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A PRELIMINARY ECONOMIC ASSESSMENT IN THE FORM OF AN INDEPENDENT TECHNICAL REPORT ON MBAC FERTILIZER CORP. (MBAC) ARAXÁ PROJECT LOCATED IN MINAS GERAIS STATE, BRAZIL, AS AMENDED,

PREPARED BY
VENMYN RAND (PTY) LIMITED
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DISCLAIMER AND RISKS

Venmyn and its Qualified Persons have prepared this Independent Technical Report and, in so doing, have utilised information provided by MBAC and its consultants. This information has been verified from independent sources with due enquiry in terms of all material issues that are a prerequisite to comply with National Instrument 43-101, the CIM Standards and the Toronto Stock Exchange rules.

OPERATIONAL RISKS

The businesses of mining and mineral exploration, development and production by their natures contain significant operational risks. The businesses depend upon, amongst other things, successful prospecting programmes and competent management. Profitability and asset values can be affected by unforeseen changes in operating circumstances and technical issues.

POLITICAL AND ECONOMIC RISKS

Factors such as political and industrial disruption, currency fluctuation, increased competition from other prospecting and mining rights holders and interest rates could have an impact on MBAC and its subsidiaries' future operations, and potential revenue streams can also be affected by these factors. The majority of these factors are, and will be, beyond the control of MBAC or any other operating entity.

FORWARD LOOKING INFORMATION

The following report contains forward-looking information. This forward looking information is based on opinions and estimates of MBAC management and Venmyn at the date the information is provided. Such information is subject to a number of known and unknown risks, uncertainties and other factors that may cause actual results to differ materially from those anticipated in the forward-looking information. Factors that could cause such differences include changes in world commodity markets, equity markets, costs and supply of materials relevant to the projects, and changes to regulations affecting the project. Although Venmyn believes the assumptions and expectations reflected in the forward-looking information to be reasonable, Venmyn cannot guarantee future results, levels of activity, performance or achievements.

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MBAC Fertilizer Corp.
Rua Visconde de Pirajá, 430, 10° Andar – Ipanema,
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Dear Sirs

1. EXECUTIVE SUMMARY (NI 1)

The directors of MBAC Fertilizer Corp. (MBAC or the Company) requested Venmyn Rand (Pty) Limited (Venmyn) to prepare an Independent Technical Report (ITR) on the Araxá Project (the Project or the Araxá Project) in Minas Gerais, Brazil.

MBAC is an international, Toronto Stock Exchange (TSX) (TSX:MBC) listed company focused on becoming a significant integrated producer of phosphate and potash fertilisers and related products in Brazil and other Latin American countries. The company currently operates a small phosphate mine and related infrastructure in Brazil and has an exploration portfolio of other phosphate and potash opportunities. This ITR specifically refers to the potential of the company's Araxá Exploration Project, situated in the Minas Gerais State of Brazil, which has potential for rare earth elements (REE), niobium (Nb) and phosphate (P). The company's initial focus will be on the mining of REEs, while also exploring the potential for the mining of Nb and P. Therefore, this ITR will be structured accordingly.

In this regard, the report has been prepared based on the requirements of the Canadian National Instrument 43-101 Standards of Disclosure for Mineral Projects, Form 43-101F1 and Companion Policy 43-101CP (NI43-101), as well as the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Definition Standards. This report serves as a compilation of all technical work completed on the Project to date by MBAC's advisors and includes a valuation prepared by Venmyn. This valuation, which is conceptual in nature, has been prepared for the Araxá Project as a Preliminary Economic Assessment (PEA) according to NI43-101, utilising information provided by MBAC, while also making a number of assumptions.

The effective date of this ITR is 1st October 2012, as amended 25th January 2013. Venmyn consents to MBAC using this report in any applicable disclosure document, provided that no portion is used out of context or in such a manner as to convey a meaning which differs from that set out in the whole.

In the execution of the mandate, Venmyn undertook a technical review, in order to identify all the factors of a technical nature that would impact on the prospectivity and future viability of the Project. However, mineral resources that are not mineral reserves do not have demonstrated economic viability. Venmyn considered the strategic merits of the asset on an open and transparent basis. This work has been based upon technical information, which has been supplied by MBAC and its technical advisors, which has been independently reviewed by Venmyn.

A site visit was undertaken by Mr Bradley Ackroyd of Andes Mining Services Limited (AMS) to the Araxá Project between the 5th and 6th of April 2012. Mr Ackroyd, a staff member of AMS, is the Qualified Person responsible for the Mineral Resources Statement and also a co-author of this ITR. Venmyn did not prepare the Resource Statement for the Araxá Project. Venmyn has, however, prepared the valuation of the Araxá Project based upon this declared Mineral Resource, MBAC's Business model, metallurgical testwork prepared on the Araxá mineralisation samples and the mass balance prepared by Hatch Consulting (Hatch) on the Araxá Project.

The reader is cautioned that this ITR is a PEA that is preliminary in nature that includes inferred mineral resources that are considered to be speculative geologically to have economic considerations applied to them that would enable them to be categorised as mineral reserves. There is no certainty that the PEA will be realised. No mineral reserves have been estimated. Mineral resources that are not mineral reserves do not have demonstrated economic viability.

1.1. Project Description (NI 1)

The Araxá Project is an advanced stage exploration project with declared Inferred, Indicated and Measured Mineral Resources of REEs, niobium and phosphate defined by drilling and pitting.

The Araxá Project comprises four exploration permits and one mining permit, covering a total area of 226ha. It is located 5km south of the town of Araxá, Minas Gerais State, Brazil. Araxá is situated approximately 375km from the capital of this State, Belo Horizonte, 549km from Sao Paulo and 848km from Rio de Janeiro. The Araxá Project is situated at latitude of 19°40'S and longitude of 46°57'W.

The town of Araxá is accessed from Belo Horizonte via the tarred BR262 state highway travelling west-northwest over a distance of 375km, whilst the Araxá Project is accessed via the BR146 tarred road travelling south from the town.

The Araxá Project is located within 1km of the Vale Fertilizantes SA's (Vale's) phosphate mine and Single Super Phosphate (SSP) fertiliser plant as well as within 1km of the world's largest operating niobium mine, belonging to Companhia Brasileira de Metalurgia e Mineração (CBMM).

1.2. Infrastructure (NI 1)

The local infrastructure available to the Araxá Project is excellent as a result of the Araxá Project being situated 5km south of the town of Araxá and within 1km of two other mining operations. The following is available within the exploration permit boundary or within a 5km radius of it:-

- tarred roads;
- grid power;
- borehole water;
- accommodation and offices – available in Araxá town;
- telecommunications – cellular phone coverage is available on site;
- skilled workforce – available locally from Araxá, or from Belo Horizonte, the capital and the centre of mining in the state of Minas Gerais; and
- labour – available from the nearby town of Araxá.

1.3. Ownership (NI 1)

MBAC has access to four Exploration Permits and one Mining Permit over the Araxá Project, covering a total area of 226ha:-

- Exploration Permit No. 834653/2011, an application in the name of MBAC, which has not yet been granted by the Departamento Nacional de Producao Mineral (DNPM);
- Exploration Permit No. 832150/1989, held by MBAC. An application for an extension for this permit was submitted to DNPM and has been awarded;
- Exploration Permit No. 831437/1988, held by MBAC. An application for an extension for this permit was submitted to DNPM and has been awarded
- Exploration Permit No. 831436/1988, held by MBAC The final exploration report on this property has been submitted to DNPM and is under review; and
- Exploration Permit No. 831972/1985 is held by MBAC. MBAC has applied for the definitive mining permit, which is still being evaluated by the DNPM

MBAC does not own the surface rights over the Araxá Project but has been granted full access by CBMM, the holder of the surface rights.

1.4. Material Agreements (NI 1)

According to information supplied by MBAC's independent lawyer, Magma Servicos de Minaeracao Ltda, the following material agreements apply to the Araxá Project:-

- an exercised option agreement between Itafós and Extramil, dated 15th June 2011, which allows for MBAC to obtain the rights to Extramil's Exploration Permits via its subsidiary, Itafós; and
- an agreement between MBAC and CBMM, allowing MBAC full access to the Araxá Project.

The royalties for the government in Brazil are 2% of the revenue on the sale of mineral products. However, considering the fact that MBAC is selling oxides that have already been transformed through a chemical process, MBAC royalties on the Araxá Project are calculated based on the cost of the mineral products. This refers to the production cost up to the crushing and drying (beneficiation) of the ore.

1.5. Geology and Mineralisation (NI 1)

The Araxá Project is a REE, niobium and phosphate mineral deposit. Geologically, the Araxá Project is classified as a primary carbonatite deposit, with near surface secondary enrichment in the saprolitic profile due to the influence of tropical weathering conditions and the relative mobility of the REEs and niobium.

REE-enriched mineral deposits are broadly divided into primary and secondary deposits. Primary deposits are associated with igneous and hydrothermal processes while secondary deposits are associated with sedimentary and weathering processes.

Carbonatites and other alkaline intrusive complexes, as well as their weathering products are considered a primary source of REE mineralisation. The mineral hosting the REEs at Araxá is monazite.

Primary niobium deposits occur within granite intrusions and associated pegmatites or within carbonatite and other alkaline igneous intrusions. The niobium mineralisation at Araxá is therefore present within a carbonatite. The host mineral for niobium at Araxá is pyrochlore.

Phosphate rocks are derived principally from two primary sources, namely phosphorous rich sediments known as phosphorites, and from carbonatite and alkaline igneous intrusive rocks. The phosphate deposit at Araxá is the latter type. Carbonatite and alkaline igneous intrusive sources of phosphate rocks are typically considerably smaller deposits than the sedimentary sources. However, these igneous deposits are often of a significant local importance for fertiliser industries or, alternatively, produce phosphate as a by-product of other minerals mined within the carbonatite host. The host mineral for phosphate at Araxá is apatite.

Carbonatites are defined as igneous rocks with a mineralogical composition of in excess of 50% carbonate minerals. Alkaline intrusive rocks, including carbonatites, contain elevated concentrations of REEs, although it is important to note that the source of the REEs is the initial magma. The principal REE-bearing minerals associated with carbonatites are fluocarbonates (bastnaesite, parasite, and synchysite), hydrated carbonates (ancylite), and phosphates (monazite and apatite).

It is useful to place the Araxá Project into context with other global REE, niobium and phosphate deposits in terms of grade and tonnage. The Project may be classified as a medium-grade and high-tonnage REE deposit, comparable to the Mountain Pass deposit in terms of grade and the Dubbo deposit in terms of tonnage.

REEs are traditionally divided into two types for scientific and economic valuation purposes, namely light REEs (LREE) and heavy REEs (HREE), with each element having its own specific properties, dedicated end uses and price as well as supply and demand fundamentals. Recently, researchers and industry analysts have favoured a valuation subdivision based on industrial demand for the different REEs. This subdivision system is dynamic, allowing for a primary evaluation approach to REE that takes into account the direct industrial uses for individual REEs, coordinated with current and forecasted demand and potential future supply. REEs are now grouped into Critical REEs (CREEs), Excess REEs (EREEs) and Uncritical REEs (UREEs), with CREE being in greatest demand and lowest supply resulting in a net higher price.

The Araxá Project can be classified has a CREE Project. The relative abundance of CREEs at Araxá implies significant economic potential. It is comparable to deposits such as Mount Weld and Bear Lodge in the USA on the basis of its REE makeup. When compared to global niobium deposits, Araxá is a relatively high grade and low volume deposit with respect to its niobium content, while, when compared to global phosphate deposits, Araxá has relatively low grades and low tonnages.

The Araxá Project is located within the Barreiro Carbonatite Intrusive Complex which forms part of the Alto Paranaiba suite of alkaline carbonatites and kimberlites which were intruded along the so called AZ125° lineament. This lineament stretches over 2,000km from Rondonia to Rio de Janeiro. The Barreiro Complex is a circular shaped intrusion with a diameter of approximately 5km. The complex intruded into the surrounding sediments (quartzites and schists) of the Araxá Group approximately 87 million years ago. This intrusion caused the doming of the existing sediments, with concentric and radial fracturing evident in the quartzites.

The subsequent erosion and weathering of the carbonatite complex in a tropical climate has formed a deep saprolitic profile. The leaching associated with the formation of the saprolitic profile has resulted in the enrichment of the REEs, niobium and phosphates present into economic concentrations. These economic deposits are currently being exploited by Vale and CBMM at their phosphate and niobium mines, respectively, located adjacent to the Araxá Project.

The Araxá Project forms a small part of the carbonatite complex and is situated on the northern limit of the pipe. The local geology, within this part of the complex, is comprised of phlogopite and subordinate beforite rock types. The surface is covered by hard iron-rich laterite, locally called “Canga”. Colluvial material covers the laterite on a saddle between the slopes of two small hills. There are limited exposures of highly weathered carbonatite.

The Araxá Project has defined a mineralised target area of 650m x 250m, as a result of the location of the boreholes associated with the exploration programme. Mineralisation is known to extend to a depth of 80m based upon this drilling. It is important to note that mineralisation is open ended in all directions and has been limited along the permit boundaries, positioning of the boreholes and by the maximum drill depth.

1.6. Status of Exploration (NI 1)

The Berreiro Carbonatite was first documented in 1925 and as having phosphate potential from as early as the 1940s. However, the REE and niobium mineralisation was only identified a decade later.

Historical exploration was undertaken between 1965 and 1974 by the Brazilian government under the auspices of the DNPM and by CBMM and Canopus Holding SA (Canopus). Exploration included the drilling and sampling of 24 diamond boreholes and the excavation and sampling of 59 pits. All these exploration sites were located within the Araxá Project boundary and are relevant to this report. Between 2004 and 2008 exploration was conducted by Extramil and Companhia Industrial Fluminense (CIF) within the Araxá Project boundary. Exploration included the drilling and sampling of 11 diamond boreholes and 31 auger holes. The most recent exploration was carried out by MBAC and commenced in October 2011. This exploration included mapping, topographical surveys, 36 auger drillholes and 67 diamond core drillholes. The diamond drilling was completed by March 2012 and constituted 3,764.09m.

Using the exploration and sampling results of the 67 diamond drillholes and 36 auger drillholes, a three dimensional (3D) block model was prepared for the Araxá Project by AMS. The block model was based upon a borehole database for which 2.0m down-hole composites were created. The block model utilised a parent block size of 10m x 10m x 2m within which to estimate the grade using a set of consecutive Ordinary Kriging (OK) passes based on variography analysis as a method of estimation. The block model was used to estimate the resource grade and tonnage statement issued by the company in June 2012.

The Araxá Project is at an advanced stage of exploration, having declared Inferred, Indicated and Measured Mineral Resources; however, the proportion of these Mineral Resources of the total Resources base are ~77% Inferred, ~18% Indicated and ~5% Measured. MBAC does not plan any further drilling on the Araxá Project in the near future. Further drilling is only anticipated after the Project is running, considering that fact that the current Measured and Indicated Resources are enough for more than 20 years of the forecasted life of mine.

1.7. Development and Operations (NI 1)

The Araxá Project is an advanced exploration project. On completing this PEA report, MBAC intends to commission a Prefeasibility Study (PFS) on the Project and subsequently a Definitive Feasibility Study (DFS). MBAC plans to start mining the Araxá Project in 2015.

1.8. Mineral Processing and Metallurgical Testing (NI 1)

Historical metallurgical testwork carried out on the Araxá Project was undertaken by Instituto de Pesquisas Radioativas (IPR) and Extramil. More recent metallurgical testwork were carried out by Centro de Tecnologia Mineral (CETEM) in 2012 and by MBAC in 2012. The CETEM testwork provided further evidence that concentration of the rare earth oxides (REO) prior to chemical processing was not feasible and this paved way for the MBAC testwork which was a comprehensive bench-scale testwork programme aimed at investigating ways to produce a mother liquor (rare earth chloride solution) for use in the solvent extraction plant to generate the individual REOs.

After reviewing the various phases of metallurgical testwork carried out, Venmyn has drawn the following conclusions:-

- it is evident that the mineralisation has not been demonstrated to be amenable to concentration prior to chemical processing. Tests carried out so far have indicated that, although a concentrate can be produced, the grade and recoveries are not acceptable and neither are they optimum. This has been due to the existence of complex interrelationships between the various mineral grains, which makes it extremely difficult to liberate and separate. The 2012 CETEM study provided evidence to support this;
- the inability to produce a concentrate for the cracking step is not a new occurrence and neither is it a fatal flaw. There have been cases, which Venmyn has previously worked on, where such a phenomenon occurs and it can be dealt with by skipping the physical concentration step altogether. In that case, the cracking process would be performed on the ROM as delivered from the mine (whole REO cracking);
- solvent extraction, to obtain REOs, is a chemical step that can be reliably predicted using appropriate mass transfer equations. However, the premise for the ability to physically reproduce the mass transfer predictions lies in the ability to supply the solvent extraction process with an “on-spec” feed solution. To this end, the precipitation and dissolution circuits have been subjected to a programme of metallurgical testwork to establish the various parameters at various residence times although this needs to be optimised. The most optimum residence time required to produce the best feed solution to the solvent extraction plant would then be used, not only for equipment sizing and reagent addition requirements, but also for REE recovery calculations to be used in financial assessment exercises. Nevertheless, for solvent extraction, Venmyn notes that mass transfer equations provide a useful benchmark to predict plant performance but must be validated by appropriate testwork and the testwork carried out by IPR in 1975 and by MBAC in 2012 will serve as a basis;

- testwork to investigate the amenability of the REO to cracking and acid leaching have demonstrated that it is possible to recover 92% of the REOs in the mineralisation. It, therefore, follows that the most likely process route to be followed is whole REO cracking followed by precipitation, dissolution and solvent extraction without using a physical concentration step at the beginning;
- Venmyn notes that, although the testwork carried out to-date is detailed, it is, nonetheless bench-scale. The extent to which the testwork results can be replicated in a scaled-up plant is unknown. However, this can be confirmed through pilot plant construction as the Araxá Project moves into the PFS stage. MBAC is already engaging in the preparation of the pilot plant phase as 18t of REO samples have been collected, and a portion of this material is already prepared (crushed, grinded and dried) for the pilot plant. The pilot plant is expected to be operational by the end of 2012;
- in addition, variability metallurgical testwork also needs to be carried out using samples from different areas of the deposit to reliably estimate plant performance as different areas of the deposit are mined. The 18t of mineralisation that have been collected at the future mine is representative of the four main types of mineralisation described so far and the pilot plant will run using these four types. This phase of the testwork can, however, form part of the PFS studies as the first priority of obtaining a robust process flow sheet has already been accomplished; and
- the 2012 testwork has demonstrated that it is possible to recover 92% of the REOs in the Araxá mineralisation at the given reagents' consumption rates using the given flowsheet.

1.9. Mineral Resource and Mineral Reserve Estimates (NI 1)

A Mineral Resource estimate was conducted in May and June 2012 by AMS in conjunction with the independent resource geologist, Mr B Ackroyd. A NI43-101 compliant Resource Statement was issued and signed off by the Qualified Person using recent drilling data completed by MBAC during late 2011 to early 2012. The database is current to the 1st of May 2012 and was used to produce the Mineral Resource estimate from 67 diamond drillholes totalling 3,764.09m drilled at a spacing of approximately 40m by 40m as well as 35 Auger holes totalling 176.56m at irregular spacing. Within the centre of the Mineral Resource, drill spacing was drilled at 20m by 20m in an effort to increase the Mineral Resource category confidence. Only assay results from the diamond drillholes were used for variography and grade estimation purposes, while the auger and diamond drillholes were used for modelling and wireframing.

The Mineral Resource Statement is presented in the Table 1:-

Table 1 : Araxá Project Resource Statement (AMS, June 2012)

MINERAL RESOURCE GRADE TONNAGE REPORT - 1ST JUNE 2012 (BLOCK MODEL - 10me x 10mn x 2mRL) - ORDINARY KRIGING								
CUTOFF (% TREO)	TONNES (Mt)	TREO %	LREO %*	HREO %**	P_2O_5 %	Nb_2O_5 %	Al_2O_3 %	Fe_2O_3 %
Measured Resource Category								
0.00	1.33	5.62	5.48	0.15	7.89	1.25	3.31	34.23
2.00	1.33	5.62	5.48	0.15	7.89	1.25	3.31	34.23
4.00	1.10	6.05	5.89	0.16	7.84	1.32	3.42	34.57
6.00	0.37	8.46	8.23	0.23	9.13	1.72	5.18	33.97
8.00	0.16	10.47	10.18	0.29	9.87	1.99	6.00	31.44
10.00	0.08	12.19	11.85	0.34	10.42	2.20	5.98	28.58
Indicated Resource Category								
0.00	5.02	4.85	4.73	0.12	8.54	0.96	5.68	32.76
2.00	5.02	4.85	4.73	0.12	8.54	0.96	5.68	32.76
4.00	3.29	5.58	5.44	0.14	8.69	1.07	5.69	32.36
6.00	0.88	7.75	7.57	0.19	10.25	1.35	8.17	29.32
8.00	0.27	9.88	9.64	0.24	11.28	1.67	8.95	28.79
10.00	0.10	11.73	11.44	0.29	11.83	1.98	8.66	29.38
Measured and Indicated Mineral Resource Category (2% Cutoff TREO)***								
2.00	**6.34**	**5.01**	**4.88**	**0.13**	**8.40**	**1.02**	**5.19**	**33.06**
Inferred Resource Category								
0.00	23.99	3.88	3.78	0.11	7.89	0.62	4.28	29.28
2.00	21.94	3.99	3.88	0.11	7.86	0.64	4.31	29.59
4.00	9.32	5.01	4.89	0.12	7.64	0.81	4.46	31.56
6.00	1.01	6.95	6.82	0.13	8.93	0.99	4.93	29.05
8.00	0.14	9.08	8.97	0.12	10.01	1.01	4.17	24.45
10.00	0.02	10.84	10.70	0.14	10.95	1.16	4.98	22.15
Inferred Mineral Resource Category (2% Cutoff TREO)***								
2.00	**21.94**	**3.99**	**3.88**	**0.11**	**7.86**	**0.64**	**4.31**	**29.59**

TREO includes La_2O_3,Ce_2O_3, Pr_2O_3, Nd_2O_3, Sm_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 and Y_2O_3

* LREO (97.60% of TREO) includes La_2O_3, Ce_2O_3, Pr_2O_3, Nd_2O_3 and Sm_2O_3

** HREO + Y_2O_3 (2.4% of TREO) includes Tb_2O_3, Dy_2O_3, Ho_2O_3, Er_2O_3, Tm_2O_3, Yb_2O_3, Eu_2O_3, Gd_2O_3, Lu_2O_3 and Y_2O_3

An independent mineral resource has been estimated for the Araxá Project comprising a combined measured and indicated mineral resource of 6.34 Mt at 5.01% TREO (using a 2% TREO cut-off), 8.40% P_2O_5 and 1.02% Nb_2O_5 and an inferred mineral resource of 21.94 Mt at 3.99% TREO, 7.86% P_2O_5 and 0.64% Nb_2O_5 (using a 2% TREO cut-off grade).

Table 2 and Table 3 highlight the breakdown for the various REO's for the Araxá Project

Table 2 : Breakdown of the LREO Mineral Resource Grades and Tonnages (AMS, June 2012)

CATEGORY	CUTOFF	SUITE OF LREO's (%)					LREO
	(% TREO)	La_2O_3	Ce_2O_3	Pr_2O_3	Nd_2O_3	Sm_2O_3	(%)
Measured	2.00	1.53	2.81	0.26	0.79	0.08	**5.48**
Indicated	2.00	1.35	2.40	0.22	0.67	0.07	**4.73**
Inferred	2.00	1.12	1.96	0.18	0.55	0.06	**3.88**

Table 3 : Breakdown of the HREO Mineral Resource Grades and Tonnages (AMS, June 2012)

CATEGORY	CUTOFF	SUITE OF LREO's (ppm)										HREO
	(% TREO)	Eu_2O_3	Gd_2O_3	Tb_4O_7	Dy_2O_3	Ho_2O_3	Er_2O_3	Tm_2O_3	Yb_2O_3	Lu_2O_3	Y_2O_3	(ppm)
Measured	2.00	182	371	38	153	22	44	3	23	1	626	**1,463**
Indicated	2.00	158	322	33	129	18	36	2	18	1	502	**1,217**
Inferred	2.00	135	275	29	117	16	32	2	16	0	459	**1,080**

No Mineral Reserve Estimate has been undertaken for the Araxá Project at the date of publishing this ITR.

1.10. Mining Methods (NI 1)

At the time of the preparation of this report, MBAC had not undertaken any mine/pit design studies on the Project. However, MBAC provided Venmyn with a detailed business plan showing the proposed mining method, mining schedule, mine production, production phases and equipment that will be used by MBAC in mining the Araxá Project. Venmyn is of the opinion that the study undertaken by MBAC, which is conceptual in nature, is appropriate for a PEA of the Araxá Project.

MBAC proposes to mine the Project in three phases, mining 120kt in the first five years of the operation of the mine, which is scheduled to begin operation in 2015.

An initial cut-off of 6% REO was assumed for the initial operating of the mine (between 2015 and 2022), and a cut-off of 4% assumed for the remaining years of operating the mine.

Table 4 summarises the REO grade at the initial mine operation and the remaining phases of operating the mine.

Table 4 : Summary of the REO grades at various mine operation phases

RESOURCE	INITIAL OPERATING (2015 – 2022)(MEASURED AND INDCATED RESOURCES - CUT-OFF OF 6%)	REO GRADE	REMAINING MINERALIZATION FOR PHASE 3 OPERATING - CUT-OFF 4%	REO GRADE
CATEGORY	(Mt)	(%)	(Mt)	(%)
Inferred			9.32	5.01
Indicated	0.88	7.75	2.41	4.79
Measured	0.37	8.46	0.73	4.83
Total/Average	**1.25**	**7.96**	**12.46**	**4.96**

When compared to most mines in operation, the Araxá Project feed will have a low feed rate and hence a low capital cost is required. In conclusion, the Araxá Project will require low capital investment to kick-off operation.

1.11. Recovery Methods (NI 1)

Following the bench-scale testwork that has been completed on Araxá, a process route has been proposed for the extraction of REOs. This route is in line with the results of the testwork, which demonstrated that production of a concentrate prior to chemical processing is not feasible. The plant is envisaged to be capable of producing seven REOs as well as an Nb_2O_5 concentrate. The production of dicalcium phosphate is still under investigation. In Venmyn's opinion, this proposed process route has been completed to a Scoping study level and has been successful in producing a robust Process Flow Diagram (PFD) for use in further optimisation and scale-up work.

The proposed process flow route comprises the following steps (in their order):-

- Run of Mine (ROM) treatment;
- Cracking Circuit – ROM is baked with sulphuric acid in a digestion process prior to water leaching to dissolve REEs along with iron, thorium, and niobium among other metals;
- Solvent Extraction for iron and thorium removal from the REE-containing solution;

- Precipitation Circuit – with the use of oxalic acid, rare earths (and niobium) are precipitated as rare earth oxalates and then filtered to separate them from a solution containing phosphoric acid;
- Dissolution Circuit – hydrochloric acid is used to dissolve the rare earth oxalate (to form rare earth chlorides, or the mother liquor) leaving behind a niobium-rich residue; and
- Solvent Extraction – individual rare earths and rare earths chlorides are separated from one another;
- Precipitation and Calcining – individual REE chlorides are converted to their respective soluble hydroxides prior to calcining to form the respective high-purity REO.

In Venmyn's opinion, the proposed process route conforms to the generalised and standard ways of extracting REOs from monazite ores through "whole ore cracking" whereby no pre-concentration is undertaken prior to cracking and there has been no evidence to suggest that fatal flaws exist.

A programme of bench-scale testwork has established some critical parameters of the project and is a solid base upon which to conduct more work going forward. In addition, whole ore cracking increases the sulphuric acid requirements in the cracking process. Hatch has, however, suggested that MBAC investigate the possibility of constructing a sulphuric acid plant to supply the cracking process and the current Capex estimates have taken the construction of a sulphuric acid plant into consideration.

1.12. Preliminary Economic Assessment (NI 1)

Venmyn was commissioned by MBAC to perform an independent valuation of 100% of the Araxá mineral asset. However, mineral resources that are not mineral reserves do not have demonstrated economic viability. Any decision to apply a valuation technique depends principally on the stage at which the project has been developed, the geological confidence and the potential of the asset for reasonable and realistic prospects for eventual economic extraction.

For the purposes of the valuation of Araxá, Venmyn valued the Araxá Project using the Discounted Cash Flow approach (DCF).

The DCF approach relies on the "value in use" principle and requires determination of the present value of future cash flows over the useful life of the asset. The DCF model is aimed at assessing the economic feasibility of mining and processing the niobium, Dicalcium Phosphate (DCP) and TREO Mineral Resources. The assumptions made in constructing the DCF model are summarised in the Table 5, while Table 6 shows the breakdown of the component prices of the REO basket price used in the DCF model.

Table 5 : Input Assumptions for DCF Model

INPUT ASSUMPTIONS	UNIT	VALUE
Life of Mine	years	40
Mining Recoveries	(%)	100%
Plant Recovery Factor for REO	(%)	92%
Leaching Efficiency for Nb_2O_5	(%)	41%
TREO Basket Price	(USD/t)	29,189
Nb_2O_5 Basket Price	(USD/t)	50,000
Project Real Discount Rate	(%)	10%
Tax Rate	(%)	34%

Table 6 : Breakdown of TREO Basket Price use in the DCF Model

REO	GRADE (%)	PRICES (US$/Kg)*	Basket (USD)
La	27.99	10.64	2.98
Ce	49.44	12.04	5.95
Pr-Nd	18.40	77.22	14.21
Sm	1.48	9.18	0.14
Eu	0.33	775.74	2.59
Gd	0.68	30.27	0.21
Tb	0.07	963.03	0.68
Dy	0.33	617.65	2.04
Ho	0.04	65.68	0.03
Er	0.08	42.97	0.03
Yb	0.04	50.00	0.02
Y	1.12	28.08	0.31

A study was undertaken on the Araxá Project by Hatch in February 2012 to determine the Capex as well as the Opex requirements for the production of REOs, niobium as well as DCPs. The estimates from the Hatch study, together with benchmark values from other similar projects, were used in the DCF model. Venmyn has reviewed the Hatch study and believes its basic assumptions are factual and accurate and that the interpretations are reasonable.

There are three production phases for the Araxá Project. Phase 1 is from 2015 – 2019, phase 2 is from 2020 to 2022 and phase 3 from 2023 onwards. The ROM volume, grade as well as the REO production for the different phases are summarised in Table 7 below.

Table 7 : Production Phases

DESCRIPTION	UNIT	2015	2016	2017	2018	2019	2020	2021	2022	2023
ROM/Year	tpa	95,858	119,454	119,454	119,454	119,454	191,702	239,645	239,645	384,881
TREO Grade	(%)	7.96%	7.96%	7.96%	7.96%	7.96%	7.96%	7.96%	7.96%	4.96%
REO Recoveries	(%)	92%	92%	92%	92%	92%	92%	92%	92%	92%
REO Production	tpa	7,020	8,748	8,748	8,748	8,748	14,039	17,550	17,550	17,550
Nb_2O_5 Grade	(%)	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.15%
Leaching Efficiency for Nb_2O_5	(%)	41.40%	41.40%	41.40%	41.40%	41.40%	41.40%	41.40%	41.40%	41.40%
Nb_2O_5 Production	tpa	595	742	742	742	742	1,190	1,488	1,488	1,832

The Capex and Opex assumed for the Araxá Project are summarised in Table 8 and Table 9.

Table 8 : Capex Assumptions

DESCRIPTION	UNIT	VALUE
Initial Capital Requirements Phase 1	(USDm)	(406.05)
Initial Capital Requirements Phase 2	(USDm)	(214.48)
Sustaining Capital 2015 - 2036	(USDm)	(7.00)
Sustaining Capital 2037 Onwards	(USDm)	(4.00)

The first two phases will require capital expenditure. The capital requirements for phase 1 will be paid between 2013 and 2015, and the phase 2 capital requirements between 2018 and 2020. A sustaining capital provision of USD7m is made for 2015 – 2036 and USD4m from 2036 onwards.

Table 9 : Opex Assumptions

		VALUES		
DESCRIPTION	UNIT	PHASE1	PHASE2	PHASE3
Total REA Reagent Costs	USD/t TREO	(7,668.09)	(7,668.09)	(9,856.77)
NB2O5 Production Costs	USD/t Nb2O5	(10,000.00)	(10,000.00)	(10,000.00)
Mining Costs	USD/t TREO	(360.12)	(360.12)	(531.32)
Labour Costs	USD/t TREO	(1,644.00)	(822.01)	(822.01)
Contingency	(%of Opex)	5%	5%	5%
Maintenance	(% of Opex)	3%	3%	3%
SG&A Costs	(USDm)	(12.50)	(12.50)	(12.50)
CFEM	USD/t TREO	(32.61)	(32.61)	(32.61)

Operating costs were estimated for each of the three production phases in the Araxá Project. CFEM (Financial Contribution over Mineral Exploration) is a Federal Exploration Tax.

After applying all the assumptions, the DCF model has a Net Present Value (**NPV) of USD967m** and an Internal Rate of Return (IRR) of 30%. The valuation summary using the cash flow approach is presented in Table 10.

Table 10: Valuation Summary for Cash Flow Approach

DESCRIPTION	UNIT	VALUE
Discount Rate	%	10
NPV	USDm	967
IRR	%	30

Due to the fact that the DCF for the Araxá Project has been prepared for a PEA study level, a number of assumptions were made. It is therefore, necessary to present the effect of various scenarios on the NPV at various discount rates in the form of a sensitivity analysis. This is useful in establishing the level to which the Project is robust and is also helpful in quantifying certain risk factors. The sensitivity of the NPV to the Real Discount Rate is summarised in the table below.

Table 11 : NPV Sensitivity to Real Discount Rate

REAL DISCOUNT RATE (%)	NPV (USDm)
8	1,375
9	1,150
10	967
11	816
12	691

1.13. Conclusions (NI 1)

Araxá is an igneous carbonatite containing REEs, niobium and phosphate mineralisation. When compared to world class deposits, Araxá is a high grade, high tonnage REE deposit, a high grade and low tonnage niobium deposit and a low grade and low tonnage phosphate deposit.

MBAC has undertaken a systematic exploration programme over the past year which has been successful in defining significant resources of REO's, Phosphate and Niobium.

AMS is of the opinion that MBAC has successfully confirmed the Mineral Resource potential of the Araxá Project based on the 2011 and 2012 exploration programmes, with significant further upside for the addition of Measured and Indicated Resource.

AMS considers the Araxá Project to be sufficiently robust to warrant the undertaking of further metallurgical studies to better characterise individual REE recoveries as well as the rare earth mineralisation processing parameters, while also conducting additional drilling to potentially increase the quantity and augment the confidence level of the current Mineral Resource. However, MBAC only anticipates further drilling after the project is running, since the current Measured and Indicated Resources are enough for more than 20 years of the forecasted life of mine.

Venmyn is of the opinion that a number of strategic issues need to be highlighted with respect to the PEA carried out on the Araxá Project for MBAC:-

- the extent of current exploration has demonstrated that the mineralisation is open ended both laterally and vertically. Therefore, additional exploration outside the current limits may significantly increase the resource base;
- the metallurgical testwork that has been carried out to-date has demonstrated that concentration prior to cracking is not feasible. As a result, whole ore cracking will be employed and this has been confirmed through the bench-scale testwork that has been carried out on the project. REO recoveries of 92% have been attained from this testwork;
- more metallurgical testwork of representative samples needs to be undertaken to determine the process route for the extraction of phosphate from the Project to increase the potential revenue of the Araxá Project. MBAC is already engaging in the preparation of the pilot plant phase as 18t of ore has been collected, and a portion of this material is already prepared (crushed, grinded and dried) for the pilot plant. The pilot plant is expected to be operational by the end of 2012. The 18t of REO samples that has been collected at the future mine is representative of the 4 main types of mineralisation described so far and the pilot plant will run using these four types;
- the Araxa Project will be mined using an open pit mining method with benches, while the orebody will be mechanically excavated and transported from the mine to the processing plant by road;
- due to the expected low feed rate of 120kt in the first five years of operation, the mining operation will not require large equipments, hence the Araxá Project requires a low capital cost relative to many other globally operating REE mines;
- the proximity of the Araxá Project to neighbouring CBMM niobium mine and Vale Fertilizantes phosphate mine shows that the Araxá Project is located in an area with established infrastructure, and this may reduce the capital cost of establishing the mine;
- The Araxa Project is currently in the PEA stage and, as such, an Environmental Impact Asssessment (EIA) has not been completed. However, preliminary evaluation of the potential environmental impact and their respective measures for mitigation has been undertaken by MBAC independent consultant;
- the proximity to established mines suggest that there will be a pool of labour familiar with mining that can be readily accessed when mining begins;
- the proximity to established mines is an indication that the Araxá Project should be able to access proven technology for the extraction of the niobium and phosphate in the Project, thereby increasing the economic potential of the Araxá Project;
- Venmyn found the Discounted Cashflow Approach was most appropriate for the valuing of the Araxá Project, hence ascribing a "Fair Value" of **USD 967m** to the Araxá Project.

In conclusion, the PEA carried out by Venmyn on the Araxá Project shows that the Araxá Project has a positive NPV base at current market condition. However, this financial model was developed based on a number of assumptions, and once the above mentioned work is done at the PFS level, confidence in the assumptions as well as the NPV of the project will increase.

1.14. Recommendation (NI 1)

In Venmyn's opinion the studies that have been carried out on the Araxá Project, satisfy the requirement for a PEA and MBAC should proceed to undertake a PFS on the Araxá Project.

2. INTRODUCTION (NI 2)

2.1. Issuer (NI 2a)

MBAC requested Venmyn to prepare an ITR on the Araxá Project in Brazil (Figure 1). MBAC through its 100% owned subsidiary Araxá Mineração e Metalurgia Ltda is the sole beneficial holder of three exploration permits and one mining application license through an option agreement with Extramil Ltda (Figure 2).

MBAC is an international, Toronto Stock Exchange (TSX) (TSX:MBC) listed company focused on becoming a significant integrated producer of phosphate and potash fertilisers and related products in Brazil and other Latin American countries. The company currently operates a small phosphate mine and related infrastructure in Brazil and has an exploration portfolio of other phosphate and potash opportunities. This ITR specifically refers to the potential of the company's Araxá Exploration Project, situated in the Minas Gerais State of Brazil, which has potential for rare earth elements (REE), niobium (Nb) and phosphate (P). The company's initial focus will be on the mining of REEs, while also exploring the potential for the mining of Nb and P. Therefore, this ITR will be structured accordingly.

2.2. Terms of Reference and Purpose (NI 2b)

In this regard, the report has been prepared for MBAC based on the requirements of NI43-101 as well as CIM. A valuation has been prepared for the Araxá Project as a PEA according to NI43-101 and utilising all available information as at the effective date of this report. These guidelines are considered by Venmyn to be a concise recognition of the best-practice due-diligence methods for this type of mineral project and accord with the principles of open and transparent disclosure that are embodied in internationally accepted Codes for Corporate Governance.

