally located close to potential chloride slag customers in Europe and North America; and
- there are significant environmental benefits associated with pigment produced using the chlorination process.

In August 2016, an operational incident at TTI damaged the roof and surrounds of the furnace. The facility was closed for the remainder of 2016. Following a successful repair operation, during which the furnace was relined, production resumed in January 2017, with shipments commencing in March 2017.

The facility has an expected production capacity of 230,000 tonnes per year of titanium slag and 90,000 tonnes per year of high-purity pig iron.

TTI benefits from access to cheap and clean power which is sourced from a nearby hydroelectric plant.

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<sup>12</sup> Tronox produces a chloride slag but consumes it internally



## Logistics and sales

TTI is conveniently located on Hardangerfjord with year round access to deep water shipping facilities. Ilmenite is shipped from Senegal to TTI (an approximate two week journey) and TTI is also well placed to service key customers in Europe and North America.

## Operating performance

TTI's sales and production volumes for the four years ended 31 December 2017 are shown below:

**TTI – ANNUAL SALES AND PRODUCTION**

	YEAR ENDED 31 DECEMBER			
	2014	2015	2016	2017
<b>Titanium slag</b>				
Produced (kt)	183.7	106.8	103.6	181.1
Sold (kt)	178.2	131.7	121.8	159.8
<b>High-purity pig iron</b>				
Produced (kt)	103.0	59.2	42.6	73.8
Sold (kt)	105.7	64.6	47.3	65.5

Source: MDL

Production and sales fell significantly in 2015 as a result of a three month shutdown for the furnace conversion and capacity expansion project. The ramp up of operations in 2016 was successful, with production exceeding expectations until an operational incident in August 2016. Sales volumes in FY17 for both titanium slag and pig iron were significantly higher than FY16, primarily due to the operational incident in FY16 and increased availability of product.

**TTI – QUARTERLY SALES AND PRODUCTION**

	3Q16	4Q16	1Q17	2Q17	3Q17	4Q17	1Q18
<b>Titanium slag</b>							
Produced (kt)	24.6	-	27.8	49.5	53.2	50.7	34.0
Sold (kt)	36.5	3.9	11.5	47.1	39.0	62.1	36.6
<b>High-purity pig iron</b>							
Produced (kt)	10.6	-	11.2	20.1	21.6	20.8	14.2
Sold (kt)	13.2	3.7	7.0	20.0	15.2	23.3	17.1

Source: MDL

Quarterly production has generally increased across the period. Damage to the lining of the furnace following the operational incident in 2016 required repairs that were completed in January 2017. Ramp up to commercial volumes progressed during the first quarter of 2017, with shipments of chloride titanium slag recommencing in March. TTI achieved near record production rates in the second quarter of 2017, representing 86% of expanded nameplate capacity (230kt per annum). Following the restart of the furnace, TTI operated more efficiently with lower consumption of both power and coal per tonne of slag produce.

In the second half of 2017, without any operational interruptions TTI achieved the three highest months of production since the establishment of TiZir. After a strong start in the first quarter of 2018, a mechanical failure in the pre-reduction kiln at the end of February meant that the furnace was required to operate at significantly reduced rates. Accordingly, production was approximately 33% below that achieved in the fourth quarter of 2017.



## Outlook

In 2018, the furnace at TTI is expected to maintain or even exceed production levels achieved during 2017 despite the impact of the pre-reduction kiln gearbox failure. MDL anticipates that production will achieve nameplate capacity (230kt per annum) in 2019.

TTI will seek to improve the overall energy efficiency at the facility, as well as continue to focus on limiting its carbon footprint. To this end, in 2015, TTI received funding from Enova, a Norwegian government environment agency, to assist with the development of an innovative upgrading process that aims to reduce TTI's CO<sub>2</sub> emissions by as much as 90% and reduce energy consumption by up to 40%.

## 5.3 Financial Performance

The financial performance of TiZir for the three years ended 31 December 2017 is summarised below:

**TIZIR - FINANCIAL PERFORMANCE (US\$ MILLIONS)**

	YEAR TO 31 DEC		
	2015	2016	2017
<b>Revenue</b>	<b>169.0</b>	<b>160.6</b>	<b>224.6</b>
Cost of goods sold	(168.3)	(159.3)	(167.8)
Administration expenses	(6.9)	(2.9)	(3.7)
Other income	(0.4)	25.7	9.4
<b>EBITDA</b>	<b>(6.7)</b>	<b>24.1</b>	<b>62.5</b>
Depreciation and amortisation	(34.5)	(36.7)	(40.0)
Provision for losses and contingencies	-	(1.0)	-
<b>EBIT</b>	<b>(41.2)</b>	<b>(13.6)</b>	<b>22.0</b>
Net interest expense	(33.7)	(46.3)	(51.8)
Significant items	(12.6)	(6.1)	-
<b>Profit before tax - Continuing operations</b>	<b>(87.5)</b>	<b>(66.0)</b>	<b>(29.9)</b>
Income tax expense - Continuing operations	3.0	(0.5)	(0.8)
<b>Profit after tax - Continuing operations</b>	<b>(84.4)</b>	<b>(66.6)</b>	<b>(30.7)</b>
Profit/(loss) from discontinued operations (net of tax)	4.5	2.4	(2.0)
<b>NPAT attributable to TiZir shareholders</b>	<b>(80.0)</b>	<b>(64.2)</b>	<b>(32.7)</b>

Source: TiZir and Grant Samuel analysis

TiZir's financial performance has improved significantly over the period. EBITDA for the year ended 31 December 2017 was US\$63 million, an increase of approximately US\$39 million compared to the prior corresponding period.

Improvements in the financial performance of TiZir for the year ended 31 December 2017 reflect:

- successful progressive ramp up of production and sales volumes at GCO, driven by increases in zircon (14%), ilmenite (13%) and rutile and leucoxene (16%) compared with FY16. GCO's strong performance was partly offset by reduced production and sales volumes at TTI, resulting from the fire and repairs in late 2016 and scheduled maintenance shutdowns in 2017. However, the progressive ramp up of operations in 2017 was successful with the furnace currently operating close to expanded capacity and exceeding expectations in terms of operating efficiency;
- positive trends in commodity markets in 2017. Ilmenite prices strengthened considerably with increasing pressure on the availability of titanium feedstock. Zircon prices also benefited from strong demand out of Europe and North American and tightening supply. Positive movements in coal and iron ore pricing through the year also lead to an increase in the price of pig iron. The price of titanium slag also benefitted from the increased use of high-quality feedstocks; and

## GRANT SAMUEL



- a fall in operating costs following implementation of energy efficiencies at TTI and cost reduction initiatives at GCO including changes to key contractors and sale of valuable by-products.

TiZir's significant expenses included:

- depreciation of the dredge, wet concentrator plant, mineral separation plant and associated infrastructure at GCO, as well as the fixed plant at TTI; and
- interest expense including line credit fees (c.US\$4 million), interest on subordinated loans from the joint venture sponsors (c.US\$14.6 million), amortisation of borrowing costs (c.\$5.4 million) and interest on its secured bond (c.US\$27.4 million).

The significant item for 2015 was an impairment (write down) of the carrying value of GCO, reflecting the poor commodity prices prevailing. The loss on the asset disposal relates to the written down value of parts of the furnace and surrounds that were damaged in the operational incident at TTI and were subsequently written off.

### TIZIR – SIGNIFICANT ITEMS (US\$ MILLIONS)

	YEAR ENDED 31 DECEMBER		
	2015	2016	2017
Impairment of assets	(12.6)	-	-
Loss on asset disposals	-	(6.1)	-
<b>Total</b>	<b>(12.6)</b>	<b>(6.1)</b>	<b>-</b>

Source: TiZir and Grant Samuel analysis

## 5.4 Financial Position

The financial position of TiZir as at 31 December 2016 and 31 December 2017 is summarised below:

### TIZIR - FINANCIAL POSITION (US\$ MILLIONS)

	AS AT 31 DECEMBER 2016	AS AT 31 DECEMBER 2017
Debtors and prepayments	25.8	41.0
Inventories	47.7	64.5
Trade and other payables	(53.2)	(53.7)
Tax asset	-	-
<b>Net working capital</b>	<b>20.4</b>	<b>51.8</b>
Property, plant and equipment (net)	797.0	773.7
Deferred tax liability	(5.6)	(6.6)
Intangible assets	51.7	50.0
Other non-current assets	0.4	0.5
Hedge receivable/(payable)	(1.6)	(0.7)
Provisions (non-current)	(0.1)	(0.6)
<b>Total funds employed</b>	<b>862.2</b>	<b>868.0</b>
Cash and deposits	10.4	48.2
ERAMET establishment loan	(53.5)	(57.0)
Shareholder loans	(156.4)	(174.5)
Bank loans and convertible bonds	(322.4)	(371.0)
Net cash/(borrowings)	(521.9)	(554.3)
<b>Net assets</b>	<b>340.2</b>	<b>313.7</b>
<b>Equity attributable to non-controlling interests</b>	<b>16.2</b>	<b>14.2</b>



# GRANT SAMUEL



<b>Equity attributable to TiZir shareholders</b>	<b>356.4</b>	<b>327.9</b>
<i>Statistics</i>		
<i>Total assets</i>	<i>933.1</i>	<i>977.9</i>
<i>Net assets</i>	<i>340.2</i>	<i>313.7</i>
<i>Net tangible assets</i>	<i>288.5</i>	<i>263.7</i>
<i>Gearing</i>	<i>61%</i>	<i>64%</i>
<i>Gearing excluding shareholder loans</i>	<i>37.7%</i>	<i>43.5%</i>

Source: TiZir and Grant Samuel analysis

The following should be noted in relation to TiZir's financial position:

- inventories and trade receivables as at 31 December 2017 were significantly higher than as at 31 December 2016, reflecting the increased production and sales at GCO and TTI;
- property, plant and equipment of US\$773.7 million consists of the dredge, mineral separation plant and associated infrastructure at GCO, as well as the fixed plant at TTI; and
- intangible assets of US\$50.0 million primarily comprise mine development expenditure.

At 31 December 2017, net external borrowings of TiZir amounted to US\$322.5 million comprised:

- cash of US\$48.2 million;
- US\$300.0 million in corporate bonds secured against TiZir's interest in GCO and TTI. On 5 July 2017, TiZir announced it had successfully completed a new 9.5% US\$300.0 million senior secured bond issue with maturity scheduled in July 2022. The proceeds of the bond were primarily used to refinance the US\$275.0 million bonds that matured in September 2017. The newly issued bonds were listed on the Oslo Børs in early 2018; and
- US\$68.0 million in operating lines of credit, which are secured over stock and receivables at GCO and TTI.

In addition, as at 31 December 2017, TiZir owed US\$231.5 million in subordinated shareholder loans to MDL and ERAMET, of which US\$87.3 million is due to MDL and US\$144.3<sup>13</sup> million to ERAMET. The shareholder loans from MDL and ERAMET are subordinated to the corporate bonds.

## 5.5 Cash Flow

TiZir's cash flows for the three years ended 31 December 2017 are summarised below:

### TIZIR - CASH FLOW (US\$ MILLIONS)

	YEAR TO 31 DEC		
	2015	2016	2017
<b>EBITDA</b>	<b>(6.7)</b>	<b>23.1</b>	<b>62.0</b>
Changes in working capital and other adjustments	(7.0)	24.1	(23.1)
Tax (paid) / received	-	-	-
Net borrowing costs	(24.8)	(28.7)	(32.9)
<b>Operating cash flow</b>	<b>(38.5)</b>	<b>18.5</b>	<b>6.0</b>
Capital expenditure (net)	(51.8)	(20.2)	(11.5)
<b>Free cash flow</b>	<b>(90.3)</b>	<b>(1.7)</b>	<b>(5.5)</b>
Proceeds from share issues (net of expenses)	-	-	-
Proceeds from borrowings (net)	80.6	10.2	42.2
Other	-	0.0	(0.0)

<sup>13</sup> Includes a first priority establishment loan of approximately US\$57 million. This loan is first priority until 29 September 2018 at which point all subordinated shareholder loans will rank pari passu

## GRANT SAMUEL



<b>Net cash generated (used)</b>	<b>(9.7)</b>	<b>8.5</b>	<b>36.6</b>
<i>Cash opening</i>	<i>8.4</i>	<i>2.7</i>	<i>10.5</i>
<i>Effects of exchange rate movements</i>	<i>3.9</i>	<i>(0.7)</i>	<i>1.2</i>
<i>Cash closing</i>	<i>2.7</i>	<i>10.4</i>	<i>48.3</i>

Source: MDL and Grant Samuel analysis

Cash flows in 2016 and 2017 reflect improvements in TiZir's operations including the first year of positive cash flows at GCO. Working capital has fluctuated across the period due in part to the shutdown and subsequent restart of the furnace at TTI. TiZir committed a significant amount of capital in 2015 and 2016 in relation to the furnace reline and capacity expansion project, repairs to the furnace following the operational incident at TTI and optimisation projects at GCO.

### 5.6 Taxation Structure

TiZir is incorporated in the United Kingdom and is subject to all applicable tax laws under the United Kingdom tax code.

TiZir's interest in GCO is held through its wholly owned subsidiary TiZir Mauritius Limited. Income earned at GCO is subject to a tax holiday until 2022, after which the prevailing Senegalese corporate tax rate (currently fixed at 25% as part of GCO's mining convention) will apply to GCO's earnings.

TiZir's interest in TTI is directly held. Income earned at TTI is taxed at the Norwegian corporate tax rate (currently 23%).



## 6 Valuation of MDL

### 6.1 Summary

Grant Samuel has valued MDL in the range A\$408-503 million, which corresponds to a value of A\$2.04-2.52 per share. The valuation represents the estimated full underlying value of MDL assuming 100% of the company was available to be acquired and includes a premium for control. The value exceeds the price at which, based on current market conditions, Grant Samuel would expect MDL shares to trade on the ASX in the absence of a takeover offer.

Valuation of MDL is essentially based on an assessment of the underlying value of TiZir. The value of TiZir has been estimated by aggregating the estimated market value of its assets (GCO and TTI), adjusting for corporate costs and subtracting external net debt and shareholder loans as at 31 December 2017. The valuation of MDL is summarised below:

**MDL VALUATION RANGE**

	Value Range US\$m)	
	LOW	HIGH
GCO	800	900
TTI	275	325
TiZir corporate costs	(22)	(18)
<b>TiZir enterprise value (100%)</b>	<b>1,053</b>	<b>1,207</b>
Less: External net debt	(333)	(333)
Less: Shareholder loans	(232)	(232)
<b>TiZir equity value (100%)</b>	<b>489</b>	<b>643</b>
<b>TiZir equity value (50%)</b>	<b>244</b>	<b>321</b>
Value attributed to MDL's 50% shareholding in TiZir	220	290
MDL's shareholder loan to TiZir	87	87
Net cash	13	13
Head office costs (net of savings)	(14)	(13)
<b>MDL equity value (US\$)</b>	<b>306</b>	<b>377</b>
<b>MDL equity value (A\$)</b>	<b>408</b>	<b>503</b>
Fully diluted MDL shares on issue (millions)	200	200
<b>MDL value per share (A\$)</b>	<b>2.04</b>	<b>2.52</b>

The principal approach to valuing TiZir's operating business was discounted cash flow analysis.

Grant Samuel appointed AMC Consultants Pty Ltd ("AMC") as independent technical specialist to review GCO. AMC's role included a review of reserves and resources, development plans, production schedules, operating and capital costs. A full copy of AMC's report is set out in Appendix 4.

Valuation scenarios for GCO were prepared by Grant Samuel in conjunction with AMC, based on assumptions regarding production rates, operating costs and development costs developed by AMC. In relation to TTI, a financial model was developed by Grant Samuel on the basis of the operating model provided by MDL.

Grant Samuel's valuation model uses as its starting point the balance sheet of MDL as at 31 December 2017 and projects cash flows from 1 January 2018 onwards. Projected ungeared after tax cash flows were discounted to a present value using nominal after tax discount rates of 9-11%. Appendix 3 sets out a detailed analysis of the selection of this range of discount rates. Grant Samuel's valuations of GCO and TTI are at a discount to calculated NPVs, reflecting the production risks and (in GCO's case) sovereign risks to which the operations are exposed.

## GRANT SAMUEL



The valuation incorporates modest synergies associated with head office cost reductions that should be achievable by any acquirer of MDL. It does not reflect any special value that may be available to ERAMET, including the value for ERAMET of acquiring 100% control of TiZir.

While Grant Samuel has valued TiZir on a sum of the parts basis, TiZir operates as an integrated business. As a cross-check to its valuation, Grant Samuel has also considered the multiples of TiZir's earnings implied by the valuation range. TiZir's estimated enterprise value of US\$1,053 -1,207 million implies the following valuation parameters:

### TIZIR – IMPLIED VALUATION PARAMETERS

	VARIABLE (US\$ MILLION)	IMPLIED MULTIPLES	
		LOW	HIGH
<b>Multiple of EBITDA (times)</b>			
Year ended 31 December 2017	62	16.9	19.3
Year ending 31 December 2018 <sup>14</sup>	116	9.1	10.4
Year ending 31 December 2019 <sup>15</sup>	187	5.6	6.4

The multiples of earnings for FY18 and FY19 set out above are based on earnings guidance prepared by MDL and set out in the *TiZir Financial and Operations Guidance for 2018 and 2019* released to ASX on 10 May 2018.

While the multiples of actual FY17 EBITDA are high, the multiples of forecast FY18 and FY19 earnings from MDL's guidance are much lower. Overall, in Grant Samuel's view, the multiples implied by the valuation of TiZir are reasonable having regard to the following factors:

- TiZir delivered significant growth in earnings in FY17, as GCO production continued to build towards name plate capacity and TTI production increased after an operational incident in late 2016;
- TiZir production, sales and earnings are expected to grow strongly in FY18, notwithstanding production interruptions at TTI in the first quarter of FY18. Earnings growth will be supported by the recent strengthening in commodity prices;
- further earnings growth is expected for FY19. Commodity prices are expected to continue to strengthen. In addition, TiZir's earnings for FY19 will fully reflect the benefit of stronger commodity price, as contracts entered into in a lower commodity price environment come to an end and are renegotiated;
- neither GCO nor TTI require any substantial capital expenditure in the short to medium term;
- the vertical integration of TiZir's assets mitigates risk and ensures that TTI has relative security of ilmenite supply, while GCO has guaranteed offtake for a substantial amount of its production; and
- GCO's "tax exemption period" and substantial tax depreciation should mean that GCO will enjoy very strong EBITDA to free cash flow conversion.

As a cross-check, Grant Samuel has assessed the EBITDA multiples implied by its valuation of TiZir having regard to trading and transaction multiples for companies with mineral sands interests. However, this analysis provides only limited evidence as to value:

- none of the comparable companies has exactly the same business mix and range of products as TiZir. Many of the comparable companies do not operate both mining operations and smelting facilities. On the other hand, Tronox and Cristal, unlike TiZir, are fully integrated titanium dioxide producers (i.e. they produce pigment);

<sup>14</sup> Projected TiZir EBITDA for FY18 is sourced from MDL's guidance using agreed pricing in executed contracts and TiZir internal sales targets based on current and potential customer discussions

<sup>15</sup> Projected TiZir EBITDA for FY19 is sourced from TZMI base case pricing assumptions



- brokers' earnings forecasts are based on a range of commodity price forecasts that are not necessarily consistent with the TZMI price forecasts upon which the TiZir earnings forecasts are based; and
- there are few recent transactions that provide meaningful valuation evidence for TiZir. The information available to derive multiples for the comparable transactions is limited and generally does not enable the calculation of forward looking multiples. The multiples implied by the transaction prices reflect a wide range of factors, including the particular circumstances of the target companies, market conditions at the time (particularly in relation to commodity prices), expected synergies and other factors.

MDL does not have a direct interest in TiZir's operating assets. Instead, MDL's interest is by way of a 50% shareholding in an incorporated joint venture. Accordingly, MDL's interest in TiZir falls well short of full, unfettered control. In particular:

- MDL does not have direct access to TiZir's underlying cash flows, but instead is limited to access to residual cash flows (by way of dividends or other distributions) after TiZir has satisfied its funding and other obligations;
- MDL is unable to determine the funding structure for TiZir. Rather it is required to negotiate with Eramet a funding structure for TiZir, even if that is sub-optimal; and
- both operational and funding decisions regarding GCO and TTI need to be negotiated with ERAMET, the TiZir joint venture partner, within the constraints imposed by the joint venture arrangements. Differing objectives, time horizons, risk appetites and funding capacities as between the joint venture partners may make it difficult to reach agreement on how to progress and result in sub-optimal outcomes.

Accordingly, Grant Samuel has valued MDL's 50% interest in TiZir at a discount to its see-through share of the estimated full underlying value of TiZir. The extent of this discount is essentially subjective.

The valuation range represents very high premiums over the price at which MDL shares were trading prior to the announcement of the Offer, in the range of 76-117%. However, in Grant Samuel's view, this is not unreasonable. There are good reasons to believe that the pre-bid MDL share price did not reflect the fair market value of MDL shares, including:

- TiZir has experienced an extended production ramp-up at GCO and significant operational issues at TTI. It is to be expected that share market investors may have had a somewhat jaundiced view in relation to MDL's operational performance;
- MDL has a modest share market capitalisation and limited share liquidity, and is followed by relatively few equity analysts. In these circumstances it is to be expected that limited and irregular analysis of the company and its prospects would be imputed into the share price;
- MDL's market releases have provided only high level required information on the underlying performance of TiZir, with MDL's ability to make detailed disclosures constrained by its TiZir joint venture obligations; and
- perhaps most importantly, the opaque nature of the markets for mineral sands products and limited understanding of TiZir's existing pricing arrangements will have made it difficult for investors to fully understand TiZir's leverage to the significant increase in commodity prices that is expected to unfold in the short to medium term.

Overall, the valuations of TiZir and MDL are critically dependent on assumptions regarding future mineral sands product prices. Grant Samuel's valuation reflects an assumption of strong minerals sands product prices through to 2022, followed by a reversion to much lower long term averages.

The value of TiZir is sensitive to changes in various factors and, in particular, to changes in expectations for future commodity prices and changes in exchange rates. Accordingly, the value of TiZir could shift relatively quickly, either positively or negatively, by significant amounts. In particular, given TiZir's gearing, even



relatively small movements in the value of TiZir's operating assets could have a material impact on the value of TiZir, and therefore MDL.

## 6.2 Methodology

Grant Samuel's valuation of MDL has been estimated by valuing its equity interest in TiZir and adding the value of its loans to TiZir and net cash. TiZir has been valued by aggregating the estimated market value of its operating businesses (on a "control" basis) and deducting external net borrowings and non-trading liabilities including loans to shareholders. The value of the operating business has been estimated on the basis of fair market value as a going concern, defined as the maximum price that could be realised in an open market over a reasonable period assuming that potential buyers have full information.

The valuation represents the estimated full underlying value of MDL assuming 100% of the company was available to be acquired and includes a premium for control. The value exceeds the price at which, based on current market conditions, Grant Samuel would expect MDL shares to trade on the ASX in the absence of a takeover offer.

The most reliable evidence as to the value of a business is the price at which the business or a comparable business has been bought and sold in an arm's length transaction. In the absence of direct market evidence of value, estimates of value are made using methodologies that infer value from other available evidence. There are four primary valuation methodologies that are commonly used for valuing businesses:

- capitalisation of earnings or cash flows;
- discounting of projected cash flows;
- industry rules of thumb; and
- estimation of the aggregate proceeds from an orderly realisation of assets.

Each of these valuation methodologies has application in different circumstances. The primary criterion for determining which methodology is appropriate is the actual practice adopted by purchasers of the type of business involved.

Grant Samuel's primary approach to the valuation of TiZir has involved the application of the discounted cash flow ("DCF") methodology. The discounted cash flow methodology involves the calculation of net present values ("NPV") by discounting expected future cash flows. Projected cash flows are discounted to a present value using discount rates that take into account the time value of money and risks associated with the cash flows. The discounted cash flow methodology is particularly appropriate for valuing mining and resource based assets with depleting ore reserves, varying production levels and capital requirements. By contrast, capitalisation of earnings or cash flows is the most commonly used method for valuation of industrial businesses. This methodology is most appropriate for industrial businesses with a substantial operating history and a consistent earnings trend that is sufficiently stable to be indicative of ongoing earnings potential. This methodology is not particularly suitable for start-up businesses, businesses with an erratic earnings pattern or businesses that have unusual capital expenditure requirements. This methodology is arguable not suitable for the valuation of TiZir's business operation, which has variations in cash flows and earnings.

Grant Samuel developed a cash flow model for GCO based on the operating scenarios developed by AMC, which were based on production plans provided by MDL. AMC reviewed each of the technical assumptions in GCO's operating model, including those regarding reserve estimates, development plans, production profiles, operating costs and capital costs and made adjustments to these assumptions when appropriate. For TTI, Grant Samuel prepared cash flow models on the basis of long term financial projections provided by MDL.

Grant Samuel determined the economic and financial assumptions used in both cash flow models.



As secondary evidence as to the value of MDL, Grant Samuel has considered the EBITDA multiples implied by the valuation range having regard to earnings multiples implied by the share price of comparable listed companies and by transaction involving comparable businesses. The valuation metrics, while relatively crude, are useful in assessing the reasonableness of a discounted cash flow valuation since the discounted cash flow valuation is typically sensitive to the assumptions adopted.

The valuation of TiZir represents Grant Samuel's overall judgement as to value. It does not rely on any one particular scenario or set of economic assumptions. The valuation has been determined having regard to the sensitivity of the DCF analysis to a range of technical and economic assumptions. It incorporates Grant Samuel's judgemental assessment of the impact on value of development status and optionality, sovereign risk and control to the extent not reflected in the DCF analysis.

The valuation is based on a number of important assumptions, in particular assumptions regarding future commodity prices, and reflects the technical judgements of AMC regarding the prospects for GCO. Commodity prices and expectations regarding future operating parameters can change significantly over short periods of time. Such changes can have significant impacts on underlying value. Accordingly, while the values estimated are believed to be appropriate for the purpose of assessing the Offer, they may not be appropriate for other purposes or in the context of changed economic circumstances or different operational prospects for MDL's assets.

### 6.3 Valuation Assumptions

The valuation of TiZir has principally been determined by reference to DCF valuation analysis. This analysis involves making a number of general assumptions regarding future zircon and titanium feedstock prices, economic factors and discount rates. The DCF analysis results in the calculation of estimated net present values ("NPV") under a range of assumptions. The calculated NPVs are sensitive to the assumptions used in the analysis and relatively small changes in certain variables can cause significant changes in value. For this reason, DCF valuations should be treated with caution.

Grant Samuel has made the following assumptions:

- global inflation rates of 2.5% per annum;
- a long run forward estimate of USD:NOK of 7.37 has been assumed;
- tax depreciation schedules determined on the basis of tax written down values for various asset categories;
- tax rates of 23% for TTI and 25% for GCO, although GCO will enjoy a tax holiday until the end of 2022;
- nominal discount rates for the discounted cash flow valuations in the range 9-11%. The rates are estimates of weighted average costs of capital and have been applied to expected future ungeared nominal after-tax US\$ cash flows. They effectively represent the rates of return required by capital providers to the universe of potential acquirers of assets such as those of TiZir, having regard to the systematic riskiness of TiZir's assets. The rates do not incorporate any adjustment for sovereign or other risks associated with GCO's location in Senegal, given Grant Samuel's view that such risks are better captured through risk adjustments to cash flows or calculated NPVs. The basis for the selection of the rates is set out in Appendix 3; and
- US\$ values have been translated to A\$ equivalents as a spot rate of A\$1.00=US\$0.75.

The fundamental driver of value for TiZir (and MDL) is commodity prices. Accordingly, judgements regarding the value of TiZir are ultimately dependent on judgements regarding future prices for, in particular, chloride titanium slag, ilmenite and zircon. The valuation is based on commodity prices and expectations of future commodity prices prevailing in early May 2018. In considering the prospects for minerals sands commodity prices, the following factors are relevant:



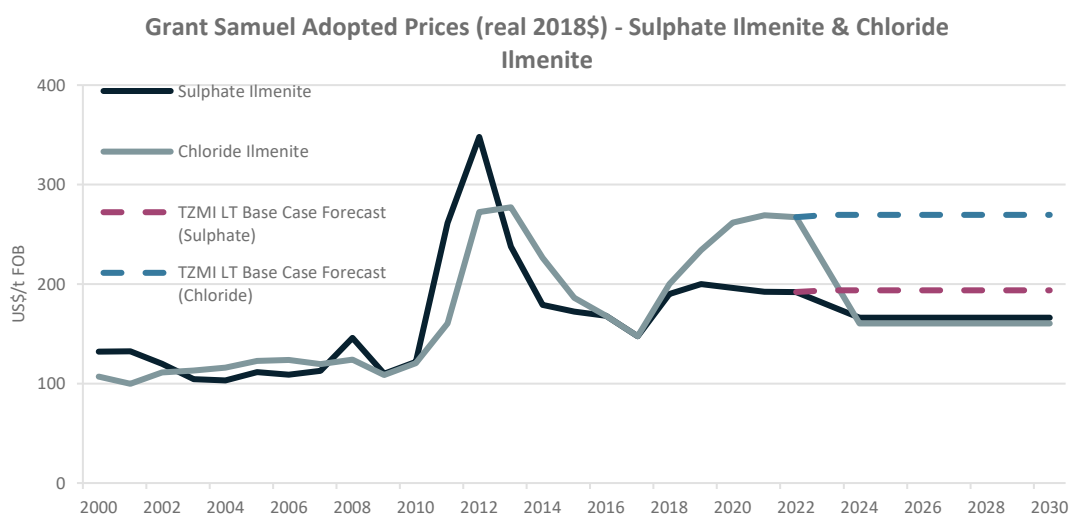
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- none of TiZir's products is sold in exchange traded markets. Rather, these products are typically sold under bespoke contractual arrangements with customers: in relation to titanium slag in particular there is a limited number of customers that specialise in chloride based titanium pigment production. The overall market for minerals sands products is concentrated, with relatively few producers and consumers. Accordingly, there is little equity market analyst or commodity analyst coverage of the relevant commodity markets. Historical pricing is opaque, there is no readily observable spot market and there are few credible forecasts of future commodity prices;
- the price of mineral sands products has historically been extremely volatile. Following the global financial crisis of 2008, the mineral sands commodity prices generally doubled in value over four years. From price peaks in 2012, commodity prices fell sharply, with some commodities falling by more than half. Zircon prices fell from around US\$2,500/t in 2012 to around US\$1,000/t in 2016. More recently, prices have strengthened on the back of supply constraints across the sector; and
- in the context of extreme price volatility, price forecasts by analysts and industry commentators may become rapidly out of date so any view on 'consensus' price forecasts may lag or otherwise not match current market expectations. In the case of mineral sands products this issue is exacerbated by the limited coverage of minerals sands producers and the industry generally by equity market and commodity analysts.

MDL commissioned TZMI to provide relevant commodity price information and forecasts.

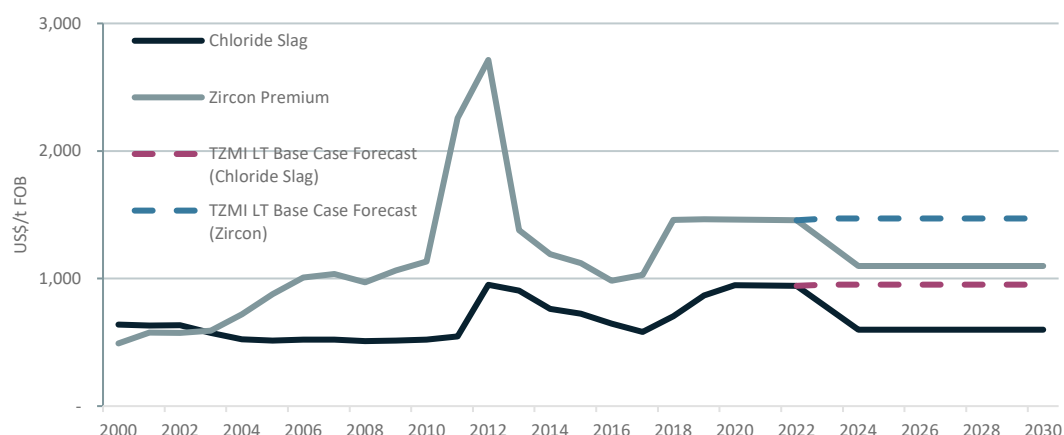
The charts below summarise historical pricing information compiled by TZMI, TZMI's short to medium term price forecasts and long term assumptions adopted by TZMI and Grant Samuel.



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Grant Samuel Adopted Prices (real 2018\$) - Chloride Slag & Premium Zircon



Mineral sands commodity prices, led by ilmenite and zircon, strengthened appreciably during the second quarter of 2017 and have continued to appreciate through to the first quarter of 2018. TZMI is predicting significant further price increases during 2018 and into 2019. Chloride slag pricing, in particular, is predicted to peak at prices above previous highs of 2012. Chloride ilmenite prices are also forecast to increase substantially, while zircon pricing is forecast to strengthen significantly in FY18, and then remain substantially flat in the long term. TZMI is forecasting that elevated price levels will continue beyond 2022, on the basis that historically high long term prices will be required to induce sufficient production to meet demand.

Grant Samuel has adopted TZMI's price forecasts for the period 2018-2022. However, as shown on the chart above, Grant Samuel has adopted long term price assumptions that are lower than those of TZMI. These lower long term price assumptions are consistent with historical real term median pricing. The adoption of these lower long term price assumptions notionally reflects a more significant supply side response than that assumed by TZMI, substitution effects or other factors. However, Grant Samuel's long term price assumptions are essentially subjective. They do not represent a forecast of long term minerals sands commodity prices. Rather, they reflect a judgement that industry participants and investors are unlikely to be prepared to pay a price for mineral sands assets based on long term price forecasts that are substantially higher than current and historical prices, even if there are good first principles reasons for expecting such higher long term prices. Overall, the pricing assumptions adopted by Grant Samuel do not represent forecasts but are intended to reflect the range of assumptions that could be reasonably adopted by industry participants in their pricing of MDL and its assets.

The long term price assumptions adopted by Grant Samuel (in real terms) are shown in detail below:

	2024+
MINERAL	
Zircon (premium) (US\$/t)	1,099
Zircon (standard) (US\$/t)	985
Rutile (US\$/t)	808
Leucoxene (US\$/t)	435
Sulphate ilmenite (54%) (US\$/t)	166



Chloride ilmenite (58%) (US\$/t)	160
Chloride slag (US\$/t)	599
Chloride fines (US\$/t)	471
High purity pig iron (EUR/t)	332

## 6.4 TiZir Valuation

Valuation of MDL is essentially based on an assessment of the underlying value of TiZir. The value of TiZir has been estimated by aggregating the estimated market value of its assets (GCO and TTI) and subtracting external net debt and shareholder loans as at 31 December 2017.

Grant Samuel has valued TiZir in the range US\$489-\$643 million.

### 6.4.1 GCO

Grant Samuel has valued GCO in the range US\$800-900 million.

Grant Samuel prepared a cash flow model for GCO based on two valuation cases developed by AMC using information provided by MDL. The DCF model forecasts nominal after tax cash flows from 2018 to 2050. However, the model does not constitute a forecast or projections by Grant Samuel of the future performance of the GCO business and no assurance or warranty is given that future performance will be consistent with the assumptions adopted in the model.

AMC reviewed each of the technical assumptions in GCO's operating model, including those regarding reserve estimates, production profiles, operating costs and capital costs, and adjusted these assumptions where appropriate:

**Case 1** – this scenario reflects the current GCO life of mine plan. It assumes the following:

- production continues for 32 years until 2050 and total production is 22.88Mt of heavy metal concentrate;
- annual production averages a throughput rate of 7,000 tph and average run time of 89%;
- heavy mineral grades vary significantly over the life of the mine, with a minimum of 1.04% and a maximum of 1.85%; and
- annual operating costs average approximately US\$80 million in real terms, resulting in total operating costs over the life of the mine of approximately US\$2.6 billion.

**Case 2** – is the same for Case 1 except:

- the dredge throughput rate is increased from 7,000 tph to 8,000 tph. Production is assumed to ramp up over three years and to achieve the full increased production rate in the year 2020. As a result of the higher production rate, the mine life is reduced to 28 years; and
- personnel numbers are assumed to be reduced to a level considered more consistent with similar sized mineral sands operations, reducing annual labour costs by around US\$4 million.

The following table summarises the NPV analysis for GCO<sup>16</sup>:

<sup>16</sup> Note: MDL's interest in GCO is 45%

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## GCO – NPV ANALYSIS (US\$M)

SCENARIO	DISCOUNT RATE		
	9%	10%	11%
Case 1	993	923	863
Case 2	1,143	1,067	999

Grant Samuel's valuation of MDL's interest in GCO in the range US\$800-900 million reflects the NPV analysis summarised above and takes into account the following factors:

- GCO commenced production in 2014. Following a lengthy and at times challenging ramp-up phase, GCO is now starting to produce at levels approaching nameplate capacity and has been cash flow positive since the third quarter of 2016. GCO is forecast to achieve nameplate capacity in 2019;
- although ore grades are lower than grades for many comparable projects, GCO has a large reserve base which supports high throughput rates and a long mine life;
- GCO has the single largest dredge operation in the world, which suits the scale of the resource and the uniformity of its ore grade. Dredge mining is regarded as a cost competitive method of mineral sands mining;
- there is potential to improve the profitability of operations, subject to the successful implementation of mine optimisation and cost reduction initiatives currently being rolled out at GCO; and
- the Mineral Separation Plant has substantial excess capacity (with current utilisation as low as 70% of the circuit design). Accordingly, there is scope to increase production of finished goods.

On the other hand:

- GCO's location in Senegal exposes it to a range of risks that may not apply to an operation in a first world jurisdiction, including such risks as future changes to the fiscal regime. However, the Senegalese economic landscape is dominated by European investment and Senegal remains one of the most stable countries in Africa; and
- GCO's operational performance history has been characterised by a slower than expected ramp-up and some operational difficulties. GCO has never consistently operated at full capacity, with the dredge not yet achieving a full quarter at the long term targeted average production rate of 7,000 tph. In this context, there is a degree of uncertainty in terms of future production performance, notwithstanding AMC's confidence that the operation should be comfortably capable of producing at a long term rate of 7,000 tph (as per GCO's life of mine plan) and in fact should be able over time to increase production to 8,000 tph.

Grant Samuel has sought to address the uncertainty in relation to operational performance in part through sensitivity analysis. Grant Samuel has assessed the sensitivity of calculated NPVs to changes in key variables as follows:

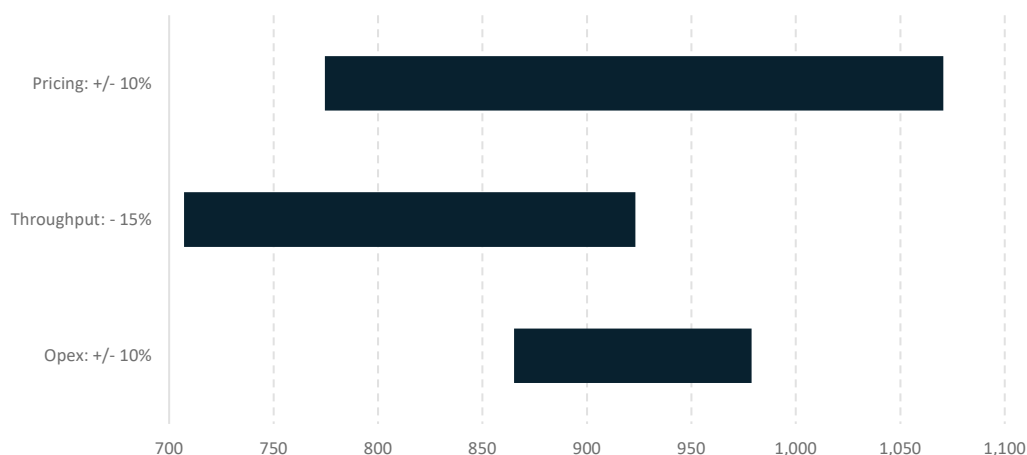
- variation of +/-10% in mineral sands product prices;
- variation of +/- 10% in operating costs; and
- variation of - 15% in dredge throughput.

The outcome of the sensitivity analysis for Case 1 is summarised below:

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### GCO – NPV SENSITIVITY (US\$M)



These sensitivities do not, and do not purport to, represent the full range of potential value outcomes for GCO. They are simply theoretical indicators of the sensitivity of the NPVs derived from the DCF analysis. In this regard, the net present value outcomes show a relatively wide range across the different scenarios, highlighting the sensitivity to relatively small changes in assumptions.

NPVs for GCO are highly sensitive to commodity price assumptions. There are no broadly based market consensus views on future mineral sands commodity prices. Market participants and analysts could reasonably hold widely varying views on value.

Accordingly, Grant Samuel has also estimated NPVs for GCO for alternative sets of price assumptions. Adoption of TZMI's base case long term price forecasts would yield materially higher NPVs for GCO than Grant Samuel's valuation range. For example, on the basis of AMC's base case production scenario and a discount rate of 10%, the calculated NPV for GCO would be approximately US\$1,168 million. In conjunction with a similar calculated NPV outcome for TTI of US\$763 million (i.e. on the basis of TZMI's base case long term price forecasts), this would imply very high values for TiZir and MDL, at levels representing multiples of the ERAMET Offer price.

Grant Samuel has also calculated NPVs for price decks that assume:

- TZMI's high case assumptions for the period to 2022, followed by Grant Samuel's long term price assumptions (as per Grant Samuel's base case pricing assumptions); and
- TZMI's low case assumptions for the period to 2022, followed by Grant Samuel's long term price assumptions.

The following table sets out the results of this NPV analysis for the AMC Case 1 production scenario:

### GCO – NPV ANALYSIS -ALTERNATIVE TZMI PRICING (US\$M)

SCENARIO	DISCOUNT RATE		
	9%	10%	11%
TZMI Low - Grant Samuel long term	884	817	760
TZMI High - Grant Samuel long term	1,130	1,056	992

The NPV outcomes show a relatively wide range of values across the different pricing scenarios, highlighting again the sensitivity to relatively small changes in assumptions, particularly in relation to commodity pricing.

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A further alternative is to estimate NPVs on the basis that spot pricing continues in perpetuity. Given that there are no formal “spot” markets, for the purpose of this analysis Grant Samuel has estimated NPVs on the basis both of actual prices for the 4th quarter, 2017 (as reported by TZMI) and of TZMI’s forecast base price for FY18. In each case these prices are assumed to continue (in real terms) in perpetuity. The following table sets out the NPVs for GCO for AMC’s Case 1 production scenario:

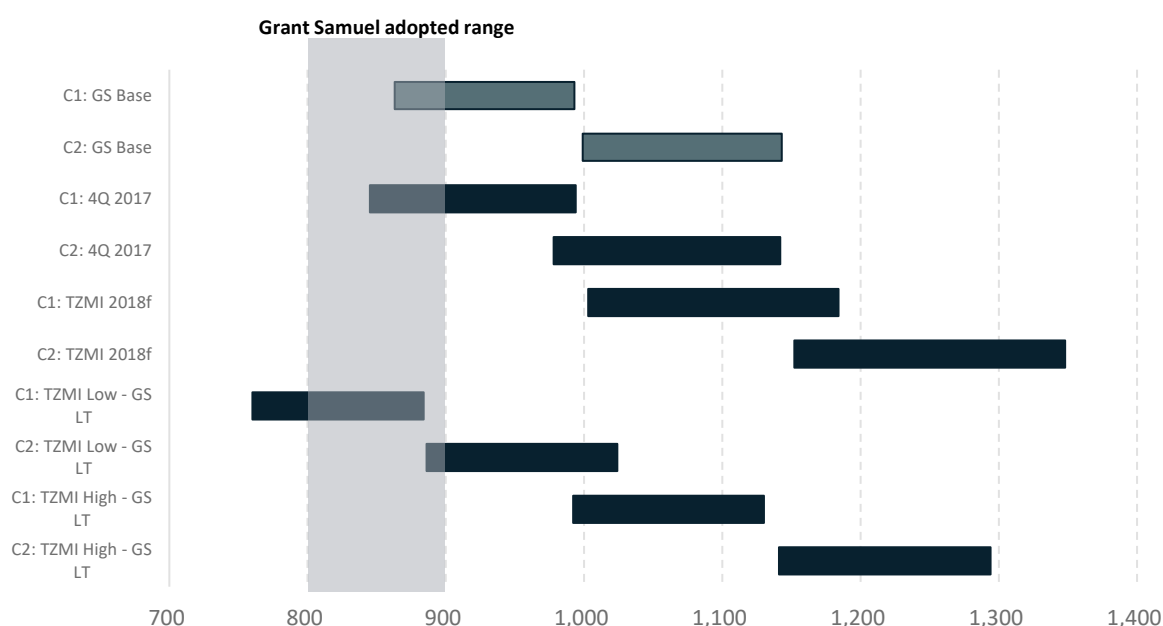
**GCO – NPV ANALYSIS – SPOT PRICING (US\$M)**

SCENARIO	DISCOUNT RATE		
	9%	10%	11%
<b>4<sup>TH</sup> QUARTER 2017</b>	994	913	845
<b>TZMI 2018 FORECAST</b>	1,184	1,087	1,003

The analysis suggests a value for GCO around or above Grant Samuel’s valuation range, even if future mineral sands commodity prices do no more than reflect current “spot” values.

The NPV outcomes for the various pricing scenarios, together with Grant Samuel’s selected valuation range, are illustrated as follows:

**GCO – NPV SENSITIVITY (9% - 11% WACC) (US\$M)<sup>17</sup>**



Grant Samuel’s valuation of GCO in the range US\$800-900 million is a subjective judgement, having regard to:

- NPVs estimated on the basis of the valuation cases recommended by AMC and Grant Samuel’s base case pricing assumptions. The analysis suggests unrisks NPVs (for a discount rate of 10%) in the range US\$923-1,067 million;
- the reality that, notwithstanding that AMC is confident that GCO should be able to comfortably achieve the 7,000 tph production and 89% run time rates assumed in the life of mine plan, GCO has not yet been able to consistently achieve these production rates. In this context, in Grant Samuel’s view, it is appropriate to be cautious about the extent to which the upside case is given weight in the overall valuation conclusion; and

<sup>17</sup> C1 and C2 refers to the Case 1 and Case 2 valuation cases prepared by AMC



- sovereign risks associated with GCO's Senegalese location, which are not captured in the calculated NPVs. Grant Samuel has sought to reflect these sovereign risks by effectively risk-adjusting the projected cash flows, through judgemental selection of a valuation range that represents a discount to the unrisked NPVs<sup>18</sup>.

## 6.4.2 TTI

Grant Samuel has valued TTI in the range US\$275-325 million.

Grant Samuel prepared a cash flow model for TTI based on an operating model provided by MDL. The DCF model is based on a number of assumptions that Grant Samuel considers reasonable. However, the model does not constitute a forecast or projection by Grant Samuel of the future performance of the TTI business and no assurance or warranty is given that future performance will be consistent with the assumptions adopted in the model.

The key operational assumptions modelled are:

- capacity utilisation of the furnaces of approximately 100%, with actual utilisation varying based on estimated maintenance for each year;
- annual production of chloride slag and chloride fines of approximately 230kt per annum;
- annual production of high purity pig iron of 90kt per annum; and
- capital expenditure of approximately US\$10 million per annum, increasing to US\$20 million every five years to allow for planned major maintenance of the furnace.

