19 February 2018

ASX ANNOUNCEMENT

GRANDE CÔTE MINERAL RESOURCE AND ORE RESERVE UPDATE

HIGHLIGHTS

- GCO life of mine now 33 years, extended by seven years to 2050
- Increase in Ore Reserve to 24.7Mt of heavy mineral (**HM**) (Proved and Probable)
- Optimised and updated mine path and schedule increases recovery of Proved Reserves
- 2017 mining activity reduced the Mineral Resource estimate by 0.85Mt of in situ HM

Mineral Deposits Limited (**MDL**, the **Company**) is pleased to announce an update of the Mineral Resource and Ore Reserve estimate in relation to the Grande Côte mineral sands operation (**GCO**) in Senegal, West Africa (100% basis). MDL owns 50% of TiZir Limited (**TiZir**), which in turn owns 90% of GCO. The updated Mineral Resource and Ore Reserve estimates were prepared by GCO Competent Persons in accordance with the 2012 edition of the JORC Code[1] and replace the Mineral Resource and Ore Reserve estimates released by the Company on 22 February 2017.

The updated estimates include:

- depletion of the 2016 Mineral Resource estimate by 46.8Mt (at 1.7% HM) of material containing 0.8Mt of in situ HM mined in 2017;
- exclusion of 6.5Mt (at 0.8% HM) of material included in the 2016 Mineral Resource estimate due to elevation of the pond floor during 2017 mining activity;
- increase in the Ore Reserve estimate to 24.7Mt (2016 – 21.7Mt) of HM (Proved and Probable);
- optimised and updated mine path and schedule, including: reduced frequency of acute path direction changes; optimised path width and dredge pond water level; and revisions arising due to community and infrastructure considerations; and
- increase in the life of mine by seven years to 2050.

Explanatory information in relation to the updated Mineral Resource and Ore Reserve estimates is included in Appendices A and B of this ASX release.

MINERAL RESOURCE ESTIMATE

As at 31 December 2017, the GCO Mineral Resource was a total of 26.2Mt of HM (Measured and Indicated and Inferred) at an average HM grade of 1.4% based on a 1.0% HM cut-off grade. 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.

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.

[1] *Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, 2012 Edition, sets out minimum standards, recommendations and guidelines for public reporting in Australasia of Exploration Results, Mineral Resources and Ore Reserves, authored by the Joint Ore Reserves Committee of The Australian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and the Minerals Council of Australia.*

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

Mineral Resource Estimate

100% basis

Resource Category	Ore Mt	In Situ HM Mt	HM %	Ilmenite %	Zircon %	Leucoxene %	Rutile %
Measured	1,456	20.9	1.4	72.0	10.7	3.2	2.5
Indicated	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
Total	**1,847**	**26.2**	**1.4**	**72.0**	**10.7**	**3.2**	**2.5**

Note:

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.

Information in this report that relates to Mineral Resource estimates is based on information compiled by Mr Djibril Sow, a Competent Person who is a Member of The Australasian Institute of Mining and Metallurgy and a full-time employee of Grande Côte Operations SA. Mr Sow has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr Sow consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

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; and
- 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:

Ore Reserve Estimate

100% basis

Classification	Ore Mt	HM Mt	HM %	Ilmenite %	Zircon %	Leucoxene %	Rutile %
Proved	1,392	20.2	1.5	72.0	10.7	3.2	2.5
Probable	373	4.5	1.2	72.0	10.7	3.2	2.5
Proved and Probable	**1,765**	**24.7**	**1.4**	**72.0**	**10.7**	**3.2**	**2.5**

Note:

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.

Information in this report that relates to Ore Reserve estimates is based on information compiled by Mr Djibril Sow, a Competent Person who is a Member of The Australasian Institute of Mining and Metallurgy and a full-time employee of Grande Côte Operations SA. Mr Sow has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr Sow consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

The GCO deposit continues to the north and south of the Mining Concession beyond these Ore Reserves. Additional mine life will depend on the success of additional drilling and the future economics of GCO.

SUPPORTING STATEMENT MINERAL RESOURCE AND ORE RESERVE REPORTING

In September 2004, MDL was selected by the Government of the Republic of Senegal (**RoS**) to explore and develop the Grande Côte mineral sands project. A Presidential Decree was granted in 2007, providing MDL a Mining Concession of 25 years. Ownership of GCO was transferred to TiZir as part of the MDL/ERAMET joint venture in late-2011. The RoS is a valued project partner, holding a 10% interest. Construction of Grande Côte began in 2011 and was completed in March 2014.

GCO is the biggest single-dredge mineral sands operation in the world with operations managed by an experienced team. Grande Côte is located on a coastal, mobile dune system starting approximately 50 kilometres north–east of Dakar and extends northwards along the coast for more than 100 kilometres. The mineralised dune system averages four kilometres in width and contains largely unvegetated sand masses. The project area is 445.7 square kilometres. Dredging operations commenced in March 2014, with processing operations shortly thereafter in June. Since that time, GCO has gradually increased production.

Geological description

The extensive Senegal-Mauritanian Basin covers most of Senegal and is composed of Mid-Jurassic to Recent, poorly cemented marine sands, marls, limestones and shales overlain by continental lacustrine and marine sediments.

The GCO project is within the belt of coastal dunes that lie along the current shoreline. The dunes, recent in age, are mobile or semi-fixed, pale yellow in colour and overlie older Late Quaternary white marine sands. The dunes range between 5m and 35m in height and the mineralised zones, which are essentially flat-lying, average around 15m in thickness.

The GCO deposit comprises a linear series of Aeolian sand dunes containing an HM assemblage concentrated by wind action. The Aeolian or mobile dunes overlie a substratum of former beach sands representing a recessive littoral environment. These sands also contain a lesser HM concentration. The natural water table generally occurs close to the interface between the mobile dune and littoral sand together with occasional peaty materials preferentially located at the dune-littoral sand interface.

Geological figures, including drillhole location plan and schematic cross section of drillholes and block model are included in Appendix A.

Resource estimation

Geological data was used to define the top and bottom of the mineralised unit. A wireframe of the water table from piezometer readings was constructed. Parent block sizes were 20mE x 100mN x 1mRL, based on a general drillhole spacing of 40mE x 200mN. The Inferred Resources defined in the area south of Mboro called Noto is based on an estimation using parent block sizes of 80mE x 800mN x 1mRL, from RC drill spacing of 160mE x 1600mN for three lines. The total extent of the mineralisation is 3.2km.

Hand auger and reverse circulation drilling were used in the estimation. All samples were either sampled or composited to 1m. No by-products or deleterious elements were considered.

The deposit was divided into three zones with top-capping applied to two of the zones. No assumptions on correlation between variables were used as only HM % was estimated. All input data was rotated 35° toward north so the deposit is orthogonal. Ordinary kriging was used to estimate block grades. The maximum search distance was 750m north, 300m east and 9mRL.

Tonnages are estimated using dry bulk density, 1.7t/m^3. A cut-off of 1.0% HM (1.3% for the first five years) was applied to the accumulated grade. Adjustments were made based on where peat exists.

Swath plots and visual comparisons between the block model and drillhole data was used to check the block grade estimates. The area is currently being mined and previous Mineral Resource estimates by AMC Consultants Pty Ltd in 2010 and 2015 gave similar results (*reference: ASX release, 16 June 2010 – Grande Côte Definitive Feasibility Study Results; ASX release, 19 February 2015 – 2015 Updated Grande Côte Mineral Resource and Ore Reserves*).

The Resource was classified mainly on the drillhole spacing due to the uncomplicated geology, continuity of mineralisation and confidence in the drillhole data. Blocks where the drilling was spaced 200mN x 40mE were classified as Measured and the remaining areas as Indicated (200mN x 100mE) and Inferred (1600mN x 160mE).