Venmyn's professional advisor Mr Andy Clay is a Qualified Person as defined by the NI43-101, and, internationally accredited. Mr Clay is also a fellow of the Australasian Institute of Mining and Metallurgy (AusIMM) which embodies the Code and Guidelines for Assessment and Valuation of Mineral Assets and Mineral Securities for Independent Expert Reports 2005 (The Valmin Code). However, Mr Bradley Ackroyd, a co-author in the PEA report, a staff member of AMS, is the Qualified Person responsible for the Mineral Resource estimate and associated work in this report. Mr Ackroyd, is a member in good standing with the Australian Institute of Geoscientists (AIG) and has the relevant and appropriate experience and independence to appraise this Project. To this end, the Qualified Person Certificates are presented in Appendix 1.

Venmyn is an independent advisory company. Neither Venmyn nor its staff have or have had any interest in MBAC, its subsidiaries or the Araxá Project capable of affecting their ability to give an unbiased opinion, and have not received, and will not receive, any pecuniary or other benefits in connection with this assignment, other than normal consulting fees. Neither Venmyn, nor any of the authors of this report, hold any share capital in MBAC or its subsidiaries.

The effective date of this ITR is the 1st October 2012. Venmyn consents to MBAC using this report in any applicable disclosure document, provided that no portion be used out of context or in such a manner as to convey a meaning which differs from that set out in the whole.

The reader is cautioned that this ITR is a PEA that is preliminary in nature that includes inferred mineral resources that are considered to be speculative geologically to have economic considerations applied to them that would enable them to be categorised as mineral reserves. There is no certainty that the PEA will be realised. No mineral reserves have been estimated. Mineral resources that are not mineral reserves do not have demonstrated economic viability.

2.3. Use of the Term "Ore"

The Canadian National Instrument Companion Policy 43-101 (Section 2.3) states "We consider the use of the word "ore" in the context of mineral resource estimates to be misleading because "ore" implies technical feasibility and economic viability that should only be attributed to mineral reserves". In compliance with Section 2.3 of the Companion Policy, the term "ore" is not used in the Mineral Resource context of this ITR (Section 13).

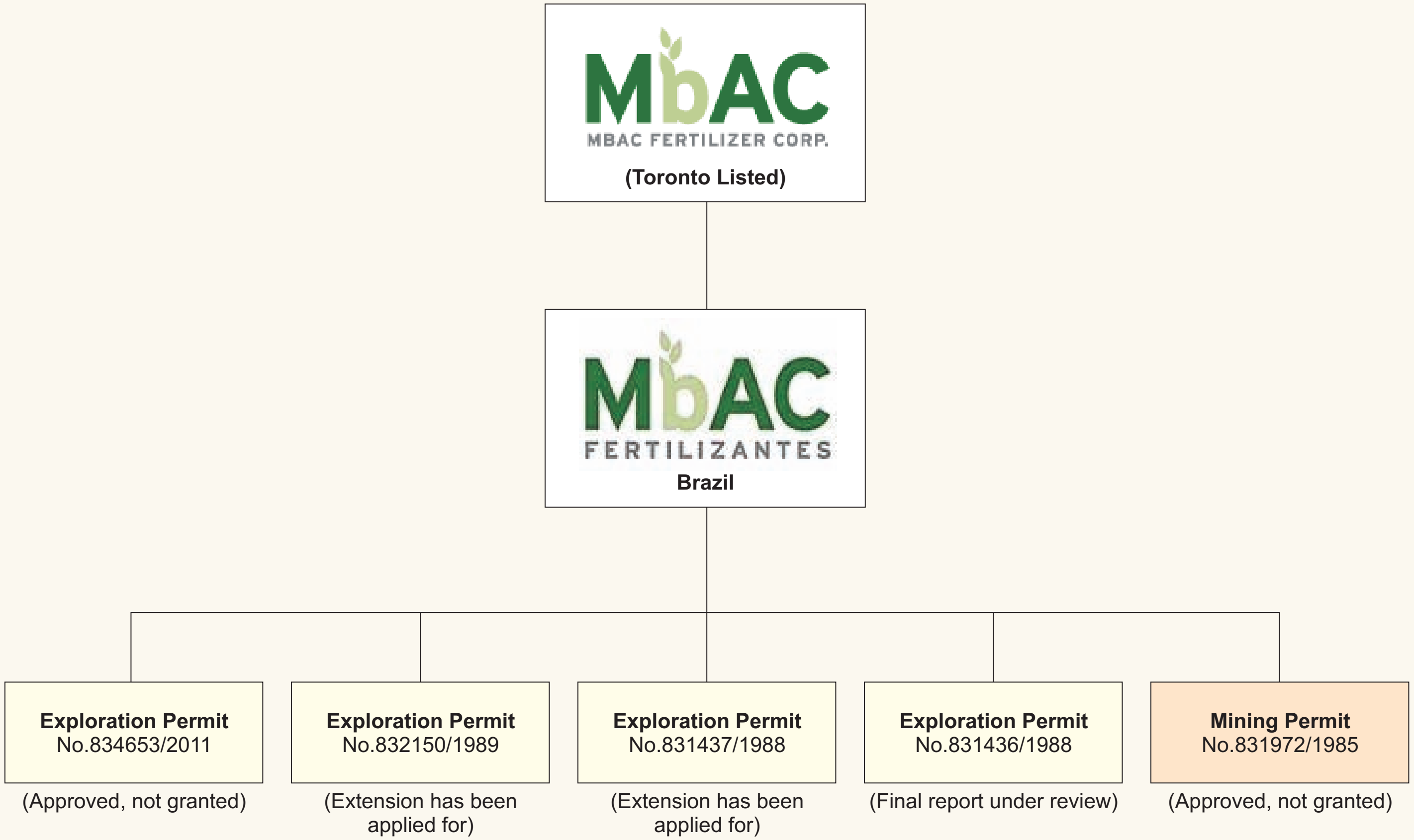
However, there are places throughout this ITR where for clarity purposes, the term "ore" is used in the normal historical geological sense and is hereby defined as describing "material containing REEs in potential economic quantities, with no implication that the material is a Mineral Reserve for which economic and technical feasibility studies have been completed"

2.4. Sources of Information (NI 2c)

In the execution of the mandate, Venmyn undertook a technical review, in order to identify all the factors of a technical nature that would impact on the prospectivity and future viability of the project. However, mineral resources that are not mineral reserves do not have demonstrated economic viability. Venmyn considered the strategic merits of the asset on an open and transparent basis. This work has been based upon technical information which has been supplied by MBAC and its technical advisors and which has been independently reviewed by Venmyn. The information supplied includes the following:-

LOCATION OF THE ARAXÁ PROJECT IN BRAZIL

OWNERSHIP OF THE ARAXÁ PROJECT



MBAC FERTILIZER CORP.
(Toronto Listed)

MBAC FERTILIZANTES
Brazil

Exploration Permit
No.834653/2011
(Approved, not granted)

Exploration Permit
No.832150/1989
(Extension has been applied for)

Exploration Permit
No.831437/1988
(Extension has been applied for)

Exploration Permit
No.831436/1988
(Final report under review)

Mining Permit
No.831972/1985
(Approved, not granted)

Source: MBAC

Araxá Project

FIGURE 02

- Documentation provided by MBAC on the legal tenure;
- Mineral Resource Estimate – Araxá Rare Earth Oxide – Phosphate – Niobium Project, Minas Gerais State, Brazil by Mr B Nicholls of Amazon Geoservices (2012);
- Mineral Resource Estimate – Araxá Rare Earth Oxide – Phosphate – Niobium Project, Minas Gerais State, Brazil by Mr B Ackroyd of Andes Mining Services (2012);
- Complete Technological Characterisation of Rare Earth Elements Ore by Dr R Neumann of Centro de Tecnologia Mineral (CETEM) (2012);
- Feasibility Studies of a Technological Route to obtain Rate Earth Oxides from the Araxá Ore by Mr W da Cunha and Ms G Wildhagen (2012);
- Araxá Business Model by MBAC (2012);
- Araxá Mass Balance by MBAC (2012);
- Project Araxá – Prosphate and Rare Earth Areas – Preliminary Assessment by Paulo Roberto Amorim dos Santos Lima (2011); and
- Characteriszation studies on mineralized samples containing rare earth and niobium – Extramil Project Araxá – Phosphate and Rare Earth Areas – Preliminary Assessment by Paulo Roberto Amorim dos Santos Lima (2011).

A full and detailed list of references used in the compilation of this ITR is presented in Section 27.

A draft of this report has been provided to MBAC in order to identify and address any factual errors or omissions prior to finalisation. This document has been compiled in order to incorporate all currently available and material information that will enable potential investors to make a reasoned and balanced judgement regarding the economic merits of the project. The report has been prepared using information up to and including 20th July 2012. MBAC has warranted that it has openly provided all material information to Venmyn which, to the best of its knowledge and understanding, is complete, accurate and true.

The authors of this report believe that the basic assumptions contained in the information listed above are factual and accurate and that the interpretations are reasonable. The authors of this report have to the extent applicable relied on this data and have no reason to believe that any material facts have been withheld. The authors of this report have taken all appropriate steps, in their professional judgement, to ensure that the work, information, or advice from the above noted information is sound.

2.5. Personal Inspection (NI 2d)

A site visit was undertaken by Mr Bradley Ackroyd (AMS) to the Araxá Project between the 5th and 6th of April 2012. Mr Ackroyd, a geological consultant with AMS, is the Qualified Person responsible for the signing off of the Mineral Resources statement and also a co-author of this PEA report.

3. RELIANCE ON OTHER EXPERTS (NI 3)

In compiling the ITR, Venmyn reviewed and made use of the documentation outlined in Section 1.5 and Venmyn has relied upon the independent opinion of the experts, Qualified Persons and Specialist Consultants to the extent and in the context outlined in Table 12:

Table 12 : Reliance on Other Experts

DATE	COMPANY	EXPERT	STUDY	EXTENT OF RELIANCE
12-Sep	Independent Consultant with MBAC Fertilizers	Rosangela Rios	Environmental Assessment at the Araxá Project area	Section 20
11-Aug	Magma Servicos de Minercao Ltda	Lawyers	Opinion of the Araxá mineral permits	Section 4

4. PROPERTY DESCRIPTION AND LOCATION (NI 4)

4.1. Description (NI 4a)

The Araxá Project is an advanced stage exploration project with declared Inferred, Indicated and Measured Mineral Resources of Rare Earth Element (REE), niobium and phosphate defined by drilling and pitting. The Araxá Project comprises five exploration permits and one mining permit covering an area of 226ha.

4.2. Location (NI 4b)

The Araxá Project is located 5km south of the town of Araxá, Minas Gerais State, Brazil (Figure 1 and Figure 3). It is situated approximately 375km from the capital of this State, Belo Horizonte, 549km from Sao Paulo and 848km from Rio de Janeiro. The Araxá Project is found at a latitude of 19°40'S and longitude of 46°57'W. The Araxá Project is also located within 1km of the Vale phosphate mine and SSP fertiliser plant and the world’s largest operating niobium mine, belonging to CBMM (Figure 4).

4.3. Mineral Tenure (NI 4c)(NI 4d)

The mineral tenure that currently applies in Brazil, as outlined in the Mining Code (Decree-law No. 227 of 1967), is summarised in Table 13. The Code enshrines the fact that minerals in the ground belong to the Federal Government of Brazil. It emphasises that exploration and mining are regarded as activities of national interest. It also notes that mining and exploration are to be carried out by Brazilian individuals or companies incorporated in Brazil and that mining concession holders are the owners of extracted minerals (Lagodourado, undated).

Table 13 : Summary of Brazilian Mineral Tenure

LICENCE TYPE	PURPOSE	DURATION	RIGHTS	CONDITIONS
Exploration Authorisation or Permit	Intended to allow for the location and definition of a deposit and the determination of its economic feasibility on an exclusive basis.	Between one and three years (renewable once).	The holder is entitled to use rights of way and servitudes over the authorisation area and / or the neighbouring land.	If a mineral other than the one applied for is discovered, the DNPM must be notified. Work must be carried out in accordance with environmental authorisations. The surface owner must be compensated for the use of land and any losses caused by exploration-related activity. The DNPM should receive a yearly report on exploration work and expenditure incurred from this. The DNPM should be paid an annual exploration fee.
Mining Concession (also known as an Extraction Authorisation or Permit)	Intended to allow the commercial development of a deposit on an exclusive basis.	Does not specify a time limit, but allows the company to operate until the orebody is exhausted, provided that all the necessary conditions are met.	The holder is entitled to use rights of way and servitudes over the authorisation area and / or the neighbouring land for mining, processing and infrastructure. The mining concession can be transferred and encumbered through a judicial order or as security.	Development must begin within 180 days of the granting of the concession. Approval must be sought if development or mining is discontinued for six months. Mining must take place in accordance with a mining plan. Royalties must be paid to the landowner and to government, for distribution to the local, state and federal governments. The concession holder is required to have all necessary environmental licences and authorisations and restore areas that have been harmed by mining, processing or the installation of infrastructure. The concession holder is required to report on activities, production and sales on a yearly basis.

MBAC holds 100% of the Araxá Project through four Exploration Permits and one Mining Permit, covering a total area of 226ha The mineral tenure and associated status is summarised in Table 14 and graphically portrayed in Figure 2.

Table 14 : Mineral Tenure of the Araxá Project

TYPE	PERMIT NO.	COMPANY HOLDING RIGHTS	AREA (ha)	DATE GRANTED	EXPIRY DATE
Exploration	834653 / 2011	MBAC	13.01	Not granted	NA-
Exploration	832150 / 1989	MBAC	114.32	01 Oct 2002	28 May 2015
Exploration	831437 / 1988	MBAC	1.72	13 May 2002	28 May 2015
Exploration	831436 / 1988	MBAC	28.25	05 May 2011	4 May 2014
Exploration	831972 / 1985	MBAC	68.80	1985	N/A*
TOTAL			**226.10**		

Note: N/A* - MBAC has applied for the mining permit, and so there is no "limit date".

The location of the permits in relation to local infrastructure is presented in Figure 4. MBAC does not own the surface rights over the Araxá Project but has been granted full access by CBMM.

4.4. Material Agreements (NI 4e)

According to information supplied by MBAC's independent Brazilian lawyer, Magma Servicos de Minaeracao Ltda, there are two material agreements that apply to the Araxá Project.

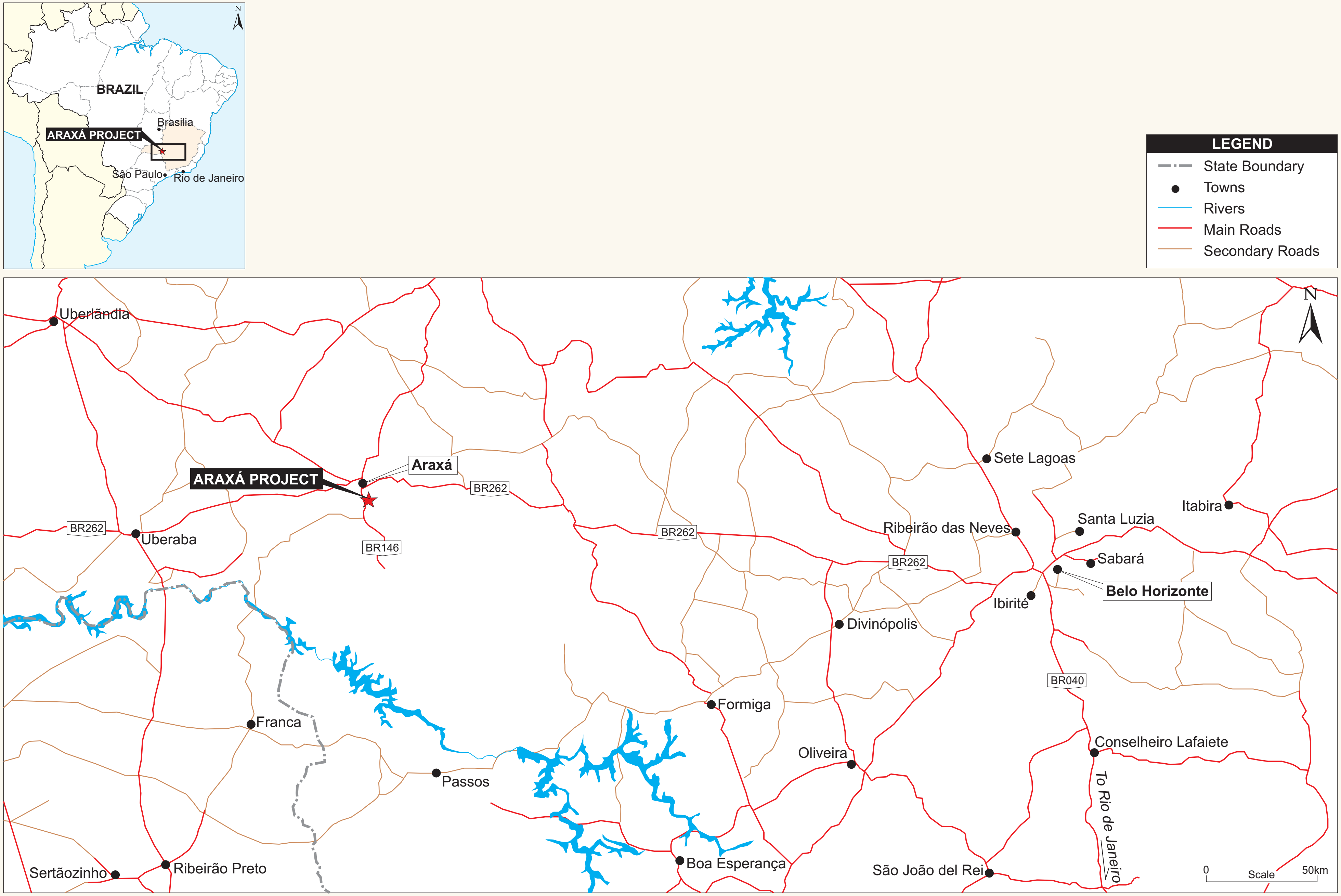
4.4.1. Itafós and Extramil Option Agreement

An option agreement was signed on 15th June 2011 between Itafós and Extramil. This agreement allowed MBAC to purchase the rights to Extramil's Exploration Permits through its 100% subsidiary company, Itafós. This option has been exercised. No monies are required to be paid upon exercise.

The ongoing obligations include the payment, to Extramil, of a specified percentage of the revenue on Net Smelter Returns (NSR). The following percentages apply:-

- 3.5% NSR on phosphate;
- 3.0% - 10.5% NSR on REEs and niobium, on a sliding scale according to the actual Internal Rate of Return of the Araxá Project, more specifically:-
  - 3.0% NSR for IRR =<25%;
  - 4.5% NSR for IRR =>25% < 30%;
  - 6.0% NSR for IRR =>30% < 50%;

LOCATION OF THE ARAXÁ PROJECT IN RELATION TO REGIONAL INFRASTRUCTURE



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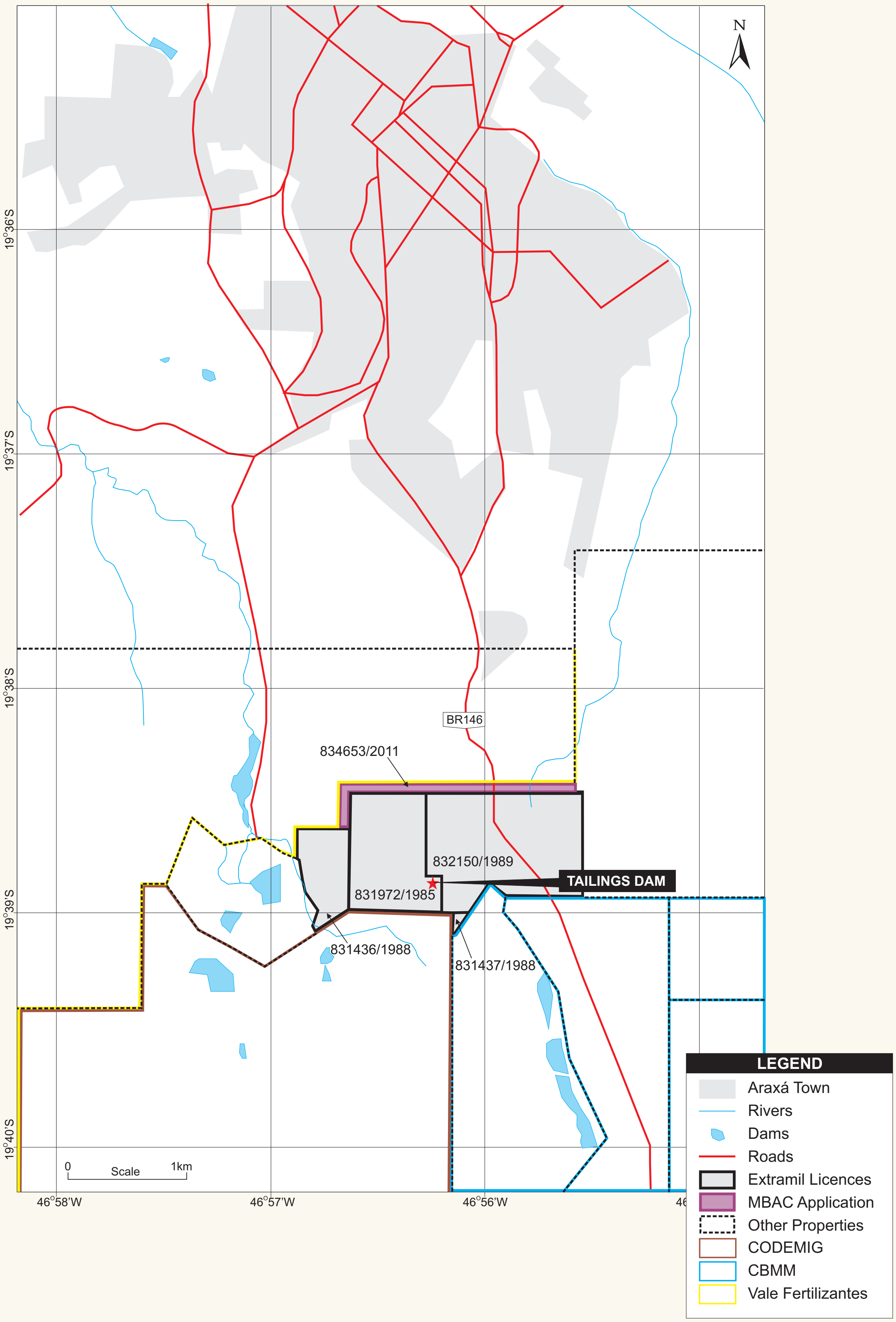
D1115M_MBAC Araxa 2012

VENMYN
Independence you can trust

Araxá Project

FIGURE 03

LOCAL INFRASTRUCTURE AND LEGAL TENURE OF THE ARAXÁ PROJECT



- 7.5% NSR for IRR =>50% < 70%; or
- 10.5% NSR for IRR => 90%.

4.4.2. MBAC and CBMM Access Agreement

An agreement between MBAC and CBMM, allows MBAC full access to the Araxá Project.

4.4.3. Government Royalty

Government royalties differ depending on the commodity produced, and can range between 0.2% and 3.0% of revenue. The royalty is calculated based on the proceeds from the sale of the ore, after marketing taxes, external transportation costs and insurance have been deducted. Mining companies that beneficiate their ore are required to calculate the royalty payable on the cost of extracting and processing the ore up to the stage of the production process immediately before industrialisation occurs, not on the proceeds from sales of the industrialised product.

The royalties for the government in Brazil are 2% of the revenue of the selling of mineral products. However, considering the fact that MBAC is selling oxides that have already been transformed by a chemical process, MBAC royalties on the Araxá Project are calculated based on the cost of the mineral products. This refers to the production cost up to the grinding and drying of the ore.

4.4.4. Marketing or Sales Agreements

Venmyn is unaware of any marketing agreements as at the writing of this report. MBAC has engaged in several negotiations, and although they are still at a beginning stage the company firmly believes it will be successful in completing long term agreements with consumers in Brazil and abroad as the Project develops.

4.5. Environmental Liabilities (NI 4f)

The Araxa Project is currently in the PEA stage and, as such, no environmental studies have been completed. Nevertheless, MBAC hired in November 2010 Rosangela Rios, a Specialist Consultant to perform an initial environmental assessment at the Araxa area.

MBAC is expected to commission an EIA and an Environmental Impact Report (EIR) shortly. These documents will identify environmental impacts to the Araxa Project area, while stating the measures to be undertaken to mitigate this potential impacts. However, preliminary evaluation of the potential environmental impact and their respective measures for mitigation has been undertaken by MBAC independent consultant. The study was carried out on the potential impacts of the Project on the following areas:-

- the human environment;
- the waters quality of the area;
- the terrestrial ecosystem; and
- the soil.

Brazil's regulatory framework is particularly complex with several layers and jurisdictions divided between municipal, state and federal levels of government. It is important to understand that Federal environmental regulations serve as a "minimum standard" for the states, but some states may have more stringent regulatory requirements. In addition to the minimum standards required by Brazilian legislation, the EIA must also meet internationally accepted Best Management Practices (BMP).

The regulations relating to radiation protection and radioactive waste disposal are managed by the National Nuclear Energy Council (CNEN). At the appropriate time, CNEN performs an inspection and evaluates the activities and materials involved, defining, for each case, the procedures that must be adopted.

AMS is unaware of any environmental liabilities to which the Araxá Project is subject. However, of particular note is that the current measured and indicated mineral resource is located at the base of a tailings dam wall.

4.6. Other Permits (NI 4g)

No additional permits are required at the current stage of exploration.

Prior to mining, MBAC would be required to obtain a mining permit over the required ground. This would entail submitting the required studies for it to be awarded.

4.7. Other Risks (NI 4h)

AMS and Venmyn are not aware of any risk relating to access, title, or the ability to carry out work on the property.

5. ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY (NI 5)

5.1. Topography, Elevation and Vegetation (NI 5a)

The Project area is situated on two small hills (Figure 5) with an elevation of between 620m above mean sea level (amsl) and 640mamsl. The town of Araxá has an elevation of 1,002mamsl.

The indigenous vegetation of the area may be classed as primitive savannah. This vegetation type is locally known as “cerrado”. The area is, however, extensively covered by farmland, consisting of soya and coffee crops, and exotic forests of eucalyptus and pine trees.

5.2. Access (NI 5b)

The town of Araxá can be accessed by road from Belo Horizonte via the tarred BR262 state highway (Figure 3) travelling west-northwest over a distance of 370km, whilst the Araxá Project is accessed via the BR146 tarred road (Figure 3 and Figure 4) travelling south from the town. Both Araxá and Belo Horizonte can be reached by air with local flights being available on a daily basis to Belo Horizonte and a weekly basis to Araxá.

5.3. Proximity to Population Centres (NI 5c)

The Araxá Project is situated 5km south of the town of Araxá and within 1km of two other mining operations. The town of Araxá has a population of approximately 100,000 and has excellent infrastructure and facilities. Transport to site would be by road using private vehicles or buses.

Belo Horizonte is a large city with a population of over four million. This city is the capital of the Minas Gerais State and the centre of mining in Brazil.

As a result of the Project being situated within a mining area, a skilled work force would be readily available from Belo Horizonte and Araxá.

5.4. Climate (NI 5d)

The climate is temperate, with the nearest weather station being located at the town of Araxá.

- The annual rainfall is between 1,300mm and 1,800mm during summer. The maximum monthly rainfall of approximately 300mm is received in December and January.

Temperatures vary from a summer maximum of 28°C in February to a winter minimum of 12°C in July.

The climate does not have an adverse effect on the potential operation of the Project, and mining would take place all year round.

5.5. Availability of Infrastructure (NI 5e)

The local infrastructure available to the Araxá Project is excellent as a result of the Project being situated within a well-established mining area, within 5km of the town of Araxá and within 1km of two other mining operations. The following is available within the exploration permit boundary or within a 5km radius of it:-

- tarred roads;
- hospitals - Araxá town has four hospitals;
- schools - Araxá town has 44 schools;
- electrical power (grid or diesel generation);
- borehole water;
- accommodation and offices – available in Araxá town;
- telecommunications – cellular phone coverage is available on site;
- skilled workforce – available locally from Araxá, or from Belo Horizonte, the capital and the centre of mining in the state of Minas Gerais; and
- labour – available from the nearby town of Araxá. Access to the surface area of the Project licence boundary has been provided by CBMM.

6. HISTORY (NI 6)

The Barreiro Carbonatite was first described in 1925, by Brazilian government geologists. The available information on this carbonatite, with specific reference to the Araxá Project, is presented in the section to follow.

6.1. Historical Ownership (NI 6a) and Exploration (NI 6b)

Information available on the historical activities on the Barreiro Carbonatite and, more specifically, on the Araxá Project by various companies and government agencies is presented in two geological reports. These include the reports on the Araxá Project by Senior Geologist, Mr P Lima, and by AMS. There is a paucity of specific information on ownership changes. All available information, however, is summarised in Table 15.

PHOTOGRAPHS OF ARAXÁ PROJECT

TAILINGS DAM LOCATED ABOVE THE RESOURCE AREA - DRY SEASON

VIEW TOWARDS THE WEST OF VEGETATION AND DAM FROM ATOP THE TAILINGS DAM

TYPICAL VEGETATION ENCOUNTERED BY DRILLERS IN THE PROJECT AREA

PANORAMIC VIEW LOOKING WEST OF TYPICAL PROJECT AREA TOPOGRAPHY FROM ATOP THE TAILINGS DAM

Table 15 : Summary of Historical Ownership Changes and Activities for the Araxá Project

YEAR	COMPANY / ORGANISATION	AREA	ACTIVITY
1925	Brazilian Government	Barreiro Carbonatite	Discovery and first description of the Barreiro Carbonatite.
1940s	Unknown		Exploration for phosphate.
1950s	Brazilian Government		Mapping and geophysical survey focused on the identification of uranium deposits. Economic uranium was not found; however, deposits of niobium and phosphate were found. These deposits are currently being mined by CBMM and Vale. REE mineralisation was also discovered.
1960s	Instituto de Pesquisas Radioativas (IPR)		Prospected for uranium and thorium. REE mineralisation was mapped over an area of 900m by 300m and identified as "Área Zero".
1965	Departamento Nacional de Produção Mineral (DNPM)	Área Zero	Drilling and sampling of 2 diamond core boreholes.
1970	CBMM		Drilling and sampling of 22 diamond core boreholes and 16 pits.
1974	Mineracao Canopus (Canopus)		Excavation and sampling of 43 pits.
1985	Extramil		Acquired first exploration licence associated with the project.
1988			Acquired 2 additional exploration licences on the Araxá project.
1989			Acquired 1 additional exploration licence on the Araxá project.
			Mineral Resource statement (Not NI43-101 standards compliant).
2004			Drilling and sampling of 6 diamond core boreholes and 14 auger holes. Mineral Resource statement issued (Not NI43-101 standards compliant).
2008	Companhia Industrial Fluminense (CIF)		Drilling and sampling of 5 diamond core boreholes and 17 pits.
2011	MBAC	Araxá Project	Acquired three exploration licences and a mining licence (in application) from Extramil.
			Excavation and sampling of 36 pits.
			Contracted consultants to perform specialist work on resource derivation and metallurgical studies.
			Drilling and sampling of 67 diamond core drillholes and 36 auger drillholes
2012			Issued first NI43-101 compliant resource statement.

Exploration work started in the 1940s, led to the discovery of the phosphate mineralization. In the 1950s, niobium and REO were first described after detailed geological mapping and geophysical surveys. The "Area Zero" REO mineralization was first defined in 1965 by the Instituto de Pesquisas Radioativas (IPR) following up uranium and thorium anomalies. The early exploration activities targeted the Barreiro Carbonatite after the identification of the phosphate and niobium deposits, which are currently still being exploited. The REEs which were discovered later, still remain unexploited.

The first drilling was carried out in the mid 1960s. Details on the amount and types of exploration carried out on the Araxá Project from 1965 to the present are outlined in Table 16. A total of 162 boreholes have been drilled or excavated at the Araxá exploration licences and, of these, 103 have been used in the current resource statement. Exploration included the excavation and sampling of 59 pits. All these exploration sites were located within the Araxá Project boundary and are relevant to this report.

Historical exploration was undertaken between 1965 and 1974 by the Brazilian government under the auspices of the DNPM and by CBMM and Canopus. Between 2004 and 2008 exploration was conducted by Extramil and CIF, within the Araxá Project boundary. A total of 14 holes (81.55m) were augered by Extramil in 2004, 17 holes (117.70m) were augered by CIF in 2008, while MBAC 36 holes (178m) were augered across the current Measured and Indicated Mineral Resource area in late 2011. Exploration included the drilling and sampling of 11 diamond boreholes and 31 auger holes.

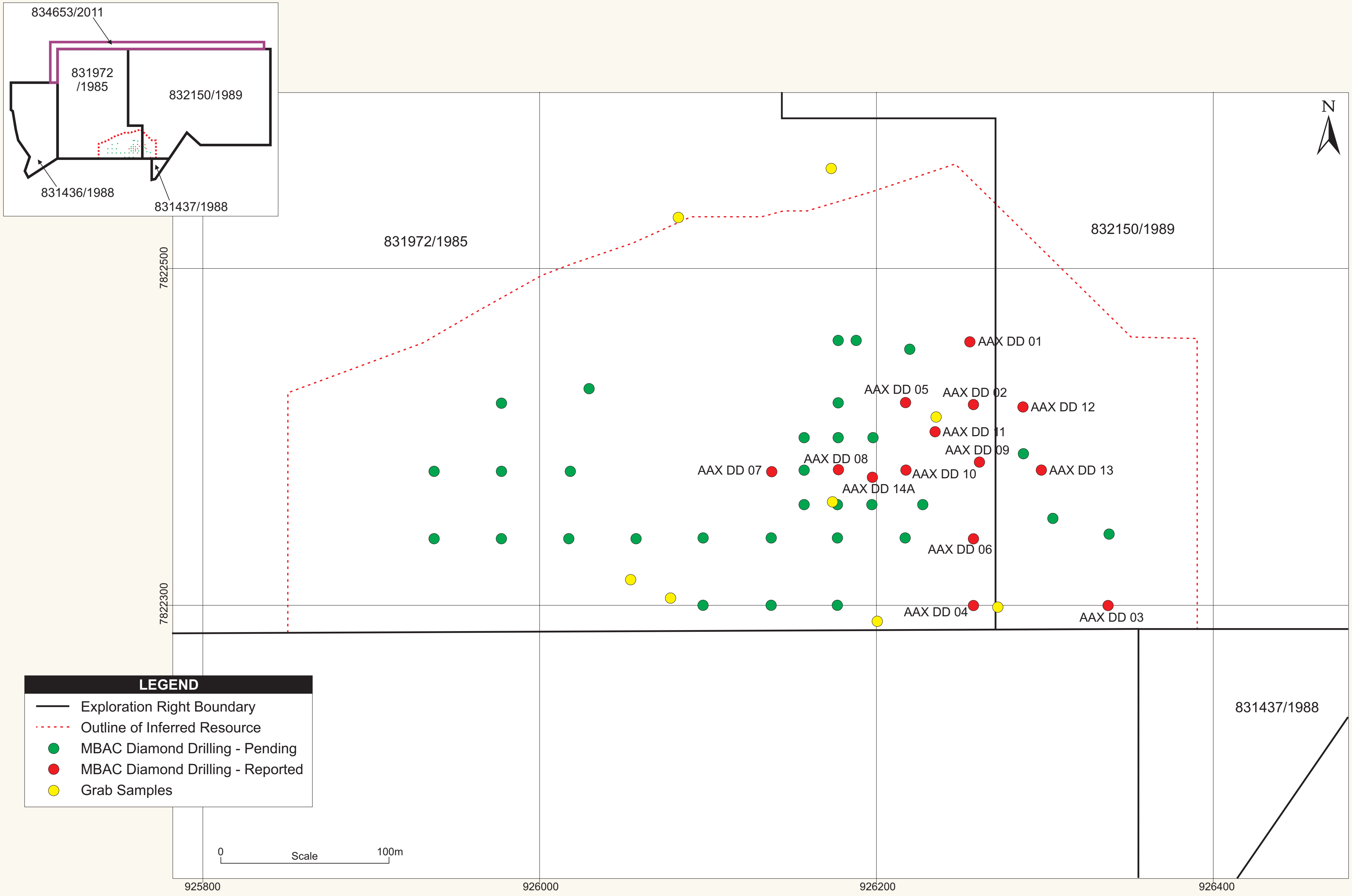
The location of the points of exploration in relation to the licence boundaries is illustrated in Figure 6.

Table 16 : Summary of Exploration for the Araxá Project

YEAR	COMPANY	TYPE OF EXPLORATION	NO. HOLES / PITS	TOTAL LENGTH (m)	NO. USED IN MAY 2012 RESOURCE ESTIMATION
1965	DNPM	Diamond Drilling	2	277.70	-
1970	CBMM	Diamond Drilling	22	2,099.10	-
		Pit	16	186.60	-
1974	Canopus	Pit	43	438.30	-
2004	Extramil	Diamond Drilling	6	816.00	-
		Auger	14	81.55	-
2008	CIF	Diamond Drilling	5	328.90	-
		Auger	17	117.70	-
2011	MBAC	Auger	36	178.56	36
2012		Diamond Drilling	67	3,764.09	67
		TOTAL	**221**	**8,288.50**	**103**

Available information on each of the historical exploration campaigns is reported in Section 9 for pitting and Section 10 for drilling. The current Mineral Resource estimation is based solely on the 2011 and 2012 drilling which includes the 67 DD and 36 auger drillholes.

LOCATION OF EXPLORATION IN RELATION TO LICENCE BOUNDARIES



D1115M_MBAC Araxa 2012

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Araxá Project

FIGURE 06

6.2. Previous Resource and Reserve Statements (NI 6c)

Both historical estimates and recent Mineral Resource estimates have been declared in 1989 and 2011 respectively, for the Araxá Project, according to the definitions stipulated in NI43-101. The current Mineral Resource estimate is based on only the recent grade data. The use of the lithology intercepts from previous auger drillholes, common to the 2011 Mineral Resource estimate, were used in the current Mineral Resource estimate to guide wireframing, however, no other similarities to the previous estimates exist. For these reasons, these historical estimates and previous Mineral Resource estimates are not presented here-in."

6.3. Previous Production (NI 6d)

There has been no previous production of any mineral from the Araxá Project. Mineral production of niobium and phosphate is currently taking place from the Barreiro Carbonatite, but not from within the Araxá Project boundary.

7. GEOLOGICAL SETTING AND MINERALISATION (NI 7)

7.1. Regional, Local and Property Geology (NI 7a)

7.1.1. Regional Geology

Brazil comprises the largest portion of the South American shield or platform. This shield consists of two distinct lithospheric components: cratons and Neoproterozoic orogenic belts.