Grant Samuel has estimated a terminal value (i.e. the value of cash flows beyond the 32 years of explicit cash flows modelled) for TTI. This requires an assumption regarding the growth rates of free cash flow in perpetuity. Grant Samuel has selected growth rates in the range 2-3%, reflecting an assumption that in the long term the business will generate modest real growth in free cash flows (i.e. marginally above inflation).

The following table summarises the NPV analysis for TTI<sup>19</sup>:

**TTI – NPV ANALYSIS (US\$)**

DISCOUNT RATE		
9%	10%	11%
345	313	287

Grant Samuel's valuation of TTI in the range US\$275-325 million reflects the NPV analysis summarised above and takes into account the following factors:

- There have been a number of planned production interruptions and operational setbacks at TTI in recent times that have reduced production:
  - in 2015 the furnace was relined (as part of its scheduled maintenance) and a capacity expansion completed to facilitate the conversion of the facility from the production of sulphate slag to chloride slag (although it retains sulphate slag production capability);
  - a major operational incident damaged the roof of the furnace at the facility in August 2016, resulting in its closure for repairs until production recommenced in January 2017; and

<sup>18</sup> Grant Samuel's preferred approach to incorporating sovereign risks in valuation outcomes is to risk adjust expected cash flows or calculated NPVs. An alternative approach would be to increase the discount rate used in the DCF analysis. By way of illustration, a \$100 million reduction in assessed value for GCO (relative to base case NPV estimates) is broadly consistent with an increase in the discount rate of approximately 2%.

<sup>19</sup> Note: MDL has a 50% interest in TTI through the TiZir joint venture



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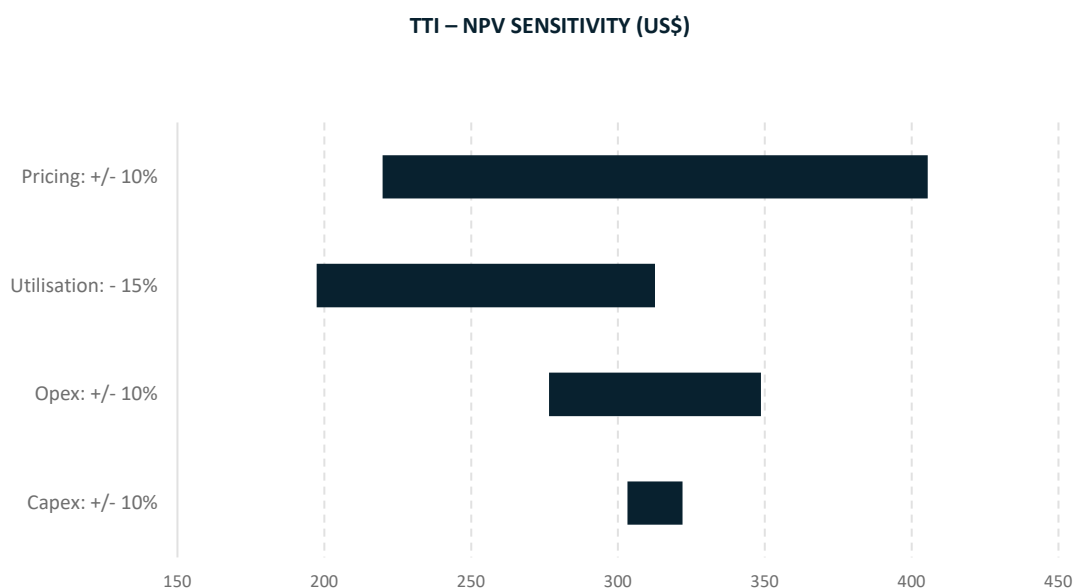


- for the first half of the first quarter of FY18, TTI production rates approached its expanded production capacity of 230,000 tonnes per annum. However, a gearbox failure at the pre-reduction kiln in February 2018 resulted in a loss of approximately six weeks of normal production.
- The operations are now producing at pre-shutdown rates (c.87% of nameplate capacity) with titanium slag and fines production for FY18 expected to be approximately 10% higher than FY17 at around 200,000 tonnes. Production is expected to reach nameplate capacity for FY19.
- The valuation reflects the following attractive characteristics of TTI:
  - TTI has an extensive successful operational history (circa 30 years), has access to abundant cheap hydropower and year round access to deep water shipping facilities;
  - TTI enjoys valuable intellectual property as the only chloride slag producer in Europe and one of only six operating facilities globally. The significant environmental benefits associated with pigment production via the chlorination process means that there will be increasing pressure on pigment producers to move towards the chlorination route, reflected in the recently announced Chinese policy looking to end production of titanium pigment via the sulphate route. These environmental pressures should underpin demand for chloride slag; and
  - TiZir is successfully implementing a number of improvement initiatives. The furnace is exceeding expectations from an operational efficiency perspective – consuming less coal and energy to reach production targets and improving chloride slag yields through crusher optimisation.

Grant Samuel has assessed the sensitivity of calculated NPVs for TTI to changes in the following variables:

- variations of +/- 10% in pricing;
- variation of – 15% in capacity utilisation;
- variations of +/- 10% in operating costs; and
- variations of +/- 10% in capital costs.

The outcome of the sensitivity analysis is summarised below:



These sensitivities do not, and do not purport to, represent the full range of potential value outcomes for TTI. They are simply theoretical indicators of the sensitivity of the net present values derived from the DCF

## GRANT SAMUEL



analysis. In this regard, the net present value outcomes show a relatively wide range across the different scenarios, highlighting the sensitivity to relatively small changes in assumptions.

In particular, calculated NPVs are highly sensitive to chloride slag price assumptions. Valuation of TTI on the basis of TZMI's chloride slag forecasts for the medium to longer term would result in very high estimates of the value of TTI. For example, assuming a discount rate of 10%, the unrisked NPV of TTI would be US\$763 million.

As for GCO, Grant Samuel has calculated NPVs for TTI for two price decks that assume:

- TZMI's high case assumptions for the period to 2022, followed by Grant Samuel's long term price assumptions (as per Grant Samuel's base case pricing assumptions); and
- TZMI's low case assumptions for the period to 2022, followed by Grant Samuel's long term price assumptions.

The following table sets out the results of this NPV analysis:

**TTI – NPV ANALYSIS – ALTERNATIVE TZMI PRICING (US\$M)**

SCENARIO	DISCOUNT RATE		
	9%	10%	11%
<b>TZMI Low - Grant Samuel long term</b>	257	228	205
<b>TZMI High - Grant Samuel long term</b>	436	401	373

Grant Samuel has also calculated NPVs on the basis that spot pricing continues in perpetuity. As before, in the absence of formal "spot" markets, for the purpose of this analysis Grant Samuel has estimated NPVs on the basis both of actual prices for the 4th quarter 2017 (as reported by TZMI) and of TZMI's forecast base case prices for FY18. In each case these prices are assumed to continue (in real terms) in perpetuity. The following table sets out the NPVs for TTI:

**TTI – NPV ANALYSIS – SPOT PRICING (US\$M)**

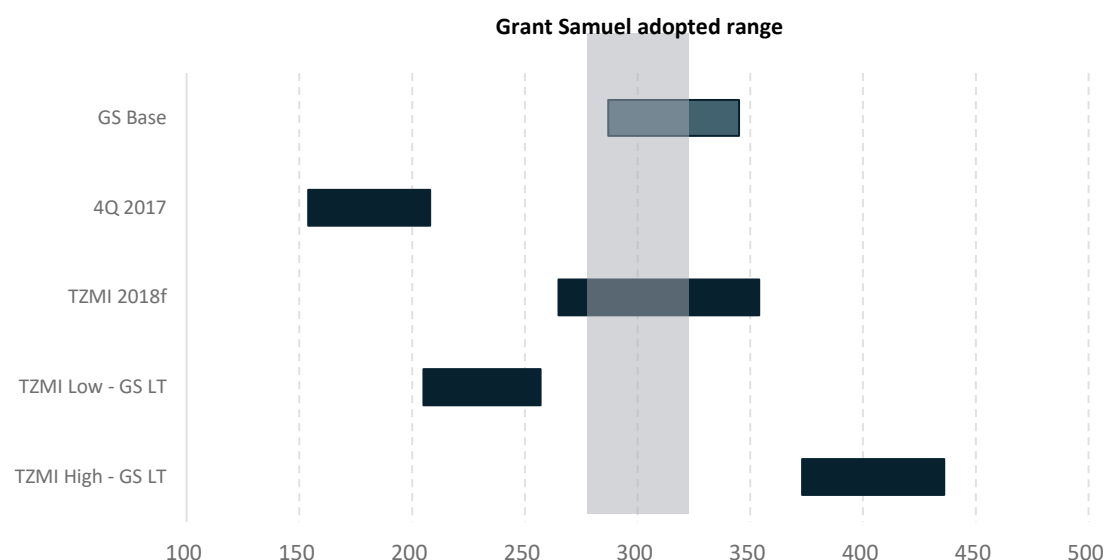
SCENARIO	DISCOUNT RATE		
	9%	10%	11%
<b>4<sup>TH</sup> QUARTER 2017</b>	208	177	154
<b>TZMI 2018 FORECAST</b>	354	304	265

The NPV results for the various sets of price assumptions, together with Grant Samuel's valuation range, are shown below:

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### TTI – NPV SENSITIVITY (9% - 11% WACC) (US\$M)



The NPV outcomes show a wide range of values across the different pricing scenarios, highlighting the sensitivity of calculated values to relatively small changes in titanium slag price assumptions. In addition, the analysis shows the sensitivity of TTI NPVs to changes in relative pricing, with TTI's profitability in part a function of the relative pricing of chloride titanium slag and ilmenite.

The valuation range for TTI of US\$275-325 million represents the following multiples of earnings:

### TTI – IMPLIED VALUATION PARAMETERS

	VARIABLE (US\$ MILLION)	IMPLIED MULTIPLES	
		LOW	HIGH
Multiple of EBITDA (times)			
Year ended 31 December 2017	15	18.1	21.4
Year ending 31 December 2018 <sup>20</sup>	28	9.8	11.5
Year ending 31 December 2019 <sup>21</sup>	40	6.9	8.2

The multiples of earnings for FY18 and FY19 set out above are based on earnings forecasts prepared by MDL. While the multiples of actual FY17 EBITDA are high, the multiples of forecast FY18 and FY19 earnings are much lower. This reflects expectations of strong earnings growth based on strengthening of chloride slag prices in the short to medium term.

Grant Samuel's valuation of TTI in the range of US\$275-325 million is a subjective judgement, having regard to:

- NPV analysis on the basis of Grant Samuel's base case pricing assumptions, which suggest NPVs of US\$287-345 million for discount rates of 9-11%;
- the reality that the operation has not yet achieved nameplate capacity for any extended period and accordingly remains exposed to production risk. In this context, Grant Samuel's sensitivity analysis suggests that a longer term failure to achieve nameplate capacity could significantly reduce TTI's value; and

<sup>20</sup> Projected TTI EBITDA for FY18 is sourced from MDL's guidance using agreed pricing in executed contracts and TiZir internal sales targets based on current and potential customer discussions

<sup>21</sup> Projected TTI EBITDA for FY19 is sourced from TZMI base case pricing assumptions



- the sensitivity of the earnings of TTI to chloride slag pricing and to relativities between chloride slag pricing and ilmenite pricing.

### 6.4.3 Market evidence

#### Transaction Evidence

Grant Samuel has considered as a cross check of its valuation of TiZir the earnings multiples implied by transaction values for selected acquisition in the mineral sands sector since 2008. The following table summarises the multiples of historical and forecast EBITDA implied by the transaction values for the selected transaction:

**RECENT TRANSACTION EVIDENCE**

DATE	TARGET	TRANSACTION	CONSID- ERATION (MILLIONS) <sup>22</sup>	EBITDA MULTIPLE (TIMES)		
				HISTORICAL	FORECAST (T+1)	FORECAST (T+2)
Feb-18 <sup>23</sup>	Cristal TiO <sub>2</sub> business	Cash acquisition by Tronox	US\$2,215	-	6.5	6.3
Dec-16	Sierra Rutile	100% cash acquisition by Iluka Resources	A\$375	20.7	8.0	5.0
May-09	Consolidated Rutile	Remaining 80.4% cash acquisition by Unimin (subsidiary of Sibelco)	A\$165	3.9	-	-
July-08	BeMax Resources	Remaining 65.5% cash acquisition by Cristal	A\$302	11.2	-	-

Source: Grant Samuel analysis (see Appendix 1)

There are few recent transactions that provide meaningful valuation evidence for TiZir. The information available to derive multiples for the comparable transactions is limited and generally does not enable the calculation of forward looking multiples. The multiples implied by the transaction prices reflect a wide range of factors, including the particular circumstances of the target companies (including size and market position), market conditions at the time (particularly in relation to commodity prices), expected synergies and other factors.

Grant Samuel notes the following in relation to the above transactions:

- Cristal's TiO<sub>2</sub> business is broadly comparable to TiZir in that both operate a mine and a smelter, although Cristal is fully integrated and also operates a number of pigment plants. The transaction is yet to complete subject only to regulatory approvals;
- Sierra Rutile is primarily a titanium dioxide minerals business, with the majority of its revenue generated from a single rutile mine. At the time of its acquisition, Sierra Rutile's rutile production was approximately 140kt with expansion potential of up to 240kt per annum. The company was acquired at or around the bottom of the rutile price cycle, which, together with expected increases in future production, is reflected in the fact that multiples of prospective earnings were significantly lower than multiples of historical earnings;
- Unimin acquired Consolidated Rutile at a time when the resources market was still recovering from the global financial crisis of late 2007 and 2008. Consolidated Rutile was an illiquid stock, with Iluka holding a 51.4% interest at the time the transaction was announced; and

<sup>22</sup> Implied equity value if 100% of the company or business had been acquired

<sup>23</sup> This transaction has been announced but has not completed



- BeMax owned two mines in Australia producing titanium dioxide minerals and zircon, and had a well progressed development project, also in Australia. The acquisition of BeMax secured offtake for Cristal to supply feedstock to its Millennium operations in Western Australia.

While there is considerable variability in the multiples, in Grant Samuel's view the EBITDA multiples for comparable transactions are broadly consistent with the multiples implied by the valuation range of TiZir. In particular, the pending bid for Cristal by Tronox and the takeover of Sierra Rutile by Iluka offer some insight into the multiples that major mineral sands industry participants are willing to pay for strategic assets.

Further details on these transactions are set out in Appendix 1.

### Sharemarket Evidence

The following table sets out the implied EBITDA multiples for a range of comparable listed companies based on share prices as at 14 May 2018:

**SHAREMARKET RATINGS OF SELECTED LISTED MINERAL SANDS COMPANIES**

COMPANY	MARKET CAPITALISATION <sup>24</sup> (MILLIONS)	EBITDA MULTIPLE <sup>25</sup> (TIMES)		
		HISTORICAL	FORECAST YEAR 1	FORECAST YEAR 2
Iluka Resources <sup>26</sup>	A\$4,946	8.7	8.0	7.7
Base Resources	A\$293	3.4	2.6	2.3
Kenmare Resources	£275	7.6	4.3	3.7
Tronox	US\$2,097	8.1	6.4	6.2

Source: Source: Grant Samuel analysis (see Appendix 2)

The value determined for TiZir is appropriate for the acquisition of a business as a whole and, accordingly, incorporates a premium for control. The multiples set out above reflect the market prices at which shares trade on the share market in the absence of a takeover offer and are therefore often (but not always) less than multiples that would apply to acquisitions of similar companies. However, while the premium paid to obtain control in takeovers is observable (typically in the range 20-35%) it is inappropriate to simply add a premium to listed multiples. The premium for control is an outcome of the valuation process, not a determinant of value. Premiums are paid for reasons that vary from case to case and may be substantial due to synergy or other benefits available to the acquirer. In other situations, premiums may be minimal or even zero.

While there is considerable variability in the multiples, the larger, more diversified operators (i.e. Iluka and Tronox) tend to trade on higher multiples reflecting their more attractive cost position and portfolio of longer life assets.

The following factors are relevant to consideration of the multiples of the comparable companies in the table above:

- Iluka is a multi-project mineral sands producer with a product mix comprising primarily zircon and high grade titanium dioxide feedstocks (synthetic rutile and rutile). Iluka holds significant influence over the supply of zircon to the market, and significantly influences its price in the market. Iluka has provided guidance outlining A\$410 million of capital expenditure planned to maintain current production levels;
- Base Resources ("Base") produces mineral sands from its Kwale mine in Kenya. Kwale has approximately six years of mine life remaining and predominantly produces rutile, ilmenite and some zircon. The low multiples for Base appear to reflect Kwale's limited mine life;

<sup>24</sup> Market capitalisation based on sharemarket prices as at 14 May 2018.

<sup>25</sup> Represents gross capitalisation (that is, the sum of the market capitalisation adjusted for minorities, plus borrowings less cash as at the latest balance date) divided by EBITDA.

<sup>26</sup> Iluka Resources' enterprise value has been adjusted for the value of the Mining Area C royalty and the royalty's contribution to EBITDA.



- Kenmare Resources (“Kenmare”) produces mineral sands from a single mine in Mozambique. The mine, Moma, has been in commercial production since 2009 and primarily produces ilmenite, the sales of which account for approximately 75% of Kenmare’s revenue. The low multiples of Kenmare may reflect the fact that the stock is thinly traded, its high degree of exposure to low margin ilmenite and recent challenging mining conditions, including a complete redirection of its mine path; and
- Tronox is a vertically integrated business, owning mineral sands mines, slag plants and pigment plants globally. Tronox uses the majority of production from its mines for its titanium dioxide business.

Further details of these entities are set out in Appendix 2.

Overall, given that the trading multiples do not include a premium for control, in Grant Samuel’s view the multiples implied by the share prices for Iluka and Tronox provide broad support for the valuation range for TiZir of US\$489-643 million.

#### 6.4.4 TiZir Net Borrowings

TiZir’s external net debt for valuation purposes is US\$332.7 million. This amount is based on:

- a cash balance of US\$48.0 million as at 31 December 2017;
- the outstanding bond owing of US\$300 million as at 31 December 2017;
- working capital facilities of US\$67.9 million as at 31 December 2017; and
- accrued interest payable of US\$12.8 million as at 31 December 2017.

In addition, as at 31 December 2017, TiZir owed US\$231.5 million in subordinated shareholder loans to MDL and ERAMET, of which US\$87.3 million is due to MDL and US\$144.3<sup>27</sup> million to ERAMET. The shareholder loans from MDL and ERAMET are subordinated to the corporate bonds.

#### 6.4.5 TiZir Corporate Costs

TiZir’s corporate costs, excluding costs incurred on behalf of the projects, have been estimated at approximately US\$2.5 million per annum.

These corporate costs have been capitalised on a DCF basis to give a total cost of US\$18-22 million.

### 6.5 Corporate Costs/ Head Office Costs

MDL’s head office costs, excluding costs incurred on behalf of the projects, have been estimated at approximately US\$3.2 million per annum. Any acquirer of MDL would be able to save the costs associated with MDL being a listed company (i.e. board fees and listing costs) as well as most finance, human resources, corporate development, legal and general head office costs. Grant Samuel has assumed residual corporate costs of approximately US\$1.5 million per annum for the purposes of the valuation. An allowance of US\$12.5-14 million has been made in the valuation for the capitalisation (on a DCF basis) of the residual corporate costs.

### 6.6 MDL Net Borrowings

MDL’s net cash for valuation purposes is US\$12.6 million. This amount is based on MDL’s cash balance as at 31 December 2017.

The loan to TiZir from MDL was US\$87.3 million as at 31 December 2017. This relates to shareholder loans provided to TiZir between the period 31 December 2013 to 31 March 2017.

<sup>27</sup> Includes a first priority establishment loan of approximately US\$57 million. This loan is first priority until 29 September 2018 at which point all subordinated shareholder loans will rank pari passu



## 7 Evaluation of the Offer

### 7.1 Fairness

Grant Samuel has estimated a full underlying value for MDL, including a premium for control, in the range of A\$2.04-2.52 per share. The valuation represents the estimated full underlying value of MDL assuming 100% of the company was available to be acquired and includes a premium for control. The valuation is set out in Section 6 of this report.

The Offer of A\$1.46 falls well below the bottom end of the valuation range. Accordingly, in Grant Samuel's opinion, the Offer is not fair.

In considering the fairness of the ERAMET Offer, shareholders should note that there is fundamental uncertainty in relation to future mineral sands commodity prices. Shareholders could hold a wide range of views on future prices and, therefore, the value of MDL. However, in Grant Samuel's opinion, for any reasonable set of commodity price assumptions, assessments of the value of MDL are likely to yield valuations well above the ERAMET Offer price.

### 7.2 Reasonableness

#### 7.2.1 Overview

In some circumstances there are reasons for shareholders to consider accepting a takeover offer, even if that offer is not fair. In particular, that may be the case if shareholders have little prospect of realising value in excess of the offer price if they do not accept the offer. In Grant Samuel's view, the following factors should be considered in assessing whether the ERAMET Offer is reasonable, notwithstanding that it is not fair:

- the ERAMET Offer price of A\$1.46 per share is substantially lower than Grant Samuel's valuation range for MDL of A\$2.04-2.52 per share;
- takeover premium analysis in relation to the ERAMET Offer is inconclusive. It does not provide any compelling rationale to accept the Offer, given Grant Samuel's conclusion that the Offer is not fair;
- while MDL shares could trade at prices below the ERAMET Offer price in the short term in the absence of the ERAMET Offer, the MDL share price should be supported by the additional information provided in MDL's Target's Statement, expectations of strengthening commodity prices and, over time, improved financial performance. Moreover, MDL would clearly remain an attractive takeover target, not least to ERAMET, providing further support for the MDL share price;
- ERAMET's interest in MDL (13.36% as at 14 May 2018) is not an impediment to some alternative change of control transaction involving MDL, particularly given the structure of MDL's share register; and
- since the announcement of the ERAMET Offer, MDL shares have generally traded at prices above the ERAMET Offer price of A\$1.46 per share. As long as MDL shareholders can realise more than A\$1.46 per share by selling their shares on market, there is no reason for shareholders to sell their shares into the ERAMET Offer.

These issues are analysed in more detail below.

#### 7.2.2 Premium for Control

The ERAMET Offer of A\$1.46 per share represents the following premiums relative to MDL's pre-offer share price:





**MDL – IMPLIED PREMIUMS OVER PRE-ANNOUNCEMENT SHARE PRICES (\$A)**

PERIOD	SHARE PRICE	PREMIUM
26 April 2018 – pre-announcement price	1.16	26%
1 week prior 26 April 2018 - VWAP <sup>28</sup>	1.15	27%
1 month prior to 26 April 2018 - VWAP	1.10	33%
3 month prior to 26 April 2018 - VWAP	1.13	30%

Source: IRESS and Grant Samuel analysis

The premiums implied by the ERAMET Offer price are broadly consistent with the range of premiums typically regarded as the benchmark for successful change of control transactions in the Australian market (20-35%).

However, in the context of MDL the premiums are not in any sense determinative of value, nor do they provide any useful evidence as to value. The premiums are no more than the difference between the offer price and the pre-bid trading price for MDL shares. In any event, for the reasons set out in Section 6.1 of this report, there are good reasons to believe that the pre-bid MDL share price did not reflect the fair market value of MDL shares, including:

- TiZir’s lengthy operational ramp-up and repeated operational setbacks, which would have resulted in a cautious investor approach to assessing the prospects for TiZir;
- MDL’s modest share market capitalisation, limited share liquidity and restricted equity analyst coverage; and
- the opaque nature of the markets for mineral sands products and limited understanding of TiZir’s existing pricing, which will have made it difficult for investors to fully understand TiZir’s leverage to the significant increase in commodity prices that is expected to unfold in the short to medium term.

Accordingly, while the ERAMET Offer does represent a significant premium to MDL’s pre-offer share price, premium analysis is not particularly meaningful in relation to assessment of the ERAMET Offer.

### 7.2.3 Share Trading in the absence of any Offer

It is difficult to form any confident view as to the price at which MDL shares would trade in the absence of the Offer. While MDL shares could trade at prices below the ERAMET Offer price in the short term in the absence of the ERAMET Offer, the MDL share price should be supported by the additional information provided in MDL’s Target’s Statement, expectations of strengthening commodity prices and, over time, improved financial performance. Moreover, it is likely that the MDL share price would be supported to some extent by market perceptions that MDL continued to be an attractive takeover target, not least to ERAMET (assuming the continuation of current market conditions and no material changes in MDL’s circumstances).

ERAMET’s current shareholding should not affect the liquidity of MDL shares, given that it essentially represents the acquisition of existing substantial shareholdings.

### 7.2.4 Alternatives

In weighing up any offer, shareholders need to have regard to the alternatives that are realistically available to them. In relation to the ERAMET Offer:

- ERAMET’s interest in MDL (13.36% as at 14 May 2018) is not an impediment to some alternative change of control transaction involving MDL. MDL’s three largest shareholders other than ERAMET collectively hold approximately 33% of the shares in MDL and would be in a position to deliver control of MDL to an

<sup>28</sup> VWAP refers to volume weighted average prices

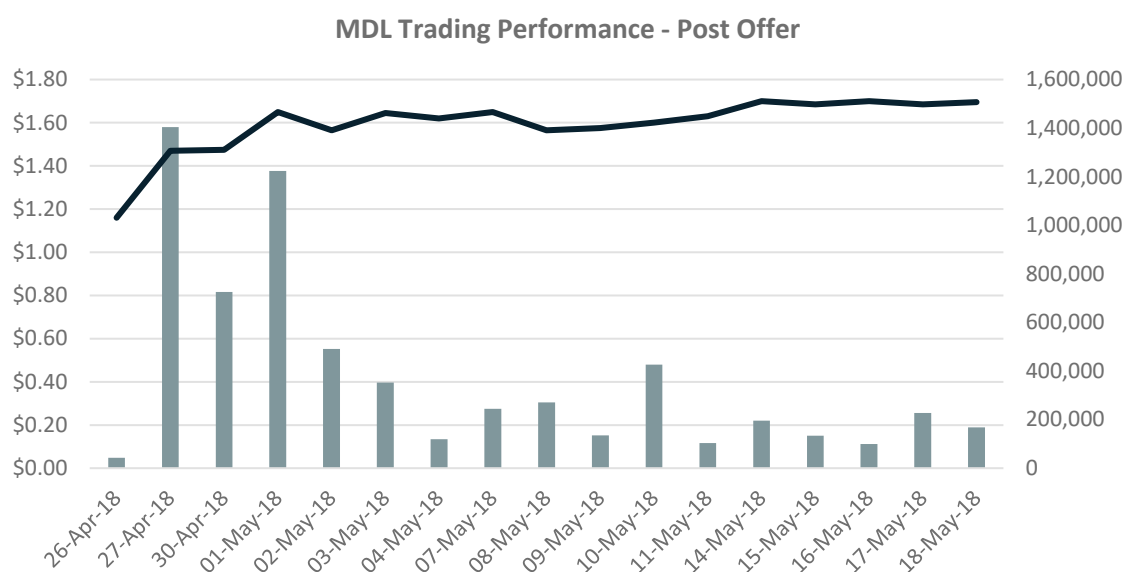
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alternative bidder. However, it must be recognised that any material increases in ERAMET's shareholding would potentially represent a deterrent to an alternative bid for MDL;

- MDL has no pressing need to raise capital and as TiZir's debt balance is reduced from operating cash flow there is a reasonable prospect of meaningful dividends being paid in due course; and
- since the announcement of the ERAMET Offer, MDL shares have generally traded at prices above the ERAMET Offer price of A\$1.46 per share.

The following chart shows MDL's trading performance (share price and volumes) for the period from the announcement of the ERAMET Offer to 18 May 2018:



Between the announcement of the ERAMET Offer and 18 May 2018, MDL shares have generally traded well above the offer price. For the period 30 April 2018 (the first trading day after the announcement of the ERAMET Offer on 27 April) to 18 May 2018, 8,293,328 shares were traded, in the range \$1.47-1.73, at a volume weighted average price of \$1.62. Accordingly, MDL shareholders have had an opportunity to realise cash value well in excess of the ERAMET Offer price through selling their shares on market. For as long as MDL shares continue to trade at prices above the ERAMET Offer price, MDL shareholders have no incentive to sell their shares into the ERAMET Offer.

There is no indication at this time that ERAMET may be prepared to increase its offer price. However, Grant Samuel's analysis suggests that the underlying value of TiZir is substantially greater than that implied by the ERAMET Offer. TiZir (and MDL) should be more valuable to ERAMET than to any other party. Accordingly, there must be at least some prospect that ERAMET could be prepared to increase its offer price if required to achieve control of MDL. Of course, this prospect will be undermined to the extent that there are any significant levels of acceptance of the ERAMET Offer.

### 7.2.5 Conclusion

Having regard to the above, Grant Samuel has concluded that the ERAMET Offer is not reasonable. Grant Samuel's conclusion could change in different circumstances, including in circumstances in which control had passed to ERAMET, the liquidity of MDL shares had been materially affected, or it had become otherwise apparent that MDL shareholders had limited prospects in the short to medium term of realising value greater than the ERAMET Offer price of A\$1.46 per share.



### 7.3 Shareholder Decision

Grant Samuel has been engaged to prepare an independent expert's report setting out whether in its opinion the ERAMET Offer is fair and reasonable to shareholders and to state reasons for that opinion. Grant Samuel has not been engaged to provide a recommendation to shareholders in relation to the ERAMET Offer, the responsibility for which lies with the directors of MDL.

In any event, the decision whether to accept or reject the Offer is a matter for individual shareholders based on each shareholder's views as to value and business strategy, their expectations about future economic and market conditions and their particular circumstances including risk profile, liquidity preference, investment strategy, portfolio structure and tax position. In particular, taxation consequences may vary from shareholder to shareholder. If in any doubt as to the action they should take in relation to the ERAMET Offer, shareholders should consult their own professional adviser.

Similarly, it is a matter for individual shareholders as to whether to buy, hold or sell shares in MDL. This is an investment decision upon which Grant Samuel does not offer an opinion and is independent of a decision on whether to accept the ERAMET Offer. Shareholders should consult their own professional adviser in this regard.



## 8 Qualifications, Declarations and Consents

### 8.1 Qualifications

The Grant Samuel group of companies provide corporate advisory services in relation to mergers and acquisitions, capital raisings, debt raisings, corporate restructurings and financial matters generally. The primary activity of Grant Samuel & Associates Pty Limited is the preparation of corporate and business valuations and the provision of independent advice and expert's reports in connection with mergers and acquisitions, takeovers and capital reconstructions. Since inception in 1988, Grant Samuel and its related companies have prepared more than 545 public independent expert and appraisal reports.

The person responsible for preparing this report on behalf of Grant Samuel is Stephen Cooper BCom (Hons) ACA. Stephen has a significant number of years of experience in relevant corporate advisory matters. David Szeleczky BCom(Hons) LLB(Hons) and Jardee Kininmonth BCom(Hons) assisted with the preparation of the report. Each of the above persons is a representative of Grant Samuel pursuant to its Australian Financial Services Licence under Part 7.6 of the Corporations Act.

### 8.2 Disclaimers

It is not intended that this report should be used or relied upon for any purpose other than as an expression of Grant Samuel's opinion as to whether the ERAMET Offer is fair and reasonable to shareholders. Grant Samuel expressly disclaims any liability to any MDL shareholder who relies or purports to rely on the report for any other purpose and to any other party who relies or purports to rely on the report for any purpose whatsoever.

Grant Samuel has had no involvement in the preparation of the Target's Statement issued by MDL and has not verified or approved any of the contents of the Target's Statement. Grant Samuel does not accept any responsibility for the contents of the Target's Statement (except for this report).

### 8.3 Independence

Grant Samuel and its related entities do not have at the date of this report, and have not had within the previous two years, any business or professional relationship with MDL or ERAMET or any financial or other interest that could reasonably be regarded as capable of affecting its ability to provide an unbiased opinion in relation to the ERAMET Offer.

Grant Samuel had no part in the formulation of the ERAMET Offer. Its only role has been the preparation of this report.

Grant Samuel will receive a fixed fee of \$300,000 for the preparation of this report. This fee is not contingent on the conclusions reached or the outcome of the ERAMET Offer. Grant Samuel's out of pocket expenses in relation to the preparation of the report will be reimbursed. Grant Samuel will receive no other benefit for the preparation of this report.

Grant Samuel considers itself to be independent in terms of Regulatory Guide 112 issued by ASIC on 30 March 2011.

### 8.4 Declarations

MDL has agreed that it will indemnify Grant Samuel and its employees and officers in respect of any liability suffered or incurred as a result of or in connection with the preparation of the report. This indemnity will not apply in respect of the proportion of any liability found by a court to be primarily caused by any conduct involving gross negligence or wilful misconduct by Grant Samuel. MDL has also agreed to indemnify Grant Samuel and its employees and officers for time spent and reasonable legal costs and expenses incurred in relation to any inquiry or proceeding initiated by any person. Any claims by MDL are limited to an amount equal to the fees paid to Grant Samuel. Where Grant Samuel or its employees and officers are found to have



been grossly negligent or engaged in wilful misconduct Grant Samuel shall bear the proportion of such costs caused by its action.

Advance drafts of this report were provided to MDL and its advisers. Certain changes were made to the drafting of the report as a result of the circulation of the draft report. There was no alteration to the methodology, evaluation or conclusions as a result of issuing the drafts.

## 8.5 Consents

Grant Samuel consents to the issuing of this report in the form and context in which it is to be included in the Target's Statement to be sent to shareholders of MDL. Neither the whole nor any part of this report nor any reference thereto may be included in any other document without the prior written consent of Grant Samuel as to the form and context in which it appears.

## 8.6 Other

The accompanying letter dated 21 May 2018 and the Appendices form part of this report.

Grant Samuel has prepared a Financial Services Guide as required by the Corporations Act. The Financial Services Guide is set out at the beginning of this report.

**GRANT SAMUEL & ASSOCIATES PTY LIMITED**

21 May 2018

*Grant Samuel & Associates*



## APPENDIX 1

### MARKET EVIDENCE - TRANSACTIONS

Set out below is a summary of transactions involving mineral sands businesses over the last 10 years for which there is sufficient information to calculate meaningful valuation parameters:

#### RECENT TRANSACTION EVIDENCE – MINERAL SANDS INDUSTRY

DATE	TARGET	TRANSACTION	CONSID- ERATION <sup>1</sup> (MILLIONS)	EBITDA MULTIPLE <sup>2</sup> (TIMES)		
				HISTORICAL	FORECAST (T+1)	FORECAST (T+2)
Feb-18 <sup>3</sup>	Cristal TiO <sub>2</sub> business	Cash acquisition by Tronox	US\$2,215	-	6.5	6.3
Dec-16	Sierra Rutile	100% cash acquisition by Iluka Resources	A\$375	20.7	8.0	5.0
May-09	Consolidated Rutile	Remaining 80.4% cash acquisition by Unimin (subsidiary of Sibelco)	A\$165	3.9	-	-
July-08	BeMax Resources	Remaining 65.5% cash acquisition by Cristal	A\$302	11.2	-	-

Source: Grant Samuel analysis<sup>4</sup>

A brief summary of each transaction is set out below:

#### ***Cristal's TiO<sub>2</sub> business/Tronox***

On 21 February 2017, Tronox Limited ("Tronox") announced it had reached a definitive agreement with Cristal to acquire its TiO<sub>2</sub> business. The consideration to be provided is US\$1.7 billion in cash and issuance of shares representing approximately 24% of the pro forma Tronox. On 1 March 2018, Tronox announced an extension to the agreement to acquire Cristal's TiO<sub>2</sub> business, extending the end date for the transaction from 21 May 2018 to 30 June 2018, with automatic three-month extensions until 31 March 2019. The transaction would combine two of the largest integrated titanium dioxide businesses in the world, adding Cristal's six mines, eight TiO<sub>2</sub> plants and one slag production plant to Tronox's four mines and three TiO<sub>2</sub> plants.

#### ***Sierra Rutile/Iluka***

On 1 August 2016, Iluka announced it had made an offer to acquire Sierra Rutile in an all cash bid valuing the company's equity at A\$375 million. Lanti, Sierra Rutile's operating project in Sierra Leone, consists of a dredge and dry mining operation which jointly feed a mineral separation plant. The project primarily produces rutile. Iluka was granted extensive due diligence which allowed it to identify a number of operational improvements and options for production expansion. The offer represented a 32.3% premium to the one-month VWAP.

#### ***Consolidated Rutile/Unimin (Sibelco)***

<sup>1</sup> Implied equity value if 100% of the company or business had been acquired.

<sup>2</sup> Represents gross consideration divided by EBITDA. EBITDA is earnings before net interest, tax, depreciation, amortisation, investment income and significant and non-recurring items.

<sup>3</sup> This transaction has been announced but has not completed

<sup>4</sup> Grant Samuel analysis based on data obtained from IRESS, S&P Global Market Intelligence, company announcements, transaction documentation and, in the absence of company published financial forecasts, brokers' reports. Where company financial forecasts are not available, the median of the financial forecasts prepared by a range of brokers has generally been used to derive relevant forecast value parameters. The source, date and number of broker reports utilised for each transaction depends on analyst coverage, availability and corporate activity.

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On 17 April 2009, Unimin made an off-market takeover offer for all the shares in Consolidated Rutile it did not own. On 18 May 2009, Unimin revised its bid for Consolidated Rutile. Consolidated Rutile had two mines at the time of acquisition, both located on North Stradbroke Island in Queensland. Both the Enterprise and Yarraman mines utilised dry and dredge mining techniques. However, the Yarraman mine was on care and maintenance at the time of acquisition due to the low prices then prevailing. Both mines produced rutile, ilmenite and zircon. Iluka owned approximately 50% of Consolidated Rutile prior to the offer. Unimin is a wholly owned subsidiary of Sibelco, a large Belgian-headquartered raw materials producer. Unimin's offer represented a 52.1% premium to the three-month VWAP.

### ***BeMax Resources/Cristal***

On 26 May 2008, Cristal Australia Pty Ltd ("Cristal") a subsidiary of The National Titanium Dioxide Co. Ltd ("NTDC"), announced it had made an off-market takeover offer for all the shares in BeMax Resources Limited ("BeMax") that it did not already own. NTDC had a 34.5% interest in BeMax prior to completion of the transaction. BeMax was a mineral sands producer with two operating projects, the Ginkgo and Gwindinup mines located in Australia, both of which produced titanium dioxide feedstock minerals and zircon. BeMax also had a well progressed development project, Snapper, which had received many of the approvals required to commence construction. BeMax's production of titanium dioxide feedstocks was largely contracted under long term offtake agreements subject to inflation adjustments. Cristal was an offtaker of BeMax's product. The offer price was at a 45.5% premium to the closing price of BeMax's share the day before the transaction was announced, and a 36.8% premium over the one month VWAP.





## APPENDIX 2

## MARKET EVIDENCE – COMPARABLE LISTED COMPANIES

The sharemarket ratings of selected listed mineral sands companies are set out below.

SHAREMARKET RATINGS OF SELECTED LISTED COMPANIES – MINERAL SANDS COMPANIES<sup>1</sup>

COMPANY	MARKET CAPITALISATION <sup>2</sup> (MILLIONS)	EBITDA MULTIPLE <sup>3</sup> (TIMES)		
		HISTORICAL	FORECAST YEAR 1	FORECAST YEAR 2
Iluka Resources <sup>4</sup>	A\$4,946	8.7	8.0	7.7
Base Resources	A\$293	3.4	2.6	2.3
Kenmare Resources	£275	7.6	4.3	3.7
Tronox	US\$2,097	8.1	6.4	6.2

Source: Grant Samuel analysis<sup>5</sup>

The multiples shown above are based on sharemarket prices as at 14 May 2018 and do not reflect a premium for control.

All of the companies have a December year end with the exception of Base Resources, which has a June year end.

A brief description of each company is set out below:

**Iluka Resources**

Iluka Resources (“Iluka”) is a major international mineral sands company listed on ASX (ASX: ILU). Iluka is involved in the exploration, development, production and marketing of mineral sands products. Iluka also holds a royalty over certain mining tenements where BHP Billiton operates (Mining Area C). Iluka produces approximately one-third of the global supply of zircon and is a significant producer of titanium dioxide feedstock (ilmenite, rutile and synthetic rutile). Iluka’s core operation is the Jacinth-Ambrosia project in South Australia, the Cataby and Tutunup South projects in Western Australia, and the Sierra Rutile project in Sierra Leone. Iluka generates approximately half of its revenue from the sale of zircon. However, this is expected to decline in favour of titanium dioxide feedstock product revenue.

**Base Resources**

Base Resources (“Base”) is an ASX listed (ASX:BSE) mineral sands producer. The company’s core project is the Kwale Mineral Sands Operations in Kenya. Base commenced production at Kwale in late 2013 and has a remaining mine life of approximately five and a half years. Kwale primarily produces titanium dioxide feedstocks (rutile and ilmenite), as well as zircon. Base additionally owns 85% of the Toliara Sands development project in Madagascar, which it acquired in December 2017. Base has undergone a period of significant deleveraging over

<sup>1</sup> The companies selected have a variety of year ends and therefore the data presented for each company is the most recent annual historical result plus the subsequent two forecast years.

<sup>2</sup> Market capitalisation based on sharemarket prices as at 14 May 2018.

<sup>3</sup> Represents gross capitalisation (that is, the sum of the market capitalisation adjusted for minorities, plus borrowings less cash as at the latest balance date) divided by EBITDA. EBITDA is earnings before net interest, tax, depreciation, amortisation, investment income and significant and non-recurring items.

<sup>4</sup> Iluka Resources’ enterprise value has been adjusted for the value of the Mining Area C royalty and the royalty’s contribution to EBITDA.

<sup>5</sup> Grant Samuel analysis based on data obtained from IRESS, S&P Global Market Intelligence, company announcements and, in the absence of company published financial forecasts, brokers’ reports. Where company financial forecasts are not available, the median of the financial forecasts prepared by a range of brokers has generally been used to derive relevant forecast value parameters. The source, date and number of broker reports utilised for each company depends on analyst coverage, availability and recent corporate activity.



the past two years, reducing total debt from \$280 million as at 30 June 2015 to \$148 million as at 31 December 2017.

#### ***Kenmare Resources***

Kenmare Resources (Kenmare) is a mineral sands producer listed on the London Stock Exchange (LSE: KMR). Kenmare's core project is the Moma Titanium Minerals Mine in Mozambique. The Moma Mine has been in commercial production since 2009 and primarily produces ilmenite, with ilmenite sales representing approximately 75% of 2017 revenue and zircon sales the balance. The mine is expected to be in operation for more than 100 years. In July 2016, Kenmare underwent a restructuring in terms of which it paid down the majority of its debt with the proceeds from a substantial equity raising.

#### ***Tronox***

Tronox is a vertically integrated business with operations in mineral sands mining, titanium dioxide feedstock processing and pigment manufacturing. Tronox is listed on the New York Stock Exchange (NYSE: TROX). Tronox has operations in South Africa, Australia, the Netherlands and the United States. Aside from zircon, the majority of the mineral sands mined by Tronox is used by the company to produce pigments for sale into the paint, plastics and paper markets. In February 2017, Tronox announced it had reached an agreement to acquire the titanium dioxide business of Cristal, a privately held chemical and mining company, for US\$1.7 billion of cash and shares representing 24% of the pro forma entity. In March 2018, Tronox announced an extension to the acquisition agreement with Cristal pending regulatory approvals.

## APPENDIX 3 – SELECTION OF DISCOUNT RATE

### 1 Overview

A discount rate in the range of 9.0 – 11.0% has been selected as appropriate to apply to the forecast nominal ungeared after tax cash flows of MDL's assets. While MDL's assets consist of discrete operations (viz. GCO and TTI), the reality is that these operations are substantially integrated and exposed to similar market (or systematic) risks. Grant Samuel considers it appropriate to value MDL's assets using a single discount rate.

The valuation of an asset or business involves estimating the discount rates that may be utilised by potential acquirers of that asset in assessing the net present value of expected future cash flows. There is a body of theory from which models that generate a cost capital have been developed but the selection of a discount rate is still fundamentally a matter of judgement. Despite the widespread acceptance and application of various theoretical models, it is Grant Samuel's experience that many companies rely on less sophisticated approaches. Many businesses and investors use relatively arbitrary "hurdle rates" which do not vary significantly from investment to investment or change significantly over time despite movements in interest rates. Valuation is an estimate of what real world buyers and sellers of assets would pay and must therefore reflect parameters that will be applied in practice even if they are not theoretically correct. In other words, the objective is to estimate a discount rate that generates a value for the asset that is, as far as practically possible, consistent with market prices, whether that rate fits a particular theory or not. Grant Samuel considers the rates selected to be discount rates that acquirers would use in practice.

The discount rate selected represents an estimate of the weighted average cost of capital ("WACC") appropriate for MDL's assets, based on a weighted average of the cost of the two primary funding sources, equity and debt, that would apply for notional acquirers of MDL or its assets. This is the relevant rate to apply to ungeared cash flows. There are three main elements to the determination of an appropriate WACC:

- cost of equity;
- cost of debt; and
- debt/equity mix.

The cost of equity has initially been derived from application of the capital asset pricing model ("CAPM") methodology. The CAPM is probably the most widely accepted and used methodology for determining the cost of equity capital. There are more sophisticated multivariate models which utilise additional risk factors but these models have not achieved any significant degree of usage or acceptance in practice. However, the cost of equity is not an observable number that can ever be "discovered" or "proved" (no matter how many studies are conducted). Estimates are derived from models or theories but these do no more than infer a rate from other data using one particular theory about the way in which security prices behave. The usefulness of any estimate therefore depends on the efficacy of the theory and the robustness of the data. While the theory underlying the CAPM is rigorous the practical application is subject to shortcomings and limitations and the results of applying the CAPM model should only be regarded as providing a general guide. There is a tendency to regard the rates calculated using CAPM as inviolate. To do so is to misunderstand the limitations of the model. The CAPM involves:

- a model that has questionable empirical validity;
- simplifying assumptions and approximations;
- the use of historical data as a proxy for estimates of forward looking parameters;



- data of dubious statistical reliability; and
- unresolved issues (such as the impact of dividend imputation).

The cost of debt represents an estimate of the expected future returns required by debt providers to the relevant acquirer over the period of the cash flows to fund an acquisition of MDL or its assets. However, even for something as relatively straightforward as interest rates, there are measurement issues and judgements to be made.

The debt/equity mix represents an appropriate level of gearing, stated in market value terms, for the business over the forecast period. However, it should be recognised that selection of the ratio involves a significant degree of simplification and a substantial level of judgement.

In summary, it is important not to over-engineer the process or to credit the output of models with an unwarranted precision. The accumulation of data and the apparent sophistication of the theory and its application may lead practitioners to place excessive reliance on theoretical estimates of cost of capital. A mechanistic application of formulae derived from theory can obscure the reality that any output from cost of capital models should be treated as a broad guide rather than an absolute truth.

The following sections set out the basis for Grant Samuel's determination of the discount rates for MDL together with a discussion of the factors that limit the accuracy and reliability of the estimates. Grant Samuel's approach involves:

- derivation of a "calculated WACC" by applying the CAPM/WACC methodology using existing market data points;
- consideration of other methodologies, data and factors (e.g. the Gordon Growth Model); and
- forming a judgement as to a commercially sensible discount rate.

