TANTALUS RARE EARTHS IONIC CLAY PROJECT

TANTALUM RARE EARTH MALAGASY SARL

MADAGASCAR

INDEPENDENT QUALIFIED PERSONS TECHNICAL REPORT

September 2017

Report Prepared for

ISR CAPITAL LIMITED

Report Prepared by

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21 September 2017

Mr Chen Tong
Executive Chairman
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Dear Mr Chen

INDEPENDENT TECHNICAL VALUATION

TANTALUS RARE EARTHS IONIC CLAY PROJECT

MADAGASCAR

BEHRE DOLBEAR AUSTRALIA PTY LIMITED

1.0 INTRODUCTION

ISR Capital Limited ("ISR") has requested that Behre Dolbear Australia Pty Limited ("BDA") undertake an independent technical valuation assessment of the Tantalus Rare Earths Ionic Clay Project ("Tantalus project" or "the project") in northern Madagascar (Figure 1), and prepare an independent valuation report for submission to the Singapore Exchange ("SGX").

BDA is based in Sydney, Australia (Level 9, 80 Mount Street, North Sydney). BDA has conducted its review and valuation in accordance with Australian and international mining industry standards and the requirements of the VALMIN Code (Australasian Code for Public Reporting of Technical Assessments and Valuations of Mineral Assets - 2015) and in compliance with the Code and Guidelines for Reporting Exploration Results, Mineral Resources and Ore Reserves - Joint Ore Reserve Committee of the Australasian Institute of Mining and Metallurgy ("AusIMM"), Australian Institute of Geoscientists ("AIG") and Minerals Council of Australia ("MCA") - December 2012 ("the JORC Code"). This report has been prepared in accordance with the Listing and Disclosure requirements of the Singapore Exchange for Main Board Listed Companies in relation to disclosures by Mineral, Oil and Gas Companies. BDA confirms that it is appropriately qualified in terms of both the requirements of the VALMIN Code and as a Qualified Person under SGX requirements.

The technical review, site inspection and valuation work have been conducted by Mr Malcolm Hancock, Executive Director of Behre Dolbear Australia, and Dr Philip Hellman, BDA Senior Associate. Both are qualified professional geologists with more than 40 years of relevant experience. Mr Hancock is a Fellow of the Australasian Institute of Mining and Metallurgy, a Fellow of the Geological Society and a Member of the Australian Institute of Mineral Valuers and Appraisers ("AIMVA"). Dr Hellman is a Member of the Australasian Institute of Mining and Metallurgy, and a Member of the Australian Institute of Geoscientists. Both Mr Hancock and Dr Hellman fulfil the necessary requirements in terms of technical and professional qualifications and experience, and in terms of Professional Society membership and affiliations to qualify as Qualified Persons under SGX listing rules.

The Tantalus project lies within Permis de Recherche ("PR") 6698 (Figure 1), which grants exclusive rights for prospecting and research. The PR is held by Tantalum Rare Earth Malagasy S.A.R.L. ("TREM"). TREM is a 100% owned subsidiary of Tantalum Holding (Mauritius) Ltd ("THM") which in turn is 40% owned by Tantalus Rare Earths AG ("TRE") and 60% owned by REO Magnetic Pte Ltd ("REOM"), a private limited company incorporated in Singapore. ISR has entered into agreements to acquire 60% of THM from REOM ("Proposed Acquisition"). The Proposed Acquisition is subject to clearance by the SGX and approval by ISR's shareholders at an Extraordinary Meeting, to be convened.

TREM/ISR Capital Limited

Tantalus Rare Earths Project

Figure 1

PROJECT LOCATION PLANS

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The project tenement details are summarised in Table 1.1 below.

Table 1.1

Tantalus Project Tenement Summary

Country	Licence Number	Licence Area (km^2)	Mineral Type	Development Status	Licence Expiry Date	ISR Potential Interest
Madagascar	PR 6698	238	Rare Earths	Exploration*	January 2017**	60%***

**bulk sampling undertaken; project ready to enter pre-feasability study stage*
***application made for further three-year renewal period*
****ISR has agreement to acquire 60% of the project from REO Magnetic Pte Ltd*

The project has a defined Measured, Indicated and Inferred rare earths resource of 628 million tonnes (“Mt”) grading approximately 900 parts per million (“ppm”) or 0.09% Total Rare Earth Oxides (“TREO”) containing 562,000 tonnes (“t”) of TREO. Table 1.2 summarises the project Mineral Resources.

Table 1.2

Tantalus Project Mineral Resource Summary

Category	Tonnage Mt	Thickness m	TREO (ppm)	TREO (tonnes)
Measured	40.1	5.4	975	39,100
Indicated	157.6	6.8	878	138,300
Inferred	430.0	5.6	894	384,600
Total	*627.7*	*5.9*	*895*	*562,000*

Note: SGS October 2014 estimate; Mt = million tonnes, m = metres; ppm = parts per million
TREO = total rare earth oxides (all lanthanide rare earth oxides plus yttrium oxide)

The resource lies within a shallow weathered regolith lateritised clay horizon with an average thickness of around 14m; the average thickness of the mineralised zone is approximately 6.0m. Additional hard rock rare earth mineralisation exists, but no estimation of hard rock resources has been carried out. The regolith resource estimate has been carried out by independent specialists SGS Canada Inc. (“SGS”), based on 4,412 sample pits and 359 drill holes.

Preliminary testwork has been carried out on samples from the deposit by the University of Toronto, Outotec and SGS Lakefield and has indicated that the rare earth oxides can be readily leached from the host soils and clays. A 1,000t bulk sample has been extracted from a grid of sample pits from the Betaimboay area (Figure 1); TREM is considering both in-situ leach, vat leach and heap leach options.

BDA confirms that it is well qualified to undertake the technical review and valuation work required. BDA specialises in technical due diligence, project valuations, advisory and review work for companies, financial institutions and government bodies on mining and processing projects, and has been involved in numerous mining-related studies, valuations, and Independent Engineer assignments in recent years. BDA’s specialist consultants have many years of technical and operating experience and are respected experts in their field. This expertise covers geology, mining, hydrology, geotechnics, processing, infrastructure, project construction and operations, and environmental, community and social aspects including Equator Principles and International Finance Corporation (“IFC”) Performance Standards.

Most of BDA’s work relates to independent technical and environmental review and valuation studies, typically carried out on behalf of project financiers or mining companies. This work typically involves review and assessment of feasibility studies and project development proposals, both for the benefit of the project company and its directors, and for the information and advice of prospective financiers and investors.

BDA has prepared and reviewed IPO (Initial Public Offering) reports under Australian Securities Exchange (“ASX”), Hong Kong, Singapore, UK and Canadian stock exchange requirements. BDA has previously worked in Madagascar on the Ambatovy nickel laterite project, providing technical advisory services to one of the joint venture partners. BDA has also worked directly for Ambatovy Minerals Société Anonyme and Dynatec Madagascar Société Anonyme, the operating companies.

Of specific relevance to the Tantalus rare earths project, BDA has undertaken a number of reviews and independent reports for Lynas Corporation Limited (“Lynas”) in relation to its rare earths deposit located at Mt Weld in Western Australia and its rare earths processing plant in Kuantan, Pahang, in eastern Malaysia. BDA’s Senior Geological Consultant, Dr Phillip Hellman, who has undertaken the site visit and technical review for this assessment, is widely experienced in the geology and evaluation of rare earth projects and has consulted on rare earth projects in Australia, South Asia and the Middle East and has authored a number of rare earth specialist technical papers and presentations.

BDA's assessment covers the technical areas of geology, exploration, drilling, pitting and sampling, resources and resource estimation, proposed mining and mineral processing options, and testwork studies undertaken to date. The report also summarises the infrastructure, transport, power and utilities status and environmental and community aspects, licensing, permitting and approvals.

BDA's valuation assessment has considered the industry standard valuation methodologies and the relevance of each to an assessment of the value of the project. In BDA's opinion, insufficient feasibility-type work, cost estimation or recovery testwork has been carried out at this stage of the project to allow a meaningful discounted cash flow analysis. On this basis, the assessment has considered project expenditure, relevant transactions and joint venture terms, comparable transactions, yardstick data, and other independent expert valuations.

BDA visited the TREM project site at the end of June and early July 2017. BDA reviewed the prospects where drilling, trenching and pitting have been undertaken, and reviewed the surveying, sampling, assaying and density determination processes and procedures together with drill core, drill and pit logs and plans and sections. Discussions were held with project managers and staff in TREM's office in Antananarivo concerning the work to date and the future testwork and development programmes planned.

BDA has reviewed relevant project reports in undertaking this assessment and these are referenced in Section 19 (Sources of Information). In particular BDA acknowledges the detailed work undertaken by SGS Canada Inc. in its NI 43-101 report *"Resources for the Tantalus Rare Earth Ionic Clay Project, Northern Madagascar - October 2014"* and its subsequent update in June 2016.

BDA confirms that BDA, its partners, directors, substantial shareholders and associates ("BDA and Associates") are independent of all parties in the Proposed Acquisition, including ISR, its directors and substantial shareholders, its advisers and their associates. BDA and Associates do not have any interest, direct or indirect, in ISR, its subsidiaries or associated companies, the assets or parties involved. BDA confirms that it has and will not receive benefits (direct or indirect) other than remuneration paid to BDA in connection with this report. BDA will be paid a fee for this report comprising its normal professional rates and reimbursable expenses. The fee is not contingent on the conclusions of this report.

BDA has not undertaken an audit of the data or re-estimated the resources or reserves. BDA has not independently verified the current ownership status and legal standing of the tenements that are the subject of this report, but has relied on independent legal advice provided by ISR's lawyers in Madagascar, Lexel Juridique and Fiscal, for BDA's review.

This report contains forecasts and projections based on data provided by TREM. However, these forecasts and projections cannot be assured and factors both within and beyond the control of TREM could cause the actual results to be materially different from BDA's assessments and estimates contained in this report. BDA has made reasonable enquiries and exercised judgment on the reasonable use of such information and found no reason to doubt the accuracy or reliability of the information provided. In preparing this report, BDA has taken into account all relevant information supplied to BDA by the directors of ISR

Under SGX requirements, a Qualified Person's report is required for a major transaction relating to an acquisition or disposal of a mineral asset or a mineral company. ISR has appointed BDA to undertake the preparation of this Qualified Person's Report. The sole purpose of this BDA report is for use by ISR directors and their advisors and shareholders in connection with the Proposed Acquisition and the listing requirements of the SGX, and should not be used or relied upon for any other purpose. A draft copy of this report has been provided to ISR, TRE and TREM for correction of any material errors or omissions. Neither the whole nor any part of this report nor any reference thereto may be included in or with or attached to any document or used for any other purpose, without BDA's written consent to the form and context in which it appears, except as required by the laws and regulations relating to ISR and the Proposed Acquisition, including any rules of the Listing Manual of the SGX and other requirements of the SGX. In this regard, BDA acknowledges that this report is intended to be used for the purposes of the Proposed Acquisition (including reference to and/or inclusion in a shareholders' circular or other documents in connection with the Proposed Acquisition). The foregoing sentence constitutes BDA's approval and consent to the aforesaid use of BDA's report.

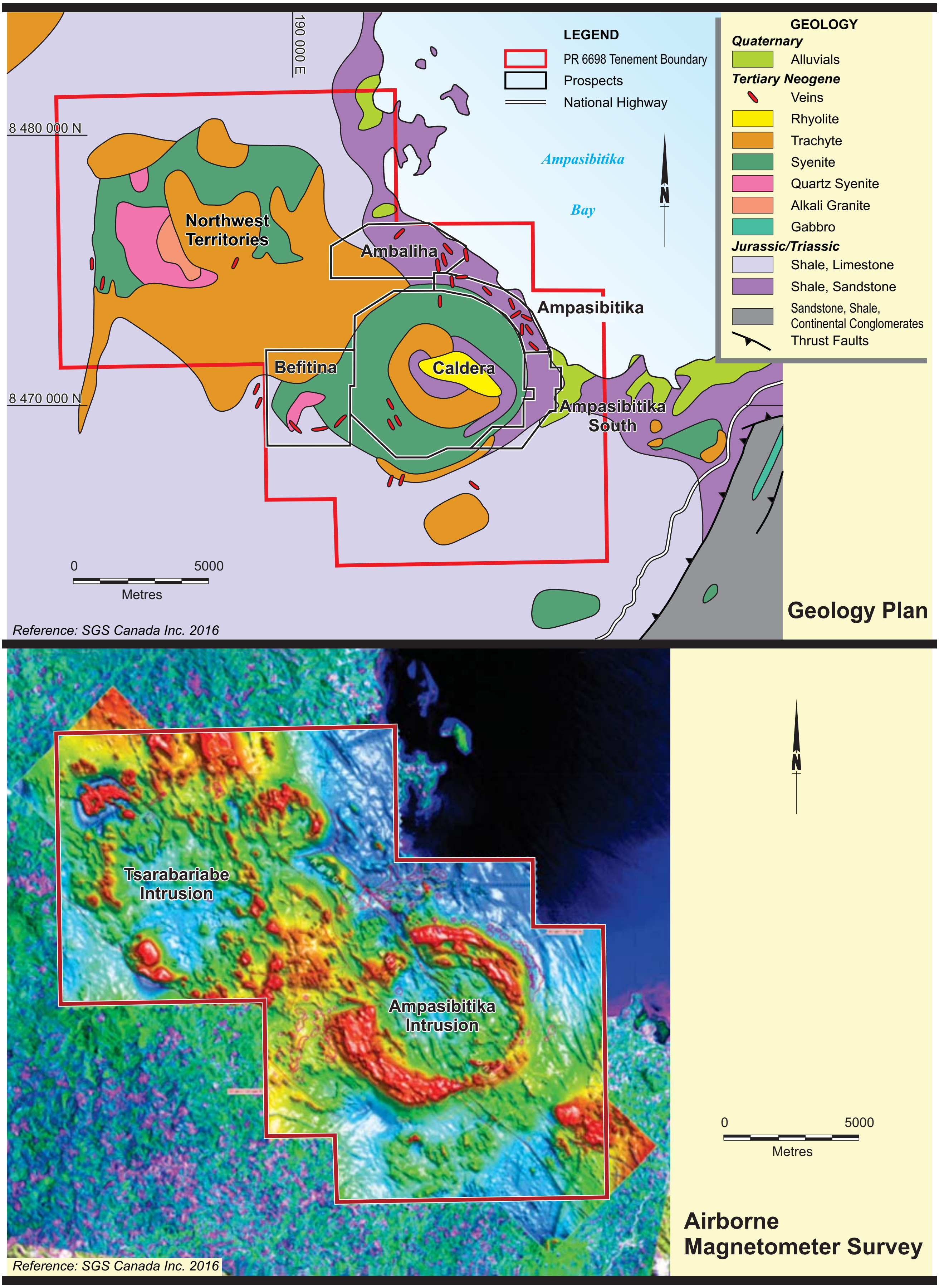
2.0 EXECUTIVE SUMMARY – TANTALUS RARE EARTHS PROJECT

2.1 Overview

- BDA has undertaken a technical assessment and valuation of the Tantalus rare earths ionic clay project in northern Madagascar. The project location and tenements are shown in Figures 1 and 2. BDA has visited the project site and reviewed the technical and financial data provided by TRE, TREM and ISR.
- No project feasibility study has been completed to date, however, significant geological and mineralogical work programmes have been undertaken, resource estimates have been completed, and preliminary bench scale and column leaching testwork have been carried out. This work has identified a significant near-surface resource with potential for heap leach or in-situ leach extraction. BDA has reviewed the resource estimates, possible extensions to the resource, the planned work programme and the potential development scenarios.
- Insufficient work has been undertaken to date to define potential capital and operating costs, extraction rates, recovery or mine life. and therefore, in BDA's opinion, and in accordance with the VALMIN Code, a discounted cashflow or net present value assessment would not be feasible or appropriate. BDA has therefore considered alternative means of valuation including exploration expenditure, relevant transactions and joint venture terms, comparable transactions and market capitalisation yardstick data, and other independent expert valuations to assess a likely range of values.
- The valuation principles adopted by BDA are reviewed in Section 3. Section 4 provides a Risk Summary and Section 5 provides a summary description of the rare earth elements, their characteristics, properties and uses. The Tantalus project is described in Sections 6-17, and the valuation of the assets is discussed in Section 18.
- References to rare earth elements and rare earth oxides are abbreviated to REE and REO; assay determinations are given in terms of total rare earth oxides or TREO.

2.2 Background

- The Tantalus rare earths project is located on the Ampasindava Peninsula, in Antsiranana Province in northwestern Madagascar, approximately 500 kilometres ("km") north of the capital, Antananarivo (Figure 1). The nearest major town and administrative centre is Ambanja, some 40km to the northeast of the project area. Access to the area is by road from Ambanja or by boat from the nearby island of Nosy Be which is serviced by an international airport. Ambanja has a domestic airport and a nearby maritime harbour.
- The original project area covered 300km^2 and was held under exploration licence PR 6698 which grants exclusive rights for prospecting and research. The permit was originally granted for five years in 2008 and was renewed for three years in January 2014. One further renewal period of three years is allowed and application for the second three-year renewal was made on 7 December 2016, together with a renunciation of the southern portion of the PR, retaining approximately 238km^2 of the prospective northern portion (Figure 2). The renewal application is awaiting the signature of the Minister of Mines and the Prime Minister.
- The PR is held by Tantalum Rare Earth Malagasy SARL. TREM is a 100% owned subsidiary of Tantalum Holding (Mauritius) Ltd which in turn is 40% owned by Tantalus Rare Earths AG and 60% owned by REOM Magnetic Pte Ltd, a Singapore incorporated company. ISR is proposing to acquire 60% of THM from REOM.
- The project area is relatively rugged, with elevations from seal level up to approximately 700m, and is largely covered by secondary vegetation including bamboos and palms, with mangroves in the coastal areas and shallow bays. Slash and burn agriculture is common through much of the area. The original primary forest is restricted to a few mountain tops and a small area in the northwest which is a protected area; primary forest covers less than 7% of the project area.
- The climate is divided into two distinct seasons, a dry season from April to October and a wet season from November to March. Annual rainfall exceeds 2,000mm per year and temperatures average around 25°C.



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Tantalus Rare Earths Project

Figure 2

TENEMENT GEOLOGY AND STRUCTURE PLAN

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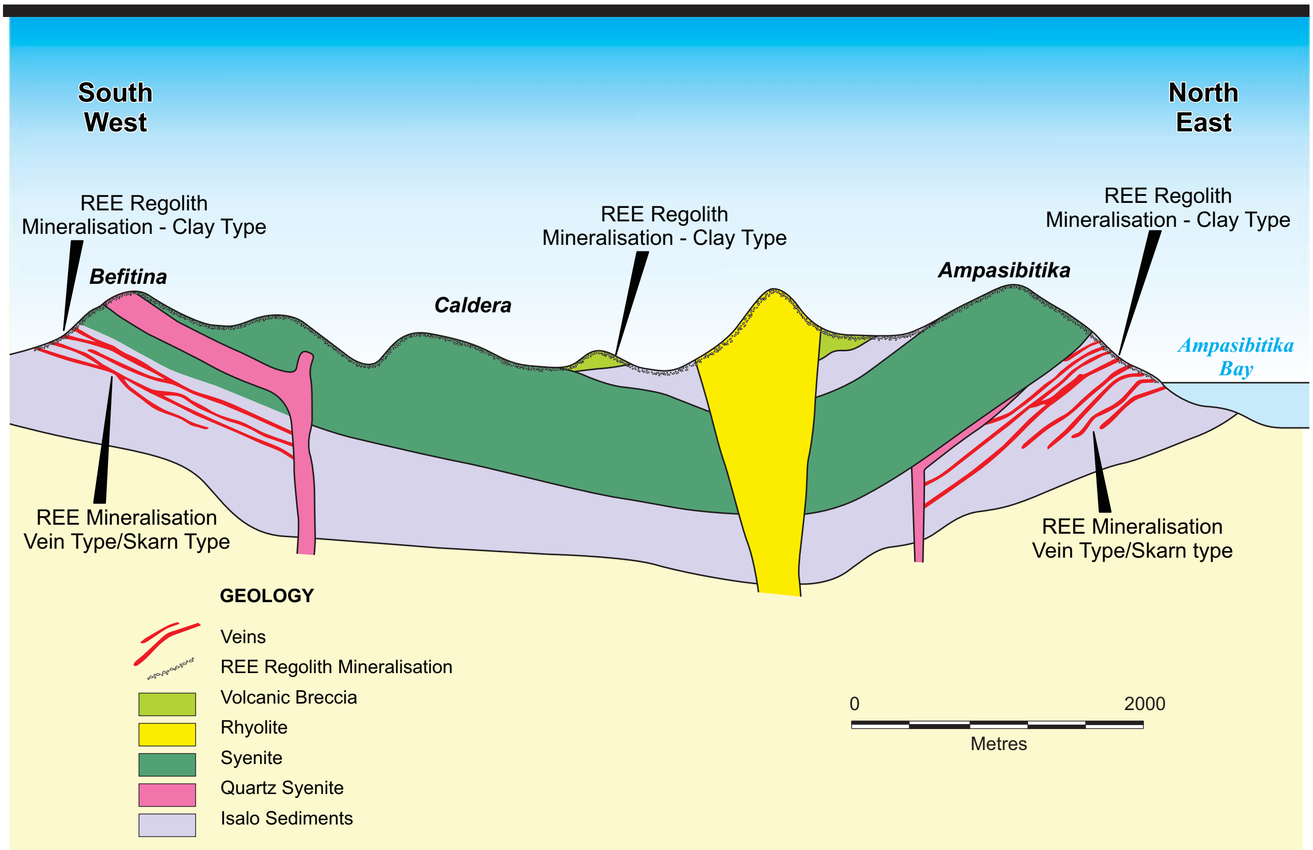
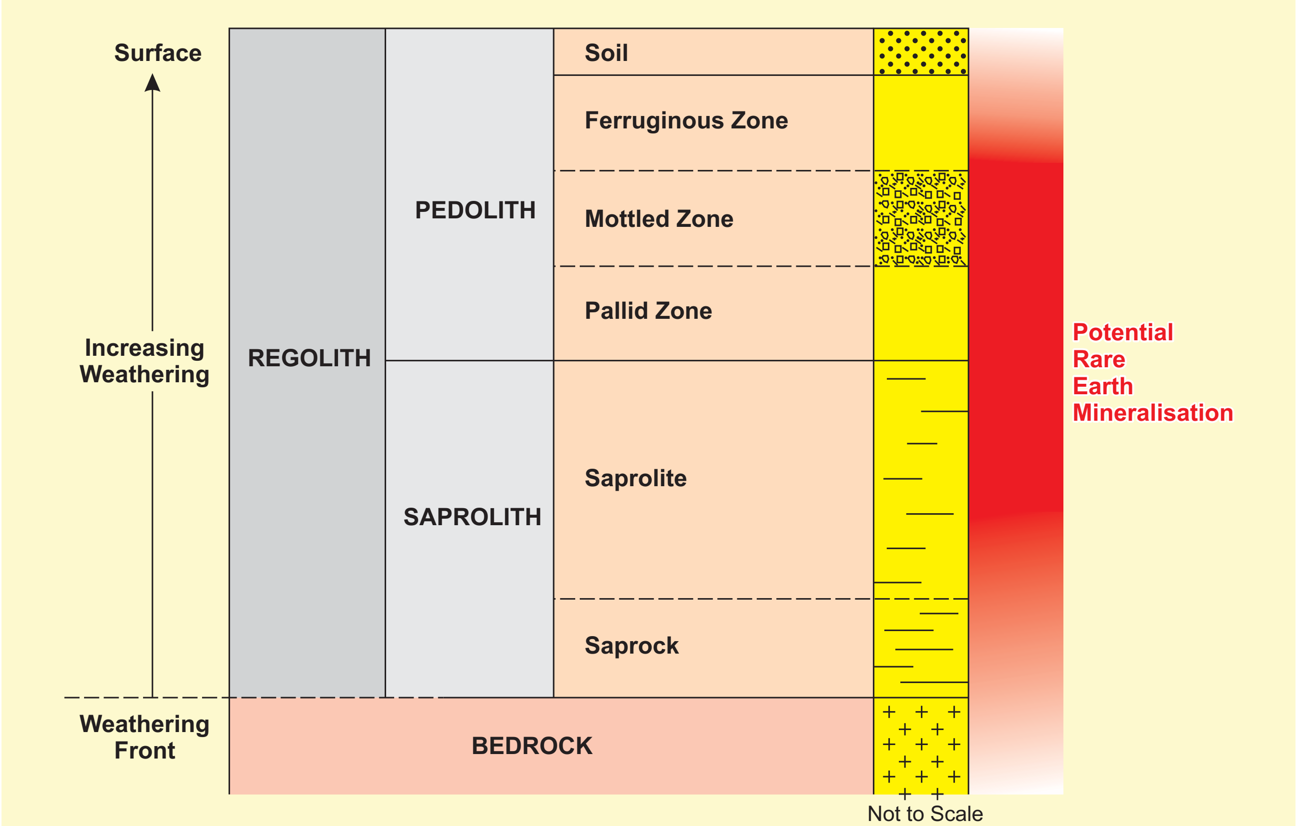
2.3 Geology and Mineralisation

- The Tantalus project area on the Ampasindava Peninsula, comprises a sequence of mainly Jurassic mudstones and siltstones, intruded by Tertiary alkaline igneous rocks named the Ambohimirahavavy igneous complex (Figure 2). The complex is approximately 20km in length and 8km in width and is characterised by alkaline rocks including syenite, alkali granite, trachyte, phonolite, rhyolite and volcanic breccia.
- Two principal intrusive centres have been recognised, the Ampasibitika intrusion to the southeast and the Tsarabariabe intrusion to the northwest. Airborne geophysical coverage (magnetic and radiometric) shows the intrusions to be of a circular nature, with the characteristics of a caldera (Figure 2).
- The presence of alkaline intrusive rocks near the village of Ampasibitika was first noted by French geologists in the late 19th century. Subsequent mineralogical examination identified niobium-tantalum-zirconium mineralisation within intrusive dyke material which was named "fasibitikite" (Lacroix, 1922).
- Limited work was carried out in the area from the 1920s to the 1980s, other than academic studies and mapping by the government geological survey. Russian-funded exploration was conducted between 1988 and 1991 and included stream sediment and outcrop sampling. Radiometric surveying and pitting identified uranium mineralisation, which was the main focus of interest at the time.
- In 2008, stream and beach sediment sampling were carried out, looking principally for heavy mineral sands. Widespread peralkaline granitic intrusives were mapped, five trenches were dug and samples were taken for bulk analyses. The results showed anomalous niobium, tantalum, tin, zirconium and uranium mineralisation, but also anomalous rare earth values.
- Helicopter magnetic and radiometric surveys were also undertaken in 2008 and revealed the two major circular caldera features corresponding to the Ampasibitika intrusion in the southeast and the Tsarabariabe intrusion to the northwest (Figure 2).
- Peralkaline granitic ring dykes and sills around the rims of the caldera were noted as hosting 'fasibitikite' mineralisation with REE-bearing accessory minerals including chevkinite, eudyalite, monazite, pyrochlore and zircon. However, drilling and sampling showed that while some mineralised veins occurred within the 'hard rock' these intersections were relatively sporadic and low grade, while the upper weathered regolith horizons (Figure 3) contained more consistent concentrations of rare earth minerals.
- It was recognised that the Tantalus regolith REE mineralisation had possible similarities to the ion adsorption clay-type rare earth mineralisation in southern China, which is a major source of current world REE supply. Unlike the world's best known primary REE deposits such as Bayan Obo (China), Mt Weld (Australia) and Mountain Pass (USA), the REE in these ionic clay deposits are relatively easy to recover using low cost leaching techniques based on lixiviants or eluants consisting of simple electrolytes such as ammonium sulphate and sodium chloride. Current practice in China is to use in-situ leaching ("ISL"), vat or tank leaching or heap leaching to extract the REE from these types of deposits.
- Drilling and pitting within the Tantalus project area showed the regolith to be well-developed, averaging around 14m thick, and generally obscuring the underlying bed-rock. The regolith profile is typical of a tropical weathering sequence, and consists of a surface soil layer, a pedolith (lateritic soil and clay) horizon comprising a ferruginous zone, mottled zone and pallid zone, and below the pedolith, a saprolith (weathered bedrock) zone comprising saprolitic clays overlying saprock, which grades into unweathered bedrock (Figure 3).
- Sampling and assaying showed that the rare earth mineralisation is concentrated in the pedolith and saprolite horizons. Six principal prospects have been designated, Ambaliha, Ampasibitika, Ampasibitika South, Caldera, Befitina and Northwest Territories (Figure 2).