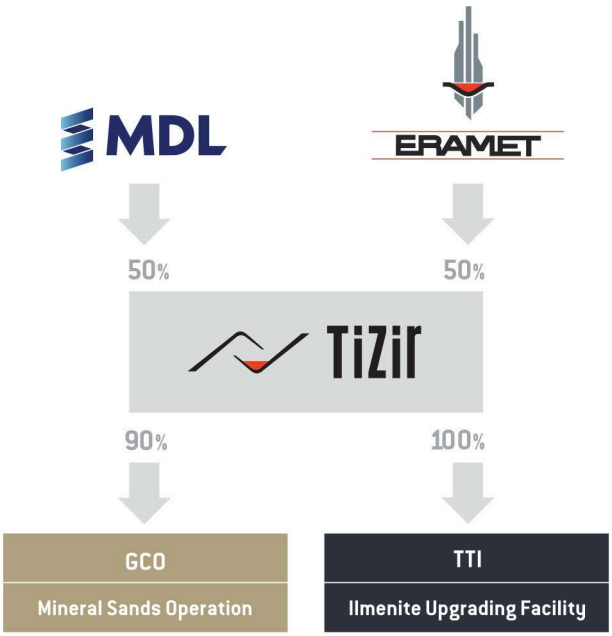
ABOUT MDL

Mineral Deposits Limited (ASX: **MDL**) is an established, ASX-listed, integrated mining company with a 50% equity interest in TiZir Limited (**TiZir**) in partnership 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 report, 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.

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 report.

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

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APPENDIX A: GEOLOGICAL DIAGRAMS