## 2 Definition and Limitations of the CAPM and WACC

The CAPM provides a theoretical basis for determining a discount rate that reflects the returns required by diversified investors in the equity of a company (which is one component of the total capital funding structure). In the context of the market for corporate control, the relevant rate is the rate that reflects the returns required by equity investors in notional/potential acquirers of the target or its assets, having regard to the systematic riskiness of the target and its assets. CAPM is based on the assumption that investors require a premium for investing in equities rather than in risk free investments (such as Australian government bonds). The premium is commonly known as the market risk premium and notionally represents the premium required to compensate for investment in the equity market in general.

The risks relating to a company or business may be divided into specific risks and systematic risks. Specific risks are risks that are specific to a particular company or business and are unrelated to movements in equity markets generally. While specific risks will result in actual returns varying from expected returns, it is assumed that diversified investors require no additional returns to compensate for specific risk, because the net effect of specific risks across a diversified portfolio will, on average, be zero. Portfolio investors can diversify away all specific risk.

However, investors cannot diversify away the systematic risk of a particular investment or business operation. Systematic risk is the risk that the return from an investment or business operation will vary with the market return in general. If the return on an investment was expected to be completely correlated with the return from the market, then the return required on the investment would be equal to the return required from the market (i.e. the risk free rate plus the market risk premium).



Systematic risk is affected by the following factors:

- financial leverage: additional debt will increase the impact of changes in returns on underlying assets and therefore increase systematic risk;
- cyclicity of revenue: projects and companies with cyclical revenues will generally be subject to greater systematic risk than those with non-cyclical revenues; and
- operating leverage: projects and companies with greater proportions of fixed costs in their cost structure will generally be subject to more systematic risk than those with lesser proportions of fixed costs.

CAPM postulates that the return required on an investment or asset can be estimated by applying to the market risk premium a measure of systematic risk described as the beta factor. The beta for an investment reflects the covariance of the return from that investment with the return from the market as a whole. Covariance is a measure of relative volatility and correlation. The beta of an investment represents its systematic risk only. It is not a measure of the total risk of a particular investment. An investment with a beta of more than one is riskier than the market as a whole and an investment with a beta of less than one is less risky. The discount rate appropriate for an investment which involves zero systematic risk would be equal to the risk free rate.

The formula for deriving the cost of equity using CAPM is as follows:

$$Re = Rf + Beta (Rm - Rf)$$

Where:

- Re = the cost of equity capital;
- Rf = the risk free rate;
- Beta = the beta factor;
- Rm = the expected market return; and
- Rm - Rf = the market risk premium.

The beta for a company or business operation is normally estimated by observing the historical relationship between returns from the company or comparable companies and returns from the market in general. The market risk premium is estimated by reference to the actual long run premium earned on equity investments by comparison with the return on risk free investments.

The formula conventionally used to calculate a WACC under a “classical tax system”<sup>1</sup> is as follows:

$$WACC = (Re \times E/V) + (Rd \times (1-t) \times D/V)$$

Where:

- E/V = the proportion of equity to total value (where V = D + E);
- D/V = the proportion of debt to total value;
- Re = the cost of equity capital;
- Rd = the cost of debt capital; and
- t = the corporate tax rate

The models, while simple, are based on a sophisticated and rigorous theoretical analysis. Nevertheless, application of the theory is not straightforward and the discount rate calculated should be treated as no more than a general guide. The reliability of any estimate derived from the model is limited. Some of the issues are discussed below.

<sup>1</sup> A tax system not featuring dividend imputation or other variants such as advance corporation tax (i.e. dividends are paid out of after tax income and are subject to full tax in the hands of investors).



### ***Overall Validity of the Model***

The CAPM has been subject to intense criticism over many years with numerous empirical studies demonstrating that it does not accurately portray movements in individual share prices and has limited explanatory power. There are also competing formulations (such as the Sharpe-Lintner, Black, Brennan-Lally, Officer or Monkhouse models) which can give different results.

In addition:

- the CAPM is a single period model rather than one developed specifically for valuing long term cash flows. It has been adapted to a multi-period model (usually annually) to calculate the value of long term cash flows. Theoretically, the analysis should use a forecast of the parameters for each period in question (annual is no more correct than any other period) but, typically, a long term average rate is assumed for the sake of practicality;
- the CAPM assumes investors are diversified and therefore are not (and should not be) concerned with the specific risk of a particular investment. Behavioural economics suggests while this may be theoretically sensible, it doesn't actually reflect how investors behave or how they price risk; and
- it ignores all investor taxes, which may or may not have an impact in the real world. Even where models do attempt to reflect taxation effects, adjustments are usually based on assumed averages which may not be accurate or appropriate given the diversity of individual tax positions.

### ***Risk Free Rate***

Theoretically, the risk free rate used should be an estimate of the risk free rate in each future period (i.e. the one year spot rate in that year if annual cash flows are used). There is no official "risk free" rate but, in developed economies such as Australia, rates on government securities are typically used as an acceptable substitute. In practice, the long term government bond rate is used as the most practical estimate (even though rates for individual years could be interpolated). However, it should be recognised that the yield to maturity of a long term bond is only an average rate and where the yield curve is strongly positive (i.e. longer term rates are significantly above short term rates) the adoption of a single long term bond rate has the effect of reducing the net present value where the major positive cash flows are in the initial years. The long term bond rate is therefore only an approximation.

The ten year bond rate is a widely used and accepted benchmark for the risk free rate. Where the forecast period exceeds ten years, an issue arises as to the appropriate bond to use. While longer term bond rates are available, the ten year bond market is the deepest long term bond market in Australia and is a widely used and recognised benchmark. There is a limited market for bonds of more than ten years although the Australian government has recently issued 30 year bonds in volume. In the United States, there are deeper markets for longer term bonds. However, long term rates accentuate the distortions of the yield curve on cash flows in early years. In any event, a single long term bond rate matching the term of the cash flows is no more theoretically correct than using a ten year rate. More importantly, the ten year rate is the standard benchmark used in practice.

### ***Market Risk Premium***

The market risk premium ( $R_m - R_f$ ) represents the "extra" return that investors require to invest in equity securities as a whole over risk free investments. This is an "ex-ante" concept. It is the expected premium and, as such, it is not an observable phenomenon. There is no generally accepted approach to estimating a forward looking market risk premium and attempts to develop one (e.g. through surveys) have yielded unreliable and highly variable results. Accordingly, the historical premium is used as the best available proxy measure. The premium earned historically by equity investments is usually calculated over a time period of many years, typically at least 30 years. This long time frame is used on the basis that short term



rates of return are highly volatile and that a long term average return would be a fair indication of what most rational investors would expect to earn in the future from an investment in equities with a five to ten year time frame.

In the absence of controls over capital flows, differences in taxation and other regulatory and institutional differences, it is reasonable to assume that the market risk premium should be approximately equal across markets which exhibit similar risk characteristics after adjusting for the effects of expected inflation differentials. Accordingly, it is reasonable to assume similar market risk premiums for first world countries enjoying political economic stability, such as Australia, New Zealand, the United States, Japan, the United Kingdom and various western European countries.

In the United States, it is generally postulated that the historical premium is in the range of 4-6% but there are widely varying assessments (from 3% to 9%). Australian studies have been more limited and mainly derive from the Officer Study<sup>2</sup> which was based on data for the period 1883 to 1987 (prior to the introduction of dividend imputation in Australia) and indicated that the long run average premium was in the order of 8% using an arithmetic average but subject to significant statistical error. More recently, the Officer Study data has been updated to 2011<sup>3</sup> with the long term average declining to around 6%. Due to concerns about the earlier market data, emphasis is now placed on the average risk premium since 1958, which is estimated to be 5.8% ignoring the impact of imputation (where imputation credits are valued at 100% the market risk premium over the same period is 6.6%).

However, even the measurement or use of long term historical returns is subject to considerable debate:

- there are multiple different outcomes for the historical market risk premium depending on time period, basis (over long term bonds or shorter term bills), method (arithmetic or geometric averages) and estimation approach;
- the measures of historical returns typically have extremely high statistical error measures. For a, say, 6% average measured premium the “true” figure will typically lie in a range of 2-10% at a 95% confidence level;
- the methodology is inflexible and tends to fail when market conditions change materially. Market volatility is the reality of financial markets. Clearly, in the immediate aftermath of the global financial crisis (which commenced in late 2007), investors’ perceptions of risk and the pricing of that risk rose significantly and rapidly. This can be demonstrated by the observable data from the pricing of lowly rated corporate bonds (which sit on the risk spectrum between risk free assets and equities) over this period. Yields to maturity rose dramatically in 2008 and 2009. However, long term average historical data will not flex to reflect these changes – an average of, say, 50 years of data will not move much even with 2-3 years of “new” data;
- the longer the period of measurement (and therefore the greater the “robustness” of the average) the more likely it is to reflect economic and market circumstances that have little resemblance to the present (is it really likely that investor returns prior to World War II are relevant to the kinds of returns investors expect today?); and
- the historical data also contains a logical contradiction – when the equity return required by investors is lower than the returns implied by market prices, investors respond by bidding the price of equities higher. A rising market translates to a higher measured historical risk premium, contrary to the lower return expectations driving the upwards movement in prices.

<sup>2</sup> R.R. Officer in Ball, R., Brown, P., Finn, F. J. & Officer, R. R., “Share Market and Portfolio Theory: Readings and Australian Evidence” (second edition), University of Queensland Press, 1989 (“Officer Study”).

<sup>3</sup> J.C. Handley, “An Estimate of the Historical Risk Premium for the period 1883 to 2011”, April 2012 (prepared for the Australian Energy Regulator). This paper is based on earlier work by T. Brailsford, J.C. Handley and K. Maheswaran in 2008 and 2012.



**Beta Factor**

The beta factor is a measure of the expected covariance (i.e. volatility and correlation of returns) between the return on an investment and the return from the market as a whole. The expected beta factor cannot be observed. The conventional practice is to calculate an historical beta from past share price data and use it as a proxy for the future but it must be recognised that:

- the expected beta is not necessarily the same as the historical beta. A company's relative risk does change over time and measured historical betas can often reflect structural changes in an industry over the time period rather than its inherent correlation to the market;
- the starting point is normally to measure the historical correlation of a company's share price against its local market index. However:
- the composition of indices varies substantially between markets. For example, the Australian index is dominated by resources and banks; and
- where a company is extensively traded by global investors it can be argued that regression against an index such as the Morgan Stanley Capital International Developed World Index ("MSCI"), an international equities market index that is widely used as a proxy for the global stockmarket as a whole, is more relevant but it:
  - depends on who the "price setting" investors are;
  - can give materially different results to measures based on the local index; and
  - raises a related issue as to whether a global risk premium is also appropriate and, if so, what that global premium is;
- the appropriate beta is the beta for the business or assets of the company being valued rather than the beta of a particular acquirer (which may be in a different business with different risks). To be precise, the relevant beta is the beta that would apply for diversified investors in the universe of acquirer companies having regard to the systematic riskiness of the businesses or assets of the target company. Betas for the particular subject company may be utilised but these are seldom regarded as sufficiently reliable. They may be inappropriate if the target has an anomalous or sub-optimal capital structure or if specific performance issues have generated spurious associations/relationships with overall market movements (and may not be available if the company is not listed). Accordingly, it is common practice to utilise betas for comparable companies and sector averages (particularly as those may be more reliable). However, none of these other companies is likely to be exactly comparable to the subject entity (e.g. it may operate in other jurisdictions with different economic drivers, regulatory regimes and benchmark index composition). In any event, the comparable company data seldom yields a tight and consistent range from which a precise estimate can be derived;
- there are very significant measurement issues with betas which mean that only limited reliance should be placed on such statistics. There is no "correct" beta. For example,
  - over the last three years MDL's beta as measured by the Securities Industry Research Centre of Asia-Pacific (SIRCA Limited ("SIRCA")) has varied between 1.88 as at 31 December 2015, 2.37 as at 31 December 2016 and 1.97 as at 31 December 2017;
  - the standard error of the SIRCA's estimate of MDL's beta has generally been in the order of 0.18 to 0.23 meaning that for a beta of, say, 1.90 even at a 68% confidence level, the range is 1.70 to 2.10; and
  - SIRCA's latest estimate of 1.97 compares to 0.52 measured by MSCI Barra Inc. ("Barra") and around 1.67 measured by Bloomberg.



- estimates of “predicted” betas made by providers such as Barra can be significantly different to the historically calculated beta. In the case of MDL, its predicted beta is around 1.25 – 1.30 compared to its historical beta (as measured by Barra) of 0.52.

### ***Debt/Equity Mix***

The relevant measure of the debt/equity mix is based on market values (not book values). As beta is normally considered in the context of comparable companies as well as the subject company, the debt/equity mix should involve similar analysis. Accordingly, the relevant proportions of debt and equity are usually determined having regard to the financial gearing of the subject company, comparable companies and the industry in general as well as assessments of the appropriate level of gearing taking into account the nature and quality of the cash flow stream. However:

- a simple debt/equity mix is usually used for practicality but it represents a simplification of what are usually much more complex financial structures (e.g. hybrids, convertibles);
- a constant degree of leverage is typically assumed but this is seldom the case;
- the debt/equity mix (measured over the same period as the historical beta is measured) can be volatile over time at an individual company level. Averages across time may give a more meaningful guide but in some circumstances, this may not be appropriate;
- there is often a wide diversity of debt/equity ratios across companies in an industry. Moreover, there is often inconsistency between gearing and beta ratios (e.g. those with higher gearing may exhibit lower betas than their peers); and
- the measured beta factors for listed companies are “equity” betas and reflect the financial leverage of the individual companies. It is possible to delever beta factors to derive asset betas and releverage betas to reflect a more appropriate or comparable financial structure. In Grant Samuel’s view, this technique is subject to considerable estimation error. Deleveraging and releveraging betas exacerbates the estimation errors in the original beta calculation and gives a misleading impression as to the precision of the methodology. Indeed, there are competing deleveraging formulae which give different results. Deleveraging and releveraging is also commonly calculated based on debt levels at a single point in time. This is incorrect as it is leverage over the same period in which the beta was measured that is relevant (although this can be difficult to estimate accurately given that data points may be at best quarterly).

### ***Corporate Tax***

The WACC calculation generally assumes a constant rate of corporate tax, typically the standard corporate rate. However, the tax position of many corporates, particularly multinationals, is usually much more complex and can change significantly over time.

### ***Specific Risk***

The WACC is designed to be applied to “expected cash flows” which are effectively a weighted average of the likely scenarios. To the extent that a business is perceived as being particularly risky, this specific risk should be dealt with by adjusting the cash flow scenarios. This avoids the need to make arbitrary adjustments to the discount rate which can dramatically affect estimated values, particularly when the cash flows are of extended duration or much of the business value reflects future growth in cash flows. In addition, risk adjusting the cash flows requires a more disciplined analysis of the risks that the valuer is trying to reflect in the valuation.



However, (although it is not Grant Samuel's preferred approach) it is also common in practice to allow for certain classes of specific risk (particularly sovereign and other country specific risks) in a different way by adjusting the discount rate applied to forecast cash flows.

### 3 Calculated WACC for MDL

#### 3.1 Cost of Equity Capital

##### *Risk Free Rate*

The modelling of project cash flows for GCO and TTI has been performed in U.S. dollars. Accordingly, Grant Samuel has estimated a cost of capital in U.S. dollars.

Grant Samuel has adopted a risk free rate of 2.9%. The risk free rate approximates the yield to maturity on ten year U.S. Government bonds.

##### *Market Risk Premium*

Grant Samuel has consistently adopted a market risk premium of 6% and believes that this continues to be a reasonable estimate. It:

- is not statistically significantly different to the premium suggested by long term historical data; and
- is similar to that used by a wide variety of analysts and practitioners as well as regulators (typically in the range 5-7%).

##### *Beta Factor*

Grant Samuel has adopted a beta factor in the range 1.0 – 1.4 for the purposes of valuing MDL's assets.

The beta factors for a range of mineral sand and diversified mining companies have been considered in determining an appropriate beta for MDL's assets. They have been calculated on two bases – relative to each company's home exchange index and relative to the MSCI. A summary of betas for selected comparable listed companies is set out in the table below:

# GRANT SAMUEL



## EQUITY BETA FACTORS FOR SELECTED LISTED DIVERSIFIED MINING COMPANIES

COMPANY	MARKET CAPITALISATION <sup>4</sup> (MILLIONS)	MONTHLY OBSERVATIONS OVER 5 YEARS BARRA <sup>5</sup>	MONTHLY OBSERVATIONS OVER 4 YEARS			WEEKLY OBSERVATIONS OVER 2 YEARS	
			SIRCA <sup>6</sup>	BLOOMBERG <sup>7</sup>		BLOOMBERG	
				LOCAL INDEX	MSCI <sup>8</sup>	LOCAL INDEX	MSCI
<b>MDL</b>	<b>A\$228</b>	<b>0.52</b>	<b>1.97</b>	<b>1.83</b>	<b>2.33</b>	<b>1.51</b>	<b>1.28</b>
<b>AUSTRALIA MINERAL SANDS</b>							
Iluka	A\$4,852	0.72	1.44	1.14	0.86	1.47	0.96
Base	A\$287	0.87	1.45	0.57	0.88	0.82	0.89
Sheffield	A\$165	0.54	1.64	1.38	1.28	0.67	0.53
<b>INTERNATIONAL MINERAL SANDS</b>							
Kenmare	£243	0.49	-	nm	nm	nm	nm
Tronox	US\$2,459	1.71	-	2.76	2.78	1.48	1.70
Chemours	US\$9,549	1.95	-	2.17	2.19	1.19	1.25
<b>DIVERSIFIED MINERS</b>							
Rio Tinto	A\$137,277	0.55	0.91	1.02	0.99	1.16	1.10
BHP	A\$160,081	0.72	1.24	1.15	1.16	1.35	1.13
South32	A\$19,080	0.65	1.72	1.35	1.61	1.08	0.68
Anglo American	£25,236	1.31	-	1.52	1.24	1.45	1.44
Eramet	€4,203	1.55	-	1.06	2.13	1.42	2.06
<i>Minimum</i>			<i>0.91</i>	<i>0.57</i>	<i>0.86</i>	<i>0.67</i>	<i>0.53</i>
<i>Maximum</i>			<i>1.97</i>	<i>2.76</i>	<i>2.78</i>	<i>1.51</i>	<i>2.06</i>
<b>Median</b>			<b>1.45</b>	<b>1.35</b>	<b>1.28</b>	<b>1.35</b>	<b>1.13</b>
<i>Weighted average<sup>9</sup></i>			<i>1.08</i>	<i>1.20</i>	<i>1.19</i>	<i>1.27</i>	<i>1.16</i>

Source: SIRCA, Barra, Bloomberg

The table shows outcomes that suggest it is extremely difficult to determine a reliable beta for MDL and its assets:

- MDL's betas vary significantly depending on the measurement source (SIRCA, Bloomberg etc.) and, as discussed earlier, have varied significantly over time;
- individual company betas (for the same source/period) fall in a very wide range. For example, Bloomberg Four Year MSCI betas range from 0.86 (Iluka) to 1.61 (South32) and up to 2.78 (Tronox) although this should be treated as an outlier;

<sup>4</sup> Based on share prices as at 18 April 2018, except MDL which is based on its share price as at 26 April 2018 (being the day prior to the Offer).

<sup>5</sup> Beta factors calculated by MSCI Barra, Inc. ("Barra") as at March 2018 over a period of 60 months using ordinary least squares regression or the Scholes-Williams technique (including lag) where the stock is thinly traded.

<sup>6</sup> The Australian beta factors calculated by SIRCA as at December 2017 over a period of 48 months using ordinary least squares regression or the Scholes-Williams technique where the stock is thinly traded.

<sup>7</sup> Bloomberg betas have been calculated up to 18 April 2018. Grant Samuel understands that betas estimated by Bloomberg are not calculated strictly in conformity with accepted theoretical approaches to the estimation of betas (i.e. they are based on regressing total returns rather than the excess return over the risk free rate). However, in Grant Samuel's view the Bloomberg beta estimates can still provide a useful insight into the systematic risks associated with companies and industries. The figures used are the Bloomberg "adjusted" betas.

<sup>8</sup> MSCI is calculated using local currency so that there is no impact of currency changes in the performance of the index.

<sup>9</sup> Weighted by market capitalisation converted to Australian dollars using the following exchange rates: AUD1.6:EUR, AUD1.9:GBP and AUD1.3:USD.



- some individual company betas vary significantly depending on which market index is utilised (Local or MSCI);
- none of the other companies is directly comparable to MDL, which has some level of vertical integration. The comparable companies are generally completely unintegrated (i.e. single asset companies) or are fully vertically integrated, giving them a different risk profile; and
- gearing levels vary significantly but are not always consistent with beta factors.

MDL's beta factor is 1.97 as measured against the Australian sharemarket by the SIRCA, 1.83 as measured against the Australian sharemarket by Bloomberg and 2.33 as measured against the MSCI by Bloomberg. All of these betas have been calculated using monthly observations over a four year period. The relevance of these betas may be limited due to a number of factors affecting MDL's share price over the measurement period. These included GCO's transitioning from development to production in 2014 and its subsequent ramp-up, TTI's major plant upgrade in 2015 and its subsequent production interruptions and uncertainties surrounding TiZir's refinancing and MDL's funding requirements during 2017.

Moreover and more importantly, (as reflected in the choice of US\$ denominated cash flows for the purpose of the DCF analysis), the natural acquirers of MDL or its assets are generally multinational resources companies, the costs of capital for which would be established in international capital markets. Many of the betas for the relevant companies as calculated by Barra or Bloomberg (against the MSCI) are below 1.

MDL's assets are most comparable to those companies exposed to the titanium dioxide feedstock and/or zircon markets. The historical beta of each comparable company is also inextricably linked to the gearing level of that company. The companies that own assets most comparable to MDL's assets have highly variable gearing levels. However, Grant Samuel believes that a gearing range of 20% - 30% is appropriate for the purposes of this analysis.

Taking these factors into account as well as the nature of the business and its exposure to macroeconomic factors, Grant Samuel believes that a beta in the range 1.0 – 1.4 is a reasonable estimate of the appropriate beta for MDL's assets.

### Calculation

Using the estimates set out above, the cost of equity capital for MDL's assets can be calculated as follows:

#### LOW

$$\begin{aligned} Re &= R_f + \text{Beta} (R_m - R_f) \\ &= 2.9\% + (1.0 \times 6.0\%) \\ &= \mathbf{8.9\%} \end{aligned}$$

#### HIGH

$$\begin{aligned} Re &= R_f + \text{Beta} (R_m - R_f) \\ &= 2.9\% + (1.4 \times 6.0\%) \\ &= \mathbf{11.3\%} \end{aligned}$$

## 3.2 Cost of Debt

A cost of debt of 5.4% has been adopted based on a margin of 2.5% over the risk free rate. This figure represents the expected future cost of borrowing over the duration of the cash flow model. Grant Samuel believes that this would be a reasonable estimate of an average interest rate, including a margin that would match the duration of the cash flows assuming that the operations were funded with a mixture of short term and long term debt. This margin:

- reflects Grant Samuel's understanding of current market margins for companies with the chosen optimal gearing levels; and



- allows for the margin between government bonds (i.e. the risk free rate) and lending benchmarks (i.e. interbank lending/swap rates).

### 3.3 Debt/Equity Mix

In determining an appropriate debt/equity mix, regard was had to gearing levels for the peer group companies used in the beta analysis. While MDL has had much higher gearing levels than most of the comparable companies, this has reflected the start up nature of its operations in earlier years, the funding of that start up and depressed share prices reflecting both commodity price levels and the various operational issues experienced by TiZir's assets as they have moved towards nameplate capacity. Accordingly, in Grant Samuel's view, MDL's own capital structure is of limited relevance for the purpose of determining an appropriate debt/equity mix. Gearing levels for MDL and the comparable companies for the past five years are set out below:

**GEARING LEVELS FOR SELECTED LISTED DIVERSIFIED MINING COMPANIES**

	NET DEBT/(NET DEBT + MARKET CAPITALISATION)							
	YEAR ENDED 31 DECEMBER					CURRENT <sup>10</sup>	4 YEAR AVERAGE	5 YEAR AVERAGE
	HISTORICAL 5	HISTORICAL 4	HISTORICAL 3	HISTORICAL 2	HISTORICAL 1			
MDL	23.3%	64.5%	89.7%	78.5%	50.2%	47.4%	70.7%	61.2%
AUSTRALIA MINERAL SANDS								
Iluka	5.4%	2.3%	(0.2)%	14.3%	4.1%	3.6%	5.1%	5.2%
Base	42.3%	69.4%	91.0%	56.8%	36.8%	29.0%	63.5%	59.2%
Sheffield	(5.4)%	(4.9)%	(15.3)%	(8.4)%	(27.1)%	50.4%	(13.9)%	(12.2)%
INTERNATIONAL MINERAL SANDS								
Kenmare	33.3%	77.9%	96.2%	14.1%	10.1%	12.3%	49.6%	46.3%
Tronox	26.3%	29.0%	86.3%	70.0%	45.3%	45.2%	57.6%	51.4%
Chemours	na	na	78.7%	39.7%	21.6%	21.1%	46.7%	46.7%
DIVERSIFIED MINERS								
Rio Tinto	12.7%	10.6%	14.8%	8.4%	3.6%	3.4%	9.3%	10.0%
BHP	11.8%	13.8%	21.4%	14.2%	9.3%	9.2%	14.7%	14.1%
South32	na	na	2.0%	(6.2)%	(8.6)%	(8.1)%	(4.3)%	(4.3)%
Anglo American	37.9%	43.5%	74.3%	32.4%	16.3%	14.4%	41.6%	40.9%
Eramet	14.4%	29.4%	54.0%	40.3%	19.5%	13.1%	35.8%	31.5%
Minimum	(5.4)%	(4.9)%	(15.3)%	(8.4)%	(27.1)%	(8.1)%	(13.9)%	(12.2)%
Maximum	42.3%	77.9%	96.2%	78.5%	50.2%	50.4%	70.7%	61.2%
Median	18.8%	29.2%	64.1%	23.3%	13.2%	13.7%	38.7%	36.2%

Source: Company Reports, IRESS, S&P Global Market Intelligence, Bloomberg, Grant Samuel analysis

The table shows a very wide range of gearing levels. The debt levels should actually be the weighted average measured over the same period as the beta factor rather than just at the current point in time. Moreover, these do not always bear any relationship to the betas of the individual companies. In some cases lowly geared companies have equity betas towards the higher end of the range (e.g. South32).

Having regard to the above, the debt/equity mix has been estimated as 70-80% equity and 20-30% debt. This is regarded as being broadly consistent with a beta factor of 1.0 – 1.4.

<sup>10</sup> Current gearing levels are based on the most recent balance sheet information and on sharemarket prices as at 18 April 2018, except for MDL, for which the current gearing level is based on its share price as at 26 April 2018 (being the day prior to the Offer).



### 3.4 Tax

Grant Samuel has adopted a tax rate of 24%, being the average of corporate tax rates in Norway of 23% and corporate tax rates in Senegal of 25%.

### 3.5 WACC

On the basis of the parameters outlined and assuming a corporate tax rate of 24.0% (for the purposes of calculating the WACC), the nominal WACC is calculated to be in the range 7.5% - 9.9%:

#### LOW

$$\begin{aligned} WACC &= (Re \times E/V) + (Rd \times (1-t) \times D/V) \\ &= (8.9\% \times 70\%) + (5.4\% \times 0.76 \times 30\%) \\ &= 7.5\% \end{aligned}$$

#### HIGH

$$\begin{aligned} WACC &= (Re \times E/V) + (Rd \times (1-t) \times D/V) \\ &= (11.3\% \times 80\%) + (5.4\% \times 0.76 \times 20\%) \\ &= 9.9\% \end{aligned}$$

On the basis of the parameters outlined and assuming a corporate tax rate of 24%, the nominal WACC is calculated to be in the range 7.5% - 9.9%.

## 4 Selection of Discount Rate

Grant Samuel's view is that the selected weighted average cost of capital should incorporate a margin over the calculated WACC range to reflect a broader range of evidence:

- global interest rates, including long term bond rates, are at low levels by comparison with historical norms reflecting the very substantial amounts of liquidity being pumped into many advanced economies (particularly Western Europe and the United States) to stimulate economic activity. Effective real interest rates are now low and, in some cases are negative. There is an argument that these conditions have now been present for some years and are therefore the "new normal". While there is some merit in this argument, we do not believe the current position is sustainable over the long term and, in our view, the risk is clearly towards a rise in bond yields. Indeed, the Federal Reserve in the United States has signalled that official interest rates are likely to rise in the near future.

Conceptually, the interest rates used to calculate the discount rate should recognise this expectation (i.e. they should be forecast for each future period) but for practical ease market practice is that a single average rate based on the current long term bond rate is generally adopted for valuation purposes. Some academics/valuation practitioners consider it to be inappropriate to add a "normal" market risk premium (e.g. 6%) to a temporarily depressed bond yield and argue that a "normalised" risk free rate should be used. This practice has become increasingly common among broker analysts. On this basis, an increase in the risk free rate to, say, 4% (still relatively low by historical standards) would, for example, increase MDL's calculated WACC range to 8.5% -10.9%; and

- analysis of research reports on MDL indicates that brokers are currently adopting a WACC in the range of 10.6% - 13.0% with a median of 11.8%.

Having regard to these matters and the calculations set out above, a discount rate (WACC) range of 9.0% - 11.0% has been selected for application in the discounted cash flow analysis for both businesses. There is nothing in the analysis that suggests there is a strong case for adopting different rates for GCO and TTI.



G R A N T   S A M U E L



**APPENDIX 4**

**REPORT BY AMC CONSULTANTS PTY LTD**

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# Report

## Independent Technical Specialist's Report Mineral Deposits Limited

AMC Project 217067\_4  
21 May 2018

## Executive summary

Mineral Deposits Limited (MDL) received an off-market takeover offer (Offer) from Eramet SA (ERAMET) on 27 April 2018 that is subject to certain conditions including:

- All-cash takeover offer of A\$1.46 per MDL share.
- ERAMET has acquired a relevant interest in 13.3% of MDL, purchased from some of the largest MDL shareholders.
- Limited conditionality, no funding or due diligence conditions.
- MDL will engage an independent expert (Expert) to prepare an independent expert's report (IER) with a conclusion as to whether the Proposed Transaction is in the best interests of MDL shareholders.

MDL holds interests in the Grande Côte mineral sands operation (GCO) in Senegal, and an upgrading facility in Norway.

The Directors of MDL engaged Grant Samuel & Associates Pty Ltd (Grant Samuel) as the Expert to prepare the IER in relation to the Proposed Transaction.

MDL engaged AMC Consultants Pty Ltd (AMC) to provide Grant Samuel with an independent technical specialist's report (ITSR) on GCO, under instruction from Grant Samuel. The ITSR is to be attached in full as an appendix to the IER.

Key aspects of GCO are:

- MDL was selected by the Government of the Republic of Senegal (GRS) to further explore and develop the Grande Côte mineral sands project in September 2004.
- A Mining Concession for 25 years was granted to MDL via Presidential Decree in 2007.
- GCO is situated on a coastal, mobile dune system starting approximately 80 km north-east of Dakar, and extending northwards along the coast for more than 100 km. The mineralized dune system averages 4 km in width and comprises largely un-vegetated sand masses.
- Construction of GCO began in 2011 and was completed in March 2014.
- Dredging operations commenced in March 2014, and processing operations commenced in June. Since that time, GCO's rate of production has gradually increased.
- GCO is the largest single-dredge mineral sands operation in the world, with a dredge nameplate production rate of 7,000 tonnes per hour ore processing capacity.
- GCO produces high quality zircon, rutile, leucoxene and ilmenite, which is transported from Senegal to the upgrading facility in Norway, as well as exported to other international customers.

The purpose of AMC's engagement, as instructed by Grant Samuel, was to provide Grant Samuel with advice in relation to the technical judgements required as inputs to the IER. In particular, AMC was to:

- Review of information provided by MDL including GCO's JORC Code<sup>1</sup> compliant Mineral Resources and Ore Reserves, production schedule and capital and operating cost estimates, with advice to Grant Samuel as to the reasonableness of these for valuation purposes.
- Inspect GCO sites.
- Review of the latest iteration of the GCO life-of-mine financial model (LOM financial model) prepared by MDL. Based on that review, provide Grant Samuel with life-of-mine production cases that include capital and operating cost schedules as inputs to the IER.
- AMC's conclusions as to the technical assumptions regarding mining inventory, capital costs, production profiles, and operating costs for a production/development scenario, which AMC refers to in this report as its Production Case.
- Undertake its work in compliance with the requirements of the VALMIN Code<sup>2</sup>.
- Be, and remain, independent of MDL for the purposes of its work and subsequent preparation of the ITSR.

The scope of this ITSR as instructed by Grant Samuel to AMC comprises preparation of a report setting out the nature of AMC's engagement, the nature of the work performed, a technical description of GCO and the plans for its operations, and AMC's conclusions as to the technical assumptions regarding Mineral Resources and Ore Reserves, and the production profiles and capital and operating cost schedules for each production case.

<sup>1</sup> Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, The JORC Code 2012 Edition, Effective December 20, Prepared by the Joint Ore Reserves Committee of the Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Minerals Council of Australia (JORC).

<sup>2</sup> Australasian Code for Public Reporting of Technical Assessments and Valuations of Mineral Assets The VALMIN Code 2015 Edition, Prepared by the VALMIN Committee, a joint committee of the Australasian Institute of Mining and Metallurgy, the Australian Institute of Geoscientists.

Accordingly, AMC prepared this ITSR that includes two production cases for GCO. The two production cases provided by AMC to the Expert are summarized as:

**Production Case 1:**

- Production Case 1 mining schedule is consistent with the 2018 Ore Reserve schedule "R&R production schedule" provided by MDL.
- Life-of-mine (LOM) is 33 years at a targeted production rate of 7,000 tph. A total of 22.9 Mt of HMC is produced.

**Production Case 2:**

- The Production Case 2 mining schedule has a higher dredge throughput rate than Production Case 1 which targets a production rate of 8,000 tph. This level of production is assumed to be achieved in 2020 following a three-year ramp up period.
- Production Case 2 forecasts a four-year reduction in mine life, from 33 years to 28 years, compared to Production Case 1. The total HMC produced is unchanged as the same total mining activity is condensed into a shorter time period.
- Personnel numbers (both expatriate and national employees) were reduced in line with an AMC estimate of manning requirements. AMC decreased the personnel numbers in Production Case 2 from current total of 680 to 590 over seven years to 2025 with expatriate personnel numbers decreasing from 53 in 2018 to 20 in 2023, and national employee numbers decreasing from 670 to 520 over same five years.
- All other costs in Production Case 2 were calculated on the same basis as for Production Case 1. A cost comparison summary between the production cases is shown in Table I.

**Table I**                      **Production Case 1 and Production Case 2 schedule and cost summary**

<b>Parameter (Not Inflated)</b>	<b>Units</b>	<b>Production Case 1 (Adjusted)</b>	<b>Production Case 2</b>
Production rate	tph	7,000	8,000
Life-of-mine (LOM)	years	32	28
Personnel numbers	persons	660	590
Total labour cost (LOM)	US\$M	750	513
Labour cost per annum	US\$M	22.4	17.2
Reduction in annual labour cost	US\$M	–	5.23
Reduction in LOM labour cost	US\$M	–	237.3

The two production cases developed by AMC include sustaining capital and operating cost schedules based on information provided by MDL. Those costs do not include off-site costs such as head office or corporate costs, which AMC understands are considered by Grant Samuel.

At the request of MDL, AMC has not included sensitive commercial information in the production case data presented in Appendices G & H of this report.

AMC believes that its production cases (Production Case 1 and Production Case 2) are based on reasonable grounds.

MDL provided AMC with information on the status of its material tenements. Based on that information, AMC has concluded that the material tenements of MDL are in good standing.

AMC has completed its engagement as a Specialist in accordance with the VALMIN Code to the extent that the code is relevant to AMC's engagement.

AMC's use, in this report, of the terms Mineral Resources and Ore Reserves is in accordance with the JORC Code.

Principal sources of information considered by AMC in the preparation of this ITSR are listed in Appendix A.

For the purposes of preparing this ITSR, AMC visited GCO in July 2017, reviewed material technical reports and management information, and held discussions with GCO management staff both on site in Senegal and at the head office located in Perth, Western Australia. AMC has not visited the mineral upgrading facility, located in Norway, and as such the evaluation of this section of the MDL business is excluded from the AMC scope of the ITSR.

AMC has not audited the information provided to it, but has aimed to satisfy itself that the information has been prepared in accordance with proper industry standards and is based on data that AMC considers to be of acceptable quality and reliability. Where AMC has not been so satisfied, AMC has included comment in this ITSR and made modifications to the estimates and forecasts provided by AMC to Grant Samuel.

AMC presents the ITSR, which follows in the form of:

- 1 Introduction
- 2 Geology
- 3 Mining operations
- 4 Wet concentrator plant
- 5 Mineral separation plant
- 6 Power station
- 7 Rail system
- 8 Port operations
- 9 Environmental and land impact
- 10 Production Cases
- 11 Key risks and opportunities
- 12 Qualifications

Currency in this report is expressed in 2017 United States Dollars (US\$ or \$) or West African CFA Francs (XOF) unless otherwise noted. Costs are presented on a cash cost basis unless otherwise specified.

Reporting of production and costs in this report is presented on a calendar year basis (January to December) unless otherwise specified.

For definitions of abbreviations and terms used in this report, refer to Appendix B and Appendix C respectively, and for contributors to this ITSR, refer to Appendix D.

## Extension of original ITSR engagement

In June 2017, MDL engaged AMC to conduct a technical review of GCO mining operations that would lead to an ITSR; In July 2017, AMC technical experts accompanied Grant Samuel representatives in attending a site visit to the GCO Senegal mine site and Dakar port operations. The site visit allowed AMC to inspect the status of key GCO operational components, (as of July 2017) of mining, mineral processing, rail, port, power generation, environment, mine site services and planning.

Following the completion of the site visit, AMC requested that MDL provide supporting data and reports of the operational planning, design and operation in order that AMC could form a view upon the viability of the GCO operations. The provision of supporting information by MDL was completed in late September 2017 and AMC concluded the collation of a report and two production cases (based upon information from the 2017 MDL budget) in November 2017.

The AMC technical review was then paused, until April 2018, when the requirement for the ITSR was initiated by the posting of the ERAMET Offer. Grant Samuel reinitiated their ITSR review and reporting process in April 2018. MDL supplied AMC with selected updates of data, including a revised Mineral Resource statement (depleted 2016 Resource), updated Ore Reserve statement, 2017 production data and a new MDL corporate financial model for the GCO operation. Upon review of this new information, AMC revised the production cases first developed in 2017 and verified the new Ore Reserve. AMC did not revisit the GCO mining operation during the update to technical review in April 2018. Therefore, AMC's commentary upon the GCO physical operations is limited to the historical 2016/17 information arising from the site inspection undertaken during the original June 2017 engagement.

Yours faithfully

***Signature Removed***

**A Jones**  
**MAusIMM (CP)**  
**Principal Mining Engineer**

***Signature Removed***

**L J Gillett**  
**FAusIMM (CP)**  
**Director/Practice Leader –**  
**Corporate Consultancy Australia**

## Contents

1	Introduction .....	8
1.1	Scope of the ITSR .....	9
1.2	MDL background and GCO tenure .....	10
1.3	GCO geographic setting .....	10
1.4	GCO development background .....	11
1.5	General.....	13
2	Geology.....	14
2.1	Regional geology .....	14
2.2	Local geology.....	14
2.3	Mineral Resource.....	15
2.3.1	Mineral Resource estimate.....	15
2.3.2	Drillhole data .....	15
2.3.3	HM measurements.....	16
2.3.4	Mineralogy.....	16
2.3.5	Bulk density.....	17
2.3.6	Mineral Resource estimation.....	17
2.3.7	Resource classification.....	18
2.3.8	Currency of data.....	18
2.3.9	Recommendations .....	18
2.3.10	JORC opinion.....	18
3	Mining operations.....	19
3.1	Overview.....	19
3.2	Mining method selection .....	19
3.3	Mining method description.....	19
3.4	Mining regulations.....	21
3.5	Mining licences and approvals.....	21
3.5.1	Survey .....	21
3.5.2	Geotechnical .....	22
3.5.3	Production rates.....	22
3.5.4	Dredge path design criteria .....	22
3.6	Mine design .....	23
3.6.1	Mine design assessment.....	23
3.6.2	Dredge path design.....	23
3.6.3	Ore Reserve.....	26
3.7	Mining schedules .....	27
3.7.1	Production schedule.....	27
3.8	Mobile mining equipment.....	27
3.9	Mine services.....	27
3.9.1	Roads.....	27
3.9.2	Power reticulation.....	28
3.9.3	Borefields and water reticulation .....	28
3.9.4	Pumping of HMC and return water.....	28
3.9.5	Extension of services .....	28
3.9.6	Specialist equipment.....	28
3.10	Mine maintenance .....	28
3.11	GCO mine production .....	28
3.11.1	Mine production reconciliation.....	28
3.11.2	Resource model reconciliation .....	29
4	Wet concentrator plant.....	30
4.1	Plant overview .....	30
4.2	Plant areas.....	30
4.3	Equipment suitability .....	32
	Dewatering cyclones.....	32
	Surge tank.....	32
	Rougher spirals: SP-001 to SP-024 & SP-048 to SP-055 .....	32
	Cleaner spirals: SP-033 to SP-036 .....	32
	Re-cleaner spirals: SP-037 to SP-040, SP-062, SP-063.....	32
	Finisher spirals: SP-041 to SP-044 .....	33
	Tailings dewatering cyclones .....	33
	HMC stacker cyclones: CY-085, CY-118 .....	33
4.4	Maintenance assessment .....	33
4.5	WSP operational suitability .....	33
5	Mineral separation plant.....	34

5.1	Plant overview .....	34
5.2	Plant areas.....	34
5.2.1	Whims-wet feed preparation building .....	34
5.2.2	Specific gravity separation with spirals and wet tables.....	35
5.3	Plant availability .....	37
5.3.1	Ilmenite dry separation circuit.....	37
5.3.2	Zircon dry plant .....	38
5.3.3	Product storage and handling .....	39
5.4	Plant design and operations .....	39
	Laboratory functions .....	39
5.5	MSP operational suitability .....	39
6	Power station .....	40
6.1	Capacity and consumption .....	40
6.2	Assessment.....	42
6.3	Maintenance information intervals and scope.....	43
6.4	Suitability to the needs of the operation.....	43
6.5	Operating cost .....	43
6.6	Recommendations.....	44
7	Rail system .....	45
7.1	Train load-out.....	45
7.2	Rolling stock .....	45
7.3	Locomotives.....	47
7.4	Rail and rail path.....	48
7.5	Assessment.....	49
7.6	Maintenance information intervals and scope.....	50
7.7	Suitability to the needs of the operation.....	51
7.8	Operating cost .....	51
8	Port operations.....	52
8.1	Stockpiling and warehouse facility .....	52
8.2	Reclaim.....	52
8.3	Maintenance information intervals and scope.....	53
8.4	Suitability to the needs of the operation.....	54
8.5	Conveyors to port .....	55
8.6	Mobile ship-loader and grasshopper conveyors .....	55
9	Environmental and land impact.....	57
9.1	Introduction .....	57
9.2	Environmental and social assessment and management system.....	57
9.2.1	Permitting.....	58
9.2.2	Labour and working conditions (health and safety) .....	58
9.3	Resource efficiency and pollution prevention .....	59
9.4	Water management .....	59
9.5	Energy supply and consumption, and climate change.....	60
9.6	Air quality .....	60
9.7	Hazardous and solid waste management.....	61
9.8	Community health, safety and security .....	61
9.9	Land acquisition and involuntary resettlement.....	62
9.10	Conservation of biodiversity and sustainable natural resources management .....	64
9.11	Biodiversity management .....	65
9.12	Rehabilitation.....	65
9.13	Ecosystem services management .....	68
9.14	Cultural heritage .....	68
9.15	Conclusions .....	68
9.15.1	Summary.....	68
9.15.2	Recommendations .....	69
10	Production cases .....	70
10.1	2017 Production Cases .....	70
10.2	2018 Production Cases .....	71
10.3	Summary of Production Case 1 .....	71
10.4	Summary of Production Case 2 .....	72
10.5	Financial model schedule input.....	72
11	Key risks and opportunities.....	75
11.1	Geology .....	75
11.2	Mining.....	75
11.3	Wet concentrator plant.....	75



11.4	Mineral separation plant .....	76
11.5	Rail and port .....	76
11.6	Power plant.....	77
11.7	Social and environmental .....	77
11.8	Personnel .....	77
12	Qualifications .....	78

## Tables

Table 2.1	GCO Mineral Resource Estimate as at 31 December 2017 .....	15
Table 3.1	Dredge mining rates .....	22
Table 3.2	Ore Reserve as at 31 January 2018 .....	26
Table 3.3	Revised dredge capacity forecast .....	27
Table 3.4	Resource model reconciliation .....	29
Table 6.1	GCO installed power generating units.....	40
Table 6.2	Generator availability and utilization.....	42
Table 6.3	Generator fuel consumption.....	43
Table 6.4	Monthly unit cost of power .....	43
Table 6.5	Breakdown of power costs .....	44
Table 7.1	Locomotive incident reports 2016 .....	47
Table 8.1	Rail unloader equipment availability.....	52
Table 8.2	Ship loading equipment availability .....	55
Table 10.1	AMC Production Case 1 versus Case 2 schedule – 2017.....	71
Table 10.2	Production Case 1 and Production Case 2 schedule and cost summary.....	72

## Figures

Figure 1.1	Grande Côte location .....	8
Figure 1.2	Grande Cote Operations SA corporate structure chart .....	9
Figure 1.3	Mineralized dune system .....	11
Figure 1.4	Dredge .....	12
Figure 1.5	Wet concentrator plant.....	12
Figure 1.6	Dredge and wet concentrator plant .....	13
Figure 1.7	Mineral separation plant.....	13
Figure 2.1	Diagrammatic cross section through the Grande Côte deposits .....	14
Figure 3.1	Typical terrain surrounding the mining area .....	19
Figure 3.2	Dredge .....	20
Figure 3.3	Wet concentrator plant.....	20
Figure 3.4	Heavy mineral concentrate stacker .....	21
Figure 3.5	Dredge path coloured by year.....	24
Figure 3.6	Typical orebody cross-section.....	25
Figure 3.7	Actual HMC production 2014 to 2017 .....	29
Figure 4.1	Spiral separation performance profile .....	31
Figure 4.2	Non-efficient sand flow in the rougher spiral .....	31
Figure 5.1	WHIMS area .....	35
Figure 5.2	Intermediate magnetics laydown area.....	35
Figure 5.3	Wet tabling machine area .....	36
Figure 5.4	Long side vacant area of feed preparation building .....	36
Figure 5.5	Dry separation units .....	38
Figure 5.6	Rare earth roll magnetic separator (RER).....	38
Figure 6.1	Power station consumables .....	40
Figure 6.2	Energy generated.....	41
Figure 6.3	Energy consumed .....	41
Figure 6.4	Average run MW generated .....	42

Figure 6.5	33 kV Transformer and overhead line.....	42
Figure 7.1	Train loader overhead hopper.....	45
Figure 7.2	Bulk wagons.....	46
Figure 7.3	Rolling stock utilization.....	46
Figure 7.4	Locomotive.....	47
Figure 7.5	Rail incident report .....	48
Figure 7.6	Maintenance workshop .....	48
Figure 7.7	GCO rail network.....	49
Figure 7.8	Products railed (2017).....	49
Figure 7.9	Potential rail project.....	50
Figure 7.10	Tack condition report.....	51
Figure 8.1	Rail unloading point.....	52
Figure 8.2	Port covered stockpile.....	53
Figure 8.3	Rate of loading and changing of hold.....	53
Figure 8.4	Reliability of unloading line.....	54
Figure 8.5	Reliability of loading line.....	54
Figure 8.6	Tube conveyor .....	55
Figure 8.7	Loading rates summary.....	56
Figure 8.8	Products shipped January to October 2016 .....	56
Figure 9.1	Mineral separation plant (a) tailings deposition and (b) effluent 'pond' forming wetland .....	59
Figure 9.2	Temporary waste disposal site with construction wastes and old incinerator.....	61
Figure 9.3	Recently completed resettlement village.....	64
Figure 9.4	Cleared mine path land, final landform awaiting rehabilitation; adjacent naiyes zone on the right.....	66
Figure 9.5	Windbreaks installed.....	66
Figure 9.6	Hydroseeded grass starting to grow following the first rains .....	66
Figure 9.7	Some of the oldest rehabilitated areas.....	67
Figure 9.8	View from a naiyes agricultural plot looking towards mining zone where rehabilitation process is just starting .....	67
Figure 9.9	Faidherbia albida trees.....	67
Figure 10.1	Actual operating cost breakdown 2016 .....	73
Figure 10.2	Production Case1 schedule versus 2016 R&R Production Schedule .....	73
Figure 10.3	Production Case comparison production profile.....	73
Figure 10.4	Production Case reduction in manning levels .....	74
Figure 10.5	Production Case comparison of HMC tonnes produced .....	74

## Appendices

Appendix A Principal sources of information  
Appendix B Abbreviations  
Appendix C Glossary  
Appendix D Report contributors  
Appendix E Material tenements  
Appendix F GCO's permit register  
Appendix G Case 1 details  
Appendix H Case 2 details

## Distribution list

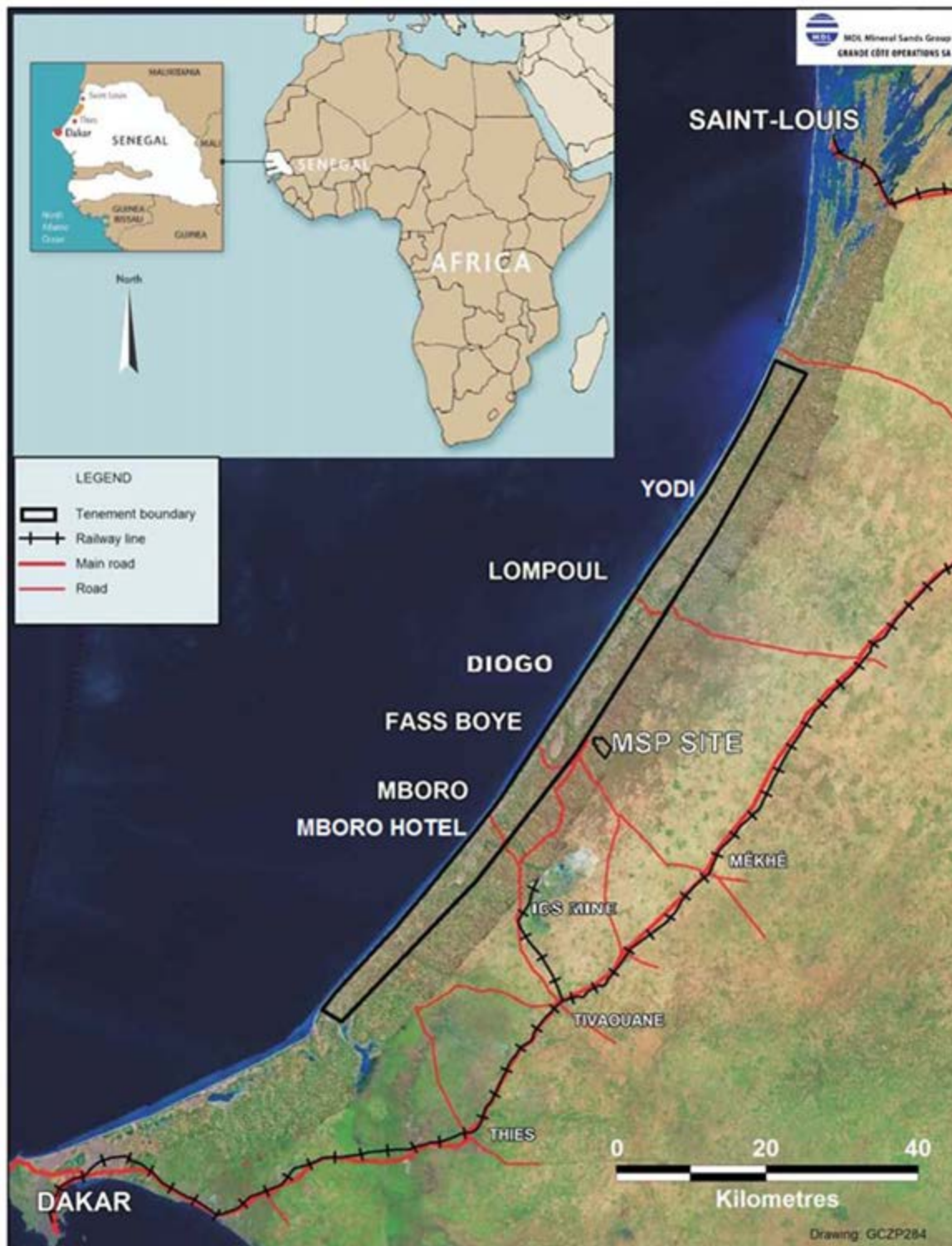
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1 e-copy to Mr David Szelecky, Corporate Financier, Grant Samuel  
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## 1 Introduction

The Grande Côte mineral sand operation (GCO) is a large-scale mineral sands mining and processing operation located in Senegal (Figure 1.1) and primarily produces high-quality zircon and ilmenite as well as lesser amounts of rutile and leucoxene. GCO's products are railed to the port of Dakar for shipping to customers, mainly located in Europe and North America.

