JORC Code, 2012 Edition – Table 1: Namalope Deposit

Indicated Resource/Probable Reserve & Measured Resource/Proved Reserve

31 December 2018

Section 1 Sampling Techniques and Data

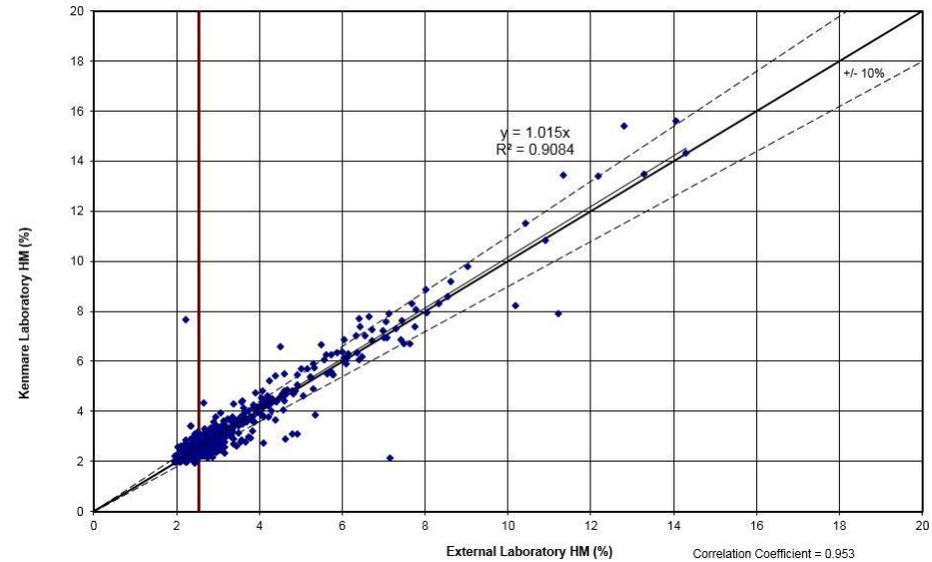(Criteria in this section apply to all succeeding sections.)

Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling (eg 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.*	• Air-core drill samples taken (predominantly) at 1m intervals typically 7 kg, riffle split to 100g in the lab then analysed for oversize (+1mm), slimes (-45 micron), and heavy minerals (+2.8 SG). Heavy mineral (HM) mineralogy determined by compositing HM fractions from the drilling samples by geology unit, then analyzing magnetic and non-magnetic fractions using XRF.
	• *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.*	• Air-Core Drilling. Drilling is conducted on a regular grid using air-core drilling technology, an industry standard drilling technique for HM deposits. Drilling rods are 3m long and 3 samples are taken for each rod at 1m intervals. • Collar Survey. Collar positions are surveyed using GPS RTK equipment, accurate to within 0.1m in the z direction. • Monthly Reconciliation. Grade estimations are compared monthly with the grades encountered during mining, with good correlation.
	• *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 (eg '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 (eg submarine nodules) may warrant disclosure of detailed information.*	• Heavy mineral mineralisation occurs as disseminated zones within sedimentary units. At Namalope there are units deposited in a shallow marine environment with some beach strands, and units deposited as aeolian dunes with greater vertical continuity. Mineralised zones extend for many hundreds of metres to kilometres along strike with minor local variability. • Downhole sampling is conducted at 1m intervals principally to delineate the edges of the layers for mine planning purposes. This leads to an excess of grade information - above that strictly required for grade estimation for the geological model.

Criteria	JORC Code explanation	Commentary
Drilling techniques	• *Drill type (eg core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (eg 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).*	• NQ air-core drilling with hole diameter approx 75mm, all holes are vertical. Air-core drilling is a form of reverse circulation drilling requiring twin tubes, and where the sample is collected from the open face drilling bit and blown up the inner tube. It is well suited to drilling unconsolidated sediments and is one of the few drilling techniques to give good sample quality below the water table.
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.*	• Field assessment of sample volume. Samples with good recovery weigh 7-8kg for each metre (7.7 kg theoretical). With air-core method, there is normally lower than average sample recovery at the very top of the drillhole due to air and sample losses into the surrounding soil. Sample recovery below the water table can be greater than 100% as water flowing into the hole causes the hole to have a greater diameter than the drilling bit. With careful management, though, sampling below the water table still gives uncontaminated samples provided the sample stream is only sampled when the bit is cutting new material. • With the disseminated style of mineralisation typical of heavy mineral deposits, it is preferable to have samples of lower volume that are free of contamination, rather than samples of correct sample weight that may be contaminated. Therefore, while drilling the sampling team focus on ensuring that the sample stream coming from the drilling rig is only sampled when the bit is drilling into new, uncontaminated material. Contamination is most often a problem during rod changes and where there is a high flow of groundwater into the drillhole
	• *Measures taken to maximise sample recovery and ensure representative nature of the samples.*	• The entire drill sample is delivered to the laboratory for further analysis, thereby eliminating the possibility of sample bias caused by splitting the sample in the field. • Samples are collected in calico bags and allowed to drain and partially dry in the field or in the exploration yard prior to delivery to the laboratory. With very wet samples there can be a slight loss of the slimes fraction through the weave of the cloth of the bag as the sample drains, but this is only a very small fraction of the total slimes in the sample.
	• *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.*	• Materials sampled by the air-core drilling rig can be dry, moist or wet. Dry samples may lose some of their slimes fraction due to blowing out of the sampling equipment, but HM and oversize are not affected. Moist drill samples (the most commonly found at Namalope) are the most representative as the whole sample is returned as "clumps" of material from the bit face. There is no chance for HM or slimes to segregate in the moist samples, because all of the material stays stuck together. Wet samples taken from permeable sands and gravels underneath the water table where there is a high flow of water into the drillhole may segregate at the bit face and in the drill string and there is potential for slimes to be washed out of the sample, and for HM to segregate from the quartz sand and to preferentially be flushed out of the system with the other