Reference: SGS Canada Inc. 2016

Schematic Cross Section Ampasibitika Intrusion



Reference: SGS Canada Inc. 2016

Schematic Regolith Stratigraphic Section

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Tantalus Rare Earths Project

Figure 3

SCHEMATIC SECTIONS

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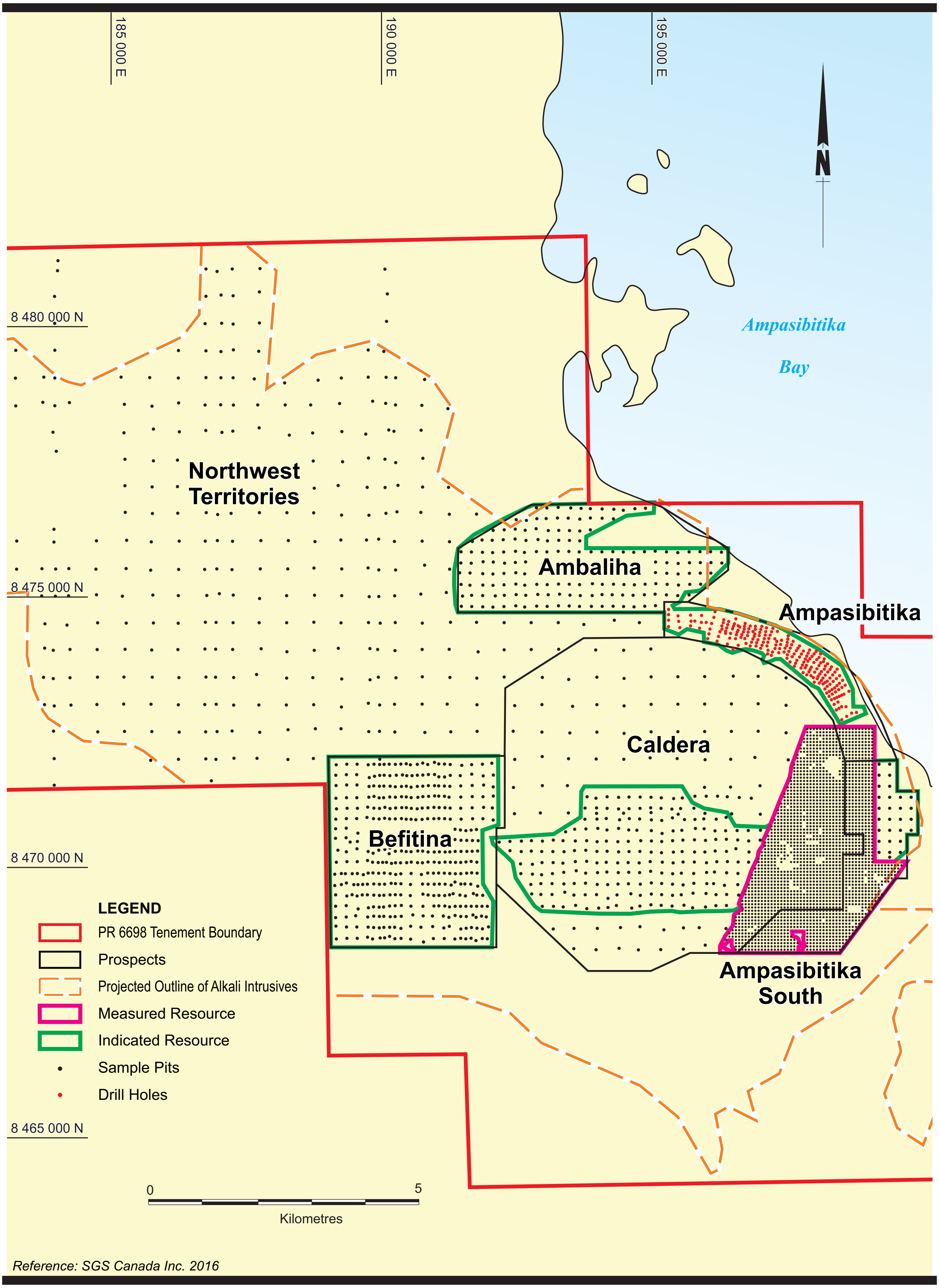
2.4 Geological Data

- Geological investigations have included mapping, airborne geophysical surveys (magnetics and radiometrics), drilling and pitting. The principal data on which the resource estimates are based comprises drill core and pit samples and assays, with pitting providing the bulk of the data.
- In 2010/11, diamond drilling was undertaken, directed at testing bedrock for REE mineralisation within a radiometric anomaly in the Ampasibitika and Caldera prospect areas (Figure 4). Drilling was conducted on lines 100-200m apart, with spacing of 50m along the lines. The core drilling confirmed the presence of variably mineralised rocks, though the continuity and grades were considered insufficient for a viable primary REE resource. However, more continuous REE mineralisation was noted in the upper regolith portions of the core.
- From 2011, the regolith mineralisation has been the main focus of exploration. Apart from a limited number of soil, trench and wacker samples, TREM's primary exploration method has been pitting. During 2011, 2013 and 2014, 4,474 pits, averaging 1 x 1m wide, were manually excavated to a maximum depth of 10m within six prospects (Ambaliha, Ampasibitika, Ampasibitika South, Caldera, Befitina, and Northwest Territories) at spacings ranging from 50m to 250m (Figure 4). The bulk of the data used for resource estimation is from pit samples. Pits were sampled on a one metre basis, logged and also sampled for density determinations. It should be noted that the average thickness of the regolith based on drill data is around 13.8m, suggesting that the tonnage calculations based on pitting, with a maximum depth of 10m, are likely to be understated.
- The bulk of the samples collected from the project area have been prepared at TREM's sample preparation facility in Ambanja. Regolith samples are weighed and dried at 135°C for 4-8 hours and re-weighed. If the samples contain rock fragments they are crushed to less than 2mm in a jaw crusher. Samples with no fragments are manually pulverised using a mortar and pestle. A 250g sample is split off for dispatch to the assay laboratory. The residual samples are stored at the Ambanja core and sample storage facility.
- Quality assurance/quality control ("QA/QC") procedures, instituted by TREM, consist of the insertion of one blank, one standard and one duplicate sample within each batch of 35 samples, representing a QA/QC sample rate of approximately 9%. There are some shortcomings in the QA/QC programme, notably that the standards used were not certified, some of the blanks were in fact mineralised and check assays have not been carried out; SGS recommended some changes to procedures, but overall concluded that the sample and assay database was adequate for use in resource estimation.
- Induced Coupled Plasma Mass Spectrometry ("ICP-MS") analysis based on alkali fusions was undertaken at the two laboratories used, ALS Chemex and SGS South Africa. Both laboratories are ISO accredited. SGS, from its review and audit concludes that the analytical methods used are according to industry standards and the data received is appropriate for use in resource estimation studies.
- Overall topographic data is sourced from Government maps with a 10m contour interval and from the Fugro airborne survey. TREM also recorded handheld GPS drill hole collar and pit collar surveys. SGS noted some discrepancies between the GPS and other data, but these were corrected to the topographic surface for the purpose of geological and resource modelling. SGS noted that a higher precision survey would be required for any economic study.
- Density measurements were taken from each pit excavated, by hammering a tube of known diameter into the side wall. The sample is extracted, placed in a sealed sample bag and weighed. At the sample preparation laboratory the sample is reweighed, then dried in an oven and weighed again to provide an in-situ and dry density. In total 4,569 dry density measurements have been taken. SGS adopted values of 1.10-1.15 tonnes per cubic metre (t/m^3) for the resource estimation work.



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Tantalus Rare Earths Project

Figure 4

RESOURCE AREAS - PITTING AND DRILLING

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2.5 Mineral Resource Estimate

- In 2014 (and updated in 2016) SGS Canada Inc. undertook an independent resource estimate of the regolith mineralisation. The estimate was based principally on pit sampling and assaying, but also included the regolith sampling from the diamond drilling. In total, data from 4,412 pits and 359 drill holes were used in the resource estimation.
- The pedolith (laterite) and saprolite layers were separately modelled. The data base comprised 4,369 pedolith intervals (13,926 assays) and 3,730 saprolite intervals (16,133 assays). Most of the assay samples have a length of 1m. The thickness of the mineralised zone varies between 1-10m (maximum pitting depth).
- Initially a two-dimensional model was prepared, to derive an accurate volume representation, with values based on assayed grades and the thickness of the zone. This was converted into a three-dimensional model. REE grades were interpolated by Ordinary Kriging ("OK") and cut offs were applied (300ppm and 500ppm) based on the slope of the area and assumed amenability to in-situ or heap leaching.
- Blocks were classified as Measured, Indicated or Inferred, largely based on the density of the pit sampling. Areas with a 50 x 50m coverage were largely classified as Measured; areas covered by at least a 200 x 200m grid were classified as Indicated with an Inferred category ascribed to blocks with at least a 500 x 500m grid coverage.
- SGS estimated a Measured, Indicated and Inferred resource of 628Mt averaging approximately 900ppm TREO with 560,000t of contained TREO (Table 2.1). The distribution of TREO grades is shown in Figure 5.

Table 2.1

Tantalus Project Mineral Resource Summary

Category	Tonnage Mt	Thickness m	TREO (ppm)	TREOnoCe (ppm)	CREO (ppm)	HREO (ppm)	TREO (tonnes)
Measured	40.1	5.4	975	660	296	187	39,100
Indicated	157.6	6.8	878	554	255	166	138,300
Meas/Ind	*197.7*	*6.5*	*897*	*575*	*263*	*170*	*177,400*
Inferred	430.0	5.6	894	574	247	149	384,600
Total	*627.7*	*5.9*	*895*	*574*	*252*	*156*	*562,000*

Note: SGS October 2014 estimate; cut-off grade 300-500ppm TREOnoCe; Mt = million tonnes, m = metres; ppm = parts per million
TREO = total rare earth oxides, arithmetic total abundance of all lanthanide rare earth oxides plus yttrium oxide
TREOnoCe = Total Rare Earth Oxides excluding Cerium Oxide = TREO – Ce_2O_3
CREO = Critical Rare Earth Oxides = Nd_2O_3 + Y_2O_3 + Eu_2O_3 + Tb_2O_3 + Dy_2O_3
HREO = Heavy Rare Earth Oxides = Y_2O_3 + Eu_2O_3 + Gd2O3 + Tb_2O_3 + Dy_2O_3 +Ho_2O_3 +Er_2O_3 + Tm_2O_3 + Yb_2O_3 + Lu_2O_3

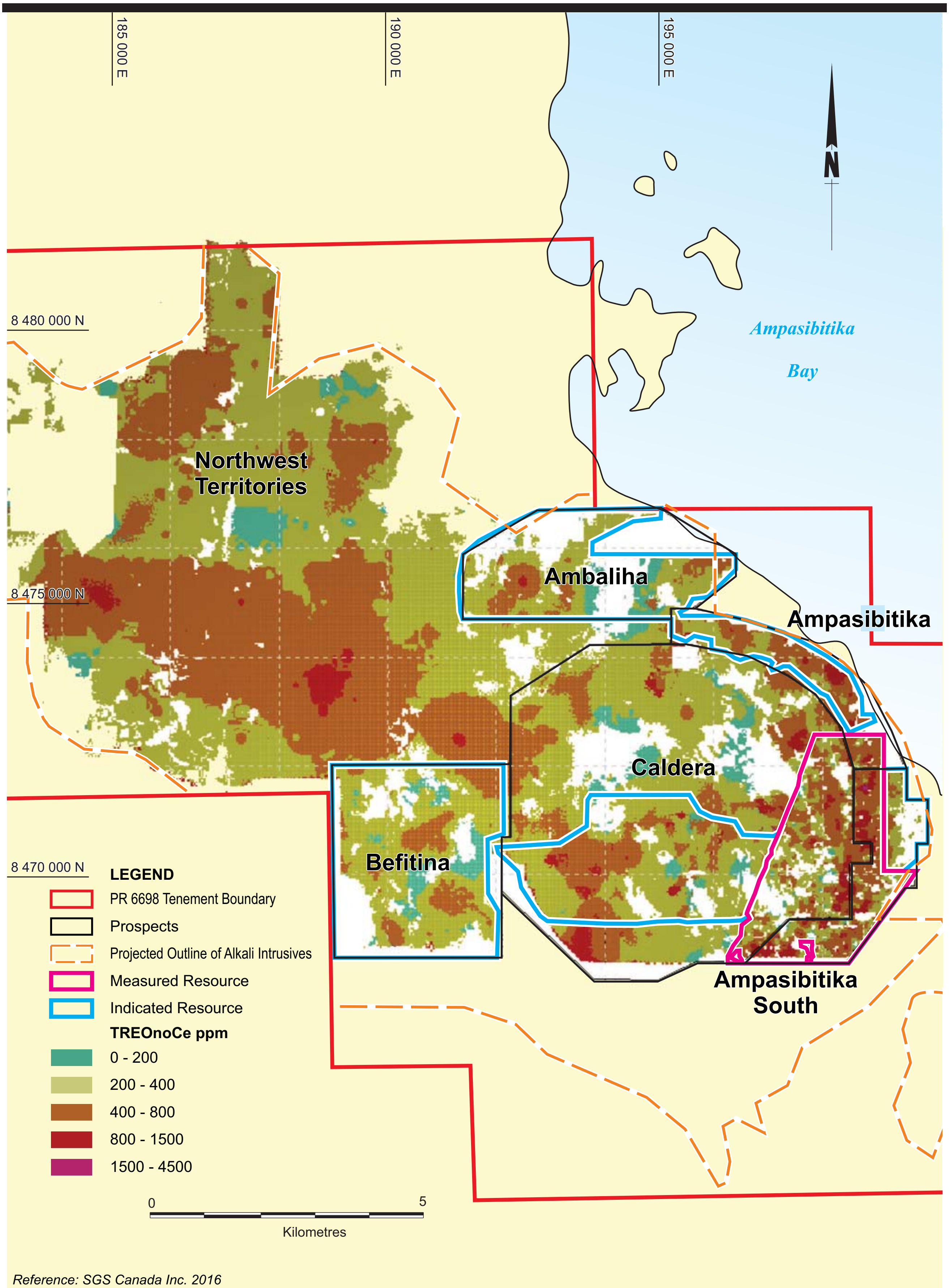
- The breakdown of the individual REO grades is shown in Table 2.2 and illustrated in the charts in Figure 6.

Table 2.2

Tantalus Project Mineral Resource Summary – Individual REO Grades

Category	Y_2O_3 ppm	La_2O_3 ppm	Ce_2O_3 ppm	Pr_2O_3 ppm	Nd_2O_3 ppm	Sm_2O_3 ppm	Eu_2O_3 ppm	Gd_2O_3 ppm	Tb_2O_3 ppm	Dy_2O_3 ppm	Ho_2O_3 ppm	Er_2O_3 ppm	Tm_2O_3 ppm	Yb_2O_3 ppm	Lu_2O_3 ppm	TREO ppm
Measured	113	241	315	47	158	27	3	23	3	19	4	10	1	9	1	975
Indicated	101	195	324	39	131	23	3	18	3	17	3	10	1	9	1	878
Inferred	90	223	321	42	137	22	2	18	3	15	3	9	1	8	1	894

- Although Ce is a major component of the resource, recovery into the potential concentrate, based on testwork to date, is relatively low, averaging only around 8% of REO weight distribution (Figure 6); in terms of potential sales, Ce represents only 1% of estimated value. Because of the low value ascribed to Ce, SGS has applied the resource cut off values to the TREO grades without Ce ("TREOnoCe").
- The resource contains a relatively high percentage of the more valuable critical rare earth oxides ("CREO"), including Y, Nd and Dy. From the leaching testwork, SGS has estimated that the principal components of a mixed rare earth concentrate derived from the Tantalus project will comprise La, Nd, Y and Pr (Figure 6). Based on forecast prices, SGS determined that the principal contributors to revenue are likely to be Nd, Pr, Dy, Eu, La, Tb and Y.



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Tantalus Rare Earths Project

Figure 5

RESOURCE AREAS - GRADE DISTRIBUTION

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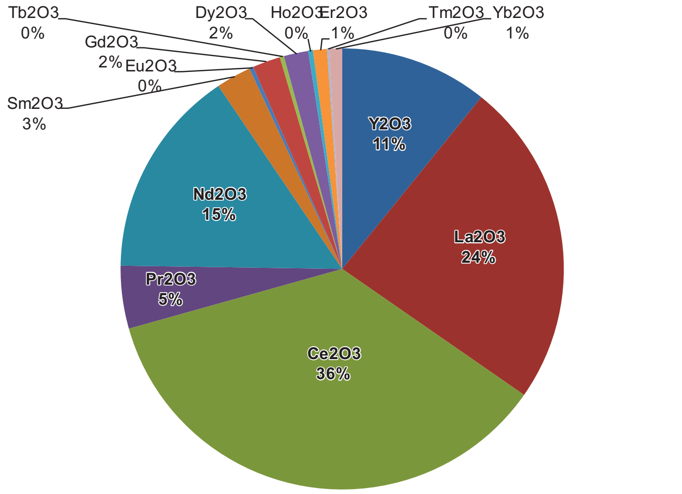
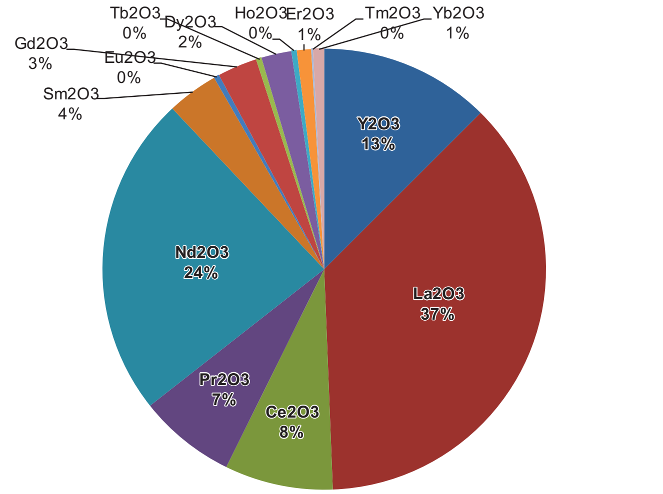
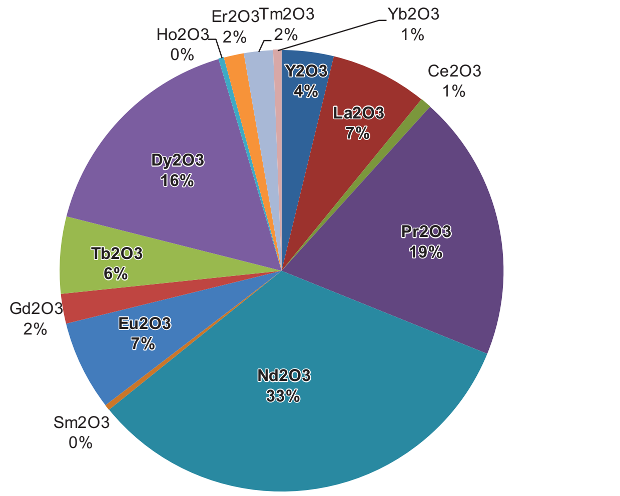


REO Weight Distribution - Resource



REO Weight Distribution - Potential Concentrate



REO Value Distribution - Potential Sales

Reference: SGS Canada Inc. 2016

2.6 Mining

- The pedolith and saprolite mineralised zones average approximately 6.0m in depth, immediately below a thin 20cm zone of topsoil (Figure 3). The mining plans have not yet been finalised, as both in-situ leach and vat leach/heap leach operations are under consideration, with in-situ leach proposed for areas with at least a 5° slope and heap leach for flatter areas.
- In the case of in-situ leach, there would be no conventional mining, only the drilling of a series of injection wells and, down slope, collection trenches and horizontal fans of collection holes. In the flatter areas where it is projected that heap leach operations may be more effective, the mining operations would still be relatively modest in size, and would likely be undertaken by contract, using conventional mining equipment in the form of hydraulic excavators and all-wheel drive ("AWD") articulated rear-dump trucks. The top soil would be removed and dumped separately for future rehabilitation. The pedolith and saprolite would be mined in shallow pits averaging around 6m in depth. The average depth of the regolith based on drilling is around 14m. The mineralised material would be trucked to the heap leach pads and crushed, agglomerated and stacked.
- Prior to defining the areas for in-situ or heap leaching, detailed grade control drilling would be undertaken to define the depth and parameters of the mineralised zone and to allow detailed planning and scheduling.
- Limited testing of the water table has been undertaken; the bulk of the exploration pits were dug above the water table. Some pit dewatering may be required, particularly during the wet season.
- No mine plans have yet been developed, but in areas where shallow open pit mining and heap leaching are carried out, it is likely the mineralised zones will be mined in 2.5-3m flitches, with close-spaced grade control drilling well ahead of mining. No mining dilution or mining recovery estimates have been made, but in BDA's opinion, given the flat lying nature of the deposit from the information to date, recovery of at least 95% of the resource blocks with dilution of less than 5% should be achievable.

2.7 Processing

- No detailed processing plans have yet been developed, other than the general concept of carrying out in-situ leaching in the sloping (>5°) areas, and mining and vat leaching/heap leaching in the flatter areas. No pilot testing has been undertaken to date, though a 1,000t bulk sample has been mined from a series of close-spaced pits in the Betaimboay region (Figure 1), and stockpiled in preparation for a trial heap leach, and a 1km^2 area has been selected for a proposed in-situ leach trial.
- Metallurgical testwork has been carried out by the University of Toronto in 2012, by SGS Lakefield in 2013 and by Outotec in 2014/15, on samples of lateritic and saprolitic clays. Leaching tests were undertaken using ammonium sulphate, $(NH_4)_2SO_4$, and sodium chloride, NaCl, solutions. Oxalic acid was used to conduct preliminary REE precipitation tests and ammonium bicarbonate was used to test precipitation of Al from solution.
- The most comprehensive testwork programme was carried out by SGS Lakefield based on sixty pit samples averaging around 15kg per sample. A 1kg representative sample was taken from 35 of the pit samples to produce a master clay composite with an average grade of 0.20% REE (2,000ppm). Both ammonium sulphate and sodium chloride solutions were used; ammonium sulphate generally appeared to give better extractions. LREE extractions ranged from 70-88% (with the exception of Ce with a maximum extraction of 29%); HREE extractions ranged from 50-80%. Extractions for U, Th and most gangue elements were low. Optimum conditions appeared to be 1M (one molar) solutions at around pH4.
- SGS Lakefield also conducted two column leach tests (0.5m diameter, 1.8m height) to simulate heap leaching conditions. The feed was agglomerated and the tests ran for 218 hours. Extractions generally ranging from 50-88% were achieved.
- SGS Lakefield concluded:
  - REEs can be extracted from the Tantalus project clays by ion desorption using ammonium sulphate or sodium chloride as eluants, with extraction of the main REEs generally from 70% to >80%; maximum extractions were achieved with ammonium sulphate at a pH of 4
  - High REE extractions and high REE grade liquors can be achieved with low eluant:ore ratios
  - Column leaching, simulating heap leaching, using 1M ammonium sulphate at pH4 for 218 hours with irrigation rates of around 14L/h/m^2 achieved extractions of 88% Nd, 73% Dy, 67% Y and 86% La

  - Oxalic acid precipitated the REEs from solution, but even at the highest acid to REE ratio tested (300%), not all REEs were completely precipitated.