The cratons themselves consist of Archaean nuclei bounded by Paleo- or Mesoproterozoic orogenic belts, which are due to amalgamation on to the nuclei of the craton and correspond to lithospheric segments that remained relatively stable during the Neoproterozoic Brasiliano orogenies. These cratons are generally composed of greenstone belts and tonalite-trondhjemite-granodiorite (TTG) complexes and represent the internal portions of the South American plate that collided to form West Gondwana at the end of the Neoproterozoic. These cratons are represented as undifferentiated PreCambrian on the geological map of Brazil (Figure 7). The cratons, or portions of them that are found in Brazil, are the Amazonian, São Francisco (Figure 8), Río Apa, São Luis and Río de la Plata cratons. These cratons or shields are exposed in nearly 50% of the area of Brazil, the rest being covered up by more modern sediments from the extensive sedimentary basins or covered by Mesozoic sediments and volcanics.

After the initial amalgamation of the cratons, these drifted across the globe, each going through its own series of collision and rifting events to give the present pre-Gondwana stratigraphy and morphology. These ancient wanderings are often very hard to reconstruct as much of the evidence gets destroyed by weathering and metamorphic processes over time. Only recent collisions and rifts are easiest to reconstruct as these are the least overprinted and can often be traced over many continents.

The last major Supercontinent building event occurred during the final assembly of Gondwana, where the West African and Congo cratons were to the east of the Brazilian shield, with Laurasia to the north of the Brazilian shield. This also emplaced the more modern orogenic belts, which connect the cratons together. This event coincides with the Pan-African event and is of similar age, and both formed part of the joining of west and eastern Gondwana (570-510 Ma). Gondwana was originally part of the larger continent of Pangaea (510-210 Ma). After this period, Laurasia broke off and Gondwanaland was left, after which it also began to drift apart to give the modern continents as we know them today.

The Andes Mountains and associated highlands started forming with the oceanic sedimentary deposition on the edge of a stable craton; after which it was faulted and folded up with the formation of the South American subduction zone. This also amalgamated some smaller arcs and terrains to the cratonic platforms all along the coast. The only surface evidence of the ancient collisions and rifting is the ancient mountain roots at surface and remnants of the deposited fossils and magmas across a few continents that were originally linked.

It was during this rifting that most of the known carbonatites in Brazil erupted, close to the rifting edges. Carbonatitic magmatism in Brazil appears to be exclusively related to rifting events, with ages ranging from Early Cretaceous to Tertiary on Brazil's eastern coastline. Due to the fact that carbonatites alter and weather away relatively quickly only the more recent eruptions or intrusions remain in evidence. Figure 8 indicates the location of carbonatites in Brazil, with particular reference to Araxá.

7.1.2. Local Geology

The Araxá Project is located within the Barreiro Carbonatite Intrusive Complex which forms part of the Alto Paranaiba suite of alkaline carbonatites (Figure 8) and kimberlites which were intruded along the so called AZ125° lineament. This lineament stretches over 2,000km from Rondonia to Rio de Janeiro.

The Barreiro Carbonatite Complex is located 6km south of Araxá City. The intrusion is around 5km in diameter and circular in shape (Figure 9). The intrusion is dated at about 87Ma, and intruded into quartzites and schists of the Araxá Group, resulting in a domed structure with concentric radial fractures into the country rock along with shattering of the quartzites. The centre of the complex is composed of beforsites and glimerites with subordinated sovites.

This carbonatitic nucleus is surrounded by glimerites with subordinated beforsites. The erosion and weathering of the alkaline rocks created a thick saprolitic profile with residual enrichment of the resistate minerals and consequent mineralization in niobium, phosphate and REO depending on the source rock.

7.1.3. Property Geology

The Araxá Project area is contained within two small laterite hills, with a colluvial cover located in between the hills. The Araxá Project forms a small part of the carbonatite complex and is situated on the northern limit of the pipe (Figure 9). The local geology, within this part of the complex, is comprised of phlogopite and subordinate beforite rock types.

The area is less than 1.0km^2 and with the exception of the hard iron rich laterite “Canga”, there is limited outcropping rocks, with only strongly weathered carbonatite rock located within small pits. The mechanism by which lateritisation occurs is largely due to the tropical climate and chemistry of the rock, in this case the carbonatite. The relatively insoluble REE minerals are shown to be enriched in the lateritic lithologies due to the intensive weathering and leaching of the carbonatite host rock.

The Araxá Project has defined a mineralised target area of 650m x 250m, as a result of the location of the boreholes associated with the exploration programme. Enriched mineralisation is known to extend to a depth of 80m, based upon this drilling. It is important to note that mineralisation is open ended in all directions and has been limited along the permit boundaries, by the extent of drilling and by the maximum drill depth (Figure 6).

The diamond drilling to date has defined the base of weathering at around 100m below surface, intersected by one historical drillhole.

7.2. Mineralisation of Rare Earth Deposits (NI 7b)

7.2.1. Host Minerals

REEs do not naturally occur as free metals in nature, but rather as a wide range of mineral compounds such as halides, carbonates, oxides, phosphates and silicates (Walters et al., 2011). REE minerals typically occur in combinations that tend to be biased towards either the LREEs or HREEs. The elemental forms of REEs are iron-grey to silvery lustrous metals (Harben 1999), which are typically soft, malleable, ductile, and usually react rapidly by forming REE oxides.

The three most economically significant minerals of the more than 200 minerals known to contain essential or significant REEs are bastnaesite $(Ce,La)(CO_3)(OH,F)$, xenotime (YPO_4), and monazite $(Ce,La,Nd,Th)PO_4$ (Christie et al. 1998). Bastnaesite and monazite are the major sources of LREEs, accounting for the majority of REEs currently produced. Xenotime is a source of the HREEs and yttrium (Y). Thorium (Th) is found principally in monazite, which contains up to 30% Th.

REE minerals include eudialyte $Na_4(Ca,Ce)_2(Fe_2+,Mn,Y)ZrSi_8O_{22}(OH,Cl)_2$ and loparite $(Ce,La,Na,Ca,Sr)(Ti,Nb)O_3$.

7.2.2. Classification of REE Deposits

REE-enriched mineral deposits are divided into primary and secondary deposits. Primary deposits are associated with igneous and hydrothermal processes (Whitehouse, 2007; Walter et al., 2011), while secondary deposits are associated with sedimentary and weathering processes of primary deposits.

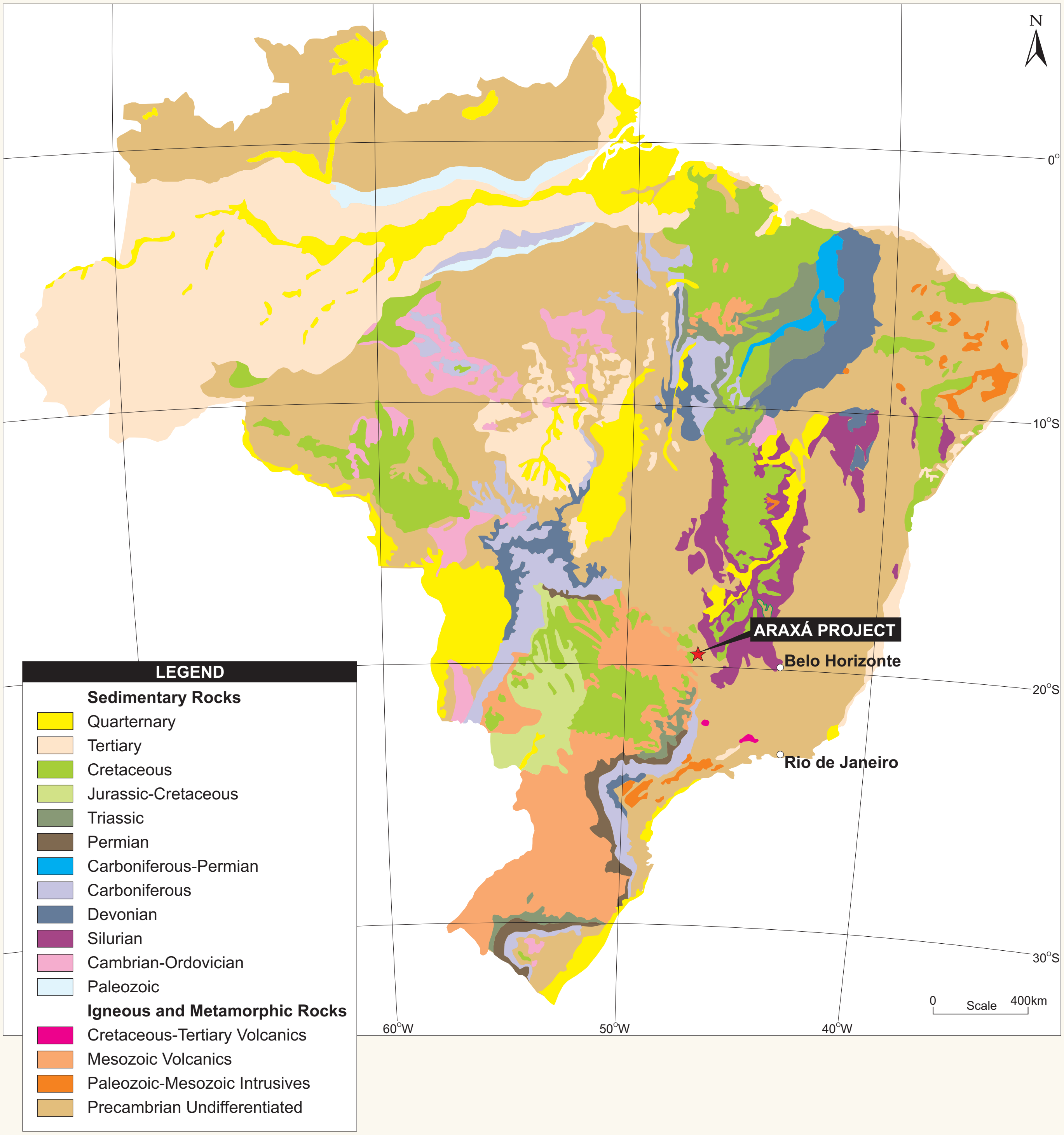
Further subdivisions based on genetic association are possible but become increasingly vague and confusing when one begins to consider primary magma sources, weathering types and the various REE elemental combinations for example.

Primary deposits can broadly be defined as carbonatite and alkaline/peralkaline intrusives, iron-oxide copper gold and hydrothermal enrichment. Secondary deposits can be defined as marine and alluvial placer deposits, lateritic enriched deposits and ion-adsorption clays from residual weathering. The location of the global deposits according to classification type is presented in Figure 10, along with the major producing countries.

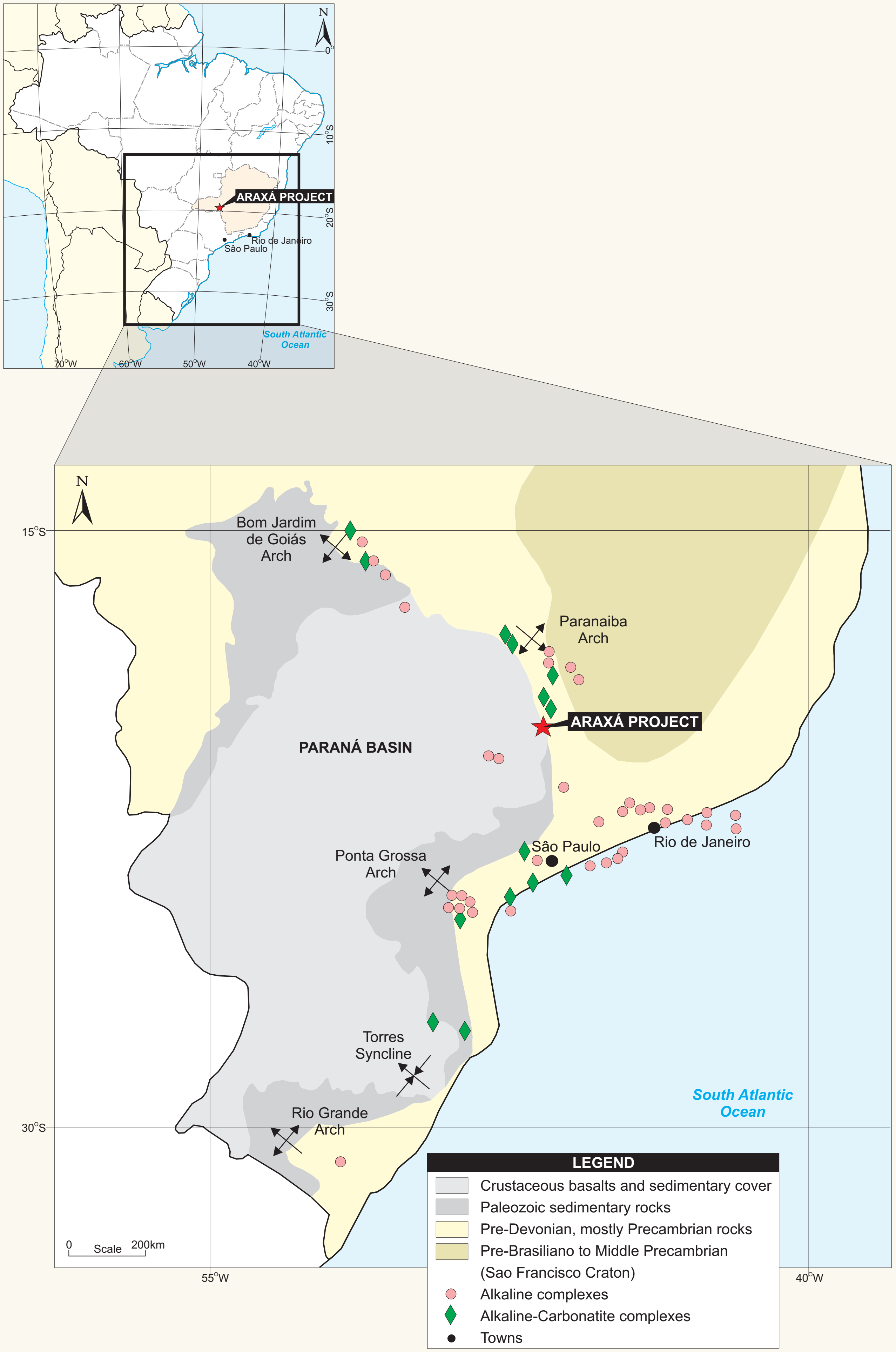
FIGURE 07

Araxá Project

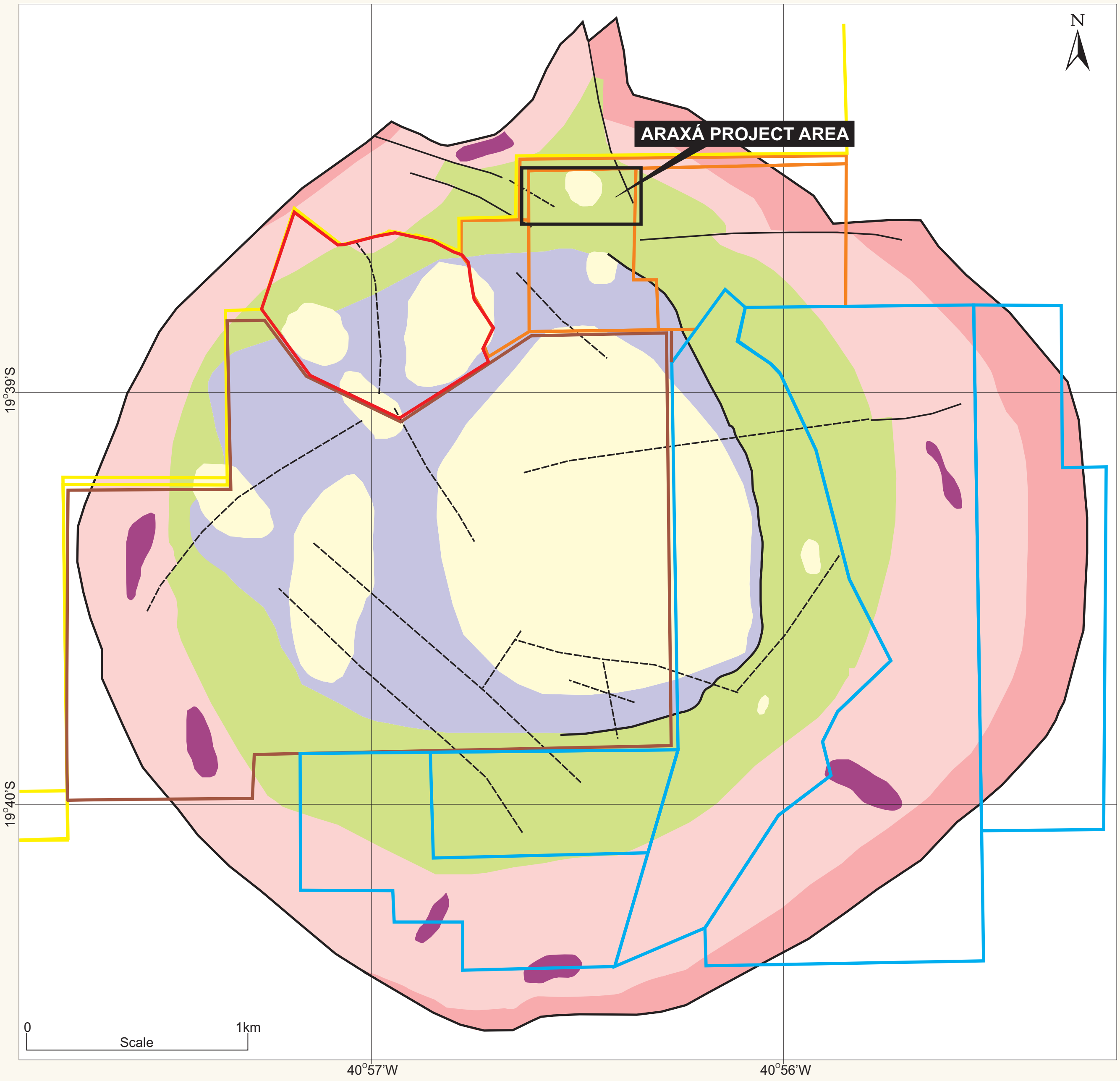
REGIONAL GEOLOGY OF BRAZIL



ALKALINE AND ALKALINE-CARBONATITE OCCURRENCES OF SOUTHERN BRAZIL



GEOLOGY OF THE BARREIRO CARBONATITE



LEGEND

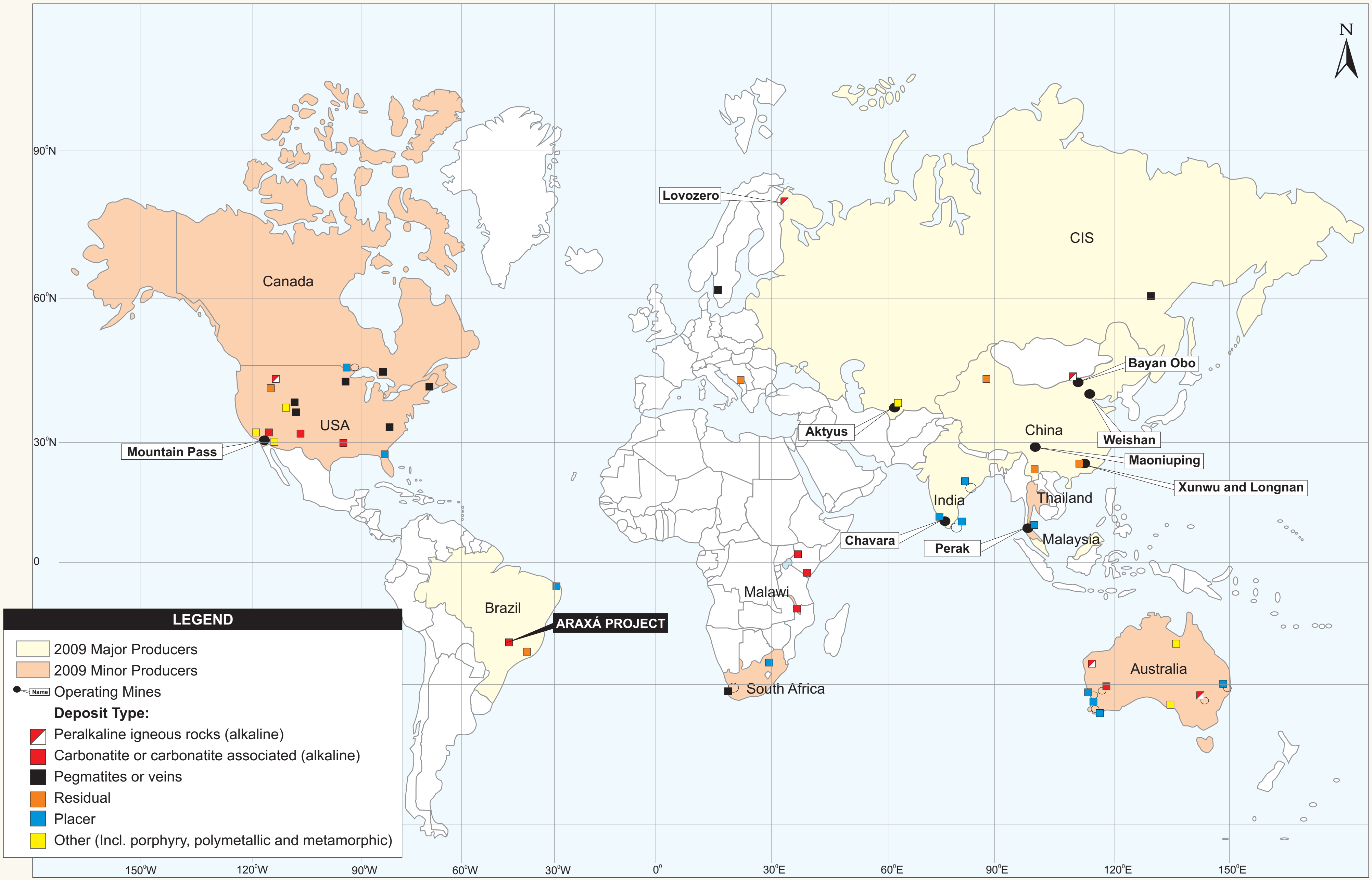
Lithology

- 🟨 Dolomite carbonatite with phlogopitite subordinated
- 🟪 Dolomite carbonatite/phlogopitite
- 🟩 Phlogopitite with dolomite carbonatite subordinated
- 🟥 Fenitized quartzite
- 🟪 Silexite
- 🟥 Fentized schist
- —— Faults
- ------ Infered Faults
- ☐ Approximate location of Araxá Project

Mineral Rights

- ☐ Hotel Area
- ☐ CODEMIG
- ☐ CBMM
- ☐ MBAC/Extramil
- ☐ Vale Fertilizantes

LOCATION OF GLOBAL REE DEPOSITS AND PRODUCERS



Source: www.geology.com

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7.2.3. Carbonatite and Alkaline Igneous Rocks

Carbonatites and other alkaline intrusive complexes, as well as their weathering products are considered a primary source of REE mineralisation. The vast majority of carbonatites are intrusive igneous bodies with few exceptions.

Broadly speaking, alkaline rocks are deficient in SiO_2 relative to Na_2O, K_2O and CaO. Although the International Union of Geological Sciences defines carbonatites as igneous rocks containing more than 50 modal per cent (%) primary carbonate minerals, recent research argues for a classification system where the precise amount of carbonate present is less important than the fact that a suite of carbonate-bearing rocks is derived from the same magma (Mitchell, 2005; Verplanck and Gosen, 2011)

7.2.4. REE Mineralisation in Carbonatites

Carbonatites contain elevated concentrations of REEs. It is important to note that the source of the REEs is the initial magma. The principal REE-bearing minerals associated with carbonatites are fluocarbonates (bastnaesite, parasite, and synchysite), hydrated carbonates (ancylite), and phosphates (monazite and apatite) (Zaitsev, 1998; Verplanck and Gosen, 2011).

There are several common characteristics with regards to carbonatite which are described below. Many of these characteristics apply to alkaline REE as well (Verplanck and Gosen, 2011), namely:-

- the surrounding rocks are often hydrothermally altered by alkali-metasomatism;
- they contain a variety of ore minerals;
- the significant REE-bearing ore minerals include bastnaesite, monazite, and xenotime;
- they tend to occur within a stable continental tectonic unit, and are generally associated with intra-continental rift and fault systems. This is typical of the location of Araxá along the AZ125° lineament and on the edge of the Paranaiba Craton; and
- carbonatites are more enriched in LREEs than alkaline deposits.

7.3. Mineralisation of Niobium Deposits (NI 7b)

7.3.1. Host Minerals

As with the REEs, niobium does not occur as a free metal element in nature. The economically important niobium minerals are various constituents of oxides and hydroxide minerals (Crockett et al, 1993). Depending on the type of primary deposit, for which there are two, different niobium ore minerals will be prevalent. The important niobium ore-bearing minerals are those of the columbite-tantalite series, as well as pyrochlore.

According to Crockett et al (1993), columbite $(Fe,Mn)Nb_2O_6$ and tantalite $(Fe,Mn)Ta_2O_6$ are similar in chemical composition and atomic structure as well as having all degrees of intermediate composition in both the iron-manganese and niobium-tantalum series states. The occurrence of both niobium and tantalum in this mineralogy is inseparable. Different deposits will be relatively more enriched in either tantalum or niobium, but both elements will be present in the mineralogy in elevated proportions to background levels.

The mineral pyrochlore $(Ca,Na)_2(Nb,Ta)_2O_6(O,OH,F)$ has no importance as a source of tantalum as the ratio of niobium to tantalum in pyrochlore is about 200:1 or greater and is thus accepted as only a source of niobium. A rarer barium rich member of this pyrochlore series, pandaite $(Ba,Sr)_2(Nb,Ti)_2(O,OH)_7$, may also be locally important in some deposits. Lastly, latrappite $(Ca,Na)(Nb,Ti,Fe)O_3$ and loparite $(Ce,Na,Ca)_2(Ti,Nb)_2O_6$ are other rare oxide ore minerals which may be locally important in certain deposits.

7.3.2. Classification of Niobium Deposits

There are two types of primary niobium deposits.

The first primary deposit type for economically exploitable niobium is granitic intrusions or pegmatites associated with granitic intrusions. The second primary deposit type is carbonatite and other alkaline igneous intrusions. Both these deposits are discussed in Section 7.4.3, while the location and geologic deposit types are illustrated in Figure 11.

With regards to the first type of primary deposit, granitic intrusions or pegmatites associated with granitic intrusions, the important ore-bearing minerals are those of the columbite-tantalite series as well as pyrochlore.

For these deposits, the tantalum and niobium content are mined and concentrated together which is why these minerals are seldom discussed separately when referring to granitic or pegmatite intrusive deposits.

With regards to the second type of primary deposit, namely carbonatites and other alkaline igneous intrusions, the principal ore mineral is only pyrochlore.

Secondary deposits for niobium are of considerably less economic importance than primary deposits. These secondary deposits are largely derived from the in-situ weathering of primary igneous deposits or alternatively the concentration of placer type deposits through alluvial action. One exception to these secondary deposits is the world's largest niobium deposit, Bayan Obo in China (Nebler, 2007), which is a low grade but high tonnage deposit. The sequence geology is interpreted to suggest that the hydrothermal re-mobilisation of secondary sedimentary sources is responsible for the deposit.

7.3.3. Niobium Mineralisation in Carbonatites

Most major operations that extract niobium as a primary mineral, and not as a by-product, are focused on the mineral pyrochlore. The largest concentrations of pyrochlore are found in carbonatites.

Several regions contain significant occurrences of carbonatite (and associated alkaline) complexes accounting for significant mineralisation of niobium within pyrochlore (Figure 11). These areas include:-

- the Laurentian Highlands of the Canadian shield;
- the Brazilian shield within the states of Goias and Minas Gerais;
- the active rift margin of the Great Rift Valley in central-east Africa; and
- the Kola Peninsula of the Baltic shield in Russia.

Apart from these regions, several other localised carbonatite complexes or individual carbonatites' niobium resources are known and in cases are exploited.

The world's largest single producer of niobium, belonging to CBMM, is situated within the Barreiro Carbonatite, adjacent to the Araxá Project.

7.4. Mineralisation of Phosphate Deposits (NI 7b)

7.4.1. Host Minerals

The three most common and economically exploitable phosphorous minerals are the oxy-salt phosphate minerals, xenotime YPO_4, monazite $(Ce,La,Nd,Th)PO_4$ and apatite $Ca_5(PO_4)F,Cl,OH)$. Phosphorous does not occur in its elemental form and is readily oxidised at the earth's surface into PO_4^{3-} or, alternatively, HPO_4^{-} under acidic conditions.

7.4.2. Classification of Phosphate Deposits

Phosphate rocks are derived principally from two primary sources, namely phosphorous rich sediments known as phosphorites, or from carbonatite and alkaline igneous intrusive rocks, already discussed in Section 7.2.3. The predominant source of the massive worldwide fertiliser phosphorous industry is the sedimentary phosphorites deposits which are of variable ages and typically are deposited along continental shelves and in shallow marine settings. Most major phosphorite deposits are located close to current day coastlines within the tropical regions of the globe (Figure 12).

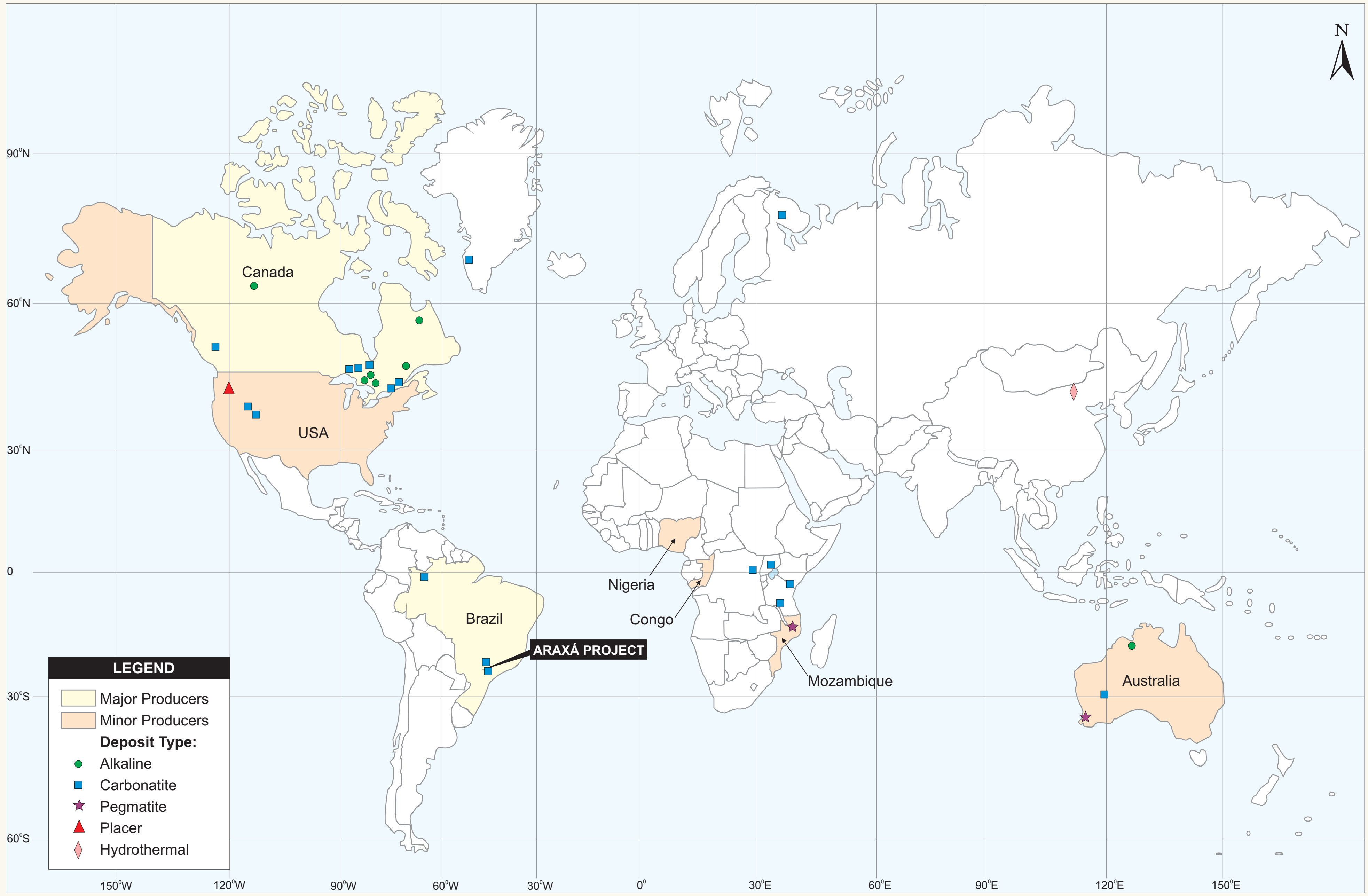
Carbonatite and alkaline igneous intrusive sources of phosphate rocks are typically considerably smaller deposits than the sedimentary sources. However, these igneous deposits are often of a significant local importance for fertiliser industries or, alternatively, produce phosphate as a by-product of another mineral within the carbonatite host.

7.4.3. Phosphate Mineralisation in Carbonatites

The predominant phosphorous mineral of economic importance hosted in carbonatite is apatite with lesser amounts of monazite and xenotime. Indeed, some carbonatite complexes have separate apatite rich intrusive phases where apatite is the dominant mineral in that sequence of the intrusion, such as the Phalaborwa Complex, Limpopo Province, South Africa.

The Araxá Project is located within 1km of the Vale's phosphate mine and SSP fertiliser plant, which is also hosted within the Barreiro Carbonatite.

LOCATION OF MAJOR GLOBAL NIOBIUM DEPOSITS AND PRODUCERS



Source: www.geology.com

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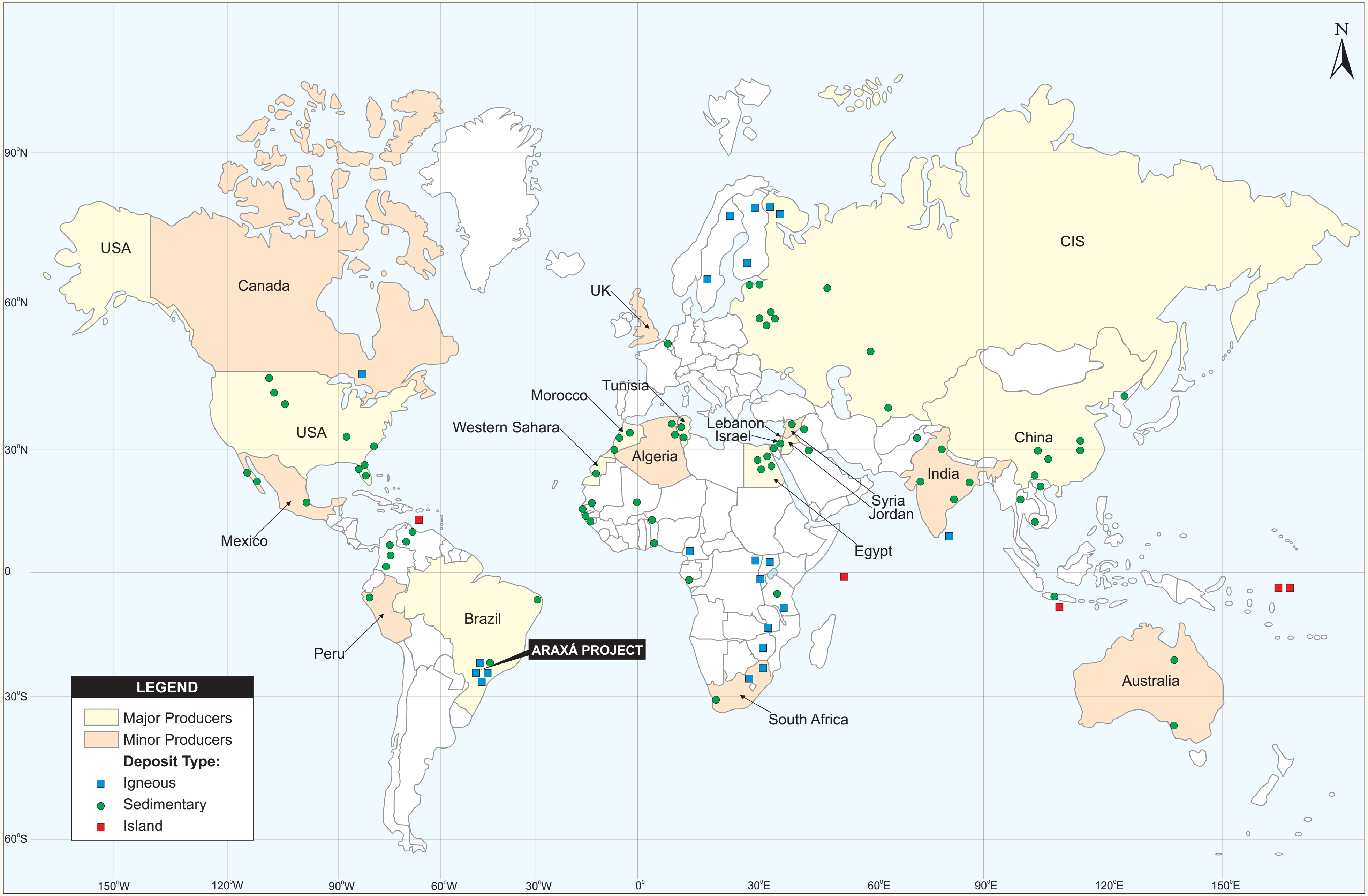
FIGURE 11

LOCATION OF GLOBAL PHOSPHATE DEPOSITS AND PRODUCERS



Source: www.geology.com, USGS

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FIGURE 12

7.5. Mineralisation of the Araxá Project (NI 7b)

The mineralisation of the Araxá Project is comprised of REEs, niobium and phosphate, with REEs and niobium preferentially occurring near surface due to lateritisation in tropical climates, whilst the phosphate mineralisation increases at depth.

The REO mineralogy of the Araxá Project was studied by several of the companies that historically worked on the area. The most recent report was prepared by LCT-USP for two samples sent by Extramil.

The reports summarised two samples with grades of 11.7% and 8.03 % TREO, derived from auger holes FT 01 A and FT 08 A respectively, located in the centre of the project. The minerals were identified by X-ray diffraction (XRD) and elements were analysed by X-ray florescence (XRF). As reported in the AMS report, the main minerals present included:-

- quartz (FT01A = 30%, FT08A = 39%);
- gorceixite-goyazite (FT01A = 31%, FT08A = 17%);
- Fe oxi-hydroxides (FT01A = 8%, FT08A = 38%);
- monazite (FT01A = 15%, FT08A = 10%);
- ilmeno rutile (FT01A = 2%, FT08A = 2%); and
- pyrocholore (FT01A = 2%, FT08A = 1%).

REEs are present in the following minerals:-

- monazite (87%); and
- gorceixite-goyazite (13%).

The niobium mineralisation is present in the following minerals:-

- pyrochlore (81%);
- ilmeno rutile (17%); and
- various other minerals (2%).

The phosphate mineralisation is present in apatite, which is generally found in increasing quantity at depth.