Figure 1.1 Grande Côte location

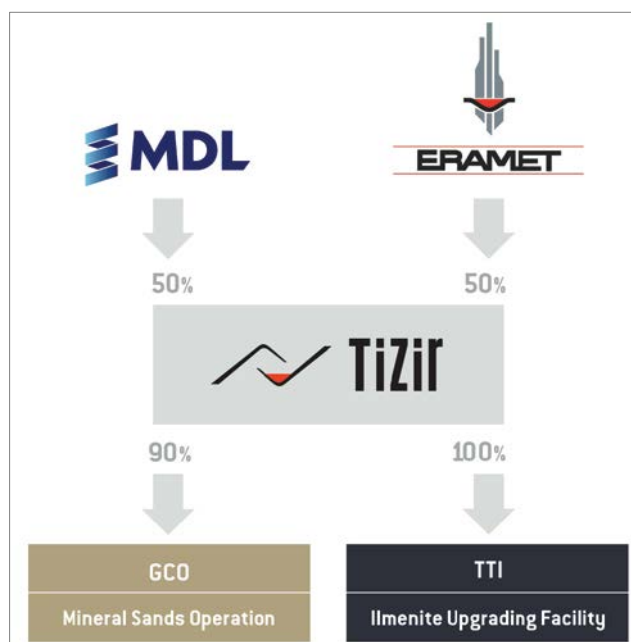


AMC is advised that:

- GCO is owned and operated by a Senegal-based company, Grande Côte Operations SA (GCOSA), which was established in accordance with the Mining Convention and Supplementary Deed No. 2 (9 July 2008).
- GCOSA holds the Mining Concession for GCO.
- GCOSA is jointly owned by TiZir Limited ('TiZir') and the Government of the Republic of Senegal (GRS).
- TiZir holds 90% of GCOSA, and the GRS holds 10%.
- Mineral Deposits Limited (MDL) holds its interest in GCO, and the titanium and iron ilmenite upgrading facility (TTI) in Norway through its interest in TiZir.
- MDL has 50% equity interest in TiZir in partnership with ERAMET of France.

The ownership structure is shown in the MDL 2016 Annual Report, reproduced as per Figure 1.2.

Figure 1.2 Grande Cote Operations SA corporate structure chart



The Directors of MDL engaged Grant Samuel & Associates Pty Ltd (Grant Samuel) as an independent expert (Expert) to prepare an independent expert's report (IER) in relation to the Proposed Transaction.

MDL also engaged AMC Consultants Pty Ltd (AMC) to take instruction from Grant Samuel and provide Grant Samuel with this independent technical specialist's report (ITSR) on GCO. This ITSR is required as a technical input to the IER and is to be attached in full as an appendix to the IER.

As referred to above, MDL also holds an interest in the TTI upgrading facility in Norway through its interest in TiZir. TTI upgrades GCO ilmenite to produce high-quality titanium feedstocks, which are primarily sold to pigment producers, and a high-purity pig iron (a valuable co-product), which is sold to ductile iron foundries.

Consideration of the TTI upgrading facility is excluded from AMC's scope for this ITSR.

### 1.1 Scope of the ITSR

The purpose of AMC's engagement, as instructed by Grant Samuel, was to provide Grant Samuel with advice in relation to the technical judgements required as inputs to the IER. In particular, AMC was to:

- Review information provided by MDL, including GCO's Mineral Resources and Ore Reserves as defined in the JORC Code<sup>3</sup>, production profile, and capital and operating cost estimates, and advise Grant Samuel as to the reasonableness of these for valuation purposes.
- Inspect GCO mining operations.

<sup>3</sup> Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, The JORC Code 2012 Edition, Effective December 2012, Prepared by the Joint Ore Reserves Committee of the Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Minerals Council of Australia (JORC).

- Review the latest iteration of the TiZir Corporate Model that defines the GCO life-of-mine financial model (LOM financial model) prepared by MDL. Based on that review, provide Grant Samuel with two life-of-mine production cases, consisting of a base case and an opportunity upside case, that include capital and operating cost schedules as inputs to the IER.
- Undertake its work in compliance with the requirements of the VALMIN Code<sup>4</sup>.
- Be, and remain, independent of MDL for the purposes of its work and subsequent preparation of the ITSR.

The scope of this ITSR as instructed by Grant Samuel to AMC comprises preparation of a report setting out the nature of AMC's engagement, the nature of the work performed, a technical description of GCO and the plans for its operations, and AMC's conclusions as to the technical assumptions regarding Mineral Resources and Ore Reserves, and the production profiles and capital and operating cost schedules for each production case.

The contributors to this ITSR are listed in Appendix D.

## 1.2 MDL background and GCO tenure

MDL is listed on the Australian Securities Exchange (ASX). Incorporated as Nimbus Resources NL in 1994, the Company focused on the exploration and evaluation of base metal prospects and began seeking opportunities to diversify following its listing on the ASX in 1997. In 1998 Nimbus acquired its current name, Mineral Deposits Limited, following the acquisition of the Hawks Nest mineral sands operation near Newcastle in New South Wales. The 'Mineral Deposits' brand traces its history to the Mineral Deposits Syndicate – a pioneer of Australia's mineral sands industry – which started operations in Southport, Queensland in 1940.

In the early 2000s, MDL shifted its project development focus from Australia to Senegal and acquired rights to develop the Sabodala gold mine (Sabodala) in south eastern Senegal and GCO.

In September 2004, the GRS selected MDL to develop GCO.

After submission of an Environmental and Social Impact Assessment Study (Etude d' Impact Environmental et Social, EIES) in December 2005, the GRS granted MDL a Mining Concession on 27 November 2007 for a period of 25 years. The Mining Concession allows for the development, extraction, processing, transport and marketing of zircon, ilmenite, rutile, leucoxene and related minerals. The Mining Concession is renewable.

MDL transferred the Mining Concession to GCO in accordance with the Mining Convention.

The purpose of the Mining Convention is to provide a contractual basis for the relationship between the GRS and the mine operator. The Mining Convention defines the general, legal, financial, fiscal, economic, administrative and specific corporate conditions under which the operator can undertake exploration and mining activities in the Grande Côte Permit Area.

No further deeds were required for GCOSA to operate GCO and the mineral tenure was secured by GCOSA by the execution of the Mining Convention and Supplementary Deeds. This included the discretionary authorization for the extension of the period of investment, in alignment with the project development timetable.

On 12 February 2008, the Minister of Mines issued interministerial arrêté 1059 granting MDL the land (354 ha) for the mineral separation plant (MSP) site. This interministerial arrêté was revised in January 2010 to include an additional (31.7 ha) for the starter pit and the dredge construction site.

Accordingly, this ITSR has been prepared on the basis that all the tenements are in good standing, and that all the required permits, approvals and authorizations are in place or can be reasonably expected to be obtained in a timely manner so that operations of GCO can continue as planned.

Since 2011, MDL's primary focus has been on TiZir through which it holds its interests in GCO and the TTI upgrading facility in Norway.

## 1.3 GCO geographic setting

Mboro is the main regional centre to the GCO mineral sand deposits, and is located 120 km from Dakar via Thiès and Tivaouane (see Figure 1.2) and 90 km from Dakar via Rufisque and Bayakh.

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<sup>4</sup> Australasian Code for Public Reporting of Technical Assessments and Valuations of Mineral Assets The VALMIN Code 2015 Edition, Prepared by the VALMIN Committee, a joint committee of the Australasian Institute of Mining and Metallurgy, the Australian Institute of Geoscientists.



The norther regions of Senegal lie within the Sahel, the semi desert or savannah region that forms a broad band across Africa between the Sahara Desert to the north and the forested countries to the south. The landscape of the country is generally of low, rolling plains rising to foothills in the southeast. The mining area is located on a coastal dunal system starting about 25 km north of Dakar and extending north-eastwards for more than 140 km. The mineralized dune system averages about 2 km wide with some areas extending to up to 4.5 km wide, and contains very large un-vegetated sand masses.

The northeast coastal area of Senegal (Dakar to St Louis) is tropical with distinct wet and dry seasons. The wet season is from June to October with the most rain falling during August. The dry season is from November to May. The annual rainfall in the Mboro area is approximately 425 mm and at Lompoul approximately 350 mm. The Harmattan is a dry wind that blows from the north, usually from December to February. In Dakar, average day-time maximum temperatures are around 24°C from January to March, and between 25°C and 27°C in April, May and December. From June to October, temperatures rise to around 30°C.

#### 1.4 GCO development background

GCO is located on a coastal mobile dune system starting about 80 km north-east of Dakar and extending northward for more than 100 km. The mineralized dune system contains very large, mostly un-vegetated sand masses as indicated in Figure 1.3. The mineralized dune system averages 4 km in width. The project area is 445.7 km<sup>2</sup> and the main heavy mineral (HM) deposits are Diogo, Mboro, Fass Boye and Lompoul. Other deposits have been partially explored within the Mining Concession and there is potential to identify additional deposits beyond the limits of present drilling.

Figure 1.3 Mineralized dune system



The dunes are recent in age, established 2,000 to 4,000 years before present, are mobile or semi-fixed, pale yellow in colour, and overlie older deposition white marine sands. The dunes range between 5 m and 35 m in height and the mineralized zones are essentially flat-lying and average around 15 m in thickness. Both the dunes and the underlying marine sands contain HMs; principally ilmenite with accessory zircon, rutile and leucoxene. Zircon and ilmenite are the main commodities of commercial interest.

The Grande Côte mineral sands deposits were first recognized in 1945, but it was not until they were acquired by El du Pont de Nemours and Company Inc (DuPont) in 1989 that systematic exploration was undertaken. Based on a substantial drilling campaign over 80 km of strike length, DuPont estimated a substantial mineral resource. However, it relinquished its tenements in 1992 and no further exploration took place on the deposits until a Senegalese subsidiary of MDL acquired its Exploration Permit in 2004.

Since the granting of the Mining Concession, GCO has progressed through a series of feasibility and development studies, bulk sampling, test work, marketing studies, product quality trials, and customer evaluations. This work found the optimum development path for GCO to be a dredging operation, with mineralized sand being treated in a conventional floating spiral pre-concentrator, wet concentrator and dry mineral separation plant. The definitive feasibility study (DFS) for GCO was initiated in 2009.

MDL reports that construction of GCO began in 2011 and was completed in March 2014 at a capital cost of US\$650M. Dredging operations commenced in March 2014, with processing operations commenced in June 2014. Since that time, GCO has gradually increased the rate of production, with GCO being the largest throughput rate single-dredge mineral sands operation in the world. The dredge, wet concentrator plant, and MSP are shown in Figure 1.4 to Figure 1.7.

Figure 1.4 Dredge



Source - 06.17.27 Mining Presentation.pdf

Figure 1.5 Wet concentrator plant



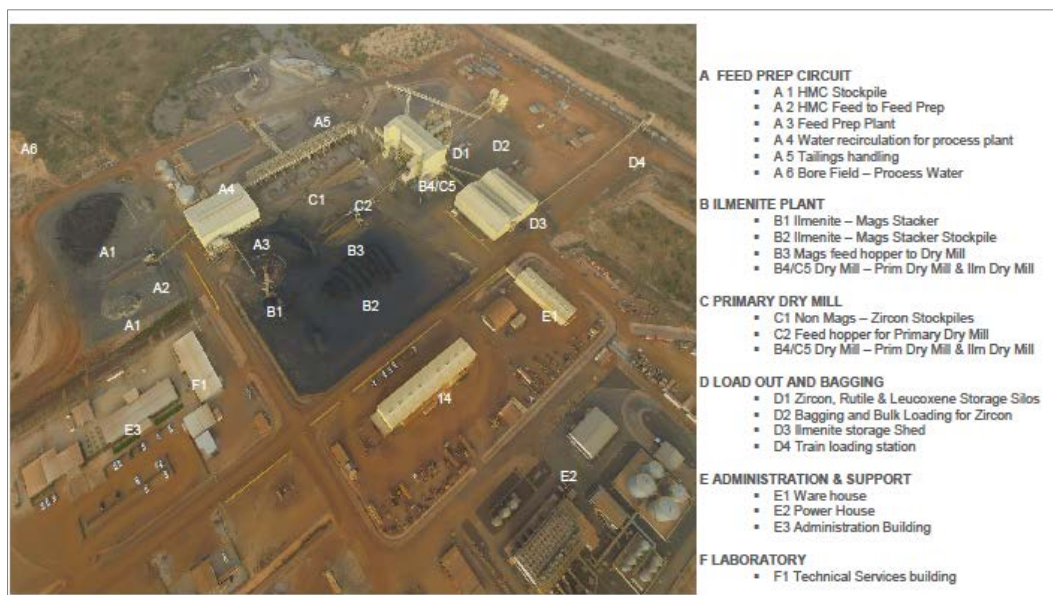
Source - 06.17.27 Mining Presentation.pdf



Figure 1.6 Dredge and wet concentrator plant



Figure 1.7 Mineral separation plant



Source - 06.17.28 MSP Presentation.pdf

## 1.5 General

Currency in this report is expressed in 2017 United States Dollars (US\$ or \$) or West African CFA Francs (XOF) unless otherwise noted. Costs are presented on a cash cost basis unless otherwise specified.

Reporting of production and costs in this report is presented on a calendar year basis (January to December) unless otherwise specified.

For definitions of abbreviations and terms used in this report, refer to Appendix B and Appendix C respectively, and for contributors to this ITSR, refer to Appendix D.

## 2 Geology

### 2.1 Regional geology

The Atlantic Grande Côte area of north-west Senegal comprises an assemblage of marine sands remaining after the sea retreated in recent times. The prevailing weather is from the north-west and this has contributed to the formation of a normal fore dune system and a series of high aeolian – mobile dunes, which trend north-west and extend inland for up to 4.5 km from the beach.

GCO is located within the belt of coastal dunes that lie along the current shoreline that starts approximately 80 km north-east of Dakar and extends northward for more than 100 km. Significant HM deposits have been identified by drilling on the GCO Mining Concession in the areas of Mboro Hotel, Mboro, Fass Boye, Diogo, Lompoul and Yodi over an extent exceeding 70 km.

There is potential for additional deposits within the GCO Mining Concession along strike of the existing drilling both to the north and the south of the known deposits that comprise the reported 2017 Mineral Resources.

### 2.2 Local geology

The dunes, which host the Grande Côte deposits are Holocene (Recent) in age, mobile or semi-fixed, pale yellow in colour and overlie Quaternary white marine sands, which represent a recessive littoral environment. The dunes range between 5 m and 35 m in height and the mineralized zones, which are essentially flat-lying, average around 15 m in thickness.

Both the mobile dunes and the underlying precursor marine sands contain HM; principally ilmenite with accessory zircon, rutile and leucoxene.

An extensive older back dune system of north-east trending aeolian red or orange coloured sands was formed during the Ogolien regression (20,000 to 11,000 years before present) when the Sahel desert spread southwards to this region. The mobile dunes may also be a reworked part of these back dunes. The mobile dunes intermittently overlie the back-dune sands in the more inland parts of the deposits.

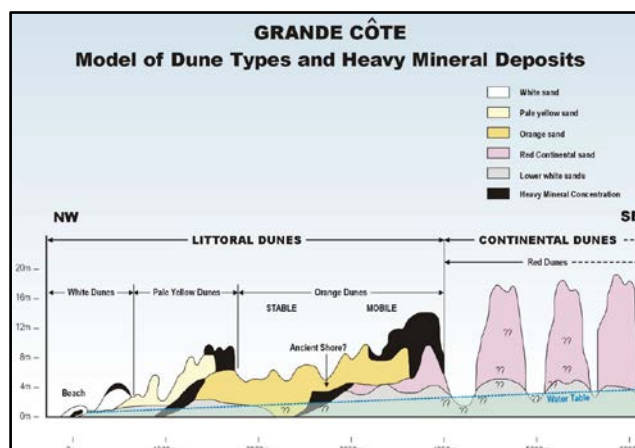
Based on work by the Geological Survey and DuPont, the current understanding of the mineral sands deposits suggests there are three aeolian phases, with the greatest amount of HM in the oldest phase, which is now the most inland part of the mobile dune system.

The littoral sands contain some HM and the reworking of this material by longshore currents, coupled with wave action is believed to have fractionated the sands to produce thinly bedded HM concentrations reworked as lag deposits in the mobile dunes. In general, the littoral white sand horizon is fine grained but at depth (25 m to 45 m below surface) it contains some lenses of coarse sands and grits, which enhance the surficial aquifer.

There is generally a thin (0.5 m) humic horizon present at the interface between the yellow mobile dunes and the white beach sands. Beneath the humic layer, localized accumulations of fine grained iron oxide-rich friable sandy clays representing ancient swamps are occasionally present. Where present, the peat material considered a lignitic peat formed from tropical gallery-forest of Guinean type contains deposits of fossil wood. These type of peat deposits in old inter-dune depressions, have variable thicknesses between one to ten metres. Generally, the peat deposits are discontinuous, trend north-east and are bounded on their margins by grey humic sand and clay.

A diagrammatic cross section through the Grande Côte deposits is presented in Figure 2.1.

Figure 2.1 Diagrammatic cross section through the Grande Côte deposits



## 2.3 Mineral Resource

### 2.3.1 Mineral Resource estimate

AMC first reviewed the GCO Mineral Resource estimate reported at 31 December 2016 as part of the ITSR activities undertaken during 2017. An update to the project Mineral Resource estimate reported as at 31 December 2017 was subsequently reviewed when supplied to AMC in April 2018. MDL updated the Mineral Resource estimate and depletion as a result of mining activities during 2017. All supporting information reviewed for the 2016 Mineral Resource by AMC remains the same for the 2017 Mineral Resource and is therefore relevant to the updated Mineral Resource.

The GCO Mineral Resource estimate reported as at 31 January 2018 is shown in Table 2.1.

Table 2.1 GCO Mineral Resource Estimate as at 31 December 2017

Resource Category	Tonnes (Mt)	In Situ (HM Mt)	HM (%)	Zircon (%)	Leucoxene (%)	Rutile (%)	Ilmenite (%)
Measured	1,456	20.9	1.4	10.7	3.2	2.5	72
Indicated	350	4.8	1.4	10.7	3.2	2.5	72
Inferred	41	0.5	1.2	10.7	3.2	2.5	72
Total	1,847	26.2	1.4	10.7	3.2	2.5	72

Notes: Quantities and grades have been derived by accumulating the grades to 6 m below the natural water table except for the Mboro Hotel and Yodi deposits, where the accumulation is to the natural water table.

A cut-off grade of 1.0% HM has been applied to the accumulated grades.

Tonnes have been rounded to the nearest 1 Mt.

Grades have been rounded to one decimal place.

The mineral assemblage (zircon, leucoxene, rutile, and ilmenite) is reported as a percentage of HM.

Mineral Resources are inclusive of Ore Reserves.

### 2.3.2 Drillhole data

The Mineral Resource estimate is based on predominantly aircore (AC) drilling and hand auger drilling undertaken by MDL and historical drilling that was undertaken by DuPont. The DuPont drilling is comprised of water injection reverse circulation (RC) drilling and hand auger drilling. Historical drillholes comprise approximately 35% of the number of drillholes contained in the database provided by MDL to AMC.

All holes are vertical, which is appropriate for the generally flat-lying nature of the mineralization. The drill spacing varies. The majority of the strike length is informed by drilling on a 40 m by 200 m drill grid.

Auger drilling is generally conducted on an 80 m by 200 m spacing with auger holes terminated at or above the water table. AC infill drilling is generally on an 80 m by 200 m spacing, with holes drilled to approximately 8 m below the water table. The auger and AC holes combined achieve a 40 m drill spacing on 200 m spaced drill sections, with alternate holes providing samples from below the water table. Grade control AC drilling campaigns are conducted on 40 m by 100 m spacing in advance of mining.

Drillhole collars were surveyed. Vertical down holes were not surveyed at depth/down-the-hole, which is reasonable as short AC drillholes are unlikely to deviate significantly. The average sample length is 1 m, for samples submitted for routine analysis. A geological log was completed for each sample interval.

The co-ordinate system used for data collection is the Universal Transverse Mercator (UTM), Northern Hemisphere Projection, Zone 28, WGS84 Datum. A local grid co-ordinate system is used for resource modelling purposes, which requires the subtraction of one million from the north co-ordinate and rotation of the data by -35° around the Z plane.

The files containing drillholes used to estimate the 2016 Mineral Resources at the Mboro Hotel and Yodi deposits have incorrect local grid co-ordinates for all drillholes. Two data files supplied to AMC, dhyodi.dm and dhmbro.dm, contain the drillholes used in 2014 to extend the block model north to include Yodi and south to include the Mboro Hotel area. The local grid drillhole co-ordinates in these files do not correspond to the co-ordinates of the same drillholes when extracted from the drill database with UTM co-ordinates and converted to the local grid. Nor do they correspond to the local grid co-ordinates stored in the database supplied. AMC notes that in the access database supplied, GCO\_Database.acddb, that all the local grid northing data are stored in the local grid easting field and vice-versa. As the areas affected by these drill holes are at both the Northern and Southern extents of the Mineral Resource and are not planned to be mined within the next 10 years AMC does not consider this a material issue.

The auger drillholes in the data file used to estimate the Mboro Hotel deposit are located approximately 40 m south – southwest of their true positions in the local grid co-ordinate system. The auger drillholes in the data file used to estimate the Yodi deposit are located approximately 150 m east – northeast of their true positions in the local grid co-ordinate system and these holes are also offset 0.5 m above the elevations recorded in the database.

The Inferred Mineral Resource for the Noto deposit was first reported in the 2015 Mineral Resource, however, in the report GCO 2016 Resource and Reserve report\_Final2.pdf it was noted that a mistake was made in the method applied to determine the Mineral Resource for Noto, and that another part of the Noto block model was overlapping with the Mboro Hotel block model. The files for the 2015 Noto Mineral Resource estimate were supplied but the corrected files from the 2016 estimate were not provided to AMC. Therefore, AMC has not been able to complete the review the Noto 2016 Inferred Mineral Resource estimate. AMC have excluded the overlapping area during the verification of the 2016 Mineral Resource statement and the results correspond with MDL data.

The drilling data file used in the 2015 Mineral Resource estimate for the Noto deposit was supplied to AMC however, these drillholes are not contained in the database supplied and could not be validated. AMC notes that the northern drill section of the 1,600 m spaced drill sections at Noto is located only 100 m south of existing 80 m by 400 m spaced auger drilling of the Mboro Hotel deposit, which may indicate a similar error in translation to the local mine grid as evident in the Mboro Hotel and Yodi drillhole files supplied.

### 2.3.3 HM measurements

MDL's HM measurements were determined by heavy liquid separation utilising lithium sodium tri-polytungstate at MDL's site laboratory. DuPont's HM determinations were conducted in the same site laboratory and used the Magstream separation process, which uses ferro-fluids, and magnetic and centrifugal forces to produce precise split points over a range of specific gravities.

Quality assurance/quality control (QA/QC) protocols in place during sample analysis by MDL include use of reference material standards and analysis of duplicate samples at an umpire laboratory in Australia. Dupont's QA/QC included analysis of duplicate samples using the heavy liquid tetrabromoethane. The QA/QC data analysis presented in the Definitive Feasibility Study (DFS) report dated June 2010 demonstrated that the HM determinations were reliable and an appropriate basis for Mineral Resource estimation and project development.

No QA/QC data has been presented to AMC for the 183 infill drillholes in the database drilled after the DFS. The infill drillholes were not used in estimating the reported Mineral Resources.

The updated Mineral Resource statement issued by GCO on 31 January 2018, sequential to the 2016 Mineral Resource statement analysed by AMC, appears to have only dealt with the depletion of the Mineral Resource as a result of mining activities during 2017 and an adjustment to the planned dredge pond levels. No data has been received from GCO to amend any of the inaccuracies described above, as observed in the 2016 Mineral Resource statement, as stated above however, these issues are not considered material.

### 2.3.4 Mineralogy

The default mineralogy assemblage assigned to the Mineral Resource is based on limited sampling conducted during the Definitive Feasibility Study and is supported by reconciled production data. In the *2010 Grande Côte Mineral Sands Project, Senegal, West Africa Technical Report for Mineral Deposits Limited* prepared by AMC, it was noted that the mineralogical assessment of the various bulk samples and drillhole composite samples taken from the Fass Boye and Diogo deposits produced a reasonable estimate of the zircon range as 8.3% to 11.0% with an unweighted mean of 10.6%. The average zircon grade of 10.7% was applied by AMC in preparation of the Mineral Reserves as part of the DFS, reported in accordance with the Canadian listing standards for National Instrument 43-101.

It is stated in the *GCO 2016 Resource and Reserve Report* that; *"The heavy mineral has a consistent assemblage of 10.7% zircon, 72% ilmenite, 2.5% rutile and 3.2% leucoxene. This has been reconciled with other tests carried out by ERAMET during the due diligence, Infill drilling and the metallurgical report from actual mining production"*. An internal MDL report<sup>5</sup> presents a summary of the various mineralogy determination methods used and the average zircon proportions determined. Grain count analysis are dismissed as not very accurate and leading to a serious over estimation of the zircon content. Mineral laser ablation (MLA) analysis of 17 composite samples by MDL returned an average zircon grade of 10.6%. In contrast, the report demonstrates that MLA analysis subsequently conducted of 19 samples sourced from 17 randomly selected drillholes had an average zircon grade of 8.9% and that 233 samples sourced from the Fas Boyes and Diogo areas analysed by X-ray fluorescence (XRF) returned an average zircon grade of 9.8%. Similar variance between the datasets and the default values is demonstrated for the ilmenite and leucoxene average grades.

Reconciliation data for the production period January to October 2015 presented in the Tonnage and Grade Reconciliation.xls spreadsheet supplied to AMC demonstrates the average dredge feed total heavy mineral (THM) zircon grade was 11.0% compared with the default value of 10.7%. The reconciliation data demonstrates the average dredge feed total heavy mineral (THM) ilmenite grade for the period January to October 2015 was 66.5%, which is significantly lower than the default grade. Conversely, the average dredge feed THM leucoxene grade for the period was 6.0%, which

<sup>5</sup> *Dakar Project, Grande Côte Operation, Due Diligence Resource and Reserves Evaluation ([13.1.3.4.1.1] DAKAR DD geology-reserves\_v2.doc)*



is higher than the default grade whilst the average reconciled rutile grade was 2.1%, which is also lower than the default grade.

Reconciliation indicates the average grade is lower than the estimated grade and assumed assemblage.

An updated Mineral Resource statement was issued by GCO on 31 January 2018, sequential to the previous 2016 Mineral Resource statement analysed by AMC that demonstrated a depletion of 46.8 Mt at 1.7% HM, containing 0.8 Mt of in-situ HM mined during 2017.

Mineralogy data is collected for the infill drilling conducted for the short-term production block models. For the production period January to October 2015, the short-term production block model underestimated all valuable HM mineralogy average grades against the reconciled dredge feed THM except for ilmenite. The short-term production model mineralogy monthly average data for the 2015 period demonstrates significantly less variability than the reconciled dredge feed mineralogy. The default ilmenite grade reported for the 2016 Mineral Resource is 72%, which is lower than the 74.5% ilmenite grade reported in the DFS, however, no supporting documentation was supplied to AMC regarding this change.

The default mineralogy values used in the DFS have been applied to the Indicated and Inferred Mineral Resources located at the northern and southern extremities of the modelled mineralization. No mineralogy data has been collected to support the application of the default values to these areas.

### 2.3.5 Bulk density

Bulk density determinations were carried out on more than 600 samples obtained from across the deposit using a tube driven into the sand and sealed at both ends to deliver an in situ undisturbed sample. The majority of sampling was conducted on near-surface intervals (between 0.3 m and 1 m below surface). Samples were taken representing the various facies present including the aeolian dunes, continental dunes and the white littoral sands. Sample densities range from 1.67 t/m<sup>3</sup> to 1.80 t/m<sup>3</sup> and an average bulk density of 1.70 t/m<sup>3</sup> was applied for tonnage estimation. Adjustments are made to the local density based on the proportion of peat where it is present in the model.

### 2.3.6 Mineral Resource estimation

The Mineral Resource estimates were developed without the use of geological domains. A review conducted during the DFS supports this estimation practice. Grades have been estimated into a block model using ordinary kriging and parameters derived from studies of variography.

AMC considers that the Mineral Resource estimates have been completed using appropriate estimation methods.

The auger drillholes in the data file used to estimate the Mboro Hotel deposit are located approximately 40 m south-southwest of their true positions in the local grid co-ordinate system. Given the absence of domaining in the estimation process and the regular offsets of drillholes from their true locations, AMC does not expect the correction of this error to have a material impact on the Indicated Resources reported from this area.

The auger drillholes in the data file used to estimate the Yodi deposit are located approximately 150 m east – northeast of their true positions in the local grid co-ordinate system and are also offset 0.5 m above the elevations recorded in the database supplied. The large offset across the strike direction of the mineralized dunes for these drillholes could have a significant impact on the Indicated Resources reported for Yodi given the interaction of the highly variable topography with the resources estimated from these drillholes. However, given the likely magnitude of the changes when these errors in the estimate are corrected, relative to the size of the total Mineral Resource and that mining is not scheduled in this area until 2029, AMC does not consider this to have a material impact on the overall GCO reported Mineral Resources and Ore Reserves.

The Inferred Mineral Resource for the Noto deposit was first reported in the 2015 Mineral Resource however, as detailed above, a mistake was made in the method applied to determine the Mineral Resource for Noto and this was rectified for the 2016 Mineral Resource. Files from the 2016 or 2017 estimates were not provided to AMC and therefore, AMC has not been able to review the Noto Inferred Mineral Resource estimates.

As the deposit is mined by dredge, all material from surface to the base of the potential dredge pond will pass through the dredge and treatment plant. The 2016 Mineral Resource only includes material where the cumulative grade from the surface to base of potential pond exceeds the 1% HM cut-off grade. The Mineral Resource for the majority of the deposit is reported above a surface generated 6 m below the natural water table. The Mboro Hotel and Yodi deposits have been reported above the natural water table surface, which is the lower limit of the drilling at those deposits. Mining of additional high-grade material from the periphery of the dredge path by dozer push has been incorporated into the 2016 and 2017 Ore Reserve.

AMC was unable to replicate the 2016 Mineral Resource tonnages and grades reported as at 31 December 2016 from the *1.everywherebm.dm* model. It is unclear which input variable (such as topography, water table, reporting methodology, resource classification and the overlap of the Noto and Mboro models) might be causing the difference in results. The report generated by AMC was 6% higher than the MDL reported total tonnage and within 4% of the MDL reported total average HM. AMC notes that the distribution of Indicated Mineral Resources in the RES field in the block model *1.everywherebm.dm* differs from that presented in the plan of Mineral Resources Classification, dated 2 February 2017 in the report *GCO 2016 Resource and Reserve report\_Final2.pdf*. Given the known issues, including the overlapping models discussed above, AMC does not consider this tonnage and grade difference to be material.

The updated Mineral Resource statement issued by GCO on 31 January 2018, sequential to the 2016 Mineral Resource statement analysed by AMC, appears to have only dealt with the depletion of the Mineral Resource as a result of mining activities during 2017. Additionally, an accompanying updated Ore Reserve statement was issued that incorporates an adjustment to the planned dredge pond levels and additional off-dredge path material to be recovered by dozing ore into the dredge path. No data has been received from GCO to amend any of the inaccuracies described above, as observed in the 2016 Mineral Resource statement.

### 2.3.7 Resource classification

The Mineral Resource estimate is classified as Measured Mineral Resource where it is based on drill spacing of 40 m by 200 m, and as Indicated Mineral Resource where the drill spacing is up to 100 m by 400 m. All Mineral Resources at Mboro Hotel and Yodi are classified as Indicated and these comprise the majority of the Indicated Mineral Resource. Inferred Mineral Resource classification is based on a drill spacing of 160 m by 1,600 m and the majority of Inferred Mineral Resource occurs at Noto.

The estimates are classified as Measured, Indicated and Inferred Resources in accordance with the JORC Code.

No assessment has been conducted of the potential for additional mineralization in the areas of the GCO Mining Concession located outside the areas that contain the reported Mineral Resources. AMC notes that within the GCO Mining Concession there remains 10 km of strike length yet to be drilled to the north of the Yodi deposit and a further 21 km of strike length yet to be drilled to the south of the Noto deposit.

### 2.3.8 Currency of data

AMC notes that although a considerable amount of technical information has been provided, there are no dates on most of the technical files including many of the MDL's PowerPoint presentations. A file register accompanied 18 files provided to AMC on 14 August 2017, however this register only provides descriptions and comments for those 18 files.

The absence of the effective dates of the files provided, including the multiple drill databases, is not currently material to the existing Resource modelling. However, under extenuating circumstances, this has the potential to be material were the need to reconstruct the digital technical data to arise. Data security is discussed in the JORC Code as part of Table 1, section 1.

### 2.3.9 Recommendations

AMC recommends:

- Correction of the collar location of the drillholes used to estimate Yodi and Mboro Hotel deposits, where applicable, and re estimation of the Mineral Resource.
- Evaluate the requirement for additional mineralogy data and the inclusion of mineralogy data in the Mineral Resource estimation, if justified by sampling.
- Implement a file and report naming convention that incorporates date and version control.
- Detail all relevant supporting documentation when reporting Mineral Resources, including filenames of files used, details of the reporting methodology and all of the selection criteria used.

### 2.3.10 JORC opinion

In AMC's opinion the data inputs used to estimate the 2018 Mineral Resource have been collected using appropriate methods with acceptable levels of QA/QC, and are thus suitable to act as inputs in the resource estimation. AMC considers that the Mineral Resource estimates have been generated using appropriate methods.

### 3 Mining operations

#### 3.1 Overview

The Grande Côte resource consists of mineralized sand dunes of free-flowing sand with low slime levels (less than 1% clay). The minerals are naturally concentrated by wind action. Most of the HM occur in the upper leeward side (eastern side) of the dunes. The photograph shown in Figure 3.1 is typical of the terrain surrounding the mineralized sand dunes being mined.

Figure 3.1 Typical terrain surrounding the mining area



Analysis of piezometer measurements throughout the mining area indicates a stable water table on average 4 m beneath the swales (the base of the mobile dunes). The water table trends from 1 m above sea level (ASL) on the western side (ocean side) to 8 m ASL on the eastern side of the mobile dune system.

#### 3.2 Mining method selection

A dredge mining operation was selected by GCO based on the following considerations:

- Orebody HM grade and the physical size of the dunes both lending themselves to high-volume dredging as opposed to conventional open-pit dry-mining techniques.
- Drilling information indicating that all of the proposed mining areas consist of free-flowing sand with a minimal slimes (clay) content of less than 1%.
- The dunal system has a reasonably consistent water table depth.
- Comparable orebodies in Australia and elsewhere in the world have been successfully mined by dredging.
- Dredge mining is cost competitive, allows ready restoration of the mining areas and has a low impact on the environment.

#### 3.3 Mining method description

Mining is carried out by dredging a continuous canal (dredge path) through the dunal orebody. The dredge floats in an artificial pond accompanied by a floating wet concentrator plant (WCP). The pond advances through the orebody as material in is mined at the front of the pond and tailings are discharged at the rear of the pond.

Vegetation is cleared in advance of the dredge pond. Topsoil, if present, is removed in advance of mining and is stockpiled in areas adjacent to the dredge path for later use in rehabilitation. The pond varies in width from 130 m to 270 m (nominally 240 m) and approximately 250 m long.

The dredge is equipped with a suction-cutter head that excavates sand from the mining face and feeds the sand/water slurry to the WCP. Mining occurs below the pond level at the cutter head. The cutter head sweeps the face from one side of the pond to the other, benching the face in subsequent passes as necessary. Material located above the pond level rills down the face as mining progresses. The dredge is equipped with winch slew ropes for cutting control, dredge positioning and to control forward advance.



The WCP produces a heavy mineral concentrate (HMC) and tailings. The HMC is pumped to a land-based stacker and then trucked to the MSP where it is dewatered and stockpiled for batch processing. A tailings stacker at the rear of the WCP deposits the tailings to fill the mined canal and achieve a final landform. The final landform is then rehabilitated.

The dredge and WCP is connected via a floating flexible pipeline to transport the mined sand and water, and for the supply of power and control systems. A floating walkway connects the concentrator to the shore and provides access, power and a product pipeline for HMC transfer to the MSP.

The dredge, WCP, MSP and tailings stacker design and engineering for the DFS was undertaken by Ausenco Limited. Figure 3.2 shows a view of the operating dredge, Figure 3.3 shows a view of the operating WCP, and Figure 3.4 shows a view of the operating HMC stacker.

Figure 3.2 Dredge



Figure 3.3 Wet concentrator plant

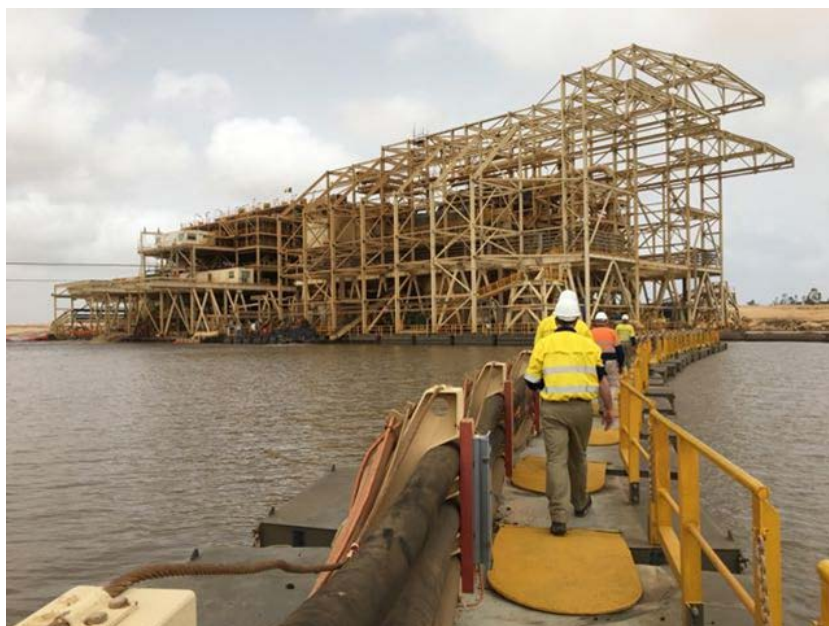


Figure 3.4 Heavy mineral concentrate stacker



Water losses due to natural evaporation and seepage from the dredge pond and tailings will occur. Lateral bores and pumps reclaim the seepage and return the water to the dredge pond. This process minimizes the water loss and prevents changes to the water level in the pond. The operation returns the majority of the water used in the mining, treatment and tailings stacking processes to the active mining pond. When required, additional make-up water is sourced from a fresh water aquifer located 400 m below surface so as not to impact on the local water table.

### 3.4 Mining regulations

Mining is undertaken according to the “Senegal Code Minier Loi No 2003 36” (the Mining Code). The Mining Code details the regulatory requirements under which exploration, mining, processing, loading and transport are conducted, including the requirements for permits and royalties.

Section 8, Chapter 3, Article 96 of the Mining Code, pertaining to health and safety (H&S) in mines and quarries, details the requirement of GCO to draw up its own specific set of H&S regulations and to have them approved by the Minister for Mines. All holders of mining operation titles are required to conform to the provisions of the approved regulations.

The technical management of the mining operation and its annexes is to be undertaken by an operations manager whose name must be supplied to the Director of Mines and Geology, who in turn informs the relevant administrative authority and the work inspector and social security agency with territorial responsibility. The operations manager is required to ensure the strict application of the regulations to which the mine site and facilities under the operations manager's responsibility are subject. The operations manager must be invested with the required authority in relation to the other personnel to exercise the operations manager's assigned duties.

Section 8, Chapter 3, Article 102 of the Mining Code requires authorization from the Director of Mines and Geology to mine sides or slopes of more than 15 m in height. Authorization will be required as the dredge path design has continuous lengths with slopes greater than 15 m high.

The Mining Code has provisions for the need to provide the workers and the communities with a safe environment. The Mining Code also refers to the Labour Code for matters of H&S.

### 3.5 Mining licences and approvals

GCO has all necessary Senegalese mining licences required for the operation of the dredge, WCP and MSP. Details of the Mineral tenements held by GCO that relate to the current planned mining operations at Grande Côte are listed in the mineral tenements listed in Appendix D.

#### 3.5.1 Survey

All plans and files for GCO are in the Universal Transverse Mercator (UTM) grid system Northern Hemisphere Zone 28 with a WGS84 datum. The geological modelling and mine design undertaken by AMC used a rotated coordinate system. After the modelling and mine design work was completed, the data was rotated back to the original Universal Transverse Mercator grid system.

The following transformation was used to convert from the UTM North zone 28 to AMC Block Model Grid used for the mine planning:

- Rotation is -35° on azimuth.
- Original X coordinate is 310,339.781 mE. Rotated X coordinate is 296,831.250 mE.
- Original Y coordinate is 1,697,683.250 mN. Rotated Y coordinate is 703,160.313 mN.
- No transformation in the Z plane.