Figure 1: Grande Côte drillhole location plan

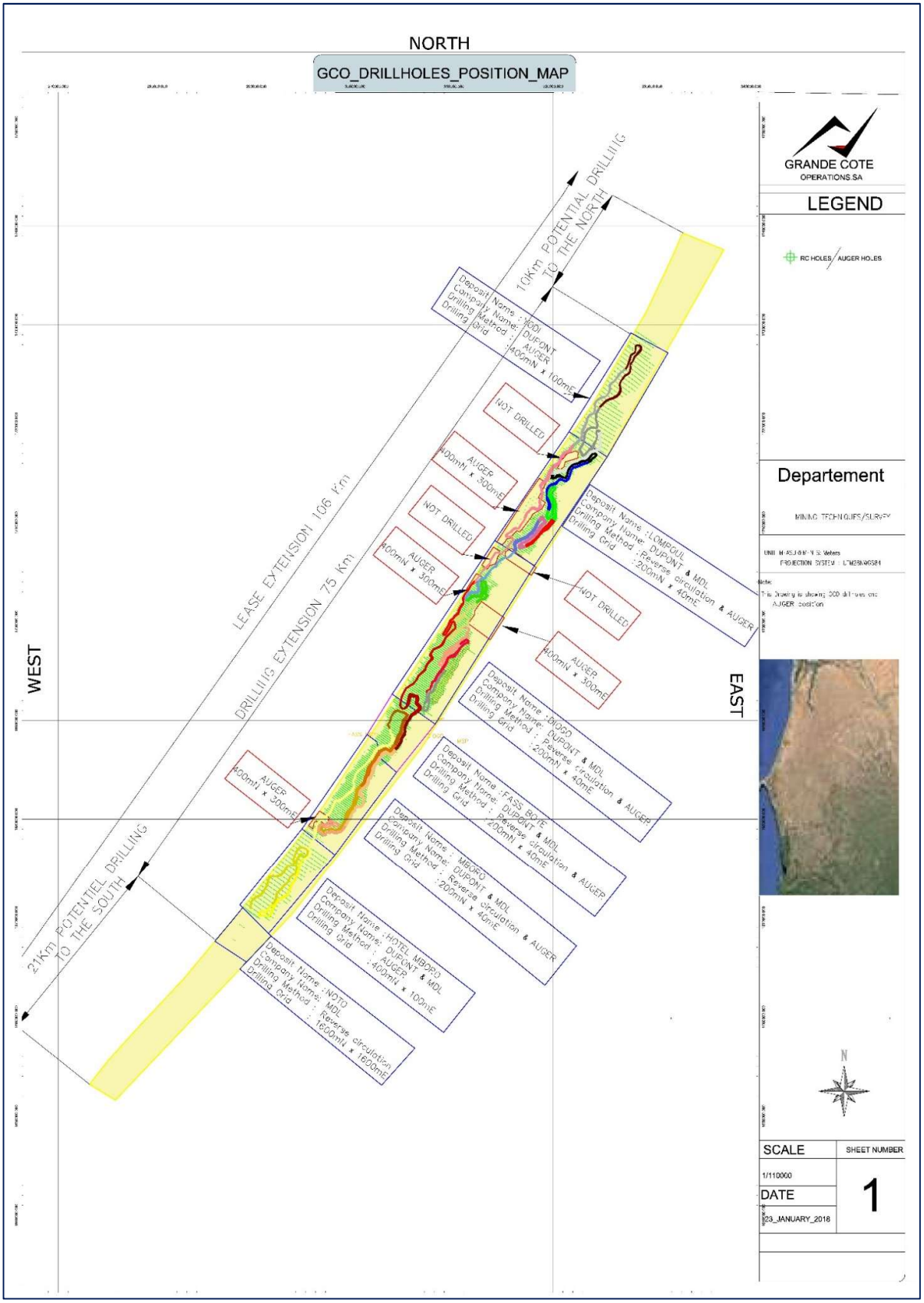


Figure 2: Schematic cross section of drillholes and block model

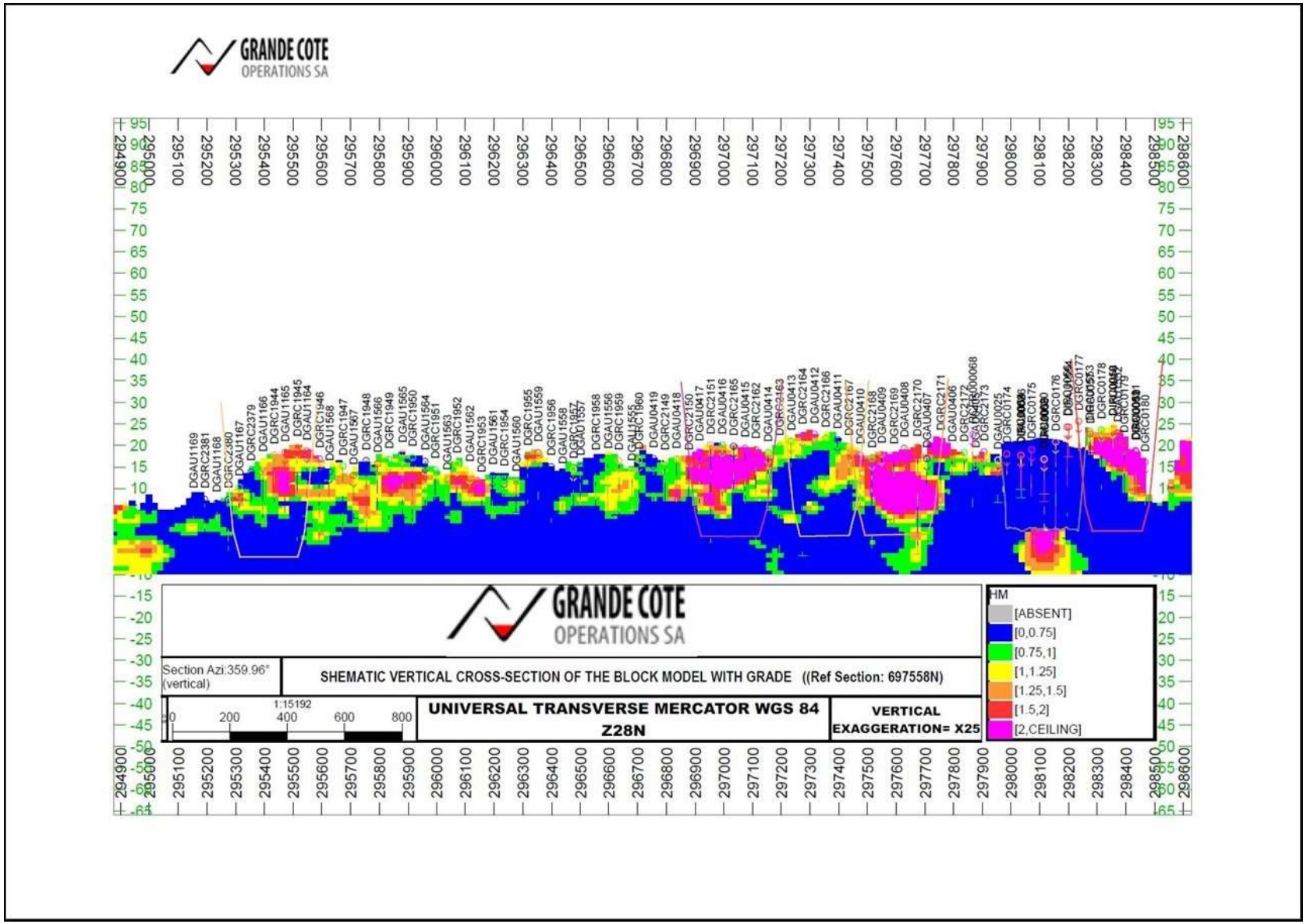


Figure 3: Schematic cross section of geology block model

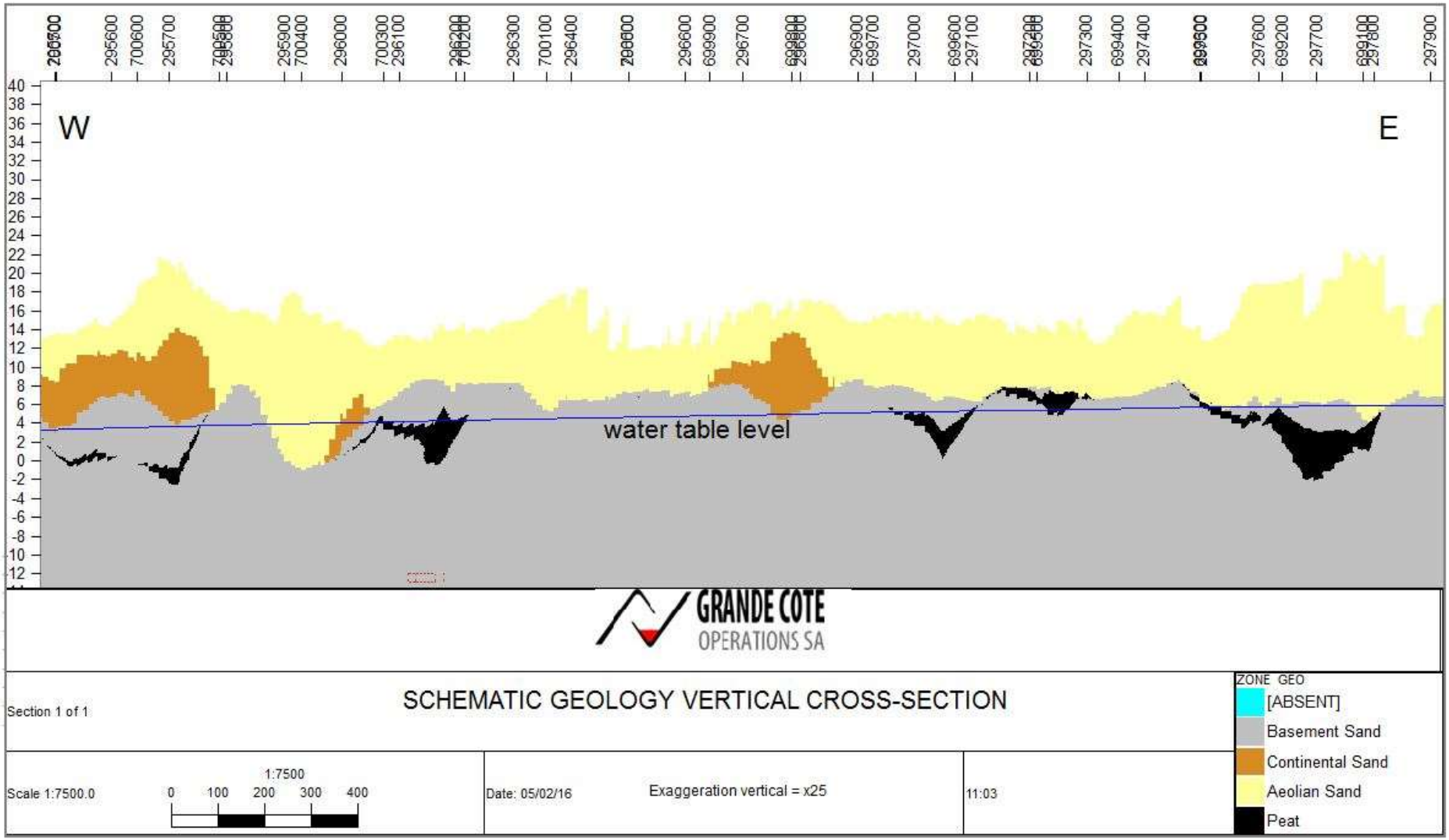
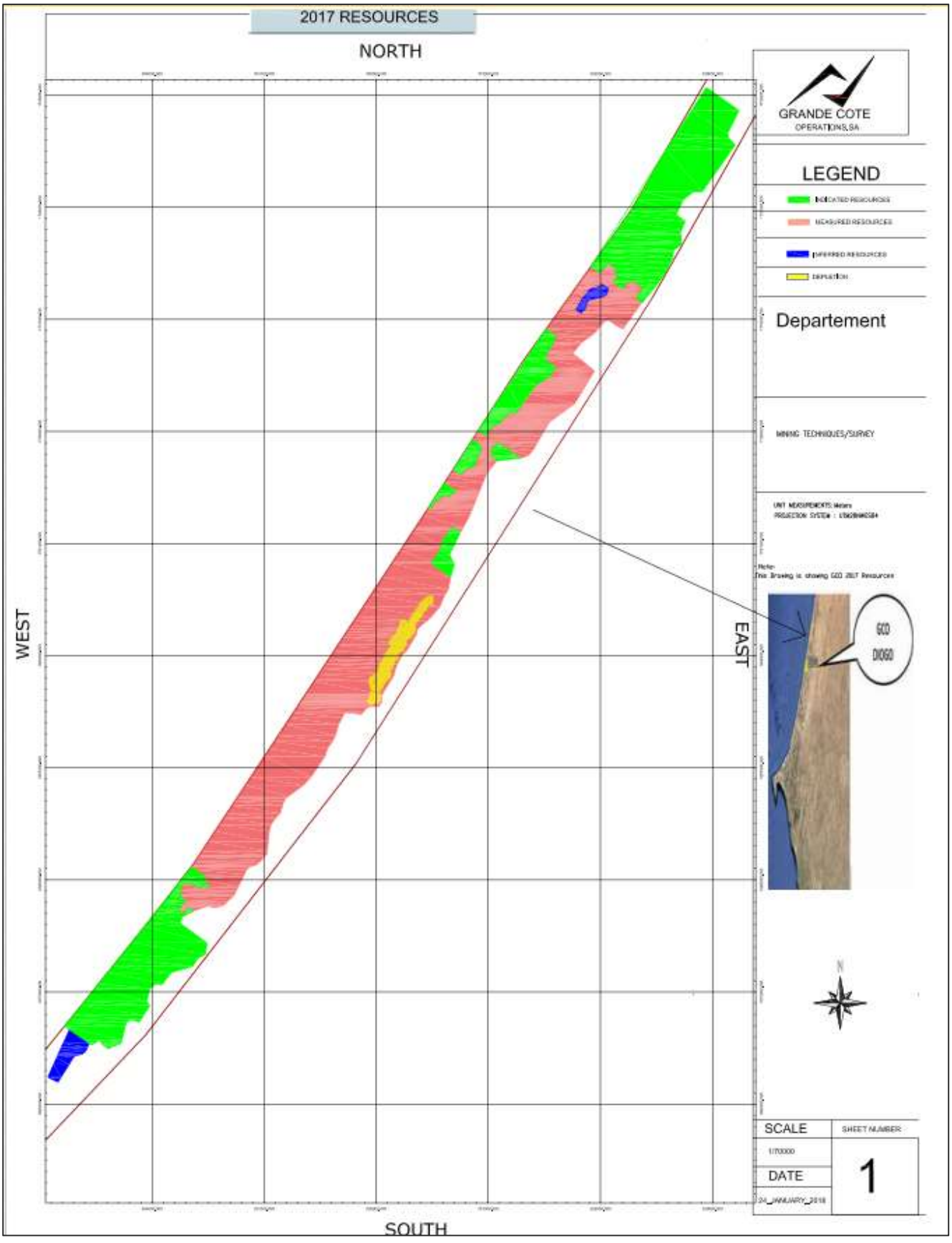