The mineralisation is located within two small laterite hills and exploration within the license boundary has defined a mineralised area with the dimensions 650m x 250m x 80m deep. The areal extent is defined by the limit of the licence boundary and extent of drilling, whilst the depth is limited to the maximum depth of the drilling. Therefore it must be noted that mineralisation is open ended in all directions.

8. DEPOSIT TYPES (NI 8)

The Araxá Project is classed as a carbonatite deposit with REE, niobium and phosphate mineralisation which has been enriched as a result of the effects of lateritisation in a tropical climate.

Exploration within the licence boundary has defined a mineralised area with the dimensions 650m x 250m x 80m deep. The areal extent is defined by the limit of the licence boundary and extent of drilling, whilst the depth is limited to the maximum depth of the drilling. Therefore, it must be noted that mineralisation is open ended in all directions.

Drilling has focused on the residually enriched REO, phosphate and niobium saprolite material which overlies the carbonatite at depth. The phosphate mineralisation occurs at depth and will form the focus of subsequent exploration activities.

9. EXPLORATION (NI 9)

MBAC commenced exploration on the Araxá Project in October 2011. According to AMS, this exploration included:-

- geological mapping;
- a topographical survey;
- limited grab samples taken during MBAC's due diligence process; and
- auger and diamond drilling.

The available information on the various exploration activities, both historical and recent but excluding drilling, is reported in the relevant subsections to follow.

9.1. Pitting (CBMM)

According to the AMS report, pitting was carried out by CBMM and Canopus in 1970 and 1974, respectively. A total of 59 pits were excavated to a maximum depth of 33.8m. All pits were dug to a minimum depth of 1.5m. Pits were typically excavated to a depth of 15m and 1m long channel samples were taken along the side wall. The location of the pits is indicated on Figure 6. No details on the sampling methods and protocols were available.

The CBMM samples were analysed at the company's internal laboratory. The REEs were analysed at the Geologia e Sondagens (Geosol) Laboratory (now SGS Geosol) in Belo Horizonte. The laboratories' accreditations at this time are unknown. No information on Quality Assurance and Quality Control (QA/QC) protocols or results was available.

The Canopus samples were sent to Rhone-Poulenc for analysis. No laboratory accreditations were available for this time. No information on QA/QC protocols or results was available.

The 43 pits excavated by Canopus in 1974 were included in the previous December 2011 database used for 3D modelling and resource estimation. The pits were treated as drill hole intersections. A comparison between the historical pit results and adjacent auger results and, according to AMS, a moderate correlation was identified.

9.2. Geological Mapping (MBAC)

Detailed geological mapping was conducted by MBAC according to AMS reports, however, no details on this activity were presented to Venmyn.

9.3. Topographical Survey (MBAC)

A detailed topographic survey has been completed by MBAC across the Araxá Project area which is accurate to within 10cm through use of a base/total station and survey equipment. A final topographic surface was generated for the Araxá Project area which has been utilized as an upper bounding surface for the wireframe generation (see Section 14).

9.4. Grab Sampling (MBAC)

Amazon Geoservices (AGS) along with MBAC took a total of nine grab samples from the immediate target area around the lake, as part of their due diligence process. Samples were taken from "Canga" outcrop and from soil samples across the Araxá Project area. The purpose of the sampling was to independently verify that mineralisation was present. The location of the grab samples is indicated in relation to the Project boundaries on Figure 6. Three of these samples returned values of between 1% - 3% TREO; four samples returned values between 3% - 6% TREO; and two samples returned values greater than 6% TREO.

The nature of this sampling exercise was to confirm mineralisation only, the assays were not relied upon for Mineral Resource estimation and the details, sampling and assay methodology are not presented herein.

9.5. Bulk Density and Specific Gravity Samples

MBAC have taken a total of 537 Specific Gravity (SG) samples from weathered and fresh diamond core samples as part of the recent drilling campaign completed across the Araxá Project area. SG measurements were not collected for the first 14 diamond drill holes due to problems with the onsite oven used for drying samples. However, the remaining 53 diamond drill holes adequately cover the Araxá resource area, and have had a substantial number of SG measurements completed across the geological boundaries to give confidence in the estimations of tonnage.

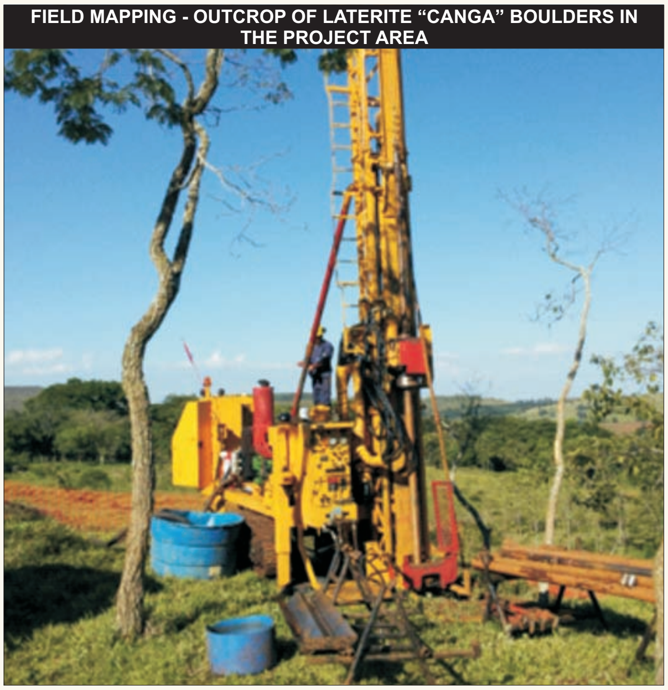
SG measurements were undertaken by MBAC technicians using the following procedure:-

- approximately 20cm of full core taken from core boxes (a minimum of 10cm of full core was accepted by AMS for bulk density calculations);
- sample is placed in a small oven for 24 hours, and then weighed dry on a set of electronic scales;
- the dry core sample is then paraffin wax coated and weighed again on the electronic scale to determine the mass of dry core, and then immersed in water and weighed while in suspension to determine the volume of water displaced; and
- a final bulk density value was determined by using the Archimedes Principle.

Samples collected for bulk density measurements are consider by AMS to be representative of the various geological boundaries defined for the Araxá Project, with no sampling bias evident. Results for SQ testing are illustrated in Table 17.

PHOTOGRAPHS OF HISTORICAL AND RECENT EXPLORATION

FIELD MAPPING - OUTCROP OF LATERITE “CANGA” BOULDERS IN THE PROJECT AREA



DIAMOND DRILLING AT THE ARAXA PROJECT (DECEMBER 2011)

FIELD MAPPING - OUTCROP OF LATERITE “ CANGA” BOULDERS IN THE PROJECT AREA

CORE STORAGE FACILITY AT OFFICES

DRILL CORE SAMPLES READY FOR DESPATCH TO SGS

CORE LOGGING - SAPROLITE TO FRESH ROCK BOUNDARY

Table 17 : Assay Results for Grab Sampling (2011)

MATERIAL	NO. SAMPLES	DENSITY (g/cm^3)
Laterite	51	2.77
Weathered / Saprolite Profile	375	1.82
Fresh Rock	111	2.55
TOTAL / AVERAGE	**537**	**2.06**

10. DRILLING (NI 10)

The drilling of the Araxá Project commenced in 1965 with the latest campaign being carried out by the issuer of this report, MBAC, in 2012. Both diamond core and auger drilling methods have been utilised during this period.

10.1. Type and Extent (NI 10a)

The drilling by type and extent, carried out on the Araxá Project since 1965, is summarised in Figure 6. The location of the various drill holes in relation to the licence boundaries, including the historical ones, is illustrated on Figure 6.

10.2. Auger Drilling and Sampling Procedures (NI 10a)

Three auger drilling campaigns have been carried out on the Araxá Project since 2004, with the latest being completed in 2011 by MBAC.

10.2.1. 2004 Auger Drilling Campaign (Extramil)

A total of 14 holes (81.55m) were augered by Extramil in 2004 (Figure 6). AMS believes that the augering would typically have been carried out using a Brazilian manufactured “trado” auger unit. This unit provides a face sampling blade bit. AMS states that minor contamination may occur between samples due to material falling into the auger hole.

According to AMS, the auger holes were sampled but no description of the sampling protocols is available.

The borehole collar positions were identified in the field from cement collars caps and have been verified.

10.2.2. 2008 Auger Drilling Campaign (CIF)

A total of 17 holes (117.70m) were augered by CIF in 2008 (Figure 6). AMS believes that the augering would typically have been carried out using a Brazilian manufactured “trado” auger unit. This unit provides a face sampling blade bit. AMS states that minor contamination may occur between samples due to material falling into the auger hole from above.

According to AMS, the auger holes were sampled but no description of the sampling protocols is available.

The borehole collar positions were identified in the field from cement collars caps and have been verified.

10.2.3. 2011 Auger Drilling Campaign (MBAC)

Auger drilling was undertaken in late 2011 across the current Measured and Indicated Mineral Resource area, with a total of 36 holes completed for 178m. Auger holes were drilled to a maximum depth of 18.20m with an average depth of 5.64m. The specific auger machine used is not provided. However, AMS states that as the auger blade turns it extracts between 30cm and 50cm of material as the sample length. Again the company states that it is common to have minor contamination between samples due to the unconsolidated material in the wall falling down the hole.

Results of this auger drilling have not been incorporated into the current Mineral Resource estimate, however, results were used to guide the wireframing process.

10.3. Auger Drilling Results (NI10a)

Auger drilling was undertaken in late 2011 across the current measured and indicated Mineral Resource area, with a total of 36 holes completed for 178m. Results of this auger drilling have not been incorporated into the current Mineral Resource estimate, however, results were used to guide the wireframing process for the current resource modelling.

10.4. Diamond Drilling and Sampling Procedures (NI 10a, b, c)

10.4.1. 1965 Diamond Drilling Campaign (DNPM)

No information was provided on the historical DNPM diamond drilling programme except that a total of two holes were drilled, totalling 277.70m in length. The location of the boreholes is indicated on Figure 6. No information relating to drilling procedures is available.

The position of these boreholes is no longer evident on site for verification purposes and AMS states that survey data used in the historical drilling was not clearly documented. AMS therefore has a moderate to low confidence as to the accuracy of the collar coordinates.

10.4.2. 1970 Diamond Drilling Campaign (CBMM)

In 1970 CBMM drilled a total of 22 boreholes (2,099.10m) on the current MBAC licences as part of its exploration for niobium. The location of the boreholes is indicated on Figure 6. No information relating to drilling procedures is available.

The position of these boreholes is no longer evident on site for verification purposes and AMS states that survey data used in the historical drilling was not clearly documented. AMS therefore has a moderate to low confidence as to the accuracy of the collar coordinates.

10.4.3. 2004 Diamond Drilling Campaign (Extramil)

In 2004 Extramil drilled a total of six boreholes (816.00m) on the current MBAC licences as part of its exploration for niobium.

The holes were drilled vertically. No down-the-hole surveys were carried out; however, this is not deemed necessary as the holes were less than 100m deep. AMS inspected these drill cores and were able to determine that the boreholes were drilled using HQ and NQ sized drill bits. They were also able to determine that satisfactory core recovery was achieved.

The borehole collar positions were identified in the field from cement collars caps and have been verified by AMS.

10.4.4. 2008 Diamond Drilling Campaign (CIF)

In 2008 CIF drilled a total of five boreholes (328.90m) on the current MBAC licences. The summary of borehole results is presented in Table 18. The borehole collar positions were identified in the field from cement collars caps and have been verified.

10.4.5. 2011 Diamond Drilling Campaign (MBAC)

MBAC commenced drilling across the Araxá Project in October 2011 on an initial grid spacing of 40m x 40m. In early December 2011, a maiden Mineral Resource estimate was completed by AGS for the Araxá Project. The Mineral Resource estimate was based upon those reliable historic diamond drilling, auger and pitting data as well as assay data received from the MBAC 2011 drilling campaign as at the 1st of December, 2011. The results of this drilling are included in the discussion in Section 10.4.6.

10.4.6. 2012 Diamond Drilling Campaign (MBAC)

As discussed, MBAC commenced diamond core drilling across the Araxá Project area in late 2011. The initial grid spacing was 40m by 40m across the project area, with additional 20m x 20m infill drilling in 2012 completed in the centre of the Mineral Resource in an effort to increase the resource category confidence from Inferred to Indicated and Measured as well as provide suitable vectors from variography studies.

Two drilling contractors, Geologica Sondagems and Fuad Rassi, completed a total of 67 diamond drill holes for a total of 3,764m for the 2011 – 2012 diamond drilling campaign. The drilling was focused on an area of 480m by 240m (Figure 6).

MBAC has contracted the services of the drilling companies, Geologia Sondagems and Fuad Rassi, based in Minas Gerais, Brazil. The location of the completed boreholes is indicated on Figure 6. The summary of borehole results is presented in Table 18.

The drillers were predominantly using HQ sized drill bits with lesser usage of NQ sized bits where necessary. AMS have observed their drilling methods on site and are satisfied with the quality of the drilling. Recoveries are generally good except where the drill intersects very soft and then hard material. In this case core recovery drops, but the losses are not material to the Project. According to AMS, core recovery is greater than 95%.

All boreholes were named with a prefix of AAX, followed by DD to indicate diamond drilling and then the sequential borehole number. Any holes requiring re-drilling were identified with a sequential alphabetical suffix.

Table 18 : Summary of 2012 Diamond Drilling Results as at March 2012

BH No	EOH (m)	TREO (%)	P_2O_5 (%)	Nb_2O_5 (%)
AAX-DD-001	65.15	3.88	7.01	0.84
AAX-DD-002	81.36	3.79	7.34	0.68
AAX-DD-003	65.75	4.01	7.20	0.73
AAX-DD-004	51.75	3.45	6.91	0.77
AAX-DD-005	51.13	4.27	7.71	0.97
AAX-DD-006	55.55	3.78	8.04	0.77
AAX-DD-007	40.55	9.39	12.94	2.08
AAX-DD-008	40.20	9.05	9.16	1.58
AAX-DD-009	38.81	9.10	3.90	1.86
AAX-DD-010	40.20	5.45	9.08	1.15
AAX-DD-011	41.80	3.93	5.33	0.97
AAX-DD-012	40.90	4.85	6.08	1.14
AAX-DD-013	31.40	9.84	8.52	1.90
AAX-DD-014	60.38	5.58	9.91	1.43
AAX-DD-014A	10.00	14.75	13.80	2.32
AAX-DD-015	60.80	4.91	7.89	1.31
AAX-DD-016	60.70	5.13	10.72	1.02
AAX-DD-017	60.00	7.35	9.77	1.65
AAX-DD-018	60.45	5.85	9.14	1.48
AAX-DD-019	60.20	5.46	9.02	1.32
AAX-DD-020	60.40	4.85	6.41	0.82
AAX-DD-021	60.43	4.11	8.24	0.81
AAX-DD-022	60.36	5.73	8.26	1.39
AAX-DD-023	60.45	3.55	11.10	0.73
AAX-DD-024	60.00	4.19	4.21	1.12
AAX-DD-025	59.40	4.90	4.50	1.12
AAX-DD-026	61.69	5.27	5.23	1.05
AAX-DD-027	60.32	3.93	4.47	0.74
AAX-DD-028	61.55	5.47	4.56	0.92
AAX-DD-029	60.15	5.76	9.95	1.12
AAX-DD-030	60.17	6.18	12.36	1.41
AAX-DD-031	60.00	5.09	9.67	0.77
AAX-DD-032	116.39	4.16	6.42	0.62
AAX-DD-033	61.30	4.46	10.22	0.91
AAX-DD-034	60.20	3.42	10.92	0.86
AAX-DD-035	40.30	3.15	9.84	0.58
AAX-DD-036	40.30	4.55	11.79	1.50
AAX-DD-037	40.40	4.45	8.84	0.98
AAX-DD-038	40.15	5.26	9.21	0.96
AAX-DD-039	41.50	6.70	11.69	0.63
AAX-DD-040	40.40	5.65	8.16	0.53
AAX-DD-041	40.00	5.35	9.70	0.93
AAX-DD-042	40.00	4.94	12.71	1.06
AAX-DD-043	40.40	4.62	8.02	0.90
AAX-DD-044	30.90	7.16	10.15	1.18
AAX-DD-045	154.40	5.14	10.86	1.11
AAX-DD-046	156.95	3.85	11.65	0.79
AAX-DD-047	30.40	5.19	4.76	1.48
AAX-DD-048	30.40	3.78	7.24	1.02
AAX-DD-049	30.00	5.49	10.63	0.94
AAX-DD-050	30.70	5.06	11.75	0.99
AAX-DD-051	113.40	4.45	9.72	0.95
AAX-DD-052	31.35	5.90	8.96	1.21
AAX-DD-053	30.55	7.58	10.16	1.13
AAX-DD-054	30.00	8.80	12.85	1.50
AAX-DD-055	30.10	5.78	10.08	1.02
AAX-DD-056	30.00	7.74	10.66	1.09
AAX-DD-057	30.00	5.89	10.28	0.84
AAX-DD-058	31.05	2.97	5.67	0.58
AAX-DD-059	41.25	3.70	7.80	1.50
AAX-DD-060	70.35	3.93	7.89	0.63
AAX-DD-061	60.05	2.40	7.99	0.41
AAX-DD-062	63.85	2.78	6.50	0.32
AAX-DD-063	60.70	3.78	5.91	0.29
AAX-DD-064	60.05	4.16	7.09	0.50
AAX-DD-065	160.35	4.47	7.70	0.93
AAX-DD-066	113.95	2.37	5.15	0.36
TOTAL / AVERAGE	**3,764.09**	**4.85**	**8.47**	**0.97**

Venmyn understands that all diamond cores are laid out in either wooden or plastic core boxes and sealed with a ply wood or plastic lid respectively. These core boxes are securely stored at a rented house in Araxá city after logging and sampling has been completed (Figure 13).

Logging is carried out on site by a qualified MBAC geologist before core is marked up for sampling and splitting.

10.5. Diamond Drilling Results (NI10a, b)

The diamond drilling results are summarised in Table 18. All results are reported as true thickness as the holes are vertical.

AMS could not comment on the drilling quality of the historical campaigns, but notes that the drilling was carried out by reputable companies, and would therefore be expected to be of a high quality, and has no reason to doubt the integrity of the results.

11. SAMPLE PREPARATION, ANALYSES AND SECURITY (NI 11)

This section reports on all available information relating to the sample preparation on site through to the laboratory preparation and analysis. Where no information has been made available to Venmyn negative statements are provided.

11.1. On Site Sample Preparation, Control Measures and Security (NI 11a)

11.1.1. 1965 Diamond Drilling Campaign (DNPM)

No description of the sample preparation or sampling protocols is available. No information is provided on the security of the samples, nor how they were transported to the laboratory.

11.1.2. 1970 Diamond Drilling Campaign (CBMM)

No description of the sample preparation nor sampling protocols is available. No information is provided on the security of the samples, nor how they were transported to the laboratory.

11.1.3. 2004 Auger Drilling Campaign (Extramil)

No description of the sample preparation nor sampling protocols is available. No information is provided on the security of the samples, nor how they were transported to the laboratory.

11.1.4. 2004 Diamond Drilling Campaign (Extramil)

No description of the sample preparation nor sampling protocols was provided. No information was available on the security of the samples, nor how they were transported to the laboratory.

The remaining diamond cores are currently stored in a secure core shed in Belo Horizonte and were inspected by AMS.

11.1.5. 2008 Auger Drilling Campaign (CIF)

No description of the sample preparation nor sampling protocols is available. No information is provided on the security of the samples, nor how they were transported to the laboratory.

11.1.6. 2008 Diamond Drilling Campaign (CIF)

No description of the sample preparation nor sampling protocols is available. No information is provided on the security of the samples, nor how they were transported to the laboratory.

11.1.7. 2011 Auger Drilling Campaign (MBAC)

MBAC used a single tier riffle splitter to split the recovered auger material into a suitable sample size. The material was passed through the splitter three times to obtain a representative 3kg sample. AMS has recommended that, in future, MBAC use a three tier splitter to eliminate the need to pass the material through the splitter three times.

No description was provided with respect to the cleaning of the splitter between samples, nor of the bagging and labelling methods used. No information was provided on the security procedure implemented between the sampling stage and delivery to the laboratory.

11.1.8. 2011 - 2012 Diamond Drilling Campaign (MBAC)

All sampling is supervised by a MBAC geologist. Observations made by AMS for the sampling practice are as follows:-

- hole collars are sited utilising a hand held GPS (accuracy +/- 10m), later surveying is done upon completion of drilling;

- samples of the core are taken on site at consistent 1m intervals as mineralisation is subtle making the selection of sample intervals by mineralisation control problematic;
- collection of core from the drill site is in wooden core boxes and is then transported to the base for logging and sampling;
- run markers with metal tags indicating drilled depth and recovery are inserted into the core boxes upon collection;
- measurement and recording of core recovery for each drilling run is conducted by the on-site geologist at the rig. Detailed logging of alteration, lithology, structures and sulphides as well as marking up of core for sampling and splitting is done back at the offices, as is photography of the core before splitting; and
- the core is halved using a diamond saw, with one half being placed in a bag and the remaining half being replaced into the core tray.

It was witnessed that all samples are placed in a plastic bag and labelled with alpha-numeric paper sample tickets, which are sealed inside the plastic sample bags (Figure 13). Multiple sample bags are placed within a nylon bag for ease of transport. All samples are transported by truck directly to SGS Geosol in Belo Horizonte by a transport company.

Post sampling, the core boxes are sealed with a plywood lid and then transported by the MBAC geologist to a house in Araxá city where they are securely stored. AMS is satisfied that best practice sampling and security practises are currently being employed by MBAC.

A total of 3,735 assay samples were taken by March 2012, excluding quality control samples.

11.2. Analytical Procedures and Laboratory Work (NI 11b)

11.2.1. 1965 Diamond Drilling Campaign (DNPM)

An unknown number of samples were sent to Geologia Sondagens (now known as SGS Geosol) in Belo Horizonte for analysis. These samples were assayed for at least REO as far as can be discerned from the data reports provided by MRAC.

No information was provided on the laboratory sample preparation. No information was provided on the analytical techniques used, nor the QA/QC protocols.

11.2.2. 1970 Diamond Drilling Campaign

An unknown number of samples were analysed at CBMM’s internal laboratory, with the REEs being analysed at SGS Geosol in Belo Horizonte. These samples were assayed for at least REO as far as can be discerned from the data reports provided by MRAC.

No information was provided on the laboratory sample preparation. No information is provided on the analytical techniques used, nor the QA/QC protocols.

11.2.3. 2004 Auger Drilling Campaign (Extramil)

An unknown number of samples were sent to SGS Lakefield for analysis.. These samples were assayed for REO, phosphates and niobium.

No information was provided on the laboratory sample preparation. The laboratory results sheets are available in historical documentation. The laboratory utilised a combination of XRF and ICP-OS to analyse the samples.

11.2.4. 2004 Diamond Drilling Campaign (Extramil)

An unknown number of samples were sent to SGS Geosol for analysis. These samples were assayed for REO, phosphates and niobium.

No information was provided on the laboratory sample preparation. No information was provided on the analytical techniques used, nor the QA/QC protocols.

AMS obtained stored sample pulps from the laboratory and sent these to an umpire laboratory for re-assay.

11.2.5. 2008 Auger Drilling Campaign (CIF)

An unknown number of samples were sent to London and Scandinavian Metallurgical Company Ltd (LSMC) for analysis. The laboratory results sheets are available in historical documentation.

The laboratory utilised a combination of XRF and ICP-OS to analyse the samples. These samples were assayed for REO, phosphates and niobium.

11.2.6. 2008 Diamond Drilling Campaign (CIF)

An unknown number of samples were sent to LSMC for analysis. The laboratory results sheets are available in historical documentation. The laboratory utilised a combination of XRF and ICP-OS to analyse the samples. These samples were assayed for REO, phosphates and niobium.

11.2.7. 2012 - 2011 Auger Drilling Campaign (MBAC)

The MBAC auger samples were delivered to the SGS Sample Preparation Laboratory in Belo Horizonte for preparation. The following preparation procedure was utilised:-

- drying and weighing sample;
- crushing sample to -2mm;
- sample homogenisation;
- splitting of sample to obtain a representative 1kg sample;
- pulverising to 95% of the material passing through a -150mm mesh; and
- splitting the pulverised material into a representative 50g pulp.

The prepared samples were then assayed at SGS Geosol, also situated in Belo Horizonte. All samples were analysed using XRF and ICP-MS. These samples were assayed for REO, phosphates and niobium.

SGS is an international company and its analytical procedures are ISO 9001 certified and are in accordance with ISO/IEC 17025. Venmyn has not independently confirmed this certification.

11.2.8. 2012 Diamond Drilling Campaign (MBAC)

All core samples from borehole AAX-DD-001 to 003 were sent to SGS Geosol and the same sample preparation procedures, as documented in Section 11.2.7 above, apply.

The core samples from borehole AAX-DD-004 upwards were sent to ALS in Belo Horizonte. ALS is an accredited laboratory. The samples were prepared according to the following procedure:-

- drying and weighing of whole sample
- crushing of sample to -2mm
- sample homogenization and splitting to a 1kg sub-sample
- pulverization to 95% passing -150 mesh
- splitting of pulverized material to 50 gram pulp

Sample pulps are analysed for phosphate using a lithium tetraborate fusion followed by XRF analysis (0.01% Detection limit). TREOs were analysed by ICP-MS after the Li-metaborate fusion.

The ALS and SGS analytical procedures are ISO 9001 certified and are in accordance with ISO/IEC 17025. Both ALS and SGS are independent of MBAC.

11.3. Quality Assurance and Quality Control Procedures (QA/QC) (NI 11c)

No QA/QC procedures were available for the sampling programmes prior to MBAC's involvement. The low confidence in the historical sampling has resulted in the previous December 2011 Mineral Resource estimate being classified as Inferred Mineral Resources only as this previous estimate relied on this historical data.

MBAC's QA/QC procedures are described in this section as well as a verification exercise undertaken on the 2004 Extramil diamond drilling results. According to AMS, MBAC's sampling methods, chain of custody and analytical procedures are appropriate and meet industry standards.

11.3.1. 2004 Diamond Drilling Campaign (Extramil)

No information was provided on the QA/QC of the Extramil sampling campaigns.

In December 2011, the remaining half cores of six of Extramil's boreholes (BAR series) and their associated pulps were located in Belo Horizonte. The pulps, which had originally been analysed at SGS Lakefield, were re-analysed at SGS Geosol using ICP- MS and XRF for the REOs > 10%. AMS notes that none of these holes are located within the current inferred resource boundary.

The results were as follows:-

- phosphate showed an acceptable precision of 90%, with a negative bias compared to SGS Lakefield;

- niobium indicated a poor precision of 70%, with a positive bias; and
- the REOs returned a poor precision with no apparent bias. However, all samples had a grade of less than 1%.

11.3.2. 2011 Auger Drilling Campaign (MBAC)

MBAC utilises a Quality Assurance and Quality Control (QA/QC) programme by inserting approximately 5% of additional samples sent to the laboratory which includes blanks, field duplicates and certified standards. The exact details of the programme have not been provided to Venmyn.

MBAC prepared pulp duplicates of 17 auger samples for precision testing. AMS graphically analysed the results of the pulps and concluded that the precision of the field duplicates was acceptable.

During this precision testing, an issue was noted with respect to the Eu results for three standards that had been assayed by SGS Geosol. The issue has been discussed with the laboratory and they will investigate the matter.

The analytical technique of ICP-MS, which was used on these samples, is believed to be more accurate than ICP-OEP which was used previously by Extramil. Therefore, the confidence associated with these results is high.

In addition to the testing of duplicates, AMS compared the MBAC auger hole results to any neighbouring historical holes on a graphical basis. Unfortunately, due to the variability of the results over a short distance, this cannot be considered as a true twinning exercise. However, the company believes that an acceptable level of precision was demonstrated with respect to the REO grades.

11.3.3. 2011 - 2012 Diamond Drilling Campaign (MBAC)

MBAC has set in place a QA/QC programme for diamond drilling programmes which includes the submission of blanks, duplicates, certified standards and umpire assays.

MBAC has undertaken quality control on approximately 5% of the total samples prepared. This includes the submission of approximately duplicates (coarse reject), certified standards and blanks. Blanks and standards are inserted routinely into the prepared samples for despatch to the laboratory. MBAC have utilized a total of eight standards for the recent drilling programmes completed across the Araxá Project. Standards were sourced from both Geostats Limited in Australia and from Itafos (Brazil). In addition, umpire assays have also been completed on approximately 10% of the total samples prepared and assayed.

MBAC have sourced “blank” material from a quartzite at Campos Belos which was considered to have insignificant associated phosphate mineralization. Trace amounts of both feldspars and micas are present within the blank material, hence the ’greater than detection limit’ positive REE results for the blank material submitted by MBAC during the course of the recent drilling programmes. The quartzite blank material is not a certified blank. Based on results to-date, AMS recommends the use of a different blank material which has insignificant levels of phosphate phosphate and REE in future.

Standards submitted by MBAC display excellent accuracy, with no outstanding issues which require attention. AMS is satisfied with the current procedure in place for submission of certified standards.

Coarse reject duplicate data has been analysed by AMS using a number of graphical comparative analyse methods. Based on the analysis, AMS concludes that the precision of field duplicates is acceptable.

87 umpire samples were submitted to Actlabs for umpire check assays on the ALS Laboratory results, while a further 43 samples were submitted to Actlabs for umpire check assays on the SGS Laboratory results.

P_2O_5 returned acceptable precision with 98% of the samples from both laboratories, Nb_2O_5 returned acceptable precision and accuracy with umpire assay results, although, a few higher grade samples (>1.5% Nb_2O_5) returned a positive bias. This is not considered material given the minimal number higher grade assays. A total of 4 REOs were analysed by umpire laboratories (CeO_2, La_2O_3, Nd_2O_3 and Eu_2O_3) with acceptable precision and accuracy recorded.

All QA/QC results returned from the laboratory to-date have been made available to AMS for review. QAQC results and graphs were compared with hardcopy original data from both the SGS and ALS laboratories. The analytical technique of ICP-MS, which was used on these samples, is believed to be more accurate than ICP-OEP which was used previously by Extramil. Therefore, the confidence associated with these results is high.

11.4. Adequacy of Sample Preparation, Security and Analytical Procedures (NI 11d)

A low confidence has been attributed to the historical drilling and sampling results for the following reasons:-

- no QA/QC procedures were available;
- no assay of the full suite of REOs, resulting in the need for a factor to be utilised in resource estimation to take into account the grade associated with these REOs which were not assayed for;
- the assay techniques were not as accurate as those currently being used in the latest MBAC drilling campaign, i.e. ICP-MS; and
- uncertainty with respect to the collar survey positions.

It must be noted, however, that the work was carried out by reputable companies using international laboratories and therefore it can be expected to be of a high quality at that time. AMS has no reason to doubt the integrity of the historical results. However, AMS was able to re-assay pulps from the 2004 Extramil diamond drilling. This work concluded that the precision of the phosphate results was good, but this was not the case for niobium and REOs.

The historical drilling results were not used for purposes of the current Mineral Resource estimation, only the 2011 – 2012 67 DD and 36 auger drillholes were used for the recent June 2012 Mineral Resource estimate. With respect to the recent exploration results, AMS has determined that the drilling, sampling and assay procedures are adequate for the classification of resources with a moderate to high level of confidence. With respect to the recent exploration results which were relied on solely for the current June 2012 Mineral Resource estimate, AMS has determined that the drilling, sampling and assay procedures are adequate for the classification of resources with a moderate to high level of confidence.

12. DATA VERIFICATION

All historical data was compiled into an Excel database by MBAC. All recent drilling and sampling results were also compiled into an Excel database by the company. These databases formed the basis for 3D geological modelling, although, only the recent exploration drilling was utilised in the current June 2012 Mineral Resource Statement.

In March 2012, AMS completed a drilling and sampling audit for the Araxá Project. The review was undertaken by various consulting geologists and MBAC geologists. It was concluded that MBAC is fully compliant with respect to bulk density determinations, data collection methods and QA/QC programme in place for the recent exploration work undertaken across the Araxá Project area.

12.1. Procedures Applied (NI 12a)

AMS received the Excel database for the recent MBAC drilling. AMS performed the following checks:-

- a borehole database check using the database audit tool in 3D modelling package Surpac, which checks for inconsistencies in depth measurements, overlapping depths, etc. In addition a manual check was conducted; and
- boreholes in the database (recent) were documented as having been checked against hardcopy assay results by AMS.

There were no material errors noted within the database as a whole, however, AMS cautioned that more care should be taken in future to remove overlapping geological and sample intervals within the database which have now been corrected. The excel database was converted into an Access format database which is compatible with Surpac software, and allows key relationship based changes / modifications to be easily made.

Hardcopy assay data from SGS and ALS was made available to AMS, and a comparison of these results with the data supplied in the MBAC database was completed as part of the validation checks. AMS checked a total of 10% of the MBAC drillholes for validation purposes. No material errors were identified with the original log and the digital database.

12.2. Limitations (NI 12b)

The recent diamond drilling samples were analysed for TREOs with ICP-MS after Li-metaborate fusion. Therefore, no correction factor was applied in the recent 2012 Mineral Resource estimation process where only recent borehole sampling results are used for assay purposes and no limitations apply to the 2011 – 2012 drilling data used.

12.3. Adequacy of the Data (NI 12c)

The sampling methods, chain of custody procedures, and analytical techniques are all considered appropriate for declaration of Mineral Resources. The frequency and spread of the data over the licence area and the accuracy of the results is sufficient for the declaration of Inferred, Indicated and Measured Mineral Resources.

13. MINERAL PROCESSING AND METALLURGICAL TESTING (NI 13)

13.1. Nature, Extent and Results (NI 13a)

There has been limited metallurgical testwork on the Araxá Project and the bulk of the work carried out prior to MBAC's testwork focused on mineralogical characterisation of the REO mineralisation.

13.1.1. 1975 Concentration and Leaching Testwork (IPR)

In 1975, IPR performed metallurgical testwork on a 2t composite made up of material considered to be representative and sourced from 32 pits. The sample was concentrated through physical methods and chemical methods were subsequently applied in an effort to obtain a REO product that was of commercial value.

Various samples, separated on the basis of size, were taken from the composite and subjected to hydro-gravimetric and magnetic separation using a Franz separator, a "ding" roll and a Jones separator. The recoveries obtained from this phase of testwork were low.

Acid leach testwork was performed in 12 tests using sulphuric acid at differing temperatures and residence times. From this exercise, the best recoveries, of 89.2%, were achieved at:-

- acid:REO samples mass ratio of 1:1;
- residence time of 2 hours; and
- temperature of 200°C.

Precipitation and separation (using sodium sulphate) testwork was performed on this product and a REO product of 95% purity was obtained with less than 0.01% Fe_2O_3, representing a global recovery of 76% for the chemical step.

13.1.2. 2010 Concentration Testwork (Extramil)

In the testwork programme carried out by Extramil, one sample (FT-01A, 6-10m depth) with an average grade of 11.7% REO was characterised for REO and Nb_2O_5 recovery from the "very fine" fraction. Attrition was carried out followed by de-sliming and the results showed that this method was not suitable for REO upgrade. Monazite and the associated phosphates were not sufficiently liberated to allow effective concentration of REOs in the slimes.

Density tests using vibrating tables were carried out on the material of size -0.3+0.074mm and a product with 25-27% REO content was produced at a recovery of 75-80%. The corresponding Nb2O5 concentration in the same product was 16% at a recovery of 40%. This was considered satisfactory for the fine material. From this testwork, the total average recovery was 14-15% REO and 1% Nb_2O_5.

Additional tests, performed using a multi-gravity separator (MGS) concentrator on the oversize and undersize material from a cyclone classifier, showed an increase from 11.7% to 18.8% but no conclusion could be drawn from this due to lack of samples on which to perform further tests. It was, therefore, recommended that further tests, including flotation testwork, be carried out as the results were encouraging.

13.1.3. 2011 Concentration Testwork (MBAC)

MBAC carried out a metallurgical testwork programme, on a laboratory scale, with the intention of investigating the potential of concentrating REEs through desliming and flotation. It must be noted that this testwork was performed on one sample (FT08A) and it therefore, cannot be considered representative of the entire deposit.

The sample was crushed to generate material of size d100 1mm. A particle size distribution (PSD) analysis was performed on the crushed material and it showed that 41% was coarse (0.21mm) whilst 26% was fine (<0.02mm) with the balance, of 33%, having a size of between 0.02-0.21mm.

The crushed sample was then homogenised and a sub-sample (sub-sample 1) taken and submitted for wet-screen desliming tests at a screen size of 0.037mm. Approximately 32% of the sub-sample reported to the slimes and the remainder was used as float-feed material (AF-1).

Another sub sample (sub-sample 2) was also taken and submitted to grinding to d80 0.21mm and the resulting product subjected to a wet screen PSD analysis. The PSD analysis showed that 34% of the material was of size <20µm and this gave an indication that the desliming cut must not be lower than 20µm, otherwise excessive losses will be encountered in the slimes.

Desliming of AF-1 was performed in a hydrocyclone with a cutting diameter of 10µm. The results of this exercise revealed that 15% of the mass reported to the <10µm fines material and the OTR loss (sum total of CeO_2, La_2O_3, Nd_2O_3 and Pr_2O_3) in the slimes was 27%. The retained product (>10µm), labelled AF-2, was then used to assess the flotability of the mineralisation.

Flotation was performed and the overall conclusion was that the recovery was not optimum and further tests needed to be performed in order to generate a concentrate with an acceptable grade at an acceptable recovery.

13.1.4. 2012 Mineralogical Characterisation Testwork (CETEM)

A mineralogical characterisation study was undertaken by CETEM in 2012 and it showed that monazite and gorceixite are the main carriers of REEs in the Araxá mineralisation but monazite is the more important. This is illustrated in Table 19.

Table 19 : Distribution OF REE Minerals in Araxá Mineralisation

MINERAL	SIZE FRACTION (µm)							
	+212	212-150	150-106	106-75	75-53	53-45	45-38	AVERAGE
Cerianite	7.10	1.30	3.40	0.00	0.70	0.00	0.00	**2.40**
Gorceixite	45.10	39.10	39.00	38.90	36.80	34.80	33.20	**39.30**
Bastnaesite	0.50	1.30	0.90	1.10	0.90	1.60	1.20	**1.00**
Monazite	47.30	58.30	56.70	59.90	61.50	63.60	65.60	**57.30**
TOTAL	**100.00**	**100.00**	**100.00**	**99.90**	**99.90**	**100.00**	**100.00**	**100.00**

It is evident that the concentration of monazite in the mineralisation is higher at fine particle sizes. In addition, the CETEM report also states that intergrowth in monazite by other minerals (solid solution) is a common occurrence. These two factors suggest the need for fine grinding to realistically aim to achieve sufficient liberation for physical concentration of monazite.