- Overall, BDA considers that the testwork undertaken to date has confirmed that the rare earth elements can be readily extracted from the pedolith and saprolite using appropriate eluants. Extractions vary for the different REEs but for the main elements range from around 70% to more than 80%. Deleterious elements such as uranium and thorium are generally not extracted to a significant extent. Column leach testwork has tested the likely parameters for heap leaching. A large bulk sample has been mined and stockpiled on site for a trial heap leach test. An area of ground has also been selected for a trial in-situ leach test. However, to date, no on-site trials have been undertaken.

2.8 Transportation and Infrastructure

- The nearest airport is on the island of Nosy Be, approximately 60km north of the project area (Figure 1), serviced by regular flights to Antananarivo and to international centres including Johannesburg. Access from Nosy Be to the project area takes around one hour by speedboat.
- The topography in the project area is relatively rugged, and there is limited road access. TREM has constructed dirt roads to the main prospects and camp sites, but most roads are suitable only for four-wheel drive vehicles. Significant upgrading of site roads will be required as part of any future project development.
- The sealed National Highway runs approximately 18km to the east of the project site (Figure 1). The nearest town is Ambanja, some 40km northeast of the project area, where TREM maintains a sample preparation laboratory, core shed and sample storage facility. Ambanja is connected by sealed road to the local centres along the coast to the north and south and to the capital Antananarivo, 500km to the south.
- Local port facilities are available at Ankify, approximately 20km northwest of Ambanja and approximately 60km from the project site. There are several sites on the northern coast of the project area suitable for landing craft for delivery of equipment and export of product if required.
- Infrastructure facilities within the project area are limited. There is no grid power available on site; the camps are serviced by on-site generators. Water supply is from local bores. TREM advises that no investigation has been undertaken to date on the potential availability of grid power, but it is likely that initial project requirements would be satisfactorily served by on site diesel or fuel oil generated power.

2.9 Environment and Community

- BDA has not reviewed any environmental studies but understands that an environmental impact study has been prepared for the exploration phase. TREM advises that the exploration activities undertaken to date (drilling and pitting) have been conducted in accordance with environmental requirements.
- To undertake the next stage of on-site testwork (heap leaching and/or in-situ leaching) an environmental impact assessment will be required to obtain government approvals. TREM is in the process of engaging the environmental consulting firm Ramboll Environ Inc. to undertake this work.
- Industry reports indicate that there are significant environmental issues associated with some of the in-situ leach projects in southern China. It will be important for TREM going forward to produce a comprehensive environmental assessment of the potential in-situ leach and heap leach operations, and the environmental and rehabilitation measures planned to ensure minimum environmental impact.
- TREM has supported a number of social/community programmes with the local villages in the project area, mostly involving educational assistance. TREM has employed local people on the project where possible. Relations with the local communities appear generally good.

2.10 Production Plan

- No production plan has yet been developed for the project. TREM advises that it is envisaged a mixed rare earth precipitate (carbonate) would be produced for sale to offtakers. Approximate production scale is envisaged as 10,000t of contained rare earths per annum.

2.11 Capital and Operating Costs

- TREM has not yet undertaken a feasibility study on the project, and there has been no estimation of potential capital or operating costs. However, given the proposed in-situ leach method of extraction, capital costs should be modest and operating costs are anticipated to be low, compared with conventional mining and processing operations. If vat leaching/heap leaching is adopted, capital and operating costs are likely to increase, though potentially offset by higher recoveries. However, heap leaching is also a relatively low-cost process.

2.12 Project Implementation

- Project development is currently on hold until ownership and re-financing issues are resolved. The next stages in project implementation are likely to involve on-site in-situ leaching and trial heap leaching, together with further metallurgical bench scale testing, to optimise extraction and to determine recovery factors. TREM advises that specific environmental approvals will be required for such testwork, which will involve completion of environmental impact assessments.
- A pre-feasibility study will be required to consider alternative project development scenarios, and a feasibility study to define the costs and development parameters. Project development will require the granting of an exploitation (PE) licence. The current final phase of the exploration (PR) licence has three years to run from the time of signing of the renewal application.

2.13 Marketing

- In 2015, TRE announced that it had undertaken discussions with potential offtakers, and Commercial Purchasing Agreements had been signed with Shenghe Resources and ThyssenKrupp Metallurgical Products GmbH. Each agreement covered the purchase of 30% of output from the Tantalus project, or up to 3,000t of mixed rare earth oxides once full production capacity is reached. The initial duration of the contracts was for three years from the start of commercial production, with an option to extend the contract by an additional seven years. Both contracts were linked to the provision of 30% of the debt funding required for the project development.
- As these agreements were with the former German parent company TRE, rather than TREM, in BDA's opinion it is unlikely that the agreements would remain binding with a change of ownership. However, it is significant that two major companies operating in the rare earths market were prepared to sign material offtake agreements for products from the Tantalus project.
- The prices of the mixed rare earths oxide product were to be linked to the actual composition of the concentrate and independently quoted market prices for the various oxides. It is anticipated that the principal values in the mixed oxide product will relate to Neodymium, Praseodymium, and Dysprosium, together with Terbium, Europium and Lanthanum.

2.14 Valuation Summary

- BDA has derived a valuation for the Tantalus project based on a number of considerations of value. BDA has not considered the potential net present value of the project in assessing value, as the project is at too early a stage to make any reasonable assessment of capital and operating costs, production scale, process recovery or product tonnes and grade. Without a feasibility study, or, at a minimum, a pre-feasibility study, it is inappropriate to ascribe value to a mineral project based on discounted cashflow methodologies. However, a number of alternative methodologies are available and BDA has considered the following (a description and commentary on the valuation methods considered is provided in Section 3):
  - Exploration expenditure with a prospectivity enhancement multiplier ("PEM")
  - Relevant transactions and joint venture terms
  - Market capitalisation
  - Comparable transactions
  - Yardstick methods.
- The valuation ranges derived from these assessments are shown in Table 2.3. A full description of the valuation estimation process is given in Section 18. BDA considers that taking a simple average of the low, high and most likely values provides a reasonable guide to the value of the project, however, BDA's preferred approach is to consider a weighting of each of the individual assessments, based on BDA's assessment of their reasonableness and validity. BDA's overall assessment of the value of the TREM

project at this stage of development is a range of US$25-75M with a preferred most likely value of US$48M. This valuation is based on the assumption that the PR licence will be formally renewed in due course, and that approvals will be granted for the on-site testwork necessary to move the project forward. BDA is aware that substantially higher valuations can be derived by consideration of potential future cashflows, but at this stage of project development, these are considered an indication of future potential, rather than a realistic guide to current value.

Table 2.3

Summary Valuation of the Tantalus Rare Earths Project

Methodology	Valuation (US$M)			Comments
	Low	Most Likely	High	
Exploration Expenditure/PEM	61.8	84.7	107.5	Historical expenditure x PEM
TRE Historical Market Capitalisation	25.8	60.8	80.3	TRE share market capitalisation
REOM Transaction	7.1	17.8	28.5	2016 TRE/REOM Agreement
Comparable Transactions - Yardsticks	7.9	16.9	25.9	Other RE company transactions
Market Capitalisation - Yardsticks	5.6	29.8	83.2	Values of other RE projects/companies
Average of Values	*21.6*	*42.0*	*65.1*	Simple Average
BDA Assessed Valuation	**25.2**	**48.1**	**74.5**	Preferred value based on project considerations

3.0 VALUATION METHODOLOGY

3.1 Effective Date

The effective date for the valuation is 1 July 2017.

3.2 Standards and Procedures

This report has been prepared in keeping with the VALMIN Code for the Technical Assessment and Valuation of Mineral Assets and Securities for Independent Expert Reports as adopted by the Australasian Institute of Mining and Metallurgy in 1995 and as amended and updated in 2005 and 2015. Resource and reserve estimation procedures and categorisations have been reviewed in terms of the JORC Code, 2012.

3.3 Valuation Principles

As a general principle, the fair market value of a property as stated in the VALMIN Code is the amount a willing buyer would pay a willing seller in an arm's length transaction, wherein each party acted knowledgeably, prudently and without compulsion.

3.4 Valuation Methods

There is no single method of valuation which is appropriate for all situations. Rather, there are a variety of valuation methods, all of which have some merit and are more or less applicable depending on the circumstances. The following are appropriate items to be considered:

- discounted cash flow
- amount an alternative acquirer might be willing to offer
- the amount which could be distributed in an orderly realisation of assets
- the most recent quoted price of listed securities
- the current market price of the asset, securities or company.

The *discounted cash flow* or net present value method is generally regarded as the most appropriate primary valuation tool for operating mines or mining projects close to development. Valuing properties at an earlier stage of exploration where ore reserves, mining and processing methods, and capital and operating costs, are yet to be fully defined, involves the application of alternative methods. The methods generally applied to exploration properties are the *related transaction* or real estate method, the value indicated by *alternative offers* or by *joint venture terms,* and the *past expenditure* method. *Rules of thumb or yardstick values* based on certain industry ratios can be used for both mining and exploration properties. Under appropriate circumstances, values indicated by *stock market valuation* should be taken into account as should any *previous independent valuations* of the property.

The valuation methods considered are briefly described below.

Net Present Value ("NPV")

If a project is in operation, under development, or at a final feasibility study stage and reserves, mining and processing recoveries, and capital and operating costs are well defined, it is generally accepted that the net present value of the project cash flows is a primary component of any valuation study. This does not imply that the fair market value of the project necessarily is the NPV, but rather that the value should bear some defined relationship to the NPV.

If a project is at the feasibility study stage, additional weight has to be given to the risks related to uncertainties in costs and operational performance, risks related to the ability to achieve the necessary finance for the project, risks related to granting on licenses or permits, environmental and community aspects, political or sovereign risk and sometimes a lower degree of confidence in the reserves and recoveries. In an ongoing operation, many of these items are relatively well defined.

The NPV provides a technical value as defined by the VALMIN Code. The market value could be determined to be at a discount or a premium to the NPV due to other market or risk factors.

No detailed feasibility study has been completed for the TREM project; resources have been estimated but no reserves have been defined and no mine plan or production schedule has been developed. No estimates have been made of likely capital or operating costs.

In these circumstances, no reasonable determination can be made of likely cash flows and therefore the discounted cashflow or NPV method is not applicable or appropriate.

Alternative Valuation Methods

Previous Transactions, Alternative Offers and Joint Venture Terms

If discussions have been held with other parties and offers have been made on the projects or tenements under review, then these values are certainly relevant and worthy of consideration. Similarly, joint venture terms where one party pays to acquire an interest in a project, or spends exploration funds in order to earn an interest, may also provide an indication of value.

BDA has inquired of TREM whether any recent transactions, joint venture arrangements or discussions have been held which might provide a guide to possible value.

Comparable Transactions

Recent comparable transactions on other rare earth properties or involving other rare earth companies can be relevant to the valuation of the Tantalus projects and tenements. While it is acknowledged that it can be difficult to determine to what extent the properties and transactions are indeed comparable, this method can provide a useful benchmark for valuation purposes. The timing of such transactions must be considered as there can be substantial change in value with time.

BDA has considered whether, in recent years, there have been any comparable relevant transactions that could be used as a basis for estimation of value of the TREM project.

Market Valuation

On the fundamental definition of value, as being the amount a knowledgeable and willing buyer would pay a knowledgeable and willing seller in an arm's length transaction, it is clear that due consideration has to be given to market capitalisation. In the case of a one project company or a company with one major asset, the market capitalisation gives some guide to the value that the market places on that asset at that point in time, although certain sectors may trade at premiums or discounts to net assets, reflecting a view of future risk or earnings potential. Commonly however a company has several projects at various stages of development, together with a range of assets and liabilities, and in such cases it is difficult to define the value of individual projects in terms of the share price and market capitalisation.

TRE was formerly a listed company, and BDA has reviewed its historical share price and market capitalisation in order to derive an implied project valuation. BDA has also reviewed other listed companies with rare earth projects to assess the value ascribed to prospective rare earth producers and to determine potential yardstick values.

Rules of Thumb or Yardsticks

Certain industry ratios are commonly applied to mining projects to derive an approximate indication of value. The most commonly used ratios relate to gold projects and comprise dollars per ounce of gold in resources, dollars per ounce of gold in reserves, or dollars per ounce of annual production. The derivation of yardsticks is more complicated with rare earth projects in that the make-up of the "basket" of rare earths can differ significantly from project to project. However, allowances can be made for the respective 'quality' of the deposits in deriving appropriate yardstick values.

BDA has applied yardstick values ($/t of contained TREO in resource) to allow a meaningful comparison of Comparable Transaction data and Market Capitalisation data.

Past Expenditure

Past expenditure, or the amount spent on exploration of a tenement is commonly used as a guide in determining the value of exploration tenements, and 'deemed expenditure' is frequently the basis of joint venture agreements. The assumption is that well directed exploration has added value to the property. This is not always the case and exploration can also downgrade a property and therefore a 'prospectivity enhancement multiplier' (PEM), which commonly ranges from 0.5-3.0, is applied to the effective expenditure. The selection of the appropriate multiplier is a matter of experience and judgement. To eliminate some of the subjectivity with respect to this method, BDA applies a scale of PEM ranges as follows to exploration expenditure:

- PEM 0.5 - 0.9 Previous exploration indicates the area has limited potential
- PEM 1.0 - 1.4 The existing (historical and/or current) data consists of pre-drilling exploration and the results are sufficiently encouraging to warrant further exploration.
- PEM 1.5 - 1.9 The prospect contains one or more defined significant targets warranting additional exploration.
- PEM 2.0 - 2.4 The prospect has one or more targets with significant drill hole or sample intersections.
- PEM 2.5 - 2.9 Exploration is well advanced and infill drilling or sampling is required to define a resource.
- PEM >3.0 A resource has been defined but a (recent) pre-feasibility study has not yet been completed.

BDA has considered exploration expenditure as one method of determining a value for the Tantalus project.

Prospectivity

Over-riding any mechanical or technical valuation method for exploration ground must be recognition of prospectivity and potential, which is the fundamental value in relation to exploration properties.

Other Expert Valuations

Where other independent experts or analysts have made recent valuations of the same or comparable properties these opinions clearly need to be reviewed and to be taken into consideration. We have inquired of TREM whether any other recent valuations of the Company or its assets have been undertaken and these have been considered and discussed.

Special Circumstances

Special circumstances of relevance to mining projects or properties can have a significant impact on value and modify valuations which might otherwise apply. Examples could be:

- *environmental risks* - which can result in a project being subject to extensive opposition, delays and possibly refusal of development approvals
- *indigenous peoples/land rights issues* - projects in areas subject to claims from indigenous peoples can experience prolonged delays, extended negotiations or veto
- *country issues* - the location of a project can significantly impact on the cost of development and operating costs and has a major impact on perceived risk and sovereign risk
- *technical* - issues peculiar to an area or orebody such as geotechnical or hydrological conditions, or metallurgical difficulties could affect a project's economics.

We have considered, and have inquired of TREM, whether any such factors apply to the project under review.

4.0 RISK SUMMARY

4.1 Overview

Mining and exploration companies have a relatively high risk profile compared with many industrial and commercial operations. Each orebody is unique; the nature of an orebody, the occurrence and grade of the ore, and its behaviour during mining and processing can never be wholly predicted. Estimates of the tonnes, grade and overall metal content of a deposit are not precise calculations but are based on interpretation and on samples from pitting, trenching and drilling which, even at close spacing, remain a very small sample of the whole orebody. There is always a potential error in the projection of drill hole or sample data when estimating the tonnes and grade of the surrounding rock. Ground and hydrology conditions can impact on mine productivity and the availability of reserves. Process recovery projections, process flowsheet and plant design are commonly based on limited testwork and depend on the representivity of the testwork samples and the scale up of the testwork results. Process operations can be subject to a number of start-up and ramp-up issues.

Estimations of project capital and operating costs are rarely more accurate than ±10-15%. For projects in the early planning stages, estimation accuracy will be no better than ±20-30%. Mining project revenues are subject to variations in metal prices and exchange rates, though some of this risk can be reduced with hedging programs and off-take contracts; nevertheless, such contracts are commonly tied to market prices. Environmental and social issues can result in project delays and restrictions, and can impact on productivity and costs.

4.2 Risk Profile

In reviewing the Tantalus rare earths project, BDA has considered areas where there is perceived technical risk to the operation, particularly where the risk component could materially impact the potential cashflows. The assessment is necessarily subjective and qualitative. Risk has been classified from low through to high. A summary of the principal risk components of the Tantalus project is given in Table 4.1.

Table 4.1

Tantalus Project Risk Components

Risk Component	Comments
Resources *Low/Medium Risk*	Geology and mineralisation controls are reasonably well defined and well understood. Data collection relies primarily on pitting, but pit spacing is reasonable, and data collection processes and procedures appear appropriate and consistent with industry standards. The database has been independently reviewed and recognised independent specialist groups have undertaken the resource estimations; the work appears to have been professionally undertaken and in accordance with industry standards. Compared with primary deposits of rare earths, the resource is relatively low grade, though it is typical of the grade of ionic clay deposits currently being mined in China. The tonnage is sensitive to the cut off applied, however, the proposed extraction method of in-situ leach or vat leach/heap leach is relatively low cost and allows for the application of a relatively low cut-off grade. The deposit contains a significant proportion of more valuable HREEs and CREEs and the proposed leach approach generally does not extract the deleterious elements such as uranium and thorium, potentially generating a more marketable product. There is significant potential to expand the current resource, particularly to the northwest, and to upgrade the Inferred areas to Measured and Indicated with closer-spaced pitting. There is also potential to extend the resource in depth, given that the thickness of the resource is partially limited by the depth of pitting.
Reserves *Medium Risk*	To date no detailed mine plan has been developed and no reserves defined. A 1,000t bulk sample has been mined from a grid of pits near the Betaimboay village, but to date no trial heap leach has been undertaken, although bench scale work and column leaching results have been encouraging. Once a trial heap leach and pilot in-situ leach tests have been undertaken, subject to results and confirmation of costs and approvals, BDA considers that conversion of a portion of the resource to a reserve should be feasible.
Mining *Low Risk*	The mineralisation lies primarily near-surface, generally in the upper 10m of the lateritic soil and saprolitic clay horizon, with an average thickness defined to date of 6m. If in-situ leaching is undertaken, there will be no conventional mining activity. In areas designated for vat/heap leaching, shallow, conventional excavator and truck mining should be straightforward with initial top soil removal, mining on 2.5-3m flitches and progressive rehabilitation. With shallow pits, wall stability should not be an issue and while further hydrological work is required, the bulk of the mining should be above the water table. The topography in some areas is relatively rugged, but no issues are anticipated in terms of mine access.

Risk Component	Comments
Hydrology-Hydrogeology *Low/Medium Risk*	Additional hydrological and hydrogeological work is required, but in most areas the shallow mineralised zone appears to be above the water table. For in-situ leaching, the pedolith horizon of lateritic soils appear reasonably permeable, but in-situ testing is required to confirm permeability parameters. The saprolitic clays appear less permeable and their suitability for in-situ leaching requires further testwork.
Processing *Medium Risk*	Preliminary metallurgical testwork has demonstrated that the ionic clay REEs can be readily extracted with ammonium sulphate or sodium chloride solutions, using 0.5-1.0 molar solutions and a pH of around 4-5. Extractions vary according to the specific rare earth element, but 70-80% recoveries appear achievable for the bulk of the critical and heavy rare earths. Some of the lower value rare earths have lower recoveries, down to 50%, and an added benefit of the process is that there is minimal leaching of uranium and thorium and other deleterious elements. Recognised international processing specialists such as SGS Lakefield have been engaged to undertake the testwork, which has included both bench scale and column leaching. A bulk sample has been mined and is available on site for a trial heap leach. Planning has also been undertaken for a trial in-situ leach. In BDA's opinion, these trials will be important in increasing confidence that an effective recovery process can be established for the Tantalus mineralisation. Further laboratory testwork is also required, both to optimise leaching conditions and on precipitation and recovery of the rare earths from solution. The testwork should be undertaken on samples representative of the average grade of the deposit; most work to date has been on samples of significantly higher grade than the bulk of the resource.
Infrastructure *Low Risk*	No detailed work has been undertaken on infrastructure requirements. Road access to the deposit sites will require upgrading, but there is reasonable road access to the project area via the sealed National Highway to Ambanja. An international airport at Nosy Be is about 2-3 hours travelling time from the project site by road and boat. Port facilities near Ambanja could be upgraded for the import of project equipment and export of product; suitable sites for landing craft ("LCTs") to offload machinery and equipment are available near to the project site. There is no grid power available on site but initial power requirements could readily be met with on-site diesel or fuel oil generation. No hydrology studies have been conducted, but sufficient process water for the project is likely to be readily available.
Tenement and Title *Medium/High Risk*	BDA has not undertaken legal due diligence but has relied on advice provided by ISR's lawyers in Madagascar, Lexel Juridique and Fiscal. The tenement PR 6698 is in its third renewal phase and has a final three-year term before it must be relinquished or converted into a Permis de Exploitation (PE or Mining Licence). The licence system appears appropriate, and has allowed TREM to operate and undertake exploration activities as required. However, there appear to be significant administrative issues in obtaining prompt approvals and ministerial sign off; the second renewal took 12 months for approval to be received, and while TREM submitted its third renewal application in December 2016, no ministerial sign off has yet been received. It is likely that the date of sign off will constitute the date of renewal, so there is some benefit in that the 3-year renewal period has not yet commenced; however, the long delays in receiving formal approvals are of concern, and also raise questions regarding the likely efficiency of the approval process to obtain a mining licence.
Environmental Issues *Medium/High Risk*	Exploration site work to date has been conducted under the PR licence environmental conditions pertaining to the management of drill sites and exploration pits and trenching. Any larger scale heap leaching or in-situ leaching trial will require specific environmental assessment and approval. Environmental firms Gaia Oy and Ramboll Environ Inc. have been engaged to develop baseline studies and environmental impact assessments, but BDA understands this work is still at an early stage. Until an initial environmental impact assessment has been completed and submitted, BDA considers the environmental risk to be medium/high. BDA notes that there are a number of industry reports concerning environmental issues related to in-situ leach operations in southern China, so this will be a sensitive issue that needs to be properly addressed if an in-situ leach operation is proposed. Heap leaching will involve disturbance of significant areas, given the shallow but widespread nature of the deposit; however, an ongoing programme of rehabilitation should allow environmental impacts to be minimised.

Risk Component	Comments
Social and Community *Low Risk*	There are several potentially affected villages within the project area. These communities rely largely on subsistence farming and fishing. BDA has not undertaken any independent social assessment, but understands from TREM that the local village communities are generally supportive of development and employment opportunities, provided appropriate compensation is paid for disturbance and loss of land. TREM is currently supporting several community projects primarily involving educational support and assistance.
Production Plan *Medium Risk*	At this stage there is no defined production plan, although the general concept involves in-situ leaching the areas where the land slope would favour percolation of fluids (generally >5° slope) and heap leaching (or vat leaching) the flatter areas. It is envisaged that the initial scale of the operation would be the production of around 10,000t of contained rare earth oxides per annum.
Capital Costs *Low Risk*	No estimate has been made of the capital cost to develop the project. However, the planned project should not be capital intensive. There will be some expenditure on infrastructure (roads, upgrade of port facilities, power, water, and accommodation) but the in-situ leach process requires limited up front capital and it is planned to export a mixed rare earths product rather than undertake more complex rare earth separation. If heap leaching is undertaken there will be additional capital involved in preparation of heap leach pads, and in crushing, agglomeration and stacking equipment, but these costs should be modest. TREM advises that the cost of mining equipment is likely to be defrayed by the use of a mining contractor. While no feasibility study has been undertaken to date, BDA considers the project is unlikely to be sensitive to capital costs.
Operating Costs *Low/Medium Risk*	No feasibility study has been undertaken and no estimates of operating costs have been undertaken. However, based on the shallow nature of the mineralisation, and the planned in-situ or heap leach operation, operating costs should be competitive with other projects. However, it should be noted that unit operating costs (per tonne of REO produced) will also depend on the efficiency of the leaching process and the overall recovery achieved from the relatively low grade deposit.
Project Implementation *Medium/High Risk*	No project implementation plan has yet been developed. There are a number of critical milestones that need to be achieved; amongst these is the completion of the required environmental studies to obtain approval for the planned in-situ leach and heap leach and/or vat leach trials, completion of a feasibility study, and granting of a mining licence (PE or Permis Exploitation). Construction activities should be relatively straightforward, but there is significant work to be undertaken to get to a development decision phase within the remaining three years of the PR licence.
Management *Medium Risk*	ISR has only a small management team and no project development track record, but ISR management has experience of mining project operations in Africa, and it is proposed to engage Chinese specialists with rare earth experience and in-situ leach experience in particular to assist with the next stage of project testwork and development.
Country and Political Risk	BDA is not expert in this area and makes no assessment of country or political risk. BDA notes that there are several international mining operations active in Madagascar, mining a range of commodities. The exploration licence (PR) and mining licence (PE) processes appear appropriate, however, there appear to be material administrative issues in obtaining prompt approvals and ministerial sign-off. In terms of access to land, local employment and local community relations, there appear to be no outstanding difficulties.