### 3.5.2 Geotechnical

The slope angles used for the dredge path design and tailings deposition were based on the following geotechnical recommendations:

- The dredge path has 35° slopes above water.
- The dredge path has 15° slopes below water.
- Tailings will have an average deposition angle of 17° (22° above water and 8° below).

A 6 m pond depth was used to provide sufficient draft for efficient mining and processing.

The angle of repose of the sand dunes was measured at 30°. The designed angle is steeper as it is expected that the slope will not reach the final angle of repose until after the dredge has passed.

### 3.5.3 Production rates

The annual mining and production rate is 55 Mtpa. This rate was set by GCO and was based on marketing studies, which indicated this amount of zircon product (~86,000 t) could be absorbed into the market.

Comparable mineral sand operations mining includes:

- North Stradbroke (Australia) operates two dredge ponds each with a dredge and WCP. The combined production is 45 Mtpa.
- Paraíba (Brazil) operates with a single dredge and WCP at an annual production rate of 13 Mtpa.
- Moma (Mozambique) operates two dredges feeding a single WCP. Each dredge has 2,500 tonnes per hour (tph) capacity and the combined production rate is 38 Mtpa.
- Richards Bay (South Africa) operates four separate dredges and WCPs. The capacity of the dredges range between 2,200 tonnes per hour and 4,000 tonnes per hour and the combined production rate is 85 Mtpa.

Mining commenced in the first quarter of 2014. The production schedule allowed for a ramp up period of two years. Table 3.1 lists the dredge mining rates used for production scheduling including the production ramp-up.

Table 3.1 Dredge mining rates

Year	Mining Rate (Mtpa)
2013-14 financial year	41.1
2014-15 financial year	52.1
Remainder of Project	54.6

### 3.5.4 Dredge path design criteria

The dredge path was designed based on the following criteria:

- Fourteen years of initial dredge path based on current drilling. Debt funding advice given to GCO indicated a requirement that the mine path be designed for 14 years assuming that the debt is paid in the first ten years with a subsequent four-year buffer period.
- Maximizing the head grade for first 14 years of operation.
- All mining activities are within the Mining Concession.
- Only material with a mineral resource classification of Measured is included in the dredge path.
- A minimum width of 130 m (at the pond level). The minimum width is governed by the dimensions of the floating plant and angles of the pond below the water surface.
- A maximum width of 270 m (at the pond level). The limit of the pond width is governed by the mechanical capacity of the winches installed on the dredge.
- The dredge works most efficiently when the face is high and wide. The width of the dredge path is reduced in low-grade areas and where multiple passes of the wide dredge path would necessitate additional dilution.

- Avoid significant domiciles and cultivated areas. A key part of the dredge path design was an iterative review of affected persons and sites of significance in order that impacts on both would be minimized and/or avoided where practical. Areas avoided by the dredge path design include three cemeteries, the town of Foth, and settlements at Diournal and Thiakmat.

## **3.6 Mine design**

### **3.6.1 Mine design assessment**

Mine planning and scheduling completed by MDL included the following activities:

- Compile the geological resource block model to obtain total grade columns from the base of mining.
- Complete first pass 2D dredge path designs in plan.
- Evaluate the 2D design in sections to establish the preliminary design.
- Convert the design from a 2D design into a 3D design by incorporating slope angles and adjustment for depth.
- Evaluate the contents of the 3D design against the geological resource block model at a range of depths (0 m, 3 m and 6 m above the natural water table).
- Design of the tailings surface over the dredge path to calculate the volume of re-mined material and amount of tailings requiring off dredge path disposal.
- Schedule the results of the evaluation at the required production rates.
- Produce summary tables with quantities and grades by period.

### **3.6.2 Dredge path design**

The 2017 mining schedule 34-year LOM dredge path design is shown in Figure 3.5. The dredge path is coloured by year.

Figure 3.6 shows a typical cross-section through the block model and dredge path.

Figure 3.5 Dredge path coloured by year

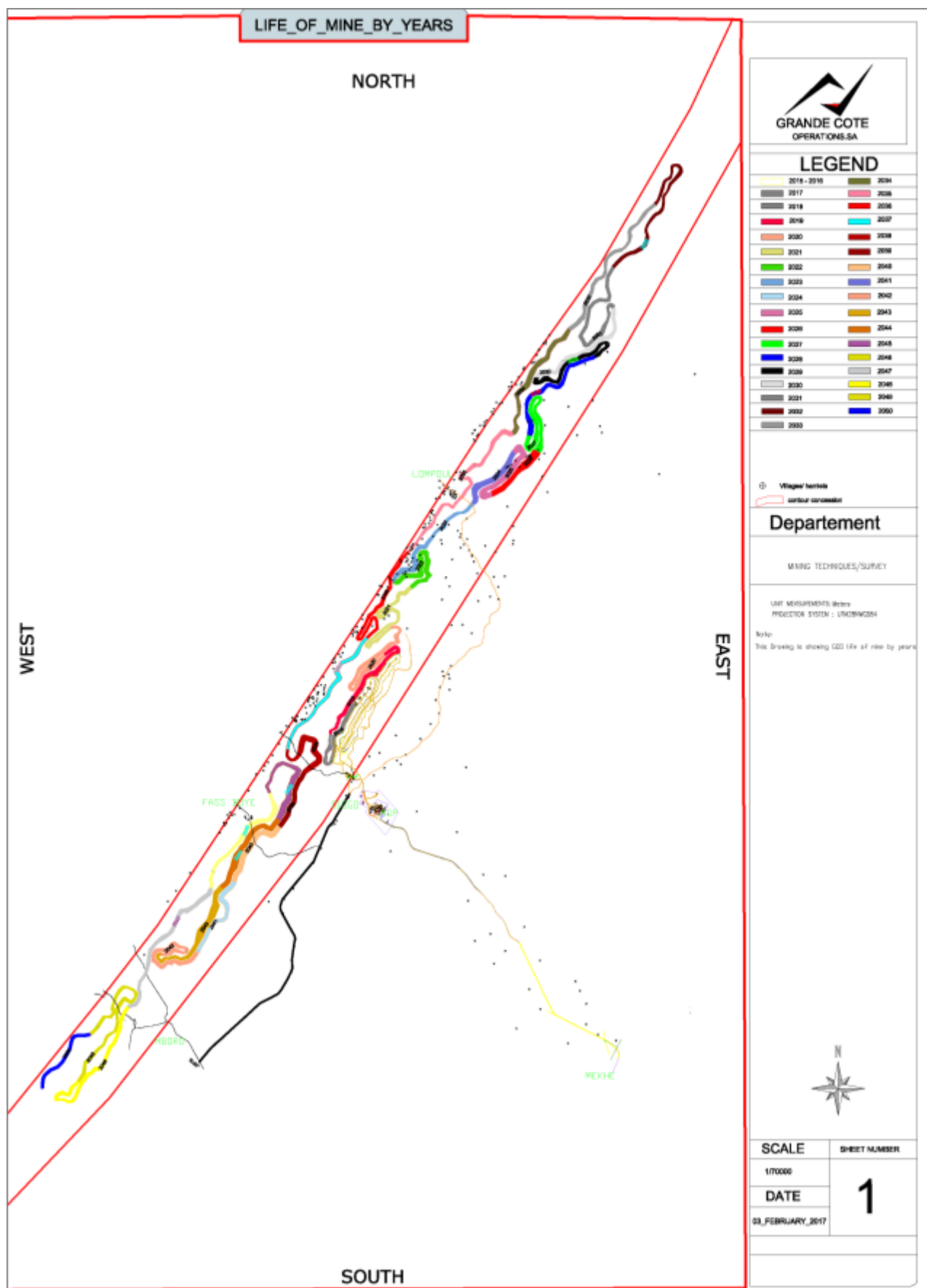
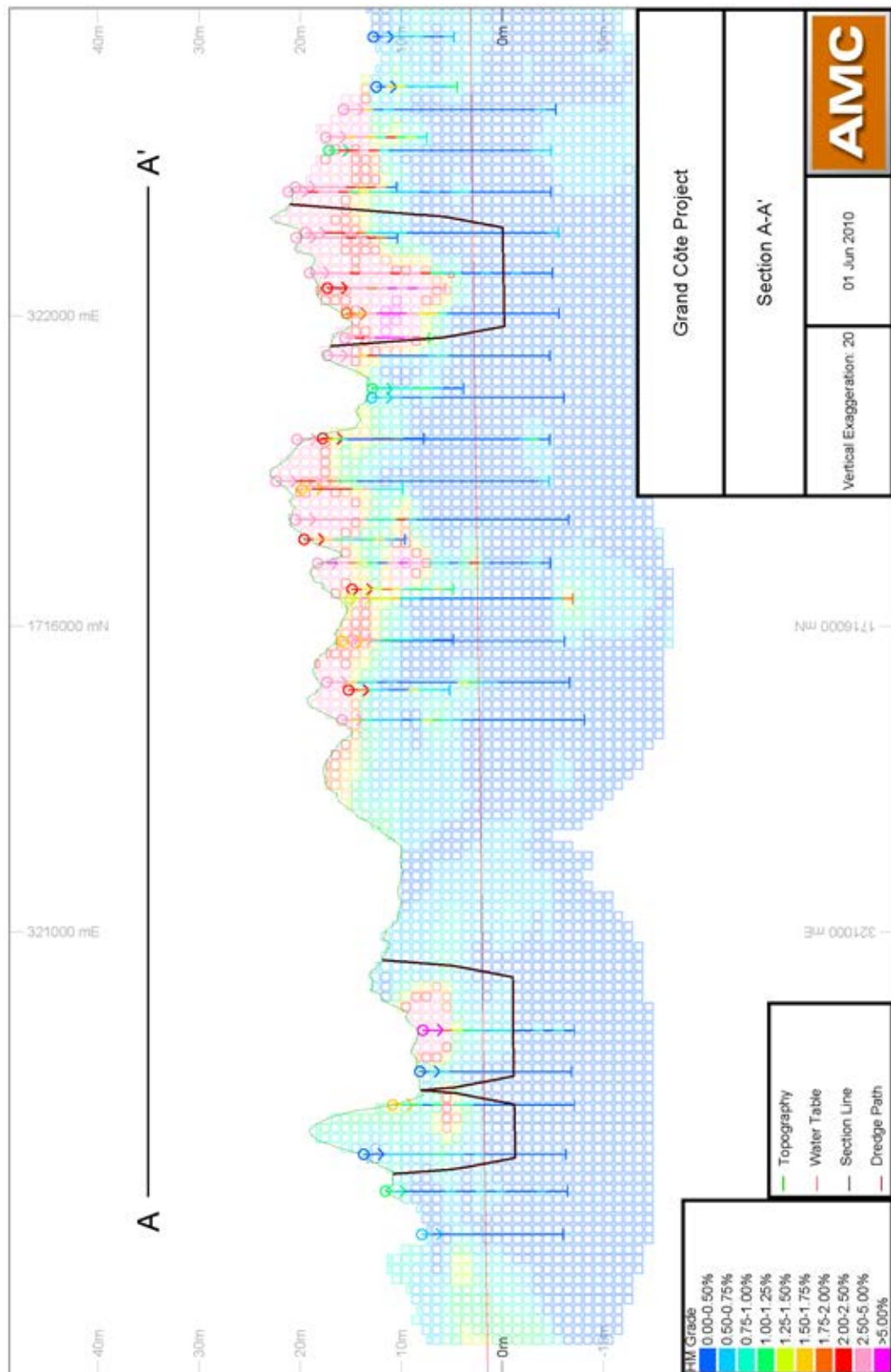




Figure 3.6 Typical orebody cross-section



The dredge path commenced on the southern end of the eastern side of the dunal system. This position was selected based upon the follow criteria:

- The starting location is close to the zone containing the highest-grade HM.
- The Mineral Resource is well defined and has a Mineral Resource classification of measured.
- The starting location is close to the MSP.
- The starter pit is located in a flat wide swale, minimizing earth works prior to dredge and concentrator construction.
- The starter pond is adjacent to a natural valley allowing tailings to be deposited away from the pond, negating many of the initial operational issues associated with tailings at the commencement of mining activities.

The dredge path initially proceeds north along the eastern edge of the mineralized dunes. In the second year of mining, the dredge path reaches the northern end of the main mineralized zone. The dredge then turns back toward the south. The adjacent dredge path is separated by 10 m at the pond level. The 10 m separation is to minimize the slumping of the previously stacked tailings. It should be noted that when mining adjacent to placed tailings, the tailings will be stacked, as far as practical, to the eastern edge of the void. This minimizes re-mining of the tailings.

The dredge path continues from south to north as shown in the Figure 3.7. The dredge path is wide in this area to improve efficiencies and to maximize grade. The dredge path then progresses north, narrowing in low-grade areas and widening in wide high-grade areas.

### 3.6.3 Ore Reserve

The Ore Reserve has been estimated by applying modifying factors to the material contained within the dredge path design. Modifying factors typically include mining dilution and ore loss. Dilution (sub-economic material, unavoidably mined as ore) has been incorporated within the dredge path design. Additional dilution from outside of the design was not added to the Ore Reserve.

Ore loss (material intended to be mined as ore, but because of the mining method, is not mined) is considered to be negligible because of the mining action of the cutter head and the mining process.

The deposit continues beyond these reserves to both the north and south and at lower grade adjacent to the designed mine path. Additional mine life will be dependent on the marginal project economics, mineral distribution, geometry and land access. Additional drilling will also be required in some areas to expand the resource base.

MDL updated the Ore Reserve in December 2017 to reflect refinements to the mine plan. Ore Reserves were increased by the addition of a minor quantum of 'off-dredge pathway/near surface ore' that is planned to be dozed into the dredge path, to augment the recovery of ore by the dredge.

Table 3.2 is a summary of the Ore Reserve estimate, as quoted by GCO following the update of the Mineral Resource statement at 31 January 2018.

Table 3.2 Ore Reserve as at 31 January 2018

Classification	Ore Tonnes (Mt)	HM (Mt)	HM (%)	Zircon (%)	Leucoxene (%)	Rutile (%)	Ilmenite (%)
Proved	1,392	20.2	1.5	10.7	3.2	2.5	72
Probable	373	4.5	1.2	10.7	3.2	2.5	72
<b>Total</b>	<b>1,765</b>	<b>24.7</b>	<b>1.4</b>	<b>10.7</b>	<b>3.2</b>	<b>2.5</b>	<b>72</b>

Note: The Ore Reserve estimate is based on Indicated and Measured Mineral Resource contained within the mine design and defined by optimization and application of minimum head grade of 1.3% for the first five years, 1.0% for the following years.

The Ore Reserve estimate is the part of the Mineral Resource contained within the dredge path design and dozer push areas. It is inclusive of mining dilution and is based on the project's economics.

Ore tonnes have been rounded to the nearest 1 Mt.

Grades have been rounded to one decimal place.

The mineral assemblage (zircon, ilmenite, rutile and leucoxene) is reported as a percentage of HM.

All Mineral Resources are inclusive of Ore Reserve.

In accordance with the JORC 2012 standards, (in AMC's opinion) the data inputs used to estimate the 2018 Ore Reserve have been collected using appropriate methods with acceptable modifying factors, and are thus representative of the current approach to mine production. AMC considers that the Ore Reserve estimate has been generated using appropriate methods.



### 3.7 Mining schedules

#### 3.7.1 Production schedule

AMC verified the GCO mine production schedule by evaluating the resource block model contained within the designed dredge path and then scheduling the results according to the production requirements.

The GCO has not been able to achieve consistent production performance for dredged ore throughput since the 2015 commissioning of mining operations. This impediment to production levels has been caused by a number of production inefficiencies present within the dredge design and the operation of the combination of dredge and WCP.

In the 2018 updated Mineral Resource and Ore Reserve report, GCO re-forecast the dredge throughput rate to target achieving nameplate production capacity from 2019. GCO also state that they have engaged a specific team dedicated to project associated with the increase in production capacity of the mining operations. AMC considers that based upon the demonstrated 2017 production performance and the planned programme of production optimization, the GCO mining and treatment schedule will be achievable. Table 3.3 shows the revised dredge throughput capacity forecast as at January 2018.

Table 3.3 Revised dredge capacity forecast

Designation	Unit	2015	2016	2017	F2018	F2019
Runtime	%	67.8	73.4	81.1	86.0	89.0
Dredge throughput	tph	5849	6078	6363	6859	7000
Mined sand	MT	35	39	45	52	—

### 3.8 Mobile mining equipment

A small fleet of mobile mining equipment is required to support the dredging operation. Mobile fleet duties include:

- Clearing ahead of the dredge. Dredge mining activities commence with land clearing and collection of vegetation and topsoil. This material is moved off the dredge path and used in the rehabilitation process. The mining equipment used for land clearing is bulldozers for removal of trees and vegetation, levelling of obstructions and short pushes of material.
- Rehabilitation activities. The operation involves large quantities of rehabilitation works; hence a small multi-purpose fleet of civil equipment is used for these activities.
- Road and track maintenance. The continual movement of the dredge necessitates ongoing road construction and maintenance.
- Assorted minor civil works across site.

Mobile equipment was selected based on the following key criteria:

- Availability (both new and used).
- Ability to be purchased from a single manufacturer, such as Caterpillar (CAT), Komatsu or others.
- Availability of spare parts and presence in Senegal.
- Experience with the construction of the Sabodala gold project in Senegal and the operation of similar dredging activities in Australia.
- Special consideration was also placed on suitability to be operated in the unique all-sand environment.

AMC considers that provision of mobile mining equipment is sufficient to support the GCO dredging operations.

### 3.9 Mine services

The GCO dredging operation requires considerable services to support mine operations. These include roads, power supply and reticulation, borefield and water reticulation infrastructure. These are described below.

#### 3.9.1 Roads

A main service corridor constructed parallel to the dredging path. This will be a permanent road built to nominally 8 m wide from laterite and chert material and will have the main water header and power line located adjacent to the road. Access roads will be constructed adjacent to the planned dredge path and will provide vehicular access to the working areas and water bores from the main service corridor.

Pond access ramps will be constructed by bulldozers cutting the ramp into the wall of the dredge pond and pushing sand out to form a landing above the pond water level. Ramps will be constructed at regular intervals as required. Pond access roads and ramps will be required to carry services to and from the dredge pond (dredge and WCP), including:

- Personnel access including transport.
- Power.

- Return and make-up water pipes.
- HMC transport pipes.
- Cranes and trucks transporting replacement equipment and maintenance tools.

### 3.9.2 Power reticulation

Overhead power lines deliver power from the onsite generation facilities located at the MSP to the dredge, the WCP and bores and booster pumps. Substations are required to distribute the power to pump sets. The overhead power lines are constructed in parallel with the advance of the dredge pond.

### 3.9.3 Borefields and water reticulation

Deep water and lateral water bores deliver water to the dredge pond and WCP and prevent possible detrimental impact of the changing ground water level adjacent to the mining and tailing operations on nearby farms and domiciles. Water bores require mains power, substations, pipes and a series of access roads off the main service corridor water pipeline.

### 3.9.4 Pumping of HMC and return water

Pipes carry the HMC to the shore based HMC stacker from the WCP. Stockpiled HMC is subsequently trucked to the MSP.

### 3.9.5 Extension of services

Services are extended as the mining operation progresses. The operating cost model contains allowances for extension of the services from the third year of operation including:

- 2 km of power and main water services on an annual basis.
- Lateral extensions of power and water at 400 m intervals in line with the dredge pond movement.
- Additional deep water and lateral bores in line with dredge movement and water requirements.

### 3.9.6 Specialist equipment

Support of service extensions require specialized machinery, including polyurethane welding machines. A service barge is utilized for supporting floating plant maintenance activities.

## 3.10 Mine maintenance

Mine maintenance practices and strategy draw heavily on the experience of MDL's Sabodala gold mining operation in Senegal. The maintenance strategy at Sabodala was based on the development of a Management Operating Strategy (MOS) and this strategy has been adapted for GCO.

The MOS details site wide process flows and the interrelationship with maintenance activities including, meetings roles/responsibilities and application of Key Performance Indicators such that maintenance practices can be effectively managed.

GCO demonstrated that maintenance practices are developed concurrently with construction of site facilities. Key activities include:

- Compilation of a complete asset register for fixed and mobile equipment.
- Criticality review of fixed and mobile plant equipment.
- Review of vendor recommended spares inventories and purchase relative to the criticality review.
- Development of short-, medium- and long-term maintenance procedures/inspections for all equipment (both fixed and mobile) associated with mining operations.
- Development of work procedures for major overhauls on identified critical equipment such as the dredge cutter.
- Scheduling and planning of maintenance activities in accordance with vendor recommendations and site conditions.

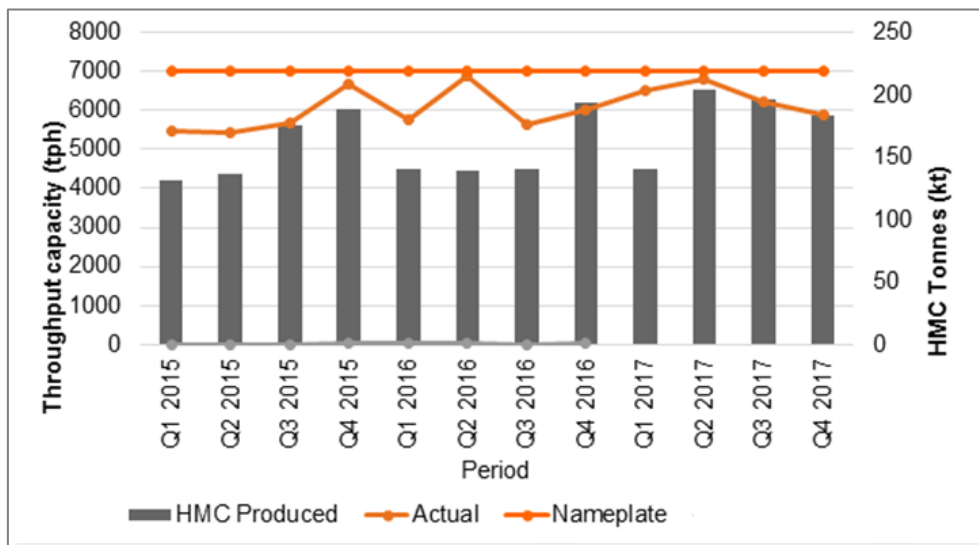
All maintenance is undertaken by GCO as opposed to contract maintenance. Specialized support such as power line installation and extensions are planned to be subcontracted out to specialized contractors. A workshop for fixed and mobile plant maintenance is located adjacent to the MSP.

## 3.11 GCO mine production

### 3.11.1 Mine production reconciliation

Figure 3.7 shows annual HMC trending upwards. In 2015, 632 kt of HMC was produced. The total production for 2016 Q1 and Q2 are similar to 2015 Q1 and Q2. The increase in production to nameplate capacity is attributed to various measures put in place by MDL to increase plant availability and utilization. Current short-term mine planning also shows the dredge path was optimized by increasing the water level by approximately 1.2 m, which has led to increases in HMC grade.

Figure 3.7 Actual HMC production 2014 to 2017



Source: 05.43 GCO Monthly Report OCTOBER 2017 Appendices.pdf

### 3.11.2 Resource model reconciliation

Table 3.4 shows reconciliation between the resource model and actual mining production. Reconciliation shows that total HM mined and HMC grade in 2016 is within 4% and 6% respectively. Overall mining reconciliation to date shows the resource model overestimate the THM by 1% whilst underestimating HMC grade by 2%. Thus, no further dilution and ore loss allowance are required prior to mine planning as is the current practice.

Table 3.4 Resource model reconciliation

Period	BLOCK MODEL ESTIMATION			ACTUAL PRODUCED AND GRADES			Variation		
	Mined (Mt)	THM tonne (Kt)	HM (%)	Mined (Mt)	THM tonne (Kt)	HM (%)	Mined Ore (%)	THM tonne (%)	HM grade (%)
April-Dec 2014	15	203	1.32%	14	209	1.50%	9%	-3%	-13%
Jan-Dec 2015	35	731	2.08%	35	687	1.98%	1%	6%	5%
Jan-Oct 2016	33	507	1.55%	32	527	1.65%	2%	-4%	-6%
Overall	83	1441	1.73%	81	1423	1.76%	3%	1%	-2%

source: Reconciliation Summary.xlsx

## 4 Wet concentrator plant

### 4.1 Plant overview

The following observations and opinions are based on the GCO site visit conducted in July 2017. AMC were provided with limited operational data.

The floating wet concentrator plant (WCP) produces a HMC achieved by a five-stage spiral concentrator circuit. The HMC is then transferred to the Mineral Separation Plant (MSP) for further processing.

The process handling of material from the dredge to the WCP is via distribution of two trommel screens situated in parallel. Trommel screen oversize reports back to the pond, while trommel screen underflows are pumped to two clusters of dewatering cyclones. A portion of the cyclone overflow also reports back to the pond while a separate portion of the cyclone overflow is used at the surge tank for dilution, density control and fluidization water. The surge tank is designed to provide consistent feed to the WCP.

The WCP five stages of concentration of the HM include:

- Rougher/scavenger spirals.
- Middlings spirals.
- Cleaner spirals.
- Re-cleaner spirals.
- Finisher spirals.

The HMC from the WCP is pumped overland to the HMC stacker circuit for stockpiling on land.

The tailings from the WCP report to the Tailings Densification Module (TDM) to ensure that tailings stacking booms receive the correct feed density.

### 4.2 Plant areas

#### Dredge operation and spiral plant feed

AMC understands that the operational availability of the WCP is not achieving desired targets. The feed rate is also often well below the target rate of 7,000 tonnes per hour. GCO reports identify common pulp densities of 40% from the dredge. In typical western operations target pulp densities of 45% to 50% are seen. This reduces the water requirement and provides a more stable slurry. The higher pulp densities reduce the critical settling velocities and reduce the pumping power required.

#### Trommel

A single flexible hose transports the slurry from the dredge up into a standard pipe T-piece to split the flow to two trommels. It is unknown if the T-piece has been inspected recently or had non-destructive testing to determine the lining thickness. Due to being a very high wear point there is risk that erosion could occur. If failure was to occur it would impact availability to the trommel processing streams and overall production rates.

#### Surge tank operations

The primary feed target is to achieve maximum solids levels, or near maximum solid levels, in the surge tank prior to a corner manoeuvring sequence being commenced by the dredge. During a corner manoeuvring sequence, the surge tank solids volume will be depleted due to the reduced dredge mining rate.

If the surge tank control is not maintained the following negative impacts may result:

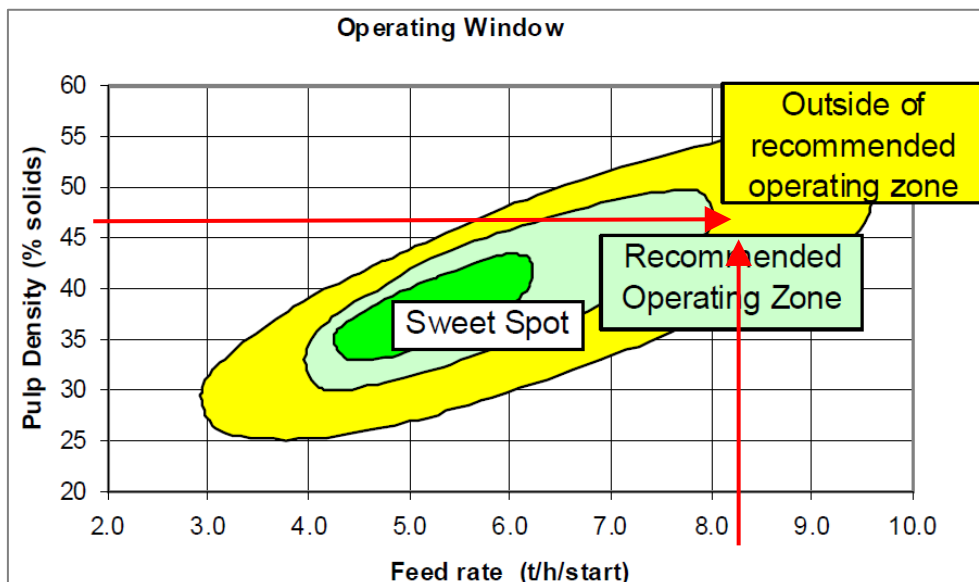
- Overfilling of the bin will cause mineral to be lost to the mining pond, via surge bin overflow.
- Not maximizing levels prior to a dredge corner manoeuvre, the effective surge capacity of the system may be insufficient to maintain constant feed to the spirals resulting in production shortfalls.

The surge tank volume is designed to provide 10 minutes capacity from full, which appears to be adequate for the currently designed control loops.

### Spiral plant

In AMCs opinion, based upon typical mineral sands WCP operating practices, the rougher spiral feed density appears to be very high considering if fed with a slurry pump density at 50% solids by weight, as indicated in the GCO mineral processing reports<sup>6</sup>. Based on the supplier's recommended operating zones, a pulp density of 50% at the target throughput of 8 tonnes per hour per start is at the very high end of the recommended operating zone of the spirals. Mineral sands operations typically aim for less than 40% solids in the rougher spiral to optimize the spiral performance. See Figure 4.1 spiral separation performance profile.

Figure 4.1 Spiral separation performance profile



Mineral Technologies, Optimal Spiral performance characterization, 2015

Operating spirals at the high end of the recommended zone results in inefficient operations if there are fluctuations in density or increase in tonnage. Non-laminar flow of separation material was observed during the site visit to the WCP. Figure 4.2 shows non-efficient sand flow in the rougher spiral.

Figure 4.2 Non-efficient sand flow in the rougher spiral



Additionally, a significant amount of water may be added in the re-pulpers to maintain mineral mobilization and this may be thrusting a lot of valuable mineral to the outside of the spiral and increasing valuable mineral reporting to the middlings or tailings streams.

<sup>6</sup> Document 05.61 Wet Concentrator Plant Technical Report and Process Flow Diagram 05.63 140111-2300-49D1-923054\_02

### 4.3 Equipment suitability

#### **Trommel screens: TR-001, TR-002**

The trommel design is efficient and adequately sized for the sand throughput. However, the original panels selected were not durable enough to withstand the high loading of peat and foreign material. It is understood a new panel design has been installed to overcome this issue.

AMC understand that modifications are being considered for the two trommels by the inclusion of a coarse screening cylinder. This will require a significant structural modification to the trommel frame and increase in the screen mass. Inspection and access to the fine panels will be compromised by the inclusion of an internal screen.

#### **Dewatering cyclones**

The purpose of the dewatering cyclones is to dewater and densify the feed reporting to the surge bin as well as supplying water for dilution, fluidization and density control through the cyclone overflows. From the design data presented, the mass pull from the cyclones to the overflow appears to be low. Generally fine material will report with the water flow due to the turbulent motion in the cyclone.

Typical dredge ore is low in slimes with a typical feed of less than 6% slimes. In AMC's opinion this level of slimes does not impede the WCP's ability to process HMC.

#### **Surge tank**

The design of the surge tank is intended to provide a consistent feed in both volumetric flow and solids density to the rougher spirals by removing the surges resulting from the dredge movements. This smoothing of the process is achieved by allowing sufficient residence time (surge capacity) within the tank, control of dilution water addition to the rougher spiral feed pump suction, and pump speed control. AMC identified that GCO allow the surge tank to overflow, with the overflow water being used in the dilution processes. Should the bin overflow, fine product may be lost in an uncontrolled manner impacting overall recovery of the mineral resource.

Inspections by AMC indicated that the only source of water for the surge tank density control, fluidization and dilution is from the overflow of the surge tank. This causes any plant start-up and shutdown to be difficult and clean-outs potentially impossible. This is not a material impact to operations; however a separate, relatively clean, and independent source of water should be sourced for the surge tank density control, fluidization and dilution to simplify the process.

#### **Rougher spirals: SP-001 to SP-024 & SP-048 to SP-055**

The rougher spirals are a combined Rougher and Scavenger type. In AMCs opinion the feed density is very high, if these are fed with a slurry pump density at 50% solids by weight as indicated in the provided reports<sup>7</sup>. The pulp density of 50% is at the very high end of the recommended operating zone of the spirals. Commonly spirals will have improved separation of minerals, particularly fine minerals, with a lower pulp density. Designing the spirals to operate at the high end of the recommended zone will result in inefficient operation should there be a fluctuation in density or increase in tonnage. This design leaves very little room for throughput increase.

#### **Middlings spirals: SP-025 to SP-032 & SP-056 to SP-059**

These spirals are operating at a high pulp density similar to the rougher spirals. As the purpose of these spirals is recovery, a lower density will offer better separation and less recirculation.

#### **Cleaner spirals: SP-033 to SP-036**

The cleaner spirals concentrate the HM from the rougher and middlings spirals concentrate streams. The Mineral Technologies – HC1RS spirals adopted are designed for high capacity in roughing and/or scavenging duty with low to medium HM content. AMC considers these spiral appropriate, however with medium to high HM content alternative spirals such as an MG12 should be investigated. To increase capacity additional spiral banks may be required as MG12 spirals are triple start.

#### **Re-cleaner spirals: SP-037 to SP-040, SP-062, SP-063**

The re-cleaner spirals improve the product grade. Although the adopted HG10i spirals are designed for high feed grades the target feed pulp solids for these spirals is 40% by weight, which is well within the recommended operating zone.

<sup>7</sup> Document 05.61 Wet Concentrator Plant Technical Report and Process Flow Diagram 05.63 140111-2300-49D1-923054\_02

## **Finisher spirals: SP-041 to SP-044**

The finisher spirals use the HG10i with a pulp density of 35% by weight, which is within the optimal range for spiral operation.

## **Tailings dewatering cyclones**

The tails dewatering cyclones produce thickened slurry for final stacking and deposition behind the path of the operating pond. AMC understands the final land formation must be higher than the pre-mined ground level. As this material has a very low grade and high swell factor the tailings must be stacked to create a steep beaching angle. Without specific details on the cyclones, testwork or physical properties AMC cannot comment on suitability.

## **HMC stacker cyclones: CY-085, CY-118**

The HMC stacking cyclones dewater the HMC and stack material in a stockpile on land in a controlled manner. The cyclone overflow is returned to a 'turkey's nest' where HMC in the overflow is captured and relocated back onto the dredge path for re-treatment. With the HC1 RS spirals, a traditionally stream going to a scavenger stage is not possible.

### **4.4 Maintenance assessment**

Some of the steel piping is rubber lined, which can cause issues in sand plants. There was no indication of premature wear on rubber lined pipe elbows however the use of polyurethane lined steel is common in sand plants due to the longer life of the components.

### **4.5 WSP operational suitability**

The WCP has the capability to meet current production targets and no material issues were identified. There are some risks in loss of mineral through overflow of the surge tank, wear on some components, and the operation of the spirals at the high end of the recommended zone will result in inefficient operation should there be a fluctuation in density or increase in tonnage.

AMC understands that the plant has been designed for a constant feed rate of 7,000 tonnes per hour with a feed grade in the range of 1% to 3.5% with a focus on HMC production. This is considered a very wide range and given the limitation on the 7,000 tonnes per hour feed to the roughers the production at the back of the plant will range widely from 70 tonnes per hour to 200 tonnes per hour. These production rates suggest about an 80% HM recovery.



## 5 Mineral separation plant

### 5.1 Plant overview

The following observations and opinions are based on the GCO site visit conducted in July 2017. AMC were provided with limited operational data.

The MSP at GCO consists of three processing plants:

- Whims/wet feed preparation (WWFP) section to separate magnetic minerals from non-magnetics. The non-magnetics are produced in three varying grades of zircon contents. The magnetics, which are mainly ilmenite, are stockpiled in a central open area before being fed into a continuous dryer and leading into the dry separation plant. The non-magnetics are stored in a shed in different bays.
- Zircon Dry Separation Plant, individually fed in batches from the WWFP.

Zircon and Ilmenite separation sections situated alongside each other in a single building structure.

All three MSP processing areas are currently significantly underutilized with plant operational run time being as low as 70% of the circuit design capacity in the period preceding the AMC site visit, in July 2017.

There are some MSP processing steps which involve the use of single machines, this lack of redundancy within the flowsheet design necessitate that if the machine requires maintenance, the mineral must be recovered to off-specification bins for later retreatment, the whole process train containing the failure has to be shut down, or the MSP temporarily produces a lower grade product.

AMC considers the use of wet Wilfey Tables and the batch processing of non-conductors is a suboptimal approach to modern mineral sands separation plants operations. The use of Induced Roll Magnetic Separators (IRMS) is also not common in modern mineral sands separation plants, with many operators substituting rare earth magnetic separation for increased reliability and lower operating cost.

In AMC's opinion there are not material issues in meeting the current budget and production targets.

### 5.2 Plant areas

The mineral separation area consists of three processing buildings and extensive laydown areas HMC and intermediate partly-separator products. The process areas are the WWFP, a Zircon Dry Separation (ZDP) building, which batch processes three non-magnetic products from a laydown storage shed, and an Ilmenite Dry Separation (IDS) building located against the ZDP. There is some interconnection of streams between the ISP and the ZDP, and also some reject streams from the ZDP, which is recovered for later reprocessing.

The MSP arrangement is not typical in that there are three separate building areas with the WWFP and IDS operating continuously and the ZDP operating in a batching mode. With the intermediate ilmenite rich magnetics from the WWFP section, it is unusual to have an outside dump storage of magnetics before feeding onto the IDS.

The MSP arrangement is not typical with the presentation of three separate buildings with the WWFP and IDS operating continuously and the ZDP operating in a batching mode. The configuration of external surge stockpiling of the intermediate ilmenite rich magnetics from the WWFP section, prior to re-feeding to the IDS, is unusual and it introduces operational inefficiency. Products produced are 58% (TiO<sub>2</sub> content) Ilmenite, 54% ilmenite, Premium Grade Zircon, Refractory Grade Zircon, a Zircon rich by-product grade (for sale mainly to Chinese customers for further processing and separation), Rutile, and Leucoxene, which is a high TiO<sub>2</sub> mineral between Ilmenite and Rutile in TiO<sub>2</sub> grade. The Ilmenite 54 is sold to the sister Titanium Slag production operation in Norway (TTI), the Ilmenite 58 to various chloride pigment producers and other titanium applications. The other products are bulked bagged and packed into 20 ft containers for various end customers around the world.

#### 5.2.1 Whims-wet feed preparation building

HMC is transported by trucks, and is stockpiled in an area across an access road around the processing area. A front-end-loader (FEL) is used to feed HMC through a hopper and conveyor system into the preparation building. Initial processing includes vibrating screen for removal of tramp oversized matter, a single wet low intensity magnetic separator (LIMS), followed by four wet high intensity magnetic separators (WHIMS) to remove magnetic minerals, mainly ilmenite, and then a large array of spirals, wet tables and up flow classifiers to treat the non-magnetics into three concentrates of varying Zircon grade.

Except for the one LIMS that probably could be bypassed if out-of-service, all other processing stages are undertaken with multiple parallel feed units. Although the up-current classifiers (UCCs) are single streaming, they could be bypassed with an increase in contaminant fine material, which could be partly removed in downstream dry processing.

The use of WHIMS, refer Figure 5.1, to remove the magnetic fraction of the HMC has become standard practice in modern mineral sands operations, targeting zircon and the other high value minerals. WHIMS can be adjusted to varying magnetic field flux and are exceptionally good at handling fine grade sized mineral.

The WHIMS manufactures' specification typically targets 65% magnetics in the feed. However, GCO generally operates above this specification at up to approximately 73% magnetics. At a 140 tph feed rate, this results in the units running between, 17% to 20% over the designed target capacity rating.

It was observed that the WHIMS installation area, within the MSP, has a lot of vacant floor space, which is assumed to be for the future addition of greater MSP capacity.

The intermediate magnetics laydown area is shown in Figure 5.2.

Figure 5.1 WHIMS area



Figure 5.2 Intermediate magnetics laydown area



(Maintenance workshop and power station in left background)

### 5.2.2 Specific gravity separation with spirals and wet tables

The non-magnetics from the WHIMS section are further separated with spirals and wet tables into different concentrates (Cons), with high Zircon Cons 1, and Cons 2 and Cons 3, which are lower in zircon content having more Leucoxene, Rutile and silicate minerals.

The spirals are Mineral Technologies (MT) HG 10i twin starts and MG 6.3 twin starts. The number of starts is generally below the recommended maximum for the units, except for the Mid Spirals and Scavenger Cleaner Spirals, where nominal feed rate is below that recommended by MT. The spirals generally could handle increased throughput above the nominal 120 tonnes per hour HMC feed rate. AMC identified that capacity increase could be achieved through the increase the pulp densities from the design 35% solids up to 40% and operate in a wider range of MT's recommended feed rates.

AMC notes that the reliability of the spirals is very good.

The wet tabling is considered older technology to separate zircon from close-density silicates. The tables take up a large amount of floor space even though they are double deck arrangement.

Figure 5.3 Wet tabling machine area



Long term there is the possibility of replacing the wet tables with more compact higher throughput units. There is no material issue with the use of the wet tables at GCO.

During the site visit, the tables appeared to be lightly loaded at nominal rates. The highest loading is nominally 0.8 tonnes per hour solids feed per table.

AMC noted that there is additional ground floor space if an expansion in capacity was required, see Figure 5.4. An alternative to utilizing the ground space would be extension of the building by adding another bay on either of its long sides.

Figure 5.4 Long side vacant area of feed preparation building





## 5.3 Plant availability

The following comments apply to all processing areas of the MSP.

AMC was not supplied with any specific details of the MSP scheduled maintenance programme, so cannot comment on the details of preventative maintenance practices.

### 5.3.1 Ilmenite dry separation circuit

Magnetic minerals are stockpiled in the surge area inside the MSP and decouples the feed preparation WHIMS plant from the IDS plant.

Magnetics are fed via FEL and hopper/conveyor up into a Fluid Bed Dryer (FBD). Feed rate is 105 tonnes per hour. Although the flow diagrams and mass balance does not state a moisture content for the FBD feed, it has been estimated to range between 5% to 8%. The feed stockpiles are exposed to the weather.

Site personnel did not indicate any capacity restriction with these dryers. The equipment supplier is Outokumpu with a Perth based designer.

FBDs generally have a very limited capacity range, 80% up to 130% of nominal rate. But their capacity can be increased with bigger burner chambers, bigger expansion chambers and a switch to natural gas fuel with shorter flame length compared to distillate or heavy fuel oil.

There are a number of re-heaters in both dry separation sections. During the site visit, none of these were seen by AMC. There was no technical specification provided to AMC after the visit. Although AMC cannot confirm the specifications of the FBDs and the design capacities, they are a common type of re-heater for dry separation and would be considered reasonable for this operation.

Considering all bucket elevators in general through both dry plants, these can be upgraded easily by reducing bucket spacing, hence increasing the number of buckets and possibly drive motor and gearboxes. If at the correct design speed, it is not recommended to increase belt speed.

The bucket elevators sighted on the visit are standard design and are considered appropriate.

The belt conveyors are appropriate and have the capacity to increase rates with new drives.

The dry separation units (refer Figure 5.5) consist of Coronastat electrostatic separators to remove non-conductors followed by rare-earth magnetic separators to achieve the split between Ilmenite 54% and Ilmenite 58%. Both Rare Earth Drum magnetic separators (RED) and Rare Earth Roll (RER) separators are used in the cleaning of the magnetic fractions.

The Coronastats have a capacity of up to 8 tonnes per hour feed rate. The machines in the IDS section at nominal rates are lightly loaded and thus have more capacity. The units are in clusters of 18 and stacks of three machines, but one process step is a single unit treating a middlings stream. This machine could be bypassed if there is a need to shut down the unit for repairs.

The RED separators are relatively new separation devices. AMC has limited knowledge of their use or capability.

The RER separators are commonly used in the mineral sands industry and have replaced original old electromagnetic cross-belt separators. Their reliability has been proven. The main maintenance requirement is to maintain correct tension and tracking of the belts, and replacement of the belts, which can be undertaken in a very short time (minutes). One of the processing duty is undertaken by a single machine. The other duty is undertaken with two units. Feed rates indicated are considered conservative at 2.3 tonnes per hour and 2.7 tonnes per hour per machine at nominal plant rates.

AMC considers that the product quality of both ilmenite streams is not critical to either sulphate or chloride pigment industries processes. The HMC produced at GCO is low in radionuclides, compared to other mineral sands operations, and the Uranium and Thorium (U+Th) levels are not considered significant.

Figure 5.5 Dry separation units



### 5.3.2 Zircon dry plant

The conveyors and elevators in the ZDP are the same as the IDP. Comments concerning both in Section 5.3.1 are relevant to the ZDP.

GCO indicated that feed moisture in the concentrate feed to the plant has been a problem, even with undercover storage in the stockpiling area. This has been rectified with the installation of a horizontal belt filter to partly or wholly reduce the moisture in mineral going to the FBD.

Although AMC cannot confirm the specifications of the FBDs and the design capacities, they are a common type of re-heater for dry separation and would be considered reasonable for this operation.

The initial stage of the ZDP consists mainly of Coronastat electrostatic separators to separate zircon rich streams from conductive minor products, rutile, leucoxene etc. The Coronastats are lightly loaded at normal rates with the processing stage undertaken across multiple units in parallel. There are two downstream processing stages with single unit and another other stream with a dual and single feed machine.

AMC considers that the separators are appropriate and with the number of Coronastat on the site, if a single machine application failed, it could be replaced from a multi-bank stage.

A single unit plate electrostatic separator is included in the Zircon flow stream. These plate separators are considered reliable and are only impacted by high voltage DC supply.

One stage of the conductor processing involves a RER separator but two units in parallel are used for the duty. See Figure 5.6 illustration of a RER.

Figure 5.6 Rare earth roll magnetic separator (RER)



In the second part of the ZDP, as defined by process flow diagram 3000-49-D1-930055, the two main Zircon products are produced and cleaned up. The main units are magnetic separator, generally RER. Induced Roll Magnetic separators are used in two process locations. These are electromagnetic devices, which most mineral sands operations replace with more modern technology. They are extremely heavy and expensive due to their copper wiring and laminated iron core. However, they will last for many years and it is understood that the magnetic field can be varied, which is not possible on a rare earth magnetic machine. There is also a process advantage, in that the magnetics are lifted clear of the main stream where in RER and REG, the magnetics are then retained on the drums.

AMC is of the opinion that loading on all magnetic and electrostatic units at nominal rates is considered conservative.

### 5.3.3 Product storage and handling

AMC did not receive additional information after the site visit regarding the storage and handling of the various products. Based on the site visit and discussion with GCO AMC are of the opinion that it is adequate and flexible enough to produce different grades of material such as the semi-bulk in container Zircon-rich concentrate.

## 5.4 Plant design and operations

AMC is of the opinion that the standard of the mechanical design of the plant areas is excellent and potentially over-designed with some large vacant floor areas, creating the opportunity for capacity expansion. Although instrumentation in the plants was not examined by AMC, it appears that there is a high level of process control and monitoring. The only non-automated section of the MSP are the front end loading of materials and checking of machine separation performance.

### Operating personnel

All operations personnel including managers, metallurgists and operators that were interviewed by AMC during the visit were considered competent and well suited to their roles at the MSP. AMC noted that all senior personnel were expatriates.

No Senegalese engineers were identified during the site visit. It is understood by AMC that there is currently a limited supply of qualified metallurgical personnel.

### Laboratory functions

AMC observed that the laboratory is well set up and provides extensive capability of test work required by GCO. The laboratory is certified to conform to an ISO quality standard. As a check of the labs quality and conformity, they participate in external cross-checking with other mineral sands producers and commercial laboratories, and in-house carry out analyses using certified reference materials. XRF is the main elemental technique and the laboratory manager is confident with this technique. Results have been cross-checked with ICP methods in other laboratories.