Criteria	JORC Code explanation	Commentary
		drill spoils at rod changes.
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.*	• Drillholes are logged in the field. All samples are qualitatively logged for lithology, grainsize, colour, clay content, sorting and a description of any unusual features. Sand samples are panned to estimate HM content which is useful as a check on the laboratory analysis. The laboratory also records the colour of the dried samples. • Virtually all of the drill samples are sand or sandy clay. Drillhole logs are useful in separating geology units and for checking the laboratory results, but do not provide any information additional to the laboratory data that is fundamentally required for the resource estimation.
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.*	• All of the field samples are delivered to the laboratory for analysis. This eliminates the need for field splitting and the possibility of bias from this source. • At the laboratory the sample is oven dried then "gently pulverised" by hitting the cloth sample bag with a rubber mallet. The resulting sample is then coarsely sieved at 1 mm and any aggregate lumps broken down so that they pass through the screen. Any genuine oversize (+1mm grains) are weighed at this stage and the oversize% is then calculated on the entire sample. The sample is then dry riffle-split down to a nominal 100g sample size for further analysis.
	• *For all sample types, the nature, quality and appropriateness of the sample preparation technique.*	• Virtually all drill samples consist of sand, clayey sand or sandy clay. For these samples the sample preparation method is appropriate. Very rarely, samples are taken of weathered bedrock, where the sample consists of rock fragments and clay with little sand fraction, and while these samples are slower to analyse, the method still gives relevant results.
	• *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.*	• All sample preparation stages are documented in standard operating procedures. • Employees conducting the work are constantly monitored by their supervisor to ensure standard procedures are being followed • Work is also monitored by geology staff, who work in an adjacent office • Laboratory duplicates are taken as part of Laboratory internal quality control at an approximate rate of 1:20. • Geology staff takes blind duplicates at a rate of about 1:20.
	• *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.*	• The entire sample is delivered to the lab, so it is representative. Care is taken with the sample collection and handling to ensure that the sample delivered to the laboratory is representative of the interval drilled.
	• *Whether sample sizes are appropriate to the grain size of the material being sampled.*	• The one-metre drill sample of 7kg nominal size is certainly large enough to reliably capture the HM, slimes and oversize characteristics of the in-situ material. Smaller diameter drilling systems have been tested in the past, which give smaller sample

Criteria	JORC Code explanation	Commentary
		volume; the sample quality was not as good as with NQ system. • The portion split at the laboratory is nominally 100g. This is sufficiently large to consistently estimate HM%, but is too small to consistently measure the generally very low percentage of oversize.
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.*	• Sieving to determine +1mm (oversize) and -45micron (slimes). • Heavy mineral separation using LST heavy liquid to separate HM from other minerals (predominantly quartz). • Control procedures include laboratory duplicates and blind duplicates. LST density is monitored and kept above 2.8 (it is water soluble).
	• *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.*	• Not used.
	• *Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.*	• Duplicates (both lab internal, and blind geology duplicates) and external laboratories are used to ensure accuracy and precision. • XRF analysis is used to estimate mineralogy. The XRF is calibrated using standards and known samples. • Round-robin inter-lab checking. • QAQC systems return acceptable results in 2018. For HM, 90% of the blind duplicates completed in 2018 were within 12% margin of error. • Duplicate samples analysed by an external lab in 2017 returned the following comparison, 90% of the samples were within 11% of the average assay value (data limited to assays greater than 2%). The correlation coefficient was 0.95 and there was no significant bias.

Criteria	JORC Code explanation	Commentary
		External Lab Checks 2017 y = 1.015x R² = 0.9084 +/- 10% Kenmare Laboratory HM (%) (y-axis) External Laboratory HM (%) (x-axis) Correlation Coefficient = 0.953 •
Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.* • •	• Mineral sands drilling involve hundreds or thousands of drillholes with moderate grade intersections. Although high-grade intersections are a relatively insignificant part of the overall mineralisation, high grade results are often checked by examining the HM "sinks" from the analysis (the HM resulting from the analysis process is stored for further testing). Sometimes, especially near weathered bedrock, iron-rich sediments and concretions can give false positive HM values. These are generally found within un-mineable units in any case.
	• *The use of twinned holes.*	• During feasibility study work, there were numerous twinned holes completed, with good correlation.
	• *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.*	• The primary data storage is in a Microsoft Access database. Collar data, geology data, assay data and mineralogy data are loaded from separate sources and verified with queries designed to detect common errors. Data is then loaded into mining software (Datamine studio RM) and geologists check the resulting cross sections to ensure drillholes are correctly positioned and assays are appropriate for the geology unit and location.