4.3 Risk Mitigation Factors

There are a number of factors which combine to reduce risks to the project. Principal amongst these are:

- The geology is reasonably straightforward and well understood. The soil profile has been examined in over 4,000 pits and consistently shows a thin zone of topsoil, underlain by a pedolith of lateritic clay grading into a saprolitic clay and then saprock zone. The pedolith and saprolite are enriched in REOs.
- The Tantalus REO composition comprises a high percentage of the more valuable CREOs.
- The resource thicknesses and grades are relatively consistent over wide areas.

- If in-situ leaching is undertaken there will be no mining component or cost, other than the development of the injection and extraction wells. If heap leaching is undertaken mining will be relatively straightforward and low cost, given the shallow nature of the deposit.
- Leaching testwork has shown both ammonium sulphate and sodium chloride are effective, and many of the deleterious elements, in particular uranium and thorium, are not leached to any significant extent.
- The project is close to the coast, which should facilitate import of equipment and machinery and export of product.
- ISR advises that it has access to Chinese expertise from the in-situ leach projects in Southern China to assist with the Tantalus testwork, process design and flow sheet.
- Construction and operating costs in Madagascar, in particular labour costs, should be relatively low compared with the costs of construction and operation in locations such as Australia, Europe or North America.

4.4 Opportunities

- There is significant opportunity to expand the known resource, particularly in the Northwest Territories where pitting is relatively sparse. There is also some opportunity to extend the resource in depth, as the thickness of the mineralised zone is largely controlled by the depth of pitting, which was commonly limited by intersecting harder, more resistant, material.
- The mineralisation is reasonably consistent, and categorisation is largely based on spacing of the pits. Where more detailed pitting has been undertaken, the infill pitting has largely confirmed the interpretations from the original wider spaced pitting. There is thus significant opportunity to upgrade the areas currently categorised as Inferred to Indicated and Measured, with more detailed work.

5.0 RARE EARTH ELEMENTS

5.1 Overview

The rare earth elements ("REE") are usually defined as the 14 lanthanides, from lanthanum (atomic number "Z" = 57) to lutetium (Z = 71), plus yttrium (Z= 39). The rare earth elements are listed in Table 5.1, together with their natural abundance and their relative percentage distribution in the Tantalus resource.

As the rare earths typically occur as compounds, they are commonly referred to in their oxide form as rare earth oxides ("REO"). In this report, unless stated otherwise, REO includes yttrium oxide and TREO refers to the total sum of the REOs.

The prevailing industry practice is to exclude scandium (Z = 21) from the rare earths, even though it may still be included in some chemistry texts. By virtue of its instability, promethium (Pm, Z = 61) effectively does not occur in nature.

Table 5.1

Rare Earth Elements and Yttrium

Element	Atomic Number	Symbol	Atomic Weight	Upper Crustal Abundance (ppm)	Distribution of REO in Tantalus Resource (%)
Yttrium	39	Y	88.91	22	11.5
Lanthanum	57	La	138.91	30	22.7
Cerium	58	Ce	140.12	64	35.9
Praseodymium	59	Pr	140.91	7.1	4.50
Neodymium	60	Nd	144.24	26	15.2
Samarium	62	Sm	150.36	4.5	2.68
Europium	63	Eu	151.96	0.88	0.30
Gadolinium	64	Gd	157.25	3.8	2.12
Terbium	65	Tb	158.93	0.64	0.32
Dysprosium	66	Dy	162.50	3.5	1.92
Holmium	67	Ho	164.93	0.8	0.38
Erbium	68	Er	167.26	2.3	1.08
Thulium	69	Tm	169.93	0.33	0.16
Ytterbium	70	Yb	173.04	2.2	1.00
Lutetium	71	Lu	174.97	0.32	0.15

Note: Crustal abundances from Castor and Hedrick, 2006; oxide distribution based on Measured and Indicated Resources, cut-offs at 300 and 500 ppm TREO depending on location, Table 1.2, SGS, 2016; per SGS usage, all oxides have been assumed to be based on REE_2O_3 *instead of the conventional mixed oxide formulae for* Pr_6O_{11} *and* Tb_4O_7 *and* CeO_2 *for* Ce^{4+}

A commonly used subdivision of the REE consists of the light REE ("LREE") or LREO and the heavy REE ("HREE") or HREO. Common industry usage is to define the LREE as consisting of La, Ce, Pr, Nd and Sm and the HREE as Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu plus Y. This grouping of LREE and HREE, used in this and the SGS (2014 and 2016) reports, can vary in some reports with the LREE sometimes extended to include Eu and even Gd.

The grouping of Sm, Eu and Gd are sometimes referred to as "SEG" and/or middle or medium REE ("MREE"). Nd and Pr are commonly grouped together and termed didymium. "Mischmetal" refers to an alloy of various REE such as Ce, La, Nd and Pr.

SGS, in its 2016 report also refers to "critical rare earths" ("CREE" or "CREO") which are defined as comprising Dy, Eu, Nd, Tb and Y. To this list should probably be added Pr (Pellegrini, et al, 2017). These rare earths are regarded in the West as "critical" due to the risk of supply disruption and their high economic importance. Categorisation of particular rare earths as CREE is not static and can change, depending upon perceived supply risks, substitution by other elements and changing uses.

REE analyses are usually received in reports from analytical laboratories in terms of parts per million (ppm) for the individual elements. REO concentrations are then calculated by conversion factors based on the appropriate oxide formulae. REE typically occur in nature in the 3+ valent state, though Eu also occurs in the 2+ state and Ce in the 4+ state. REO pricing is not uniformly based on the 3+ state, with mixed oxide formulae applied to Pr (Pr_6O_{11}), Tb (Tb_4O_7) and Ce (CeO_2). Many resource statements use a constant conversion based on REE_2O_3 as an approximation.

5.2 Rare Earths – Occurrence and Production

Rare earths are found at elevated concentrations in a number of geological environments. By far the most significant geological settings, in terms of current world production, are carbonatites or carbonatite-related environments (Wall, 2017). Weathered carbonatite (eg. Mt Weld) is also a significant source of REE. In these settings, REE are typically concentrated in the minerals monazite and bastnaesite. Metallurgical processing requires primary concentration such as flotation, followed by acid-leach cracking, solvent extraction and precipitation of REO compounds.

Alkaline granites and syenites are naturally enriched in REE and both their primary and supergene equivalents may produce viable sources of REE.

Historically, the REE, along with thorium (Th), were produced mainly from monazite, $(Ce,La,Y,Th)PO_4$, as by-products from the mineral sands industry (Chakhmouradian and Wall, 2012a).

In the early 1950s rare earths production commenced from the Mountain Pass carbonatite in California and this operation satisfied much of the world's REE requirements through the 1950s, 60s, 70s and 80s. The principal rare earth mineral at Mountain Pass was bastnaesite, $(Ce,La)CO_3F$. In 2002, Mountain Pass closed due to environmental issues associated with thorium and radon and also low REE prices. Operations resumed in 2012, but closed again in 2015; production was approximately 19,000 short tons of TREO per annum. Proven and Probable Ore Reserves were stated to be 18.4M short tons at 7.98% TREO based on a lower cut-off grade of 5.0% (Molycorp, 2012).

In the mid-1980s China started significant production of REE and since 1990 has been the dominant world producer. Total Chinese production is thought to be approximately 94,000 tonnes per annum ("tpa") TREO (Lynas, 2014).

There has been a significant growth in exploration activity for REE deposits since the firming of prices began in 2003. Numerous deposits have been subject to detailed evaluation, though since 2003 only one new Western operation, at Mt Weld in Western Australia (Lynas Corporation), has commenced production. Chinese production continues to dominate the world rare earths industry.

The Chinese Bayan Obo deposit is the main world producer of LREE, which are dominantly hosted in bastnaesite and monazite, and lesser fluoro-carbonates, within a carbonatite-related hydrothermally replaced dolomitic marble. Niobium (Nb) is a valuable by-product. Resource tonnages are reported to be 48Mt at 6% TREO and 2.2Mt at 0.13% Nb (Kynicky et al, 2012), though it is unlikely that these figures conform to a western understanding of resources or reserves.

Since the early 1970s, lateritic deposits, generally 8-10 metres ("m") thick, in southern China have been recognised as being enriched in HREE and constitute an easily recoverable resource (Kynicky, et al, 2012; Chi and Tian, 2008). Various terms have been used to describe this style of mineralisation including "ionic clays", "elution-deposited" ore and "ion-adsorbed" (Chi and Tian, 2008). These REE are derived from secondary processes and are loosely bound via adsorption processes within clay minerals. Although these ores are low grade (eg 0.05-0.2% REO) they are near-surface and have low extraction and processing costs.

Reporting of resource tonnages of this style of REE mineralisation is somewhat ambiguous, with 10Mt suggested as a guide (Kynicky et al, 2012) though Chi and Tian (2012) suggest that "prospective reserves" in Southern China amount to 50Mt with quoted grades between 0.12-0.19% REO consisting of 57-92% REO in the ionic form (Chi and Tian, 2012). This style of mineralisation has been regarded as unique (Chi and Tian, 2008) though, as the Tantalus project in Madagascar and the Serra Verde project in Brazil demonstrate, it is likely that similar deposits exist elsewhere.

5.3 Rare Earths - Uses and Application

Rare earths have unique properties that make them indispensable for many technological applications. A range of unique chemical, catalytic, electrical, magnetic, metallurgical and optical properties enable them to play a major role in the advancement of materials technology. Rare earths already play a critical role in the electronics, automotive, environmental protection, medical and petrochemical sectors. As these industries grow and as research around the world continues to develop new applications for rare earths, demand is expected to grow.

Rare earth applications are developing and changing. Older applications included polishing powders (eg Ce) or fluid cracking catalysts, and used REE mixtures (Binnemans and Jones, 2015). The requirement for pure REEs such as the use of Eu as a red phosphor evolved in the 1970s. Sm became the most critical REE in the 1980s due to its role in Sm-Co magnets. Samarium's role in the magnet market has diminished to the extent that it was in over-supply in 2015. However, recently, Nd and Pr prices have firmed due to their applications in high strength magnets. No high-volume applications currently exist for Ho, Tm, Yb and Lu (Binnemans and Jones, 2015).

The overall demand for rare earths is a combination of the demand for each of the elements. Some elements are used in a variety of applications; however, some elements have only one major application and as such a change in demand for this application can have a profound effect on overall demand for that element.

In practice, there is limited ability to use the rare earths interchangeably within applications. For example, Eu is unique in its red phosphor character and substitution by other REE is not an option. However, Nd, regarded as a critical REE, may be substituted in magnets by Pr which is regarded as a non-critical REE.

The REE market is rapidly changing and newly discovered applications may result in demand-supply disruptions for individual REE. It is difficult, therefore, to predict with any accuracy the future demand of the individual REE.

The key applications and their associated rare earths elements are shown in Table 5.2. For each application, the approximate demand and the products that are driving growth for each sector are listed.

Table 5.2

Summary of Key Rare Earth Applications, Demand, and Growth Drivers

Rare Earth Application	Rare Earth Elements	2015 REE Consumption (%)	2016 REE Production (Tonnes)	Growth Drivers
Magnets	**Nd**, **Pr**, Dy, Tb, Sm	24	29,500t	Hybrid vehicle electric motors, electronic power steering, small electric motors, air conditioners, generators, hard disk drives
NiMH batteries and metal alloys	**La**, Pr, Nd, Sm	12	15,000t	Hybrid vehicle batteries, rechargeable batteries
Catalytic converters	**Ce**, La, Nd	7	8,500t	Gasoline and hybrids, diesel fuel additive, tightening of automotive emission standards globally
Fluid Cracking Catalysis	**La**, Ce, Pr, Nd	19	23,500t	Oil production, increased use for sour oils
Phosphors	**Eu, Y, Tb**, La, Dy, Ce, Pr, Gd	12	15,000t	LCD TVs and monitors, plasma TVs and displays, energy efficient compact fluorescent lights
Polishing powders	**Ce, La, Pr**, mixed	15	18,500t	LCD TVs and monitors, plasma TVs and displays, silicon wafers and chips
Ceramics	**Ce, La**, Nd, Er, Gd, Yb	2	2,500t	Optical glass for digital cameras, fibre optics
Other applications	**Ce, La, Nd, Pr, Y** and others	10	12,000t	Metallurgy, water treatment, advanced ceramics, lighter flints, lasers, fertilizers, pharmaceuticals

*Note: **bold** denotes the main rare earth element(s) for each specific application; source for percentages Statistica:* https://www.statista.com/statistics/604190/distribution-of-rare-earth-element-consumption-worldwide-by-end-use; *production from USGS: https://minerals.usgs.gov/minerals/pubs/commodity/rare_earths/mcs-2016-raree.pdf , 2014 = 123,000 ton REO; 2015 = 124,000 ton REO)*

5.4 Rare Earth Commodities and High Purity Oxides - Prices

Recent export prices of separated high purity REE in oxide form of Chinese origin are summarised in Table 5.3. The rare earth prices used by SGS (2016) are also shown.

Table 5.3

Rare Earth Commodity Prices 2012-2017 FOB China – US$/kg

Name	Specification	Sept 2012[2]	2016[1]	SGS 2016[6]	July 2017[2]	2019 Forecast[8]
La Oxide	99% min	19.00	3.70	8.20	2.05	6.5
Ce Oxide	99% min	19.50	3.30	4.40	1.90[3]	5.0
Nd Oxide	99% min	100.50	60.00	60.00	48.5[3]	85
Pr Oxide	99% min	105.00	85.00	117.00	62.65[3]	95
Sm Oxide	99% min	54.25	3.40	4.70	1.85[3]	5.5
Dy Oxide	99% min	932.50	515.00	320.00	175.00[3]	550
Eu Oxide	99% min	2020.00	420.00	700.00	81.00[4]	635
Gd Oxide	99% min		12.16	32.00	37.40[4]	54
Tb Oxide	99% min	1800.00	970.00	590.00	470.00[7]	720
Er Oxide	99% min		53.5	60.00	25.00[3]	150
Lu Oxide	99% min		912.33	1200.00[6]	717.68[5]	610
Y Oxide	99% min		53.00	13.00	3.00[4]	30

Source: (1) Institut fur Seletene Erden und Metalle,13 May 2016, http://institut-seltene-erden.org/en/current-and-historical-market-prices-of-rare-earth-gangigsten/index.html; (2) Argus Media (with permission); (3) 99.5% min; (4) 99.99% min; (5) 99.99% China Southern, see Bainfo; (6) SGS 10 June 2016, p 118; (7) Bainfo Rare Earth Weekly, Apr 27, 2017, 99.9%; (8) Greenland Minerals and Energy Ltd, 25 May 2015, based on Adamus Intelligence figures

Prices peaked in Q3 and Q4 2011 due to supply concerns and Chinese restrictions on exports, but moderated in 2012 and have continued to decline until late 2016 when some prices have shown signs of strengthening. For example, Lynas Corporation (2017) reports the NdPr price as having bottomed in late 2016 at approximately US$32/kg, with July 2017 oxide prices within China reaching approximately US$45/kg. Lynas attributes this strengthening to actions taken by the Chinese central government with respect to:

- the enforcement and inspection of mining and production quotas
- ensuring compliance with environmental audits
- the elimination of illegal supplies by undertaking raw material audits.

In addition, Lynas (2017) reports that new and tougher environmental standards are rumoured to start by the end of 2017.

A key growth driver world-wide is the electric vehicle industry which will be an increased consumer of batteries; La, Ce and NdPr are important components of electric vehicles.

The prices listed from SGS (2016) in Table 5.3 were used by SGS to calculate a cut-off grade for reporting of resources. These are mainly based on REO prices obtained from Argus and Asian Metals, October 2014 (SGS, pers. comm., 19 July 2017). The overall nominal value using the proportions of REO found in the TREM SGS Measured and Indicated resource for the SGS 2014 prices is approximately US$36/kg. Using recent values listed for July 2017, the nominal value decreases to approximately US$21/kg. These values are termed "nominal" because they do not take into account metallurgical recoveries or saleability issues with respect to the low-usage REE such as Ho, Er, Tm and Yb.

Projected prices for 2019 are also included in Table 5.3. These must be considered to be subject to some uncertainty, as previous predictions have commonly proved incorrect. It is likely (Greenland, 2015) that a number of REO will be produced in excess of global demand, especially the low-use REE such as Er, Tm, Yb and Lu.

5.5 Tantalus Rare Earths Products

Using the results of preliminary metallurgical test-work, SGS (2016) produced a summary of the breakdown of REO in the resource (Table 5.4) and in potential concentrates (Table 5.5).

Table 5.4

Tonnage of the Individual Oxides Contained in the Tantalus Project Mineral Resource

Category	Y_2O_3 t	La_2O_3 t	Ce_2O_3 t	Pr_2O_3 t	Nd_2O_3 t	Sm_2O_3 t	Eu_2O_3 t	Gd_2O_3 t	Tb_2O_3 t	Dy_2O_3 t	Ho_2O_3 t	Er_2O_3 t	Tm_2O_3 t	Yb_2O_3 t	Lu_2O_3 t	TREO t
Measured	4520	9667	12620	1876	6347	1084	115	923	133	766	144	415	58	369	55	39092
Indicated	15953	30677	51031	6110	20659	3661	423	2837	440	2630	522	1507	222	1409	210	138292
Meas/Ind	*20472*	*40344*	*63651*	*7986*	*27006*	*4745*	*538*	*3760*	*573*	*3397*	*666*	*1922*	*280*	*1779*	*265*	*177383*
Inferred	38745	95894	137928	17960	59110	9468	1038	7578	1097	6384	1235	3645	521	3431	517	384552

Note: SGS October 2014/16 estimate; cut-off grade 300-500ppm TREOnoCe; t = tonnes; TREO = total rare earth oxides, arithmetic total abundance of all lanthanide rare earth oxides plus yttrium oxide

Table 5.5

Tonnage of the Individual Oxides Contained in the Potential Tantalus Concentrates

Category	Y_2O_3 t	La_2O_3 t	Ce_2O_3 t	Pr_2O_3 t	Nd_2O_3 t	Sm_2O_3 t	Eu_2O_3 t	Gd_2O_3 t	Tb_2O_3 t	Dy_2O_3 t	Ho_2O_3 t	Er_2O_3 t	Tm_2O_3 t	Yb_2O_3 t	Lu_2O_3 t	TREO t
Measured	2677	7683	1426	1491	5018	811	83	672	91	484	84	219	26	163	21	20948
Indicated	9450	24382	5767	4855	16333	2737	305	2066	302	1660	304	793	101	621	82	69757
Meas/Ind	*12128*	*32065*	*7193*	*6346*	*21351*	*3548*	*387*	*2738*	*394*	*2144*	*388*	*1012*	*127*	*783*	*103*	*90705*
Inferred	22953	76217	15586	14271	46732	7079	747	5518	754	4030	719	1919	236	1511	201	198473

Note: SGS October 2014/16 estimate; cut-off grade 300-500ppm TREOnoCe; t = tonnes; TREO = total rare earth oxides, arithmetic total abundance of all lanthanide rare earth oxides plus yttrium oxide

The main variance between the REO distribution in the resource, and in the potential concentrate (based on testwork to date) is the reduced proportion of Ce in the concentrate, due to a relatively low extraction by the ‘leaching’ solutions.

SGS also calculated the likely contribution to revenue from the various components of the potential concentrate. The major contributors to revenue are predicted to be Nd, Pr, Dy, Eu, La, Tb and Y (Figure 6).

6.0 TANTALUS PROJECT

6.1 Background and History

The Tantalus rare earths project is located in the eastern part of the Ampasindava Peninsula, in the province of Antsiranana in northwestern Madagascar, approximately 500km north of the capital, Antananarivo (Figure 1). The nearest major town and administrative centre is Ambanja, some 40km to the northeast of the project area. Access to the area is by road from Ambanja or by boat from the nearby island of Nosy Be which is serviced by an international airport

The original project area covered 300km^2 and was held under exploration licence PR 6698 which grants exclusive rights for prospecting and research. The permit was originally granted in 2008 for five years and was renewed for three years in January 2014. One further renewal period of three years is allowed and application for the second 3-year renewal was made on 7 December 2016, together with a renunciation of the southern portion of the PR, retaining approximately 238km^2 (608 squares) of the prospective northern portion (Figures 1 and 2). The application renewal is awaiting the signature of the Minister of Mines and the Prime Minister.

The PR is held by Tantalum Rare Earth Malagasy SARL (TREM). TREM is a 100% owned subsidiary of Tantalum Holding (Mauritius) Ltd which in turn is 40% owned by Tantalus Rare Earths AG (TRE AG) and 60% owned by REO Magnetic Pte Ltd (REOM), a Singapore incorporated company. ISR is proposing to acquire 60% of THM from REOM.

The PR was originally held by Calibra Resources and Engineers Madagascar SARL in 2003 and was acquired by Zebu Metals Ltd in January 2008. TREM assumed 100% ownership of the project in October 2009.

The presence of alkaline intrusive rocks near the village of Ampasibitika in the Ampasindava Peninsula was first noted by French geologists in the late 19th century, and subsequent mineralogical examination identified niobium-tantalum-zirconium mineralisation within intrusive dyke material which was named "fasibitikite" (Lacroix, 1922).

The peninsula was mapped by the Government Geological Survey and a map published in 1958. Between 1988 and 1991 Russian geologists working under the Soviet Geological Mission to Madagascar undertook stream sediment and outcrop sampling, radiometric surveying and pitting. Radiometric anomalies were identified and pitting took place to follow up on observed uranium mineralisation, which was the main focus of interest at the time.

In 2008, Zebu commissioned Fugro Consult GmbH to undertake stream and beach sediment sampling, looking principally for heavy mineral sands. Widespread peralkaline granitic intrusives were mapped, five trenches were dug (Ampasibitika, Befitina and Caldera prospects) and samples were taken for bulk analyses. The results showed anomalous niobium, tantalum, tin, zirconium and uranium mineralisation, but also anomalous rare earth values.

Fugro Airborne Surveys of South Africa ("Fugro") was commissioned to undertake a helicopter magnetic and radiometric survey, covering an area of 244km^2 with a line spacing of 100m. A geological interpretation of the survey undertaken by Earthmaps Consulting in 2009 revealed two major circular intrusive bodies, the Ampasibitika intrusion in the southeast and the Tsarabariabe intrusion to the northwest (Figure 2). The circular bodies with outer rims and central depressions were interpreted as calderas.

Peralkaline granitic ring dykes and sills around the rims of the caldera were noted as hosting 'fasibitikite' mineralisation, and an extensive drilling programme was planned in 2010 and 2011 to investigate the extent of the mineralisation. However, the drilling and sampling showed that while some mineralised veins occurred within the 'hard rock' these intersections were relatively sporadic and low grade, while the upper weathered regolith horizons, the pedolith (lateritic soils) and saprolite (weathered bedrock) contained more consistent concentrations of rare earth minerals (Figure 3), with possible similarities to the ion adsorption clay-type REE mineralisation in southern China, which is a major source of current world REE supply.

From 2011-2014 major pitting programmes were carried out to investigate the regolith mineralisation. Vertical pits of approximately 1m x 1m were dug to depths of up to 10m with an average of around 6m with spacing ranging from 250m to 50m. Six principal prospect areas were defined, Ampasibitika, Ampasibitika South, Caldera, Befitina, Ambaliha and Northwest Territories (Figure 4). This pitting data provides the basis for the current resource estimates and project testwork and assessment. In 2014 (and updated in 2016) SGS Canada Inc. undertook an independent resource estimate of the regolith mineralisation and estimated a Measured, Indicated and Inferred resource of 628Mt averaging 900ppm TREO with 560,000t of contained TREOs (Figure 5).

7.0 GEOLOGY AND MINERALISATION

7.1 Geology

The Tantalus rare earths project area is located on the Ampasindava peninsula (Fig 1) where the Tertiary alkaline Ambohimirahavavy igneous complex has intruded older Jurassic mudstones and siltstones (Fig 2). This complex is approximately 20km in length and 8km in width and is characterised by two arcuate intrusions comprising mainly alkaline rocks such as syenite, alkali granite, trachyte, phonolite, rhyolite and volcanic breccia. The southeastern Ampasibitika intrusion has been the principal focus of TREM's exploration activity to date. The northwestern Tsarabariabe intrusion has been subject to more limited exploration, but wide-spaced pitting within this Northwest Territory area suggests a similar rare earth potential.

Airborne magnetic and radiometric geophysical surveys (Figure 2), show the circular nature of the intrusions, with the characteristics of a caldera. The caldera diameter is approximately 7km, with a well-defined outer rim magnetic syenite surrounding a less magnetic caldera core. The outer annulus includes dykes and sills of peralkaline sodic varieties of syenite locally termed "fasibitikite". The dykes and sills have been delineated over an approximate strike length of 8km and over a width of 300m.