CETEM also performed an image analysis of the Araxá mineralisation and the overall conclusion was that, because of the solid-solution existence of monazite, it is difficult to produce a monomineral particle and this supports the need for fine grinding to realistically aim to achieve sufficient liberation for physical concentration of monazite as stated above. Of all the particles analysed, none returned evidence of 100% monazite release, as intergrowth was always present. Gangue release only occurred in particle sizes of less than 38µm and, even so, the concentration of monazite was not sufficiently high to suggest that physical concentration through fine milling would add significant value.

In summary, the findings of the CETEM study support the fact that it is not viable to produce a concentrate. According to the CETEM report, at a grind size of 38µm, there is little improvement in the concentrate grade at recoveries greater than 20%. At very low recoveries of less than 20%, the concentrate grade rises sharply and a trade-off between low recoveries and high grade concentrate against high recoveries and low-grade concentrate is necessary.

13.1.5. 2012 Bench-Scale Testwork (MBAC)

In 2012, MBAC embarked on a programme of bench-scale testwork on the Araxá mineralisation with the intention of investigating and defining the operating conditions of a process route to enable the production of high-purity concentrated rare earth hydrochloric liquor (the mother liquor). In addition, it was the objective of this testwork programme to construct detailed mass balances to be used in estimating the various input materials and the output streams. The study was based on the following:-

- obtain a REE chloride liquor (the mother liquor) at high concentration and high purity. This liquor must be suitable for separation of individual REEs by solvent extraction;
- obtaining high yield during cracking of the rare earth mineralisation with sulphuric acid;
- avoid as much as possible iron, aluminum and thorium dissolution during the opening process;
- avoid losses of REE during the production stages of the mother liquor; and
- set a route with the separation circuits and the more convenient cuts among the lanthanides according to the mother liquor produced.

In this programme of testwork, a total of 50 tests were completed for the first stage of rare earth elements digestion, using 170kg of material blended from 140 samples collected. These tests included alkaline digestion, hydrochloric acid leach, nitric acid leach, ammonium chloride fusion and sulphuric leach. As a result, a sulphuric acid leach followed by salt precipitation was found to be the most feasible for the Araxá mineralisation

This testwork represents the most significant piece of metallurgical testwork carried out to-date and the results have presented a solid base on which to perform mass balances, optimisation as well as a reasonably thorough economic evaluation of the Araxá Project.

The PFD that was used is shown in Figure 14 and the following discussion on the testwork refers to this diagram.

13.1.5.1. Acid Digestion

A quantity of REO sample (OM), whose mass is unknown to Venmyn, was mixed with concentrated 98% sulphuric acid in a suitable container and placed in an oven in the following operational conditions:-

- the particle size <53µm (270 mesh);
- sulphuric acid/REO sample ratio = 92% wt/wt;
- temperature = 200°C; and
- residence time = 3 hours.

Important aspects that were considered and observed in the acid digestion step:-

- release of sulphurous vapours, water vapour and a likely decomposition of organic matter (humic and fulvic acid) throughout the period of acid digestion. In these operating conditions, the mass of the gaseous discharge was approximately 9.5% of the total initial mass (REO samples and sulphuric acid);
- before the addition of sulphuric acid, it was necessary that the REO sample was dried to obtain a better yield of rare earths in the subsequent dissolution step (water leaching); and
- suitable homogenisation of mixture during the addition of sulphuric acid and REO sample. The order of addition was REO sample on acid.

Under these operational conditions of acid digestion, the sulphated mass (SM) had an SM/OM ratio of 1.74. The weight loss of approximately 9.5% was attributable to the gaseous discharge.

13.1.5.2. Dissolution and Washing

The sulphated mass produced from the acid digestion step was tested for leaching in water (dissolution).

The slurry from the dissolution step was passed through a filter press in order to extract as much REE-containing solution (filtrate (F1)) as possible and producing a residue (R1) for disposal.

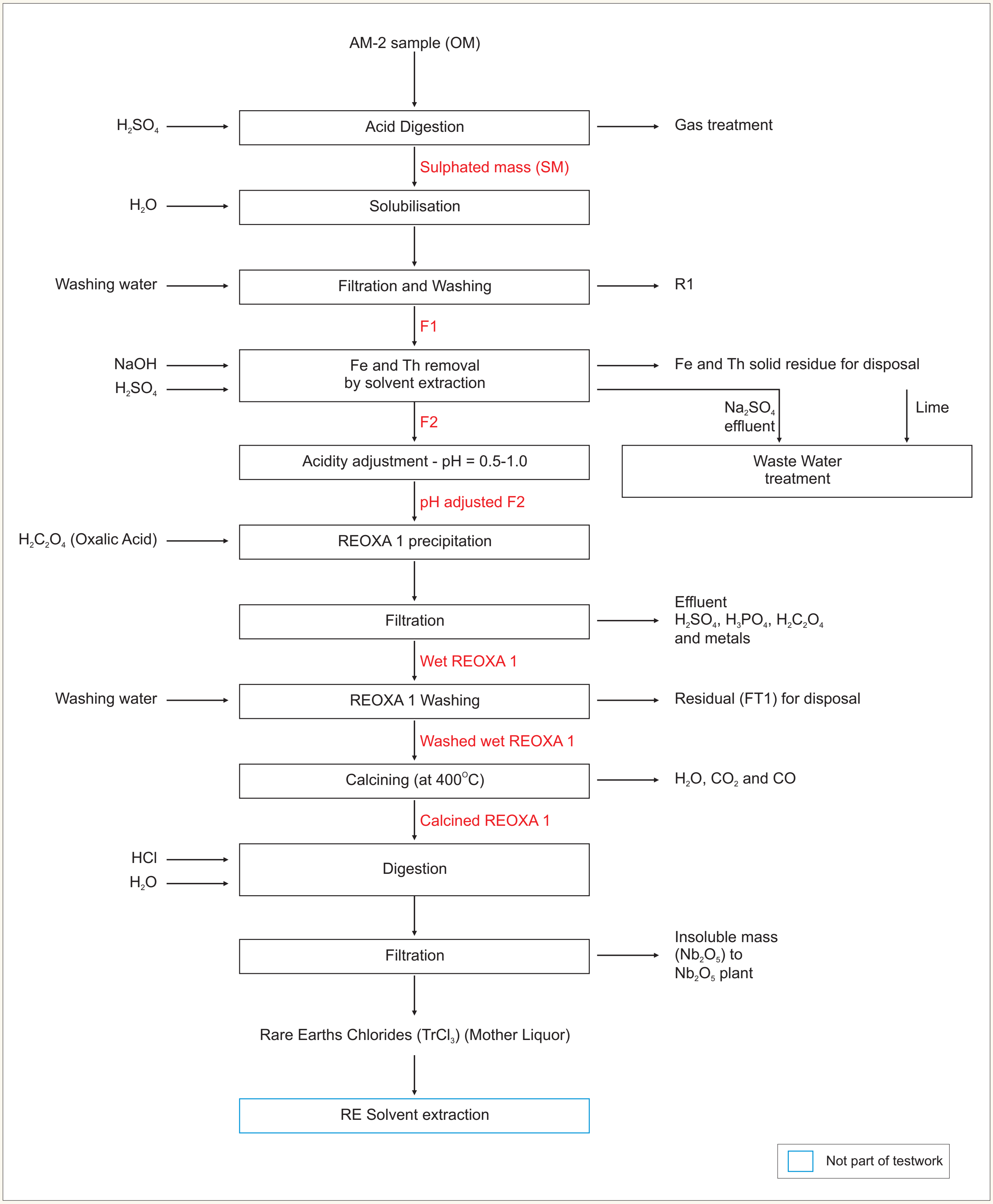
13.1.5.3. Iron and Thorium Extraction from F1

Iron and thorium were extracted (through a three-stage solvent extraction process) from the filtrate F1. Figure 15 presents the flowchart of the solvent extraction operation.

After Fe and Th extraction, a new REE-containing liquor (F2) was obtained and sent for the next step to obtain a rare earth oxalate (REOXA).

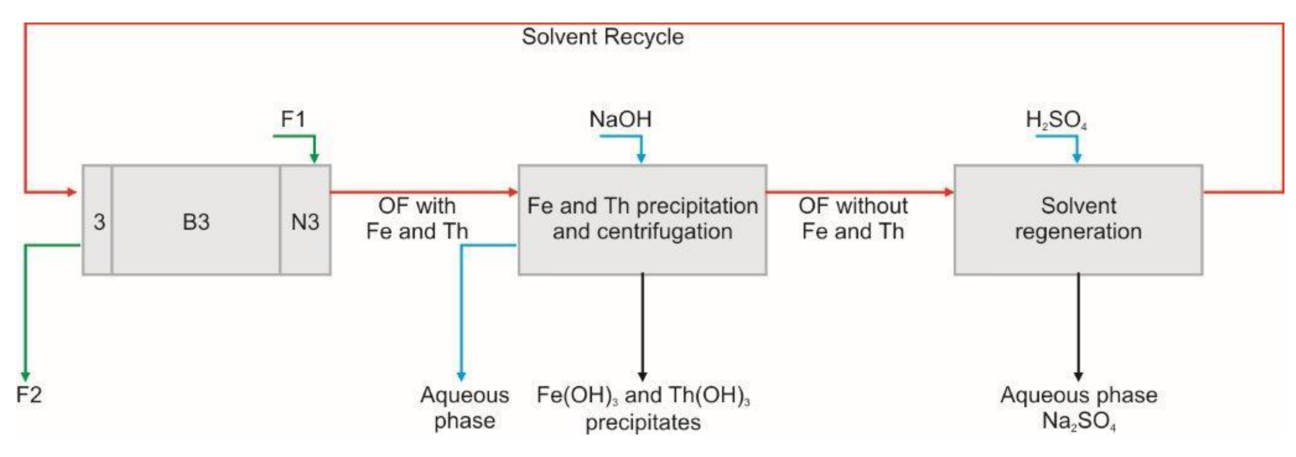
From the assay of F2, it was evident that the process had resulted in an almost complete extraction of iron (97%), thorium (100%), uranium (100%) and titanium (100%).

PFD USED IN THE 2012 MBAC TESTWORK



Source: MBAC

Figure 15: Iron and Thorium Extraction Schematic PFD



13.1.5.4. Acidity Adjustment, REOXA Production and Washing

This step was aimed at obtaining a high purity REOXA (>95%) and minimise the consumption of oxalic acid. To minimise the consumption of oxalic acid in REOXA precipitation, it was necessary that the solution pH was as high as possible and ammonium hydroxide (NH_4OH) was used as the pH-adjustment agent.

After stirring, the REOXA precipitate (REOXA 1) was separated from the aqueous phase by filtration to remove an effluent stream containing phosphoric acid. Investigations are yet to be completed on how to extract phosphoric acid as a by-product. The solid precipitate REOXA 1 was then washed with water in preparation for the next stage of testwork. The filtrate FT1, which is the major effluent from this technological route, was sent for lime treatment prior to disposal whilst REOXA 1 was calcined for 1hour at 400°C prior to HCl digestion.

13.1.5.5. Mother Liquor Production

This step was aimed at obtaining mother liquor solution of rare earth chlorides through reacting the calcined REOXA 1 with 37% HCl of density 1.18. The concentration of the mother liquor can be adjusted for the downstream separation and purification routes of the individual REOs with water or ammonium hydroxide.

In this digestion testwork programme, there was a reduction in the final solution volume over the initial amount of added water and HCl. Under these conditions, a REE chloride solution was obtained with an REO concentration of approximately 250g/L and, as has been mentioned already, it may be adjusted or diluted to the desired concentration. In addition, the insoluble residue that resulted from this step was Nb_2O_5 rich (41% recovery).

It was noted that the digestion process may require a temperature of 75°C to occur. However, under the testwork operating conditions, the heating was not necessary for achievement of complete REO digestion and because the solution obtained was clear, it was not considered necessary to clarify or filtrate this solution.

13.2. Basis of Recovery Estimates (NI 13b)

The REO recovery estimates have been based on the metallurgical testwork carried out to-date and the accompanying mass balances. The recoveries for Nb_2O_5 have only been established with a low level of confidence whilst the recoveries for dicalcium phosphate have not been tested, given the information made available to Venmyn. Therefore, no assumptions have been used regarding dicalcium phosphate recoveries as no estimates have been made. Table 20 summarises the recovery estimates as well as the reagent consumption rates.

Table 20 : Summary of Recovery Estimates and Reagent Consumptions

DESCRIPTION	VALUE	UNIT
REO Recovery	92.00	%
Nb_2O_5 Recovery	41.00	%
Sulphuric Acid	0.92	t/t ROM
Fuel oil	0.04	t/t ROM
Process water	10.61	t/t ROM
25% Ammonia Hydroxide	0.22	t/t ROM
100% Oxalic Acid	0.20	t/t ROM
Hydrochloric acid	0.38	t/t ROM
Caustic soda	0.23	t/t ROM
Sodium carbonate	0.08	t/t ROM
Lime	0.09	t/t ROM

13.3. Representativity of Test Samples (NI 13c)

The 1975 IPR testwork, which was performed on a 2t composite made up of material sourced from 32 pits, is considered to have been based on representative samples. However, the remainder of the testwork programmes (prior to the 2012 MBAC testwork) have been based on material regarded to be unrepresentative of the deposit. This is evident from the fact that material for testwork had been sourced from one borehole, as indicated in Section 13.1.

The 2012 MBAC bench-scale testwork was based on 140 samples that were collected from various parts of the deposit. As a result, the 2012 MBAC bench-scale testwork is based on samples that are considered representative of the deposit.

13.4. Potential Economic Extraction Risk Factors (NI 13d)

If the testwork has been performed on samples not considered representative of the deposit, it follows that variability across the whole deposit has not been determined to the extent considered sufficient. Grade control is difficult to achieve and the behaviour of samples from various parts of the deposit is yet to be tested to predict plant performance. However, as part of the future pilot plant plans 18t of REO samples have been collected and is representative of the four main types of mineralisation described so far and the pilot plant will run using these 4 types.

13.5. Concluding Opinion on Testwork

After reviewing the various phases of metallurgical testwork carried out, Venmyn has drawn the following conclusions:-

- it is evident that the mineralisation has not been demonstrated to be amenable to concentration prior to chemical processing. Tests carried out so far have indicated that, although a concentrate can be produced, the grade and recoveries are not acceptable and neither are they optimum. This has been due to the existence of complex interrelationships between the various mineral grains, which makes it extremely difficult to liberate and separate. The 2012 CETEM study provided evidence to support this;
- the inability to produce a concentrate for the cracking step is not a new occurrence and neither is it a fatal flaw. There have been cases, which Venmyn has previously worked on, where such a phenomenon occurs and it can be dealt with by skipping the physical concentration step altogether. In that case, the cracking process would be performed on the mineralisation mass as delivered from the mine (whole REO cracking);
- solvent extraction, to obtain REOs, is a chemical step that can be reliably predicted using appropriate mass transfer equations. However, the premise for the ability to physically reproduce the mass transfer predictions lies in the ability to supply the solvent extraction process with an “on-spec” feed solution. To this end, the precipitation and dissolution circuits have been subjected to a programme of metallurgical testwork to establish the various parameters at various residence times although this needs to be optimised. The most optimum residence time required to produce the best feed solution to the solvent extraction plant would then be used, not only for equipment sizing and reagent addition requirements, but also for REE recovery calculations to be used in financial assessment exercises. Nevertheless, for solvent extraction, Venmyn notes that mass transfer equations provide a useful benchmark to predict plant performance but must be validated by appropriate testwork and the testwork carried out by IPR in 1975 and by MBAC in 2012 will serve as a basis;
- testwork to investigate the amenability of the REO mineralised to cracking and acid leaching have demonstrated that it is possible to recover 92% of the REOs in the mineralisation. It, therefore, follows that the most likely process route to be followed is whole REO cracking followed by precipitation, dissolution and solvent extraction without using a physical concentration step at the beginning;

- Venmyn notes that, although the testwork carried out to-date is detailed, it is, nonetheless bench-scale. The extent to which the testwork results can be replicated in a scaled-up plant is unknown. However, this can be confirmed through pilot plant construction as the project moves into the PFS stage. The pilot plant is expected to be operational by the end of 2012;
- in addition, variability metallurgical testwork also needs to be carried out using samples from different areas of the deposit to reliably estimate plant performance as different areas of the deposit are mined. The 18t of REO samples that have been collected at the future mine is representative of the four main types of mineralisation s described so far and the pilot plant will run using these four types. This phase of the testwork can, however, form part of the PFS studies as the first priority of obtaining a robust process flow sheet has already been accomplished; and
- the 2012 testwork has demonstrated that it is possible to recover 92% of the REOs in the Araxá mineralisation at the given reagents consumption rates and the given flowsheet.

14. MINERAL RESOURCE ESTIMATES (NI 14)

AMS have estimated the Mineral Resource for the Araxá Project using recent drilling data completed by MBAC from late 2011 to early 2012. The database is current to the 1st of May 2012 and was used to produce the Mineral Resource estimate from 67 diamond drillholes totalling 3,764.09m drilled at a spacing of approximately 40m by 40m and 36 auger holes totalling 176.56m at irregular spacing. Within the centre of the Mineral Resource, drill spacing was drilled at 20m by 20m in an effort to increase the Mineral Resource category confidence, as well as provide suitable vectors for the variography studies.

The Mineral Resource has been estimated in Surpac Version 6, by Bradley Ackroyd, the principal consultant for AMS. Mr. Ackroyd is a professional geologist registered as a member of the Australian Institute of Geoscientists and has worked in exploration and development stage projects for metallic and non-metallic mineral deposits throughout the world. Mr. Ackroyd has been involved in Mineral Resource estimation work on a continuous basis over the past 10 years.

The Mineral Resource estimate is derived from a computerised resource block model. The construction of the block model began with modeling of 3D wireframe envelopes or solids of the mineralization using drill hole REE analytical data and lithological information.

Once the modelling had been completed, the analytical data contained within the wireframe solids was normalised to generate fixed length composites of 2.0m. The composite data was used to interpolate the grade of blocks regularly spaced on a defined grid that fills the 3D wireframe solids. The interpolated blocks located above the bedrock interface and outside the default waste solid comprise the Mineral Resources. The blocks are then classified based on confidence level using proximity to composites, composite grade variance and mineralised solids geometry.

All grade estimation was completed using OK for REO's, P_2O_5, Nb_2O_5, as well as Al_2O_3 and Fe_2O_3. This estimation approach was considered appropriate based on a review of a number of factors, including the quantity and spacing of available data, the interpreted controls on mineralization, as well as the style of mineralization under consideration.

The estimation was constrained entirely within the saprolite domain. Saprolite development is generally well developed across the Araxá Project area (typically 50-60m in depth), with all 67 diamond drill holes noted to intersect significant REO mineralization within saprolite material across the project area. Drilling into the fresh rock is limited across the Araxá Project area, however – where drilling has intercepted fresh rock, there is a sharp decrease in REO, P_2O_5 and Nb_2O_5 grades across this boundary.

14.1. Geological Modelling (NI 14a)

Given the limited number of drill holes which have reached the fresh rock boundary across the Araxá Project, no geological model per se has been developed to-date.

The majority of drilling completed by MBAC has been within the saprolite profile of the carbonatite unit, where the REO is residually enriched, and subsequent geological modelling has focused on mineralized intervals within this saprolite unit.

Modelling the considerable ferruginous laterite units within the saprolite profile was considered, however, the laterite intervals were found to be very patchy in nature, with no real lateral extensions evident from drilling completed. Grade was not found to be spatially related to the laterite development; however, there is considerable difference in the density for both the laterite and saprolite material, so this had to be considered for estimation purposes. In addition, AMS noted a sharp boundary between the saprolite and fresh rock material within the three diamond drill holes which intercepted the fresh rock boundary.
There was a significant density difference between saprolite and fresh rock material as well as a reduction in REO, P_2O_5 and Nb_2O_5 grades across this boundary.

AMS and MBAC have interpreted a mineralized REO domain (which has been utilised for P_2O_5 and Nb_2O_5 also) utilizing a 1% TREO lower grade limit to guide the interpretation. In addition, a total of three diamond drillholes have reached the fresh rock boundary, which has been used as a hard boundary for the wireframe at depth. A total of 12 north-south vertical sections have been created snapping to drillholes. The interpretation and wireframe models were developed using Surpac Version 6 software. An example of a section indicating the boreholes within the wireframe is illustrated in Figure 16.

In addition, AMS have utilized a recent detailed topographical survey across the Araxá Project area as an upper boundary surface for the Araxá wireframes. Drillholes were adjusted to the topographic surface before wireframing commenced.

Selected sample intervals were composited downhole. Table 21, shows summary statistics of the composites used for the interpolation of the resource block model.

Prior to estimation, all boreholes' grades were composited to 2.0m intervals which are a likely mining bench height for a small sized open pit mining operation. The "intersection code" field within the database was used to control compositing, with a minimum downhole composite of 0.5m. Samples which failed to meet a 0.5m composite interval were rejected given that these composite samples are not considered representative. No capping was applied to the assays before compositing.

Block model grade interpolation is conducted on composited analytical data. No top cut has been applied to TREO, P_2O_5, Nb_2O_5, Al_2O_3 and Fe_2O_3 data based on a review of histogram and log probability curves. The statistics for the 2.0m composites are summarised in Table 16.

Table 21 : Summary Statistics for 2m Composite of Araxá Project

DOMAIN	STATISTICAL PARAMETER	REO (%)	P_2O_5 (%)	Nb_2O_5 (%)
REO	Number of data points	1,851	1,851	1,851
	Minimum	0.44	0.77	0.03
	Maximum	30.35	25.00	5.71
	Mean	4.92	8.58	0.98
	Variance	10.55	23.22	0.49
	Standard Deviation	3.25	4.82	0.70

Density values were assigned appropriately downhole with an average value of 2.77g/cm^3 assigned to the ferruginous layers, while all other saprolite and coluvium material was assigned a density value of 1.82g/cm3 as per discussions in Section 9.5.

The spatial continuity of composite grades for TREO, P_2O_5, and Nb_2O_5 were assessed by variography. Normal variograms were computed and modelled for the 2.0m composite grades. Variograms in a series of directions were analysed in order to identify potential anisotropies in the grade continuity within the modelled mineralised envelope.

Generally, the variography suggested some anisotropy at relatively short distance (less than 40-50m) but that it was isotropic at longer distances (up to 100-150m). The best continuity in the analytical data was observed on a horizontal plane (azimuth 80° - 90° and dip at 0°) while the direction of worst continuity was perpendicular to the plane of best continuity (azimuth 0° and dipping towards 90°). The nugget effect was interpreted as being moderate (at ~32%).

A three-dimensional block model was defined for the Araxá Project, covering the interpreted REO domain. A parent block size of 10m x 10m x 2m has been used, with standard sub-blocking 4 times smaller than the parent block to give a sub-block size of 2.5m x 2.5m x 0.5m. The attributes coded into the block models include all REO elements, density, domain code, as well as a number of OK attributes and sample variance data.

14.2. Estimation of Key Assumptions (NI 14a)

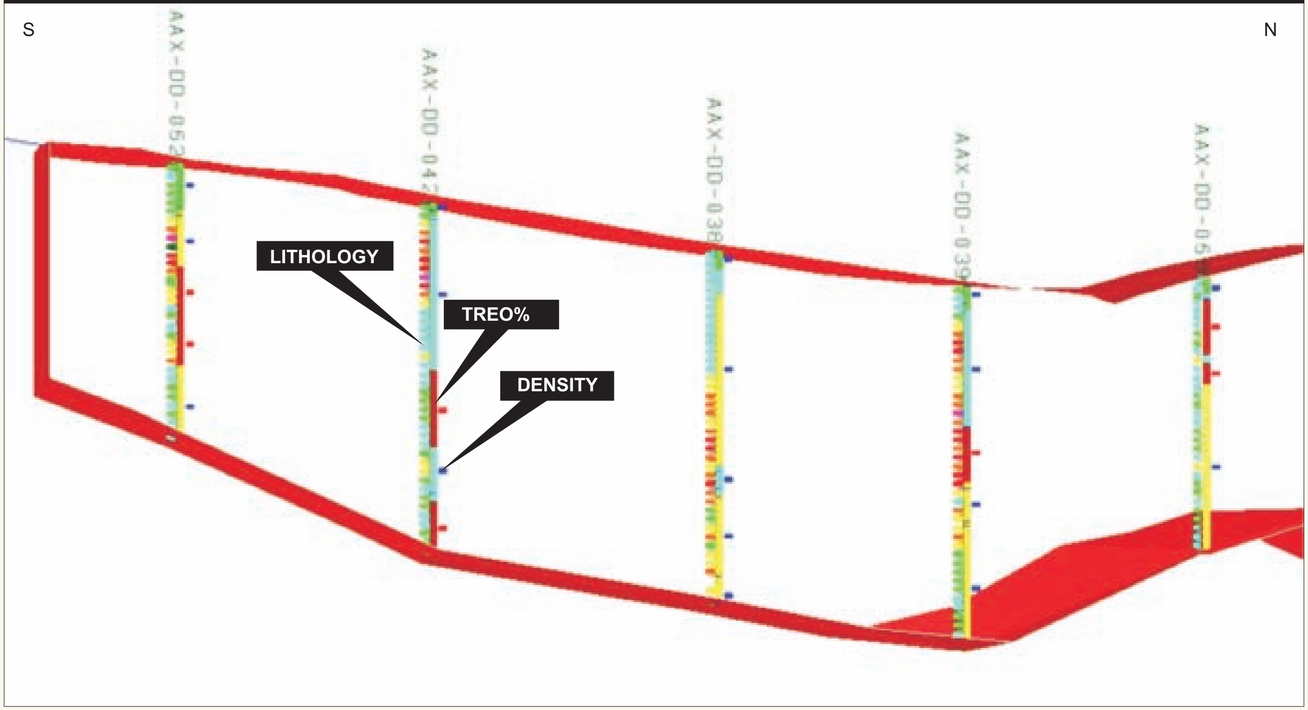
14.2.1. Volume

The volume of the resource was calculated in 3D using the wireframe or sum of the blocks. The upper limit was constructed from the surface DTM, surface topographical survey or borehole collars. The base of the wireframe was limited to the saprolite domain with depth. The horizontal extent was limited by the extent of the drilling. A 3D view of the model is presented in Figure 17.

It is for the reasons noted above that the volume is potentially open ended laterally to the limit of the licence boundary, as well as being open ended with depth as the model is underlain by the lower grade un-enriched fresh rock surface.

CROSS SECTION THROUGH ARAXÁ MODEL INDICATING BOREHOLE COMPOSITED SAMPLING GRADES AND LITHOLOGY

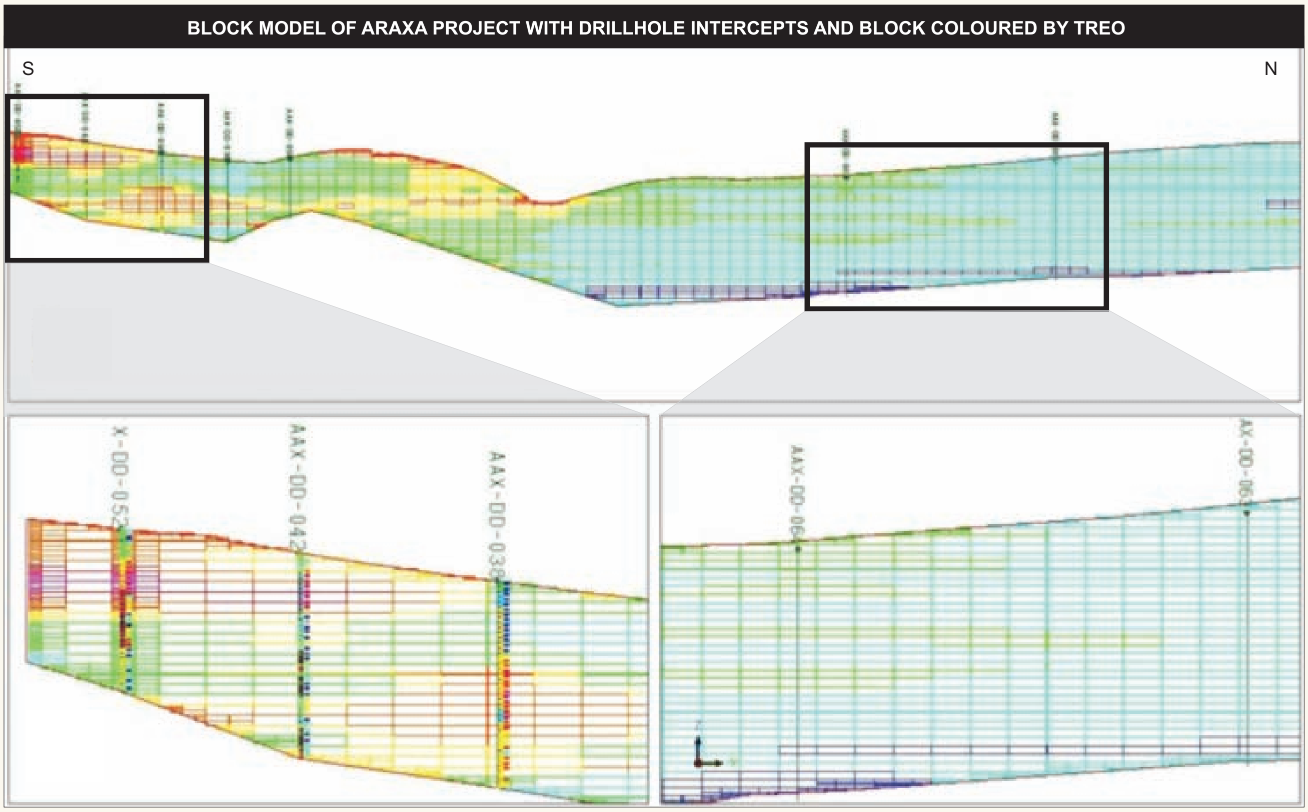
CROSS SECTION VIEW OF WIREFRAME AND DRILL HOLES (SOUTH NORTH)



LEGEND

(Lithology)	(TREO Assay %)		(Density)
🟩 Soil Cover	🟦 0.00-1.00	🟧 7.00-10.00	🟦 1.82g/cm^3
🟦 Colluvium / Elluvium	🟦 1.00-3.00	🟥 10.00-15.00	🟥 2.77g/cm^3
🟨 Saprolite / Saprock	🟩 3.00-5.00	🟪 15.00-20.00	
🟥 Ferruginous “ Laterite”	🟨 5.00-7.00		

BLOCK MODEL OF ARAXA PROJECT WITH DRILLHOLE INTERCEPTS AND BLOCK COLOURED BY TREO



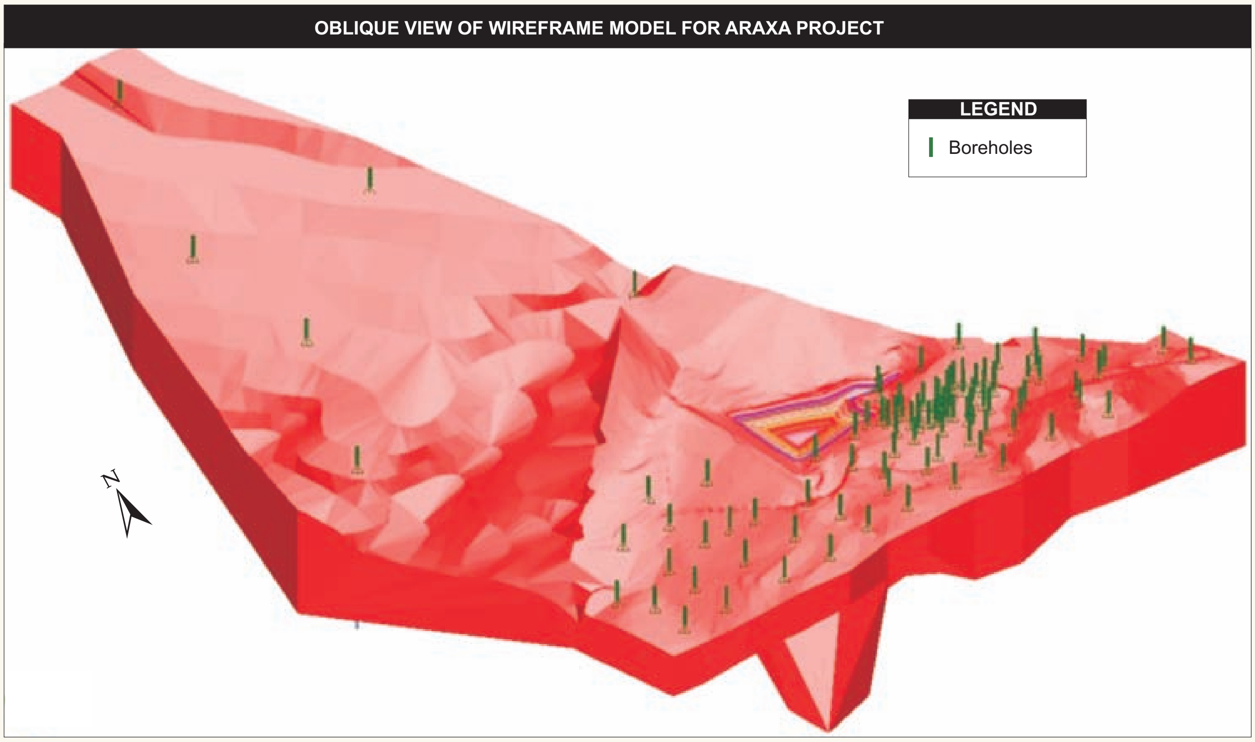
LEGEND

(TREO Grade %)

🟦 0.00-3.00	🟧 6.00-8.00
🟦 3.00-4.00	🟥 8.00-10.00
🟨 4.00-6.00	🟪 10.00-20.00

3D VIEW OF ARAXÁ PROJECT GEOLOGICAL MODEL WITH BOREHOLE LITHOLOGY

OBLIQUE VIEW OF WIREFRAME MODEL FOR ARAXA PROJECT



OBLIQUE VIEW OF DRILLHOLE LOCATIONS COLOURED BY LITHOLOGY IN RELATIONSHIP TO DAM

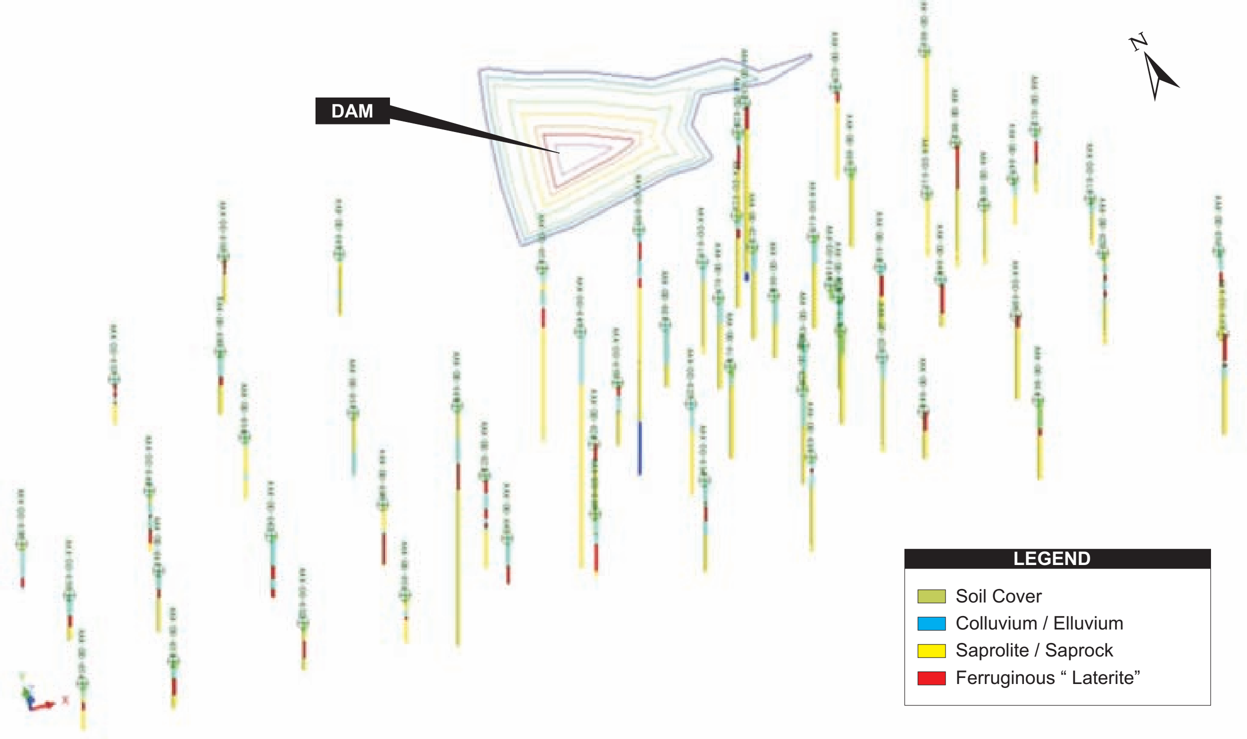
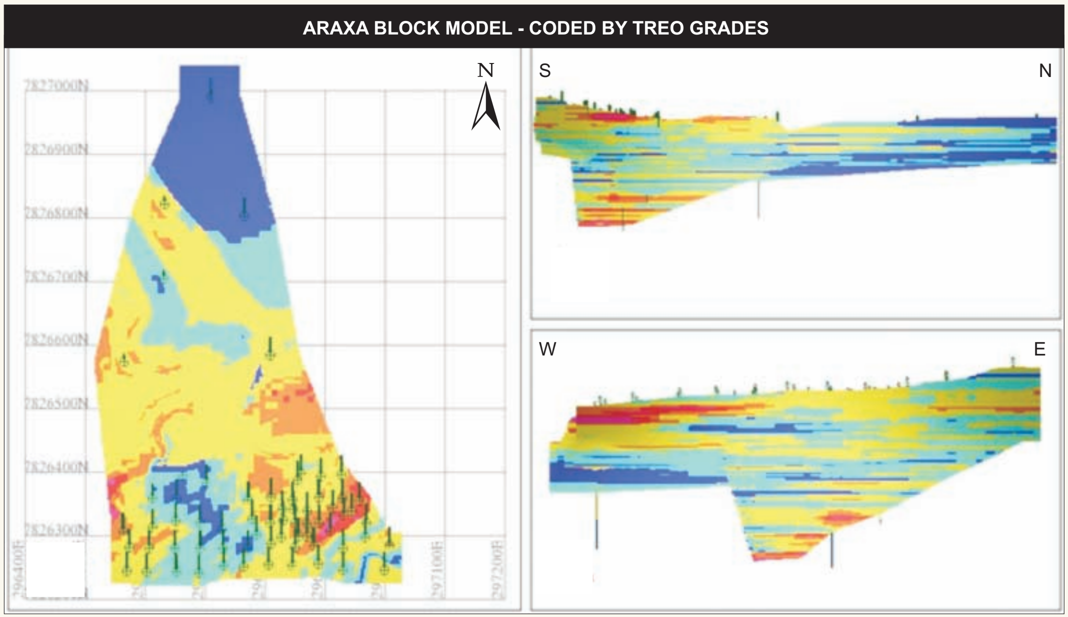