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	• *Discuss any adjustment to assay data.*	• No adjustment is made to the assay data for the purposes of public reporting.
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.*	• A RTK GPS system is used to survey drillholes. • The grid is UTM37S (WGS84) • The grid is tied into the national Mozambican topographic controls via a number of beacons setup around site. However, these are rarely used as the satellite based GPS system is primarily used for drillhole surveys. The base station for this has been levelled using a nearby beacon. A difference of +/- a few metres relative to the national grid is not a concern because the regional topographic data is never used in any case.
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.*	• No Exploration Results or Inferred Resource is reported at Namalope, just Indicated and Measured Resources (and associated reserves). • Variograms in the main mineralised units show ranges of 194m to 800m. • Drill spacings range from 50mx50m to 400mx200m. • Areas with drill spacing closer than 200m x 200m are classified as Measured Resource. Areas drilled more coarsely than that are classified as Indicated Resource. • In view of the variogram ranges, the 200mx200m spacing is appropriate for Measured Resource status. • There is a high degree of confidence in the continuity of mineralisation in areas tested at drill spacing coarser than 200mx200m and Indicated Resource classification is appropriate. • Sample compositing has not been used in the modelling process for HM, Slimes and Oversize components of the ore. • Compositing is used to determine mineralogy, but this is far less variable than the HM content, and is appropriate.
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 mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.*	• The mineralisation has several trends at Namalope; indeed two of the major mineralised units have areas where the major trend is at 90 degrees to other areas within the same unit. • Drilling is aligned with the UTM grid. The 50mx50m spacing is sufficiently fine to capture the trend, no matter which direction.
Sample security	• *The measures taken to ensure sample security.*	• Samples are sun dried in calico bags and then stored in weather-proof shelters. • HM recovered from the analysis of samples is stored and retrieved as required for mineralogical analysis.
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	• No audits conducted specifically for sampling.

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.*	• Concessão mineira (Mining Concession) No. 735C held by Kenmare resources subsidiary Kenmare Moma Mining, as shown below: • The Mining Concession is valid until 26 August 2029 and Kenmare currently has a licence to mine which over the Proved Reserves in the Namalope orebody. Kenmare reasonably expects to obtain all requisite licences to mine the area containing the Probable Reserves.
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• In the late 1990s Kenmare held a joint venture over the Namalope deposit with BHP. BHP conducted exploration work on the deposit for several years. The work was of a high quality and BHP were able to take advantage of their experience with other titanium resources to conduct initial metallurgical testing and mineralogy of the minerals at Namalope.

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Geology	• *Deposit type, geological setting and style of mineralisation.*	Mineralisation at Namalope is hosted in coastal, shallow marine sediments and dune sands. Several phases of deposition are evident, with the main mineralised units focussed around the north-eastern end of a major dune feature which has evidently formed a trap for heavy minerals.
		The earliest concentration of HM is in a very large dunal feature, approximately 50km long, 10km wide and 100m high. This dune has been subjected to moderate weathering and is now red-brown in colour and is generally known as the "Old Red Dune". Local geology Units 2 and 3 are part of this formation. Erosion of this dune during a transgression led to the deposition of "Unit 7", a shallow-marine sand now generally found between elevations -2 and +6 mASL. Overlying much of Unit 7 is a clay layer (Local Unit 81) probably deposited in estuarine conditions. This unit is overlain by another shallow marine sand, local geology Unit 6, one of the major mineralised units at Namalope. Most of Unit 6 exists as a flat layer extending NE of the NE end of the Old Red Dune (Namalope Flats), with elevations ranging from about 6 to about 13 mASL. The 'Nick Zone' is an area where Unit 6 and 7 lap onto of the Old Red Dune and both units thicken significantly. Unit 1 is probably the youngest unit in the area. It is a clean dune sand that lies over the Old Red Dune units (2 & 3).
		Mineralisation from Units 1, 2, 6 and 7 form part of the Namalope Resource and Reserves. Unit 81 is sometimes mined incidentally when dredging Unit 7.
Drill hole Information	• *A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material*	• Delineation of heavy mineral deposits at Namalope requires many thousand shallow drillholes, most of them with moderate or low-grade intercepts. The information is best presented in plan view, where all the relevant information can be presented in a more