There is full traceability of samples and products analyses.

## 5.5 MSP operational suitability

It is AMCs opinion that the MSP is well run and fit for purpose, although some of the processing arrangements are unusual by modern mineral sands processing standards. AMC considers that the MSP is currently underutilized, with the availability of ex-mine HMC feed, and throughput could be increased both by increasing the loading of the separators and increasing the plant run-time availability.

In AMC's opinion there are not material issues in meeting the current budget and production targets.

## 6 Power station

The following observations and opinions are based on the GCO site visit conducted in July 2017. AMC were provided with limited operational data.

### 6.1 Capacity and consumption

GCO has installed five power generating units. The power station generators and associated metrics are listed in Table 6.1.

Table 6.1 GCO installed power generating units

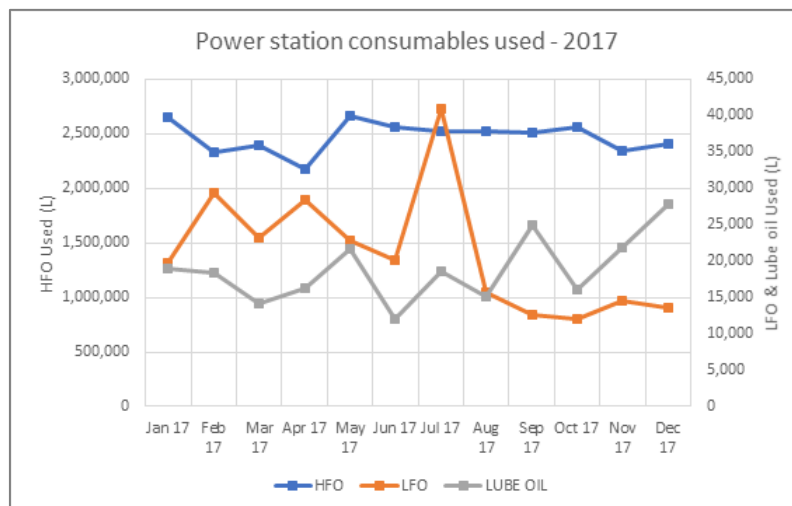
Eng. No.	Customer Genset Name	Manufacturer	Product Type	Cylinders	RPM	kW
PAAE225179	Genset 01	Wärtsilä	W9L34	10	750	4000
PAAE225175	Genset 02	Wärtsilä	W20V34	20	750	8000
PAAE225176	Genset 03	Wärtsilä	W20V34	20	750	8000
PAAE225177	Genset 04	Wärtsilä	W20V34	20	750	8000
PAAE225178	Genset 05	Wärtsilä	W20V34	20	750	8000

Key aspects AMC identified are:

- The generators are low speed (750 rpm).
- The engines operate on a combination of heavy fuel oil (HFO) and light fuel oil (LFO).
- The engines are 340 mm bore.
- Genset 01 is a 10 cylinder and Genset02, Genset 03, Genset 04, Genset 05 are 20 cylinder.
- Maximum power station capacity is 36 MW.

The operational information for the power station has been provided inclusive of May 2016 to October 2016. Figure 6.1 shows the use of consumables for power generation over this period.

Figure 6.1 Power station consumables



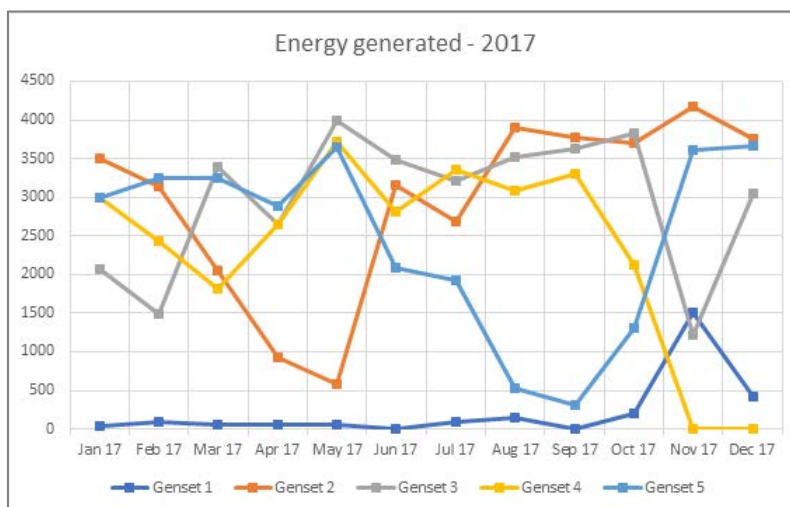
Sam Shields, MDL Financial Planning & Analysis Manager, MDL spreadsheet; *historical\_data\_requiring\_extra\_data.docx*

AMC observed that the fuel and oil usage is largely consistent over the period. Light fuel oil has a decreasing trend with a likely reduction in costs but is a small component of the total fuel used.

Figure 6.2 shows the MWh produced by each of the generators over the period.



Figure 6.2 Energy generated

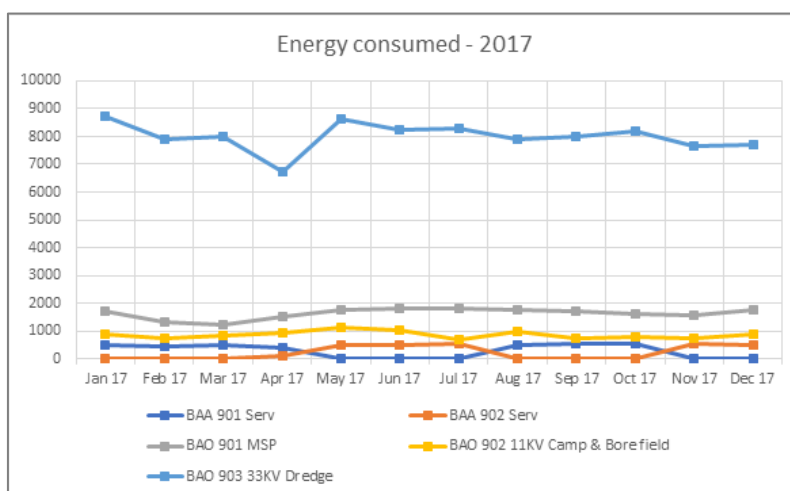


Sam Shields, MDL Financial Planning & Analysis Manager, MDL spreadsheet; *historical\_data\_requiring\_extra\_data.docx*

The data demonstrates that there is significant variability between the monthly energy generated for each of these generators. Genset 02 produced no power during June 2016, while Genset 01 provided minimal power over the entire period. As Genset 01 is a smaller generator, it may be used for peak loading, standby or alternative duty, however AMC were unable to confirm this from the information provided. The data indicates that generators Genset 03 and Genset 05 produced the most consistent power, with the Genset 04 reducing over time.

Figure 6.3 shows the energy consumption over the period.

Figure 6.3 Energy consumed



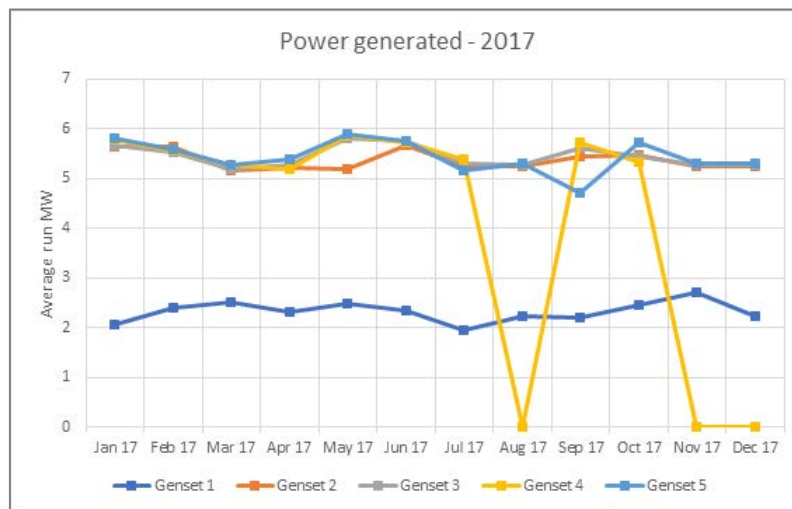
Sam Shields, MDL Financial Planning & Analysis Manager, MDL spreadsheet; *historical\_data\_requiring\_extra\_data.docx*

The 33 kV Dredge uses the most power by a considerable margin. The Station Services and 11 kV Camp & Bore Field started May with high usage and then proceeded to level out. It is unknown what the reason was for the initial higher demand during this period.

AMC identified that the average total MW produced during the time period was 23 MW, well within the power stations capability of 39.6 MW.

Figure 6.4 shows the average run power generated by each generator over the period.

Figure 6.4 Average run MW generated



Sam Shields, MDL Financial Planning & Analysis Manager, MDL spreadsheet; *historical\_data\_requiring\_extra\_data.docx*

Aside from one month when Genset 02 produced no power, the output of the generators has remained reasonably consistent throughout the period. In AMCs opinion this indicates a robust supply of power to the operation.

The operation is supplied by a 33 kV transformer and overhead line as shown below in Figure 6.5.

Figure 6.5 33 kV Transformer and overhead line



## 6.2 Assessment

Average monthly availability over the five power station generators was generally high. The age of the units may indicate that more significant overhauls will be required in the future. However the utilization values indicate that if longer maintenance periods are required for overhauls that there is sufficient redundancy in the system to complete this without impact to overall power supply to the operation. Table 6.2 provides a summary of the availability and utilization of the five generators of the period.

Table 6.2 Generator availability and utilization

Average for 5 Generators	Gen 1	Gen 2	Gen 3	Gen 4	Gen 5
Average fuel consumption (gr/kWh)	231.60	220.79	222.36	222.58	221.27
Deviation from Wärtsilä specification	+21.6	+10.79	+12.36	+12.58	+11.27
Deviation as a percentage (%)	10.3	5.1	5.9	6.0	5.4

AMC identified that the average fuel consumption exceeds the design specification for all the generators. For the four larger generators the average increase in consumption is approximately 5.5%, while it is 10% for the smaller generator. The advised Wärtsilä specific fuel consumption is 210 gr/kWh. The variance is shown in Table 6.3.

Table 6.3 Generator fuel consumption

Generator Number	Genset 01	Genset 02	Genset 03	Genset 0 4	Genset 05
Average fuel consumption (gr/kWh)	231.60	220.79	222.36	222.58	221.27
Deviation from Wärtsilä specification	+21.6	+10.79	+12.36	+12.58	+11.27
Deviation as a percentage (%)	10.3	5.1	5.9	6.0	5.4

There is scope for increasing the efficiency of the engines to reduce the fuel usage, and thus the cost. Doing so would also decrease the cost per kWh of the engines.

### 6.3 Maintenance information intervals and scope

The following maintenance information is applicable:

- The Wärtsilä engines have a major overhaul every 12,000 hours.
- Maintenance is completed on site by the GCO personnel.

The operational information over the period May 2016 to October 2016 indicates that aside from increased fuel consumption, availability and utilization, and supporting maintenance is reasonable for GCO and no material issues were identified.

### 6.4 Suitability to the needs of the operation

In AMC opinion the visual inspection and operational data indicate that the power station is capable of meeting the demands of the operation.

The mine-site is supplied via a 33 kV transformer and overhead line. In the unlikely event that this transformer is damaged, this will cut off all power supply to the operation.

The operation is completely dependent on this power supply as there is no external power supply. There is a small start-up diesel generator situated under an awning that provides start-up power.

A reverse osmosis water treatment unit is used to provide purified water for radiator top-ups and other clean water usage.

All fuel is delivered under contract by Total via single tanker road transport. Train delivery is not used due to the difficulty associated with restricted shunting capacity at the port.

AMC notes that the design makes use of reputable suppliers of switchgear, relays and the like, such as ABB, Telemecanique and Weidmüller.

### 6.5 Operating cost

AMC was advised a cost of HFO of XOF183/kg and LFO of XOF263/L. Converting to US\$ at the advised exchange rate of US\$1:XOF600 results in HFO costs of \$0.31/kg and \$0.44/L respectively. Reviewing publicly available historical exchange rate data and bunker pricing indicates this to be reasonable pricing for the period.

Reviewing the quantity of fuel and oil used and associated costs, the recent monthly cost of power provided to the processing plant is as listed in Table 6.4.

Table 6.4 Monthly unit cost of power

Average for Five Generators	May 16 (US\$/kWh)	Jun 16 (US\$/kWh)	Jul 16 (US\$/kWh)	Aug 16 (US\$/kWh)	Sep 16 (US\$/kWh)	Oct 16 (US\$/kWh)
Cost of power provided	0.104	0.108	0.074	0.079	0.078	0.077

The calculation method for obtaining these figures has been reviewed and is considered appropriate.

Cost of power is considered reasonable, especially when compared with the cost of diesel fuel. Other African projects have used a figure of approximately US\$1/kWh for generation via diesel fuel, making the cost of the fuel over three times more expensive than the use of HFO.

Table 6.5 below from an operations report shows the breakdown of the total power cost. It identifies that fuel is the major cost component of power.

Table 6.5 Breakdown of power costs

Description	Current Month		YTD Actual		Budget	
	c/kwh	%	c/kwh	%	c/kwh	%
Parts & Consumables	0.6	8%	0.7	7%	0.9	6%
Fuel	7.0	87%	8.8	88%	13.7	90%
Other	0.0	0%	0.0	0%	0.0	0%
Consultants	0.0	0%	0.0	0%	0.2	2%
Expatriate	0.0	0%	0.0	0%	0.0	0%
National	0.4	5%	0.5	5%	0.4	3%
Rental Equipment	0.0	0%	0.0	0%	0.0	0%
<b>Power Produced in c/kWh</b>	<b>8.01</b>		<b>9.98</b>		<b>15.28</b>	
<b>Power Produced in XOF/kWh</b>	<b>47.78</b>		<b>58.83</b>		<b>87.08</b>	
<b>Power without Dep. c/Kwh</b>	<b>8.01</b>		<b>9.98</b>		<b>15.28</b>	

## 6.6 Recommendations

From the site visit the following recommendations were concluded to assist with production increases and improved operational performance.

### Fuel consumption

There is scope for increasing the efficiency of the generator engines to reduce the fuel usage. This should be reviewed by GCO as it will reduce operating costs including the cost per kWh of the engines.

## 7 Rail system

The following observations and opinions are based on the GCO site visit conducted in July 2017. AMC were provided with limited operational data.

### 7.1 Train load-out

As GCO utilizes two shipping modes the train load-out and rolling stock are also setup in two modes. These modes are; bulk wagons for ilmenite and flat top wagons with containers for Zircon, Rutile and Leucoxene. Dedicated conveyors are used with the bulk wagons for ship loading, while the containers are loaded onto ships directly via container handles.

The rail loading facility consists of a conveyor fed overhead bin discharging into the rail bulk wagons. Figure 7.1 provides an example of the bulk wagons at the train loading hopper.

Figure 7.1 Train loader overhead hopper



Other products are bagged in 1 t bulk bags and loaded in containers that are in turn loaded onto the flat top wagons.

The ilmenite product handling and train load out system was commissioned in 2015 and reported as operating as per design.

In AMC's opinion and supporting operating reports, this facility is meeting the needs of the production and shipping schedule and is considered appropriate.

### 7.2 Rolling stock

The rolling stock consists of 42 bottom gated bulk wagons (also referred to as hoppers) and 10 flat top wagons for containers. As at May 2017, 15 additional hoppers had been ordered and paid for, with an expected delivery date of July 2018.

The bottom gated bulk wagons shown below in Figure 7.2 were manufactured in 2013 by China south locomotive & Rolling stock corporation limited, Yangtze Co., Ltd. (CYR), and have a capacity of 60.8 t and 24.5 m<sup>3</sup>.

Figure 7.2 Bulk wagons



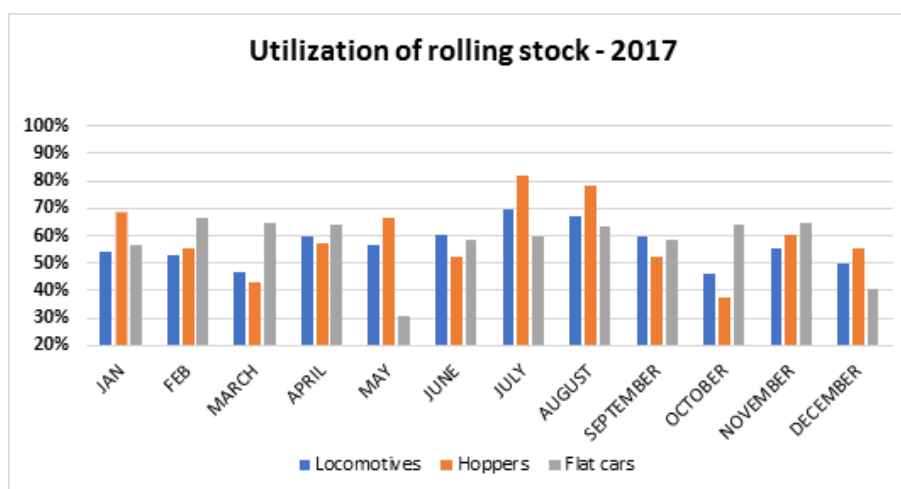
The flat top cars were manufactured by CYR, with a capacity 60.8 t.

A rail car mover is used to shunt wagons for loading. The rail car mover was manufactured by Trackmobile and is a HERCULES model.

The operation reports outline performance for the rolling stock including availability and utilization with results shown in Figure 7.3.

The operation reports outline operating performance for the rolling stock including availability and utilization.

Figure 7.3 Rolling stock utilization



Sam Shields, MDL Financial Planning & Analysis Manager, MDL spreadsheet; *historical\_data\_requiring\_extra\_data.docx*

The bulk wagons have an average utilization of between 40% and 50%, flat top wagon utilization is under 60%. These results indicate that there is some capacity within the equipment fleet for increases in production.



AMC was advised of the following maintenance activities for the rolling stock:

- Bulk wagons: scheduled maintenance every 12 months.
- Flat top wagons: scheduled maintenance every 12 months.
- Rail car mover: scheduled maintenance every 250 hours.
- All wagons: new wheels, truing has not been completed but was scheduled for end of 2017 at the time of the site visit.

A review of the operational reports indicated sufficient wagons with reasonable reliability suitable to meet the production needs of the operation.

### 7.3 Locomotives

GCO has two 3GS24C 2400 hp diesel electric locomotives that were manufactured in 2013 by National Railway Equipment Company (NREC), both with an operating weight of 108 t.

The locomotives were manufactured in China and commissioned on 31 January 2014, refer Figure 7.4. AMC reviewed the commissioning sheets, which provided evidence that the units were operational and functional after commissioning with only some minor items outstanding.

Figure 7.4 Locomotive



The operational reports reviewed indicated both locomotives have provided high availability at medium to high utilization levels. A summary of the incident reporting for 2016 is shown in Table 7.1.

Table 7.1 Locomotive incident reports 2016

Locomotive System	No. of Events	Cumulative	Cumulative (%)
CUMMINS engine system	0	0	0
Mechanical components	0	0	0
HV electrical circuits	5	5	22
Pneumatics (brake system)	1	6	26
LV electrical circuits	17	17	74

An indicative report from operations in October 2016 is shown in Figure 7.5 for a rail incident.



Figure 7.5 Rail incident report

<b>Train Operations:</b> 1) <b><u>October 26<sup>th</sup>. Derailment of GCO train at Thies station. Heading locomotive + the 1<sup>st</sup> wagon derailed.</u></b>
<b>Rolling stock Maintenance.</b> 1) October 3 <sup>rd</sup> . Locomotive RS-CC-02: Ground fault with traction motor no. 5. (HV circuit) 2) October 11 <sup>th</sup> . Locomotive RS-CC-01: Change of Power Contactor P2 failed. (HV circuit) 3) October 11 <sup>th</sup> . Locomotive RS-CC-01: I/O board failed. (LV circuit) 4) October 18 <sup>th</sup> . Locomotive RS-CC-02: Failure of the speed transmitter. (LV circuit)

AMC was advised of the following maintenance activities for the rolling the locomotives.

- Locomotives: Commissioned January 2014.
- Locomotives: Scheduled maintenance every 750 hours.
- Locomotives: Actual wheel service is reported as 183,000 km.
- Locomotives: Wheels trueing was completed as once at 120,000 km service, in December 2016.
- Locomotives: Availability losses reported are due to the LV and HV electrical and brake systems.

The maintenance workshop is shown with parking capacity for several rail units in Figure 7.6.

Figure 7.6 Maintenance workshop



Interpretation of the utilization reporting for the locomotives indicates the following metrics:

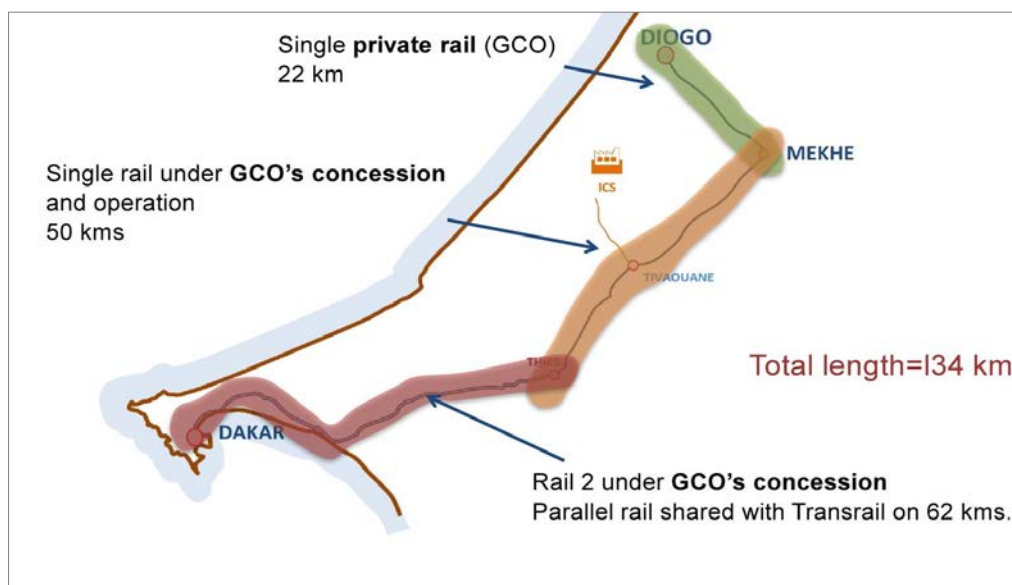
- Locomotives performance has been improving on average likely because of improvements of the quality of the track.
- Average km run per month for the period of the data was 10,400 km.  
Highest performance has produced a haulage metric of approximately 4.5 t of product hauled per locomotive operating hour and utilization of approximately 60% to 70% to haul approximately 50,000 t of product a month.

The operational reports provide production figures, availability and utilization for the locomotives. The historical reporting demonstrates that the locomotives are achieving required production at an acceptable utilization and may have some additional capacity.

#### 7.4 Rail and rail path

The rail way consists of 134 km of rail from site to Dakar, including 22 km single private rail, and 50 km single rail under GCO concession as indicated in Figure 7.7.

Figure 7.7 GCO rail network



A train cycle is reported as three hours loading, seven hours to port, two hours unloading and seven hours return trip for an average full cycle of less than 20 hours.

The rail and shipping reported for October 2016 is an example of typical production at this time period:

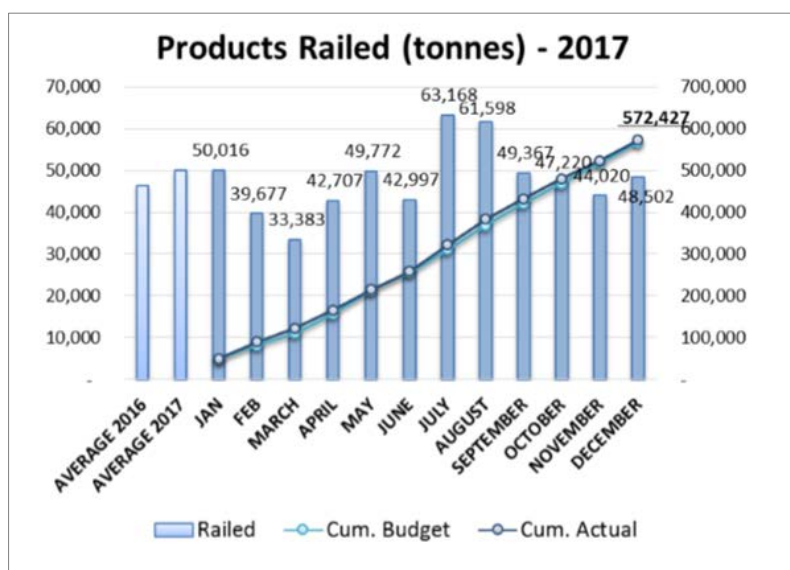
- 37 trains (round trip) were operated in October 2016 with 40,034 t of products railed.
- 4,930 t of containerized products were shipped (330 containers).
- One Chinese customer bulk shipment of 30,516 t of IL54.

## 7.5 Assessment

Details of the railway and rail path allocation was not in the documentation available to AMC but the operational reports show successful performance of the haulage operations for the historic production levels.

The production graph for 2016 shows rail haulage between 30,000 t and 50,000 t per month, see Figure 7.8.

Figure 7.8 Products railed (2017)



Sam Shields, MDL Financial Planning & Analysis Manager, MDL spreadsheet; historical\_data\_requiring\_extra\_data.docx

AMC identified that a rail project at the port was discussed in the documentation with keys points as follows:

- GCO is involved in discussions with government with major issues resolved. An agreement for the rail project is planned to be executed, see Figure 7.9.
- Rail project funding is mainly covered by French Development Agency (AFD).
- The first section project is planned to start in 2017 and should be completed in 2019. The section is Dakar to Diamniado. The section Diamniado-Airport (AIBD) will be built after in 2019.
- The project is to build two tracks with standard gauge for suburban train and a new metric gauge track dedicated for freight trains. A second new metric track will be built later with other funding.
- Works will affect a 10 km section at a time, meaning that impact of traffic should be very low.
- Track 2 will be replaced and GCO will be compensated with the new metric track added in the GCO rail concession.

AMC anticipates that this will have a minor impact on the production and transport of products.

Figure 7.9 Potential rail project



## 7.6 Maintenance information intervals and scope

The rail reporting advises that the following maintenance activities have been completed:

- 90,000 new steel railway sleepers in 2013.
- 20 km of new rail track in 2013.
- Tamper: scheduled maintenance every 250 hours.

Rail reliability was reported as improving leading to a reduction of derailments averaging two per year for 2014, 2015 and 2016.

It is reported that 82 locals are employed in a dedicated rail maintenance team that has been put together through recruiting locals and putting them through an extensive maintenance programme.

Further reporting of rail maintenance shows ongoing work on the rail and an improvement in the reliability and condition of the track.

The rail planners advised that the main information related to track condition is from inspection reports, which is analysed by the maintenance planner. Corrective maintenance is planned on a weekly basis to solve the critical issues.

The information from inspections is collated to capture the age of components and the statistics of rail breakages. Each kilometre of the track is classified into one of four categories:

- New or refurbished – Majority of components are new.
- Acceptable – Partially refurbished or with recent components.
- Bad – Track in bad condition with old components.
- Extremely fragile – Track in very bad condition with high risks to lead to an incident.

The track condition has been recorded as per the classifications in Figure 7.10.

Figure 7.10 Tack condition report



At the time of the site visit the reported maintenance strategy was to focus works on section Thiès to Mekhe especially on section Thiès to Tivaouane due to the high rate of traffic with SEFICS and GCO trains on this track segment. A capital programme (CER) has been raised to replace 7 km of new rail and introduce 2,000 new ties.

### 7.7 Suitability to the needs of the operation

The rail system is a narrow gauge and most likely a light weight rail (i.e. 45 lbs/m) typical for an older rail system such as this. The specifics of the rail specifications were not found in the documentation. A modern purpose designed rail system for bulk haulage would typically have heavier rail and would support high axle loading. As such, in AMC's opinion operation of the bulk haulage on this railway will likely have challenges and require significant management.

The operation of the system however has been proven and the weakness in the facility has likely been overcome by increased spending on rail refurbishment and maintenance. The improved management of maintenance may reach a point where the rail system is in a good state and maintenance may be able to be reduced allowing a lower operating cost to be achieved. Based on the information provided AMC are unable to determine if the maintenance costs of rail may increase or decrease in the near or long term.

### 7.8 Operating cost

AMC identified that at the time of the site visit and data provided that the rail and port operating cost is over budget by 23% (2016). The reported cost of US\$27/t was provided but with no detailed breakdown to allow more detailed analysis.

An indicative benchmark cost for bulk haulage at larger scale is 10 cents per net t km. For the 134 km haulage distance for GCO this would calculate a haulage cost of \$13.40/t. As a comparison, a recent road haulage benchmark cost for larger scale bulk haulage has been established as US\$6.50/t on a private road in West Africa excluding road capital cost.

The labour reported as applicable to the rail and port is nominated as 80 personnel. No breakdown was provided as to the makeup of this labour force or associated cost.



## 8 Port operations

The following observations and opinions are based on the GCO site visit conducted in July 2017. AMC were provided with limited operational data.

### 8.1 Stockpiling and warehouse facility

The unloading of bulk ilmenite is completed by a rail unloading facility where the bulk wagons bottom dump into a below grade hopper and onto an unloading conveyor, refer Figure 8.1. The unloading conveyor transfers material to a transfer conveyor over a belt weigher then via two transfer towers, which transfer material to the two radial stackers within the storage shed. The two stackers stack the material in a concrete floored storage shed.

Figure 8.1 Rail unloading point



Containers delivered on the flat top wagons containing the other products are unloaded with a container handler and stored in a yard.

Storage at the port is reported as able to accommodate 90,000 t of bulk ilmenite in two grades and yard storage for approximately 200 containers.

The operation reports record that the system is functional and meeting the needs of production as indicated in Table 8.1.

Table 8.1 Rail unloader equipment availability

Equipment	Equipment Availability (%)	Equipment Utilization (%)
Railcar Unloader	99.5	10.4
Conveyor 1	100	10.4
Conveyor 2	100	2.9
Stacker 1	99.9	7.5
Stacker 2	100	2.8

The utilization of the equipment is low and as such there is a low risk to the operation due to capacity constraints.

### 8.2 Reclaim

The bulk ilmenite is reclaimed from the stockpiles in the storage shed, refer Figure 8.2. A FEL reclaims ilmenite into three conveyor bins and then is transferred by a curved pipe conveyor to portable conveyors and a movable shiploader located on the berth. The berth is suitable for ships up to 190 m in length, with a draft on pier 52 of 10.3 m.

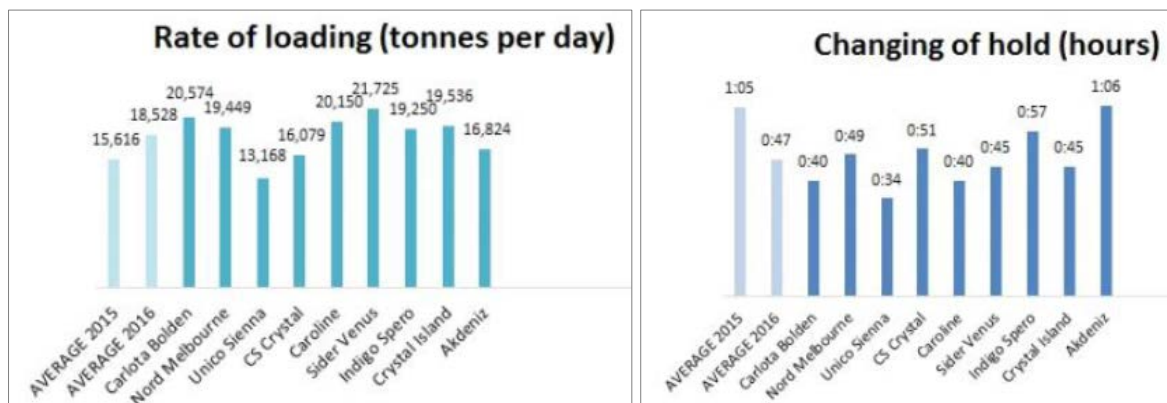
Figure 8.2 Port covered stockpile



AMCs review of the information provided indicated the designed capacity of the port is 1,200 tonnes per hour with a peak capacity of 1,600 tonnes per hour.

AMC noted at the time of the site visit and information provided that loading rate in 2016 had increased on average compared to 2015. The holding time has also considerably improved to half the time compared to 2015. Figure 8.3 graphically represents the loading rate and changing of hold across 2015 and 2016.

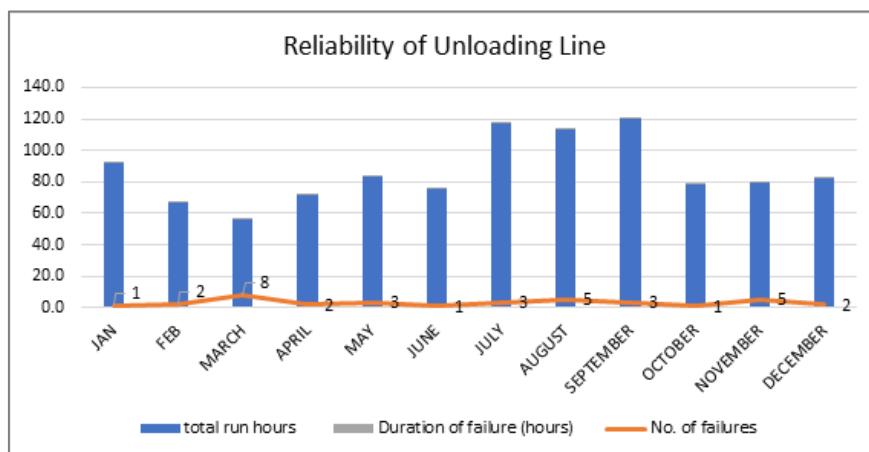
Figure 8.3 Rate of loading and changing of hold



### 8.3 Maintenance information intervals and scope

The total operational run hours for the unloading line during 2016 ranges between 50 hours to 100 hours, including failure hours. Only January, February and August have relatively long failure hours, being of 3.7, 14.18 and 2.13 hours respectively. The run hours and number of failures is shown below in Figure 8.4.

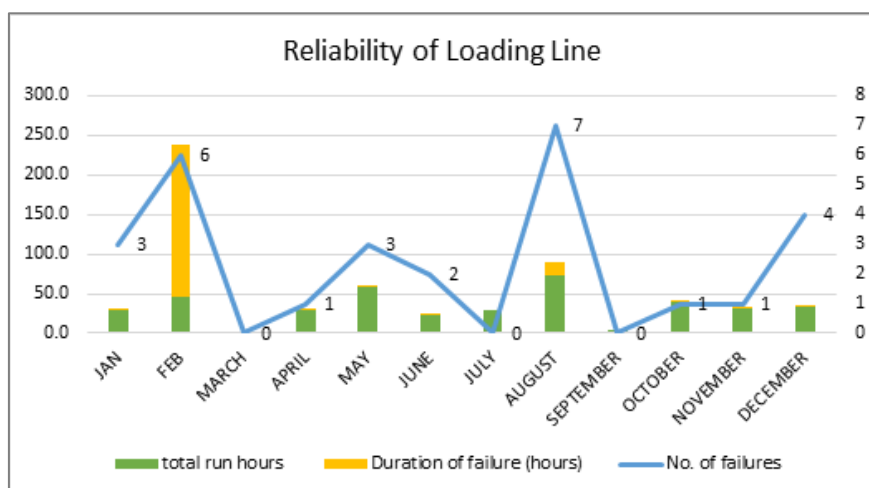
Figure 8.4 Reliability of unloading line



Sam Shields, MDL Financial Planning & Analysis Manager, MDL spreadsheet; historical\_data\_requiring\_extra\_data.docx

The total run hours for the loading line during 2016 ranges between 0 to 100 hours, including failure hours. April had 63 failure hours due to the collision of the ship loader bogie with a pylon, which damaged a wheel axle. The other months had minimal failure hours. Although the April failure was a one-off event it does highlight the criticality of the ship loader and the lack of redundancy. The hours and number of failures is shown below in Figure 8.5.

Figure 8.5 Reliability of loading line



Sam Shields, MDL Financial Planning & Analysis Manager, MDL spreadsheet; historical\_data\_requiring\_extra\_data.docx

AMC noted that for the period of January to October 2016, the total duration of failure in the unloading line was 23 hours out of 758 operating hours, being only 3%, which is very low.

In the loading line, the total duration of failure was 75 hours out of 320 operating hours, being 23.5%. This is a higher percentage and there is an opportunity to reduce these failure hours with some appropriate preventative maintenance.

#### 8.4 Suitability to the needs of the operation

The design throughput of the port is 1,200 tph. Based on the run hours reported in 2016 AMC is of the opinion that there is opportunity to further increase output of the port by increasing the run hours. This would be required if there were an increase in products from the mine.

Table 8.2 shows equipment availability and equipment utilization as an average over 2016 (January to October). The results show that with a low utilization there is considerable spare capacity available on the current arrangement at the port.



Table 8.2 Ship loading equipment availability

Equipment	Equipment Availability (%)	Equipment Utilization (%)
Feeder A	100	3.1
Feeder B	100	4.3
Feeder C	100	1.3
Conveyor 3	100	4.3
Conveyor 4	99.5	4.4
Sampler	100	4.3

### 8.5 Conveyors to port

Feeding of conveyors (hoppers) is completed with FELs. Bulk product (ilmenite) is loaded with dedicated conveyors and ship loader.

A transfer conveyor from the reclaim bins transfers via a transfer tower to a curved tube conveyor, see Figure 8.6, which is supported on towers to deliver product to a transfer tower adjacent to the wharf facility.

Figure 8.6 Tube conveyor



In information provided to AMC the conveyor system is discussed as having a capacity of 1,200 tph, but is reported as achieving an average of 1,300 tph. Average loading rates per day are reported as 18,000 tonnes per day. At an average 1,300 tph rate this indicates 13.8 operating hours per day are utilized. Thus, there is capacity for increased daily production if required.

The production reporting indicates that the facility is achieving the current production requirements.

### 8.6 Mobile ship-loader and grasshopper conveyors

The port handling infrastructure consists of the following major items:

- Mobile conveyors.
- Mobile ship-loader.

There is a single ship-loader that has a design capacity of 1,200 tonnes per hour.

Figure 8.7 shows the loading rates of vessels over 2016. AMC notes the increasing trend of higher loading rates in the loading cycle.

Figure 8.7 Loading rates summary

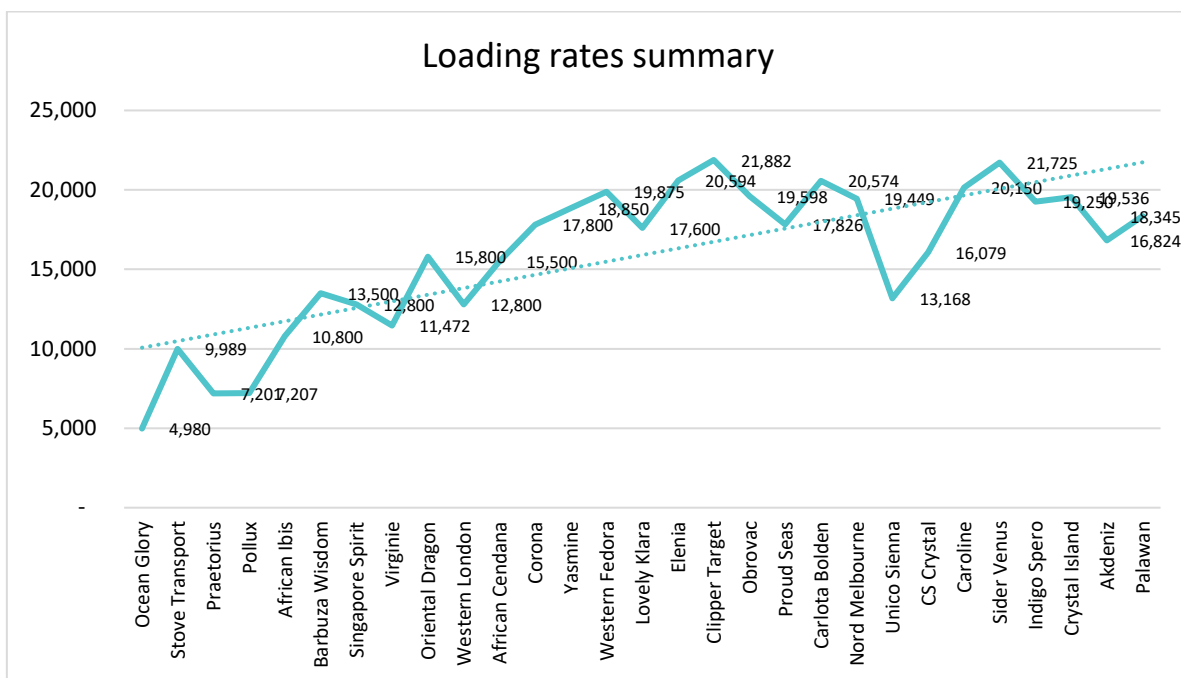
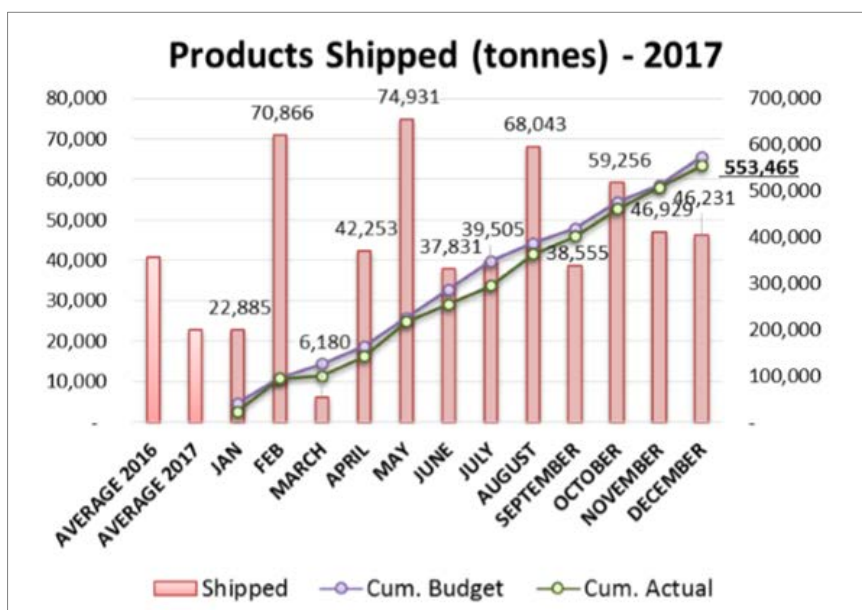


Figure 8.8 below shows the cumulative products shipped from January to October 2016, which is behind budget, but on the same trend.

Figure 8.8 Products shipped January to October 2016



Sam Shields, MDL Financial Planning & Analysis Manager, MDL spreadsheet; historical\_data\_requiring\_extra\_data.docx

In AMCs opinion the ship-loader facility has sufficient capacity to handle the current throughput with some capacity to increase if required.

## 9 Environmental and land impact

The following observations and opinions are based on the GCO site visit conducted in July 2017 during which interviews were held with key personnel in the Environment and Community, Environment & Community; Pollution: & Nuisance Monitoring; and Health and Safety (H&S) divisions.

### 9.1 Introduction

A focus of AMC in preparing this report was consideration as to whether the social, community, environmental management and permitting aspects of GCO are reasonably manageable so that continued operations per the LOM plan are, in turn, reasonably sustainable. The review has been approached from the perspective of considering risk with respect to disruption of operations and impact on GCO's reputation, and potential implications for the legal, liability, and economics aspects of the operation.

AMC approached this section of the ITSR in line with the environmental and social performance standard (PS) structure of the International Finance Corporation (IFC) as MDL's and GCO's environmental policies state that they will endeavour to meet international good practice standards as represented by the IFC's performance standards. Additionally, the 2011 Update of the environmental and social baseline and impact assessment of GCO's mining operations, conducted by international consultancies Umwelt Environmental Consultants and Earth Systems, was conducted and written to meet the applicable IFC PSs. The PSs are:

- PS1: Environmental and Social Management System (ESMS).
- PS2: Labour and Working Conditions.
- PS3: Resource Efficiency and Pollution Prevention.
- PS4: Community Health, Safety and Security.
- PS5: Land Acquisition and Involuntary Resettlement.
- PS6: Conservation of Biodiversity and Sustainable Natural Resources Management.
- PS7: Indigenous People: Not applicable because there are no groups identified as 'indigenous people' in terms of this PS in the GCO area.
- PS8: Cultural Heritage.

It should be noted that an important principle of PS1 is that the starting point for compliance is that all national statutory/regulatory permitting requirements must be complied with.

### 9.2 Environmental and social assessment and management system

In AMC's assessment, there is a low to moderate risk that legal submissions required to account for recent changes in and extensions to mine planning may not be timeously concluded unless a clear regulatory roadmap is put in place. A growing resettlement requirement carries risks of disruption to operations, financial and reputational risks.

GCO was the subject of a first environmental impact assessment submission to the Senegal environmental regulatory authority in 2004, and obtained its environmental certificate in 2008. However, delays in the achievement of financial close and the commencement of mining meant that by 2011 updates were required.

The 2011 environmental and social impact assessment (ESIA) update was compiled by Umwelt Environmental Consultants (Umwelt) and Earth Systems, Dakar, (Umwelt and Earth Systems 2011). The version of the ESIA made available for review by AMC, was written to comply with all the IFC's performance standards except PS2 (Labour and Working Conditions). The 2011 ESIA is evaluated by AMC to be generally compliant with PS1.

The environmental quality standards or guidelines to be met in GCO emissions and effluents are not all consistent with the stated intention to meet IFC performance standards. Generally, Senegal's effluent and emission standards and Australian standards are referenced, not the applicable IFC/World Bank Group's general or industry-specific Environment Health & Safety Guidelines (and stipulated standards/limit values) (GCO 2014h; 2014k).

GCO has installed and equipped a 34-member strong Environmental Department (GCO undated-c), and a Department of Social and Community Affairs with a staff complement of 14 (GCO undated-d). AMC deems this capacity to be sufficient for present purposes, but notes that the need will rise exponentially over the next few years for rehabilitation staff and for community liaison personnel linked to the escalating resettlement process.

The 2011 update of environmental and social assessment and management planning covers the first 14 years of operation, but mine planning has now extended through 25 to 30 years. The uncertainties beyond year 14, particularly concerning resettlement and associated issues, constitute potential financial, disruption and reputational risks.

### 9.2.1 Permitting

GCO's Area Manager: Environment & Community advises that GCO is up-to-date on permitting. GCO's permit register as at 12 July 2017 is attached as Appendix F to this report. The GCO operation is compliant with respect to all major environment-related permits, although this list does not indicate the status of the emergency preparedness permit. Other than a permit for a fuel depot, there is no hazardous installation on the list, although the risk assessment for and outline of a POI is the subject of Volume 5 of the audit and update of the environmental and social management plan (ESMP) conducted by HPR Ankh Consultants in 2014 (HPR 2014e). These permits appear to have been omitted from the list and GCO needs to confirm that this is the case.