FIGURE 18

BLOCK MODEL OF THE ARAXÁ PROJECT FOR REO, NIOBIUM AND PHOSPHATE GRADE ESTIMATES

ARAXA BLOCK MODEL - CODED BY TREO GRADES

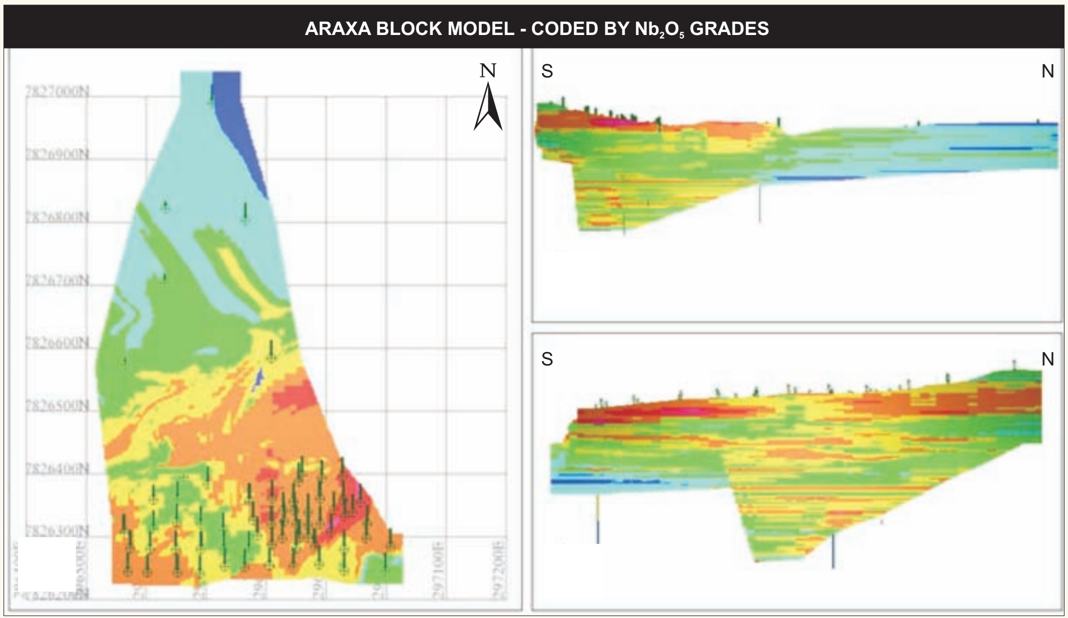


LEGEND

(TREO Grade%)

- 🟦 0.00-3.00
- 🟦 3.00-4.00
- 🟨 4.00-6.00
- 🟧 6.00-8.00
- 🟥 8.00-10.00
- 🟪 10.00-20.00

ARAXA BLOCK MODEL - CODED BY Nb_2O_5 GRADES

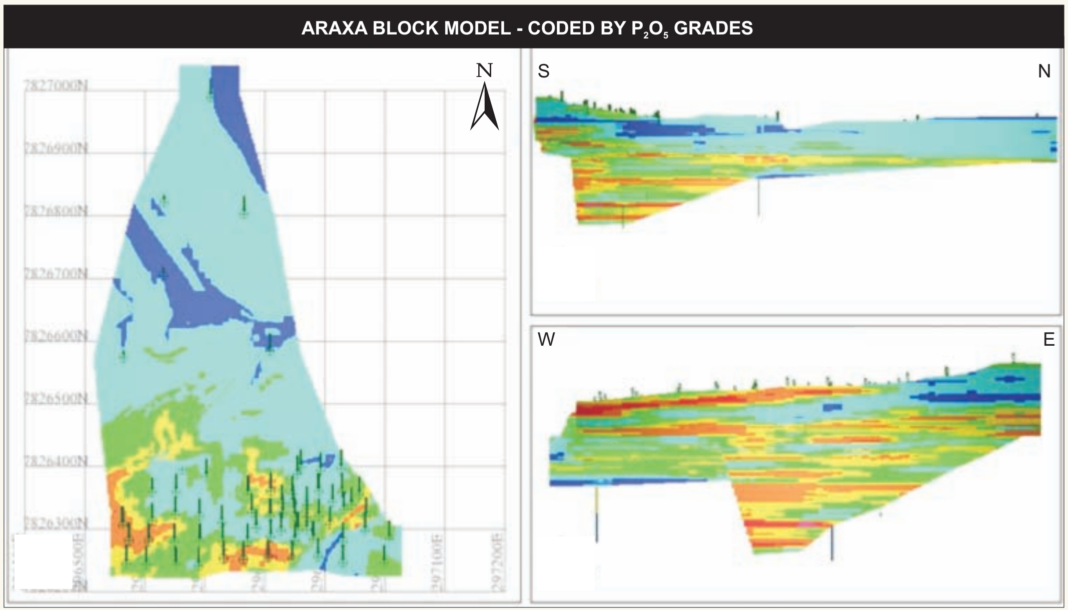


LEGEND

(Nb_2O_5Grade%)

- 🟦 0.00-0.20
- 🟦 0.20-0.50
- 🟩 0.50-0.80
- 🟨 0.80-1.00
- 🟧 1.00-1.50
- 🟥 1.50-2.00
- 🟪 2.00-5.00

ARAXA BLOCK MODEL - CODED BY P_2O_5 GRADES



LEGEND

(P_2O_5 Grade%)

- 🟦 0.00-5.00
- 🟦 5.00-8.00
- 🟩 8.00-10.00
- 🟨 10.00-12.00
- 🟧 12.00-15.00
- 🟥 15.00-18.00
- 🟪 18.00-30.00

14.2.2. Grade

The grade interpolation for the Araxá Mineral Resource block model was estimated using OK. Anisotropic search ellipsoids were selected for the grade interpolation process based on the analysis of the spatial continuity of TREO, P_2O_5, and Nb_2O_5 grades using variography and on the general geometry of the modelled mineralized saprolite envelope. Limits are set for the minimum and maximum number of composites used per interpolation pass, and restrictions are applied on the maximum number of composites used from each hole.

The interpolation process was conducted using three successive passes with relaxed search conditions from one pass to the next until all blocks were interpolated. The orientation of the search ellipsoids, which is identical for each interpolation pass, is E90° azimuth, 0° dip and 0° plunge.

In the first pass, the search ellipsoid distance was 80m (long axis) by 80m (intermediate axis) by 25 m (short axis). Search conditions were defined with a minimum of 10 composites and a maximum of 30 composites with a maximum of two composites selected from each hole. For the second pass, the search distance was increased to 120m (long axis) by 120m (intermediate axis) by 30m (short axis) and composites selection criteria were kept the same as the first pass. However with a lowering of the minimum number of samples required to make an estimate set at 8. Finally, the search distance of the third pass was increased to 240m (long axis) by 240m (intermediate axis) by 60m (short axis) and again the same composites selection criteria were applied with a lowering of the minimum number of samples to two. The search ellipsoid was configured to match the mineralisation and the parameters are presented in Table 22.

Table 22 : Search Ellipsoid Parameters

PARAMETER	1st PASS SEARCH RADIUS (m)	2nd PASS SEARCH RADIUS (m)	3rd PASS SEARCH RADIUS (m)
X	80	120	240
Y	80	120	240
Z	25	30	30
Minimum No. Samples	10	8	2
Maximum No. Samples	30	30	30

A very small portion of blocks (0.14% of the total block model) remained un-estimated following the completion of the three pass estimate. These blocks lie on the northern end of the block model and at an elevation which does not allow the search ellipse parameters to find the minimum number of composites required to make a block estimate.

Figure 18 shows the grade variations across the block model for TREO, P_2O_5, and Nb_2O_5, as well as showing the estimation throughout the saprolite domain for the Araxá Project. The limited amount of drilling across the northern portion of the Araxá Project area is notable.

14.2.3. Tonnage

The tonnage is calculated by the multiplication of the volume by the density estimate.

14.3. Araxá Project Mineral Resource Classification

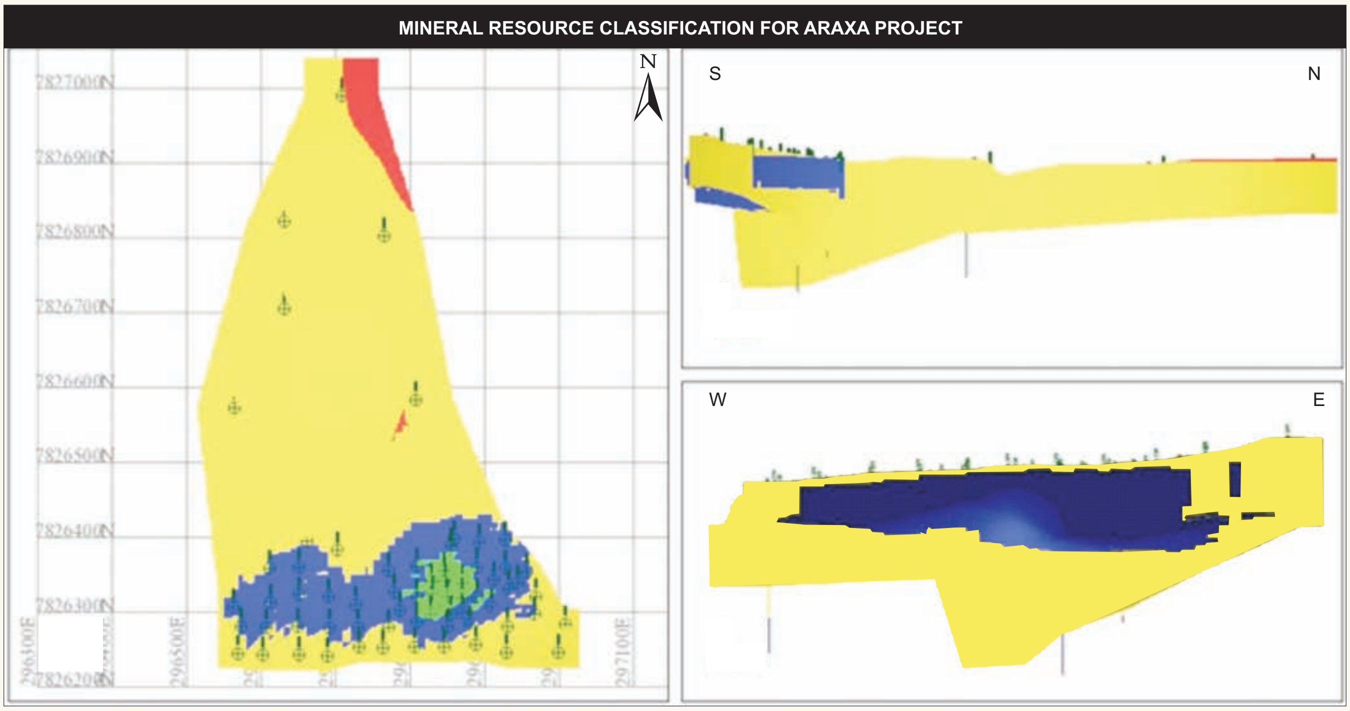
The Mineral Resources at the Araxá Project have been classified as Measured, Indicated and Inferred Mineral Resources. The parameters used to determine the Mineral Resource classification include:-

- drilling technique;
- logging;
- drill sample recovery;
- sub-sampling techniques and sample preparation;
- quality of assay data;
- verification of sampling and assaying;
- location of sampling points;
- data density and distribution;
- results from audits and reviews;
- database integrity;
- geological interpretation;
- estimation and modelling techniques;
- cut-off grades; and
- proposed mining factors and assumptions i.e. Smallest Mining Units.

The location of the resources in relation to the licence boundaries is presented in Figure 19.

LOCATION OF THE RESOURCES IN RELATION TO THE LICENCE BOUNDARIES

MINERAL RESOURCE CLASSIFICATION FOR ARAXA PROJECT

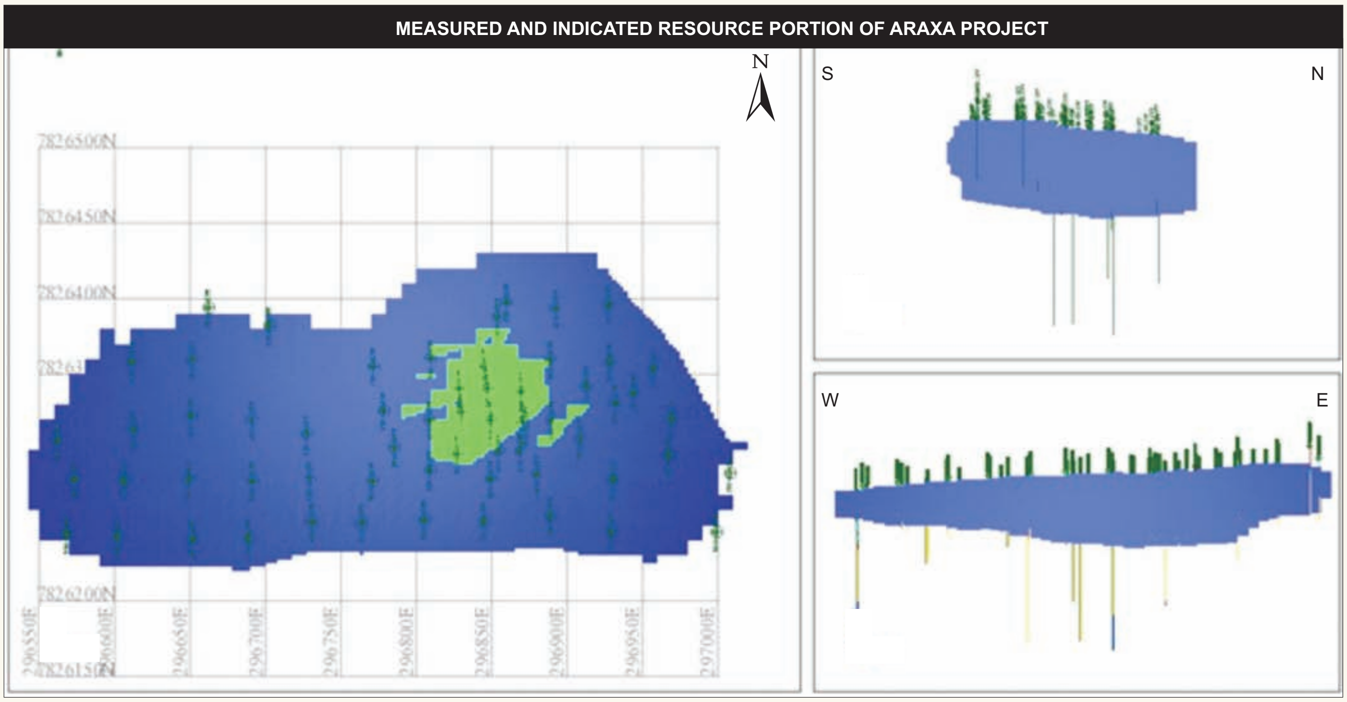


LEGEND

(Catergory)

- 🟥 Unclassified
- 🟨 Inferred
- 🟦 Indicated
- 🟩 Measured

MEASURED AND INDICATED RESOURCE PORTION OF ARAXA PROJECT



LEGEND

(Resource Catergory)

- 🟦 Indicated
- 🟩 Measured

14.4. Araxá Project Mineral Resource Statement (NI 14b,c)

A Mineral Resource estimate was conducted in June 2012 by AMS in conjunction with the independent resource geologist, Mr Bradley Ackroyd. A resource statement was issued and signed off by the Qualified Person.

The Mineral Resource statement is presented in Table 23. A breakdown of the REE grades can be seen in Appendix 4.

Table 23 : Araxá Project Resource Statement (AMS,June 2012)

MINERAL RESOURCE GRADE TONNAGE REPORT - 1ST JUNE 2012 (BLOCK MODEL - 10me x 10mn x 2mRL) - ORDINARY KRIGING								
CUTOFF (% TREO)	**TONNES (Mt)**	**TREO %**	**LREO %***	**HREO %****	**P_2O_5 %**	**Nb_2O_5 %**	**Al_2O_3 %**	**Fe_2O_3 %**
Measured Resource Category								
0.00	1.33	5.62	5.48	0.15	7.89	1.25	3.31	34.23
2.00	1.33	5.62	5.48	0.15	7.89	1.25	3.31	34.23
4.00	1.10	6.05	5.89	0.16	7.84	1.32	3.42	34.57
6.00	0.37	8.46	8.23	0.23	9.13	1.72	5.18	33.97
8.00	0.16	10.47	10.18	0.29	9.87	1.99	6.00	31.44
10.00	0.08	12.19	11.85	0.34	10.42	2.20	5.98	28.58
Indicated Resource Category								
0.00	5.02	4.85	4.73	0.12	8.54	0.96	5.68	32.76
2.00	5.02	4.85	4.73	0.12	8.54	0.96	5.68	32.76
4.00	3.29	5.58	5.44	0.14	8.69	1.07	5.69	32.36
6.00	0.88	7.75	7.57	0.19	10.25	1.35	8.17	29.32
8.00	0.27	9.88	9.64	0.24	11.28	1.67	8.95	28.79
10.00	0.10	11.73	11.44	0.29	11.83	1.98	8.66	29.38
Measured and Indicated Mineral Resource Category (2% Cutoff TREO)***								
2.00	**6.34**	**5.01**	**4.88**	**0.13**	**8.40**	**1.02**	**5.19**	**33.06**
Inferred Resource Category								
0.00	23.99	3.88	3.78	0.11	7.89	0.62	4.28	29.28
2.00	21.94	3.99	3.88	0.11	7.86	0.64	4.31	29.59
4.00	9.32	5.01	4.89	0.12	7.64	0.81	4.46	31.56
6.00	1.01	6.95	6.82	0.13	8.93	0.99	4.93	29.05
8.00	0.14	9.08	8.97	0.12	10.01	1.01	4.17	24.45
10.00	0.02	10.84	10.70	0.14	10.95	1.16	4.98	22.15
Inferred Mineral Resource Category (2% Cutoff TREO)***								
2.00	**21.94**	**3.99**	**3.88**	**0.11**	**7.86**	**0.64**	**4.31**	**29.59**

TREO includes La_2O_3,Ce_2O_3, Pr_2O_3, Nd_2O_3, Sm_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 and Y_2O_3

* LREO (97.60% of TREO) includes La_2O_3, Ce_2O_3, Pr_2O_3, Nd_2O_3 and Sm_2O_3

** HREO + Y_2O_3 (2.4% of TREO) includes Tb_2O_3, Dy_2O_3, Ho_2O_3, Er_2O_3, Tm_2O_3, Yb_2O_3, Eu_2O_3, Gd_2O_3, Lu_2O_3 and Y_2O_3

An independent mineral resource has been estimated for the Araxá Project comprising a combined measured and indicated mineral resource of 6.34 Mt at 5.01% TREO (using a 2% TREO cut-off), 8.40% P2O5 and 1.02% Nb2O5 and an inferred mineral resource of 21.94 Mt at 3.99% TREO, 7.86% P2O5 and 0.64% Nb2O5 (using a 2% TREO cut-off grade).

Table 24 and Table 25 highlight the breakdown for the various REO's for the Araxá Project.

Table 24 : Breakdown of the LREO Mineral Resource Grades and Tonnages (AMS, June 2012)

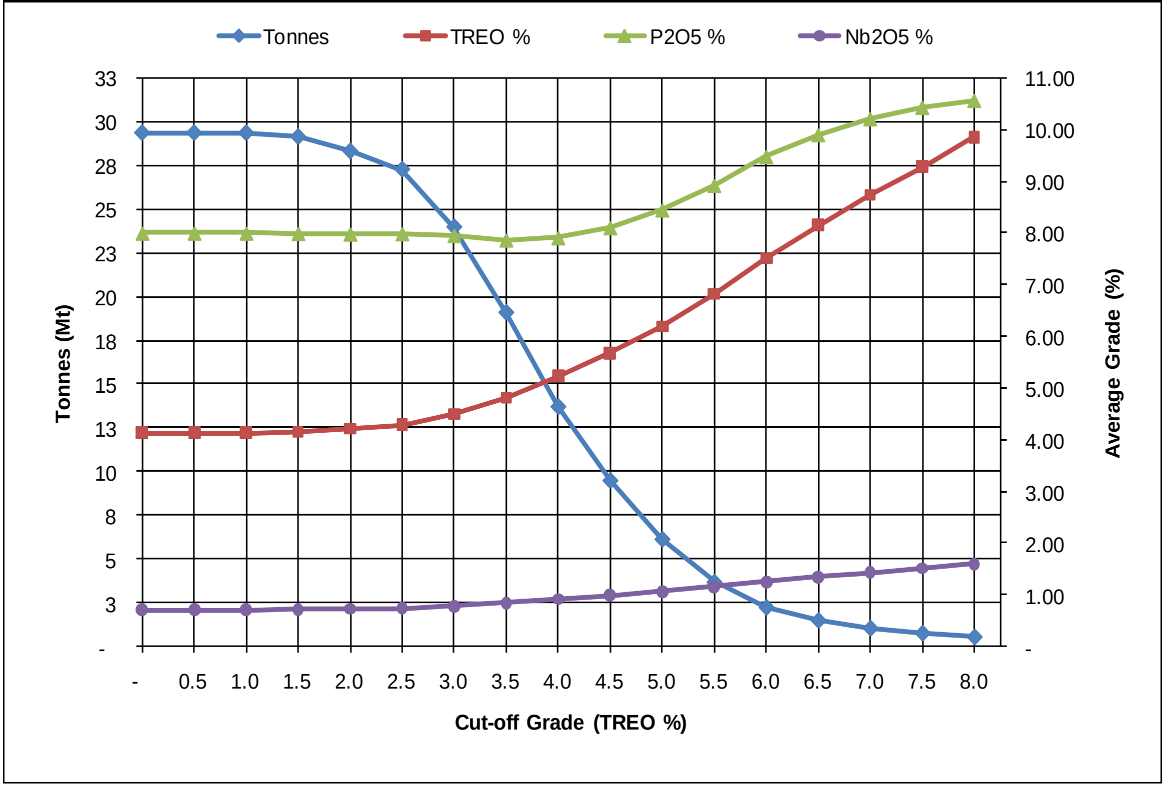
CATEGORY	**CUTOFF (% TREO)**	**SUITE OF LREO's (%)** **La_2O_3**	**Ce_2O_3**	**Pr_2O_3**	**Nd_2O_3**	**Sm_2O_3**	**LREO (%)**
Measured	2.00	1.53	2.81	0.26	0.79	0.08	**5.48**
Indicated	2.00	1.35	2.40	0.22	0.67	0.07	**4.73**
Inferred	2.00	1.12	1.96	0.18	0.55	0.06	**3.88**

Table 25 : Breakdown of the HREO Mineral Resource Grades and Tonnages (AMS, June 2012)

CATEGORY	**CUTOFF (% TREO)**	**SUITE OF LREO's (ppm)** **Eu_2O_3**	**Gd_2O_3**	**Tb_4O_7**	**Dy_2O_3**	**Ho_2O_3**	**Er_2O_3**	**Tm_2O_3**	**Yb_2O_3**	**Lu_2O_3**	**Y_2O_3**	**HREO (ppm)**
Measured	2.00	182	371	38	153	22	44	3	23	1	626	**1,463**
Indicated	2.00	158	322	33	129	18	36	2	18	1	502	**1,217**
Inferred	2.00	135	275	29	117	16	32	2	16	0	459	**1,080**

In order for the reader to obtain a full appreciation of the variability of the grade and tonnage associated with the resource with the application of cut-off grades, a grade versus tonnage curve is presented in Figure 20.

Figure 20 : Grade Tonnage Curve for REOs associated with the Araxá Project



Venmyn has not carried out a verification process on the resource statement presented in Table 23 in any manner or form. Venmyn does, however, concur with the AMS classification methodology of the resource.

It must be noted that Mineral Resources are not mineral reserves and therefore do not have demonstrated economic viability.

14.5. Effect of Other Factors (NI 14d)

The location of the old CBMM tailings dam, covering a part of the Mineral Resources, will have an effect on the ability to mine the project. This effect may influence safety and also have a cost implication for the Araxá Project. These effects have not been addressed in any manner or form and will need to be included as part of the modifying factors for Mineral Resource to Mineral Reserve conversion.

15. MINERAL RESERVE ESTIMATES (NI 15)

No mineral reserve estimates have been carried out for the Araxá Project.

16. MINING METHODS (NI 16)

The project proposition is to mine the project in three phases, mining 120kt in the first five years of the operation of the mine, which is scheduled to begin operation in 2015. The technical parameters for the proposed phases of mining the Project are summarised in Table 26.

Table 26: Summary of Technical Parameters for the proposed Araxá Mine

	PHASE 1	PHASE 2	PHASE 3
Period (Year)	2015 - 2019	2020 - 2022	2023 - 2054
Feed rate (kt)	120	240	380
Average mineralisation grade (%)	7.96	7.96	4.96
Strip ratio (waste/ore)	0.20	0.20	0.20

The Project is expected to have a low strip ratio of 0.20 (waste/ore).

The deposit has a density of 1.8t/m^3 and a moisture content of 13%.

An initial cut-off of 6% REO was assumed for the initial operating of the mine (between 2015 and 2022), and a cut-off of 4% assumed for the remaining years of operating the mine.

Table 27 summarises the REO grade at the initial mine operation and the remaining phases of operating the mine.

Table 27 : Summary of the REO grades at various mine operation phases

RESOURC CATEGORY	INITIAL OPERATING (2015 – 2022)(MEASURED AND INDCATED RESOURCES - CUT-OFF OF 6%) (Mt)	REO GRADE (%)	REMAINING MINERALIZATION FOR PHASE 3 OPERATING - CUT-OFF 4% (Mt)	REO GRADE (%)
Inferred			9.32	5.01
Indicated	0.88	7.75	2.41	4.79
Measured	0.37	8.46	0.73	4.83
Total/Average	**1.25**	**7.96**	**12.46**	**4.96**

Table 28 : Araxa Projects LREO's and HREO's Mineral Resources at 6% and 4% TREO CUT-OFF

SUIT OF LREO´S MIERAL RESOURCES @ 6% TREO CUT-OFF											
	La_2O_3	Ce_2O_3	Pr_2O_3	Nd_2O_3	Sm_2O_3	LREO					
Measured	2.30	4.23	0.39	1.19	0.12	8.24					
Indicated	2.16	3.83	0.35	1.07	0.11	7.56					
SUIT OF of HREO´s MINERAL RESOURCE @6% TREO CUT-OFF (ppm)											
	Eu_2O_3	Gd_2O_3	Tb_4O_7	Dy_2O_3	Ho_2O_3	Er_2O_3	Tm_2O_3	Yb_2O_3	Lu_2O_3	Y_2O_3	HREO
Measured	274	558	57	230	33	66	5	35	2	941	2,200
Indicated	252	514	53	206	29	58	3	29	2	802	1,944
SUIT OF LREO´s MINERAL RESOURCE @ 4% TREO CUT-OFF											
	La_2O_3	Ce_2O_3	Pr_2O_3	Nd_2O_3	Sm_2O_3	LREO					
Measured	1.31	2.41	0.22	0.68	0.07	4.70					
Indicated	1.33	2.37	0.22	0.66	0.07	4.67					
Inferred	1.41	2.46	0.23	0.69	0.08	4.87					
SUIT OF HREO´s MINERAL RESOURCES @ 4% TREO CUT-OFF(ppm)											
	Eu_2O_3	Gd_2O_3	Tb_4O_7	Dy_2O_3	Ho_2O_3	Er_2O_3	Tm_2O_3	Yb_2O_3	Lu_2O_3	Y_2O_3	HREO
Measured	156	318	33	131	19	38	3	20	1	537	1,256
Indicated	156	318	33	127	18	36	2	18	1	496	1,202
Inferred	170	345	36	147	20	40	3	20	0	577	1,357

Table 29 summarises the geotechnical parameters conceptualized for the pit design.

Table 29: Geotechnical Parameter for the Proposed Araxá Mine

GEOTECHNICAL PARAMETER	QUANTITY
Overall slope angle (degree)	30
Face angle (degree)	63
Berm width (m)	4.00
Worktop height (m)	4.00
Width of the road (m)	14.00

16.1. Mining Process

The Araxá Project will be mined using an open pit mining method with benches. The ore will be mechanically excavated and transported from the mine to the processing plant by road. Mine operation will not require large equipment due to the expected low feed rate of 120kt for the five years of operation. When compared to most mines in operation, the Araxá Project feed rate will have a low feed rate and hence a low capital cost is required.

Table 30 shows that the Araxá Project feed rate is small compared to other global project.

Table 30: Comparison of some REE Mines and Araxá Project Feed Rates

PROJECT NAMES	COMPANY	LOCATION	ROM TONNES RATE (kt)
Zandkops drift	Frontier Rare Earths Ltd	South Africa	1,000
Bear Lodge	Rare Element Resources Ltd	USA	318
Thor Lake	Avalon Rare Metals Inc.	Canada	700
Eco Ridge	Pele Mountain	Canada	3,200

Mining will be carried out on Araxá following removal the overburden which will be between 50cm and 2m in thickness, depending on the position of the mine. The overburden is expected to be removed by a bulldozer. An excavator will be used to load the road trucks which transport the organic soil from the mine to a reserved storage area.

Once the ore is exposed, it will be mined using the same equipment as was used for overburden removal. Ore will be loaded into the road trucks and hauled to the processing area, which will be located 23km from the pit.

Four 27t trucks are proposed to be used for the transporting of the ore, organic soil and overburden. It is estimated that each truck will be loaded in approximately five mins and each trip from the mine to the plant is estimated to take 50 minutes. A eight hour working period day is proposed and each truck is estimated to perform six cycles of transporting the ore and four more cycles of transporting the overburden.

The mining method proposed does not require blasting operations and the ore excavation and loading will be responsibility of MBAC.

The storage of overburden material and low grade ore will follow technical criteria in order to maintain slope stability and control of potential erosion of the stockpiles. The organic soil storage area will be provided with drainage system, so that at the time of mine closure, this material will serve as a substrate for vegetation thereafter. The removal of vegetation, stripping, ground motion and opening of access roads is expected to cause significant changes in the natural drainage system. In order to prevent the formation of water channels and cascades that would influence the suspended solids content of natural water streams in the region, a mine drainage system will be built. This system will consist of channels, settling basin, levees, ditches and terraces of protection. The objective is to avoid direct flow of rainy water from mine to the surface area that surrounds the mine to avoid the risk of environmental contamination.

The mined ore will be transported to the beneficiation plant facility shown in Figure 34, where it will be stored in stockpiles catering for three months of operation. The stockpiles will have two objectives, namely:-

- stockpile of ore for the rainy season, when the extraction activities are discontinued; and
- better homogenization of the ore.

Samples are proposed to be collected on three occasions in order to control the grade to be fed into the plant. The samples will be taken as follows:-

- immediately when the block of ore is removed by the bulldozer;
- while drumping the transported ore on the stockpile; and
- when feeding the stockpile into the crushing plant.

In conclusion, the Araxá Project will require low capital investment to begin operation.

17. RECOVERY METHODS (NI 17)

The processing methods reported are considered, by Venmyn, to be conceptual in nature.

17.1. Recovery Methods for Dicalcium Phosphate

Dicalcium phosphate is commonly produced through the “wet acid” route in which rock phosphate is reacted with sulphuric acid to produce phosphoric acid. After concentration and purification (to reduce the level of impurities), phosphoric acid is reacted with a calcium source (commonly quick lime or limestone) to produce dicalcium phosphate. This latter part of the process is largely straight forward as it is a pure chemical reaction which does not depend on mineralogy.

17.2. Recovery Methods for Niobium Pentoxide (Nb_2O_5)

An Nb_2O_5-rich concentrate (50-60%) is recovered from pyrochlore through physical processing methods which involve crushing, grinding, magnetic separation and flotation. Nb_2O_5 is then subsequently processed into a whole range of downstream products and the methods employed differ from product to product.

17.3. Proposed Processing Route (NI 17a)

Following the bench-scale testwork that has been completed on Araxá, MBAC has proposed the process route shown in Figure 21 for the extraction of REOs from the Araxá Project. This route is in line with the results of the testwork, which demonstrated that production of a concentrate prior to chemical processing is not feasible. The plant is envisaged to be capable of producing seven REOs as well as an Nb_2O_5 concentrate. The production of dicalcium phosphate is still under investigation. In Venmyn’s opinion, this proposed process route has been completed to a Scoping Study level, which has been successful in producing a robust PFD for use in further optimisation and scale-up work. The process route described in this section accounts for the production of REOs and Nb_2O_5.

17.3.1. Ore Treatment

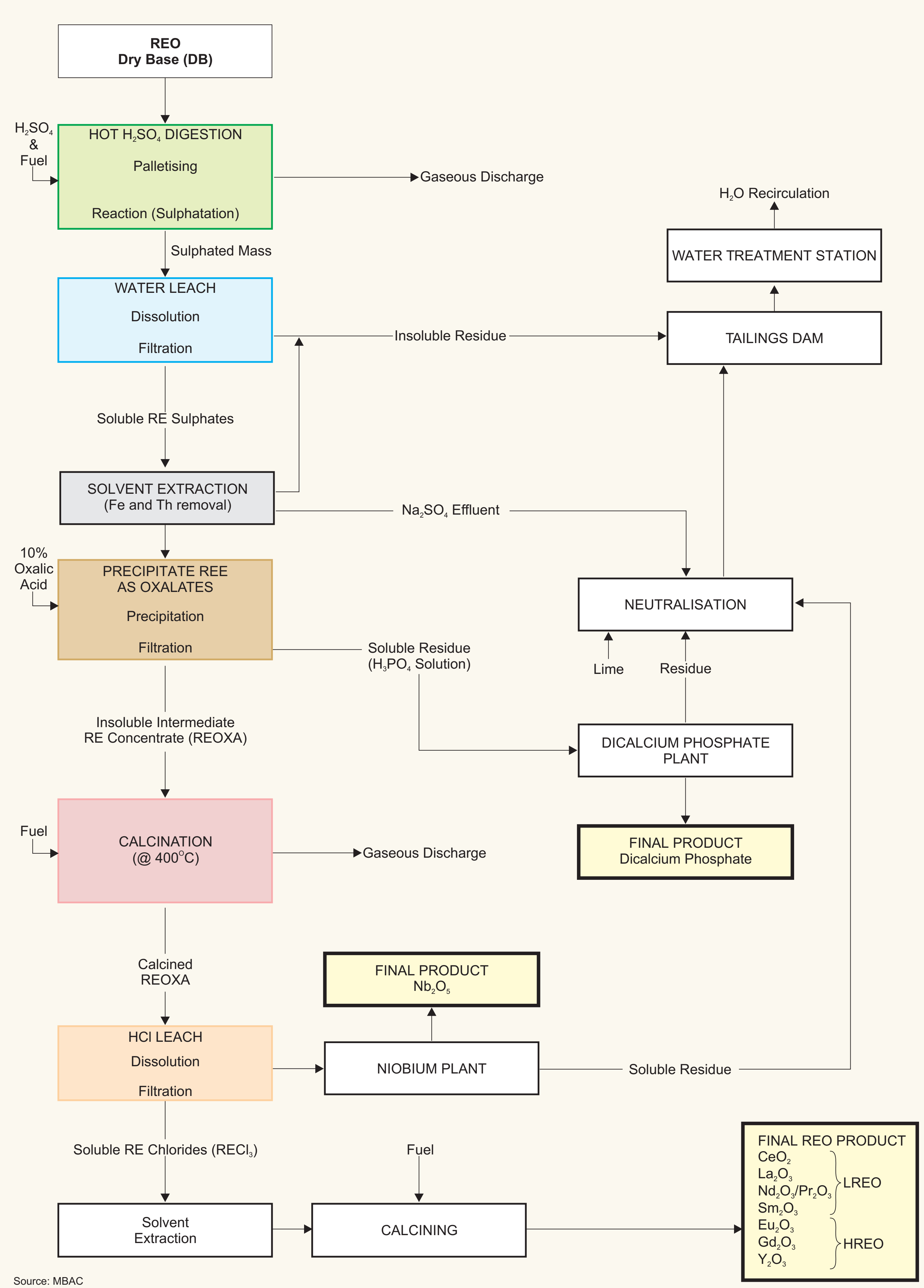
ROM will be transported from the mine site and stockpiled at the crushing plant prior to crushing to 100% passing 0.5 inches (12.7mm).

Crushed ore will be stored in a covered area where it will be mixed to ensure homogeneity. Homogenised ore will be fed into a ball mill, at a nominal throughput of 120ktpa, where milling will take place, in the presence of water, in a closed loop with a battery of hydro-cyclones to produce a final milled product of 80% passing 53µm.

17.3.2. Cracking Circuit

After milling, the slurry will be dewatered, thickened and filtered using a pressure filter. The thickened ore will be mixed with concentrated sulphuric acid (98%) prior to cracking. Cracking will occur in a kiln at a temperature of 250°C and the resulting pellets will be cooled, crushed in a hammer mill and discharged into an agitated tank for water leaching.

PROPOSED PFD



Source: MBAC

The resulting slurry, containing rare earths dissolved along with various other elements such as iron, aluminum, phosphorus, thorium, niobium, will be withdrawn continuously and fed through a pressure filter to recover the solution whilst the filter cake will be discarded.

17.3.3. Iron and Thorium Removal

Since iron is a major element in the ore and is partially dissolved with rare earths in the cracking step, it must be removed from the solution in order to reduce the cost of oxalic acid input in precipitation stage. Iron removal will be carried out by solvent extraction, after pH adjustment, using a mixture of extractors which also remove other elements such as thorium. The stripping of metals from the load organic phase (in solvent extraction) will be carried out as a batchwise process with a sodium hydroxide solution, precipitating these elements as hydroxides. This precipitate will be separated from the organic phase and aqueous phase by centrifugation.

17.3.4. Precipitation Circuit

The iron-free REE-rich solution from the solvent extraction stage will be fed into an agitated reaction tank where oxalic acid, a precipitation agent, will be added to facilitate the precipitation of REEs ((REOXA)) and niobium. The resulting slurry will be fed to a pressure filter where a filter cake, expected to contain 95% REEs and niobium, will be separated, washed, and stored in preparation for the next stage of processing.

17.3.5. Dissolution Circuit

The crushed filter cake from the Precipitation Circuit will be calcined for one hour at 400°C and fed into a reaction vessel where it will react with hydrochloric acid to form an insoluble niobium-rich residue and a solution containing dissolved REE chlorides. The slurry from this reaction vessel will then be fed to a pressure filter to recover the REE chloride solution (the mother liquor) and a niobium-rich filter cake which will be used to produce a 50-60% Nb_2O_5 concentrate via methods described in Section 17.1 of this report. It must be noted that the variables for the leaching yield for rare earth elements are unknown as the residence time for calcining and/or the temperature of calcining in the previous stage have an effect.

17.3.6. Solvent Extraction

The mother liquor from the Dissolution Circuit will be fed to a solvent extraction plant with a capacity to produce 10ktpa of separated REE chlorides. A series of solvent extraction stages will be used to effect separation. After separation, each of the REE chlorides will be precipitated to form the respective rare earth hydroxides which will then be calcined to produce the respective REOs. Each chloride will follow a separate and independent purification line to avoid contamination between the various products.