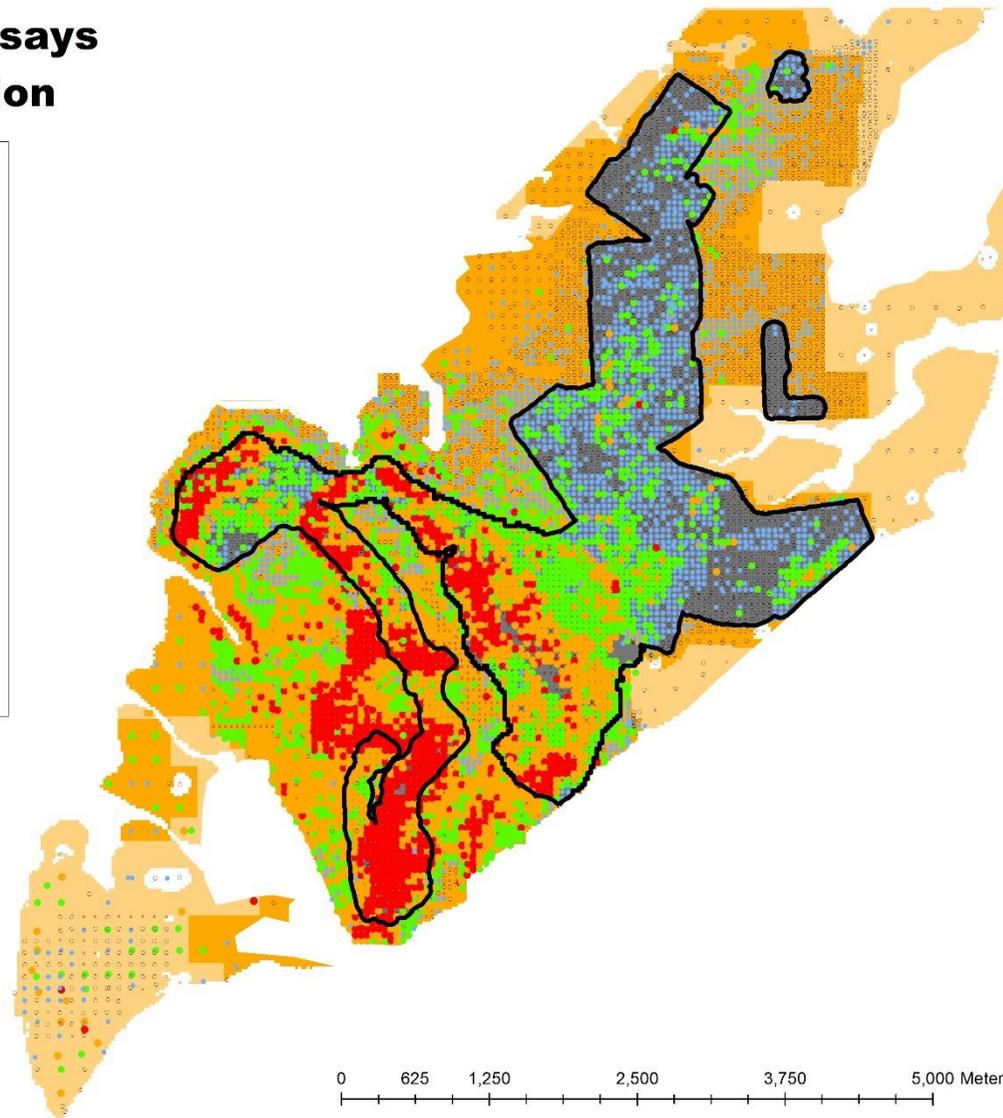| Criteria	JORC Code explanation	Commentary
	drill holes: ○ *easting and northing of the drill hole collar* ○ *elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar* ○ *dip and azimuth of the hole* ○ *down hole length and interception depth* ○ *hole length.* • *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.*	concise form - see drill plan below. The plan summarises the grade information as a "metal factor", classified by grade x thickness. The grade is HM%, with a threshold at 2% HM (values below this are not included and would give a "0" value). The thickness value is the total aggregate intercept in the drillhole exceeding the 2% threshold. Only those depth intervals exceeding 2% HM are included in the thickness value.

NAMO Drilled Holes, Assays & Resource Classification

THM Grade x Thickness (m%)

grade_x_le

- 0 - 10
- 10 - 38
- 38 - 65
- 65 - 100
- 100 - 150
- 150 +

- Indicated
- Measured
- Mined Out
- Mined Out Boundary

Criteria	JORC Code explanation	Commentary
Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg 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.*	• No exploration results have been reported for this deposit.
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 (eg 'down hole length, true width not known').*	• The drillholes are vertical and the mineralisation is generally sub-horizontal.
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.*	See drillhole plan and schematic sections above.
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.*	• This resource has only been reported as an Indicated or Measured Resource, where the modelling process has averaged the grade data.
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.*	• There is no other relevant exploration data for this area.

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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.*	• Detailed drilling at 50mx50m will continue to sample the areas 3-5 years ahead of mining. The Indicated Resource / Probable Reserve will progressively be converted to Measured Resource / Proved Reserve. • The resource is limited in lateral extent to the north, south and east because the mineralised geology units do not occur further in those directions. Mineralisation does extend to the west, but in that direction it becomes part of the neighbouring Nataka Deposit.