The source of the secondary rare earth mineralisation in the project area is interpreted as originating from these alkaline dykes and sills and other alkaline intrusives. REE-bearing accessory minerals including chevkinite, eudyalite, monazite, pyrochlore and zircon have been identified.

A schematic cross section across the Ampasindava igneous complex is shown in Figure 3. A number of distinct intrusives have been mapped and interpreted from the geophysical data. Associated with and bounding the igneous complex are a variety of mainly alkali dykes and sills. These were the subject of core drilling which was focussed on discovering economic levels of rare earth elements (Figure 4). Although elevated levels of REE, Nb, Ta and Zr were identified in the core, they do not occur across sufficiently continuous intervals to constitute significant primary targets. However, the elevated concentrations of REE within the bedrock have contributed to important secondary concentrations of REE mineralisation within the weathered regolith.

Within the project area, bedrock is mostly obscured by soils and weathered material. The extensive development of regolith has been enhanced by a number of factors, including ambient temperature, rainfall, slow rates of erosion and a relatively stable tectonic history.

The regolith in the project area has a well-developed profile that includes subdivisions recognised in tropical and sub-tropical areas of Africa, Asia, Australia and South America, comprising an upper pedolith (lateritic soil and clay) horizon, and a lower saprolite and saprock (weathered bedrock) horizon (Figure 3). The subdivisions are gradational, though the surface soil which is characterised by leaf litter and humic material is generally readily identifiable. The ferruginous zone is formed by concentration of iron and aluminium oxides and in parts of the world that have been subject to periodic drying, this zone hardens to ferricrete and duricrust. The mottled zone is characterised by spots, streaks and blotches of iron oxides within a paler matrix and is interpreted to have originated from the water table rising and falling. The saprolith represents the zone where primary rock textures and fabrics can be recognised.

Based on the available drilling data within the project area, the thickness of the regolith averages around 14m, although maximum thicknesses of up to 41m have been recorded. The pits did not exceed 10m, and the average thickness of the rare earth mineralised zone (based largely on pitting) is approximately 6.0m; however, this could be a conservative estimate as the pits commonly did not sample the full depth of the regolith.

7.2 Mineralisation

The Ambohimirahavavy alkaline igneous complex is associated with a variety of rock types that are enriched in REE, Nb, Ta and Zr. These types of rocks have been recognised worldwide as having the potential to form economic primary deposits of REE, though in the project area, it is the regolith that has been identified as containing the most attractive style of REE mineralisation.

The association of REE mineralisation with uranium and thorium results in an elevated radiometric response. In 2008, Fugro Airborne Surveys of South Africa, a well-regarded geophysical specialist company, completed a helicopter-borne magnetic and radiometric survey over the project tenement (Figure 2). Although the overall uranium and thorium contents of the bedrock, based on geochemical sampling, is low, and averages 12ppm U_3O_8 and 57ppm Th, the correlation with the rare earths means that the extent of the mineralisation has been well mapped, with areas of high potential being readily identifiable.

Initial work, including an extensive drilling programme (Figure 4) focussed on hard rock mineralisation within the sediments, syenites and alkali granites. REE-bearing accessory minerals including chevkinite, eudyalite, monazite, pyrochlore, bastnaesite, columbite, and zircon were identified. However, during 2009, it was recognised that the elevated levels of REE in the regolith overlying the Ambohimirahavavy igneous complex represented the principal zone of potential economic interest. The source of the secondary REE mineralisation in the regolith is interpreted as being derived from the alkaline dykes and sills and other alkaline intrusives in the complex.

Testwork on samples from the project area confirmed that the rare earths within the regolith are adsorbed onto clay minerals and amenable to leaching and recovery. The regolith material in the project area has many similarities to the ionic clay deposits in southern China, which are successfully exploited by low cost leaching methods, employing solutions such as ammonium sulphate and sodium chloride to extract the rare earths. The Chinese deposits were first identified in the late 1960's and now constitute an important source for the world's supply of heavy rare earths. This type of mineralisation is termed "ionic adsorption" or "IAD", and is characteristically low grade with grades between 0.05% and 0.35% TREO. Grades of 0.05% TREO and above have reportedly been exploited in China, though low cut-off grades used in China cannot necessarily be used for guidance in non-Chinese deposits, due to stricter environmental controls and other cost factors.

7.3 Exploration Potential

A significant part of the project area, particularly in the northwest, (Northwest Territories) has only been sampled by pits at 500m spacings. Figure 4 illustrates the location of the principle prospects explored by pitting, and Figure 5 shows the grade distribution of the REE mineralisation based on this pitting. Although the pitting spacing in the Northwest Territories area is broad scale, there appear to be substantial areas of significant grade, warranting detailed follow-up work.

In BDA's opinion, there is good potential for identifying additional regolith REE mineralisation, and for upgrading the current resource categories with closer-spaced sampling. There is also potential to increase the thickness of the mineralised zone, which in some areas is restricted by the depth of penetration of the pits. The potential for hard-rock primary REE mineralisation is considered limited.

Conclusions

The geology and mineralisation of the area appears to be reasonably well defined and understood. The rare earth mineralisation is associated with the Ambohimirahavavy alkaline igneous complex which is enriched in REE. While initial exploration was focussed on the hard rock mineralisation, it is now considered that the principal potential of the area relates to REE ionic clay mineralisation associated with the weathered regolith. Extensive pitting has allowed the definition of pedolith and saprolith horizons; rare earth mineralisation is associated with both the upper lateritic clay and the lower saprolite. The average thickness of the mineralised zone, as currently defined, is approximately 6.0m, but the regolith thickness intersected is partially restricted by the maximum depth of pitting (10m). There is potential in some areas to extend the depth of mineralisation; there is also potential, particularly in the Northwest Territories, to extend and better define the mineralisation with closer spaced pitting.

8.0 GEOLOGICAL DATA

8.1 Geological Supervision

Geological investigations have included mapping, airborne geophysical surveys (magnetics and radiometrics), drilling and pitting. The geological work has been largely supervised by experienced local geologists, supplemented with reviews and recommendations by international consultants SRK and SGS.

8.2 Survey

A number of sources are available for topography and elevation data including hand-held GPS readings, Government maps, SRTM (satellite) data and elevations from the Fugro geophysical surveys. A review of these data sources by SGS resulted in the overall topographic data being synthesized from Government maps with a 10m contour interval and from the Fugro airborne survey. TREM also recorded handheld GPS drill hole collar and pit collar surveys, but SGS noted some discrepancies between the GPS and other elevation data. The pit and drill hole collar data were corrected to the topographic surface for the purpose of geological and resource modelling. SGS noted that a higher precision survey would be required for any economic study.

8.3 Drilling, Pitting and Sampling

The principal data on which the resource estimates are based comprises drill core and pit samples and assays, with pitting providing the bulk of the data.

In 2010/11, 277 vertical diamond drill holes were completed at the Ampasibitika prospect and a further 20 holes were drilled at the Caldera prospect, directed at testing bedrock for REE mineralisation (Figure 4). The holes were drilled on lines 100-200m apart, and at 50m intervals along lines. Most holes were inclined at an angle of 70°, but angles ranged from 45° to vertical. Hole depths ranged from 42-130m. Core diameter was generally NW (55mm). Core recovery was generally good (>90%). Drill cores were logged and photographed prior to mark-up for sampling. The core drilling confirmed the presence of variably mineralised rocks, though the continuity and grades were considered insufficient for a viable primary REE resource.

From 2011, the regolith mineralisation has been the main focus of exploration. Apart from a limited number of soil, trench and wacker samples, TREM's primary exploration method has been pitting. During 2011, 2013 and 2014, 4,474 pits, averaging 1 x 1m wide, were manually excavated to a maximum depth of 10m within six prospects (Ambaliha, Ampasibitika, Ampasibitika South, Caldera, Befitina, and Northwest Territories) at spacings ranging from 50m to 250m (Figure 4).

Pits were sampled on a one metre basis, by cutting a vertical channel on one face of the pit. The pits were logged, and also sampled for density determinations.

8.4 Sample Preparation

The bulk of the samples collected from the project area have been prepared at TREM's sample preparation facility in Ambanja. Regolith samples are weighed and dried at 135°C for 4-8 hours and re-weighed. If the samples contain rock fragments they are crushed to -2 mm in a jaw crusher. Samples with no fragments are manually pulverised using a mortar and pestle. A 250g sample is split off for dispatch to the assay laboratory. The residual samples are stored at the Ambanja core and sample storage facility.

8.5 Assaying

Induced Coupled Plasma Mass Spectrometry (ICP-MS) analysis, based on alkali fusion, was undertaken at the two laboratories used, ALS Chemex and SGS South Africa. Both laboratories are ISO accredited. SGS, from its review and audit, concludes that the analytical methods used are according to industry standards and the data received is appropriate for use in resource estimation studies. Alkali fusion ensures that refractory minerals are dissolved ensuring effectively "total" assays.

8.6 QA/QC

Quality assurance/quality control (QA/QC) procedures, instituted by TREM, consist of the insertion of one blank, one standard and one duplicate sample within each batch of 35 samples, representing a QA/QC sample rate of approximately 9%.

Unfortunately, none of the standards were produced by an independent industry specialist, and none of them have independently certified grades. Both SRK and SGS emphasise that the standards have not been certified by an independent laboratory. Results show some trends and biases over time, but it is difficult to conclude whether this indicates poor precision in the laboratories, or is indicative of variability in the standard sample.

The standards were produced by TREM. The first standard was made up from 40kg of primary bedrock mineralisation. A second and third 80kg standard was derived from regolith mineralisation. Field Standard 1 had a mean value of 3,326ppm TREO and was used up until September 2011. Field Standard 2 averaged 738ppm TREO and was used from September 2011. Field standard 3 averaged 740ppm TREO.

In the absence of check assays and reference to a certified value obtained by consensus from independent laboratories it is difficult to make definitive statements regarding the accuracy of the results. It is apparent from the discussion by SGS of the assaying of the standard that there is a low apparent bias for a period of time (SGS, 2016). This issue appears in the graphs for Dy, Nd and Pr which suggests that for a significant period of time concentrations of several REE may have been understated.

The blank samples are described as consisting of mudstone collected from a local quarry. Unfortunately, this rock-type is naturally enriched in REE, with results generally between 180-240 ppm; on this basis the ‘blank’ results cannot be used to provide any precise information concerning possible sample cross-contamination. However, SGS (2016) concludes that the results are consistent and show no bias with time.

SRK (2013) reviewed the results from the duplicate sampling and concluded that they show a good level of precision; SGS examined 569 duplicate results and similarly concluded that they showed a good level of precision.

While there are some shortcomings in the QA/QC programme, notably that the standards used were not certified, some of the blanks were in fact mineralised, and there have been no check assays, SGS overall concluded that the sample and assay database was appropriate for use in resource estimation. It should be noted that in addition to the external QA/QC samples inserted by TREM, that the commercial laboratories used by TREM are independent and reputable and maintain their own internal checks and standards.

8.7 Density

Density measurements were taken from each pit excavated, by hammering a tube of known diameter into the side wall. The sample is extracted, placed in a sealed sample bag and weighed. At the sample preparation laboratory, the sample is reweighed, then dried in an oven and weighed again to provide an in-situ and dry density. In total 4,569 dry density measurements have been taken. SGS adopted values of 1.10-1.15 tonnes per cubic metre (t/m^3) for the resource estimation work.

Conclusions

The geology, drilling, pitting and sampling appear to have been diligently and competently undertaken. Sample preparation procedures appear appropriate, and TREM has used recognised independent and certified laboratories for assaying. SRK and SGS have identified some issues with TREM’s internal QA/QC procedures, but overall SGS has concluded that the data is suitable for resource estimation.

9.0 RESOURCES AND RESERVES

9.1 Standards and Definitions

The Tantalus resources have been reported by SGS (2016) in accordance with the Canadian National Instrument 43-101 ("NI 43-101"). This, in most material respects, is closely aligned with the JORC Code.

A Mineral Resource is defined in NI 43-101 as a concentration or occurrence of diamonds, natural solid inorganic material, or natural solid fossilized organic material including base and precious metals, coal, and industrial minerals in or on the Earth's crust in such form and quantity and of such a grade or quality that it has reasonable prospects for economic extraction. The location, quantity, grade, geological characteristics and continuity of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge.

A Mineral Resource covers mineralisation and natural material of intrinsic economic interest which has been identified and estimated through exploration and sampling and within which Mineral Reserves may subsequently be defined by the consideration and application of technical, economic, legal, environmental, socio-economic and governmental factors. The phrase "reasonable prospects for economic extraction" implies a judgement by the Qualified Person in respect of the technical and economic factors likely to influence the prospect of economic extraction. A Mineral Resource is an inventory of mineralisation that under realistically assumed and justifiable technical and economic conditions might become economically extractable. These assumptions must be presented explicitly in both public and technical reports.

A Mineral Reserve as defined by NI 43-101 is the economically mineable part of a Measured or Indicated Mineral Resource, demonstrated by at least a Preliminary Feasibility Study. This Study must include adequate information on mining, processing, metallurgical, economic and other relevant factors that demonstrate, at the time of reporting, that economic extraction can be justified. A Mineral Reserve includes diluting materials and allowances for losses that may occur when the material is mined.

In terms of the Tantalus project, a Mineral Resource has been defined but insufficient work has been undertaken at this stage to define a reserve.

9.2 Previous Resource Estimation Work

In 2013, SRK reported resource estimation studies and Inferred Resources as per Table 9.1. This work was based on a much lower density of sampling than that available for the 2014 and 2016 work of SGS. The SRK results do not readily compare with the SGS results because SRK reported tonnages and grades above a zero cut-off grade, whereas SGS used two cut-offs of 300ppm and 500ppm TREO.

Table 9.1

SRK (2013) Resource Summary

Category	Tonnage (Mt)	Average Thickness (m)	Grade TREO (ppm)	Contained TREO (t)
Inferred	130	8.0	800	104,000
Total	130	8.0	800	104,000

Note: SRK 21 January 2013 estimate; zero cut-off grade; Mt = million tonnes, m = metres; ppm = parts per million, t = tonnes

SRK noted that the potential resource could be approximately four times the size of the estimated Inferred tonnage. This prediction is generally consistent with the subsequent resource estimates of SGS.

As with other ionic clay rare earth deposits, the Tantalus deposit is relatively low grade, and both the SRK and SGS estimates demonstrate a significant decrease in tonnage as cut-off grades are raised. SRK provides limited grade-tonnage information, but that provided shows, that at approximately a 0.1% (1,000ppm) TREO cut-off, the resource tonnage decreases by up to 75% of the original tonnage. For example, in the case of the Caldera and Ampasibitika deposits, the resource tonnage at a 0.01% (100ppm) TREO cut-off is approximately 80Mt, whereas at a 0.1% TREO cut-off the tonnage reduces to approximately 19Mt. Although the SRK data is of a preliminary nature, it demonstrates that a relatively low-cost extraction method should be considered to maximise the economic recovery of the resource.

9.3 Current Resource Estimates

SGS undertook a resource estimate of the Tantalus project in 2014 and issued a resource report in October 2014. This report was updated in June 2016, though SGS advises that the resource estimation remains based on the 2014 work. The principal stages in the SGS resource estimation work were as follows:

- receipt of data and site visits
- validation of the drill hole and pitting database
- selection of the mineralised intervals for each sampling point and subdivision into pedolith and saprolith
- topographic modelling and checking
- creation of 2D and 3D volume models
- variogram modelling of 19 variables
- definition of barren areas
- density modelling
- estimation of grades (19 variables) for two layers
- classification of the resource in terms of Measured, Indicated or Inferred confidence
- reporting of resources at variable cut-off grades.

Data from a total of 4,412 pits and 359 drill holes was used for the resource estimate; trench data was considered less comprehensive and less reliable and was excluded. Only samples designated pedolith or saprolith were included. This gave a total of 30,059 assay intervals used for the resource estimates. The bulk of the samples represent a one metre interval (79%), but some samples (base of pit or contact zones) were less than one metre. Overall the samples represented 28,944m of sampled pedolith and saprolith.

Volume to tonnage conversions are based on 4,309 dry density determinations of samples obtained from pits. Approximately 250 determinations were rejected as a result of SGS validation procedures. The density samples were dried at 130°C for 8 hours to obtain a dry density sample. An overall density of 1.10t/m^3 was used across all deposits and pedolith and saprolith layers except for Ampasibitika South where an average value of 1.15t/m^3 was used. In BDA's opinion, the values used are reasonable.

A topographic model was prepared, based on digitised 10m contours from Government maps and the Fugro geophysical information. The GPS pit and drill hole collar elevations were replaced with the modelled elevations.

SGS examined cumulative frequency distribution plots of the assay data to determine whether there was any requirement for top cutting. The assay data is generally log-normally distributed, but there are no excessive outliers which might have an undue influence on the resource estimates. SGS studied the effect of "capping" or "cutting" the high grades, but noted that it had no significant effect. SGS considered the data to be of appropriate quality to be used for resource estimation, with no top cutting applied; BDA concurs with these decisions.

Surfaces defining the base of pedolith and saprolith were modelled and used, together with the topographic surface model, to characterise initially a 2D model, with thickness of the unit as the parameter for volume modelling. The 2D model was then converted to a 3D block model, with block dimensions 30 x 30 x 1m (vertical thickness).

Variograms were defined for the two regolith layers, and Ordinary Kriging (OK) was used to estimate 19 variables comprising the 15 rare earth oxides as well as oxides of Nb, Ta, Th, U.

A number of summary grades were derived from these individual variables:

- TREO - which is the sum of all of the rare earth oxides (including Y)
- TREOnoCe - TREO excluding the Ce value (using Ce_2O_3 rather than the conventional CeO_2); the Ce grade of the resources is relatively high, and Ce represents 36% of TREO weight distribution; however, recovery of Ce in the leaching process is low, with only an estimated 8% Ce in the potential concentrate, which SGS has estimated would represent only 1% of total sales revenue (Figure 6); on this basis SGS applied the cut off values for resource reporting to TREOnoCe
- LREO - "light REO", defined as the oxides of La, Ce, Pr, Nd and Sm; these represent 83% of TREO weight distribution in the resource, 80% in the potential concentrate and 60% of projected total sales revenue (Figure 6)

- HREO - "heavy REO", defined as Eu to Lu plus Y; these represent 17% of TREO weight distribution in the resource, 20% in the potential concentrate and 40% of projected total sales revenue (Figure 6)
- CREO – "critical REO", defined as the rare earth oxides which are forecast to be in short or critical supply; these comprise the oxides of Nd, Y, Eu, Tb and Dy; BDA notes that the CREO represent about 28% of the Tantalus resource weight distribution, and, based on the calculations by SGS, 39% of the estimated Tantalus concentrate distribution and 66% of the potential revenue in the concentrate.

Estimation was completed in three passes for the composited assay values for each of the two regolith layers. The search parameters are summarised in Table 9.2.

Table 9.2

Kriging Estimation Parameters

Pass	Radius (X-Y) - metres	Minimum Number of Data Points	Maximum Number of Data Points
1	90	6	9
2	350	6	9
3	900	3	9

The search direction in the Z-direction was large due to the steep topography in some parts, to ensure all relevant data was considered.

The confidence classification was based largely on data spacing, with a Measured category corresponding to blocks estimated on the basis of a 50 x 50m spacing, Indicated based on at least a 200 x 200m spacing and Inferred based on at least a 500 x 500m spacing. SGS cautions in its report that it cannot be assumed that all or any part of an Inferred Mineral Resource will be upgraded to an Indicated or Measured Mineral Resource as a result of continued exploration. BDA notes that this interpretation of Inferred resources has been updated by the Canadian Institute of Mining, Metallurgy and Petroleum ("CIM") to more closely match the JORC Code definition that there is a reasonable expectation that the majority of an Inferred Resource could be upgraded to an Indicated resource with continued exploration. However, it is relevant to note that SGS applied the older standard in its review and classification.

BDA considers the classification to be generally appropriate, but suggests that, based on some of the site QA/QC issues, it might be more prudent to classify the Measured and Indicated resources all as Indicated.

SGS differentiated between flatter areas, and those with a higher gradient, based on the modelled topography. It was considered that areas with a slope of >5° may be exploited using in-situ leaching, while the flatter areas were considered more suited to open-pit mining, with processing either by heap leaching or vat/tank leaching. The costs of these two approaches were estimated and used to derive cut-off grades for reporting of resources. As a result of these considerations, a 300ppm TREOnoCe cut-off was used to report resources from the steeper areas with a 500ppm TREOnoCe cut off applied to the flatter areas (Table 9.3).

Table 9.3

Tantalus Mineral Resource Summary

Category	Tonnage Mt	Thickness m	TREO ppm	TREOnoCe ppm	CREO ppm	HREO ppm	TREO Cont. Tonnes
Measured	40.1	5.4	975	660	296	187	39,100
Indicated	157.6	6.8	878	554	255	166	138,300
Meas/Ind	*197.7*	*6.5*	*897*	*575*	*263*	*170*	*177,400*
Inferred	430.0	5.6	894	574	247	149	384,600
Total	*627.7*	*5.9*	*895*	*574*	*252*	*156*	*562,000*

Note: SGS 10 June 2016 estimate; cut-off grade 300-500ppm TREOnoCe; Mt = million tonnes, m = metres; ppm = parts per million
TREO = total rare earth oxides, arithmetic total abundance of all lanthanide rare earth oxides plus yttrium oxide
TREOnoCe = Total Rare Earth Oxides excluding Cerium Oxide = TREO – Ce_2O_3
CREO = Critical Rare Earth Oxides = Nd_2O_3 + Y_2O_3 + Eu_2O_3 + Tb_2O_3 + Dy_2O_3
HREO = Heavy Rare Earth Oxides = Y_2O_3 + Eu_2O_3 + Gd_2O_3 + Tb_2O_3 + Dy_2O_3 +Ho_2O_3 +Er_2O_3 + Tm_2O_3 + Yb_2O_3 + Lu_2O_3

Based on the Proposed Acquisition, ISR will have a 60% interest in the project and in the project Mineral Resources, as shown in Table 9.4.

Table 9.4

ISR Potential Interest in the Tantalus Mineral Resource – Post Proposed Acquisition

Category	Total Project			ISR Potential Interest Post Proposed Acquisition		
	Tonnage Mt	TREO ppm	TREO Cont. Tonnes	Tonnage Mt	TREO ppm	TREO Cont. Tonnes
Measured	40.1	975	39,100	24.1	975	23,500
Indicated	157.6	878	138,300	94.6	878	83,000
Inferred	430.0	894	384,600	258.0	894	230,800
Total	*627.7*	*895*	*562,000*	*376.7*	*895*	*337,300*

Note: ISR interest based on Proposed Acquisition of 60% interest

BDA notes that the cut off grades applied are relatively low compared with those applied to most Western deposits. However, it is also accepted that heap leaching and in-situ leaching of near-surface lateritic clay and saprolite deposits should be a relatively low-cost method, supporting the use of relatively low cut-off grades. In-situ leaching is also relatively un-selective, once an area has been selected for extraction, so individual block cut offs are less relevant than the average grade of the selected area. Nevertheless, it is noted that a significantly higher cut off of 0.10% TREO (1,000ppm) is reported as applied to the Serra Verde deposit in Brazil, which is also categorised as an ionic clay deposit.

Lower prices would result in the requirement to target higher grades to recover the costs of extraction. BDA suggests that it would be prudent to consider the possibility that once further testwork and feasibility study work is carried out, that a higher economic cut-off grade may be indicated, with some impact on the overall contained tonnage of recoverable TREO.

Results for higher cut-off grades have been provided by SGS and are shown in Table 9.5 for the combined pedolith and saprolith Measured and Indicated resource.

Table 9.5

Tantalus Measured and Indicated Resource Summary – Variable TREO Cut Off Grade

Cut-off TREO ppm	Tonnage Mt	Thickness m	TREO ppm	TREOnoCe ppm	CREO ppm	HREO ppm	TREO Cont. Tonnes
300	213	6.48	882	562	258	167	187,383
500	118	6.84	1028	688	309	195	121,234
700	45	6.77	1205	843	372	226	54,379
900	10	6.12	1427	1051	462	279	14,815
1100	2.6	5.18	1680	1293	568	341	4,349

Note: SGS 2016 estimate - reported by SGS July 2017; cut off TREOnoCe; Mt = million tonnes, m = metres; ppm = parts per million

9.4 Reserves

A reserve comprises that portion of the Measured and Indicated resource which is planned to be mined and on which appropriate mine planning and design work has been undertaken. At this stage, insufficient mine planning and design work has been undertaken on the Tantalus project to define a reserve.

Conclusions

The resource estimation procedures appear appropriate and the work has been competently undertaken by recognised specialists. SGS has reviewed the pitting, drilling, sampling, and assaying programmes and has concluded that the data is suitable for resource estimation.

BDA considers that the resource figures provide a reasonable guide to the tonnage and grade of the in-situ Tantalus resource. The Measured, Indicated and Inferred categorisations are considered generally appropriate, though BDA notes it could be argued that due to some QA/QC issues, the Measured category might be better classified as Indicated.

SGS used a variable cut-off grade to reflect potential extraction costs in in-situ leach and heap leach operations. Further work will be required in this area as part of future pre-feasibility and feasibility studies. BDA notes the deposit is relatively low grade in comparison with primary deposits of rare earths worldwide, but the grade is typical of ionic clay deposits currently being mined in China, and of other western deposits with similar styles of mineralisation. The resource tonnage is sensitive to increases in cut-off grade; it will be important therefore to adopt a low-cost extraction process to maximise the potential of the resource.