At present, a decision is yet to be made as there is a possibility for operating in two different routes which are described below.

17.3.6.1. Solvent Extraction Route 1

Figure 22 presents the flowchart of Route 1 with three separation circuits. Each circuit is an operation mode with independent solvent recycles. In the circuits, cuts are made, and the route has a numbers of cuts and how these cuts are performed, (i.e., they can be fed in aqueous phase or organic phase).

In this Route 1, the mother liquor is fed into Circuit 1 in a certain stage of a pack of multiple stages of mixers and settlers where the cut between Neodymium (Nd) and Samarium (Sm) (the Nd/Sm cut) is affected. This cut is also known as light and heavy elements separation. In this circuit, Sm, Europium (Eu), Gadolinium (Gd), Yttrium (Y) and other present heavy rare earth as Terbium (Tb), Dysprosium (Dy), Holmium (Ho), Erbium (Er), Ytterbium (Yb), Thulium (Tm) and Lutetium (Lu) are extracted whilst Lanthanum (La), Cerium (Ce), Praseodymium (Pr) and Nd remain in the aqueous phase. This aqueous phase (with the LREE fraction) is sent to Circuit 2 whilst the heavy fraction is stripped with HCl and fed to the precipitation stage or future individual separation in other circuits.

Compared with other types of cuts, the Nd/Sm cut is the simplest and easiest to perform because the separation factor for these elements is the highest one. For obtaining a purity specification for Sm of approximately 99.9% in other circuits, the Sm/Nd cut should be performed so that the percentage of Nd in the loaded solvent does not exceed a certain amount.

In principle, the operation mode for Circuit 1 should have four (4) aqueous phase inputs and one (1) extractor input.

In Circuit 2, the cut between Ce and Pr (the Ce/Pr cut) is performed in aqueous phase. Pr and Nd are extracted whilst La and Ce remain in aqueous solution which is sent to Circuit 3. Pr and Nd are in organic phase and they are stripped by HCl and fed to the precipitation stage or another circuit for separation. For the purity of Ce reach at least 99.9% in the Circuit 3, this cut will be performed so that a small amount of Ce accompanies the current of Pr and Nd. In principle, this circuit should have one extractor input and four aqueous phase inputs.

In Circuit 3, the cut between La and Ce (the La/Ce cut) is performed in aqueous phase. The Circuit 3 is the larger circuit in Route 1 because of the volume of extractor and the solvent inventory, and also because Ce is the most abundant element in feed solution (40%).

17.3.6.2. Solvent Extraction Route 2

In route 2 (Figure 23), the feed solution (mother liquor) enters in Circuit 1 at a certain stage of a pack of mixer settlers of multiple stages where the first cut is made between Ce and Pr (the Ce/Pr cut). This cut is similar to that already described in Route 1 Circuit 2. In this circuit, Pr, Nd, Sm, Eu, Gd, Y and other HREEs are extracted whilst La and Ce remain in the aqueous phase. The aqueous phase flow is sent to Circuit 2. The load aqueous solution is sent to another pack of mixers and settlers for the separation of Pr-Nd pair from the heavy fraction. This cut is the Nd/Sm cut but it is performed with an organic feed. This type of cut is not as simple as the Nd/Sm cut performed with an aqueous feed, as in Circuit 1 Route 1 because the Pr and Nd should be stripped from the solvent and the heavy fraction should remain in the organic phase. The pair Pr and Nd in the aqueous phase is then fed to the precipitation step or for a final purification, if necessary, by the flexible circuit to meet the requirements of the market. The heavy fraction in the loaded organic phase is fed to stripping stage with HCl and then sent to the precipitation.

In principle, for the operation of Circuit 1, there should be two inputs for extractor and seven inputs for aqueous phase.

Figure 22: Solvent Extraction Route 1

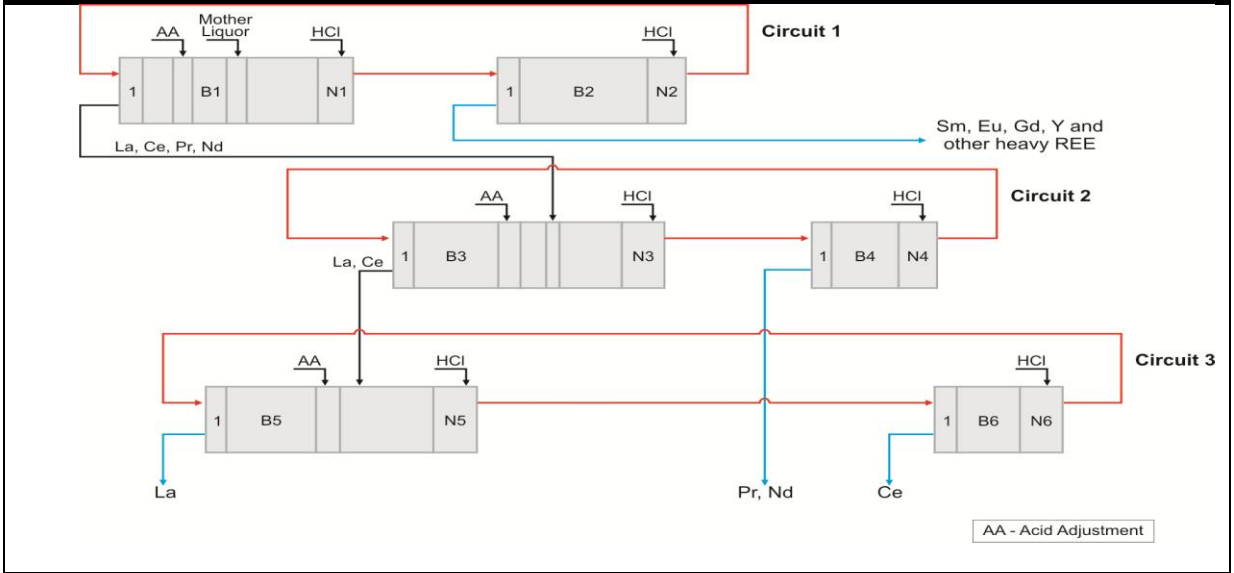
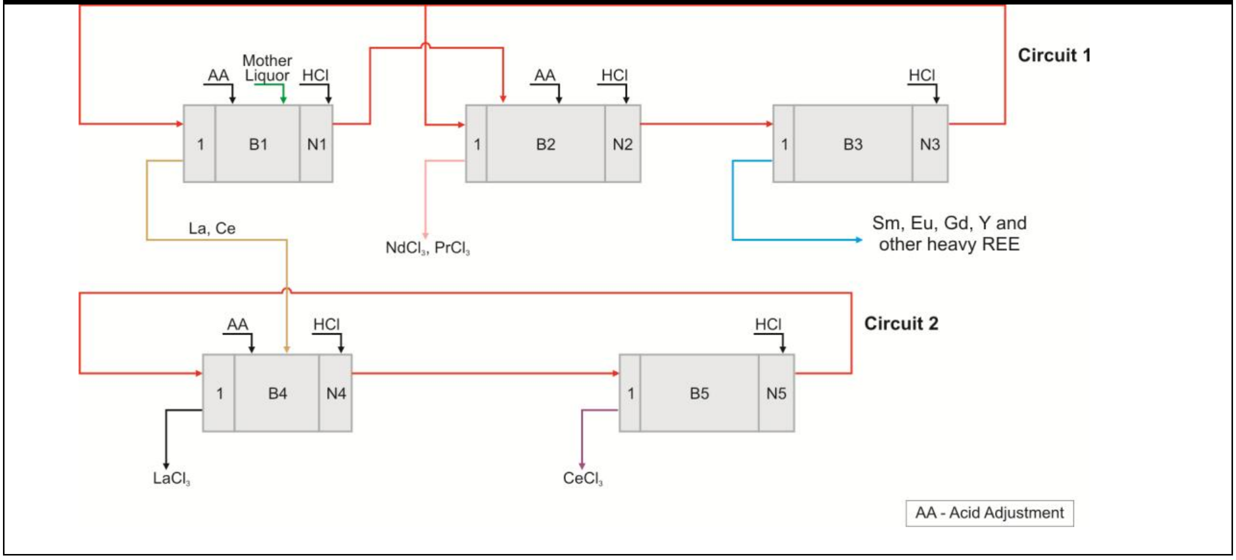


Figure 23: Solvent Extraction Route 2



17.4. Plant Design (NI 17b)

Because the plant has been designed to a PEA level, no detailed descriptions of the following items can be made at this point:-

- plant design;
- equipment characteristics; and
- equipment specifications.

17.5. Process Requirements (NI 17c)

Mass balances have been completed whilst no energy balances have been completed.

17.6. Concluding Opinion on Recovery Methods

In Venmyn's opinion, the proposed process route conforms to the generalised and standard ways of extracting REOs from monazite ores through "whole ore cracking" whereby no pre-concentration is undertaken prior to cracking and there has been no evidence to suggest that fatal flaws exist. A programme of bench-scale testwork has established some critical parameters of the project and is a solid base upon which to conduct more work going forward. In addition, whole ore cracking increases the sulphuric acid requirements in the cracking process. Hatch has, however, suggested that MBAC investigate the possibility of constructing a sulphuric acid plant to supply the cracking process and this has already been considered in the current capex estimate.

Venmyn notes that the bond work index needs to be estimated with a reasonable level of accuracy to enable the consumption of electricity in the crushing plant to be better estimated. This is part of the improvement of the capital and operating costs as the project moves up the development curve towards operation.

18. PROJECT INFRASTRUCTURE (NI 18)

The local infrastructure available to the Araxá Project is excellent as a result of the Project being situated 5km south of the city of Araxá and within 1km of two other mining operations. The following is available within the exploration permit boundary or within a 5km radius of it:-

- tarred roads;
- grid power;
- borehole water;
- accommodation and offices – available in Araxá town;
- telecommunications – cellular phone coverage is available on site;
- skilled workforce – available locally from Araxá, or from Belo Horizonte, the capital and the centre of mining in the state of Minas Gerais; and
- labour – available from the nearby city of Araxá.

19. MARKET STUDIES AND CONTRACTS (NI 19)

19.1. Reserves

It is important to consider the global reserves of the commodity in question in order to understand its market potential. Table 31 lists the REE reserves that are found globally. China has the largest percentage of global REEs in the world, followed by the Commonwealth of Independent States (CIS), and the US.

Table 31 : Estimated Global Rare Earth Reserves

COUNTRY	RESERVES (t)
China	55,000,000
Commonwealth of Independent States	19,000,000
US	13,000,000
India	3,100,000
Australia	1,600,000
Brazil	48,000
Malaysia	30,000
Other countries	22,000,000
TOTAL	**113,778,000**

Source: USGS (2011)

19.2. Production

The location of the world’s REE producers is presented on Figure 10. China is the key player in determining supply-side dynamics. It is the largest producer of REEs globally (Table 32) and the location of most of the world’s rare earth separation capacity (Sullivan, 2011).

Table 32 : Estimated Global Rare Earths Production for 2010

COUNTRY	MINE PRODUCTION (t)
China	130,000
India	2,700
Brazil	550
Malaysia	350
Other countries	Not available
TOTAL	**>133,600**

Source: USGS (2011)
e= estimate

This influence on the market has been felt in 2011 as China has become heavily involved in controlling the supply of REEs, having instituted a REEs export quota and having instituted tougher environmental controls on producers. The country’s mercantilism is an attempt to ensure that its rare earth resources are not depleted as quickly as they would be without intervention and to stave off the fact that the country will eventually have to start importing its own rare earth requirements.

The rare earth quota has resulted in:-

- an influx of HREEs into the market outside China, since these typically fetch higher prices and were favoured for export under non-specific Chinese quotas;
- dumping of unpermitted REE materials by illegal Chinese exporters who have opposed the export controls;
- selling of REEs by speculators;
- the investment in new projects in the belief that there would be a significant shortfall in the supply of REEs to the rest of the world; and
- measures to combat the reduced the availability of REEs and higher prices for the elements.

In the aftermath of the introduction of the REE export quota, measures to combat various industries’ reliance on rare earths have been introduced. These are fundamentally changing the market for rare earths and include the re-engineering of applications to use other substitute products or mechanisms, with:-

- Toyota Motor Corporation and General Motors, among others, reducing the use of REEs in their cars by introducing an inductor motor;
- General Electric Co, among others, reducing REEs use in windmills by redesigning them; and
- W.R. Grace & Co selling reduced-lanthanum oil-refining catalysts (Elmquist, 2011).

The Japanese have also introduced a strategy to replace, reduce and recycle REEs, with some suggesting that above-ground sources of rare earths are going to become increasingly important.

All of these countermeasures to combat export quotas and reduce vulnerability to high REE prices have resulted in a reduction of demand for REEs and an associated drop in REE prices. This has resulted in even less production, with some producers and smelting operations, including Ganzhou Rare Earth Mineral Industry and China's largest producer, Baotou, suspending operations. As a consequence, China has not even met the export quotas that it had set for itself (Seth, 2011).

However, globally, there is still concern over the security of supply of REEs. This has led to a plethora of REE deposits being developed or proposed, with some analysts suggesting that 350 projects outside of India and China are being investigated currently (Hayes, 2011).

19.2.1. Demand

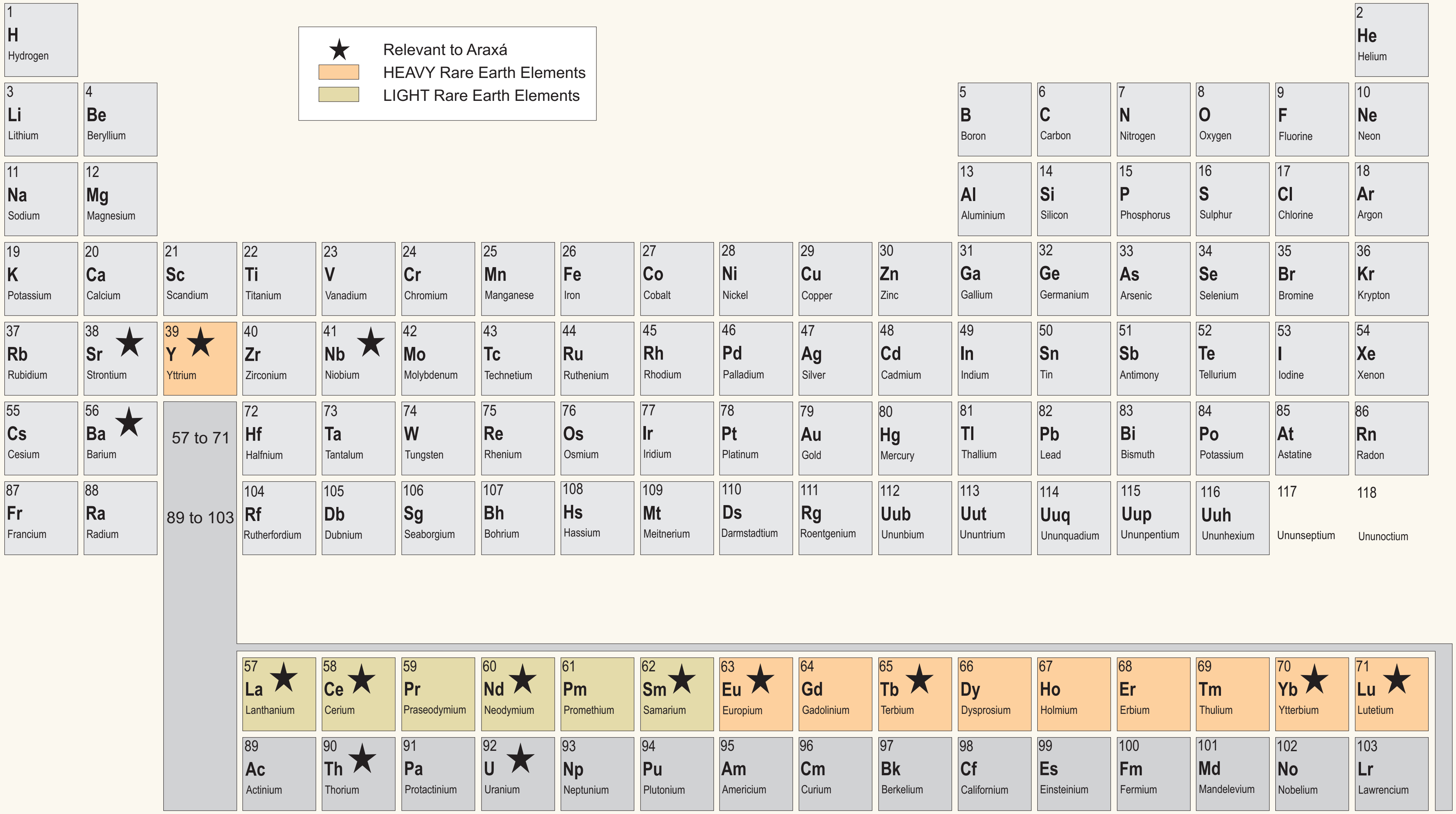
REEs are traditionally divided into two types for scientific and economic valuation purposes, namely LREEs and heavy HREEs as follows, and as indicated on the periodic table in Figure 24:-

- LREEs:-
    - lanthanum (La);
    - cerium (Ce);
    - praseodymium (Pr);
    - neodymium (Nd); and
    - samarium (Sm).
- HREEs:-
    - europium (Eu);
    - gadolinium (Gd);
    - terbium (Tb);
    - dysprosium (Dy);
    - holmium (Ho);
    - erbium (Er);
    - thulium (Tm);
    - ytterbium (Yb);
    - lutetium (Lu); and
    - yttrium (Y).

Each element has its own specific properties and dedicated end uses. The distinct classes of HREEs and LREEs also have different characteristics, occurrences, price and supply and demand fundamentals.

The traditional and economic classification of REEs is presented in Table 33 and also indicated on Figure 24.

REES ON THE PERIODIC TABLE WITH PARTICULAR REFERENCE TO THE ARAXÁ PROJECT



★ Relevant to Araxá
🟧 HEAVY Rare Earth Elements
🟨 LIGHT Rare Earth Elements

1 **H** Hydrogen																	2 **He** Helium
3 **Li** Lithium	4 **Be** Beryllium											5 **B** Boron	6 **C** Carbon	7 **N** Nitrogen	8 **O** Oxygen	9 **F** Fluorine	10 **Ne** Neon
11 **Na** Sodium	12 **Mg** Magnesium											13 **Al** Aluminium	14 **Si** Silicon	15 **P** Phosphorus	16 **S** Sulphur	17 **Cl** Chlorine	18 **Ar** Argon
19 **K** Potassium	20 **Ca** Calcium	21 **Sc** Scandium	22 **Ti** Titanium	23 **V** Vanadium	24 **Cr** Chromium	25 **Mn** Manganese	26 **Fe** Iron	27 **Co** Cobalt	28 **Ni** Nickel	29 **Cu** Copper	30 **Zn** Zinc	31 **Ga** Gallium	32 **Ge** Germanium	33 **As** Arsenic	34 **Se** Selenium	35 **Br** Bromine	36 **Kr** Krypton
37 **Rb** Rubidium	38 ★ **Sr** Strontium	39 ★ **Y** Yttrium	40 **Zr** Zirconium	41 ★ **Nb** Niobium	42 **Mo** Molybdenum	43 **Tc** Technetium	44 **Ru** Ruthenium	45 **Rh** Rhodium	46 **Pd** Palladium	47 **Ag** Silver	48 **Cd** Cadmium	49 **In** Indium	50 **Sn** Tin	51 **Sb** Antimony	52 **Te** Tellurium	53 **I** Iodine	54 **Xe** Xenon
55 **Cs** Cesium	56 ★ **Ba** Barium	57 to 71	72 **Hf** Halfnium	73 **Ta** Tantalum	74 **W** Tungsten	75 **Re** Rhenium	76 **Os** Osmium	77 **Ir** Iridium	78 **Pt** Platinum	79 **Au** Gold	80 **Hg** Mercury	81 **Tl** Thallium	82 **Pb** Lead	83 **Bi** Bismuth	84 **Po** Potassium	85 **At** Astatine	86 **Rn** Radon
87 **Fr** Francium	88 **Ra** Radium	89 to 103	104 **Rf** Rutherfordium	105 **Db** Dubnium	106 **Sg** Seaborgium	107 **Bh** Bohrium	108 **Hs** Hassium	109 **Mt** Meitnerium	110 **Ds** Darmstadtium	111 **Rg** Roentgenium	112 **Uub** Ununbium	113 **Uut** Ununtrium	114 **Uuq** Ununquadium	115 **Uup** Ununpentium	116 **Uuh** Ununhexium	117 Ununseptium	118 Ununoctium
			57 ★ **La** Lanthanium	58 ★ **Ce** Cerium	59 **Pr** Praseodymium	60 ★ **Nd** Neodymium	61 **Pm** Promethium	62 ★ **Sm** Samarium	63 ★ **Eu** Europium	64 **Gd** Gadolinium	65 ★ **Tb** Terbium	66 **Dy** Dysprosium	67 **Ho** Holmium	68 **Er** Erbium	69 **Tm** Thulium	70 ★ **Yb** Ytterbium	71 ★ **Lu** Lutetium
			89 **Ac** Actinium	90 ★ **Th** Thorium	91 **Pa** Protactinium	92 ★ **U** Uranium	93 **Np** Neptunium	94 **Pu** Plutonium	95 **Am** Americium	96 **Cm** Curium	97 **Bk** Berkelium	98 **Cf** Californium	99 **Es** Einsteinium	100 **Fm** Fermium	101 **Md** Mandelevium	102 **No** Nobelium	103 **Lr** Lawrencium

Note: The subgroup numbers 1-18 were adopted in 1984 by the International Union of Pure and Applied Chemistry.
The names of elements 112-118 are the Latin equivalents of those numbers.

FIGURE 24

Table 33 : Traditional versus Recent Economic Classification of REEs

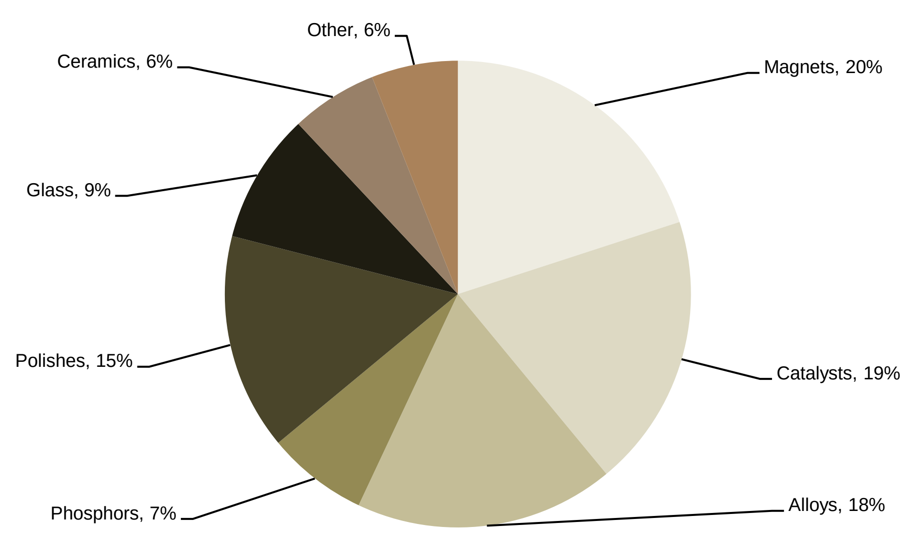
SYMBOL	NAME	TRADITIONAL SUBDIVISION	RECENT ECONOMIC SUBDIVISION
Y	Yttrium	N/A	Critical (CREEs)
Nd	Neodymium	LREE	
Eu	Europium	LREE	
Tb	Terbium	HREE	
Dy	Dysprosium	HREE	
Er	Erbium	HREE	
Ce	Cerium	LREE	Excess (EREEs)
Ho	Holmium	HREE	
Tm	Thulium	HREE	
Yb	Ytterbium	HREE	
Lu	Lutetium	HREE	
Sc	Scandium	N/A	Uncritical (UREEs)
La	Lanthanum	LREE	
Pr	Praseodymium	LREE	
Pm	Promethium	LREE	
Sm	Samarium	LREE	
Gd	Gadolinium	HREE	

Note:
Green shading represents LREEs, and brown shading represents HREEs.

Demand for REEs can either be described in volume terms or in value terms.

In volume terms, the most important applications for REEs have, in the last three years, been for magnets, catalysts, metal alloys, polishing, glass, phosphor and other applications, in decreasing order of magnitude (Figure 25).

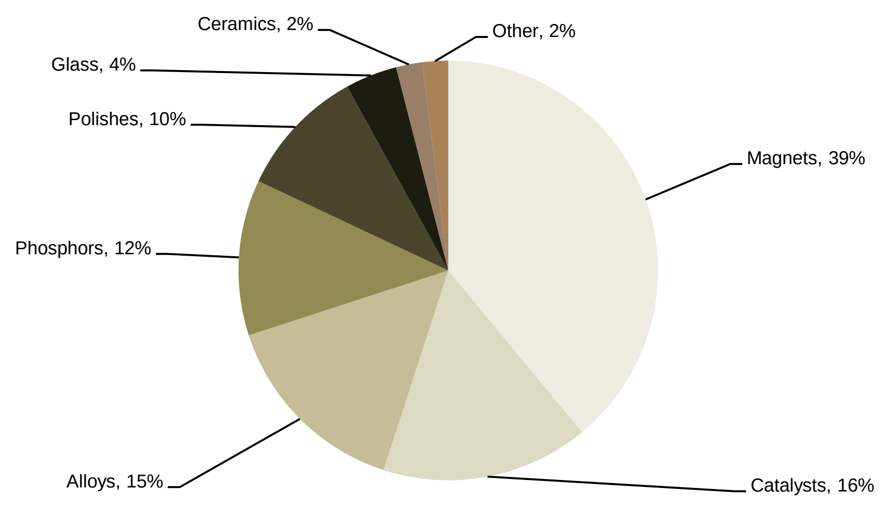
Figure 25 : REEs by End Use in 2010 (by Volume)



In value terms, the most important applications for REEs have changed their rankings considerably as the relative prices of the various REEs have changed over the last few years. Magnets, phosphors, metal alloys, catalysts, ceramics, polishing, glass and other applications had been the most important applications for rare earths, in value terms, in that order, in 2008. However, because of the changing prices of various REEs, catalysts and phosphors, in particular, have changed their relative importance as applications for REEs. Magnets remain the most important application for REEs in value terms, but catalysts were the most important application in value terms for rare earth elements in 2010, followed by metal alloys, phosphors, polishing, glass, ceramics and other applications (Figure 26).

Magnets are the most significant use of REEs in volume and value terms (Figure 25 and Figure 26). The rare earth elements most commonly associated with use in magnets are Nd, Pr, Sm, Dy and occasionally Tb (Hatch, 2011).

Figure 26 : REEs by End Use in 2010 (by Value)



Catalysts are the next most significant use of REEs, with CeO_2 as the main rare earth compound in them and La_2O_3 and Nd_2O_3 used in lesser quantities (Hatch, 2011).

Alloys, typically made up of La and nickel (Ni), which are used to produce battery cells for energy storage, among other uses, are the third most significant use of rare earths (Hatch, 2011).

Phosphors are the next most significant use of REEs in value terms, followed by polishing, glass, ceramics and other applications. The following rare earths and rare earth oxides are associated with these applications (Hatch, 2011):-

- Eu, Y and Tb compounds are frequently used to produce phosphors for use in liquid crystal displays, plasma screen displays, light-emitting diodes and compact fluorescent lamps;
- CeO_2 (with some La_2O_3 and Nd_2O_3) is used as a polishing media for the polishing of glass, mirrors, television screens, computer displays and silicon chip wafers; and
- CeO_2 and La_2O_3 are used as glass industry additives.

As a result of MBAC's likely interest in specifically the Ce_2O_3, La_2O_3 and Nd_2O_3 markets, much of the derived demand for its Ce, La and Nd products, in volume terms, are likely to come from the polishes, magnet and automotive refining end uses. Since Nd trades at a higher price than Ce and La (and Nd oxides are priced higher than Ce and La oxides), uses, such as magnets, that include high quantities of Nd, are likely to be very important for MBAC (Table 34).

Table 34 : Rare Earth Applications and La, Ce and Nd Content (2010)

	TOTAL CONTAINED REE (t)	La, Ce, Nd (t)	La (t)	Ce (t)	Nd (t)
Magnets	26,000	17,940			17,940
Catalysts-Petroleum Refining	7,800	7,800	7,020	780	
Catalysts-Automotive	16,700	16,366	835	15,030	501
Alloys-Batteries	13,400	12,516	6,700	4,476	1,340
Alloys-Excluding Batteries	8,600	8,127	2,236	4,472	1,419
Phosphors	8,500	1,658	723	935	
Polishes	19,000	18,240	5,890	12,350	
Glass	11,000	10,230	2,750	7,370	110
Ceramics	7,000	2,870	1,190	840	840
Others	7,000	5,110	1,330	2,730	1,050
TOTAL	**125,000**	**100,856**	**28,674**	**48,983**	**23,200**

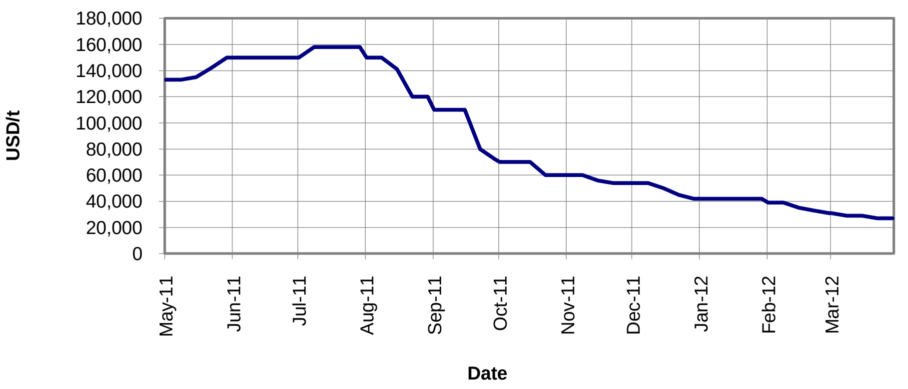
Source: Otto (2011)

19.2.2. Price

REEs and their oxides showed a considerable increase in their prices, doubling between 2005 and 2009, increasing by 300% between 2009 and the end of 2010, and increasing by 500% in the first half of 2011. However, the price started dropping for all REEs from about August of 2011. Some have exhibited steep falls since this date, some have exhibited a slow fall, and some have exhibited a steady step wise decrease in their price.

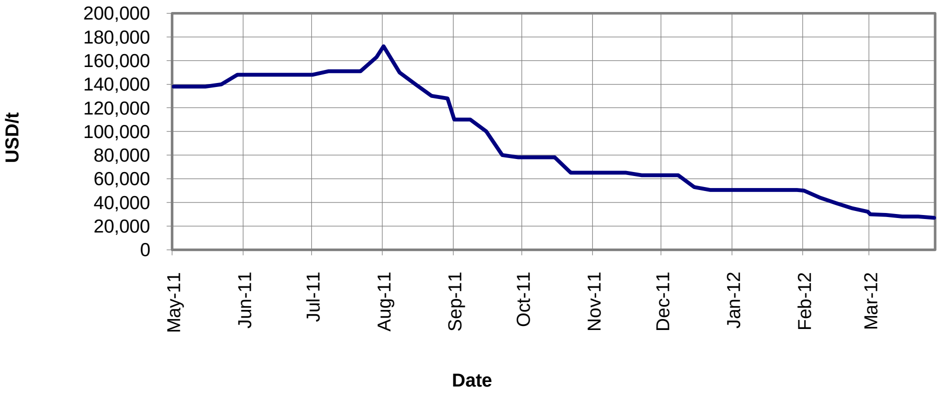
The oxides that MBAC is likely to be most interested in are no exception to this trend as Figure 27, Figure 28 and Figure 29 indicate. Nd_2O_3's price appears to have been most affected although its price is still considerably higher than those of Ce_2O_3 and La_2O_3.

Figure 27 : Ce_2O_3 Price History (2011- 2012) FOB China



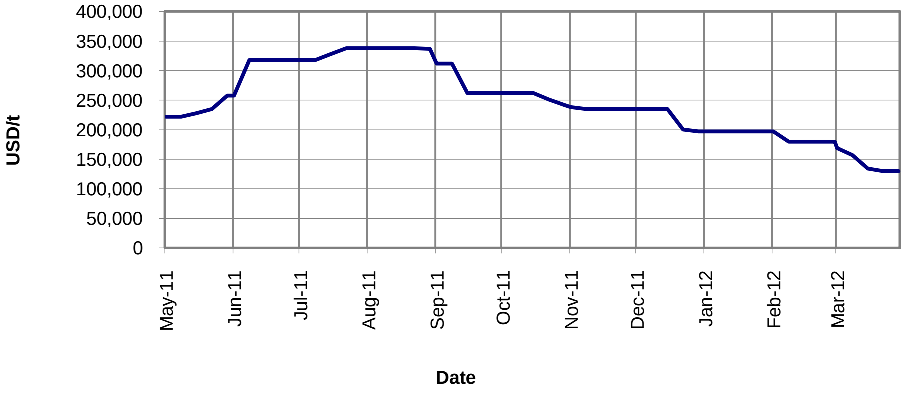
Source: Metal Pages (2012)

Figure 28 : La_2O_3 Price History (2011 - 2012) FOB China



Source: Metal Pages (2012)

Figure 29 : Nd_2O_3 Price History (2011 - 2012) FOB China



Source: Metal Pages (2012)

19.2.3. Outlook

Since much of the world's REE production and separation capacity is located in China, REEs have become highly politicised, with various countries concerned about the near-monopoly that China has on the sector. This concern over insecure supplies has been reinforced by China's imposition of export quotas.

Countries have responded by investigating or instituting REE policies. Interventions that have been suggested include (Humphries, 2011; Kenny, 2011):-

- stockpiling REEs or alloyed magnets containing REE;
- promoting research and development initiatives, including improving materials use efficiencies, developing substitutes and alternatives for REEs, and investigating REE recycling;
- identifying additional REE deposits;
- forming an international strategy for the exploitation of REE deposits; and
- filing a dispute at the World Trade Organisation, which generally does not allow members to impose export quotas or impose other restraints on exports.

These country level interventions, as well as the company ones that have already been discussed, are likely to change the world's REE supply and demand dynamics.

Most analysts have, in the past, stated that there will be a supply deficit for REEs. These forecasts rely on the fact that it is likely that the world will continue to adopt cleaner technologies and that these will rely on REEs. This position has resulted in a favourable investment environment for those deposits that will allow countries, and the companies that operate in them, to diversify their sources of supply away from China. However, an assessment of the market appears to be less clear since the introduction of export quotas in China has upset the status quo in the REE market, and resulted in substitution, application re-engineering and a drive to recycling. Some analysts have suggested that prices of REEs will continue to fall and that they will do so until a new equilibrium is reached (Elmquist, 2011). At this point, mining companies will have to assess whether they are able to produce REEs profitably and end users who have moved away for the use of REEs will have to determine whether the prices of REEs are sufficiently attractive to induce them to use REEs once more.

19.3. Niobium Market Review (NI 19a)

19.3.1. Reserves

The niobium reserves that are found globally are listed in Table 35. While other countries are producers of niobium, the USGS does not list any reserves for any other countries other than Brazil and Canada. Several countries have niobium resources; however, since the USGS notes that the 150,000t of resources situated in the USA were uneconomic at the 2011 prices for niobium, it is also likely that various other countries' mineral resources could not be converted to mineral reserves using 2011 niobium prices.

Table 35 : Estimated Global Reserves of Niobium in 2011

COUNTRY	RESERVES (t)
Brazil	2,900,000
Canada	200,000
Other countries	
TOTAL	**3,100,000**

Source: USGS (2012)

19.3.2. Production

Brazil is listed by the USGS as the most significant producer of niobium, producing approximately 92% of global niobium production (Table 36). The location of the niobium producers are illustrated on Figure 11.

Table 36 : Estimated Global Niobium Production (2010-2011)

COUNTRY	MINE PRODUCTION	
	2010	2011
	(t)	(t)
Brazil	58,000	58,000
Canada	4,420	4,400
Other countries	520	600
TOTAL	**62,940**	**63,000**

Source: USGS (2012)

Brazil's production of niobium is sourced near Araxá, in Minas Gerais Province. In this region, CBMM is the dominant producer, operating the largest of the three large niobium mines that exist globally (Hoje em Dia, 2012).

The main niobium products that are sold globally are ferroniobium, nickel-niobium, and niobium metal and oxide. Approximately 90% of the world's niobium production is transformed into ferroniobium for use in steel production (Quantum, undated). It is known that Brazil dominates the global production of ferroniobium, as is confirmed by the latest available production information for this commodity (Table 37).

Table 37 : Ferroniobium: World Production, by Country

COUNTRY	2005 (t)	2006 (t)	2007 (t)	2008 (t)	2009 (t)
Brazil	25,621	27,434	34,612	25,403	25,410
Canada	3,710	4,157	4,337	4,385	3,960
Russia^{e}	0	0	80	80	79
United States	NA	NA	NA	NA	NA
TOTAL	**29,331**	**31,591**	**39,029**	**29,868**	**29,449**

1) e = Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown.

2) NA Not available.

3) Table includes data available through August 20, 2010.

4) In addition to the countries listed, Austria, China, and Germany are thought to have produced ferroniobium (ferrocolumbium), but production information is inadequate for the formulation of estimates of output levels.

5) Reported figure for Brazil in 2009

19.3.3. Demand

Approximately 90% of niobium is used in steelmaking and is predominantly used in the manufacture of high-strength low-alloy steel for use in automobiles, construction and gas pipelines (Papp, 2011).

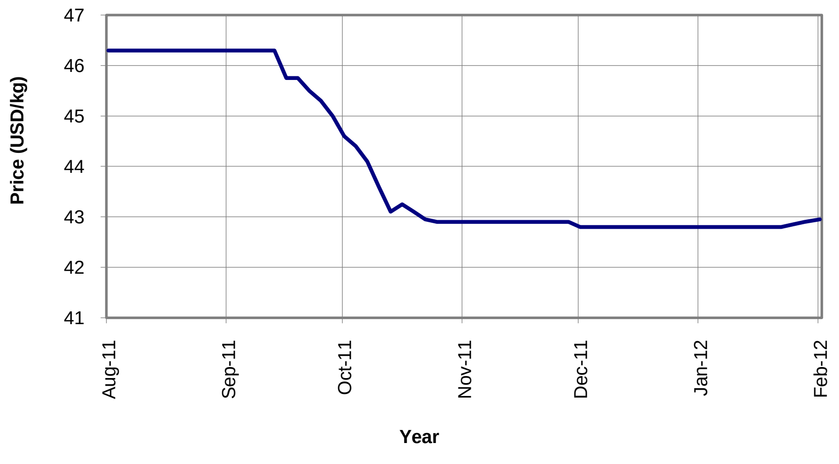
Niobium demand was affected by the global recession that started in 2008, since this recession affected demand for automobiles and construction (Papp, 2011). This, in turn, resulted in reduced niobium consumption in 2009, but it appears that consumption of niobium has since recovered and showed an increasing consumption trend in 2011 (USGS, 2011).