Section 3 Estimation and Reporting of Mineral Resources

(Criteria listed in section 1, and where relevant in 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.* •	• The primary measure to avoid data corruption is the input and storage of all sample data in a relational database. Checks are made on all data input into the database to ensure data integrity. The final check is the visual presentation of the new data in cross section, where geologists confirm that the information matches the expected results for the unit and location, the logged data, and is consistent with previously generated information for that area.
	• *Data validation procedures used.*	• Database integrity rules for all input data & visual checking of new data in cross section.
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 is currently a full time employee of Kenmare Resources.
Geological interpretation	• *Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.*	• The resource model is fundamentally based on the geology interpretation. Each unit making up the model is modelled separately. • The geology units are generally easy to distinguish based on their position in the profile, and the geology. There are narrow zones where two adjacent wind-blown units might be mixed, but in these cases, the geological boundary is not important to modelling.
	• *Nature of the data used and of any assumptions made.*	• The geology data is used, including elevation, lithology, clay content, colour, HM content and oversize content. • Variogram data is used to set the parameters for HM estimation in the different units.
	• *The effect, if any, of alternative interpretations on Mineral Resource estimation.*	• The drill data is relatively closely spaced and so alternative interpretations have little effect on the model.
	• *The use of geology in guiding and controlling*	• The geology model is used as the over-riding control in the resource estimation. Each

Criteria	JORC Code explanation	Commentary
	Mineral Resource estimation.	geology unit is modelled separately.
	• *The factors affecting continuity both of grade and geology.*	• The mineralisation was deposited in either shallow marine / beach environment, or in sand dunes near an active shoreline. The strike direction of the beach is the main factor affecting grade continuity of the beach sands. For sands deposited in a shallow marine environment, the grade is disseminated more as a sheet, rather than a linear deposit. In both cases, elevation is very important because sands deposited at the same time will share common characteristics. • For the dune sands, grade is more disseminated and less governed by elevation. However, grade trends generally follow the direction of the dune.
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.*	• Mineralisation extends for 12.3km in a NE-SW direction. At its widest, the deposit extends 4.3 km across. Mineralisation extends from about -2 mASL up to 92 mASL.
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 current resource model is a block model where the block estimates have been calculated using Ordinary Kriging algorithm. • The key assumptions are that the grade is continuous within the ellipsoid used to select samples. Ranges for the x,y and z directions are determined using variography. • The OK model estimates grades in blocks using variances, weighted distances and nugget effect calculated from variogram analysis. • Extreme values are not cut in this model. • Ordinary Kriging Interpolation Factors for NAMO geology block model.
	The availability of check estimates, previous estimates and/or mine production records and	• There have been numerous previous estimations, with the most recent published 7 months ago. Each revision to the model is verified against the previous version.

UNIT	VARIABLE	EST. METHOD	SEARCH DIST. X-DIRECTION	SEARCH DIST. Y-DIRECTION	SEARCH DIST. Z-DIRECTION	MIN NUMBER OF POINTS	MAX NUMBER OF POINTS
1	HMIN	OK	194	500	11	1	20
2	HMIN	OK	495	600	10	1	20
3	HMIN	OK	699	800	13	1	20
6	HMIN	OK	700	800	9	1	20
7	HMIN	OK	402	800	7	1	20
81	HMIN	OK	395	700	2	1	20

Criteria	JORC Code explanation	Commentary
	whether the Mineral Resource estimate takes appropriate account of such data.	• Every month the geology model is reconciled against on-going production. This information is used to assess the accuracy of the model, as well as the accuracy of the production estimates.
	• *The assumptions made regarding recovery of by-products.*	• The main products are ilmenite, zircon and rutile. None of these are regarded as "by-products". No other minerals are considered as potential by-products in this estimate.
	• *Estimation of deleterious elements or other non-grade variables of economic significance (eg sulphur for acid mine drainage characterisation).*	• Ilmenite TiO_2 quality is estimated during the mineralogy determination. Problematic trash minerals such as kyanite, chromite, and monazite are estimated. None of the materials mined at Namalope contain sulphides or would qualify as "Potentially Acid Forming" material.
	• *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.* •	• The block model uses 25m x 25m x 1m block size. These are half the size of the drill spacing (x,y), but have the same size as the drill samples in the z direction. • Most of the ore mined at Namalope is dredged and the dredges typically sweep a channel 40m wide at the base and about 80m at the top. The drill spacing and block sizes are appropriate for this type of mining.
	• *Any assumptions about correlation between variables.*	• The mineralogy is determined on a HM basis (e.g. an ilmenite content of 80% of the HM), and then multiplied by the HM content to obtain the in-situ estimate for each of the minerals. The mineralogy is much less variable than the HM content and so this is an appropriate way of determining in-situ estimates for each of the different minerals.
	• *Description of how the geological interpretation was used to control the resource estimates.*	• Block modelling is constrained within the geology unit – including using only the sample values from that unit, and the variogram range parameters specific to that unit.
	• *Discussion of basis for using or not using grade cutting or capping.*	• The samples are not capped in order to have all mineralogical grades influencing the estimation process.
	• *The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.*	• The block model is aggregated vertically into a two-dimensional display and the results compared with the previous version of the model. • The block model is aggregated vertically into a two-dimensional display and the resulting grades are compared to the drill samples. • Every month the mine production is compared against the geological model. In 2018 the geological model under-stated the grade measured on the plant by 0.54%. • SWATH analysis comparing drill hole data and resource model data is undertaken for all lithological units
Moisture	• *Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of*	• Tonnages are estimated dry.