Figure 4: Schematic Mineral Resource classification



APPENDIX B: THE JORC CODE, 2012 EDITION, TABLE 1 SECTIONS 1 TO 4

SECTION 1 – SAMPLING TECHNIQUES AND DATA

(Criteria in this section apply to all succeeding sections)

Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling (e.g. cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc.). These examples should not be taken as limiting the broad meaning of sampling.* • *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.* • *Aspects of the determination of mineralisation that are Material to the Public Report.* • *In cases where 'industry standard' work has been done this would be relatively simple (e.g. 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (e.g. submarine nodules) may warrant disclosure of detailed information.*	• All holes were drilled vertically. • All holes were sampled in 1m intervals honouring lithological contacts. • EI du Pont de Nemours and Company Inc. (**DuPont**) sample collection procedure was virtually identical to that of MDL. The only material difference was DuPont used water injection in its reverse circulation (**RC**) drilling whereas MDL used air and minimised water injected into the dry sand to reduce losses. • DuPont: – Hand auger drilling stopped at or above the water table. – RC drilling was undertaken by Victor Drilling of Florida, USA. – RC samples were collected by use of a pressure pump to force water down the inside of the inner rod and back up though the gap between the two rods, raising the suspended cuttings which were recovered as the sample. • MDL/GCO: – RC rigs were set up to collect the complete sample with a basic cyclone separation by means of a swivel outlet feeding two alternate sample bags. Sample splitting was not done on site. – For hand auger samples the sand was wetted to provide for a collar. Auger shell was filled with sample within two to three rotations. The auger was then withdrawn from the hole and the sample poured/pushed directly into a labelled sample bag. A 75mm PVC collar was placed by hand and the hole re-entered. This procedure was repeated until a 1m representative sample was collected per sample bag. – In 2007, shaft samples were collected to gather accurate geological information down the sand profile and to perform a comparative analysis of HM percentages from RC and hand auger drilling results. – The shaft samples were generally taken at 0.2m intervals and the sample location was surveyed.

Criteria	JORC Code explanation	Commentary
Drilling techniques	• *Drill type (e.g. core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc.) and details (e.g. core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc.).*	• All drillholes are vertical. • DuPont used water injection RC and hand auger drilling methods. • MDL/GCO used in-house aircore/RC rigs mounted on Bombardier Muskeg tracked carriers. • RC drillhole diameter is AQWL 44.6mm diameter, fitted with a proprietary inner tube with a face discharge drill bit, using 3m long rods. • Hand auger is a conventional 50mm diameter Dormer brand shell auger, with 1.5m long extension aluminium coarse thread drill rods. • DuPont's sample collection procedure was virtually identical to that of MDL/GCO. The only material difference was DuPont used water injection in its RC drilling whereas MDL/GCO used air and minimised water injected into the dry sand to reduce losses**.**
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.* • *Measures taken to maximise sample recovery and ensure representative nature of the samples.* • *Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.*	• RC rig theoretical sample weight is 1.8kg/m. • RC rigs used face discharge drill bits and low air pressure (15 – 20 psi) together with low rotation speed (50 – 60 rpm) that provided the most representative sample return. • For hand auger holes, every time the rod is withdrawn from the hole, the depth downhole is marked on the rod. If the rod sits high when it is returned down the hole, the equivalent volume of material is discarded from the top of the sample prior to it being placed in the sample bag. This material is assumed to be over break. • There is no correlation between sample recovery and grade resulting in no sample bias.
Logging	• *Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.* • *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.* • *The total length and percentage of the relevant intersections logged.*	• All the samples were weighed and geologically logged by site geologists for colour, lithotype, grain size, clays, humic/peat content and slimes content. • A handful of the RC sample is taken and manually panned by hand to estimate the HM content for inclusion in the logging sheet. • Depth of the standing water table is estimated.
Sub-sampling techniques and sample preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken.* • *If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.* • *For all sample types, the nature, quality and appropriateness of the sample preparation technique.* • *Quality control procedures adopted for all sub-sampling stages to maximise*	• All samples were sent to the MDL/GCO laboratory at Tivaouane, which is the same laboratory used by DuPont. • DuPont HM determinations were undertaken by Magstream, which uses ferro-fluids and magnetic and centrifugal forces to produce precise split points over a range of specific gravities. Once separation was completed the ferro-fluids were reclaimed by filtration.

Criteria	JORC Code explanation	Commentary
	representivity of samples. • *Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.* • *Whether sample sizes are appropriate to the grain size of the material being sampled.*	• MDL/GCO used heavy liquid separation utilising aqueous, non-toxic lithium sodium tri-polytungstate (**LST**). • All samples were: – dried, weighted – screened at 2mm – oversize – attrition filtered at 45 micron and weighted if clay or peat is present – riffle split if sample is <2mm – 50g and duplicated 50g samples collected – washed and screened to 45 micron – attrition all samples filtered and dried and slimes recorded – screened to 1mm –oversize discarded – LST for heavy media separation – HM % – peat / humus content removed for 24 hour treatment with 10% sodium hydroxide – weight of slimes and peat was recorded Quality control procedures included assaying of a random duplicate from each drillhole by an Australian umpire laboratory.
Quality of assay data and laboratory tests	• *The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.* • *For geophysical tools, spectrometers, handheld XRF instruments etc., the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.* • *Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e. lack of bias) and precision have been established.*	• The assaying method was AS 4350.2 – 999 Australian Standard 'Heavy mineral sand concentrates – Physical testing Part 2: Determination of heavy minerals and free quartz – Heavy liquid separation method' was used for particle heavy mineral separation by heavy liquid (LST). • Quality control procedures included: – standards – replicate testing by individual laboratories – checks between different laboratories – external analyses of one sample from each drillhole or as requested by the chief geologist or senior geologist • During 2007, MDL/GCO assessed RC and auger sampling accuracy using shaft bulk sampling. A comparison with 1m sample assays showed that the RC drilling underestimated the HM grade by an average of 7% and that the auger results were more accurate and comparable to the shafts samples results. • In May 2009, AMC conducted a study to assess the impact the DuPont drilling and MDL/GCO drilling was having on the resource estimate. The review showed the

Criteria	JORC Code explanation	Commentary
		MDL/GCO RC drilling had lower HM% grades than the DuPont drilling but the hand auger results were comparable. • During 2011, the ERAMET due diligence program included mineralogical analyses of heavy mineral composited samples (composited by sand types and levels). The samples were obtained from drillholes and shafts and assayed using MLA, X-ray microanalysis system, XRF, grain counting techniques.
Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.* • *The use of twinned holes.* • *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.* • *Discuss any adjustment to assay data.*	• Validation and updating of the main Access database was conducted on a weekly basis by a GIS and Database specialist. • DuPont tested the reliability of its sampling by randomly redrilling a hole at or very near to the location of a previous hole. The difference between the geological description and the HM determination of the samples from the two holes was generally found to be statistically negligible. • The DuPont data were provided during 2004 as hardcopy map and report, electronic Word document and Excel and Access databases. All the data was analysed and audited by AMC Consultants Pty Ltd. • The assay data was compared on a daily basis with the geology log of panned HM grades for out of range assays, gaps and overlapping intervals by site geologists. Replicate assaying was also carried out. • MDL/GCO also conducted a twin drilling program during 2007 of 55 RC holes and 55 auger holes. • During 2011, ERAMET undertook a resource and reserve due diligence program by twinning some MDL/GCO drill holes. ERAMET auditors concluded that "*We consider that drilling operations are well conducted. The work carried out during due diligence confirm the seriousness of the drilling campaigns done by MDL".*
Location of data points	• *Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.* • *Specification of the grid system used.* • *Quality and adequacy of topographic control.*	• Drillhole collars for drilling by DuPont were surveyed based on a local grid. A number of key points from the DuPont grid were preserved in concrete. Based on these key points the collar locations were translated to the international Universal Transverse Mercator (**UTM**) grid. • All MDL/GCO drill collars were surveyed by Topcon Differential GPS using the UTM WGS84 Zone 28 northern hemisphere grid. • A detailed digital terrain model (**DTM**) was produced by MAPS Geosystems of Dubai, a division of Fugro. This DTM was based on detailed aerial photography flown by MAPS in early 2008. • The aerial photography was taken at 1:12,000 with GPS location bases, surveyed on ground as control points.