The list also does not indicate permitting requirements going forward: the vegetation clearing permit expires December 2019, and groundwater abstraction permits must be obtained whenever a new borehole is to be sunk. Notably, there is no indication of whether any notifications to government or applications for amendments, either under the Mining Code or the environmental regulations, will have to be submitted concerning changes in the mine plan made in 2016. The 2011 update of environmental and social assessment and management planning covered only the first 14 years of operation, but mine planning has now extended through 30 years. Particularly with respect to land clearing in the north and involuntary resettlement issues, amendments and even new ESIA submissions may be required.

Articles 80, 82 and 84 of the Mining Code (2003) establish the requirements for mine rehabilitation and closure and the financing thereof. Pursuant to the Mining Code, Decree No. 2009-1335: Mine Rehabilitation and Closure Fund was established to provide the mechanisms and operating framework for a mine rehabilitation fund. The primary components relevant to GCO are:

- All holders of an exploitation permit must carry out rehabilitation of mine sites when their mining exploitation permit expires, unless its renewal has been approved.
- The permit owner must establish a mine rehabilitation and closure fund, which will be used to finance the rehabilitation requirements for the following year. Financial contributions will be provided annually from exploitation profits of the permit owner from the date of first production for an amount equal to the average annual cost for rehabilitation.
- The amount should be at least equal to the cost for rehabilitation as approved in the latest version of the Environmental and Social Management and Monitoring Plan (ESMMP, taking into account any updates).
- The exploitation permit owner should also provide a contingency budget equal to five times the average annual cost for rehabilitation from the date of first production.
- Fund is to be jointly managed by the permit owner and the Ministry for Mines and the Environment through a formal agreement.
- Fund will be valid for the duration of the exploitation permit, taking into account the time required to carry out post-mine closure and rehabilitation activities.

GCO management advises AMC that there is no rehabilitation and closure fund requirement when rehabilitation is ongoing. The annual rehabilitation budget is set by the projected number of hectares to be rehabilitated the following year. At the start of life of mine (LOM), the cost declared to Government was US\$18,000/ha, but cost-cutting initiatives have reduced that to US\$12,000/ha without loss of quality. AMC deems those to be realistic estimates, although the anticipated end land use objectives of rehabilitation have not yet been demonstrated.

The drawn-out project planning to start-up phase (2004 was year of first environmental permitting submission, but environmental certificate awarded 2008; GCO Mining Concession awarded 2007; however, construction started 2011 and mining commenced 2013/14; and environmental documentary updates were compiled 2011 and 2014) and the gaps in the permitting register suggest that GCO has not maintained an ongoing, up-to-date environmental legal register and that GCO needs to have a comprehensive permitting road-map in place. ERAMET in its audit in 2014 (ERAMET 2014) noted that permitting issues had resulted in delays in project execution.

### 9.2.2 Labour and working conditions (health and safety)

The ongoing work to instil a health and safety 'culture' in the local workforce and the consequences of not achieving same, indicates to AMC that a moderate risk rating is applicable to this aspect of GCO.

The Health & Safety Head-of-Department (HOD), supported by the Superintendent who alternates as HOD. They offer safety support to the operations via three coordinators who are dedicated to an area: MSP, dredge, etc. There are also three technicians in the structure, of which only two are staffed at present, with the third to be employed in 2018 to ensure all shifts are covered.

The management system is not certified, and there has been no decision yet on a system target. OSH18000 is used as a guideline, with the H&S Action Plan and Occupational Health and Safety Management Manual (GCO 2016h) built on articles of OSH18000. The management system comprises typical components: organizational development from a Safety Committee with Labour Inspector participation that meets quarterly, down to departmental safety committees, pre-start-up Safety Shares and Daily Safety Reports, to induction and training, toolbox talks, risk assessments, database management,



job hazard analysis, safe work instructions, standard operating procedures, incident response, investigation using the Incident Cause Analysis Method (ICAM) system and reporting, and medical surveillance.

Detailed records of safety incidents of all types including near-misses, and benchmarks against other companies in the same industrial sector. GCO, having only since 2015 implemented a rigorous health and safety system, still has some way to go to achieve best practice norms in health and safety performance compared with its peers, but progress is steady. GCO management advises that embedding a safety culture in local employees is a challenge, but GCO has many training activities to do precisely this.

### 9.3 Resource efficiency and pollution prevention

Water level management is critical because it concerns agricultural production in the adjacent naiyes (depression) zone, the potential for groundwater contamination to occur, and the difficulties in keeping dust levels within socially acceptable limits. AMC evaluates a moderate level of risk to persist with respect to this aspect despite the implementation of a comprehensive management and monitoring plan.

Mineral sands mining and processing is relatively benign in terms of pollution issues, because it comprises largely mechanical processes with minimal chemical inputs. The major issues are the potential mobilization of metals and salts in the tailings and dredge pond water, leaching of hydrocarbons and fertilizers into groundwater aquifers, generation of acid sulphate conditions; intrusion of salt water into aquifers; effects of contaminants on drinking water sources of neighbours; and dust generated through haulage and the exposure of surficial sediments in mined areas before revegetation commences.

### 9.4 Water management

There is no permanent surface water in the region, therefore water management is focused on groundwater management. Mine water is sourced from deep aquifer boreholes, and its management is tightly controlled utilizing a detailed dynamic water model. Mining will occur at the natural groundwater table level or above, so that there is no risk of salt-water intrusion. Mineral separation plant (MSP) water is contained in a lined dam and recycling is maximized so that this water is not a threat to groundwater. Nonetheless, plant effluent is discharged as water in the tailings. The tailings are deposited in an interdunal basin such that deposition and evaporation are balanced. The pond that has developed is clean enough to attract large numbers of waterbirds (see Figure 9.1). Daily measurement of the water quality in this 'wetland' has so far not reported any exceedances of applicable standards (Daour Dieng, pers comm). Sewage plant treated water is released into an artificial wetland and is treated to a level consistent with Senegalese water quality standards (GCO 2014k).

Figure 9.1 Mineral separation plant (a) tailings deposition and (b) effluent 'pond' forming wetland



Approximately 5% of soils in the mineral sands deposit are organic, in 1/3 of samples the potential for acid sulfate generation from the oxidation of pyrites was found. Arsenic may be released from groundwater under acid conditions if it is present (GCO 2014k). Monitoring of dredge pond water will be frequent and if acid generation is detected, remedial actions will be taken in accordance with the GCO Acid Sulfate Soils Management Plan (GCO 2014k; 2014j).

Water quality monitoring of dredge pond water, deposited tailings seepage, containment boreholes and community water sources is conducted monthly for general physico-chemical parameters, quarterly for metals. No non-compliances in results have yet been detected (Ndeye Fatou Diouf, Superintendent Pollution & Nuisance, pers comm). Four additional points in naiyes are to be added for weekly checking of primary indicators and monthly analysis of physico-chemical parameters.

The Water Management Plan (GCO 2014k) references Senegal's Inter-Ministerial Decree No. 155 applying Wastewater Discharge Standard NW05-061, as well as Australian Drinking Water Guidelines (NHMRC 2004). This may be inconsistent with the intention to comply with the IFC performance standards since the IFC's Environmental Health and Safety (EHS) water quality standards may differ. Moreover, the setting of standards needs to be done for different receiving water bodies, and the display of monitoring results shown against the standard for that point (GCO 2017d; 2017e).

### 9.5 Energy supply and consumption, and climate change

Because the mine and process plant power is supplied by a heavy fuel oil (HFO) power station on site, it is in GCO's interest to maintain the most efficient operation and thereby minimize HFO purchases. The most efficient and low-emissions alternative considered in project planning was natural gas, but there is no reliable source of supply thereof in Senegal at present. The plant is however a tri-fuel plant that can be switched easily to natural gas or diesel (Umwelt & Earth Systems 2011).

Mine plant and haulage fleets are also diesel-powered, a situation for which no viable alternatives currently exist.

GCO's environmental management strategy contains no carbon reduction/management component, that is, the ESMP did not respond to the climate change aspects of PS3. This is because Senegal is a Non-annex 1 country under the Kyoto Protocol and therefore has no restrictions on its greenhouse gas emissions (GCO 2014g).

### 9.6 Air quality

GCO has put in place an Air Quality Management Plan (GCO 2014g) that comprises a comprehensive set of objectives and broad guidelines to manage air quality issues within acceptable limits set by Senegal (Atmospheric Pollution Standard NS 05 062) and Australian standards for emissions. The Australian Standard AS3580 for the sampling and analysis of ambient air, 2003, does not impose an ambient air quality standard/guideline. It is noteworthy that GCO's monitoring data spreadsheet for respirable particulates includes columns for IFC ambient air quality standards/guidelines (GCO 2016g).

The monitoring plan as laid out in the 2014 AQ Management Plan differs from the details given in the Summary of the environmental management plan (GCO 2016b) given to AMC, which differs from the data sets of results made available to AMC (GCO 2016f; 2016g). The monitoring activity overall seems to be reasonable. Dust monitoring – dust deposition at various sites including potentially sensitive receptors was to be monitored bi-weekly; respirable particulates in power station emissions (DustTrack analysis) were to be monitored monthly for three months, then quarterly; MSP respirable particulate emissions (post-baghouse) were to be monitored every three months, and the waste incinerator every three months (the waste incinerator is no longer operating) (GCO 2014h). The details in the Summary differ from the above. Power station and railway emissions of respirable particulates are being measured daily however (GCO 2016g), but the data set given to AMC does not indicate whether respirable particulates are being measured in any sensitive receptors/villages (as the Summary states they would be).

The daily monitoring data for the power station for 2014 to April 2016 show PM<sub>2.5</sub> usually over the 0.025 mg/m<sup>3</sup> IFC/WHO limit, and PM<sub>10</sub> regularly over the 0.05 mg/m<sup>3</sup> limit. PM<sub>10</sub> levels measured by DustTrack along the railway show even higher readings. There is no indication in the data made available what ambient respirable particulate levels are in the closest villages; GCO personnel stated on site to AMC that there have been no exceedances of the standards (Daour Dieng, pers comm).

It is noteworthy that while most mine air quality monitoring strategies place considerable emphasis on dust deposition monitoring, i.e. of total or nuisance dust, national air quality regulatory regimes are focused on the respirable portion of dust that carries health risks, therefore no limits are set for dust deposition. Australian (New South Wales and Victoria), New Zealand, German and UK guidelines vary from 4 g/m<sup>2</sup>/month or 0.133 g/m<sup>2</sup>/day to 10.5 g/m<sup>2</sup>/month or 0.35 g/m<sup>2</sup>/day (AECOM Australia 2012). Atmospheric dust in the Grande Côte region is 'naturally' high due to the nature of the landscape and the climate, particularly when the Harmattan winds that blow from November/December to March. GCO's dust deposition monitoring results show dust levels exceeding this range along roads, but mostly under this range in nearby villages (monitored only since 2015) (GCO 2016f). There appears to be little correlation between measured dust deposition and the Harmattan season.

### 9.7 Hazardous and solid waste management

GCO's Hazardous Materials Handling and Storage Plan and the Spill Response and Management Plan were not provided to AMC.

Waste management is the subject of the appropriate GCO management plan HSE-PLN-017 (GCO 2014g), the scope of which includes liquid (sewage) and solid wastes. The plan includes laudable objectives to utilize products and manage procurement to meet waste reduction targets, to use non-hazardous options over hazardous alternatives wherever possible, to segregate wastes and recycle wastes where possible, but no records have been examined that would verify whether these objectives have been implemented. There is no waste recycling system in Senegal so waste management will be an ongoing challenge.

From the waste storage site observed in a closed depression close to the MSP, it appears as if the amount and volumes of wastes generated by construction were not adequately inventoried (the Management Plan's waste inventory refers mostly to operating phase waste generation). Large quantities are still present (refer Figure 9.2) although some sales have occurred and further sales are planned. Some hazardous wastes have also been stored in this area to date; final disposal is still under consideration. Hydrocarbon wastes (hazardous) are disposed offsite by a licensed waste contractor.

A new landfill is under construction for operational general waste, and a new incinerator is to be purchased, the original one having been closed down due to inefficient operation.

The waste management plan references applicable Senegalese legal obligations and Australian standards, but not IFC EHS guidelines and standards.

Figure 9.2 Temporary waste disposal site with construction wastes and old incinerator



### 9.8 Community health, safety and security

GCO's social development programme appears to be exemplary, but some low risk will remain because of the links to resettlement and the impacts of the project on agricultural land, agriculture being the primary source of livelihood in the naiyes region.

In 2011, GCO compiled a Social Development Plan (GCO 2011) to give effect to community health and safety issues and in mitigation of a number of broad-based social impacts. This plan has recently been updated by the Senegalese research agency Centre de Recherche pour le Developpement Humain (CRDH 2017c). The approach is participatory, community council management committees are in place, and the main areas of intervention are education, health and water supply, and general socio-economic development (GCO undated-d). There has been an intensive programme to raise awareness of community health and safety issues, such as traffic safety. The Company is publicly committed to spending US\$400,000 per year for every year of operation. Projects to date include a kindergarten school, three primary schools, a college in Ndjilinge, two ambulances, water tower, waste management programmes, community markets, solar lighting, malaria control and community farming.

GCO's recent presentations on social responsibility and development programmes lists a number of regional awards received for these programmes (GCO undated-d).



## 9.9 Land acquisition and involuntary resettlement

A moderate risk remains due to the increasing requirement for resettlement, the diminishing options for replacement land, and the inclusion of the tourist sector – which has an international profile – as targets for resettlement. Should opposition or objections to resettlement packages grow, public protests could disrupt operations, and there is substantial financial risk attached to this aspect.

Due to anticipated asset and agricultural losses and the necessity for relocation of a number of hamlets and villages within the mine path and close to it, a resettlement action plan (RAP) was developed in 2011 (Earth Systems 2011), and was updated in 2017 (CRDH 2017a) in preparation for the second phase of resettlement, namely the village of Foth. The socio-economic baseline has also been updated very recently, a draft report dated June 2017 having been made available for review (CRDH 2017b). The original RAP very closely followed PS5 guidelines, and the update has continued the same model.

The Earth Systems RAP was done in detail only for the first three years of operations: Foth hamlets and a few Diogo hamlets – seven in all – comprising 35 households, needing resettlement during this time. A well detailed estimate of resettlement required, both homesteads and assets lost or severely affected and land uses affected, for years 4 to 14 was then made, on basis of the original mine plan. A cost estimate for years 4 to 14 was also made, on the basis of the same compensation and resettlement entitlements agreed for Phase 1 (years 1 to 3). The rates applied went beyond Senegal's outdated (1986) standard rates, since they do not meet World Bank Group guidelines, and were based on market rates as well as industry benchmarking. The per-household cost thus estimated is reasonable in AMC's opinion. The report does not state however, whether the longer-term estimate was adjusted for inflation or whether discount rates were applied, and for which, year the figures presented are valid i.e. costs as at 2011 or not (the report is dated 2011).

The CRDH draft RAP 2017 – 2021 – draft dated May 2017 (CRDH 2017b) – focused on the details of asset losses involved in the relocation of Foth village itself, which is the next resettlement group due. Although in the definitive feasibility study a commitment was made that the main Foth village would not be moved, in late 2016 GCO decided that it would have to start investigating the opposite. The CRDH draft RAP thus identifies 79 households grouped in 54 'concessions' or farms, in the 'central village' of Foth that will be due for resettlement within the next five years. The report does not appear to have updated the estimates for the remainder of the originally estimated 14 years (the Earth Systems RAP of 2011 identified a total of 184 households in 47 hamlets and villages for resettlement in Phase 2) but it does lay out a general schedule of resettlement tasks required up to year 16 (start was end 2012), a strategic action plan.

The Socio-economic Baseline update also completed by CDRH and reported in June 2017 (CDRH 2017a), does not distinguish hamlets and villages that will have to be relocated from the totality of settlements within the Project Area, which includes nearby and adjacent communities.

Meanwhile, in 2016, a mine optimization study resulted in substantial changes to the mine plan, some within the year 4 to 14 period, and extended it beyond that to year 30. The major change in the 1 to 14-year plan is that no mining occurs south of the mine camp and MSP, all mining taking place in a northwards trajectory. The northernmost limit of mining will take place in year 2030, then the southwards return takes the mine path close to the coast all the way to just south of the camp and MSP before the dredge path turns inland again in year 2035. In year 2040 the mine path is close to the coast again in the vicinity of the large village Fass Boye and ends south of Mboro close to the coast in year 2043.

If any estimates have been done for resettlement beyond 14 years, both to the north and south of the original 14-year mine plan, they have not been made available to AMC. The GCO mine plan overlaid over a GoogleEarth image of the GCO Mining Concession area shows settlements identified as far north as Khinine Alassane (KhV01) and Tounde Maleye (TM01) but not beyond that. Examination of the GCO 30-year mine plan suggests that resettlement requirements beyond the 14th year will be considerable, particularly where the dredge path approaches the coastline. The coastal zone is heavily utilized, both for settlement and in places for the exploitation of naiyes. The coastal return dredge path will greatly complicate the identification of suitable relocation sites for hamlets and villages in the Lompoul area, and in particular for the tourist camps that will be displaced by mining in years 2025 and 2026 (when these stakeholders were consulted in 2011, there was no return mine path on the table). Moreover, population and tourism growth will exacerbate the situation as currently evaluated: Senegal's population growth rate is high at 2.6%, so that the estimate of 1,404 persons requiring relocation in years 4 to 14 rises to 1,815 (Earth Systems 2011). Previous estimates up to year 14 did not include a return dredge path at all, and nothing so close to the coastline as is now on the table.

Although the RAP (Earth Systems 2011) states that there was a resettlement site selection process whereby candidate sites were evaluated on a number of criteria, in none of the reports is there any indication of sites evaluated other than what is shown on drawings and maps as the Phase 1 site (the 1,088 ha site seems to have been demarcated on Project drawings from early on). Moreover, the Phase 1 site seems to have been chosen as the preferred site by GCO, its consultants and the governing authorities; affected community leaders were persuaded to agree that it was suitable 'once the resettlement process was re-explained' (Earth Systems 2011: page 9-5). A primary criterion is that the site must be within the GCO concession area. The 2017 draft updated RAP (CRDH 2017b) states on page 40 that due to the size of the area GCO plans to install in it all the project-affected parties (PAPs) requiring resettlement in all phases of the project.

AMC is of the opinion that such a blanket approach will increase risk as the mine path moves further north and later further south (south of the MSP there are at least 13 villages that are likely to be resettled and an area of very productive and intensively used *naïyes*). There are already complaints about the site being too far from places of origin (at 10 km away), *Peuls* not wanting to live on top of each other (CDRH 2017b), and inadequate replacement agricultural land. Moving people from entirely different village areas presently dispersed over a distance of some 40 km will carry an inherent risk of increased social conflict if not increasing opposition to GCO's operations.

The comprehensive audit in 2014 by HPR Ankh Consultants of the ESMP, in Volume 6 focused on land and asset losses and resettlement (HPR 2014f). The audit comprised largely a series of interviews and small group meetings with a wide cross-section of stakeholders, from government to project affected parties (PAPs). At that stage there was considerable unhappiness with the resettlement process, some of it linked to the slowness of the resettlement process: there were complaints that for 10 years that they were prohibited from developing anything, building etc. Recall that environmental permitting submissions were first made in 2004, RAP planning was done in detail through 2011 and resettlement of the Phase 1 resettles had not yet occurred by 2014.

The 2017 socio-economic baseline update (CDRH 2017a) conducted extensive surveys amongst already-affected and to-be-relocated parties. It found changes in attitude to GCO from the before-project studies through the 2014 audits to the present. While 76% of respondents in Foth did not support their relocation to the resettlement village, some 80% of resettled households reported positive attitudes to GCO. However, actual resettlement is very recent, with the seven initial hamlets moved only during 2016.

The update of the socio-economic baseline reported in June 2017 (CRDH 2017a) reports that the Comité d'Alerte et de Suivi (CAS) – committee for surveillance and monitoring that facilitates dialogue between GCO and affected communities - and the Commission Départementale d'Evaluation des Impenses (CDEI) – commission for the evaluation of disbursements/values of assets – have been in place. But 63% of survey respondents were dissatisfied with the level of information they received from CAS, and 76% were dissatisfied with the CDEI's information, which concerns the important issues of affected surface areas and values thereof. In response, 24% of complaints are reported directly to GCO's Social Department, CAS receives 21%, 14% go to CDEI, and 24% to the local administrative authorities. GCO's community grievance register has only nine complaints recorded from October 2014 to April 2017. These two bodies (CAS and CDEI) play crucial roles in mediating the relationship between GCO and affected communities, so this level of dissatisfaction is of concern. The situation also suggests that the grievance mechanism is not being effectively utilized, or its existence and mechanisms are not being effectively communicated.

Persons of Foth say the site selected for resettlement is haunted (CDRH 2017b: page 40); Diogo inhabitants of resettlement village say it's very far (>10 km) for them to attend the market and visit their families, and they're not comfortable staying in the host community's territory. There are allegations of social conflict: *Peuls* are traditionally nomadic, and don't like to live too close to each other, they need space and have expressed concerns about the social effects of consolidated village living. There have been complaints about the lack of potential for '*marachage*' that is, gardening with abundant water; complaints that the land in the resettlement area is not the same standard; so that there's been loss of livelihood due to the unsuitability of the area for agricultural crops. This sentiment is contradicted by the audit and soil survey that shows the soils are better in the resettlement area than in the original locations, and there is reported to be fertile *naïye* near the new village. The reason given by the Impact Assessment Board is the shortage of replacement land (resettled households did not receive an allocation of agricultural land in the resettlement area equal to what they had previously had; they were allocated at least 0.5 ha per household). It is presumably for this reason that GCO proposed, in cases where <20% of irrigated land would be 'permanently' lost, that is, lost for the duration of the mining operations, a sum of XDF3,750,000 annually for five years would be paid; losses of >20% would receive replacement land. Cash compensation is a major principle of Senegalese expropriation law when it comes to expropriation for public utility. It is the opposite in the IFC's PS5, where 'like for like' replacement is recommended over cash compensation for all asset classes except standing crops.

Complaints about dust from the haul roads and the mine area have been recorded. Complaints regarding the fencing of the railway line, preventing use of the corridor for translocation by locals – a few crossing points have been provided but still make for longer distances to other villages, or to fields and grazing areas. Where lands were cut in two by the rail line, the additional distance to travel to reach the half that's on the other side of the rail corridor has made it not worthwhile to bother cultivating it (CRDH 2017b).

In view of these issues, rehabilitation will be of critical importance in that it should restore reasonable living conditions and enable all those who have lost their agricultural land to be able to recover and exploit land suitable for agriculture at the end of the extraction works (minimum six years). But whether full land capability can be restored has yet to be demonstrated: due to the mixing of soil layers and changes in landscape topography, there are many challenges in doing so. GCO is conducting various tests on areas now undergoing rehabilitation and revegetation to establish the best means for achieving post-mining land use objectives, but the outcomes are not guaranteed.

On the other hand, GCO advised AMC that some people of Foth came forward before being informed of GCO's decision that Foth would have to be moved, requesting relocation to the new village, due to the quality of the latter (refer Figure 9.3).

The budgeted cost for Phase 1 resettlement was US\$34,000/household for 35 households and 288 individuals (GCO undated-a), a total of US\$1.3 million. However, to date, only about half of the allocated budget has been spent (GCO 2017b). It is not clear whether savings have been made, or whether expensive items are still to be installed; the main elements of the resettlement village – 35 replacement homes, communal infrastructure such as a mosque, school, health post etc. – are complete. The CDRH 2017 RAP update gives a budget for the relocation of 79 households of US\$3.7 million (CDRH 2017b: page 56), which amounts to US\$46,000 per household. The escalation in costs compared with 2014 costs represents a 36.2% increase. No explanation has been given to AMC for such an escalation. The 2011 RAP (Earth Systems 2011) gave a preliminary estimate for all costs associated with land and asset losses and resettlement years 4 to 14 of 184 households of US\$6.4 million, or a cost of US\$35,000 per relocated household.

Figure 9.3 Recently completed resettlement village



Indications of escalating numbers of homesteads and persons requiring resettlement in the years beyond year 14, a high population growth rate, rapidly escalating costs, the difficulties of finding suitable replacement land and sites for resettlement villages, the intersection of mining with tourism camps (hence the potential introduction of an international 'audience' into the mix), apparent issues in the implementation of the grievance mechanism, and the absence of planning for mining beyond year 14, all indicate that the risks associated with resettlement will likely rise as mining advances.

#### 9.10 Conservation of biodiversity and sustainable natural resources management

AMC has not been able to determine the acceptability of the status of this area of GCO's operation because the efficacy of management plans cannot be ascertained until rehabilitation results become stabilized.

AMC considers the risk in this area is moderate because of the potential dislocation between goals and actions, but mostly because of the high degree of uncertainty about rehabilitation outcomes, particularly the restoration of natural habitats and land suitable for agricultural production. This is an arena vulnerable to reputational risks. This is aligned coincidentally with GCO's internal risk assessment that rated the rehabilitation risk to company, as being medium (Tizir Grande Côte Risk Assessment April 2013, quoted in GCO 2014d).

### 9.11 Biodiversity management

Baseline studies undertaken by Tropica in 2004 (reported in 2005 according to GCO 2014) established a reasonably good biodiversity and habitat baseline. Due to its arid and coastal nature, where natural sand transport dynamics result in a zone of unstable landform, biodiversity values in the exploration or mine concession area were relatively low.

Much of the area to be disturbed by mining and mine infrastructure was already disturbed. Native vegetation occupied 44% of the exploration permit area, divided as 36% savanna and 8% bush or tree pseudo-steppe. The remaining 56% comprised market gardens and orchards (25%), plantations (15%), poorly vegetated dunes (8%), mobile dunes (2%), ephemeral lakes (2%), beach (2%) and urban areas (1.5%) (GCO 2014, citing Tropica 2005).

To address PS6 a Management Plan: Biodiversity and Conservation (HSE-PLN-012) (MPBC) was drawn up (GCO 2014a). It has laudable objectives, but the actions to be taken to support the goal of 'net positive gain' are unlikely to be sufficient to sustain the theory (the action plans and monitoring proposed will be insufficient to demonstrate progress or otherwise towards the ambitious goals).

The MPBC (HSE-PLN-012) and Land Clearance Procedure (GCO HSE-PLN-010) mandate, prior to clearing, the preparation of a 'flora inventory' involving establishment of a 100 m survey grid in which all species and number of individuals of a species (including commercial species) would be counted. Partially Protected plant species would be rescued and relocated ahead of clearing. Surprising that, given the occurrence of a number of animal species of conservation importance, no procedure for pre-clearance fauna rescue or scaring off (survey, trapping and removal/warning procedure) was included in the Land Clearance Procedure.

Replanting native species, unless they are planted according to the exact pattern of pre-mining habitat surveyed and in the densities and species proportions previously occurring, will not deliver even a 'no net loss' biodiversity outcome. As presently practiced, a mix of indigenous and exotic species is being utilized, and although additional plants are establishing themselves in places without GCO intervention, there is no guarantee that the original mix will re-establish itself. The rehabilitation of a mining footprint alone thus cannot be claimed to result in improved biodiversity conditions, especially since rehabilitation in that region is not proven, that is, the feasibility of habitat restoration was not established prior to the setting of the goal. However, GCO's rehabilitation strategy seeks to extend the pre-mining area under 'natural' habitat by planting one-third of what was previously "revegetated land", that is, State dune stabilization areas planted to exotic tree species, to natural habitat. This, according to GCO, would constitute a Project biodiversity "offset". But there is no indication that a proper offset strategy was developed using the approved methods of offset evaluation and accounting.

The biodiversity monitoring plan likewise has laudable goals but the methods proposed are unlikely to achieve them. The detailed rationale for this statement can be provided if requested. The important issue here is that monitoring is a critical component of demonstrating progress towards achieving biodiversity and habitat goals, notably the 'net positive gain' goal, and even of intermediate objectives.

The absence of any data provided to AMC indicates to AMC that annual biodiversity monitoring – especially in relation to fauna – appears not to have been implemented as planned.

GCO's biodiversity management strategy would fall short of international benchmarks for best practice, but this is not material at present. However, biodiversity issues are gaining increasing attention in the extractive industries in particular, so that, while they are difficult to price, they may feature increasingly as a reputational issue.

### 9.12 Rehabilitation

AMC has not had sight of the detailed Rehabilitation Plan. HSE-PLN-013 Mine Closure and Rehabilitation does not have detail about ongoing rehabilitation procedures/practices. Rather, it is directed at conceptual mine closure at the end of life-of-mine (LOM).

An audit of the mine rehabilitation strategy forms Volume 7 of the HPR Ankh 2014 audit and revision of the ESMP (PGES in French) (HPR 2014g). While this report makes a number of recommendations concerning rehabilitation methods, no subsequent, updated Rehabilitation Plan has been seen by AMC. The HPR detailed audit found GCO's conformance with international best practice in mine rehabilitation to be reasonably good, while noting a number of deficiencies. AMC noted a sound overall procedure, from first signing off on land handed over for rehabilitation, through installing windbreak fences, to soil preparation and hydro-seeding, to planting of individual trees etc. The nursery established to deliver plants for rehabilitation appears to be well run. However, the short three-month wet season means that planting occurs only for a short time every year. Now a series of tanks is being installed to allow irrigation in the dry season to reduce losses of perennial plants such as young trees. It was not clear the extent to which GCO utilizes indigenous coastal pioneer plants, which are adapted to survive in particularly harsh conditions, to establish a ground cover.



Examples of the stages of initial disturbance and subsequent rehabilitation are shown in Figure 9.4 to Figure 9.9:

- Figure 9.4 – Cleared mine path land; final landform awaiting rehabilitation; and adjacent naiyes zone on the right.
- Figure 9.5 – Windbreaks installed – the first step in rehabilitation but since it is the dry season, revegetation will await the wet season.
- Figure 9.6 – Hydro-seeded grass starting to grow following the first rains.
- Figure 9.7 – Some of the oldest rehabilitated areas – showing mix of indigenous and exotic trees planted. Note that water tank was recently installed. Ground cover is poor due to it being the end of the dry season.
- Figure 9.8 – View from a naiyes agricultural plot looking towards mining zone where rehabilitation process is just starting.
- Figure 9.9 – *Faidherbia albida* trees – one of the valuable indigenous, Partially Protected trees targeted for replanting.

Figure 9.4 Cleared mine path land, final landform awaiting rehabilitation; adjacent naiyes zone on the right



Figure 9.5 Windbreaks installed



Figure 9.6 Hydroseeded grass starting to grow following the first rains



Figure 9.7 Some of the oldest rehabilitated areas



Figure 9.8 View from a naiyes agricultural plot looking towards mining zone where rehabilitation process is just starting



Figure 9.9 *Faidherbia albida* trees



The nature of mineral sands mining calls for continuous rehabilitation of the mined-out areas behind the dredge path. To date, some 136 ha of mined land have been rehabilitated at GCO (GCO undated-c), with an annual total for 2017 of an additional 257 ha (Daour Dieng, pers comm). Given that 1.4 ha were rehabilitated in 2014, 44.6 ha in 2015, and 90.3 ha in 2016 respectively (Daour Dieng, pers comm), it is clear that the requirement is increasing exponentially. If contrasted with the total of almost 450 ha of cleared land as at the end of 2016 (GCO undated-c), then it indicates that the gap between cleared and rehabilitated area is growing.

It is not clear to AMC whether plans are in place to ramp-up capacity to undertake the works associated with rehabilitation in concert with the rapid rise in mined area. The plant nursery is presently sized to deliver 500,000 plants per year. At an average annual mining progress rate of 300 ha, some 450,000 plants (at 1,500 plants/ha) are required for annual revegetation (GCO undated-c).

Currently there are 19 members of staff in the Rehabilitation Service division; in addition, community contractors are utilized on a seasonal basis.

Given complaints concerning dust, sand encroachment into the agriculturally productive naiyes (HPR 2014f; GCO undated-b) and the necessity to return productive land to displaced owners, it is paramount that this programme keeps pace with mining. Reputational risks associated with rehabilitation will increase as the mine advances through more densely settled areas around Lompoul and the tourist camps there, where potentially an international audience will directly observe and experience GCO's performance on this front. Disruptions to operations are possible if GCO fails to return an appropriate proportion of the mined land to agriculturally productive land capability.

## **9.13 Ecosystem services management**

GCO is taking considerable care in mine planning and execution to manage the dredge pond water level within a narrowly defined band, combined with dewatering along the naiyes boundary of the dredge path, in order to maintain groundwater levels in the adjacent naiyes such that they do not become flooded. For the second half of 2016 a daily borehole extraction target of 20 ML/day was calculated to maintain an appropriate water table in the naiyes (GCO 2016c). The naiyes zone is one of the most agriculturally productive systems in Senegal and cropping therein is the major source of livelihood for local communities and households.

The majority of complaints on the community Grievance Register between 2014 and 2017 (GCO undated-b) have been about the water levels in the naiyes and the effects thereof on crops, indicates that ecosystem services issues will continue to attract a moderate rating as a risk, even if not all these complaints have validity. In combination with other grievances concerning resettlement and land access, such issues could escalate into wider social conflict with GCO.

## **9.14 Cultural heritage**

AMC considers there remains a low to moderate risk in this area because the cultural sensitivities surrounding burial places and sacred sites may become more acute as mining approaches more densely settled areas to the north where replacement land will become increasingly contested.

All relevant documents indicate a continuing awareness of cultural heritage issues and sensitivity to addressing them in the appropriate and legally required manner. Heritage resources were mapped for years 1 to 3, impacts to them were analysed, and mitigating measures formulated. An estimate of graveyards that would be affected up to year 14 was also developed. Although affected communities are dominated by people of the Moslem faith, there are many local people who have strong animist traditions and a belief in sacred sites (trees, locales), and these places too have been mapped or at least enumerated through group or individual interviews.

The intention to follow appropriate processes of reinterment and compensation was also stated, with the intention to draw up a chance-find procedure. The mobile nature of the mining operation indicates a particular need for a chance-find procedure, and while no such procedure has been examined by AMC, AMC is confident that it exists and is being utilized where relevant.

All graveyards affected by mining have been relocated following the appropriate and mandated cultural rituals, and the appropriate rites conducted where sacred sites have had to be eliminated.

## **9.15 Conclusions**

### **9.15.1 Summary**

The system components and documentary output of the environmental and social management process to date are broadly compliant with the applicable IFC performance standards (PSs) to the extent discernible on the basis of the documentary evidence provided to AMC. A comprehensive management system is now in place, and is appropriately staffed for current operations. However, capacity for rehabilitation and resettlement activities may become rapidly constrained in the near future.

The mine water management system is reasonably good and complaints from neighbouring land users are closed out timely. Water quality in the shallow aquifer remains within acceptable limits. Dust management over the elongated mine path will remain a challenge. Environmental quality standards referenced in GCO's management plans are not aligned with its stated intention to meet IFC environmental and social performance standards.



Biodiversity management objectives are laudable but the actions and monitoring identified to demonstrate achievements are unlikely to deliver the intended outcomes, particularly as related to the goal of 'net biodiversity gain'. This will remain largely a reputational risk.

Population resettlement is a prominent feature of the GCO life-of-mine, with resettlement planning having gone only up to year 14 of mining on the basis of the original mine plan. It has not been revised for the new mine plan, which includes significant changes in year 1 to 14 mine path, and beyond that includes a return path from the north close to the coastline that was not previously on the table. Indications of escalating numbers of homesteads and persons requiring resettlement in the years beyond year 14, a high population growth rate, rapidly escalating costs, the difficulties of finding suitable replacement land and sites for resettlement villages, the intersection of mining with tourism camps (hence the potential introduction of an international 'audience' into the mix), and the absence of resettlement planning for mining beyond year 14, all indicate that the risks under the current dispensation associated with resettlement will likely rise as mining advances.

Social license to operate at present seems to be reasonable, with community relationships having stabilized after some issues connected to delays and resettlement. However, these relationships may become fraught again later on as resettlement grows exponentially. The inclusion of tourist establishments in the targets for relocation will introduce an international audience to GCO's practices and procedures. Disruption to community access will also remain a challenge, but is the subject of ongoing planning and consultation.

There are indications that the public grievance mechanism is not being effectively utilized, or its existence and procedures are not being effectively communicated.

## 9.15.2 Recommendations

AMC makes the following recommendations based on the site visit and review of documentation.

Environmental quality standards for water and air quality management are to be brought in line with the applicable standards in the IFC's general and sector specific EHS Guidelines.

The biodiversity monitoring programme needs to be reviewed to ensure that the methods specified will deliver the results required to support ambitious objectives.

A rapid ramp-up in capacity will be needed to address rapidly rising mine rehabilitation and resettlement preparation requirements. Rehabilitation tests concerning the restoration of agricultural land capability need to be a prominent (and communicated) part of the rehabilitation strategy.

Planning for resettlement in the years beyond year 14 needs to start urgently. In particular, host sites in addition to the present resettlement area are to be identified and issues around them explored, and cost escalations incorporated into mine planning.

Problems in the administration of the public grievance mechanism need to be corrected.

## 10 Production cases

Following the GCO operation site visit in July 2017, AMC developed two production cases for the GCO operation—finalized in November 2017 (2017 Production Cases). The 2017 Production Cases were developed based upon the MDL operating plans developed for the July 2017 to June 2018 fiscal year and the 2016 Mineral Resource and Ore Reserve estimates, influenced by the observations and opinions of the AMC technical specialists who conducted the inspection of GCO mine site and port facilities in July 2017.

Subsequent to November 2017, MDL updated some inputs to the Production Cases and AMC reviewed and utilized these inputs to refine the Production Cases. An updated input was depletion of the 2016 Mineral Resource, accounting for mining production during the July 2017 to June 2018 fiscal year. Another updated input was revision of the Ore Reserve to reflect refinements to the mine plan. Ore Reserves were increased by the addition of a minor quantum of 'off-dredge pathway/near surface ore' that is planned to be dozed into the dredge path, to augment the recovery of ore by the dredge.

### 10.1 2017 Production Cases

AMC developed two production cases in 2017 for the use of Grant Samuel. Both cases were based upon MDL's 2016 Ore Reserve estimate and the associated production schedule and mining costs presented in the financial model, TiZlr Model – 2017 - v.2 (2017 Financial Model). AMC reviewed those costs and, through a number of checks, determined them to be a reasonable set of estimates for GCO.

Having reviewed the 2017 Financial Model, AMC was satisfied that the GCO 2016 budget inputs were appropriate to adopt as the basis for the production schedule and costs for Production Case 1, based on dredge and plant throughput rate of 7,000 tph.

AMC developed an alternative production scenario, Production Case 2, based on a higher production rate and a reduction in personnel numbers.

AMC developed Production Case 2 by increasing the dredge and plant throughput rate from 7,000 tph to 8,000 tph. The higher production was introduced over a three-year ramp-up period with full production achieved in the year 2020.

AMC considered the higher production rate to be achievable, with minimal additional capital cost expenditure, based on:

- Upgrading capacity of selected feed bins, pumps and spirals.
- Continuing utilization of the dedicated mine optimization team.
- Identifying equipment part's run times between part failure, and implementing end-of-life part change out prior to failure.
- Reinforcing training and primary equipment care.
- Increasing training for specialized operators.
- Implementing engineering solutions to reduce the frequency and duration of mechanical and operational downtime.
- Reducing the quantity of peat in the future production schedule and other ground condition restrictions (organic material) currently being encountered.
- Optimizing the average sweeping rate and sweeping frequency of the dredge.

The 8,000 tph throughput rate has been achieved periodically throughout the 2016-17 production records. However, this sustained higher capacity throughput has not been proven by a detailed engineering study, and needs to be verified by appropriate engineering designs and calculations.

Personnel numbers were reduced over a three-year period to a level that AMC considered more consistent with similar sized mineral sands operations.

Key observations for Production Case 2 are:

- The Production Case 2 mining schedule has a higher ore production rate of 8,000 tph. This level of production is forecast to be achieved in 2020 following a three-year production rate ramp up period.
- Production Case 2 demonstrates a three-year reduction in mine life from 28 years to 25 years compared to Case 1. The total HMC produced remains the same but is condensed into a shorter timeframe.
- Heavy metal grade varies significantly over the life of the project with a minimum of 0.89%HM and a maximum of 1.83%HM.

Production Case 1 and 2 LOM schedules are summarized in Table 10.1 below.

Table 10.1 AMC Production Case 1 versus Case 2 schedule – 2017

Parameter	Units	Case 1	Case 2
Production Rate	tph	7,000	8,000
Life-of-Mine (LOM)	years	33	28

## 10.2 2018 Production Cases

GCO Mineral Resources and Ore Reserves were updated in January 2018. Grant Samuel requested AMC update the 2017 Production Cases utilizing these updated inputs.

The 2018 Production Cases are based upon MDL's 2018 Ore Reserve estimate, and associated production schedule and mining costs in the financial model, *TiZir Corporate Model - 13022018 - Base Case (To GS).xlsb* (2018 Financial Model). AMC reviewed those costs and, through a number of checks, determined them to be a reasonable set of estimates for GCO.

Having reviewed the 2018 Financial Model, AMC was satisfied that the GCO 2018 budget inputs were appropriate to adopt as the basis for the revised production schedule and costs for Production Case 1. The labour costs and energy costs in Production Case 1 were reduced as per MDL current 2018 initiatives. Details of Case 1 are provided in Appendix G.

AMC developed an alternative production scenario, Production Case 2, based on production rate increases and further reductions in personnel numbers and energy costs that in AMC's opinion were reasonable for this production case scenario.

AMC developed Production Case 2 by increasing the dredge and plant throughput rate from 7,000 tph to 8,000 tph. The higher production was introduced over a three-year ramp-up period with full production being reached in the year 2020. Personnel numbers were reduced, over a seven-year period, to a level considered more consistent with similar sized mineral sands operations. Details of Case 2 are provided in Appendix H.

At the request of MDL, AMC has not included sensitive commercial information in the production case data presented in Appendices G & H of this report.

## 10.3 Summary of Production Case 1

The key observations for Production Case 1 are:

- Production Case 1 mining schedule is consistent with the 2018 Ore Reserve schedule "R&R production schedule" provided by MDL.
- Life-of-mine (LOM) is 33 years at a targeted production rate of 7,000 tph. A total of 22.9 Mt of HMC is produced.
- Heavy metal grade (%HM) varies significantly over the LOM with a minimum of 1.04%HM and a maximum of 1.85%HM.
- Personnel numbers (both expatriate and national employees) are, in AMC's view, high and remain constant throughout the LOM despite fluctuations in production rate. AMC decreased the personnel numbers in Production Case 1 from the currently employed personnel total of 680 to 660 that is in line with the 2018 Manning Nationalization Strategy Paper, provided by MDL.
- Labour costs constitute between 26% to 33% of the total operating cost as calculated in the Production Case 1 financial model. This total is in line with actual costs reported in monthly reports provided by MDL.
- Energy cost was reduced in Production Case 1 in line with the predicted energy savings of using the power station waste heat in the drying plant, as proposed by MDL. The energy cost reduction applied by AMC was \$0.5M in 2019, and \$1.5M in 2020 and each year onwards.
- MDL 2018 budgeted additional haulage costs (equipment rental and fuel cost) are within 95% of the Production Case 1 estimates.
- MDL 2018 budgeted dozer-push costs are approximately 17% higher than the Production Case 1 estimates. This difference is due to the currently lower assumed production rate of the dozers and together with higher hourly operating costs, compared with that assumed in Production Case 1. Although AMC considers the costs applied are reasonable for Production Case 1.
- AMC considers all other cost allowances in the 2018 MDL financial model, and included in Production Case 1, such as road maintenance, consultants and contractors are reasonable.

#### 10.4 Summary of Production Case 2

AMC developed Production Case 2 by increasing the plant throughput rate from 7,000 tph to 8,000 tph. The higher production was introduced over a three year ramp up period with full production reached in the year 2020. Personnel numbers were reduced over a three-year period to a level considered more consistent with similar sized mineral sands operations and energy costs were reduced.

The key observations for Case 2 are:

- The Production Case 2 mining schedule has a higher than Production Case 1 target production rate of 8,000 tph. This level of production is assumed to be achieved in 2020 following a three-year ramp up period.
- Production Case 2 forecasts a four-year reduction in mine life, from 32 years to 28 years, compared to Production Case 1. The total HMC produced is unchanged as the same total mining activity is condensed into a shorter time period as shown in Table 10.2.
- Heavy metal grade varies significantly over the life of the project with a minimum of 0.89%HM and a maximum of 1.83%HM.
- Personnel numbers (both expatriate and national employees) were reduced in line with an AMC estimate of manning requirements. AMC decreased the personnel numbers in Production Case 2 from current total of 680 to 590 over seven years to 2025 with expatriate personnel numbers decreasing from 53 in 2018 to 20 in 2023, and national employee numbers decreasing from 670 to 520 over same five years.
- Total labour cost in Production Case 1 is \$750M compared to \$513M in Production Case 2, showing a total cost reduction of \$237M.
- All other costs in Production Case 2 were calculated on the same basis as for Production Case 1. A cost comparison summary between the production cases is shown in Table 10.2.

Table 10.2 Production Case 1 and Production Case 2 schedule and cost summary

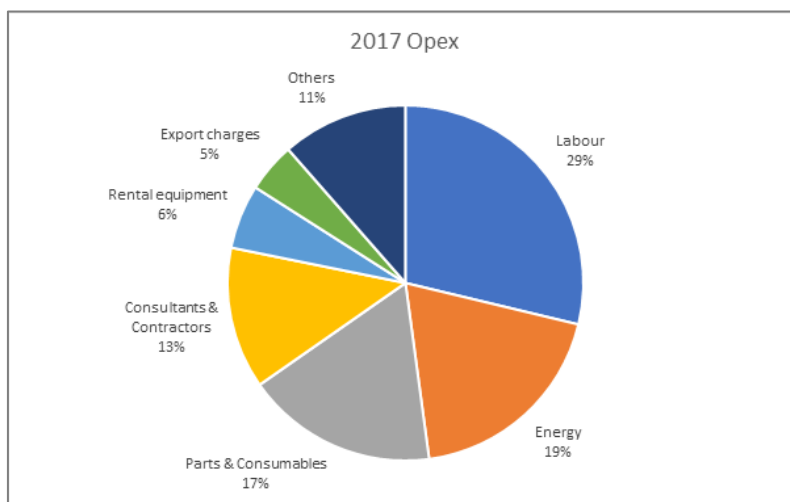
Parameter (Not Inflated)	Units	Production Case 1 (adjusted)	Production Case 2
Production rate	tph	7,000	8,000
LOM	years	33	28
Personnel numbers	persons	660	590
Total LOM labour cost	US\$M	750	513
Labour cost per annum	US\$M	22.4	17.2
Reduction in annual labour cost	US\$M	–	5.2
Reduction in LOM labour cost	US\$M	–	237.3

#### 10.5 Financial model schedule input

AMC reviewed the mining schedule and related mining cost used as basis in the financial model provided by Grant Samuel (*TiZir Corporate Model - 13022018 - Base Case (To GS).x/sb*) and is fundamentally the base for Production Case 1 (with adjustments for labour and energy costs). AMC makes the following observations:

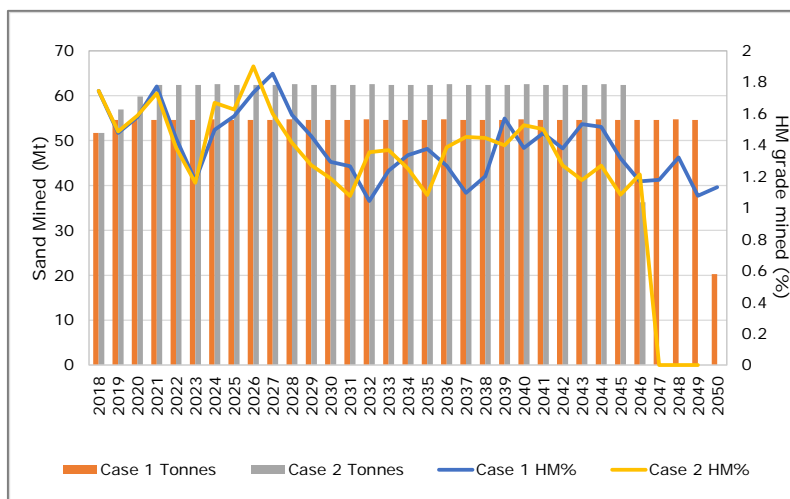
- Mining schedule used as the basis of the cost estimate is the same as the 2018 R&R production schedule.
- Labour numbers (expatriate and national employees), in AMC's opinion, are high and remain constant throughout the LOM although production rates fluctuate. Labour costs from 26% to 33% of the total operating cost in line with actual costs reported in the MDL monthly reports as shown in Figure 10.1.
- Extra haulage costs (equipment rental and fuel) is within 95% of AMC check estimates.
- MDL 2018 budgeted dozer-push costs are approximately 17% higher than the Production Case 1 estimates. This difference is due to the currently lower assumed production rate of the dozers and together with higher hourly operating costs, compared with that assumed in Production Case 1.
- All other cost allowances, such as road maintenance, consultants/contractors cost are considered reasonable.