Criteria	JORC Code explanation	Commentary
	determination of the moisture content.	
Cut-off parameters	• The basis of the adopted cut-off grade(s) or quality parameters applied.	• All drilled values within the mineralized zone were included in the model, and only those zones that averaged 2% HM or above were included in the resource estimate. • Cut-off grades are calculated using applicable contract prices under KMPL's existing contracts and current operating costs. The marginal economic cut-off grade is actually 1.4% HM, but within the mineralised units, there is very little material which is below 2% and this is used to balance with MSP production.
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. •	• The resource is considered as either dredge feed or dry mining feed. For dredge mining the ore must be greater than 5m thick and typically be wider than 180m. Of course, dredge mining must proceed continuously so all of the ore zones must be connected, unless a channel is to be constructed. For Dry Mining, the mineralisation can be any depth or width provided it doesn't extend far below the water table. For Dredging and Dry Mining, the ore should be uncemented and low in slimes (typically less than 15% slimes).
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.	• Metallurgical recovery is well understood because it is an operating mine. Spiral recovery in the Wet Concentrator Plant is 90% for ilmenite, rutile and zircon. In the Mineral Separation Plant, ilmenite recovery is 91%, zircon is 61% and rutile is 41%.
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	• Tailings sand from the Wet Concentrator plant are deposited immediately behind the dredges. Slimes which build up at times in the dredging ponds may be pumped to drying cells within the tailings areas. Mineral Separation Plant tailings are mixed in with the mine sand tailings. • The local vegetation environment generally consists of scrubby regrowth after sward-type agriculture practices. Topsoil stripped from in front of the mining operations will be placed on the dry tailings sand behind the mine and then regrowth encouraged from the

Criteria	JORC Code explanation	Commentary
	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.	natural seed bank in the soil.
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.*	• An assumed bulk density of 1.7 t/m3 is used for the block model. During feasibility study work there were many samples taken which gave average density values of about 1.6 t/m3. However these samples were generally taken from the top few metres of the profile. • During the first year of production, the tonnes mined by the dredges were reconciled to early geology models that used a density of 1.6. Both the measured feed tonnage and the HM production levels indicated that the ore density was higher than 1.6, and close to 1.7. This more closely accords with density measurements taken for Unit 2 and Unit 7. Therefore, since that time the models have used an assumed density of 1.7 and there have been no further problems with tonnage estimation of the model.
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 Namalope deposit is divided into Measured and Indicated resources principally on the basis of the drilling spacing. Areas drilled at a coarser density than 200mx200m are classified as Indicated. Most of the Measured Resource has in fact been drilled at 50mx50m spacing. • In the view of the Competent Person, all of the relevant factors have been taken into account in making the classification. • The current classification reflects the view of the Competent Person.
Audits or reviews	• *The results of any audits or reviews of Mineral Resource estimates.*	• The resource estimates and reserves were audited annually by SRK of Cardiff
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*	• The best test of accuracy for the Namalope resource model is to compare predicted grades with actual grades. • In 2018 the average actual grade of the reserves mined was 4.39% HM (as determined in the monthly reconciliations using ore samples from the plant). This was equivalent to the average grade of the equivalent material in the resource model as 4.39%. The

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	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.*	resource model grade was replicated by the average grade from the mine in 2018, and has minimal economic impact on the company. • In previous years, the actual under-statement of grade has been closer to 10%. • For each operating plant, there are 2,000 – 3,000 tonnes per hour of feed, or approximately 1 million to 1.5 million tonnes of feed per month. With the drill sample spacing ahead of mining, there are between about 230 and 350 drill samples taken from each month's feed for each plant prior to mining. Provided the sampling and analysis of these samples is not biased, the average grade value determined from the drill samples is in theory much better than the samples obtained from off the plant during mining. In a typical month, perhaps 40-60 plant feed samples are taken, of samples that are always in a slurry and therefore segregated. The errors from estimating grade from the drill samples are therefore less than those encountered by the production teams in sampling the ore during mining