Criteria	JORC Code explanation	Commentary
Data spacing and distribution	• *Data spacing for reporting of Exploration Results.* • *Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.* • *Whether sample compositing has been applied.*	• DuPont hand auger drilling was conducted on a grid spacing of 400m north–south by 80m east–west, generally stopping at the water table. The RC drilling did not follow a regular grid. • MDL/GCO auger infill drilling was undertaken on lines at 200m spacing north–south and with holes at 40m interval east–west between two auger holes and 40m spacing between previous DuPont auger and MDL/GCO RC holes. • There were no samples composited, more than 98% of the drillhole intervals were sampled on 1m intervals. • All drilling samples post the initial DFS drilling campaign were sampled on 1m intervals.
Orientation of data in relation to geological structure	• *Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.* • *If the relationship between the drilling orientation and the orientation of key mineralized structures is considered to have introduced a sampling bias, this should be assessed and reported if material.*	• All drillholes are vertical. • Drill lines are perpendicular to mineralised sand dune trends.
Sample security	• *The measures taken to ensure sample security.*	• All samples were placed into calico bags and grouped in rice bags by drillhole. • The samples bags were labelled with drillhole number and sample depth by both marker and aluminium tags. • The samples were delivered to the laboratory on a daily basis with a shipment form.
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	• Drilling methods validation programs were conducted by MDL/GCO in 2007 and reviewed by AMC. • A Mineral Resource and Ore Reserve due diligence program was undertaken by ERAMET in 2011. • These programs showed the sampling techniques and resulting data to be appropriate.

SECTION 2 – REPORTING OF EXPLORATION RESULTS

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

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• *Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.* • *The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.*	• A mining concession was granted to MDL on 2 November 2007 for a period of 25 years. The concession is renewable. • In July 2008, the concession and operation was transferred to Grande Côte Operations SA (**GCO**), which comprised 90% MDL and 10% Senegalese Government ownership. The State royalty is 5% and the company tax rate is 25% commencing from 2022. • On 1 October 2011 the GCO 90% holding, thus MDL's holding, was transferred to UK-based TiZir Limited (**TiZir**). TiZir is a 50/50 joint venture between MDL and French company ERAMET SA. • The concession allows for development, extraction, processing, transport and marketing of zircon, ilmenite, rutile, leucoxene and related minerals. • Agreements and licences are in place for groundwater pumping for the duration of the mining concession. • A 25 year licence for vegetation clearing is updated every five years.
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• The deposit was first recognised in 1945 by the Direction Federale des Mines de L'AOF (**DFMG**). • Undocumented work was subsequently undertaken by the DFMG. • The DFMG completed photogeological, geomorphological and a geological survey in 1957, classifying the dunes. • The DFMG also completed 20 drill sections 5km apart for 666 holes drilling a total of 3,138m. There was no sampling below the water table. • The lease was acquired by DuPont in 1989, and relinquished in 1992 in favour of other potentially more prospective ground. • DuPont drilled 39,062.7m along the 50km of strike length during that time. • MDL acquired the Exploration Permit in 2004. • MDL drilled a total of 198,868m from 2005 to 16 April 2010.
Geology	• *Deposit type, geological setting and style of mineralisation.*	• The extensive Senegal-Mauritanian Basin covers most of Senegal and is composed of Mid-Jurassic to Recent (Holocene, 4,000 to 2,000 years before present), poorly cemented marine sands, marls, limestones and shales overlain by continental lacustrine and marine sediments. • The project is within the belt of coastal dunes that lie along the current shoreline. The dunes are Recent in age, mobile or semi-fixed, pale yellow in colour and overlie

Criteria	JORC Code explanation	Commentary
		older Late Quaternary white marine sands. The dunes range between 5m and 35m in height and the mineralised zones, which are essentially flat-lying, average around 15m in thickness. • The deposits include: Mboro, Lompoul, Diogo, Fass Boye, Yodi, Mboro Hotel and Noto. The deposits extend over a length of about 70km. There is potential for additional deposits beyond the limits of present drilling, both to the south–west and north–east for a total strike length drilled of 75km. • The deposit comprises a linear series of Aeolian sand dunes containing a HM assemblage concentrated by wind action. The Aeolian or mobile dunes overlie a substratum of former beach sands representing a recessive littoral environment. These sands also contain a lesser HM concentration. The natural water table generally occurs close to the interface between the mobile dune and littoral sand together with occasional peaty materials preferentially located at the dune-littoral sand interface.
Drillhole Information	• *A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:* – *easting and northing of the drill hole collar* – *elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar* – *dip and azimuth of the hole* – *down hole length and interception depth* – *hole length.* • *If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.*	• DuPont drilled: – 535 RC holes for 10,210.5m; and – 7,893 hand auger holes for 28,852.2m. • Up to 16 April 2010, MDL drilled: – 7,750 RC holes for 150,665m; and – 4,569 hand auger holes for 45,203m. • GCO drilled: – 16 holes for 310m (scope drilling) in 2015 (Noto). • All holes were drilled vertically. • RC holes average 19.6m long and hand auger holes averaged 5.6m long. • See drillhole location plan in Appendix A, Figure 1.
Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high-grades) and cut-off grades are usually Material and should be stated.* • *Where aggregate intercepts incorporate short lengths of high-grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.* • *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	• A top cut of 20% was applied and any minimum grade was designated. • No metal equivalent values were used. • No aggregating of short length samples was required as samples were consistently assayed on 1m intervals.

Criteria	JORC Code explanation	Commentary
Relationship between mineralisation widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.* • *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.* • *If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (e.g. 'down hole length, true width not known').*	• The deposit is flat and intersected by vertical drill holes. • The mineralised zones average 15m thickness.
Diagrams	• *Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.*	• Drillhole location plan and resource extensions, see Appendix A Figure 1. • Geological cross section references, see Appendix A Figures 2 and Figure 3. • Plan of Mineral Resources, see Appendix A Figure 4.
Balanced reporting	• *Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high-grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.*	• Quantities and grades have been 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. A cut-off grade of 1.0% HM has been applied to the accumulated grades.
Other substantive exploration data	• *Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.*	• No exploration drilling was completed in 2017. • The description of the peat material was reported in the block model from previous exploration and infill drilling results. • Bulk samples were collected.
Further work	• *The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling).* • *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	• Further work will consist of RC infill drilling on a 200m by 40m grid with the aim of upgrading the classification of the Inferred and Indicated Mineral Resource. Also, exploration for extension of the mineralisation to the north and south is planned; see Figure 1. • Future exploration is proposed to upgrade and extend the Inferred Resources of the Noto deposit which is south of the Mboro Hotel and further exploration to the north of Yodi. Therefore, a Resource definition grid of 200mE x 40mN will be used where Inferred and Indicated Resources are located. However, due to the constraints of land occupation for farming and habitation by sedentary local communities and the low topography close to the natural water table, the exploration area in the south of the deposits is limited for drilling. This area is estimated at 10km along strike in the north direction and approximately 1km in the east–west direction.