10.0 MINING

No mine plans have yet been developed, but conceptually TREM has proposed that in-situ leaching will be carried out in areas with at least a 5° topographic slope and that vat leaching or heap leaching will be employed for flatter areas.

No mining as such will be carried out in the in-situ leach areas. Extraction of REO would be by drilling injection wells and excavating collection trenches and drilling proposed horizontal collection holes.

In the flatter areas, it is proposed that shallow open pit mining will be carried out, using conventional hydraulic excavators and small rear-dump 40t all-wheel-drive (AWD) trucks.

It is likely the mineralised zones will be mined in 2.5-3m flitches, with close-spaced grade control drilling well ahead of mining, probably by reverse circulation ("RC") drilling on a 10 x 10m grid, to define the depth and parameters of the mineralised zone and to allow detailed planning and scheduling, though these details will be refined during operations. It is likely that the mineralised areas will be mined in a panel or strip pattern.

The upper topsoil zone will be stripped from the underlying pedolith and separately stockpiled for rehabilitation purposes. The mineralised regolith will be mined and trucked to the heap leach pads for crushing, agglomeration and stacking.

From the resource estimates, the pedolith and saprolite mineralised zones average approximately 6.0m in depth, however, these estimated thicknesses are currently restricted by the depth of the pitting (maximum 10m) and any hard rock or water encountered. From the drilling data, the saprolite can extend to depths of up to 40m, but typically the regolith averages around 14m; the economic depth of extraction will be defined by the grade control drilling.

No pit wall stability problems are anticipated, given the extensive widths and shallow nature of the mineralised zones. Limited testing of the water table has been undertaken, and the bulk of the exploration pits were dug above the water table. Some pit dewatering may be required, particularly during the wet season, and additional hydrological testing is required prior to finalising the mine plans.

No mining dilution or mining recovery estimates have been made, but in BDA's opinion, given the flat lying nature of the deposit from the information to date, recovery of at least 95% of the resource block with dilution of less than 5% should be achievable.

The planned operation is relatively modest in size, with a maximum of 500,000tpa mined and leached producing approximately 10,000t of mixed REO product. The proportion of area to be heap leached/vat leached and in-situ leached will vary, year-on-year, and will depend on the topography of the production area and the relative efficiencies of the two operations. Given the likely lower operating costs of the in-situ leach process, if satisfactory recoveries are achieved, it is likely that in-situ leaching will be maximised wherever possible.

It is likely that mining, at least in the early stages, will be by contract, allowing a high degree of flexibility to increase or decrease conventional mining operations.

Conclusions

The extent of any conventional mining operation will be dependent on the success of the in-situ leach operation. Provided satisfactory in-situ leach recoveries are achieved, it is likely that in-situ leaching will be maximised, given the benefit of lower operating costs. At this stage, open pit mining (and heap leaching) is only planned for flat lying areas with a slope of less than 5°.

Open pit mining operations will be relatively modest in scale, and utilise conventional mining equipment. The pits are shallow, mostly above the water table, and no significant technical issues are envisaged. Overall the mining operation is considered low risk.

11.0 PROCESSING

11.1 Overview

No detailed processing plans have yet been developed, other than the general concept of carrying out in-situ leaching in the sloping (>5°) areas, with conventional shallow open pit mining and heap leaching or vat leaching in the flatter areas. BDA notes that REE extraction from clay is an ion exchange process rather than a leaching process, but the term 'leaching' is used in many of the metallurgical reports and, for the purpose of this review, BDA has accepted either terminology.

No pilot testing has been undertaken to date, though a 1,000t bulk sample has been mined from a series of close-spaced pits near Betaimboay village, and stockpiled in preparation for a trial heap leach; an area has also been selected for a proposed in-situ leach trial.

Laboratory-scale metallurgical testwork has been conducted in a number of specialist laboratories. The work undertaken to date is described in Section 11.2 and 11.3.

11.2 Mineralogical Testwork

Soviet Geological Mission

The Soviet Geological Mission (1988-91) carried out mineralogical examination of samples, but the bulk of this work related to hard rock samples and is thus of limited relevance to the regolith mineralisation. However, within the fasibitikite and peralkaline granitic intrusive rocks, pyrochlore, chevkinite, eudialyte, monazite, xenotime, and columbite were identified, likely source minerals for the REOs in the regolith.

University of Toulouse

As part of a research study at the University of Toulouse in 2010, mineralogical work was undertaken at laboratories in Germany and Canada (University of Toronto). Regolith samples were examined by XRD, XRF, FTIR, SEM-EDX and thin and polished sections.

A sample from the ferruginous zone was classified as a quartz-rich ferruginous laterite, and the principal minerals were determined to be quartz, kaolinite, gibbsite, goethite and haematite. Petrographic studies indicated that the REOs were hosted by relict accessory minerals including monazite, pyrochlore, thorite, zircon, baddeleyite and secondary phosphate minerals.

A clay-rich saprolite sample comprised principally quartz, kaolinite, smectite, and mica with minor goethite, haematite and gibbsite, containing a lot more clay and a greater variety of clay minerals. REOs were interpreted as being hosted in fine grain relict and ionic phases.

11.3 Metallurgical Testwork

Soviet Geological Mission 1988-91

Metallurgical testwork included five regolith samples. Flotation, gravity and magnetic separation tests were carried out to determine if a rare-metal (tantalum-niobium) concentrate could be produced. Flotation proved the most effective method but no further follow up work on rare metals was carried out.

University of Toronto

In 2012, the University of Toronto carried out metallurgical testwork on five saprolite clays and weathered bedrock samples. Leaching tests were undertaken on 50g samples using ammonium sulphate, $(NH_4)_2SO_4$, and sodium chloride, NaCl, leach solutions.

TREO analyses were conducted on the samples and the leach solutions. Sample grades ranged from 0.09-0.47% TREO and averaged 0.24% TREO, which is significantly higher than average reported resource grade; individual REO analyses were conducted for all rare earths from La through Lu plus Y; the major REE present were La, Nd, Ce, Pr, Sm and Y.

Rare earth element extraction levels ranged from 59-76% for the saprolite samples with ammonium sulphate, and somewhat lower extractions of 40-46% using sodium chloride solution. Extraction of uranium and thorium was low.

Follow up tests using two-stage leaching (a second fresh solution following initial leaching) increased total extraction by 10-20% to a maximum of 89% using ammonium sulphate and 65% using sodium chloride. The samples generally exhibited good ion adsorption-type behaviour, with the major portion of the RE content readily and rapidly extracted by simple leaching. However, it should be noted that these results were based on samples of up to five times higher grade than the resource average.

Outotec

In 2014/15 Outotec conducted leaching tests on 0.5kg clay samples using ammonium sulphate with 0.5 and 0.25 molar solutions. Sodium chloride solutions were also tested. No final report on the testwork was available for review by SGS, but in a preliminary report, rapid leaching was reported with better than 80% extraction for some REEs. Oxalic acid and sodium carbonate were used to conduct preliminary precipitation tests; oxalic acid produced a satisfactory crystalline precipitate, but sodium carbonate produced a gel-type precipitate.

Outotec noted that the yields of individual REEs were quite variable, with the highest yields being for La and Pr at 82-83%. The concentration of base metals and U and Th in the leach solutions were low and these metals remained in solution during precipitation.

SGS Lakefield

The most comprehensive metallurgical testwork to date has been undertaken by SGS Lakefield in Canada. Sixty pit samples averaging around 15kg each and with depths ranging from 1-10m were submitted to SGS Lakefield for testing in April/May 2013.

A 1kg representative sample was taken from 35 of the pit samples to produce a master clay composite which had an average grade of 0.20% REE (2,000ppm) of which HREE totalled 350ppm (17%). The most abundant REEs were La (700ppm), Nd (440ppm), Ce (340ppm), Y (200ppm) and Pr (130ppm). The principal gangue minerals were silica (22%), alumina (15%) and iron oxides (6%).

Both ammonium sulphate and sodium chloride solutions were used; ammonium sulphate generally appeared to give better extractions. LREE extractions ranged from 70-88%, with the exception of Ce with a maximum extraction of 29%; HREE extractions ranged from 50-80%. Main element extractions were Nd (85-88%), Dy (69-73%) and Y (62-67%). Extractions for Th and U and most gangue elements (except Ca) were low.

Optimum eluant conditions appeared to be 1M (one molar) solutions at around pH4, with ammonium sulphate generally proving less sensitive to change than sodium chloride.

SGS Lakefield conducted two column leach tests (0.5m diameter, 1.8m height) to simulate heap leaching conditions. The feed was agglomerated and the tests ran for 218 hours. Extractions generally ranging from 50-88% were achieved, with ammonium sulphate achieving improved results compared with sodium chloride. Main element extractions were Nd (88%), Dy (73%), Y (67%) and La (86%). Gangue material and U/Th extractions were low. The pregnant leach solutions ("PLS") reached maximum tenor of approximately 4,700mg/L TREE after around 50 hours; thereafter the tenor dropped rapidly.

SGS Lakefield conducted oxalic acid precipitation tests; a relatively high oxalic acid:REE ratio 250-300% was required to achieve reasonable precipitation efficiency. At a pH of 5.0, >40% of Al in solution could be precipitated with ammonium bicarbonate while losing <2% of REEs; 50% of Th was also removed.

SGS Lakefield concluded:

- REEs can be extracted from the Tantalus project clays by ion desorption using ammonium sulphate or sodium chloride as eluants, with extraction of the main REEs generally from 70% to >80% (Nd 88%, Dy 73%, Y 67%, La 86%). Maximum extractions were achieved with 1M ammonium sulphate at a pH of 4. Most gangue metals, U and Th are not extracted and remain with the solids.
- High REE extractions and high REE grade liquors can be achieved with low eluant:ore ratios.
- Column leaching, simulating heap leaching, using 1M ammonium sulphate at pH4 for 218 hours with irrigation rates of around $14L/h/m^2$ achieved extractions of 88% Nd, 73% Dy, 67% Y and 86% La.
- Oxalic acid precipitated the REEs from solution, but even at the highest acid to REE ratio tested (300%) not all REEs were completely precipitated.
- Aluminium can be removed from solution using ammonium bicarbonate; at a pH of 4, 40% of Al is removed with loss of only 2% of REEs.

In-Situ Leaching

A $1km^2$ area has been selected by TREM for a trial, but the trial has not yet been undertaken. Fourteen holes were drilled to investigate the hydrogeological conditions and to determine the availability of water to run the pilot test, but the results of this work have not been analysed or reported.

Conclusions

Overall, BDA considers that the testwork undertaken to date has confirmed that the rare earth elements can be readily extracted from the pedolith and saprolite using appropriate eluants. Extractions vary for the different REEs but for the main elements extractions range from around 70% to more than 80%. Deleterious elements such as uranium and thorium are generally not extracted to a significant extent. Column leach testwork has tested the likely parameters for heap leaching and initial results appear generally favourable. A large bulk sample has been mined and stockpiled on site for a trial heap leach test. An area of ground has also been selected for a trial in-situ leach test. However, to date, no on-site trials have been undertaken. In BDA's opinion, such trials are likely to be an important component in moving the project forward to a feasibility study stage and possible development decision.

12.0 INFRASTRUCTURE

12.1 Access to Site

The nearest airport is on the island of Nosy Be, approximately 60km north of the project area (Figure 1), serviced by regular flights to Antananarivo and to international centres including Johannesburg. Access from the southern coast of Nosy Be to the Ampasindava Peninsula and the project area takes around one hour by speedboat, a distance of around 40km.

By road, the project area lies around 500km north of the capital of Antananarivo (Figure1). The sealed National Highway (Route Nationale 6 or N6) runs approximately 18km to the east of the project site; dirt roads mostly constructed and maintained by TREM provide access to the site camp and prospects.

The nearest town is Ambanja, some 40km northeast of the project area (Figure 1), where TREM maintains a sample preparation laboratory, core shed and sample storage facility. Ambanja is the logistical centre of the region, with a hospital, banks, restaurants and hotels. The project access roads intersect the N6 about 30km southwest of Ambanja.

12.2 Accommodation

TREM maintains field camps adjacent to the main prospect areas. The main camp is maintained by TREM's earthmoving and construction contractor, and TREM geologists and site project managers utilise the contractor's facilities as required.

12.3 Power

The camp facilities are powered by diesel generators. TREM has not undertaken any study of grid power options, but it is likely that any pilot plant or initial operation would be powered by on-site generation, using diesel or fuel oil generators. Power demand for an in-situ leach operation would be relatively low; power requirements would increase for a heap leach project requiring crushing, agglomeration and stacking, but would still be readily managed with an on-site power generating plant.

12.4 Water

No studies have been undertaken of project water requirements, but water supply is unlikely to be a material issue. The camps are currently supplied with bore water, but there has been no systematic review undertaken of ground water resources. The area has a marked wet and dry season with annual rainfall of around 2-3m. The topography is rugged, and there would be many areas where storage dams could be constructed if required, if insufficient groundwater supplies were available.

12.5 Communications

Mobile telephone network coverage is available in parts of the project area and at the main field camp.

12.6 Port Facilities

The northern portion of the project area runs parallel with the coast of the Ampasindava Peninsula, and there are several areas which would provide suitable landing sites for LCT craft for delivery of stores or equipment. Small port facilities are available on the coast northwest of Ambanja at Ankity (Figure 1), and these could possibly be upgraded to service TREM's import and export requirements, which are relatively modest, with the export of product in bulka bags or containers. TREM advises that it has also reviewed port facilities at Nosy Be, Saint Louis and Diego Suarez on the northern tip of Madagascar.

Conclusions

Access to the project area is reasonable. Overall infrastructure requirements are relatively modest, and while no detailed infrastructure study has been undertaken, provision of adequate access roads, transport, power, water, and accommodation are not expected to present any significant technical difficulty.

13.0 ENVIRONMENT, COMMUNITY, LICENSING AND APPROVALS ISSUES

13.1 Biophysical Setting

The Tantalus rare earths project is located in the eastern part of the Ampasindava Peninsula, in the province of Antsiranana in northwestern Madagascar, covering an original area of 300km^2; in the latest project renewal parts of the less prospective southern area have been relinquished and the area reduced to 238km^2 (Figures 1 and 2).

The project area is relatively rugged, with elevations ranging from sea level to in excess of 700m. The topography is marked by two prominent circular structures occupying the northwest and southeast of the project area, of 6-7km diameter, and representing collapsed calderas.

The project area is largely covered by secondary vegetation including bamboos and palms, with mangroves in the coastal areas and shallow bays. Slash and burn agriculture is common through much of the area. The original primary forest is restricted to a few mountain tops and a small area in the northwest which is a protected area; primary forest covers less than 7% of the project area.

The climate is divided into two distinct seasons, a dry season from April to October and a wet season from November to March. Annual rainfall exceeds 2,000mm per year and temperatures average around 25°C.

13.2 Environmental Studies

BDA has not reviewed any environmental studies, but understands that an environmental impact study has been prepared for the exploration phase of the project. TREM advises that the exploration activities undertaken to date (drilling and pitting) have been conducted in accordance with the environmental requirements of the exploration licence (PR).

To undertake the next stage of on-site testwork (heap leaching and/or in-situ leaching) an environmental impact assessment will be required to obtain government approvals. TREM is in the process of engaging the Australian office of the international environmental firm Ramboll Environ Inc. to undertake this work.

One small portion of the Northwest Territories prospect has been designated a protected forest area, but TREM has already committed not to undertake any exploration or development work in this area.

In-situ leaching, while involving minimal surface disturbance, does involve the injection of elution liquors to extract the ionic rare earths. Any impact on the groundwater and any residual contamination needs to be thoroughly studied to ensure that the process can be undertaken in an environmentally sensitive manner with minimum disturbance, to ensure the appropriate government and environmental approvals are forthcoming.

BDA notes that there are a number of industry reports concerning environmental issues related to in-situ leach operations in southern China, so this will be a sensitive issue that needs to be properly addressed if an in-situ leach operation is proposed.

Heap leaching will involve disturbance of significant areas, given the shallow but widespread nature of the deposit; however, an ongoing programme of rehabilitation should allow environmental impacts to be minimised.

To progress the project to a mining stage, a full environmental impact study will be required to accompany the mining licence (PE) application. Until an environmental impact assessment has been completed and submitted, BDA considers the environmental risk to be medium to high.

13.3 Community

BDA has not reviewed any social or community studies, but TREM advises that relations with the local villagers within the project area are good. Wherever possible, local people are employed on the exploration work, and government regulations and guidelines are followed in terms of compensation paid for disturbance of land and crops for access roads, drill sites and pitting sites.

Furthermore, TREM advises that it supports a number of community development programmes, principally in the health and education areas, including support for teacher’s salaries, support for local health care centres, and assistance with infrastructure (roads, lighting, community centres).

To progress the project to a mining stage, a social impact study will be required to accompany the mining licence (PE) application.

13.4 Tenement, Licensing and Approvals

The Tantalus rare earths project is located in the eastern part of the Ampasindava Peninsula, in the province of Antsiranana in northwestern Madagascar, approximately 500km north of the capital, Antananarivo. The nearest major town and administrative centre is Ambanja, some 40km to the northeast of the project area.

The original project area covered 300km^2 and was held under exploration licence PR 6698 which grants exclusive rights for prospecting and research. The permit was originally granted in 2008 for five years and was renewed for three years in January 2014. One further renewal period of three years is allowed and application for the second three-year renewal was made on 7 December 2016, together with a renunciation of the southern portion of the PR, retaining approximately 238km^2 (608 squares) of the prospective northern portion (Figures 1 and 2).

BDA has not undertaken any legal due diligence on ownership, tenement or licensing issues. However, discussions have been held with TREM's tenement manager, and ISR's lawyers in Madagascar, Lexel Juridique and Fiscal, have provided documentation in relation to the current PR renewal process.

The application renewal is awaiting the signature of the Minister of Mines and the Prime Minister. TREM has advised that discussions have been held with the Bureau du Cadastre Minier de Madagascar ("BCMM"), and these discussions have confirmed that the renewal application is in order and all fees have been paid. While there is a delay in the sign off to the renewal, TREM advises that the 2014 renewal took 12 months to be signed off, and it would appear that there are a number of other exploration licence applicants also in the same situation. In the meantime, TREM advises that its exploration rights continue, and that the three-year period of the renewal is likely to be from the date of ministerial approval.

TREM advises that there are no private royalties payable on the project. There is no minimum expenditure requirement, other than the obligation to undertake the proposed programme of work. Current environmental liabilities are limited to making good areas disturbed by exploration activities, largely comprising rehabilitating and revegetating drill sites and filling in sample pits. Other costs will be subject to the programme of work approved for the renewal period and the environmental assessment study to be undertaken.

While the exploration licence covers such activities as drilling, pitting and trenching, the planned in-situ leach trial and heap leach trial will require specific approvals. TREM intends to prepare an environmental assessment covering these activities and submit this application and report once the licence renewal is signed off.

Prior to the expiry of this last term of PR 6698, it will be necessary to make application for a Permis de Exploitation (PE) or mining licence. This will require completion of a feasibility study within the next three years so that the parameters of the planned project are defined, and so that an environmental and social impact assessment study can be completed to accompany the application. The initial term of a PE is typically 40 years.

13.5 Tenement Ownership

PR 6698 is held by Tantalum Rare Earth Malagasy SARL (TREM). The PR was originally held by Calibra Resources and Engineers Madagascar SARL in 2003 and was acquired by Zebu Metals Ltd in January 2008. TREM assumed 100% ownership of the project in October 2009.

TREM is a 100% owned subsidiary of Tantalum Holding (Mauritius) Ltd which in turn is 40% owned by Tantalus Rare Earths AG (TRE) and 60% owned by REO Magnetic Pte Ltd (REOM), a Singapore incorporated company. ISR is proposing to acquire 60% of THM from REOM.

Conclusions

BDA has not undertaken any legal due diligence on ownership, tenement or licensing issues and has relied on information and documentation provided by TREM and ISR's lawyers in Madagascar, Lexel Juridique and Fiscal. The current status of the licence renewal is of concern, but delays in ministerial sign off of renewal applications do not appear to be unusual; the previous renewal took 12 months for ministerial approval.

Operations to date appear to have been undertaken in accordance with environmental and community requirements. However, the next phase of site investigation (trial heap leach and in-situ leach) will require specific environmental impact assessments. International environmental consulting firms have been engaged to undertake this work.

BDA is not aware of any environmental or community issues which would impact on the renewal of the PR for a further three years, or the eventual grant of a PE (mining) licence, but a detailed environmental assessment will be required, particularly to cover any concerns regarding the environmental impact of in-situ leaching, should this be the chosen extraction method.

14.0 PRODUCTION PLANS

No production plan has yet been developed for the project. TREM advises that it is envisaged that a mixed rare earth precipitate (carbonate) would be produced for sale to offtakers. Approximate production scale is envisaged as 10,000t of contained rare earths per annum.

Conclusions

The project is still at an exploration and process testing phase, and no feasibility study or production plans have yet been prepared. However, the concepts of in-situ leaching and/or heap leaching/vat leaching appear appropriate, as does the production of a mixed rare earth concentrate for sale. An initial production scale of 10,000t of contained rare earths appears reasonable. Based on the testwork to date, the concentrate is likely to contain a significant proportion of the more valuable HREEs with low U and Th values, and should be readily saleable.

15.0 CAPITAL AND OPERATING COSTS

15.1 Capital Costs

TREM has not yet undertaken a feasibility study on the project, and there has been no estimation of potential capital costs. However, given the proposed in-situ leach method of extraction, capital costs should be modest. If heap leaching is adopted, additional mining and processing equipment will be required, however, heap leaching also has relatively low capital cost requirements.

It is likely that any mining operations, including site preparation and construction of access roads, will be carried out under contract, or that the mining equipment will be leased. A crusher, agglomerator and stackers will be required for the heap leach operation, and there will be initial capital involved in preparing heap leach pads and water retention structures for barren and pregnant liquor and for environmental water management.

15.2 Operating Costs

TREM has not yet undertaken a feasibility study on the project, and there has been no estimation of potential operating costs. However, given the proposed in-situ leach method of extraction, operating costs should be relatively low, and significantly lower than operations involving hard rock mining and processing.

If heap leaching is adopted, there will be additional mining and processing costs, but the deposits are shallow, averaging around 6m, with minimal overburden (around 20cm of topsoil) so mining costs should be low and crushing should require limited power given the weathered nature of the material.

Conclusions

Given that the project is still at an exploration and trial processing stage and that no feasibility study has been undertaken, it is premature to speculate on the likely capital and operating costs. However, given the shallow nature of the deposit, the ionic clay bonding of the rare earths, and the proposed in-situ leaching and/or heap leaching extraction method proposed, it is reasonable to conclude that the capital and operating costs of any future project development are likely to be competitive with most other new proposed rare earth development projects and significantly less than most proposed hard rock projects.

16.0 PROJECT IMPLEMENTATION

From 2011-2014 major pitting programmes have been carried out to investigate the regolith rare earth mineralisation within exploration licence PR 6698 in the eastern part of the Ampasindava Peninsula in northwestern Madagascar. Six principal prospect areas have been defined, Ampasibitika, Ampasibitika South, Caldera, Befitina, Ambaliha and Northwest Territories (Figure 4).

This pitting data provides the basis for the current resource estimates and project testwork and assessment. In 2014 (and updated in 2016) SGS Canada Inc. undertook an independent resource estimate of the regolith mineralisation and estimated a Measured, Indicated and Inferred resource of 628Mt averaging 900ppm TREO with 560,000t of contained TREOs (Figure 5).

Metallurgical process testwork has been undertaken by independent specialist laboratories and has demonstrated that the rare earths can be readily extracted from the ionic clays by solutions of ammonium sulphate or sodium chloride, with minimal extraction of any potentially deleterious elements. The testwork has indicated that either in-situ leaching or heap leaching could potentially be viable extraction methods.

Project development is currently on hold until ownership and re-financing issues are resolved. The next stages in project implementation are likely to involve on-site in situ leaching and trial heap leaching and/or vat leaching, together with further metallurgical bench scale testing, to optimise extraction and to determine recovery factors. Testwork will be required on the solutions produced to determine the optimum precipitation and purification reagents and methods. The rare earth concentrate produced will be used as a basis for discussions with potential offtakers. It is likely that in-fill pitting will be required to better define higher grade areas in preparation for early production.

TREM advises that specific environmental approvals will be required for such testwork, which will involve completion of environmental impact assessments. TREM has advised that Finnish environmental specialist Gaia Oy and the Australian office of the international group Ramboll Environ Inc. have been engaged to undertake this work.

A pre-feasibility study will be required to consider alternative project development scenarios, and a feasibility study on the preferred development scenario and process flowsheet to define the costs and development parameters. This work requires to be completed within the remaining three years of the PR licence renewal.

Project development will require the granting of a mining exploitation (PE) licence. The current final phase of the exploration (PR) licence has three years to run from the time of signing of the renewal application. This application was submitted in December 2016 (with the current licence period expiring in January 2017) but is still awaiting ministerial sign off and approval.

Conclusions

Further project development awaits completion of the ownership and financing issues. Application has been made for renewal of the exploration licence; this will be the final three-year renewal period allowed prior to conversion to a mining licence. The renewal application awaits ministerial approval and sign off.