Section 4 Estimation and Reporting of Ore Reserves

(Criteria listed in section 1, and where relevant in 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 NAMO resource model is used as the basis for the Namalope Reserves. This model has been generated in Datamine Studio RM software and mining designs applied using Datamine 5D Planner software. A series of schedule blocks have been overlain on the model, along the mining path for each of the four mining plants (WCP-A, WCP-B, Dry Mine A and Dry Mine B). The material above the mining design is subjected to mining factors and the resulting reserves are scheduled into monthly advance blocks and the ore consumption information is used as the basis for the mine production schedule.
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 is a full time employee of Kenmare Resources and is based at the Moma minesite.
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*	• 80% of the current remaining Namalope Reserves were included in the Definitive Feasibility Study for the Kenmare Moma Titanium Minerals Project completed in 2001 with amendments in 2002. It is currently being mined and the data used to estimate Reserves is based on actual mine performance. • 20% of the reserves lie just outside the boundary of this study and, although very

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	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.	similar to the material in the DFS, will be subject to a new ESHIA. This area has been the subject of a PFS, using current mine data wherever possible to increase accuracy of the evaluation.
Cut-off parameters	• *The basis of the cut-off grade(s) or quality parameters applied.*	• The marginal economic cut-off grade for dredging is 1.4% HM, however the resource model uses 2% HM as this is a "natural" cut-off and it provides an optimum balance between mine output and MSP consumption.
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 (eg 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.*	• Most of the ore in the reserves will be dredge mined. For this mining method, the dredge floor level is taken as the base of the geological unit hosting mineralisation. This is appropriate because the rose-wheel cutter on the mining dredges is easily able to cut to the low slope angles found on these horizons. The dredge path is planned to maximize ore recovery, although in-situ bunds are left between mining strips to ensure geotechnical stability of the operation. Ore faces are planned at 30 degrees to the horizontal, and from experience in these materials, this has been found to be a stable angle. The top of the in-situ bund is planned to reach the same level as the natural surface, and where the dredging strip turns on itself, a top width of 100m is planned on the berm in order to place infrastructure and have secure dredge anchor positions during the turn. • A portion of the reserves will be Dry Mined. The equipment used for Dry Mining at Moma works best with ore of low slimes (less than 15%) and dry or moist ore from above the water table. • Topsoil losses are planned according to 100mm topsoil stripping depth. Total remaining mining losses (dredge spillage, excavation losses, berm losses) are planned to be 10%. • No dilution factors used in the production schedule or the reserves. • For dredging, the mining path must be at least 200m wide on the dredge floor. The minimum dredging depth is 9m for WCP-A and 5m for WCP-B. • No Inferred Resources are included in the Namalope Reserves. • Dredge and Dry Mining both require electricity and water infrastructure. Electricity is provided from 22 KV overhead powerlines which are erected along the mining path and connect the mining operations with the main substation at the Kenmare MSP. Water is provided from a borefield and is pumped to the mining sites via HDPE piping and regularly spaced booster pumps.
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*	• The ore sand is treated initially in the Wet Concentrator Plant (WCP). The ore slurry is initially screened to remove any cemented or clay-rich lumps, then pumped over spirals to concentrate heavy minerals. After five stages of spiral concentration a heavy mineral concentrate is pumped to the Mineral Separation Plant (MSP).

Criteria	JORC Code explanation	Commentary
	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?*	• At the MSP, the magnetic minerals are separated from the non-magnetic, and then various electrostatic and gravity separation techniques are used to produce saleable mineral products: ilmenite, zircon and rutile. Ilmenite is magnetic and conductive, rutile is non-magnetic and conductive and zircon is non-magnetic and non-conductive. • Ilmenite, zircon and rutile recovery is typically 86% - 92% through the WCP. • Ilmenite recovery is typically 88% through the MSP; zircon recovery is 61.4% and Rutile 30%. • The Namalope reserves are part of an on-going operation and recoveries used are based on recent plant performance. Metallurgical studies conducted during the DFS and subsequent expansion studies accurately predicted product quality and recoveries. • Ilmenite contaminants (mostly chromite, monazite & staurolite) are managed with grade control processes in the MSP. • Zircon contaminants (Kyanite, rutile) and rutile contaminants (zircon, monazite) are also closely monitored and controlled. • Planned recoveries of ilmenite, zircon and rutile are based on achieving marketable levels of contaminants.
Environmen-tal	• *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.*	An EIA was completed in 2001 as part of the DFS, an Environmental Licence was issued and is renewed every 5 years. Environmental management of the operation is covered by the Environmental Management Program (EMP).
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.*	The operation is established and all required infrastructure is in place.
Costs	• *The derivation of, or assumptions made, regarding projected capital costs in the study.*	Capital costs in the DFS, and subsequent expansion studies (1 & 2) were estimated on the basis of detailed engineering studies. All of the capital equipment is now in place using funding sourced from bank loans and share issues. Repayments form an important part of the detailed business model maintained by Kenmare for the Moma operation.
	• *The methodology used to estimate operating costs.*	The project is an operating mine and the assumptions made in 2001 for the DFS are no longer relevant to the on-going operation. Kenmare maintains a detailed business model which uses the annual budget to estimate operating costs.