SECTION 3 – ESTIMATION AND REPORTING OF MINERAL RESOURCES

(Criteria listed in Appendix B – Section 1 and, where relevant, in Appendix B – Section 2 also apply to this section)

Criteria	JORC Code explanation	Commentary
Database integrity	• *Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.* • *Data validation procedures used.*	• MDL/GCO validated the DuPont data using both automated and manual methods. MDL/GCO has access to the original DuPont drill logs, survey records, sample and assay sheets, and plans. • Data review included: – automatic testing of hole-spacing consistency for adjacent line-hole numbers. Observed potential errors were validated using hardcopy original data; – assay from/to sequences and HM% calculations from Magstream feed and product weights were checked and found to be mostly free from errors. Errors detected were corrected; – validation of the location of early RC holes drilled on an irregular pattern was difficult. Some location errors were found and corrected; however, there are instances where collar RLs of RC holes appear incompatible with those of proximal hand auger holes; and – a number of key points from the DuPont grid were located and preserved in concrete and relocated by MDL/GCO. Registered surveyor BetPlus located these tie points enabling the DuPont grid to be reconfigured in the UTM grid. • An access database is updated and maintained by GCO. It is reviewed and maintained by GCO site geologists. • The checks and validation of data include: – comparison assays for out of range values; – samples gaps; – overlapping samples; and – collar coordinate verification including collar elevations comparison to the digital terrain model.
Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.* • *If no site visits have been undertaken indicate why this is the case.*	• GCO employee Mr D Sow has undertaken all necessary investigations with respect to the current estimate. He is a Competent Person and has been a member of AusIMM since 2015. Having over 10 years' experience at GCO, Mr Sow has a long history and good understanding of the Grande Côte deposit and the operations.

Criteria	JORC Code explanation	Commentary
Geological interpretation	• *Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.* • *Nature of the data used and of any assumptions made.* • *The effect, if any, of alternative interpretations on Mineral Resource estimation.* • *The use of geology in guiding and controlling Mineral Resource estimation.* • *The factors affecting continuity both of grade and geology.*	• There is high confidence in the geological interpretation of the sand units (Aeolian sand dunes and basement sand). • It was not considered necessary to subdivide the sand into different domains to control the grade estimation. This is based on a study of dividing the sand into the upper sand dunes unit and lower beach sand. • The peat is intercalated between these sand units. It has been considered as part of the beach sand unit as it is located in depressions or former streams cutting the beach sand unit. The HM can be high-grade accumulated inside the upper Aeolian sand unit on top of the peat but the HM are not significant inside the mature peat deposits. • There is no alternative geological interpretation.
Dimensions	• *The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.*	• The resource extends for 75km north–east and averages 2km wide. • The average depth of mineralisation is 15m.
Estimation and modelling techniques	• *The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.* • *The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.* • *The assumptions made regarding recovery of by-products.* • *Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).* • *In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.* • *Any assumptions behind modelling of selective mining units.* • *Any assumptions about correlation between variables.* • *Description of how the geological interpretation was used to control the resource estimates.* • *Discussion of basis for using or not using grade cutting or capping.* • *The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.*	• Datamine software was used. • All input data was rotated 35° toward north so the deposit is orthogonal. • Geological data was used to define the top and bottom of the mineralised unit. • A wireframe of the water table from piezometer readings was constructed. • All samples were either sampled or composited to 1m. • No assumptions on correlation between variables were used as only HM % was estimated. • Auger and RC drilling were used in the estimation. • The deposit was divided into three zones with top-capping applied to two of the zones. • Parent block sizes were 20mE x 100mN x 1mRL, based on a general drillhole spacing of 40mE x 200mN. A bigger block size of 80mE x 800mN x 1mRL was used for the estimation of the Noto deposit which was based on a drillhole spacing of 160mE x 1600mN. • Ordinary Kriging was used to estimate block grades. • The maximum search distance was 750mN, 300mE and 9mRL. • The area is currently being mined and previous Mineral Resource estimates by AMC gave similar results. A maximum search distance of 2000mN, 200mE and 8m RL was adopted for the Noto block model building. • No by-products are involved in the deposit.

Criteria	JORC Code explanation	Commentary
		• No deleterious elements were considered. • Swath plots and visual comparisons between the block model and drillhole data was used to check the block grade estimates.
Moisture	• *Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	• The tonnages are estimated using dry bulk density. • The moisture content was not determined.
Cut-off parameters	• *The basis of the adopted cut-off grade(s) or quality parameters applied.*	• The high-grade mineral resource is reported above 1.0% HM cut-off grade • The cut-off grades are based on low cost dredge mining. • The Mineral Resource is estimated above a surface which is 6m below the upper aquifer water table.
Mining factors or assumptions	• *Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.*	• Project definitive feasibility study (**DFS**) completed in 2010 on the basis of bulk dredge mining. • Actual parameters since mining started in March 2014.
Metallurgical factors or assumptions	• *The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.*	• Testwork completed by Roche Mining (2002 – 2006) and Downer EDI Mining as part of the DFS (2008 – 2010) for mineral recoveries determination and process design. • The heavy mineral has a consistent assemblage of 10.7% zircon, 72% ilmenite, 2.5% rutile and 3.5% leucoxene. This assemblage was reconciled with other tests carried out by ERAMET during the due diligence, infill drilling and the metallurgical report from actual mining production.
Environmental factors or assumptions	• *Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.*	• As part of the DFS, Earth Systems and Umwelt Consultants conducted a social and environmental study, since updated in 2011 and 2014.

Criteria	JORC Code explanation	Commentary
Bulk density	• *Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.* • *The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc.), moisture and differences between rock and alteration zones within the deposit.* • *Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.*	• For bulk density determination 600 samples were collected over the area of the deposit. • Selective sampling by material type was applied. • A tube driven into the sand and sealed at both ends was used to deliver an in-situ undisturbed sample. The sample was dried and weighted for bulk density determination. • At each sampling location five samples were collected and their average was used as the bulk density for that location. • AMC and ERAMET confirmed the reliability of the method and results. • Samples range in bulk density from 1.67 t/m³ to 1.8 t/m³. • An average bulk density of 1.7 t/m³ was applied for the mineral resource tonnage estimation.
Classification	• *The basis for the classification of the Mineral Resources into varying confidence categories.* • *Whether appropriate account has been taken of all relevant factors (i.e. relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data).* • *Whether the result appropriately reflects the Competent Person's view of the deposit.*	• The resource was classified mainly on the drillhole spacing due to the uncomplicated geology, continuity of mineralisation and confidence in the drillhole data. Blocks where the drilling was spaced 200mN x 40mE were classified as Measured. Blocks where the drilling was spaced 400mN x 100mE were classified as Indicated with the remaining areas (with greater drilling space) classified as Inferred.
Audits or reviews	• *The results of any audits or reviews of Mineral Resource estimates.*	• The Mineral Resource estimates were reviewed by Mr Sow as Competent Person. Results of the review are outlined below. • Depletion: – The 2016 Measured Resource block model was depleted using the 2017 actual mine path. The depletion represents 46.8Mt of HM at 1.7% HM. – With the 3m elevation of the water in the dredge pond in 2017, 6.5Mt of material at 0.8% HM were excluded from the Measured Resources. This material is covered by tailings and will not be mined. – The total material removed from the 2016 Mineral Resource estimate is 53.3Mt of HM at 1.6% HM. • Correction of 2015 Measured Resources: – A section of the Lompoul deposit contains an area wherein drilling grid spacing was 400m x 400m, which was included in the Measured Resources estimate as at 31 December 2015. This area has since been converted into Indicated Resources, representing 30Mt of HM at 1.4% HM.