An area has been selected for a pilot scale in-situ leach trial, and a 1,000t bulk sample has been extracted from an area near Betaimboay village for a heap leach trial. Both these programmes require specific environmental approvals and the completion of environmental impact assessment studies.

During the final three-year renewal phase of the licence, it will be necessary to complete the metallurgical and process testwork and to complete a feasibility study and project environmental impact study to provide the basis for the application for a mining exploitation licence.

17.0 MARKETING

In 2015, TRE announced that it had undertaken discussions with potential offtakers, and Commercial Purchasing Agreements had been signed with Shenghe Resources ("Shenghe") and ThyssenKrupp Metallurgical Products GmbH ("ThyssenKrupp"). Based on public releases by TRE, under the agreements, both companies would annually purchase 30% of output from the Tantalus project, or up to 3,000t of mixed rare earth oxides once full planned production capacity of 10,000t per annum is reached.

The initial duration of the contracts was for three years from the start of commercial production, with an option to extend the contract by an additional seven years. Both contracts were linked to the provision of 30% of the debt funding required for the project development

Shenghe is a leading Chinese rare earths company with mining and processing operations. Shenghe operates a rare earths separation plant and alloys plant and sells rare earth products to Chinese and international customers.

The ThyssenKrupp agreement gives exclusive rights to market the Tantalus products in Germany, and non-exclusive rights for the rest of Europe.

As these agreements were with the former German parent company TRE, rather than TREM, in BDA's opinion it is unlikely that the agreements would remain binding with a change of ownership. However, it is significant that two major companies operating in the rare earths market were prepared to sign material offtake agreements for products from the Tantalus project.

The prices of the mixed rare earths oxide product were to be linked to the actual composition of the concentrate and independently quoted market prices for the various oxides. It is anticipated that the principal values in the mixed oxide product will relate to Neodymium, Praseodymium, and Dysprosium, together with Terbium, Europium and Lanthanum (Figure 6).

In its May 2015 press announcement, TRE estimated that sales of 6,000t per annum of its rare earths concentrate would generate approximately US$180M in revenue, with approximately US$300M per annum anticipated from sale of the planned production of 10,000tpa, at then current market prices. TRE also noted that the SGS resource estimate of 560,000t of contained rare earth oxides, represented a mine life of around 50 years. BDA notes that mine life projections should be based on recoverable reserves, rather than resources, and that mining, leaching and processing recoveries also need to be considered in such estimates. Nevertheless, it is accepted that the project has a significant potential mine life and that there remains substantial upside exploration potential.

18.0 VALUATION DISCUSSION

18.1 Overview

BDA has undertaken a technical assessment and valuation of the Tantalus Rare Earth Ionic Clay Project in northwestern Madagascar. BDA has visited the project site and reviewed the technical and financial data provided by TRE and TREM.

The valuation principles outlined in Section 3 have been applied to the Tantalus project. As a fundamental principle, BDA considers that the fair market value of a property, as stated in the VALMIN Code, is the amount a willing buyer would pay a willing seller in an arm's length transaction, wherein each party acted knowledgeably, prudently and without compulsion.

Valuation has been considered as of the Valuation Date of 1 July 2017.

No project feasibility study has been undertaken to date. However, significant geological and mineralogical work has been carried out, resource estimates have been completed, and preliminary bench scale and column leaching testwork has been carried out. This work has identified a significant resource with potential for heap leach or in-situ leach extraction. BDA has reviewed the resource estimates, possible extensions to the resource, the planned work programme and the potential development scenarios.

Insufficient work has been undertaken to define potential capital and operating costs, extraction rates, recovery or mine life. Therefore, in BDA's opinion, and in accordance with the VALMIN Code, a discounted cashflow or net present value (NPV) assessment would not be feasible or appropriate. BDA has therefore considered alternative means of valuation including exploration expenditure, market capitalisation, recent transactions and joint venture terms, comparable transactions and yardstick values to assess a likely range of values.

All values are estimated in terms of US dollars ("US$"). Where some primary data is in Euros ("EUR"), an exchange rate of EUR:US$ of 1.14 (1 July 2017) has been used; other data in Australian dollars ("A$") has been converted to US$ at 0.77.

18.2 Exploration Expenditure

Past expenditure, or the amount spent on exploration of a tenement is commonly used as a guide in determining the value of exploration tenements, and 'deemed expenditure' is frequently the basis of joint venture agreements. The assumption is that well directed exploration has added value to the property. This is not always the case and exploration can also downgrade a property and therefore a 'prospectivity enhancement multiplier' (PEM), which commonly ranges from 0.5-3.5, is applied to the effective expenditure. The selection of the appropriate multiplier is a matter of experience and judgement. To eliminate some of the subjectivity with respect to this method, BDA applies a scale of PEM ranges to the exploration expenditure as follows:

- PEM 0.5 - 0.9 Previous exploration indicates the area has limited potential
- PEM 1.0 - 1.4 The existing (historical and/or current) data consists of pre-drilling exploration and the results are sufficiently encouraging to warrant further exploration.
- PEM 1.5 - 1.9 The prospect contains one or more defined significant targets warranting additional exploration.
- PEM 2.0 - 2.4 The prospect has one or more targets with significant drill hole or sample intersections.
- PEM 2.5 - 2.9 Exploration is well advanced and infill drilling or sampling is required to define a resource.
- PEM 3.0 - 3.5 A resource has been defined but a (recent) pre-feasibility study has not yet been completed.

An over-riding consideration in terms of valuation of exploration ground is a recognition of prospectivity and potential, which is of fundamental value in relation to exploration properties.

BDA considers that exploration of the Tantalus project is well advanced, with regional airborne surveys having been undertaken and extensive pitting, drilling and sampling completed, with follow up metallurgical processing testwork. A substantial resource has been defined, with potential for further extension, but no pre-feasibility or feasibility studies have yet been undertaken.

BDA considers that the exploration expenditure has demonstrated significant potential and has defined a significant resource and that a PEM of 3-3.5 is appropriate for valuation purposes.

TRE has advised that capitalised exploration, evaluation and construction costs on the project total US$20.6M and that total expenditure including administration costs total US$30.7M. As TRE has been a one-project company, BDA considers that all costs, including administrative costs, have largely been employed in bringing the project to its current stage of development, and that all these costs are potentially relevant to a valuation. BDA has estimated a valuation range from a low of 3 x the capitalised costs to a high of 3.5 x the total costs with a most likely mid-point value.

Table 18.1

Multiple of Exploration Expenditure Valuation of the Tantalus Rare Earths Project

Methodology	Valuation (US$M)			Comments
	Low	Most Likely	High	
Exploration Expenditure/PEM	61.8	84.7	107.5	Historical expenditure (capitalised and total) x PEM of 3.0-3.5

18.3 TRE Market Capitalisation

On the fundamental definition of value, as being the amount a knowledgeable and willing buyer would pay a knowledgeable and willing seller in an arm's length transaction, it is clear that due consideration has to be given to market capitalisation. In the case of a one project company or a company with one major asset, the market capitalisation gives some guide to the value that the market places on that asset at that point in time.

TRE was formerly a listed company, and had as its principal asset only one project, the Tantalus rare earths project in Madagascar. On that basis BDA considers that the TRE share price and market capitalisation provide a meaningful guide as to the value the market ascribed at the relevant time to the project.

BDA has reviewed TRE's historical share price and market capitalisation in order to derive an implied project valuation. TRE was, until 2012, listed on the Frankfurt Exchange, and from 2012 to 2017 on the Dusseldorf OTC Market.

From 2010-2011, TRE's share price ranged from a low of EUR12 to a high of EUR145. BDA does not consider that this period provides a useful guide to valuation, as, firstly, the project was in a very early stage of evaluation and resources had not yet been defined, and, secondly, this was the period of an extreme spike in rare earths prices due to Chinese export restrictions, resulting in short term expectations of high future prices, whereas in fact prices rapidly returned to more realistic levels.

The period from 2012 to 2015 represents a period of more stable prices, closer to current expectations, and also represents a period where the market became reasonably well informed concerning the scale of the Tantalus resource. The TRE share price over this period was relatively stable, reaching a low of EUR10 and a peak of EUR21, but through most of this period maintaining a relatively steady average of around EUR19. With 2.4 to 3.4M shares on issue, TRE's market capitalisation ranged from a low of around US$28M to a high of US$82M, but through most of this period averaged around US$63M. Cash holdings around this period were typically around US$2M giving an implied enterprise value of US$26-80M with a most likely value of around US$61M.

From late 2015 the TRE share price began to slip dramatically to levels of only EUR1-2, with a final closing price of EUR0.55. At these levels, the market capitalisation was only around US$2-7M. TRE essentially ran out of project funding and was unsuccessful in raising additional capital. TRE was forced to file for insolvency and commenced the preliminary process with the liquidator. TRE advises that around EUR2.7M was owed to creditors at this stage, and in BDA's opinion the market capitalisation at this stage reflected the likelihood of company liquidation with outstanding debts, rather than the value of the underlying asset. TRE has advised that discussions with the potential liquidator indicated that the primary objective, should the company go into liquidation, would be to realise sufficient funds to repay the creditors, with less focus on any material payment to shareholders.

BDA considers that TRE's market capitalisation from 2012 to 2015 is a reasonable reflection of the market's assessment of the value of the underlying Tantalus rare earths project, and a valuation assessment based on this data is shown in Table 18.2. Prior to that period BDA considers that the share price was unduly influenced by the rapid but short-term rise in rare earth prices, and post 2015 the share price was reflective of a company in some financial distress and facing possible liquidation (and hence not representative of the value of the underlying project).

Table 18.2

Valuation of the Tantalus Rare Earths Project based on TRE Market Capitalisation

Methodology	Valuation (US$M)			Comments
	Low	Most Likely	High	
Market Capitalisation TRE	26.0	61.0	80.0	Enterprise value (market cap 2012-15 less cash holding)

18.4 Recent Transactions

If recent discussions have been held with other parties and offers have been made on the projects or tenements under review, then these values are certainly relevant and worthy of consideration.

In August 2016, TRE concluded an agreement with REO Magnetic Pte Ltd (REOM), a Singapore incorporated company. This transaction involved REOM paying EUR3.7M for a 60% interest in the project and agreeing to pay a further EUR10M (in cash or shares) for the remaining 40% of the project in 12 months, the latter agreement subject to various Conditions Precedent ("CPs") including approval by the Madagascan authorities for the renewal of the permit and the building of a pilot in-situ leach plant. Neither of these CPs have, to date, been satisfied, but nevertheless BDA considers this transaction an important component of the valuation assessment. TRE advises that an extension of the second component of the agreement is being discussed; the current termination date is August 2017.

The initial transaction (EUR3.7M for a 60% interest) implies a value of EUR6.2M (US$7.1M) for the total project. The second tranche payment (EUR10M for 40%) implies a value of EUR25M (US$28.5M) for the project.

In BDA's opinion, it is important to consider the circumstances of this transaction. The agreement with REOM was made at a time when TRE was facing liquidation and when TRE management had been advised by the potential liquidator that the likely outcome of liquidation would be the acceptance of any offer that allowed the repayment of the outstanding creditors (ie. any offer in excess of EUR2.7M). The cash payment of EUR3.7M thus allowed the repayment of the creditors, provided EUR1.0M of working capital, and offered some future repayment to shareholders or some retained interest in the project. In BDA's opinion, this transaction represents a transaction undertaken under distress circumstances, and as such may not be reflective of underlying values. Nevertheless, the transaction is recent, and relates specifically to the project under review, and therefore has to be given due consideration. BDA's assessment of the parameters is summarised in Table 18.3.

Table 18.3

Valuation of the Tantalus Rare Earths Project based on REOM Transaction

Methodology	Valuation (US$M)			Comments
	Low	Most Likely	High	
2016 TRE/REOM Agreement	7.1	17.8	28.5	Low value based on first tranche; high value based on agreed second tranche; most likely based on average value

TRE has also advised that discussions were held with a UK-based company regarding a possible listing on the AIM (Alternative Investment Market) board in London ("Proposed AIM Listing"). The Proposed AIM Listing would have involved raising £40M, of which £16M (US$20.8M) would have been paid to TRE for the Tantalus asset. As the Proposed AIM Listing did not progress beyond discussion of the concept and possible terms, BDA has not used this data in its valuation assessment, but nevertheless notes that the implied value of the project is similar to the most likely value derived from the REOM transaction details.

18.5 Comparable Transactions -Yardstick Values

Recent comparable transactions on other rare earth properties or involving other rare earth companies can be relevant to the valuation of the Tantalus project and tenement. While it is acknowledged that it can be difficult to determine to what extent the properties and transactions are indeed comparable, this method can provide a useful benchmark for valuation purposes, and provides some guide as to what the market in general is paying for rare earth companies and projects.

A number of factors need to be considered when reviewing other transactions:

- the timing of the transaction - as there can be substantial change in value with time
- the quality and grade of the underlying resource - rare earth deposits contain a range of REEs and those with a high percentage of HREEs are likely to be more highly valued than those with a preponderance of LREEs
- the nature and occurrence of the mineralisation - hard rock deposits at some depth which may incur significant mining and processing costs are likely to be less highly valued than those in weathered, near surface material where the REEs may be more readily recoverable.

To make allowance for the different nature of the projects to which the transactions relate, BDA has derived yardstick values in terms of US$/t of contained rare earths in resource. This yardstick takes into account the different size and grade of the deposits, but it is still necessary to make a qualitative assessment of the development status of the project and the quality of the resource (such as the percentage of HREE vs LREE).

BDA has identified a number of transactions involving rare earth companies that may provide some guide to possible value. These companies, however, have higher grade primary REO deposits which are not, therefore, directly comparable to TRE's IAD deposit in Madagascar.

Arafura/ECE

In 2012, Arafura Resources Limited's ("Arafura") major shareholder, East China Minerals Exploration and Development ("ECE"), subscribed for 45,266,500 new shares in the company at A$0.22 per share (total A$9.96M). This placement represented 8.6% of the issued capital of the company and provided an implied value of the company of A$116M. After allowing for cash holdings of A$29.5M the implied value of the company's Nolans rare earths project could be assessed at approximately A$86M or around US$67M. Arafura's Nolans project has approximately 1,460,000t of contained TREO in resource; this implies a value of around US$46 per tonne of contained TREO in resource.

Greenland Minerals/Shenghe

In September 2016, Shenghe Resource Holdings Ltd (Shenghe) acquired a 12.5% stake in Greenland Minerals and Energy Limited ("Greenland Minerals") for A$4.625M (125M shares at 3.7 cents per share). This transaction ascribes a value to Greenland Minerals of around A$37.0M. With cash holdings of around A$6M, the implied value of the company's Kvanefjeld rare earths project would have been approximately A$31M or US$24M. With around 1,710,000t of TREO in resource this implies a value of around US$14 per tonne of contained TREO in resource.

Northern Minerals/Huatai

In August 2016, Northern Minerals Limited ("Northern Minerals") announced that Huatai Mining Pty Ltd ("Huatai") would acquire 230 million shares in the company at around 13 cents per share representing an investment of A$30M. In February 2017, Northern announced that Huatai had subscribed A$19.5M and secured a 22.6% interest in the company, valuing the company at around A$86M. With cash holdings of around A$14M, the implied value of the company's Browns Range rare earths project was approximately A$$72M or US$56M. With around 57,000t of contained TREO in resource this implies a value of around US$975 per tonne of contained TREO.

Conclusions

The range of yardstick values derived from these transactions is so wide that it is difficult to obtain a meaningful yardstick value to apply to the Tantalus project. In particular, the Huatai/Northern Minerals transaction gives a particularly high US$/t yardstick of contained TREO. The Northern Minerals Browns Range deposit contains a particularly high percentage of HREEs (nearly 90%) with nearly 9% Dy, which would contribute to a higher valuation, and Northern Minerals has used a relatively high $/kg price for Dy in its projections. The project is also at an advanced stage with a decision made to proceed with a Stage I pilot plant operation, and initial production planned for 2018. Northern Minerals has reported that financing of A$56M is in place for the Pilot Plant development and sales agreements are in place for 100% of the pilot plant production. Although the quoted resource is relatively small, the exploration tenements are extensive and there would appear to be good potential to substantially expand the resource when required. BDA suggests the market is ascribing a significantly larger potential resource to the project than has been drilled out to date. Given the advanced nature of the project and the progress towards development of a pilot operation, BDA does not consider that the Huatai/Northern Minerals transaction represents a comparable transaction for the purpose of assessing yardstick values to apply to the Tantalus project. However, the Brown's Range project does illustrate the significant increase in value that can be achieved as some of the uncertainties are removed and a project progresses towards production.

Table 18.4

Comparable Transactions – Yardstick Values

Transaction	Project	Project Value* Based on Transaction US$	Resource Estimate Tonnage Mt	TREO %	TREO Contained t	Yardstick Values US$ per t of Contained TREO
Arafura/ECE	Nolans	67	56	2.6	1,460,000	46
Greenland Minerals/Shenghe	Kvanefjeld	24	122	1.4	1,710,000	14
Northern Minerals/Huatai	Browns Range	56	9	0.63	57,000	975

*Note: *Project valuation is based on value implied by transaction less any cash holding to give an implied enterprise value; Exchange Rates applied A$:US$ 0.77; Yardsticks based on implied project value per tonne of contained TREO in resource*

BDA considers that the Arafura/ECE and the Greenland Minerals/Shenghe transactions do provide some guidance that can be used to provide a guide to value of the Tantalus project, even though the range remains quite large. Applying the range of US$14-46/t TREO to the Tantalus project (contained TREO of 562,000t) gives values from US$7.9-25.9M.

18.6 Market Capitalisation - Yardstick Values - Comparison with Other Rare Earth Companies and Projects

A number of junior companies hold rare earth projects and are hopeful of becoming producers. These projects are in various parts of the world, of various sizes and grades, at various stages of development, and each has some potential advantages and some potential drawbacks. Only one, Serra Verde, is based on a similar type of ionic clay REO mineralisation to that of TRE. However, BDA considers it instructive to review these companies and projects to provide a general guide as to where the Tantalus project might fit in an overall valuation matrix. BDA has prepared a summary of the principal company and project parameters in Table 18.5 and the projects are briefly described below.

Table 18.5

Market Capitalisation and Resource Estimates of International Rare Earth Companies and Projects

Company	Project	Market Cap (Adjusted) US$	Resource Estimate Tonnage Mt	TREO %	TREO Contained (t)	Production TREO tpa	Yardstick Values US$/t Cont Resource	US$/t Annual Product
Arafura	Nolans	16	56	2.6	1,460,000	14,000	11	1,100
Greenland	Kvanefjeld	72	122	1.4	1,710,000	29,000	42	2,500
Hastings	Yangibana	32	17	1.3	216,000	8,400	148	3,800
Lynas	Mt Weld	262	24	7.9	1,890,000	22,000	138	11,900
Northern	Browns Range	42	9	0.63	57,000	5,000	740	8,400
Serra Verde	Serra Verde	NA	911	0.12	1,093,200	26,000	NA	NA
Peak	Ngualla	18	42	4.2	1,760,000	10,000	10	1,800

*Note: *Market capitalisation has been reduced by cash holdings to give an adjusted enterprise value; Exchange Rates applied A$:US$ 0.77; Yardsticks based on adjusted enterprise value; NA = not available*

To make some allowance for the different nature and size of the projects, BDA has derived yardstick values in terms of US$/t of contained rare earths in resource. This yardstick takes into account the different size and grade of the deposits, but it is still necessary to make a qualitative assessment of the development status of the project and the quality of the resource (such as the percentage of HREE vs LREE). The derivation of yardsticks is more complicated with rare earth projects in that the make-up of the "basket" of rare earths can differ significantly from project to project.

Arafura Resources Limited

Arafura is an Australian listed company which owns the Nolans rare earths project in the Northern Territory of Australia. Nolans has a resource of 56Mt averaging 2.6% TREO containing 1,460,000t TREO at a 1% TREO cut off.

A feasibility study has been completed, based on a 525,000tpa open pit mining operation, producing 14,000tpa of TREO over a 23-year mine life with a TREO recovery of around 75%; the principal value products (post separation off-shore) are 3,600tpa Neodymium-Praseodymium (NdPr) oxide, 2,700tpa La oxide and 700tpa SEG-HRE oxides. Capital cost is estimated at US$680M with operating costs at US$8.90/kg TREO (pre-phosphoric acid credits).

The share price of Arafura (1 July 2017) was around six cents (Australian) per share (12-month range A$0.05-0.10) with around 547M shares on issue, giving a market capitalisation of approximately A$33M and a project value (allowing for a cash holding of around A$12M) of approximately A$21M (US$16M), equivalent to around US$11 per tonne of contained TREO in resource.

Greenland Minerals and Energy Limited

Greenland Minerals is an Australian listed company which owns the Kvanefjeld rare earths project in Southern Greenland. The Kvanefjeld resource totals 122Mt at 1.4% TREO containing 1,710,000t TREO at a 350ppm U_3O_8 cut off (the deposit also contains uranium). An open pit reserve with a 1:1 stripping ratio has been defined totalling 108Mt at 1.4% TREO containing 1,544,000t TREO. The principal value elements are Pr, Nd, Dy and Tb, with uranium a significant by-product.

A feasibility study has been completed and application has been made for a mining licence. Greenland Minerals has indicated a mine life of around 37 years from the initial reserve, suggesting a production scale of around 29,000tpa of TREO product, assuming a 70% recovery.

The share price (1 July 2017) of Greenland was around 10 cents (Australian) per share (12-month range A$0.03-0.20) with around 1,004M shares on issue, giving a market capitalisation of around A$100M and an enterprise value, allowing for cash holdings of around A$6M, of approximately A$94M (US$72M), equivalent to approximately US$42 per tonne of contained TREO in resource.

Hastings Technology Metals Limited ("Hastings")

Hastings is an Australian listed company which owns the Yangibana rare earths project in Western Australia. The Yangibana resource, based on recent announcements, totals 17.0Mt at 1.3% TREO containing 216,000t TREO.

A feasibility study is due to be completed in Q4 2017. It is proposed to mine around 1Mtpa of ore, generating around 8,500tpa of contained TREO in a mixed rare earth carbonate, rich in Nd and Pr (which account for over 80% of value). The project has an estimated capital cost of A$300M and Hastings has estimated a NPV of A$420M over a 15-year mine life, based on a basket price of US$24/kg; operating costs are estimated at US$10.50/kg. Hastings has announced an offtake agreement with Baotou Sky Rock Rare Earth New Material Co Ltd for 2,500tpa of mixed rare earth carbonate.

The share price of Hastings (1 July 2017) was around 9 cents (Australian) per share (12-month range A$0.07-0.10) with 525M shares issued, giving a market capitalisation of around A$48M, and an enterprise value, allowing for cash holdings of around A$6M, of approximately A$41M (US$32M), equivalent to approximately US$148 per tonne of contained TREO in resource.

Lynas Corporation Limited

Lynas is an Australian listed company which owns the Mt Weld rare earths project, located at Mt Weld in Western Australia, and a rare earths processing plant (the Lynas Advanced Materials Plant or "LAMP") in Kuantan in the State of Pahang in eastern Malaysia. The rare earths are mined at Mt Weld and a rare earth concentrate is produced for shipment to Malaysia. In Malaysia, the concentrate is leached and the rare earths extracted, separated and refined.

Commissioning of the Mt Weld concentrator took place in May 2011 but construction of the process plant in Malaysia was not completed until 2014. The initial Phase 1 LAMP had a capacity to treat approximately 35,000tpa of flotation concentrate, and produce 11,000tpa of REO products, with plans to duplicate this module in Phase 2 to double capacity to produce 22,000tpa of final REO product.

Prior to commencement of operations, the Mt Weld resource totalled 23.9Mt averaging 7.9% TREO and containing 1,890,000t of TREO. Reserves totalled 9.7Mt averaging 11.7% TREO containing 1,130,000t of TREO. The reserves would support a mine life in excess of 25 years.

Capital development costs of Phase 1 were forecast at around A$590M with Phase II A$250M.

The share price of Lynas (1 July 2017) was 11 cents (Australian) per share (12-month range A$0.05-0.14) with around 3,678M shares issued, giving a market capitalisation of approximately A$405M and an enterprise value, allowing for cash holdings of around A$64M, of approximately A$341M (US$262M), equivalent to approximately US$138 per tonne of contained TREO in resource.

Northern Minerals Limited

Northern Minerals is an Australian listed company which owns the Browns Range rare earths project on the border of the Northern Territory and Western Australia. The Browns Range resource totals approximately 9.0Mt at 0.63% TREO containing 57,000t TREO at a cut-off grade of 0.15% TREO. The prospect is focussed on the delivery of HREEs, particularly Dy, hosted in xenotime.

An open pit and underground ore reserve was estimated at 3.8Mt at 0.69% TREO containing 26,000t TREO.

The share price of Northern Minerals (1 July 2017) was 10 cents (Australian) per share (12-month range $0.07-0.18) and with around 700M shares on issue, giving a market capitalisation of approximately A$70M, and an enterprise value, allowing for cash holdings of around A$16M, of around A$54M (US$42M), equivalent to approximately US$740 per tonne of contained TREO in resource.

Mineracao Serra Verde

Mineracao Serra Verde owns the Serra Verde rare earths deposit in central Brazil. The deposit is an ionic clay deposit, similar to the rare earth deposits of Southern China, and with many similarities to the Tantalus deposit in Madagascar. A large, shallow, low grade saprolite deposit has been identified, with a resource of 911Mt averaging 0.12% TREO containing 1,100,000t of contained TREO. The deposit is relatively rich in critical rare earths with Pr, Nd, Tb and Dy representing over 70% of the projected revenues.