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	• *Allowances made for the content of deleterious elements.* •	Product pricing for zircon and ilmenite depends on the content of deleterious elements. These prices are built into the business model.
	• *The source of exchange rates used in the study.*	For the current economic model: Bloomberg forward FX Rates as at June 2018.
	• *Derivation of transportation charges.*	The major product transportation cost is barging the product to the anchored ships offshore. This cost is covered by the annual budget for the Marine Department.
	• *The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.*	Not relevant for this on-going operation. Lower prices for products with higher levels of contaminants are already built into the budget.
	• *The allowances made for royalties payable, both Government and private.*	Government royalties are payable, charged at 3% of the operating costs of the mine inflated by 15%.
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.* •	There are no revenue factors applied.
	• *The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.*	Assumed mineral prices are based on existing contracts, historic price trends and guidance from independent industry consultants.
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.*	The following marketing update is taken from Kenmare Regulatory Announcement: Q4 and FY 2018 Production Report and FY 2019 Guidance, 10 January 2019: *The titanium feedstock market was softer in the second half of 2018, mainly due to destocking by the pigment industry. Industry analysts expect pigment destocking to continue into H1 2019 and normalise by mid-year. Off-setting this short-term weaker demand outlook, Indian ilmenite supply has halved from approximately 7% of global feedstock production in the last two years, and towards the end of 2018 a further major producer had its mining license suspended, leaving one operating producer compared with five at the end of 2016. Furthermore, a number of Vietnamese feedstock producers are understood to have suspended production due to uncertainty regarding the granting of additional export quotas from the Vietnamese authorities for 2019.* *Ilmenite sales to China improved in Q4 2018, following slower demand during the summer months, and Kenmare is seeing solid demand for sulphate ilmenite from Chinese and*

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		European customers in the early part of 2019. Additional ilmenite upgrading plants to serve the growing chloride pigment sector in China are set to start-up in the coming 12-18 months. Kenmare is the leading supplier to a number of existing ilmenite upgrading facilities in China and is well positioned to benefit from this growth.
		High grade chloride feedstock supply was tight throughout 2018 due to restricted supply, which is expected to continue in 2019. This is favourably impacting on demand and pricing of chloride ilmenite.
		Kenmare's received zircon prices plateaued in Q4 2018, following the successful implementation of price increases in the prior quarter. However, supply has increased from Indonesia and various regions have been producing concentrates for processing in China. Coupled with weaker demand in China, this has led to some modest softening of prices recently for non-premium zircon products. However, global zircon production is forecast to decline in the coming years with mine closures and orebody depletion at a number of operations. The Company believes a supply response is likely should supply exceed demand, muting price volatility and supporting long term prices.
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.	The discount rate used for NPV calculation is 10%, although 8% and 12% rates are also calculated for comparison. The economic model reports NPV estimates based on "real" discount rates. An inflation rate of 2% is applied.
	• NPV ranges and sensitivity to variations in the significant assumptions and inputs.	NPV values from the current business model are commercially sensitive. In the 2001 DFS economic evaluation, financial cashflow modelling shows an IRR of 23.3% and an NPV of $204.6 M on an after tax, full equity basis, using a 10% discount rate. NPV is most sensitive to mineral prices, and then operating costs, particularly labour and energy costs.
Social	• The status of agreements with key stakeholders and matters leading to social licence to operate.	Being an on-going operation, all approvals have been granted. A major part of the on-going social licence to operate is Kenmare's participation and sponsorship of KMAD – an organisation aimed at developing local communities through sponsoring initiatives in health, education, local business and sport.
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	The major natural occurring risk in this area is the risk of cyclones. The risk is not high, with the local people maintaining that destructive cyclones hit the area every 40 years on average. Much of the equipment and infrastructure built for the Kenmare project has been built with this risk in mind. Legal agreements and government approvals are in place to allow the continued extraction of 80% of the estimated reserves. The remaining 20% lie just outside the area of the original DFS and require further approvals. Mining is currently scheduled to start in

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	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.	this area in 2022. An ongoing ESHIA is planned to be completed by 2019, with data collection commenced in 2017.
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).	In general, the classification of reserves reflects the confidence in the underlying resource model (Indicated or Measured), which in turn is based on drilling spacing. However, there is a portion of Measured Resource which lies outside of the area of the original DFS (see discussion above) classified as "Probable Reserve" on the basis that there is still a level of uncertainty that mining approvals will be granted.
Audits or reviews	• The results of any audits or reviews of Ore Reserve estimates.	The reserves were audited annually by SRK of Cardiff. Feedback from SRK were used to improve the reserves estimation process.
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	Namalope is an on-going operation and as such there is the opportunity to compare the reserves estimation with actual production data with the monthly reconciliation process. The historical results show that the reserves estimations are generally within 15% every month (local estimation), and over longer periods the error is less. In 2017 the estimated grade of the reserves was 0.01% lower than the grade actually mined. The errors in production forecasting process caused by grade and tonnage estimation are generally much lower than the differences in production caused by differences to forecast mining rates, operating hours and plant recoveries.

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	Reserve viability, or for which there are remaining areas of uncertainty at the current study stage. • *It is recognized 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.*	