Criteria	JORC Code explanation	Commentary
		– An area in the northern part of the North Domain, containing no drilling, had previously been considered Measured but has since been converted to Inferred. The area represents 7Mt of HM at 1.2% HM. • Correction of Yodi and Mboro Hotel Indicated Resources: – Errors in the Yodi and Mboro Block model which occurred when these models were added to the initial DFS Block Model have been corrected resulting in an increase of 71Mt of HM at 1.4% HM. • Correction of Noto Inferred Resources: – An overlapping block model has been corrected. Hotel Mboro Indicated Resource Blocks were overlapped with Noto Inferred Blocks as they were estimated separately in the Reserve & Resource Report as at 31 December 2015. Following review in 2016, the overlap was corrected and blocks re-estimated. The reduction of the initial reported resources represents 86Mt of HM at 1.1% HM.
Discussion of relative accuracy/ confidence	• *Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.* • *The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.* • *These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	• The estimation is a global estimate. • The reconciliation of the Block Model adjusting for 2017 mining depletion shows a variance of 3.8% in sand tonnes, 1.4% in HM tonnes and -2.2% in HM grade. • In 2017, the reconciliation showed 3.77% in sand tonnes, 1.44% in HM tonnes and 2.21% in HM grade. • In 2016, the reconciliation showed 1.55% in sand tonnes, 6.49% in HM tonnes and 3.72% in HM grade. • The reconciliation was biased by the density of 1.7 applied as constant and corrected with the peat modelled density. The other uncertainty was the oversize material which was estimated. In addition, the grade in the tailings averaging 0.3% cannot be accurately estimated.

SECTION 4 – ESTIMATION AND REPORTING OF ORE RESERVES

(Criteria listed in Appendix B – Section 1, and where relevant in Appendix B – Sections 2 and 3, also apply to this section.)

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	• *Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.* • *Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.*	• The CGO mineral sand deposit is located north of Dakar on the Western coast of Senegal. The deposit is free flowing sands with dunal system overlying littoral basement sand which holds an extensive shallow aquifer. • The Mineral Resources remaining as at 1 January 2018 is used as the basis for the conversion to Ore Reserves. • The Mineral Resources are inclusive of the Ore Reserves.
Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.* • *If no site visits have been undertaken indicate why this is the case.*	• The Competent Person has worked for the company since 2006 and has been based on the mine site during this time. He met site managers and consultants to collect information relevant to the report and discuss the modifying factors.
Study status	• *The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.* • *The Code requires that a study to at least Pre-Feasibility Study level has been undertaken to convert Mineral Resources to Ore Reserves. Such studies will have been carried out and will have determined a mine plan that is technically achievable and economically viable, and that material Modifying Factors have been considered.*	• GCO is an operating mine. A detailed life of mine plan has been prepared and is based on actual and forecast inputs that exceed the level of accuracy generated in a pre-feasibility study. Mining commenced March 2014. Reconciliation of costs, recoveries and production rates were used to modify the parameters applied in the DFS. Mine optimisation was undertaken by AMC Consultants Pty Ltd and was completed in December 2016. The optimisation study resulted in a more regular mine path heading north prior to south after mining the Diogo area and introduction of high-grade dozer push into the adjacent mine path to supplement the dredge
Cut-off parameters	• *The basis of the cut-off grade(s) or quality parameters applied.*	• The ore selection criteria are controlled by the mining method and the break-even head grade. Mine production is a floating cutter suction dredge, supplemented by dozer push of high-grade material into the adjacent mine path, which is well suited to the GCO deposit. Processing is constrained by ore feed tonnes. The annual production capacity is 55Mt of mined material and is based on the estimated average production rate and the estimated operating hours per year. Dredging is a bulk mining method, unable to selectively mine the higher-grade ore and leave lower grade material. The width and depth of the mine path is adjusted in the design process to control the average feed grade. At depth there is a drop off in grade. The designs are adjusted to minimise the inclusion of this low-grade material, where practical and economic to do so. The mine design and schedule provide an average feed grade that is economically viable. AMC Consultants Pty Ltd developed value models based on the revised operational and market factors. The cut-off grade is determined based on actual and forecast parameters.

Criteria	JORC Code explanation	Commentary
Mining factors or assumptions	• *The method and assumptions used as reported in the Pre-Feasibility or Feasibility Study to convert the Mineral Resource to an Ore Reserve (i.e. either by application of appropriate factors by optimisation or by preliminary or detailed design).* • *The choice, nature and appropriateness of the selected mining method(s) and other mining parameters including associated design issues such as pre-strip, access, etc.* • *The assumptions made regarding geotechnical parameters (e.g. pit slopes, stope sizes, etc.), grade control and pre-production drilling.* • *The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).* • *The mining dilution factors used.* • *The mining recovery factors used.* • *Any minimum mining widths used.* • *The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.* • *The infrastructure requirements of the selected mining methods.*	• The Mineral Resource has been converted to Ore Reserve by the application of detailed dredge path design. The path design consists of mining three-dimensional designs defined by digitising. The shape and sequence of mining are controlled by the dredge and the floating plant constraints. • Dredges are well suited to large, free flowing sand deposits where a pond can be maintained. Dredges typically have lower mining costs than alternative mining methods. As the orebody consists of free-flowing sands holding an extensive shallow aquifer and high-grade located at the top, the choice of a dredge feeding the floating concentrator is appropriate for this deposit. However, dozer push is introduced to recover adjacent high-grade material to the mine path within 100m distance and slope angle of 15°. • No pre-strip is required. All material, within the design, is mined as ore. • The mine design is suited to the equipment used. • The geotechnical parameters were defined by investigation and have been confirmed during operation. Slopes are 35° above water and 14° below. • RC infill drilling at 100mN x 40mE grid and production reconciliation are used for grade control. The infill drilling assays are incorporated into the Mineral Resource model. • Reconciliation of production compares well with the Mineral Resource block model. There is no need to apply additional ore loss or dilution in addition to that inherent in the Mineral Resource block model. • The tailings deposition was improved in 2016 to avoid re-mining the tailings on mine path overlapping areas. The crossovers from the previous life of mine path have been removed to reduce dilution, tailings restriction and additional expense. • The optimum dredge pond level, to economically mine at and maintain the pond level below the natural surface topography, within a 2m minimum buffer, was determined to be in the order of 4m above the upper aquifer level. This pond level is maintained at water table or <4m above in some particular low topography areas. • The current maximum mine width is 220m at pond floor. The minimum used in the design is 100m. The maximum can be extended to 300m by increasing the anchor rope capacity. No additional infrastructure is required to achieve the planned mining although a program of sustaining costs is included in the cost forecast which includes extending the mine services (haul road, overhead power line, water infrastructure, heavy mineral handling, maintenance capex for the production plants and the rail & port, engineering), resettlement of villages or hamlets sitting close to or within the mine path, while advancing the mine face, and engineering projects to achieve nameplate capacity.

Criteria	JORC Code explanation	Commentary
Metallurgical factors or assumptions	• *The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.* • *Whether the metallurgical process is well-tested technology or novel in nature.* • *The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.* • *Any assumptions or allowances made for deleterious elements.* • *The existence of any bulk sample or pilot scale test work and the degree to which such samples are considered representative of the orebody as a whole.* • *For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?*	• A floating concentrator, following the dredge, produces concentrate through gravity concentration. The concentrate is transported to the mineral separation plant. This is appropriate for this style of mineralisation. • The processing method is well tested and not novel in nature. • The processing recoveries reconcile well with samples routinely taken of the produced concentrate. • The previously mined and processed material can be considered an adequate representative bulk sample of the orebody. The previously mined material is representative of the remainder of the Ore Reserve. • The Ore Reserve estimation is based on the appropriate mineralogy to meet the product specifications.
Environmental	• *The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.*	• Relevant environmental approvals were obtained prior to operations commencing in March 2014. • Twenty-five year vegetation clearing licence for the mine path, buffer area and reserved forest area that is updated every five years, was granted to GCO by the Environment department of Senegal. • Current rehabilitation process has been approved by the Forestry Department. • Environmental monitoring and rehabilitation trials have been undertaken in collaboration with international organisations (Earth Systems, Royal Botanic Garden Kew) and local experts from the University Cheikh Anta Diop of Dakar, and are ongoing. • The final Certificate of Environment Compliance was delivered by the government of Senegal to GCO in October 2016.
Infrastructure	• *The existence of appropriate infrastructure: availability of land for plant development, power, water, transportation (particularly for bulk commodities), labour, accommodation; or the ease with which the infrastructure can be provided, or accessed.*	• Sufficient land is available to accommodate the existing and planned plant development. • Adequate power and potable water is available to site. Power is provided by GCO's power station. • Labour is sourced from within Senegal with the number of expatriate workers being reduced as the Senegalese workforce is trained. • Labour is accommodated on site and in surrounding towns. • Transportation of product is by rail to Dakar where it is housed at the port prior to shipment. There is a highway that passes near the mine site for the delivery of fuel and other supplies.