Metallurgical testwork has indicated that the rare earths are amenable to heap leach recovery. A pre-feasibility study was completed in 2015 based on a 350Mt reserve averaging 0.15% TREO and indicated a potential mine life in excess of 20 years with annual production of around 26,000t contained TREO. Metallurgical testwork has progressed to the production of rare earth carbonate and oxalate products under pilot plant conditions.

The company Mineracao Serra Verde is part of the Mining Ventures Brazil Group, owned by funds controlled by Denham Capital Management. As an ionic clay deposit, the Serra Verde project has many features in common with the Tantalus project, and an assessment of market capitalisation and associated yardstick values would be of significant interest and relevance in relation to the Tantalus project; unfortunately, as a non-listed entity, there is no market capitalisation information available.

Peak Resources Limited ("Peak Resources")

Peak Resources owns the Ngualla rare earths project in southern Tanzania. At a TREO cut off of 3%, a mineral resource of 42Mt averaging 4.2% TREO containing 1.8Mt of TREO has been reported. A feasibility study has been completed and a mine life in excess of 30 years has been estimated.

The share price of Peak Resources (1 July 2017) was 6 cents (Australian) per share (12-month range $0.05-0.13), and with around 477M shares on issue, gives a market capitalisation of approximately A$27M, and an enterprise value, allowing for cash holdings of around A$3M, of around A$24M (US$18M), equivalent to approximately US$10 per tonne of contained TREO in resource.

Conclusions

The market capitalisation (adjusted for cash holdings), the resource estimates and the calculated yardstick values for the companies/projects discussed above are summarised in Table 18.5. The yardstick values (US$/t of contained TREO in resource) and per tonne of annual TREO product (proposed production levels), based on adjusted market capitalisation, show a wide range of values, as was found with the Comparable Transaction data. Similar issues appear to impact the Market Capitalisation Yardstick values (stage of development, quality of the resource in relation to HREE content, perceptions of additional resource potential).

The following observations can be made:

- If Lynas is excluded, being a company with a developed and operating rare earths project, the range of capitalisations of the rare earth 'hopefuls' (companies aiming to become the next, or one of the next rare earth producers) ranges from US$16-72M with a mean of US$36M. Thus, disregarding for the moment the differences in resource size, quality and development status, the market appears to be valuing the prospective RE producers on a scale of tens of millions of dollars (rather than the hundreds of millions ascribed to actual producers (Lynas) or the fanciful billions of dollars produced by some, on the basis of in-situ rare earth content or potential future cash flows. On a technical assessment, the Tantalus project is lower grade than the other projects considered, but the shallow nature and ionic clay bonding provide some advantages and the contained TREO tonnage places the project in the middle of the projects considered. On this basis, therefore, it is reasonable to suggest that the market would also value the Tantalus project somewhere in the range of US$16-72M. It is instructive to note however that there is a significant potential re-rating in moving from a potential to an actual producer.

- The range of yardstick values per tonnage of contained TREO, derived from market capitalisation, is so wide that it is difficult to obtain a meaningful yardstick value to apply to the Tantalus project. BDA notes that the Northern Minerals transaction gives a particularly high US$/t of contained TREO yardstick. As previously noted, the Browns Range deposit contains a particularly high percentage of HREEs (nearly 90%) with nearly 9% Dy, Northern Minerals has projected a relatively high Dy price, and the project is also at an advanced stage with a decision made to proceed with a Stage I pilot plant operation; these factors could contribute to the relatively high market capitalisation, but the other factor which contributes to the high yardstick value is the relatively small number of contained tonnes of TREO in resource; it would appear the market is actually ascribing a significantly larger potential resource to the project than has been drilled out to date. Given the advanced nature of the project and the progress towards development of a pilot operation, BDA does not consider that the Northern Minerals Browns Range yardstick represents a useful value to apply to the Tantalus project.

- A similar argument can be applied to the Lynas yardstick, being based on an operating and producing project.
- Discarding the Northern Minerals and Lynas yardsticks still leaves a wide range from US$10-148/t (Arafura Nolans, Greenland Minerals Kvanerfjeld, Hastings Yangibana and Peak Ngualla). The high yardstick applied to Yangibana is again primarily related to the low TREO tonnage contained in resource; the market appears to be ascribing more value to the likelihood of a project moving to a development stage than the size or longevity of the deposit, perhaps assessing that if the project is successful, it is likely that additional resources will be defined as required. Applying the range of US$10-148/t TREO and mean of US$53/t TREO to the Tantalus project (contained TREO of 562,000t) gives values from US$5.6-83.2M with a mean of US$29.8M.

18.7 Other Expert Valuations

Where other independent experts or analysts have made recent valuations of the same or comparable properties these opinions clearly need to be reviewed and to be taken into consideration. We have inquired of ISR, TRE and TREM whether any other recent valuations of the Company or its assets have been undertaken, and have been advised that two previous valuation documents have been prepared for submission to the SGX, but both have been rejected. BDA has reviewed these documents and concurs with their rejection. Both valuations (which were essentially identical) assessed a project value in excess of 1 billion (“B”) dollars.

The reports purported to have used a Yardstick method and a Comparable Transaction method in assessing value, but in fact the methods used were (a) essentially based on an assessment of the in-situ value of the contained rare earths in the resource modified slightly by an assumed recovery factor and (b) on an assessment of net present value (NPV) of three other rare earths projects, not, as suggested, related to any comparable transactions.

Valuations based on in situ values are in direct contradiction of the VALMIN Code which states *“in ground (in-situ) values must not be reported in a public report; …. this approach ignores appropriate Modifying Factors …. and is a misleading statement”.*

Similarly, applying a net present value approach to a project at an early exploration stage, even if the NPV values in question are derived from other projects, is quite inappropriate, as there are no grounds for ascribing a NPV to a project for which no feasibility study has been undertaken and for which there are no reliable estimates of capital or operating costs or ultimate recovery or saleability of the products.

The valuations also ignore the fundamental principle of value being the estimated amount for which a property would change hands between *“a willing buyer and a willing seller in an arm’s length transaction … where each party acted knowledgeably, prudently and without compulsion”.* To suggest that a willing buyer would pay in excess of US$1B for an exploration tenement in Madagascar, with a significant but relatively low grade rare earth deposit which is not yet at a pre-feasibility study stage, totally ignores the market valuation and market capitalisation of comparable junior rare earth companies (see Table 18.5).

BDA considers that the previous expert valuations have limited credibility and therefore BDA has not incorporated these estimates into its assessment of value.

BDA notes that valuation reports on some other rare earth projects have also estimated net present values in excess of a billion dollars. These assessments generally have the merit of having been undertaken on projects where feasibility studies have been undertaken and therefore there is a reasonable basis for adopting a discounted cash flow method of valuation. However, the assumptions are subject to significant risks in terms of the actual development and financing of the projects, the construction and ramp up time and the metallurgical processes, recoveries and product specifications. Most importantly, the cashflow projections are sensitive to the assumed rare earth prices, projected forward in some cases for over 20 years. The valuations fail the basic test of whether the value truly represents the price at which the project or company would change hands between a knowledgeable willing buyer and a willing seller. With most prospective rare earth companies and projects having a market capitalisation of less than US$100M, valuations in excess of US$1B clearly do not pass this test. These numbers however do illustrate the potential upside and long-term potential cash flow for some of these projects, if they are developed, and provided the price projections remain strong.

18.8 Valuation Summary

A summary of BDA's valuation ranges for the Tantalus Rare Earths Project is shown in Table 18.6. Five different approaches and methodologies have been considered in assessing a value of the Tantalus project. BDA considers that taking a simple average of the low, high and most likely values provides a reasonable guide to the value of the project, however, BDA's preferred approach is to consider a weighting of each of the individual assessments, based on BDA's assessment of their reasonableness and validity. Thus, BDA has applied a lower weighting to the values based on the REOM transaction (10%), on the basis that it was a transaction undertaken under the threat of liquidation; similarly, BDA has applied a lower weighting to the Comparable Transaction yardstick valuations (15%), where the nature of the project and transaction providing the yardstick differs to a significant degree to the Tantalus project. The Exploration Expenditure parameter and the TRE Historical Market Capitalisation are given increased weightings (25%), given that these parameters are directly derived from the Tantalus project itself. An increased weighting is also given to the yardstick based on Market Capitalisation (25%), as it is considered that the value the market ascribes in general to junior rare earths companies and projects at an exploration and development stage is a relevant and important valuation factor.

BDA's overall assessment of the value of the TREM project at this stage of development is a range of US$25-75M with a preferred most likely value of US$48M. This valuation is based on the assumption that the PR licence will be formally renewed in due course, and that approvals will be granted for the on-site testwork necessary to move the project forward. BDA is aware that substantially higher valuations can be derived by consideration of potential future cashflows, but at this stage of project development, these are considered an indication of future potential, rather than a realistic guide to current value.

Table 18.6

Summary Valuation of the Tantalus Rare Earths Project

Methodology	**Valuation (US$M)**			**Comments**
	Low	**Most Likely**	**High**	
Exploration Expenditure/PEM	61.8	84.7	107.5	Historical expenditure x PEM
TRE Historical Market Capitalisation	25.8	60.8	80.3	TRE AG share market capitalisation
REOM Transaction	7.1	17.8	28.5	2016 TRE/REOM Agreement
Comparable Transactions - Yardsticks	7.9	16.9	25.9	Other RE company transactions
Market Capitalisation – Yardsticks	5.6	29.8	83.2	Values of other RE projects/companies
Average of Values	*21.6*	*42.0*	*65.1*	Simple Average
BDA Assessed Valuation	**25.2**	**48.1**	**74.5**	Preferred value based on project considerations

19.0 SOURCES OF INFORMATION

BDA has undertaken a site visit to the Tantalus project in northwestern Madagascar in June/July 2017. Meetings have been held with TREM management and technical staff and consultants. BDA's report is based on the site visit and reviews of the available documentation and reports provided by TREM, TRE AG, and ISR, and other source documents. The principal reports and documents reviewed are listed below:

Tantalus Project Reports

- Stock Exchange and Press Announcements – Tantalus Rare Earths AG Website, www.tre-ag.com
- SRK, 2013: A Competent Persons Report on the Tantalus Project, Northern Madagascar. SRK Exploration Services Ltd, ES7520.
- Resources for the Tantalus Rare Earth Ionic Clay Project Northern Madagascar, NI 43-101 Technical Report – SGS Canada Inc, October 2014
- Resources for the Tantalus Rare Earth Ionic Clay Project Northern Madagascar, Updated NI 43-101 Technical Report – SGS Canada Inc, June 2016
- Independent Geology Appraisal Report on Tantalum Rare Earth Malagasy SARL (TREM) Deposit Madagascar for ISR Capital Ltd - Geologica Pty Ltd, July 2016
- Independent Technical Valuation of the Rare Earth Concession Madagascar for ISR Capital Limited – Al Maynard and Associates Pty Ltd, September 2016
- Queries by SGX on the Al Maynard Valuation Report – SGX, November 2016
- Further Queries Raised by SGX on the Al Maynard Valuation Report – SGX, November 2016
- Exploratory Programme Achievements – TREM Powerpoint Presentation, June 2017

Background Rare Earth Information

- Browns Range Rare Earths Project – Northern Minerals Limited website and ASX releases, www.northernminerals.com.au
- Cummins Range Rare Earths Project – Kimberley Rare Earths Limited, www.kimberleyrareearths.com.au
- Kvanefjeld Rare Earth Project – Greenland Minerals and Energy Ltd website and ASX releases, www.ggg.gl
- Mt Weld Rare Earths Project – Lynas Corporation Limited website and ASX releases, www.lynascorp.com
- Nolans Rare Earth Project - Arafura Resources Limited website and ASX releases, www.arafuraresources.com.au
- Serra Verde Rare Earth Project - Mineracao Serra Verde website, www.mineracaoserraverde.com.br
- Yangibana Rare Earth Deposit – Hastings Technology Metals Limited website and ASX releases, www.hastingstechmetals.com
- Ngualla Rare Earths Project – Peak Resources Limited website and ASX releases, www.peakresources.com.au
- Mineralogie de Madagascar, Tome 1, Geologie-Mineralogie Descriptive, Challamel, A. (ed.) - Lacroix, A, 1922
- Castor, S. B. and Hedrick, J. B., 2006. Rare Earth Elements, pp 769-792. In: Kogel, JE, Trivedi, NC, Barker, JM and Krukowski, ST. Industrial Minerals and Rocks: Commodities, Markets and Uses, 7th edition. SME
- Chi, R. and Tian, J., 2008. Weathered Crust Elution-Deposited Rare Earth Ores, pp 1-288. (Nova Science Publishers, Inc. New York)
- Chakhmouradian, A. R. and Wall, F., Eds: 2012a. Rare Earth Elements, Elements, 8(5):321-400
- Kynicky, J., Smith, M. P. and Xu, C. 2012. Diversity of rare earth deposits: the key example of China. Elements,8:361-367
- Molycorp, 2012. News Release April 9, 2012. Molycorp's Rare Earth Reserves at Mountain Pass Increase by 36%. http://www.molycorp.com/investors
- Lynas Corporation, 2014. Lynas Offers Sustainable RE business model. March 2014 http://www.lynascorp.com/Presentations/2014
- Binnemans, K. and Jones, T., 2015: Rare Earths and the Balance Problem. J. Sustainable Metallurgy, 1, Issue 1, pp 29-38
- Evaluation of Rare Earth Projects Using the Real Options Model - Jiangxue Lui, PhD Thesis, Freiberg, May 2016
- Pellegrini, M., Goodlewska, L., Millet, P., Gislev, M. and Grasser, L., 2017: EU potential in the field of rare earth elements and policy - ERES2017: 2nd European Rare Earth Resources Conference, Santorini
- Wall, F., The geology of rare earth deposits and its influence on choosing the best routes for processing - ERES2017: 2nd European Rare Earth Resources Conference, Santorini

- Opinion on Tenement PR6698 held by Tantalum Rare Earth Malagasy - Lexel Juridique & Fiscal July 2017.

General Data

- Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves – Prepared by the Joint Committee of the Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Minerals Council of Australia (JORC) - December 2012 Edition
- Australasian Code for Public Reporting of Technical Assessments and Valuations of Mineral Assets - The VALMIN Code - Report of the VALMIN Committee of the Australasian Institute of Mining and Metallurgy and the Australian Institute of Geoscientists - 2015 Edition
- CSA, 2011: National Instrument 43-101 Standards of Disclosure for Mineral Projects, Form 43-101f1 Technical Report, and Companion Policy 43-101cp.
- SGX Listing Rules and Practice Notes - Disclosure Requirements for Mineral, Oil and Gas Companies

20.0 STATEMENT OF CAPABILITY

This report has been prepared by Dr Phillip Hellman, BDA Senior Associate and Mr Malcolm Hancock Executive Director of BDA. Mr Roland Nice, BDA Senior Metallurgical Consultant and Mr John McIntyre, Managing Director of BDA have reviewed the data and report. A summary of the professional qualifications and experience of the consultants involved is included below.

Dr Hellman and Mr Hancock have sufficient experience relevant to the Technical Assessment and Valuation of the Mineral Assets under consideration and to the activities which they have undertaken to qualify as Practitioners as defined in the 2015 edition of the VALMIN Code. Dr Hellman and Mr Hancock consent to the inclusion in the report of the information and data in the form and context in which they appear. Dr Hellman is a Member of the AIG and Mr Hancock is a Fellow of the AusIMM and both are bound by their Professional Societies to comply with the requirements of the VALMIN Code.

Dr Hellman is an experienced geologist and geostatistician, former Principal of Hellman and Schofield Pty Ltd and a Senior Consultant to H&S Consultants. He has worked on numerous rare earth projects in Australia, Asia and Africa and is the author of various specialist papers on rare earth deposits. He is a Member of the AIG and is a Competent Person under the JORC Code.

Both Mr Hancock and Mr McIntyre are Fellows of the AusIMM and are qualified as Competent Persons under the JORC Code, and each is qualified as a Certified Minerals Valuer (CMV) under the Australasian Institute of Minerals Valuers and Appraisers (AIMVA). Mr McIntyre is also a Certified Valuer as a Member of the International Institute of Mineral Appraisers ("IIMA"), formerly the American Institute of Mineral Appraisers ("AIMA").

BDA confirms that:

- the firm and the persons preparing this report have not been found to be in breach of any relevant rule or law
- are not denied or disqualified from membership of any relevant regulatory authority or professional association
- are not subject to any sanction imposed by, or the subject of any disciplinary proceedings by, or the subject of any investigation which might lead to disciplinary action by any relevant regulatory authority or professional association.

BDA is a mineral industry consulting group, specialising in independent due diligence reviews, valuations and technical audits of resources and reserves, mining and processing operations, project feasibility studies, and Independent Engineer work on project development, construction, and certification. BDA specialises in review and due diligence work for companies and financial institutions. The parent company, Behre Dolbear and Company Inc. has operated continuously as a mineral industry consultancy since 1911, and has offices in Denver, New York, Toronto, Vancouver, London, Hong Kong, Guadalajara and Sydney.

Mr Malcolm Hancock (BA, MA, FGS, FAusIMM, MIMMM, MMICA, CP (Geol), MAIMVA (CMV)) is a Principal and Executive Director of BDA. He is a geologist with more than 45 years of experience in the areas of resource/reserve estimation, reconciliation, exploration, project feasibility and development, mine geology, mining operations and project valuation. Before joining BDA, he held executive positions responsible for geological and mining aspects of project acquisitions, feasibility studies, mine development and operations. He has been involved in the feasibility, construction, and commissioning of several mining operations. He has worked on both open pit and underground operations, on gold, base metal, light metal, strategic minerals and industrial mineral projects, and has undertaken the management and direction of many of BDA's independent engineer operations in recent years.

Mr John McIntyre (BE (Min) Hon., FAusIMM, CP (Min), MAIMVA (CMV), MMICA, MAIMA) is a Principal and Managing Director of BDA. He is a mining engineer who has been involved in the Australian and international mining industry for more than 45 years, with operational and management experience in copper, lead, zinc, nickel, gold, uranium and coal in open pit and underground operations. He has been involved in numerous mining projects and operations, feasibility studies and technical and operational reviews and valuations in Australia, West Africa, New Zealand, North America, PNG and Southeast Asia. He has been a consultant for more than 30 years and has been Managing Director of BDA since 1994, involved in the development of the independent engineering and technical audit and valuation role.

Dr Phillip Hellman (BSc, PhD, MAusIMM, MIAG) is a Senior Associate of BDA with more than 40 years of experience as a professional geologist and resource estimation geologist. Dr Hellman is a former Principal of Hellman and Schofield Pty Ltd and a Senior Consultant to H&S Consultants. He has worked on numerous rare earth projects in Australia, Asia and Africa, India, Mongolia, Saudi Arabia, USA and is the author of various specialist papers on rare earth deposits. He is a Competent Person under the JORC Code.

Mr Roland Nice (BSc, FAusIMM, MCIM, MAIME, MIEAust, Chartered Engineer) is a Senior Associate of BDA with 45 years as a professional metallurgical engineer. He has extensive experience in process engineering and operations, project evaluation, technical design and analysis. He has held senior management positions, including General Manager, Metallurgy (12 years) and Concentrator Manager (4 years). Mr Nice has been closely involved with the development and construction of gold, copper, non-ferrous and base metal mines, including process plant design, as well as numerous other metallurgical projects. He has worked in Australia, South East Asia, Africa, South America and Canada.

21.0 STATEMENT OF INDEPENDENCE

Neither the Principals nor Associates of BDA have any material interest or entitlement in the securities or assets of TRE, REOM, ISR or any associated companies. BDA confirms that BDA, its partners, directors, substantial shareholders and their associates (BDA and Associates) are independent of all parties in the Proposed Acquisition, including ISR, its directors and substantial shareholders, its advisers and their associates. BDA and Associates do not have any interest, direct or indirect, in ISR, its subsidiaries or associated companies, the assets or parties involved. BDA confirms that it has not and will not receive benefits (direct or indirect) other than remuneration paid to BDA in connection with this report. BDA will be paid a fee for this report comprising its normal professional rates and reimbursable expenses. The consulting fees for this assignment, including travel and discussions with management and technical staff, total approximately A$79,000. The fee is not contingent on the conclusions of this report.

22.0 LIMITATIONS AND CONSENT

This assessment has been based on data, reports and other information made available to BDA by TREM, TRE AG and ISR. BDA has been advised that the information is complete as to material details and is not misleading. BDA has made reasonable enquiries and exercised its judgment on the reasonable use of such information and found no reason to doubt the accuracy or reliability of the information provided. In preparing this report, BDA has taken into account all relevant information supplied to BDA by the directors of ISR. A draft copy of this report has been provided to TREM, TRE and ISR for comment as to any errors of fact, omissions or incorrect assumptions.

The opinions stated herein are given in good faith. We believe that the basic assumptions are factual and correct and the interpretations reasonable.

With respect to the BDA report and use thereof by ISR, ISR agrees to indemnify and hold harmless BDA and Associates against any and all losses, claims, damages, liabilities or actions to which they or any of them may become subject under any securities act, statute or common law, except in the case of fraud or gross negligence, and will reimburse them on a current basis for any legal or other expenses incurred by them in connection with investigating any claims or defending any actions.

This report is provided to the Directors of ISR and their advisors and shareholders in connection with the valuation of the Tantalus Rare Earth project, the Proposed Acquisition and the listing requirements of the SGX, and should not be used or relied upon for any other purpose. This report does not constitute an audit. Neither the whole nor any part of this report nor any reference thereto may be included in or with or attached to any document or used for any purpose without our written consent to the form and context in which it appears, except as required by the laws and regulations relating to ISR and the Proposed Acquisition, including any rules of the Listing Manual of the SGX and other requirements of the SGX. In this regard, BDA acknowledges that this report is intended to be used for the purposes of the Proposed Acquisition (including reference to and/or inclusion in a shareholders' circular or other documents in connection with the Proposed Acquisition). The foregoing sentence constitutes BDA's approval and consent to the aforesaid use of BDA's report.

Report Prepared by Dr P Hellman and Mr M Hancock

Yours faithfully

BEHRE DOLBEAR AUSTRALIA PTY LTD

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APPENDIX

GLOSSARY

Term/Abbreviation	Description
A$	Australian Dollar
AIG	Australian Institute of Geoscientists
AIMA	American Institute of Mineral Appraisers
AIMVA	Australian Institute of Mineral Valuers and Appraisers
Arafura	Arafura Resources Limited
ASX	Australian Securities Exchange
AusIMM	Australasian Institute of Mining and Metallurgy
AWD	All Wheel Drive
B	Billion
BCMM	Bureau du Cadastre Minier de Madagascar
BDA	Behre Dolbear Australia Pty Limited
Behre Dolbear	Behre Dolbear & Company, Inc.
CP	Conditions Precedent
CREE/CREO	Critical Rare Earth Elements/Oxides
ECE	East China Minerals Exploration and Development
EUR	Euro
Fugro	Fugro Airborne Surveys of South Africa
Greenland Minerals	Greenland Minerals and Energy Limited
Hastings	Hastings Technology Metals Limited
HREE/HREO	Heavy Rare Earth Elements/Oxides
Huatai	Huatai Mining Pty Limited
IAD	Ionic Adsorption
ICP-MS	Induced Coupled Plasma Mass Spectrometry
IFC	International Finance Corporation
IIMA	International Institute of Mineral Appraisers
ISL	In-Situ Leach
JORC	Joint Ore Reserve Committee
kg	Kilogram
km	Kilometre
km^2	Square Kilometres
L	Litre
$L/h/m^2$	Litres per hour per square metre
LAMP	Lynas Advanced Materials Plant
LCT	Landing Craft
Lynas	Lynas Corporation Limited
LREE/LREO	Light Rare Earth Elements/Oxides
m	Metre
M	Million
m^3	Cubic Metre
MCA	Minerals Council of Australia
mm	Millimetre
MREE	Medium Rare Earth Elements
Mt	Million Tonnes
Mtpa	Million Tonnes Per Annum
NI 43-101	Canadian National Instrument 43-101
Northern Minerals	Northern Minerals Limited
OK	Ordinary Kriging
PEM	Prospectivity Enhancement Multiplier
pH	Measure of acidity where <7 is acidic and >7 is alkaline
PLS	Pregnant Leach Solution
ppm	Parts Per Million
PR	Permis de Recherche (Exploration Permit)
QA/QC	Quality Assurance/Quality Control

GLOSSARY CONTINUED

Term/Abbreviation	Description
RC	Reverse Circulation Percussion Drilling
REE/REO	Rare Earth Elements/Oxides
REOM	REO Magnetic Pte Ltd
RN	Route Nationale
SEG	Sm, Eu and Gd
SGS	SGS Canada Inc
SGX	Singapore Exchange
Shenghe	Shenghe Resource Holdings Ltd
SRK	SRK Exploration Services Ltd
t	Tonne
the project	Tantalus Rare Earths Project
THM	Tantalum Holding (Mauritius) Ltd
ThyssenKrupp	ThyssenKrupp Metallurgical Products GmbH
TRE	Tantalus Rare Earths AG
TREE/TREO	Total Rare Earth Elements/Oxides
TREOnoCe	Total Rare Earth Oxides without Ce
TREM	Tantalum Rare Earth Malagasy SARL
tpa	Tonnes Per Annum
US$	US Dollar
VALMIN	Australasian Code for Public Reporting of Technical Assessments and Valuations of Mineral Assets – 2015
Z	Atomic Number