Figure 10.1 Actual operating cost breakdown 2016



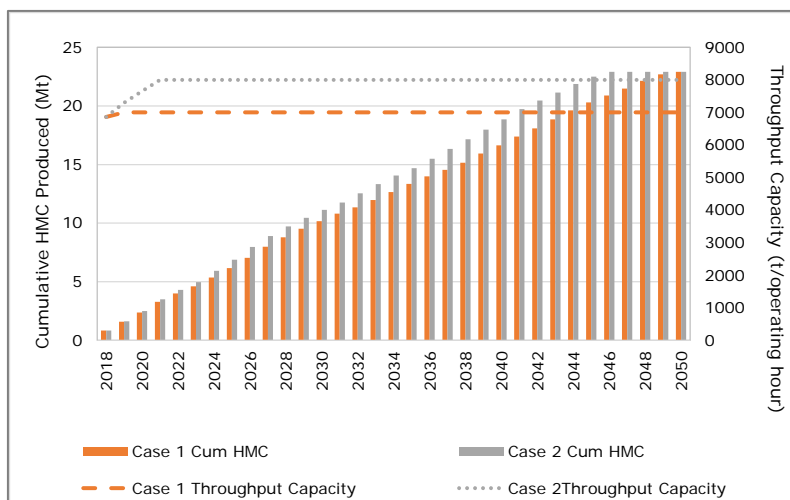
Sam Shields, MDL Financial Planning & Analysis Manager, MDL spreadsheet; historical\_data\_requiring\_extra\_data.docx

Figure 10.2 Production Case1 schedule versus 2016 R&amp;R Production Schedule



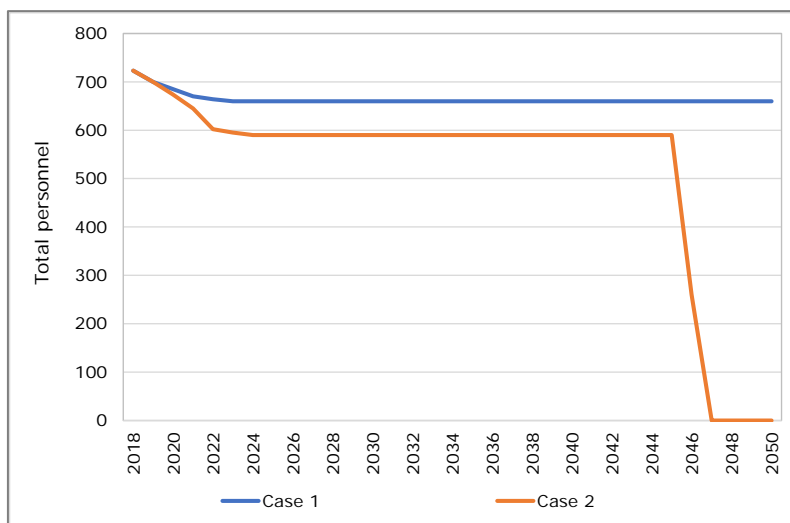
AMC developed Production Case 2 by increasing the throughput capacity to 8,000 tph, from the 7,000 tph in Production Case 1, as shown in Figure 10.3.

Figure 10.3 Production Case comparison production profile



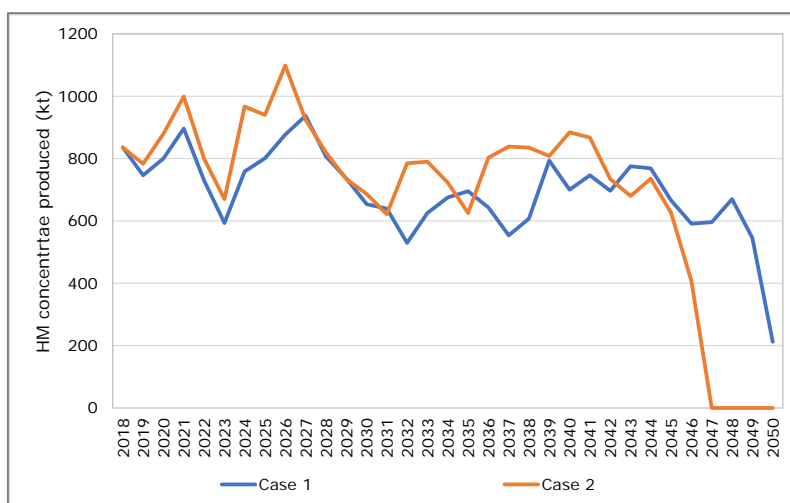
Labour costs are reduced in Production Case 2 as seen in Figure 10.4.

Figure 10.4 Production Case reduction in manning levels



The total HMC produced is the same in both Production Cases, as the same total mining activity is condensed into a shorter time period for Production Case 2, as shown in Figure 10.5.

Figure 10.5 Production Case comparison of HMC tonnes produced



## 11 Key risks and opportunities

The following key risks and opportunities have been identified:

### 11.1 Geology

Deficiencies identified in the Yodi and Mboro Hotel data impact the Indicated Mineral Resource estimated for Yodi and Mboro Hotel deposits. However, given the likely magnitude of the changes when these deficiencies are rectified relative to the size of the total Mineral Resource and that the Yodi and Mboro Hotel deposits are not expected to be mined until 2029 and 2042 respectively, these deficiencies are not considered by AMC to have a material impact on the overall GCO reported Mineral Resources and Ore Reserves.

The estimated Inferred Mineral Resource for the Noto deposit has not been reviewed but this only comprises 2% of the total reported Mineral Resource and is not considered by AMC to be material.

### 11.2 Mining

The design capacity of the GCO mining and processing components are higher than the 7,000 tph dredge throughput rate currently being targeted by the current LOM schedule. AMC have presented an alternative moderate opportunity production case, which sees the dredge throughput increase to 8,000 tph, to indicate the potential upside of increasing mining throughput. However, with further improvements to site operating practices, and the appropriate level of engineering assessment (with potential minor upgrade capital investment) the dredge and WCP achievable capacity could be increased. This increased HMC production will significantly improve the viability of the GCO operation by supplying additional feedstock to the underutilized MSP and transportation infrastructure.

AMC observes that the mining operations labour numbers are significantly higher than for comparable size mineral sands dredge mining operations. MDL have indicated their intent to progressively reduce both their ex-patriate and national labour force numbers and further opportunity exists to achieve operating cost reductions by further decreases in the work force numbers.

MDL updated the Ore Reserve in December 2017 to reflect refinements to the mine plan. Ore Reserves were increased by the addition of a minor quantum of 'off-dredge pathway/near surface ore' that is planned to be dozed into the dredge path, to augment the recovery of ore by the dredge. AMC believe that further refinement of the dredge pathway, in light of the changes to the utilization of surface dozing, should be assessed to optimize the recovery of ore.

### 11.3 Wet concentrator plant

#### Trommel

The T-piece between the dredge feed and trommels should be on a preventative maintenance schedule to monitor the wear. This would include inspection and non-destructive testing. A Distributor Pot with two branches may provide a longer-term solution as the pot can be ceramic lined and have bolted inspection panels. These types of pressurized distributors are common in sand plants and heavy medium plants where excessive wear can be encountered.

An alternative to using the T-piece is the use of a boil box that can incorporate a grizzly screen or parallel bar screen, which can be used to remove the coarse material prior to the trommels. The elevated position of the boil box will promote the even distribution of slurry to the two trommels and provide adequate height to discharge the oversize materials further away from the WCP than the current trommel oversize location.

#### Spiral plant

If a current survey of the operation of the spirals were conducted then the metallurgists would be able to identify if valuable product is being lost at this stage. It is recommended a plant survey be undertaken if this is not already being undertaken on a regular basis.

#### Increase WCP capacity

In AMC's opinion there is opportunity for improved recoveries and production rates. This can be achieved through detailed mine planning and constant management of the spirals and flowrates to maintain optimum feed conditions. Blocking or opening of spiral starts to match ideal spiral loadings is a manual activity and required specialized operators to work well.

To increase the production rate and capacity of the WCP the following considerations are made.

If the head grade of the ore is reduced to 1% THM or less, the increased feed will exceed the capacity of the trommels, dewatering cyclones and rougher spirals. As the majority of the mass is rejected at the rougher stage the four remaining stages of spirals will be relatively unaffected and operate at a similar capacity to the original design.



Preliminary calculations indicate that the trommels are highly loaded and currently experience an excessive loading of oversize materials, peat and foreign matter. Organic matter has been reported to cause wear issues at the trommels, which in turn causes blockage issues in the WCP. To reduce the loading and impact damage on the trommel screens a new oversize removal stage will need to be introduced. Trommel capacity can be increased with the inclusion of baffle rings in the first stages of the trommel to slow slurry velocity and scrolls to control slurry loading.

With pulp density of the rougher spirals already at the upper limit of recommended solids density improvement to the spirals may be achieved by introducing additional dilution water. However, as such a significant amount of additional water is required, it is unlikely the existing water circuit will be capable of the additional demand.

If space is limited on the existing WCP structure additional spiral capacity could be introduced on outriggers to the floating concentrator.

An increase in tailings from the spiral circuit will increase the loading in the tailings dewatering and disposal area. A significant increase in pump power and dewatering stages would be required to increase the stacking capacity and angle of the WCP tailings.

## 11.4 Mineral separation plant

### Throughput capacity

AMC believes there is opportunity for improved plant availability up to 97.5%. There are many mineral sands operations that achieve this level of plant availability Doral Picton MSP, Tronox Chandala MSP and its Synthetic Rutile plant with high-temperature reduction kiln, and the Iluka operations. To achieve higher availabilities, the prescribed preventative maintenance of the separation units, pumps and other motor driven units is required.

AMC identified that capacity increase could be achieved through the increase the pulp densities from the design 35% solids up to 40% and operate in a wider range of MT's recommended feed rates.

The MSP is capable of higher throughput, achievable by both increasing the circuit throughput and by increasing the on-line availability of the MSP. AMC notes that other mineral sands plants are achieving 97.5% availability such as Doral, Tronox, and Iluka Resources, whereas GCO was only typically running at approximately 70% capacity up to July 2017.

### Bucket elevators

If any elevators are replaced in the future, GCO should consider designs with suspended boots and belt adjustment at the head rather than the tail drum, in order to facilitate easy maintenance and reduce downtime.

### ZDP

The main comment on the filter operation would be to trial de-watering agents to reduce the mineral moisture going to the dryer. The main heat requirement is in driving off the moisture in the FBD. The FBD capacity could be increased if required in the future.

As an example of how far a FBD's capacity can be increased, Tronox have taken the synthetic rutile plant fluid bed dryer from the original nominal 100% capacity up to 200% of the original design rate. Some of this capacity is in over-design originally but the rest has been achieved by staged capital project modifications.

Consideration should be given to converting the batch processing of the dry plant with three different cons feed, into a single continuous operation.

### Processing personnel

The management of the MSP with expatriates is of a high standard. If available, Senegalese metallurgists should also be introduced to the staffing to reduce cost.

## 11.5 Rail and port

The following risks and opportunities are identified:

- Rail and Port costs appear high at a reported \$27/t. There may be the potential for a reduction in this item particularly if the rail maintenance is achieving an overall improvement of the track condition. Indicative benchmark operating costs for another project were of the order of \$12/t to \$19/t.
- The operational figures appear to show an improvement in rail haulage performance likely and this may indicate that a higher level of performance is achievable.
- The major impact on haulage appears to be rail breakage and derailment, which is being managed but will be an ongoing issue until the rail is brought up to a good condition.

- The rail upgrade project has the potential to impact on haulage operations and cause loss of production. However, this is partially mitigated by the option to truck finished product to port in containers.
- With current cycle times, the haulage time of seven hours results in an average train speed of approximately 20 km/hr. Improving rail condition and reliability will yield higher sustainable haulage speeds and reduced cycle times. This in turn will result in an increased daily transport tonnage capacity.
- Ongoing track work may result in an improvement of track condition that will result in a reduced maintenance cost for the line. The rail condition is recorded as being the cause of regular derailments. A derailment has the potential to render wagons out of service and interrupt shipping schedules.
- There appears to be capacity within the fleet for higher levels of production without the requirement for additional equipment.
- The locomotive units are now in their fourth year of service and may be approaching requirements for a more major service, resulting in lower availabilities.
- The utilization reported and the operational metrics indicate that there may be the potential for increased production levels with the existing equipment.
- An operating failure in the ship loader was observed in the reporting. The facility is vulnerable to a failure in the ship loader. A review of insurance spares and stocking critical items would be a possible strategy to decrease the risk of outage.
- The cumulative actual shipping tons is below the cumulative budget for most the year. This may be due to delays in vessel arrival. The root cause should be established to enable GCO to meet budget requirements. There may be potential for improvement.
- The pipe conveyor has no redundancy system and loss of the equipment would lead to delay in ship-loading.

## 11.6 Power plant

The following risks and opportunities were identified:

- Power generation costs are around 8 c/kWh. The potential to convert to gas is noted. The conversion to gas could reduce costs potentially by 30%. If this could be achieved the savings would be of the order of \$8/t or \$3M/year.
- The cost of energy is directly related to the fuel price. Increases in fuel price will result in an increased energy cost.
- Exhaust gases from the engines are approximately 400°C. There is no waste heat recovery and there may be a future capacity upgrade by installing a waste heat steam boiler. There is no site requirement for low temperature heating.
- There appears to be capacity within the power station for higher levels of production without the requirement for additional generators. Fault levels, busbar ratings and switchgear ratings would need to be reviewed before stating this with certainty.
- It is noted in the documentation that natural gas may be available in four years' time. It is unknown whether the Wärtsilä 34 generators can run on natural gas and this may be an option. It is likely that gas could have a lower fuel cost than fuel oil and even if this is offset by the capital costs to convert to gas this may provide an overall cost reduction to the project.
- There appears to be scope for increasing the efficiency of the motors to reduce fuel consumption, thus cost, per kWh.

## 11.7 Social and environmental

The key remaining risks to GCO are:

- Resettlement and livelihood restoration.
- Water management for the naiyes zone adjacent to the mine path.
- Managing environmental quality (dust, noise, water quality, and access) such that public health and wellbeing is protected.
- Reputational risk, in ensuring that, given the extent of uncertainties remaining, operational performance matches the scope and achieves the aims of the environmental and social management system.

## 11.8 Personnel

Total number of expats are reported at approximately 60. As the project trains and develops local personnel and skills this has the potential to decrease leading to savings in operating costs.

## 12 Qualifications

AMC is a firm of mineral industry consultants whose activities include the preparation of independent technical specialist's reports, and due diligence reports on, and reviews of, mining and exploration projects for purposes related to equity and debt funding, and public reports. In these assignments, AMC and its sub-consultants act as an independent party.

Based on our checks of AMC's project database, and enquiries of our team members who have contributed to the preparation this ITSR, we advise that we do not have a conflict of interest in preparing this ITSR.

AMC has carried out numerous technical consulting assignments for MDL and related companies in the period 2015 and 2016. In carrying out these consulting assignments, AMC and its sub-consultants have acted as independent parties and have no business relationship with MDL, other than the carrying out of individual consulting assignments, as engaged.

While some employees of AMC and its sub-consultants may have direct or beneficial shareholdings in MDL, neither AMC nor the contributors to this report nor do members of their immediate families have any interests in MDL that could be reasonably construed to affect their independence. AMC has no pecuniary interest, association or employment relationship with MDL.

MDL will pay AMC a professional fee of approximately A\$200,000 according to AMC's normal per diem rates for the preparation of this ITSR, including reimbursement of out-of-pocket expenses. The fee is not contingent upon the outcome of this ITSR, and AMC will receive no other benefit for the preparation of this ITSR.

In a letter relating to our engagement, MDL agreed to comply with those obligations of the commissioning entity under the VALMIN Code including that to the best of its knowledge and understanding, complete, accurate and true disclosure of all relevant material information will be made.

MDL represented in writing that, to the best of its knowledge, it has provided AMC with all material information relevant to its mineral assets described in this ITSR.

AMC has not audited the Mineral Resources and Ore Reserves, mining and processing schedules, cost estimates or other information provided by MDL. AMC has reviewed that information to the extent necessary to satisfy itself that the Production Cases presented in this report are based on reasonable grounds and assumptions, and that the information AMC has in relation to valuation of the exploration properties, is sufficient.

MDL has been provided with drafts of this ITSR to enable correction of any factual errors and notation of any material omissions.

This ITSR and the conclusions in it are effective at 21 May 2018. Those conclusions may change in the future with changes in relevant product prices, exploration and other technical developments in regard to the operation and exploration tenements and the market for mineral properties.

MDL has provided AMC with indemnities regarding damages, losses and liabilities related to or arising out of its engagement other than those arising from illegal acts, bad faith or negligence on its part or its reliance on unauthorized statements from third parties.

This ITSR has been provided to Grant Samuel for the purposes of it forming its opinion and preparing its IER in relation to the Proposed Transaction. AMC has given its consent for its report to be appended to the IER and for it to be provided to shareholders and has not withdrawn that consent before their lodgement with the Australian Securities & Investments Commission. Neither this ITSR nor any part of it may be used for any other purpose without written consent.

The signatories to this report are corporate members of the AusIMM and bound by its Code of Ethics.

Yours faithfully

***Signature Removed***

**A Jones**  
**MAusIMM (CP)**  
**Principal Mining Engineer**

***Signature Removed***

**L J Gillett**  
**FAusIMM (CP)**  
**Director/Practice Leader –**  
**Corporate Consultancy Australia**

## Appendix A

### Principal sources of information

In listing the following reference documents AMC has included the document number referenced in ( ), which was provided in the “AMC GCO data room.pdf” document.

(2014b) Audit environnemental et reactualisation du PGES de GCO SA: Volume 2: Synthèse des Résultats de L’audit environnemntal. Rapport fait pour GCO S.A. de février a mai 2014.

(2014b) HSE-PLN-011-Management Plan: Topsoil (Rev B).

(2014c) Audit environnemental et reactualisation du PGES de GCO SA: Volume 3: Centrale. Rapport fait pour GCO S.A. de février a mai 2014.

(2014c) HSE-PLN-012 Management Plan: Biodiversity and Conservation (Rev B).

(2014d) Audit environnemental et reactualisation du PGES de GCO SA: Volume 4: Camp Minier. Rapport fait pour GCO S.A. de février a mai 2014.

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(2014e) Audit environnemental et reactualisation du PGES de GCO SA: Volume 5: Etude de Danger. Rapport fait pour GCO S.A. de février a mai 2014.

(2014e) HSE-PLN-015- Management Plan: Weed Management (Rev B).

(2014f) Audit environnemental et reactualisation du PGES de GCO SA: Volume 6: Rapport Réinstallation. Rapport fait pour GCO S.A. de février a mai 2014.

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(2014h) HSE-PLN-018- Management Plan: Air Quality Control (Rev B).

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(2014j) HSE-PLN-020- Management Plan: Acid Sulfate Soils (Rev B).

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CRDH (2017b) Réactualisation Des Etudes Socio-economiques (PAR, PSD, PCDP) Dans Les Zones Impactées Par Les Activités De GCO: Plan D'Action de Réinstallation (PAR) 2017-2021. Rapport préparé pour GCO, Dakar, Mai 2017.

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GCO (2014a) HSE-PLN-010 (Rev B) Management Plan: Land Clearance. GCO SA, Dakar, 18/08/2014.

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Wartsila HFO Specifications.

## **GCO General**

GCO Mine Optimization Study Final Report.pdf

GCO Mine Optimization Study Presentation.pdf

LOM Infrastructure&Community Costs\_AMCv5b(Dredge+Dozer).xlsx

PathCompare.pdf

Revised North Foth 3D with Dozer Push schedule (v5b).xlsx

Current Surveys and Plans

Tails Deposition 01 Novembre 2016.dxf

Tin Diogo (topo).dxf

Env & Community Presentations

ERAMET Internal Audit\_April 2014

RAPPORT GCO 30 OCT 2014 VF.pdf

Synthesis of ERAMET 2014 report VF.pdf

Draft Socio-economic Study Update\_CRDH

DRAFT 2016 PSD\_CGO Rapport Final \_18\_11\_ 2016.pdf

Management Plans

GCO\_Environment Monitoring Plan final.pdf

Env Compliance Register

Permitting Reg.pdf

Example Minutes Local Authorities Visits

CR reunion cadre de concertation.pdf

Monitoring Programme\_April 2016

SW GW Air Quality & Meteorological Databases

Compensation Rates Calculations

Budget Environment 2014\_2016

Grievance Land Access Resettlement Docs

Examples of Grievance Recording

Social Development

- Commission Emploi Local\_Arrete Sous-Prefectoral

- arrete Prefectoral\_Commission Emploi Local.pdf

- Example of Socio-Economic Developement Project

- Projet Communautaire de Ferme Agricole Pilote - Rapport complet.pdf

- SDP Social Development Plan.pdf

Resettlement documentation

Community Projects Meckhe.pdf

Audit\_Reactualisation ESMP by HPR

GCO Permitting Reg.pdf

General documentation

GCO - Mine 5YP vs DFS.pdf

GCO - Budget 2017 FINANCE.pdf

Geology-Resources & Mining Planning-Reserves documents



GCO 2015 Resource and Reserve report\_Final.pdf  
Production Schedule  
Reconciliation\_2015.xlsx  
Reconciliation\_2016.xlsx  
Tailings documents and plans  
2016 Mine Path Upgrade.ppt  
2016 Tailings Balance and Schedule.pptx  
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GCO Mining Techniques\_SRK visit.rar  
R&R Block Model 2015  
ASX release Reserve and Resource.pdf  
Health Safety & HR documents and reports  
Hydrogeology - Water Model Reports  
Bore licenses  
Bores and piezos maps  
Bores pumping records  
Infrastructure  
- Power Station  
- Rail  
Network Infrastructure Schematic.pdf  
Rail project - Dakar.pdf  
Mineral Resource & Reserves  
- R&R Statements  
Production Schedule  
- GCO\_RR2015\_production schedule.xlsx  
- GCO LOM2015.emf  
- mineral reserves classification GCO LOM2015.emf  
Monthly Reports  
MSP reports  
MSP Monthly Reports, Balances & Performance  
MSP Bankers Presentation 08 November 2016 .pdf  
MSP Projects  
Radiation reports  
HSE-XXX-001 Radiation Management Plan.pdf  
MSP Waste Dumping Area.pdf  
MSP WASTE LAYOUT.pdf  
RADIATION EXPOSURE.pdf  
MINING FACE SURVEYS  
ERAMET Due Diligence documents  
Production Reports  
2016 Reconciliation.xlsx  
GCO Grade and Mineral Assemblage Reconciliation\_August 2015.doc  
HM predicted Vs Actual.docx  
Topography files  
Mine layout\_ 2016 11 November.pdf  
Water Management reports  
Tailings and water management reports  
Wet Concentrator Plant Technical Reports

## Appendix B

### Abbreviations

Abbreviation	Definition
AMC	AMC Consultants Pty Ltd
ASX	Australian Securities Exchange
CRDH	Centre de Recherche pour le Developpement Humain
DFS	Definitive feasibility study
DuPont	El du Pont de Nemours and Company Inc
EIES	Etude d'Impact Environnemental et Social EIES
ERAMET	Eramet SA
ESIA	Environmental and social impact assessment
Etude d'Impact Environnemental et Social EIES	Environmental and Social Impact Assessment Study
Expert	Independent expert
FEL	Front-end-loader
Financial model	TiZir Model – 2017 – v.2
GCO	Grande Côte mineral sands operation
GCOSA	Grande Côte Operations SA
Grant Samuel	Grant Samuel & Associates
GRS	Government of the Republic of Senegal
HM	Heavy mineral
HMC	Heavy mineral concentrate
HPR	HPR Ankh Consultants
ITSR	Independent technical specialist's report
LOM financial model	GCO life-of-mine financial model
MDL	Mineral Deposits Limited
MSP	Mineral separation plant
Proposal Transaction	Transaction as proposed
Sabodala	Sabodala gold mine
the Mining Code	Senegal Code Minier Loi No 2003 36"
TiZir	TiZir Limited
TTI	Titanium and ilron ilmenite upgrading facility
Umwelt	Umwelt Environmental Consultants
Umwelt and Earth Systems 2011	Earth Systems, Dakar
US\$ or \$	United States dollars
WCP	Floating spiral concentrator
XOF	West African CFS Francs

## Appendix C Glossary

\$ or A\$ - Australian dollars, the lawful currency of the Commonwealth of Australia.

ASIC - the Australian Securities and Investments Commission.

ASX - as the context requires, ASX Limited ABN 98 008 624 691 or the securities market conducted by it.

Corporations Act - the Corporations Act 2001 (Cth).

Eramet - Eramet SA, French company incorporated under the Companies Registry of Paris under number 632 045 381.

MDL - Mineral Deposits Limited ABN 19 064 377 420.

MDL Group - MDL and each of its Subsidiaries and the TiZir Group and MDL Group Member means any member of the MDL Group.

naiyes zone – depression zone

Public Authority - any government or any governmental, semi governmental, statutory or judicial entity, agency or authority, whether in Australia or elsewhere, including (without limitation) any self regulatory organisation established under statute or otherwise discharging substantially public or regulatory functions, and ASX or any other stock exchange.

Shares or MDL Shares - fully paid ordinary shares in the capital of MDL.

TiZir Group - TiZir Limited, TiZir Titanium & Iron AS, Grande Côte Operations SA and each of TiZir Limited's Subsidiaries and TiZir Group Member means any member of the TiZir Group.

TiZir Limited - TiZir Limited, a private limited company registered in the Register of Companies for England and Wales under company number 07727671.

## Appendix D

### Report contributors

Name	Qualifications	Affiliations	Involvement
Lawrie Gillett	BEng (Mining) (Hons) DipGeosc (Mineral Economics)	AMC Director/Practice Leader – Corporate Consultancy Australia	Peer reviewer and Project Director.
Patrick Smith	BEng (Mining)	AMC Managing Director and Principal Mining Engineer.	Peer reviewer.
Colin Sprott	Master of Science (Mineral Economics BEng (Geological) Graduate Diploma of Management	AMC General Manager (Melbourne) and Principal Mining Engineer.	Peer reviewer.
Adrian Jones	MEng (Mining) (Hons) ARSM (Mining & Rock Mech)	AMC Principal Mining Engineer	Author, mining engineering and project manager.
Vincent O'Brien	B App Sc (App. Geol)	AMC Geology Manager – Perth Principal Geologist	Geology and Mineral Resources.
Kwabena Dapaah	BSc (Mining Engineering)	AMC Senior Mining Engineer	Mining modelling.
Roslyn Dioth	BEng (Mining)	AMC Principal Mining Engineer	Financial modelling.
Dave Robinson	BEng (Mech) (Hons)	EPMS Managing Director	Mineral processing peer reviewer.
David Schmidt	BEng (Chem)	EPMS Lead Process Engineer	Mineral processing.
Jeff Sterling	BEng (Mech)	Intech Engineers Managing Director	Infrastructure peer reviewer.
Tibby Skala	BEng (Mech)	Intech Engineers Principal Mechanical Engineer	Rail and port infrastructure.
Mark Poli	BEng (Elec)	Intech Engineers Electrical Manager	Power infrastructure.
Dr. Caroline Henderson	BSc (Zoology) (Hons) PhD (Env Science)	EMC2 Director	Environmental, social and safety.

## Appendix E

### Material tenements






Tenement Type	Tenement Number	Location (state)	Title Holder or Applicant	Date Granted	Date Expiry	Area (ha)
E	830.325/2011	Minas Gerais	Mirabela	16/09/2011	16/09/2014	741.83
E	830.326/2011	Minas Gerais	Mirabela	4/07/2011	4/07/2014	1479.65
E	830.328/2011	Minas Gerais	Mirabela	4/07/2011	4/07/2014	1354.14
E	830.329/2011	Minas Gerais	Mirabela	4/07/2011	4/07/2014	1862.79
E	878.147/2011	Sergipe	Mirabela	14/11/2013	14/11/2016	1999.71
E	878.148/2011	Sergipe	Mirabela	14/11/2013	14/11/2016	1994.82
E	878.149/2011	Sergipe	Mirabela	14/11/2013	14/11/2016	1998.98
E	878.152/2011	Sergipe	Mirabela	14/11/2013	14/11/2016	1998.45
E	878.153/2011	Sergipe	Mirabela	14/11/2013	14/11/2016	1998.52
E	878.154/2011	Sergipe	Mirabela	14/11/2013	14/11/2016	1999.18
E	878.155/2011	Sergipe	Mirabela	14/11/2013	14/11/2016	1999.64
E	878.156/2011	Sergipe	Mirabela	14/11/2013	14/11/2016	1997.20
E	878.157/2011	Sergipe	Mirabela	14/11/2013	14/11/2016	1912.34
E	878.159/2011	Sergipe	Mirabela	14/11/2013	14/11/2016	1613.67
E	878.150/2011	Sergipe	Mirabela	14/11/2013	14/11/2016	1556.38
E	878.151/2011	Sergipe	Mirabela	14/11/2013	14/11/2016	1998.19
E	878.158/2011	Sergipe	Mirabela	14/11/2013	14/11/2016	1862.36
E	870.270/2013	Bahia	Mirabela	29/10/2013	29/10/2016	971.27
E	870.305/2012	Bahia	Mirabela	29/10/2013	29/10/2016	1677.85
E	870.306/2012	Bahia	Mirabela	29/10/2013	29/10/2016	1089.50
E	870.307/2012	Bahia	Mirabela	29/10/2013	29/10/2016	1549.62
E	870.396/2012	Bahia	Mirabela	29/10/2013	29/10/2016	692.01
E	872.947/2010	Bahia	Mirabela	12/08/2011	12/08/2014	308.01
E	872.824/2011	Bahia	Mirabela	19/09/2011	19/09/2014	1999.79
E	872.969/2011	Bahia	Mirabela	19/09/2011	19/09/2014	993.79

# Appendix F

## GCO's permit register



### PERMITTING REGISTER v120717










N°	Titre du Document/ <i>Docu- ment Name</i>	Origine / Authorities	Statut / Status		Preuves / Prouves	Date d'expiration/ <i>Expiry Date</i>	Fréquence de Renouvellement/ <i>Renewal Frequency</i>	Comments
1	Concession minière / <i>Mining Concession</i>	Mining Minister	Reçue le 27 Nov 2007 / <i>Received Nov 27, 2007</i>	 100%	<a href="#">ConcessMin</a>	N/A	N/A	Loi n° 2003-36 du 24 novembre 2003 portant code minier (Article 25 de la Loi minière); Décret 2007- 1326 du 02 Novembre 2007 / <i>Law No. 2003-36 of November 24, 2003 regarding Mining Code (Article 25 of the Mining Act); Decree No. 1326 - 2007 of November 2, 2007</i>
2	Certificat de conformité de l'EIES de GCO_2008 / <i>Conformity Certificat of ESIA_2008</i>	Senegal Environment Minister / DEEC	<i>document received at 14/02/2008</i>	 100%	<a href="#">3. Arrêté Ministriel 0502 MEPN DEEC Certificat de Conformité EIES du projet GCO</a>	N/A	N/A	Arrêté Ministriel 0502 MEPN DEEC Certificat de Conformité EIES du projet GCO 2008 / <i>Ministerial order N° 0502 MEPN DEEC Conformity Certificat of GCO ESIA_2008</i>
3	Décret terrain additionnel / <i>Decree for Additional Land</i>	Senegal State	Reçu le 30 Dec 2009 / <i>Received Dec 30, 2009</i>	 100%	<a href="#">Décret</a>	Validité 25 ans (2034) / <i>Validity 25 Years (2034)</i>	N/A	Décret n° 2009-1488 en date du 30 décembre 2009, autorisant la société Grande Côte Opérations S.A. (SGO), à occuper des terrains de 31.57 ha et 354 ha dans la zone de Diogo et environs (Région de Thiès) / <i>Decree No. 2009-1488 of December 30, 2009, authorizing the company Grande Cote Operations S.A. (SGO) to occupy land 31.57 ha and 354 ha in the area and around Diogo (Region of Thies)</i>
4	Autorisation d'implanter des forages / <i>Authorization to install boreholes</i>	Ministère de l'Urbanisme, de l'Habitat, de la Construction et de l'Hydraulique / <i>Ministry of Urban Planning, Housing, Construction and Hydraulics</i>	Reçue le 23 Juin 2010 / <i>Received Jun 23, 2010</i>	 100%	<a href="#">AutForages</a>	N/A	N/A	
5	Convention de Concession de la voie ferroviaire / <i>Railway Concession Agreement</i>	Ministre chargé des transports ferroviaires / <i>Minister responsible for Railway Transport</i>	11 Juin 2011 / <i>Received Jun 2011</i>	 100%	<a href="#">ConcFe</a>	31/05/2036	Accord entre les parties / <i>common agreement of the Parties</i>	Décret n° 2011-1728 du 17 octobre 2011 portant approbation de la Convention de Concession de la voie ferroviaire Mékhé-Thiès et de la voie 2 entre Thiès et Hann / <i>Decree No. 2011-1728 of October 17, 2011 approving the Concession Agreement of the railway between Mékhé and Thies and route 2 between Thies and Hann.</i>
6	Attestation dépôt de carburant / <i>Fuel Depot certificate</i>	Senegal Environment Minister	Reçue le 09 Mars 2012 / <i>Received Mar 9, 2012</i>	 100%	<a href="#">AttesCarb</a>	N/A	N/A	



# Independent Technical Specialist's Report

Mineral Deposits Limited

217067\_4

N°	Titre du Document/ <i>Document Name</i>	Origine / Authorities	Statut / <i>Status</i>	Preuves / <i>Prouves</i>	Date d'expiration/ <i>Expiry Date</i>	Fréquence de Renouvellement/ <i>Renewal Frequency</i>	Comments	
7	Certificat de conformité des installations de GCO au Port de Dakar / <i>Certificate of Conformity of the GCO installations at Port of Dakar</i>	Senegal Environment Minister / DEEC	2013 / Received Jul 2013	 100%	<a href="#">CertConf</a>	N/A	N/A	Code de l'Environnement (2001) / <i>Environment Code (2001)</i>
8	Autorisation d'accès au Périmètre de restauration des Niayes / <i>Access Access Authorisation to the Niayes Restoration Perimeter</i>	Senegal Environment Minister/ DEFCCS	Reçue le 31 Dec 2014 / <i>Received Dec 31, 2014</i>	 100%	<a href="#">AutOccPRN</a>	N/A	N/A	Arrêté 2565 du 4 avril 1957 portant Classement du Périmètre de Restauration des Niayes / <i>Decree No. of April 4, 1957 regarding the Classification of Niayes Perimeter Restoration</i>
9	Permis de coupe et Défrichement / <i>Vegetation clearing /Cutting Permit</i>	Senegal Environment Minister / DEFCCS	Reçue le 31 Dec 2014 / <i>Received Dec 31, 2014</i>	 100%	<a href="#">AutCoupeDeFr</a>	31/12/2019	5 years	Code Forestier / <i>Forestry Code</i>
10	Autorisation d'importation de sources radioactives scellées / <i>Import Authorization of Sealed Radioactive Sources</i>	Autorité de Radioprotection et de Sureté nucléaire / <i>Radiation Protection and Nuclear Safety Authority</i>	Reçue le 08 Jan 2015 / <i>Received Jan 8, 2015</i>	 100%	<a href="#">AutImportationSRA</a>	Date d'arrivée à destination / <i>Date of Arrival at Destination</i>	N/A	Loi 2004-17 du 15 juin 2004 et de la loi 2009- 14 du 02 mars 2009 / <i>Law 2004-17 of June 15, 2004 and Law 2009-14 of March 2, 2009</i>
11	Attestation Conformite de la Réactualisation du PGES GCO 2016 / <i>onformity certificat of updated GCO ESMP</i>	Senegal Environment Minister / DEEC	Document received at 24/10/2016	 100%	<a href="#">6. Attestation Conformite Réactualisation PGES GCO 2016.pdf</a>	N/A	N/A	Attestation Conformité N° 2506/MEDD/DEEC du 24/10/2016 pour la Réactualisation PGES GCO /
12	Arrêté ministriel portant Autorisation d'opérer les Etablissements Classés de GCO, 2017	Senegal Environment Minister / DEEC	Received at 24/03/2017	 100%	<a href="#">7. Arrêté ministriel 4715 MEDD portant Autorisation Etablissements Classés de GCO 2017.pdf</a>	N/A	N/A	Arrêté ministriel 4715_MEDD portant Autorisation Etablissements Classés de GCO 2017
13	Autorisation de pompage de 9 forages	Ministère Hydraulique et Assainissement / <i>Hydraulic Minister</i>	Received at 28/03/2017	 100%	<a href="#">9. Autorisation de pompage de 9 forages_ 2017.pdf</a>	N/A	N/A	Autorisation N°00441 / MHA / DGPRE portant autorisation de pompage de 9 forages 2017
14	Protocole entre MHA et GCO 2017-2020 sur la gestion des ressources en eau / <i>MoU GCO_MHA 2017-2020 on Water resouces management</i>	Ministère Hydraulique et Assainissement / <i>Hydraulic Minister</i>	Received at 22/05/2017	 100%	<a href="#">8. Protocole MHA et GCO 2017-2020.pdf</a>	31/12/2020	4 ans	Protocole N° 00670/MHA/DGPRES du 22/5/2017 entre MHA et GCO sur la gestion des ressources en eau de 2017 à 2020 / <i>MoU GCO_MHA 2017-2020 on Water resouces management</i>
15	Autorisation de délocalisation et de transfert d'oiseaux ayant nidifié sur les infrastructures / <i>Authorization for relocation and transfer of birds that have nested on Plant / Equipment</i>	Senegal Environment Minister/ DEFCCS	Received at 12/05/2017	 100%	<a href="#">Autorisation déloc. Oiseaux Port.pdf</a>	N/A	N/A	Des oiseaux avaient nidifiés dans le convoyeur au Port de Dakar et présentaient un risque pour le personnel / <i>Birds had nested in the conveyor at the Port of Dakar and presented a risk to the staff</i>

## Appendix G

### Case 1 details

	CY 2017	CY 2018	CY 2019	CY 2020	CY 2021	CY 2022	CY 2023	CY 2024	CY 2025	CY 2026	CY 2027	CY 2028	CY 2029	CY 2030	CY 2031	CY 2032	CY 2033
<b>Mining Production</b>																	
Days	365	365	365	366	365	365	365	366	365	365	365	366	365	365	365	366	365
Mined Sand (Ore)		50	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55
Heavy metal grade		1.73	1.48	1.58	1.77	1.44	1.17	1.50	1.58	1.73	1.85	1.59	1.46	1.29	1.27	1.04	1.24
Utilisation		89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%
Heavy metal recovery		82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%
Heavy metal concentrate		87%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%
HMC Produced		816	747	800	896	730	594	759	801	877	938	807	736	654	640	530	626
<b>Product</b>																	
Premium Zircon	0	58	54	58	65	53	43	55	58	63	68	58	53	47	46	38	45
Standard Zircon	0	15	14	15	16	13	11	14	15	16	17	15	13	12	12	10	11
Rutile	0	4	4	4	4	4	3	4	4	4	5	4	4	4	3	3	3
Leucosene	0	9	9	9	11	9	7	9	9	10	11	10	9	8	8	6	7
Sulphate Ilmenite	0	407	373	399	447	364	286	379	400	438	468	403	367	326	319	284	312
Chloride Ilmenite	0	151	138	148	166	135	110	140	148	162	174	149	136	121	118	98	116
AMC Product- Total	0	645	591	634	709	578	470	601	634	694	742	639	583	518	506	419	495
<b>Total OPEX - uninflated</b>		86	81	82	81	82	81	82	84	85	88	85	83	81	82	80	81

	CY 2034	CY 2035	CY 2036	CY 2037	CY 2038	CY 2039	CY 2040	CY 2041	CY 2042	CY 2043	CY 2044	CY 2045	CY 2046	CY 2047	CY 2048	CY 2049	CY 2050
<b>Mining Production</b>																	
Days	365	365	366	365	365	365	366	365	365	365	366	365	365	365	366	365	365
Mined Sand (Ore)	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	20
Heavy metal grade	1.34	1.38	1.27	1.10	1.20	1.57	1.38	1.48	1.38	1.53	1.52	1.32	1.17	1.18	1.32	1.08	1.13
Utilisation	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%
Heavy metal recovery	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%
Heavy metal concentrate	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%
HMC Produced	675	695	643	554	607	794	700	746	697	775	769	666	591	596	670	545	212
<b>Product</b>																	
Premium Zircon	49	50	46	40	44	57	50	54	50	56	55	48	43	43	43	39	15
Standard Zircon	12	13	12	10	14	14	13	14	13	14	14	12	11	11	12	10	4
Rutile	4	4	3	3	3	4	4	4	4	4	4	4	3	3	4	3	4
Leucosene	8	8	8	8	7	9	8	9	8	9	9	8	7	7	8	6	1
Sulphate Ilmenite	337	347	321	276	303	396	349	372	348	367	384	332	295	297	334	272	106
Chloride Ilmenite	125	129	119	102	112	147	130	130	129	143	142	123	109	124	124	101	38
AMC Product- Total	534	550	509	438	481	628	554	591	551	613	608	527	468	472	530	431	168
<b>Total OPEX - uninflated</b>	80	80	79	78	78	80	80	80	81	82	81	80	78	78	79	77	38

# Appendix H

## Case 2 details

Days	CY 2017	CY 2018	CY 2019	CY 2020	CY 2021	CY 2022	CY 2023	CY 2024	CY 2025	CY 2026	CY 2027	CY 2028	CY 2029	CY 2030	CY 2031	CY 2032	CY 2033
<b>Mining Production</b>	365	365	365	366	365	365	365	366	365	365	365	366	365	365	365	366	365
Mined Sand		50	57	60	62	62	62	63	62	62	62	63	62	62	62	63	62
Heavy metal grade		1.73	1.49	1.59	1.73	1.38	1.16	1.67	1.63	1.90	1.60	1.41	1.27	1.19	1.08	1.35	1.37
Utilisation		85%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%
Heavy metal recovery		82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%
Heavy metal concentrate		89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%
HMC Produced		816	784	880	999	800	670	967	940	1,098	924	820	735	687	622	785	790
<b>Product</b>																	
Premium Zircon	0	58	56	63	72	58	48	70	68	79	67	59	53	49	45	57	57
Standard Zircon	0	15	14	16	18	15	12	18	17	20	17	15	13	13	11	14	14
Rutile	0	4	4	5	5	4	4	5	5	6	5	4	4	4	3	4	4
Leucosene	0	9	9	10	12	9	8	11	11	13	11	10	9	8	7	9	9
Sulphate Ilmenite	0	407	391	439	499	399	334	482	469	548	461	409	367	343	310	392	394
Chloride Ilmenite	0	151	145	163	185	148	124	179	174	203	171	152	136	127	115	145	146
AMC Product- Total	0	645	620	696	791	633	530	765	744	869	732	649	581	544	492	621	626
<b>Total OPEX - uninfated</b>		85	83	85	85	86	81	84	85	89	86	83	81	81	81	82	81

Days	CY 2034	CY 2035	CY 2036	CY 2037	CY 2038	CY 2039	CY 2040	CY 2041	CY 2042	CY 2043	CY 2044	CY 2045	CY 2046	CY 2047	CY 2048	CY 2049	CY 2050
<b>Mining Production</b>	365	365	366	366	365	365	366	365	365	365	366	365	365	365	366	365	365
Mined Sand	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Heavy metal grade	1.25	1.08	1.39	1.45	1.45	1.40	1.53	1.50	1.27	1.18	1.27	1.08	1.21	0.00	0.00	0.00	0.00
Utilisation	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%
Heavy metal recovery	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%
Heavy metal concentrate	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%
HMC Produced	723	625	803	839	835	808	884	868	734	680	736	626	407	0	0	0	0
<b>Product</b>																	
Premium Zircon	52	45	58	60	60	58	64	62	53	49	53	45	29	0	0	0	0
Standard Zircon	13	11	15	15	15	15	16	16	13	12	13	11	7	0	0	0	0
Rutile	4	4	4	5	5	4	5	5	4	4	5	4	2	0	0	0	0
Leucosene	6	6	6	10	10	10	10	10	8	8	9	9	5	0	0	0	0
Sulphate Ilmenite	361	312	401	419	417	403	441	433	366	339	367	312	203	0	0	0	0
Chloride Ilmenite	134	116	149	155	154	149	161	161	136	126	136	116	75	0	0	0	0
AMC Product- Total	572	495	636	664	661	639	699	687	581	538	582	496	322	0	0	0	0
<b>Total OPEX - uninfated</b>	81	77	79	80	81	81	83	80	78	77	79	79	40	2	2	2	1

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# CORPORATE DIRECTORY

## Directors

Nic Limb (non-executive chairman)  
Robert Sennitt (managing director)  
Martin Ackland (non-executive)  
Tom Whiting (non-executive)  
Charles (Sandy) MacDonald (non-executive)

## Executive

Jozsef Patarica (Chief Operating Officer)  
Greg Bell (Chief Financial Officer)  
Michaela Evans (Company Secretary)

## Registered office

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W [mineraldeposits.com.au](http://mineraldeposits.com.au)

## Financial Adviser

Flagstaff Partners Pty Ltd  
Level 20 101 Collins Street  
Melbourne Victoria 3000

## Legal Adviser

MinterEllison  
Rialto Towers  
Level 23 525 Collins Street  
Melbourne Victoria 3000

## Independent Expert

Grant Samuel & Associates Pty Limited  
Level 6 1 Collins Street  
Melbourne Victoria 3000

## Independent Technical Specialist

AMC Consultants Pty Ltd  
Level 29 140 William Street  
Melbourne Victoria 3000

## Share registry

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