Criteria	JORC Code explanation	Commentary
Costs	• *The derivation of, or assumptions made, regarding projected capital costs in the study.* • *The methodology used to estimate operating costs.* • *Allowances made for the content of deleterious elements.* • *The source of exchange rates used in the study.* • *Derivation of transportation charges.* • *The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.* • *The allowances made for royalties payable, both Government and private.*	• Sustaining costs and working capital variation were included in the costs used in the analysis. • Operating costs were derived from those incurred in the 2016 financial year. Costs for extra haulage distance and dozer push were included in the operating costs. • Current independent market price forecasts were used. • US dollars were used in the analysis and for all costs and product prices. • All product prices used are FOB from the port in Dakar. The concentrate and final product haulage costs were derived from 2016 operating costs. • The heavy mineral, mineral proportions and quality is consistent throughout the deposit. The final products can be controlled to meet product specifications. • Government share production costs were applied in the financial model. • A state royalty of 5% was applied to all revenues. In addition, a company tax rate of 25% commencing from 2022. • The royalty and taxation arrangements for GCO are detailed in Mining Convention and Supplementary Deed No. 1.
Revenue factors	• *The derivation of, or assumptions made regarding revenue factors including head grade, metal or commodity price(s) exchange rates, transportation and treatment charges, penalties, net smelter returns, etc.* • *The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.*	• Minimum head grade of 1.3% HM was considered for the first five years, 1.0% HM for the following years. • The product prices for 2018 – 2021 are based on an independent assessment of short-term market pricing. The prices for 2021 onwards are based on long-term price forecasts which take into account current and projected supply and demand fundamentals for each product and long-term global economic outlook. A yearly inflation rate of 2.5% is considered.
Market assessment	• *The demand, supply and stock situation for the particular commodity, consumption trends and factors likely to affect supply and demand into the future.* • *A customer and competitor analysis along with the identification of likely market windows for the product.* • *Price and volume forecasts and the basis for these forecasts.* • *For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.*	• After processing, zircon, rutile, leucoxene and 58 ilmenite will be shipped to worldwide customers. The 54 ilmenite will be shipped for further processing at the TiZir Titanium and Iron ilmenite upgrading facility in Norway (**TTI**), producing titanium slag (upgraded ilmenite) for consumption by TiO_2-producers and the Ti-metal industry. • TTI is owned and operated by TiZir, a vertically integrated zircon and titanium business which owns GCO and TTI. The company is jointly owned 50/50 by MDL of Australia and ERAMET of France. • Price and volume forecasts are considered commercially sensitive and will not be published in the Ore Reserves. Mr Mouhamed Drame reviewed the supporting information and found it suitable for the project evaluation. • TiZir is constantly monitoring the market and making adjustments to forecast product prices based on supply and demand.

Criteria	JORC Code explanation	Commentary
Economic	• *The inputs to the economic analysis to produce the net present value (NPV) in the study, the source and confidence of these economic inputs including estimated inflation, discount rate, etc.* • *NPV ranges and sensitivity to variations in the significant assumptions and inputs.*	• The Competent Person reviewed GCO's financial model to determine the economics of the project by applying the forecast inputs from the production schedule and using an 8% discount rate which produces a positive after tax NPV. The NPV at an 8% discount rate has been assessed for variations in the key value drivers of product prices, operating costs, operating time, throughput, and pond water level. The NPV is highly sensitive to changes in product prices and water level as well as operating time, costs and throughput (though to a lesser extent). However, the operation remains economic, NPV positive, even for the considered worst case performance over the life of the mine and all years are positive cash flow.
Social	• *The status of agreements with key stakeholders and matters leading to social licence to operate.*	• There are no outstanding issues relating to social licence to operate in the planned mining areas. GCO has ongoing negotiations with key stakeholders. • Further studies were undertaken in 2016 to update the previous social studies. • Resettlement of seven hamlets has been completed. Resettlement of Foth Village is underway. • The mine path will cross three public roads and an artisanal tourist area. • Community processes are considered as a model by different institutions (Environment department of Senegal, Extractive Industry Transparency Initiative Senegal) and presented at the last COP21.
Other	• *To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves:* • *Any identified material naturally occurring risks.* • *The status of material legal agreements and marketing arrangements.* • *The status of governmental agreements and approvals critical to the viability of the project, such as mineral tenement status, and government and statutory approvals. There must be reasonable grounds to expect that all necessary Government approvals will be received within the timeframes anticipated in the Pre-Feasibility or Feasibility study. Highlight and discuss the materiality of any unresolved matter that is dependent on a third party on which extraction of the reserve is contingent.*	• No material naturally occurring risks were identified that will impact on the Ore Reserve estimation or classification. • There are no material legal agreements and marketing arrangements that will impact on the Ore Reserve estimation or classification. • All necessary Government approvals critical to the viability of the project have been obtained for the project. • GCO has a mining concession covering an area of 445.7km² for the operation of zircon, ilmenite, rutile, leucoxene and other associated minerals and notified by Decree No. 2007-1326 of 2 November 2007. • Prior to this decree, the State of Senegal had granted MDL an exploration licence in the same area by Order No. 007474 dated September 10, 2004 published in the Official Gazette of 30 October 2004. An agreement for Mining was signed between the State of Senegal and MDL for the same area. The Mining Convention was amended by amendments 1, 2, 3 and 4 respectively dated 20 September 2007, 9 July 2008, 8 December 2010 and 19 December 2013. • The Mining Concession covers part of Thies and Louga and has a 25 year renewable term. Under the provisions of the Mining Code, the holder of a mining title must conduct site rehabilitation at the expiration of each security and is subject to

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		regulations on mining rehabilitation. The nature of the exploitation of HM requires GCO to undertake continuous rehabilitation. • An environmental and social impact study was approved in 2008 and updated in 2016. The Environmental and Social Management Plan takes into account the impacts of the project. Rehabilitation measures, social and economic development, and resettlement and compensation of people affected by the project are considered. • GCO has obtained licences for additional water infrastructure and maintains ongoing negotiations with the Water Ministry on water management to accommodate the adjustment of the pond elevation.
Classification	• *The basis for the classification of the Ore Reserves into varying confidence categories.* • *Whether the result appropriately reflects the Competent Person's view of the deposit.* • *The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).*	• Measured and Indicated Mineral Resource materials that fall within the mine design have been converted to the Proved and Probable Ore Reserve. • The confidence assigned to the Ore Reserves is appropriate and is representative of the confidence of the Mineral Resource. • The Probable Ore Reserves have been derived from Indicated Mineral Resources that fall within the mine path and from Measured and Indicated Resources for the dozer push material.
Audits or reviews	• *The results of any audits or reviews of Ore Reserve estimates.*	• Michael Rose (GCO Mine Manager) and Mouhamat Seck (GCO Technical Services Manager) have reviewed the GCO produced mining schedule and designs. The review found that the designs and documentation were adequate for the generation of an Ore Reserve.
Discussion of relative accuracy/ confidence	• *Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.* • *The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.* • *Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.* • *It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	• The GCO Ore Reserve is for an operating mine. The economic analysis is based on recent inputs, derived from actual accounts, and is of an accuracy and confidence appropriate for Ore Reserve classification. The economic analysis is based on estimates of costs and prices. • There is sufficient record-keeping and reconciliation of the mining and separation processes. There are no significant changes planned for mining and processing. • The material included in the Ore Reserve is similar in nature to previously mined and treated material (both geotechnically and in terms of mineralogy and geology). The mine plan is technically achievable. The material modifying factors have been considered and applied. However, further design and sequencing works are required for the dozer push material to be converted from Probable to Measured Reserve. • The project is economically viable at the forecast costs and prices.