19.3.4. Price

Papp (2012) notes that niobium is not openly traded and that purchase contracts remain confidential.

Venmyn has sourced ferroniobium prices as an indication of the general price trend for ferroniobium and niobium. Figure 30 shows that the price of ferroniobium fell between September and November 2011 and lost more than USD3/kg. Ferroniobium was priced at just under USD43/kg in February 2012 (Metal Pages, 2012).

Figure 30 : FeNb Price History (2011-2012) EU

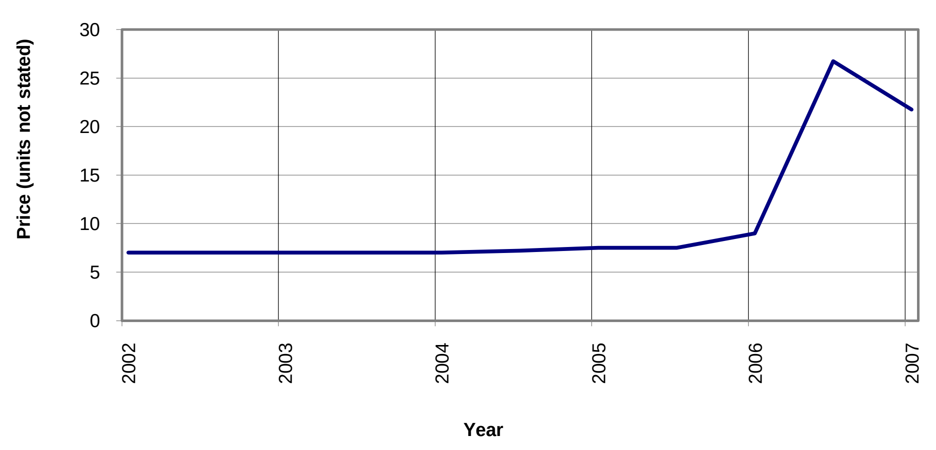


Source: Metal Pages (2012)

The only other price curve that Venmyn could source (Figure 31) was the Free on Board (FOB) USD price for the period between 2002 and 2007 (with units not provided); as a result, Figure

31's price information was deemed to be discontinuous with the information provided in Figure 30, in addition to not being comparable. Nevertheless, Figure 31 is instructive in that it provides a longer price history for ferroniobium than Figure 30, and illustrates that the ferroniobium price was relatively unchanged until there was a rapid rise in price between 2006 and 2007.

Figure 31 : FeNb Price History (2002-2007) FOB N. America



Source: MetalPrices.com (2012)

19.3.5. Outlook

Niobium continues to be in demand for its use in high-strength low-alloy steels. Demand for these steels continues to grow on the back of automobile and construction demand (USGS, 2012).

In the US, these sectors are still demonstrating demand and sales below historical norms and are still at levels below those experienced before the financial crisis (Goldman Sachs, 2011). However, Chinese and various other countries' construction and automotive demand is strong and is helping to boost demand for high-strength, low-alloy steels, and therefore for ferroniobium, and allay the modest demand from other regions, and notably from the US.

Besides increased demand for niobium caused by growing demand for steel, there is also likely to be a future increase in demand caused by a change in the niobium content levels in these high-strength low-alloy steels. This is because developed countries use 100g of niobium per tonne of steel, while China uses 40g of niobium per tonne of steel (Quantum, undated). This suggests that demand for niobium is likely to grow as China ramps up the proportion of niobium contained in its high-strength low-alloy steels to the levels of developed countries, and in line with a growing desire to benefit from niobium's properties, which make steel stronger, lighter and more corrosion resistant.

19.4. Phosphate Market Review (NI 19a)

19.4.1. Reserves

The phosphate reserves that are found globally are listed in Table 38. Morocco and Western Sahara have the most significant reserves of phosphate rock globally, with more than 70% of global phosphate reserves located in this area. Brazil has the 10th largest reserves of phosphate rock in the world, with 0.4% of global reserves located in the country.

19.4.2. Production

The most significant global producers of phosphate rock are listed in Table 39. China is ranked as the most significant producer of phosphate rock, producing 38% of global production. Brazil, meanwhile, ranks as the fifth most significant producer of phosphate rock, producing approximately 3% of global phosphate rock production.

Phosphate rock producers have been steadily increasing their capacity to take advantage of increased demand for phosphate rock globally, and it is believed that the supply of phosphate rock exceeds demand by approximately 20Mt (Jung, 2008). Nonetheless, phosphate rock producers continue to open mines, with mines with capacities of 58Mtpa expected to open between 2008 and 2012 despite excess supply in the market and despite the fact that there are increased compliance costs for producers of phosphate as a result of concerns about soil and water pollution (Jung, 2008; Heffer et al, 2010)

Table 38 : Estimated Global Reserves for Phosphate Rock in 2011

COUNTRY	RESERVES (kt)
Morocco and Western Sahara	50,000,000
Iraq	5,800,000
China	3,700,000
Algeria	2,200,000
Syria	1,800,000
Jordan	1,500,000
South Africa	1,500,000
US	1,400,000
Russia	1,300,000
Brazil	310,000
Australia	250,000
Peru	240,000
Israel	180,000
Senegal	180,000
Egypt	100,000
Tunisia	100,000
Togo	60,000
Mexico	30,000
India	6,100
Canada	2,000
Other countries	500,000
TOTAL	**70,158,100**

Source: Jasinski (2012)

Table 39 : Estimated Global Phosphate Rock Mine Production (2010 -2011)

COUNTRY	MINE PRODUCTION 2010 (kt)	2011 (kt)
China	68,000	72,000
US	25,800	28,400
Morocco and Western Sahara	25,800	27,000
Russia	11,000	11,000
Brazil	5,700	6,200
Jordan	6,000	6,200
Egypt	6,000	6,000
Tunisia	7,600	5,000
Israel	3,140	3,200
Syria	3,000	3,100
Australia	2,600	2,700
South Africa	2,500	2,500
Peru	791	2,400
Algeria	1,800	1,800
Mexico	1,510	1,620
India	1,240	1,250
Canada	700	1,000
Senegal	950	950
Togo	850	800
Other countries	6,400	7,400
TOTAL	**181,381**	**190,520**

Source: Jasinski (2012)

Several of these new phosphate rock mines will be located in Brazil, with 4.5Mtpa of new and expanded capacity expected to come on stream by 2012 or 2013. This includes new capacity at Copebras's Catalao mine, Bunge and Yara's Anitopolis mine and Fosfertil's Tapira and Salitre mines (Jung, 2008).

The Project under consideration in this report is located within 1km of the Vale's phosphate mine and SSP fertiliser plant.

19.4.3. Demand

Demand for phosphate rock is intricately tied to demand for food because of its importance in food production through its use in fertilisers. While not the only fertiliser ingredient, phosphates are important inputs into many fertilisers, since they promote root development, water-use efficiency, early plant maturity and higher crop yields (Minbos, 2011). Demand for phosphate rock is thus tied to issues surrounding food production and provision globally.

Since much of the use of food is for nutrition, feed for livestock or fibre, fertiliser use is predominantly influenced by:-

- the growing world population, with growth rates of 1.5% at present;
- the increase in the consumption of proteins in emerging nations caused by growing affluence which, in turn, causes changes in diets;
- lower amounts of available arable land per person that will result in calls for increased productivity per unit of land; and
- government policies to increase crop yields, as a result of increased population levels in some cases and a desire to have self sustainable food provision in other cases (Minbos, 2011).

However, because food is increasingly being used in the production of biofuels, particularly in the EU and US, phosphate rock is becoming increasingly linked to the global fuel economy, with policy shifts in fuel production having a significant effect on the use of phosphate rock. It is noteworthy that a third of US maize, two-thirds of EU rapeseed oil and 55% of Brazilian cane was used in the production of ethanol and biodiesel in 2009 (Heffer et al, 2010).

There has been a generally increasing level of food production for a variety of uses, as can been seen in production statistics for cereals, which show that global cereal production steadily increasing between 1996 and 2010. The usage of fertiliser has followed a similar increase in demand.

However, this generally increasing demand for fertiliser had been influenced by the recession that took hold of much of the world from late 2008. This resulted in:-

- a decreasing demand for biofuels, which resulted in a reduction in fertiliser use for growing crops used as an input into biofuel production (Simonsen, 2009); and
- a stagnation in the consumption of meat and dairy products in 2009 as incomes fell in parts of the world. This resulted in less growth from the agricultural sector than had previously been anticipated, as well as an increase in the number of undernourished people, as the global recession was accompanied by higher food prices (Heffer et al, 2010).

Heffer et al (2010) note that world fertiliser consumption reduced by 7% in 2008 and 2009, with reductions seen in nitrogen fertiliser use, which reduced by 1.8%; phosphate fertiliser use, which reduced by 11%; and potassium fertiliser use, which reduced by 20%.

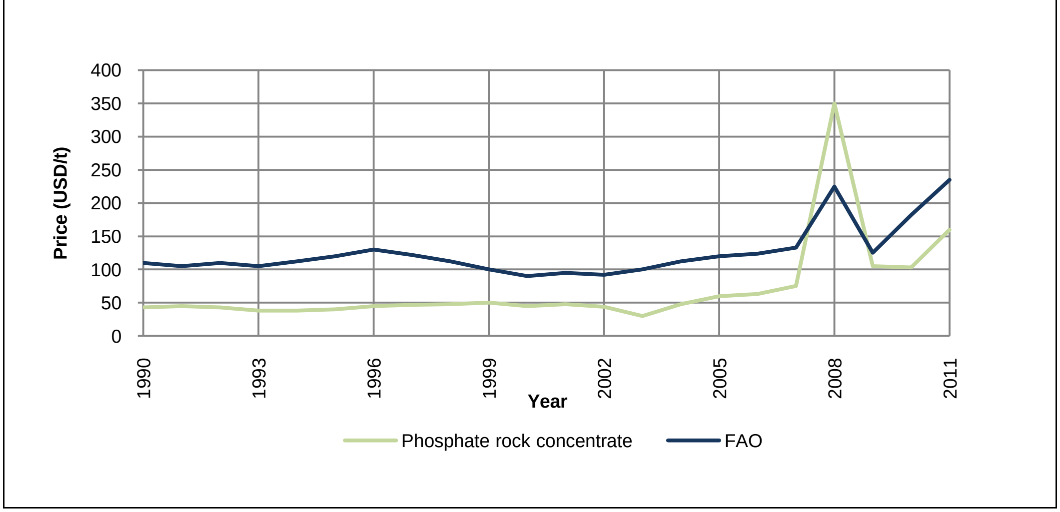
However, global demand appears to have recovered and increases in fertiliser demand, in general, and phosphate fertiliser use, in particular, seems to again be increasing.

19.4.4. Price

Figure 32 of the FOB Moroccan phosphate rock price shows a relatively unchanged price from the 1990s and the 2000s up until about 2007, when there was a significant spike in the price. Jung (2008) notes that the phosphate fertiliser price outpaced the rise in grain prices, as is indicated in Figure 32, and that this resulted in a destruction of demand for phosphate fertiliser since the fertiliser price pushed farmer costs past levels at which farmers could break even. This resulted in an inevitable correction in the phosphate rock price.

However, post the spike, in about 2009, the phosphate price has moved to a higher price level than it was at prior to 2007 and appears to be demonstrating an increasing price trend, marked by a step-like price increase. Stonegate (2012) notes that Morocco widened its benchmark percentage of contained P_2O_5 during the last quarter of 2010, from between 32% and 33% to between 31% and 33%, as a result of lower grades being produced, so the price for a comparative product, as was available prior to 2010, has increased more significantly than the price graph suggests.

Figure 32: Price of Phosphate Rock Concentrate 32-33% P_2O_5 FOB Morocco and the Food and Agricultural Organisation (FAO) Food Price Index



Source: Stonegate (2012)

19.4.5. Outlook

The demand fundamentals that were outlined in Section 19.4.3 are likely to remain in place in the future. However, the emphasis of these features may change as a result of the following:-

- the rate of population growth is likely to slow to 1% in future resulting in reduced growth in the number of people that will require food globally. However, the influence on food and fertiliser usage of this reduced growth will be mitigated by the fact that the global population is likely to have a higher per capita income and higher protein requirements; and
- potential policy changes in decisions on the energy supply mix that is favoured by governments.

Nonetheless, it appears that the demand fundamentals are strong for the continued increasing demand for phosphate rock, although this should be able to be met with supply given the considerable increases in production capacity that are coming on stream.

A review of the market outlook by Mr Clay, shows that the above market studies and analyses supports the assumptions made in this PEA report.

19.5. Material Contracts (NI 19b)

MBAC does not have any material contract at this stage of the Project. A situation of the nature is not uncommon for a Project at the level of development of the Araxá Project.

20. ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT (NI 20)

The Araxá Project is currently in the PEA stage and, as such, no environmental studies have been completed. Nevertheless, MBAC hired in November 2010 Rosangela Rios, a Specialist Consultant to perform an initial environmental assessment at the Araxá area, where the largest impacts are expected. The summary of the findings obtained so far are provided in this section.

MBAC will prepare a complete EIA and an EIR shortly. The set of mitigation measures that will be addressed in both documents shall cover not only the project itself, but aim to mitigate environmental impacts due to earlier improper waste disposal, eliminating environmental liabilities and avoiding the aggravation of new impacts.

It must be considered that the areas involved in the Araxá Project's future mining activity, as well as the future processing areas, have undergone significant changes over recent years and in the last century, with human disturbance from mining exploration, ore processing, agroforestry and tourism. Together with a broad overview of the impacts of rare earth mineral mining and a discussion of local and country level environmental issues a list of various specialist studies to be undertaken have been compiled and are presented herein for inclusion into the EIA process.

20.1. Physical Environmental

The following data were obtained from various reports of geological characterization of the Araxa Barreiro Complex, Environmental Impact Assessments and Environmental Impact Reports prepared to meet the requirements of environmental agencies in Minas Gerais states and in compliance with federal and municipal environmental laws.

The Barreiro Complex is formed by plutonic igneous rocks of circular outline, predominantly rich in silica and carbonates, approximately 4.5km in diameter and moving an approximate area of 2,516ha. It has as surrounding country rock a highly fissure quartzite.

The rocks that form the complex are historically known from drilling studies, where not outcropping.

The Barreiro/Araxá complex stands out as the most economically important alkaline complex located at the so-called Alto Parnaíba region. A thick soil layer covers the whole group of rocks of the Complex and contains important mineral deposits being explored, especially niobium which is mined by Companhia Mineradora do Pirocloro de Araxá and CBMM. This niobium reserve is the world's largest currently mined, with 4.6 x 108t of ore with an average grade of 2.5% Nb_2O_5 (SME, 1999).

The so-called 'Alkaline Chimneys' area covers part of the Triangulo Minerio region and the south of the state of Goias State. This includes two distinct regions: the central Brazilian plateau and the São Francisco River Basin. From this Basin the plateau rises to the west by the slope commonly called Serra da Mata da Corda. The eastern edge of the plateau is the Paraná/São Francisco drainage divide (Pádua, 2011).

The maximum elevation observed in the Barreiro Complex is 1,222m in the fars south and the lowest elevation point is 935m, corresponding to the Córrego do Sal bed. This stream is the main drainage point for the area and has its source located within the Complex, formed by Cascatinha, Baritina and da Mata streams.

Grossi Sad et al. (1970 in SME, 1999) defined four erosion surfaces at Barreiro area, shown in Figure 33, correlated with those previously defined by Barbosa et al. (1970).

Surface I corresponds to the Canastra area. It occurs in a restricted area, corresponding to elevations above 1,200m. The Surface II occurs between elevations of 1,100m and 1,200m, probably corresponding to South-American surface (Barbosa et al, 1970). Surface III, located at elevations ranging from 990m to 1,180m, is characterized by gentle slopes and flat top hills and corresponds to the Araxá surface (Barbosa et al, 1970).

Surface IV corresponds to the Velhas surfaces (Barbosa et al, 1970). Its maximum elevation is 990m and it is occupied almost entirely by recent deposits. An example of this type of deposit can be found at the Andrade Junior fountain, characterized by canga debris containing fossil bones from Upper Pleistocene age.

Based on drilling campaigns in the area, it was possible to determine the depth profile changes, which increases in the north – south way. In the northern portion, the thickness of the weathering profile is between 10m and 180m, while in the southern portion the decomposed material is over 200m deep. In the weathered mantle (modified) there is a predominance of laterite and lateritic soils, canga deposits bordering the drainages, and a small argillite deposit, as showed in Figure 33.

The first geological studies in Araxá are by Derby (1866), Djalma Guimarães (1925 and 1926) and Barbosa in 1937 (Barbosa et al, 1970). Thereafter, the local geology is described by Barbosa et al, Grossi Sad (1970) and on the COMIG/CPRM agreement (SME, 1970).

The headwaters involved belong to the Paranaiba River Basin which, together with Rio Grande River, forms the Great Basin of the Paraná River. These areas are more precisely in sub Araguari River Basin. The mining area is in the Córrego do Sal microbasin and the processing area is in Ribeirão Tamanduá microbasin.

20.1.1. Fauna and Flora

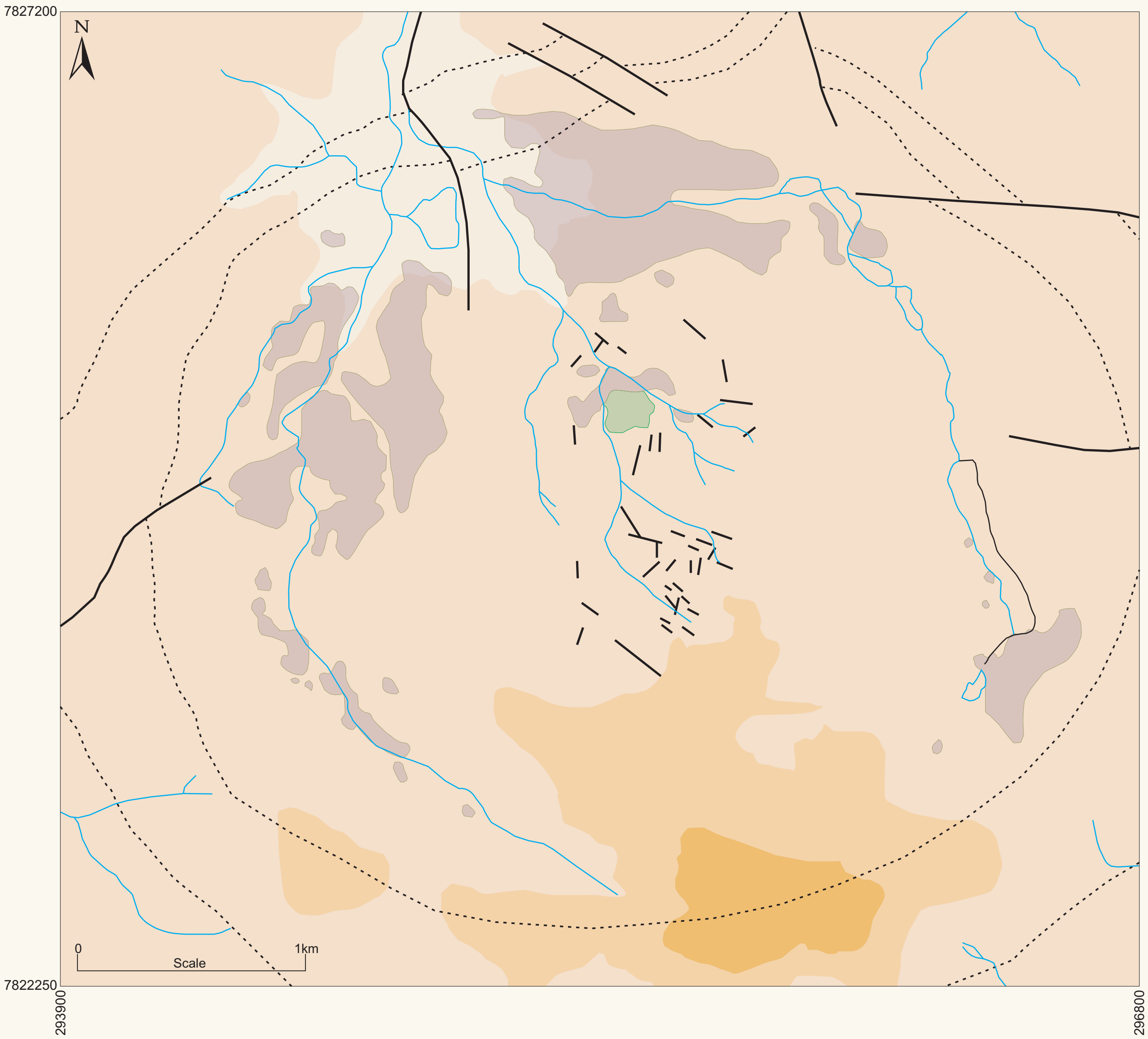
The Brazilian Cerrado, known internationally as the largest Savanna of the Neotropical region, consists of a mosaic of vegetation ranging from open areas in Central Brazil (dirty field, grasslands, rupestrian fields) to forest areas (veredas, gallery forests, mesophytic forest). It is the second largest biosphere in South America and Brazil. Its original area corresponds to 21% of Brazil's territory (1.8 million km²), extending diagonally across the country a northeast – southwest direction (Ribeiro and Walter, 1998). It also houses the headwaters of the two South American major river basins (Platina, AmazÕnica and São Francisco).

According to Myers et al. (2000), the Cerrado is considered one of the 25 ecological hotspots in the world the planet, due to its high degree of endemism and because it is one of the most biologically rich areas with a large number of endangered species.

Cerrado contains 33% of Brazilian biodiversity, estimated at more than 395,800 species (Aguiar et al., 2004). The number of vascular plants is higher than that found in most regions of the world: herbaceous plants, shrubs, trees and vines totaling more than 7,000 species (Mendonça et al., 2008). Some 44% of the flora is endemic and there is a high rate of species alternation (Ratter et al., 2003).

FIGURE 33

GEOMORPHOLOGICAL MAP OF THE BARREIRO AREA, ARAXÁ (SME, 1999)



LEGEND

EROSION SURFACES

▨	Surface 1	>1,200m
▨	Surface 2	1,100m-1,200m
▨	Surface 3	990m-1,180m
▨	Surface 4	<990m
▨	Canga Deposit	
🟩	Argillite Deposit	

Although the most recent study of mammal fauna shows a greater number of species than the previous one – about 200 species in the biome – the group wealth is still relatively small. The mammals are mainly associated or restricted to forest fragments and gallery forest. The avifauna is rich (more than 830 species), but the endemism level is low (3.4%). The number of fish, reptiles and amphibians are high. Although the number of endemic fish is not known, the diversity of endemic forms of herpetofauna is numerically greater than birds.

In recent years, the Cerrado has faced a fast reduction of its original vegetation cover due to the agricultural frontier expansion in the central region, which was transformed into planted pastures, annual crop, and other uses (Klink and Machado, 2005).

The influence of human activities on wildlife has grown at an unprecedented rate. In this sense, studies show that the major threat to birds, mammals and amphibians species is the distortion and the degradation of their habitats, driven by agriculture and forestry (Machado et al., 2004).

20.2. Environmental Historical Overview

The mining concession areas belonging to MBAC have been held by CBMM. The area is compromised by tailings in the old stream called the Córrego da Mata bed (DNPM 832.150/89 and DNPM 831.972/85). Besides the area which contains part of the tailings, there are others currently held by MBAC (DNPM 831.436/88 and DNPM 831.437/88). It must be noted that the existing tailings dam will not be affected by the mining activities, since MBAC will not any interfere with this area.

The area has been replanted, without being covered by native species. It was intended to form a green belt surrounding the existing hotel and thermal complexes near the concession areas, known as the Grand Hotel and Araxá Hot Springs. Next to this tourist area, there are two resources of mineral waters that supply the Hot Springs and are important for local tourisms, the D. Beja Source (radioactive mineral water at source) and Andrade Junior Source (sulphurous water).

The biota and the terrestrial ecosystem characterization, besides the inventory of flora, fauna and aquatic ecosystem, have already been performed in the mining areas.

20.3. Decommissioning and Closure Planning

Although the closure plan can only be defined in more advanced stages of the project, some considerations need to be taken into account of:-.

- to remediate the open pit resulting from the mining operation, the EIA/EIR studies will point out the formation of a lake, which will help the neutralization of the water that will emerge. The underground water from aquifers polluted by former effluent may also be neutralized by the water body to be formed; and
- the area around the lake will receive landscape treatment in accordance with Brazilian Forest Code and therefore will be transformed into a Permanent Preservation Area (APP).

20.4. Preliminary Evaluation of Potential Environmental Impacts

The potential environmental risks caused by rare earth mining and processing activities and their respective mitigation measures will be detailed in EIA/RIMA studies and in the Environmental Control Plan. For now, some potential impacts and mitigation measures have been listed.

20.4.1. Potential Impacts to human environment

The Project implementation (both mining and processing activities) will not involve removal of the settler population. The areas have already suffered modifications and are currently impaired by prior mining processes (mining area) and agroforestry activities (processing plant area). It is considered that the overall impact will be positive, since it will add value to the existing mineral resources and will generate employment and incomes (including taxes that will be raised at municipal, state and federal levels).

20.4.2. Potential impacts to water quality

The mining activities will be implemented in an area with environmental liabilities from past activities and therefore will benefit the existing aquifer. This is because the upwelling of groundwater into a proposed lake will neutralize former wastewater.

The processing plant will have a tailings dam constructed in accordance with existing environmental standards. It will be waterproofed and allow for the process water, in accordance with modern requirements for the conservation of water.

20.4.3. Potential Impacts to the terrestrial ecosystem

The mining and processing units will require removal of plant species and, consequently, will displace wildlife, destroying ecological niches that remain in the areas where mining ore processing will be carried out.

Large investments will be provided for in the EIA/RIMA reports to address the environmental recovery of equivalent areas, and then for creation of ecological corridors and legal reserves as compensatory measures in accordance with the applicable laws.

20.4.4. Potential impacts to soil

The mineral waste disposal should be performed with special attention to future recovery and sealing, in order to avoid soil and groundwater contamination. All mining waste generated in current processes, according to environmental regulations, have already consolidated environmental impacts mitigation.

Both the mining and beneficiation activities are located in the city of Araxá, Minas Gerais state. The area granted by the municipal government to receive the ore processing unit has already been expropriated. It comprises two distinct areas bordering the BR-262 road and FCA railroad (Figure 34a) and at Ribeirsão Tamanduá border. The distances between the processing area, the mine and Araxá city are shown in Figure 34b.

20.5. Preliminary Evaluation of Potential Environmental Impacts

This topic discusses in brief summary the relevant legal aspects of the Rare Earths exploration from an environmental standpoint. It was excluded the aspects related to mining rights, as its supervision and grant are jurisdiction of the DNPM and not of environmental agencies. The approach will be restricted to federal, state and municipal aspects.

At the municipal level, the present area is classified by the City Master Plan and the Land Use Law as an urban area. In this case, according to CONAMA Resolution 237, section 10 paragraph 1º, the Municipality shall issue a Declaration of Conformity, stating that “the type of activity performed and the location of the Project are in accordance to the laws and administrative regulations of the municipalities”.

In order to issue the aforementioned Declaration of Conformity, the Municipality has to previously hear CODEMA (Board of Conservation and Environmental Protection of Araxá), which manifest on the request. This Declaration is an essential and irreplaceable requirement to obtain the Environmental License along with environmental control agencies in Minas Gerais state.

At the state level, the licensing activities involve the following aspects:

- Previous licensing for installation or operation in accordance to State Law nº 7.772 of December 8th 1980 regulated by State Decree nº 44.844/2008 of June 25th 2008, which governs protection, conservation and improvement of the environment in Minas Gerais state.
- Defining the Araxá Project’s size as stated by COPAM Normative Deliberation nº 74 of September 9th 2004, which addresses the criteria for the classification of the Araxá Project and the activities that modify the environment and that are subjected to environmental authorization or licensing at the state level. These criteria’s are based on the Araxá Project size and its potential impacts. The costs of examining the applications for environmental authorization and licensing involved are also provided.
- Identification of the protected areas defined by State Law nº 14,309 of June 19th 2002 as APP.
- “Pro-Araxá”: old revitalization project of Barreiro area, adjacent to Araxá Project.
- Use of water resources, considering the provisions of State Law nº 13199 of January 29th 1999, which defines the requirements for water resources protection, and the IGAM (Minas Gerais Water Institute) ordinances.
- All forms of waste, effluents, noise and vibration controls, considering federal and state laws, CONAMA resolutions and others.
- Environmental compensation considering the provisions of State Decree nº 45629 of July 07, 2011.

Brazil’s regulatory framework is particularly complex with several layers and jurisdictions divided between municipal, state and federal levels of government. It is important to understand that Federal environmental regulations serve as a “minimum standard” for the states, but some states may have more stringent regulatory requirements. In addition to the minimum standards required by Brazilian legislation, the EIA must also meet internationally accepted BMP.

The regulations relating to radiation protection and radioactive waste disposal are managed by the CNEN. At the appropriate time, CNEN performs an inspection and evaluates the activities and materials involved, defining, for each case, the procedures that must be adopted.

Compliance with the legal aspects mentioned above will serve as a guide to the future environmental issues, and therefore will define the terms and responsibilities of those involved in Araxá Project’s environmental licensing.

PROPOSED LOCATION OF THE REO PROCESSING AND STORAGE FACILITY

In addition to the Environmental Impact Study (EIA) and the Environmental Impact Report (RIMA), environmental issues will be discussed in public hearings along the environmental licensing of the Project.

21. CAPITAL AND OPERATING COSTS (NI 21)

A study was undertaken on the Araxá Project by Hatch in February 2012 to determine the Capex as well as the Opex requirements for the production of REOs, niobium as well as DCPs. The estimates from the Hatch study, together with benchmark values from other similar projects, were used in the DCF model. The Capex and Opex assumed for the Araxá Project are summarised in Table 40 and Table 41.

Table 40 : Capex Assumptions

DESCRIPTION	UNIT	VALUE
Initial Capital Requirements Phase 1		
Mechanical / Equipments	(USDm)	(124.54)
Electric	(USDm)	(18.26)
Instrumentation	(USDm)	(5.62)
Piping	(USDm)	(9.83)
Metalic Structure	(USDm)	(16.76)
Civil construction	(USDm)	(34.47)
EPCM Service Provider	(USDm)	(65.85)
Temporary Construction Facilities	(USDm)	(5.81)
Spare Parts	(USDm)	(3.56)
Insurance	(USDm)	(1.16)
Environmental costs	(USDm)	(5.24)
Owner's cost	(USDm)	(9.68)
Contingency	(USDm)	(105.27)
Total Initial Capital Requirements Phase 1	**(USDm)**	**(406.05)**
Initial Capital Requirements Phase 2		
Mechanical / Equipments	(USDm)	(65.79)
Electric	(USDm)	(9.64)
Instrumentation	(USDm)	(2.97)
Piping	(USDm)	(5.19)
Metalic Structure	(USDm)	(8.85)
Civil construction	(USDm)	(18.21)
EPCM Service Provider	(USDm)	(34.78)
Temporary Construction Facilities	(USDm)	(3.07)
Spare Parts	(USDm)	(1.88)
Insurance	(USDm)	(0.61)
Environmental costs	(USDm)	(2.77)
Owner's cost	(USDm)	(5.12)
Contingency	(USDm)	(55.61)
Total Initial Capital Requirements Phase 2	**(USDm)**	**(214.48)**
Sustaining Capital 2015 - 2036	(USDm)	(7.00)
Sustaining Capital 2037 Onwards	(USDm)	(4.00)

There are three production phases for the Araxá Project. The first two phases will require capital expenditure. The capital requirements for phase 1 will be paid between 2013 and 2015, and the phase 2 capital requirements between 2018 and 2020. A sustaining capital provision of USD7m is made for 2015 – 2036 and USD4m from 2036 onwards. These capital requirements are based on a production rate of ~120ktpa for phase 1, ~240ktpa for phase 2 and ~380ktpa for phase 3.

Table 41 : Opex Assumptions

		VALUE		
DESCRIPTION	**UNIT**	**PHASE1**	**PHASE2**	**PHASE3**
Reagent Costs				
Sulfuric Acid	USD/kg TREO	(1,000.00)	(1,000.00)	(1,600.00)
Fuel oil	USD/kg TREO	(360.12)	(360.12)	(531.32)
Process water	USD/kg TREO	(14.42)	(14.42)	(18.27)
Ammonia Hydroxide 25%	USD/kg TREO	(666.26)	(666.26)	(871.77)
Oxalic Acid	USD/kg TREO	(2,215.23)	(2,215.23)	(2,215.23)
Hydrochloric acid	USD/kg TREO	(1,040.18)	(1,040.18)	(1,040.18)
Caustic soda	USD/kg TREO	(1,899.04)	(1,899.04)	(3,038.47)
Sodium carbonate	USD/kg TREO	(314.16)	(314.16)	(314.16)
Lime	USD/kg TREO	(158.68)	(158.68)	(227.38)
Total Reagent Costs	**USD/kg TREO**	**(7,668.09)**	**(7,668.09)**	**(9,856.77)**
NB_2O_5 Production Costs	USD/t Nb2O5	(10,000.00)	(10,000.00)	(10,000.00)
Mining Costs	USD/t TREO	(360.12)	(360.12)	(531.32)
Labour Costs	USD/t TREO	(1,644.00)	(822.01)	(822.01)
Contingency	(%of Opex)	5%	5%	5%
Maintenance	(% of Opex)	3%	3%	3%
SG&A Costs	(USDm)	(12.50)	(12.50)	(12.50)
CFEM	USD/t TREO	(32.61)	(32.61)	(32.61)

Operating costs were estimated according to each of the three production phases in the Araxá Project. Phase 1 is from 2015 – 2019, phase 2 is from 2020 to 2022 and phase 3 from 2023 onwards. CFEM is a Federal Exploration Tax.

22. ECONOMIC ANALYSIS (NI 22)

Venmyn was commissioned by MBAC to perform an independent valuation of 100% of the Araxá mineral asset. The valuation was compiled in accordance with the reporting and assessment criteria stipulated for a PEA for the TSX. However, mineral resources that are not mineral reserves do not have demonstrated economic viability. This report is preliminary in nature and includes inferred mineral resources that are considered too speculative geologically to have the economic consideration applied to them that would enable them to be categorised as mineral reserves. There is no certainty that this preliminary economic analysis will be realised.

Any decision to apply a valuation technique depends principally on the stage at which the project has been developed, the geological confidence and the potential of the asset for reasonable and realistic prospects for eventual economic extraction.

For the purposes of the valuation of Araxá, Venmyn valued the Araxá Project using the DCF approach.

22.1. Valuation

The DCF valuation method was used in valuing the Araxa Project. The Cash Flow Approach relies on the “value in use” principle and requires determination of the present value of future cash flows over the useful life of the asset. The asset is valued using the free cash flow capitalisation, i.e. the DCF methodology.

The DCF model is aimed at assessing the economic feasibility of mining and processing the niobium and TREO Mineral Resources.

22.1.1. Principal Assumptions (NI 22a)

Araxá will only mine small, selected blocks. Therefore the mining recoveries are assumed as 100%. A global recovery for the REOs is assumed at 92%, and recovery for niobium is 41%. There are three phases in the Araxá Project. The annual production rate is assumed at ~120ktpa for phase 1, ~240ktpa for phase 2 and ~380ktpa for phase 3. A TREO basket price of USD29,189/t for REO, and a niobium price of USD50,000/t was used. Due to the early stage of the Araxá Project, a real discount rate of 10% was used.

The principal assumptions made in the DCF model are summarised in Table 42, while Table 43 shows the breakdown of the component prices of the REO basket price used in the DCF model.

Table 42 : Input Factors for DCF Model

	UNIT	VALUE
Life of Mine*	years	40
Mining Recoveries	(%)	100%
Plant Recovery Factor for REO	(%)	92%
Leaching Efficiency for Nb_2O_5	(%)	41%
TREO Basket Price	(USD/t)	29,189
Nb_2O_5 Basket Price	(USD/t)	50,000
Project Real Discount Rate	(%)	10%
Tax Rate	(%)	34%

Note: The Life of Mine of 40 years is inclusive of potential mining of the inferred resources.

Table 43 : Breakdown of TREO Basket Price use in the DCF Model

REO	GRADE (%)	PRICES (US$/Kg)*	Basket (USD)
La	27.99	10.64	2.98
Ce	49.44	12.04	5.95
Pr-Nd	18.40	77.22	14.21
Sm	1.48	9.18	0.14
Eu	0.33	775.74	2.59
Gd	0.68	30.27	0.21
Tb	0.07	963.03	0.68
Dy	0.33	617.65	2.04
Ho	0.04	65.68	0.03
Er	0.08	42.97	0.03
Yb	0.04	50.00	0.02
Y	1.12	28.08	0.31

22.1.2. Taxes and Royalties

In constructing the DCF model, a corporate income tax rate of 34% was applied. The royalties for the government in Brazil are 2% of the revenue of the selling of mineral products. However, considering the fact that MBAC is selling oxides that have already been transformed through a chemical process, MBAC royalties on the Araxá Project are calculated based on the cost of the mineral products. This refers to the production cost up to the crushing and drying (beneficiation) of the ore.

22.1.3. Cash flow Forecasts (NI 22b)

After applying all the assumptions, the DCF model has an NPV of USD967m, an IRR of 30% and the payback period of 6 years. The cash flow forecasts can be seen in Table 44.

22.1.4. Sensitivity Analysis (NI 22c)

Due to the stage to which Araxá has been developed, with some unverified assumptions having been incorporated, it was necessary to present the effect that various scenarios have on the NPV, at various discount rates, in the form of sensitivity analyses. The sensitivity analyses graphs are presented in Figure 35 to Figure 37.

Figure 35: NPV Sensitivity on Operating Income

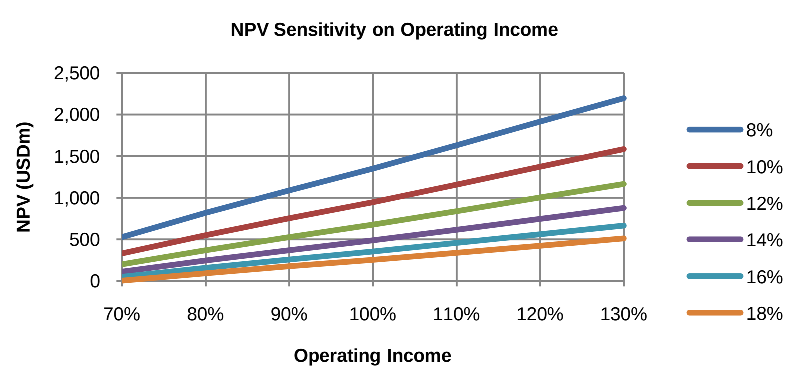


Figure 36: NPV Sensitivity on Capital Expenditure

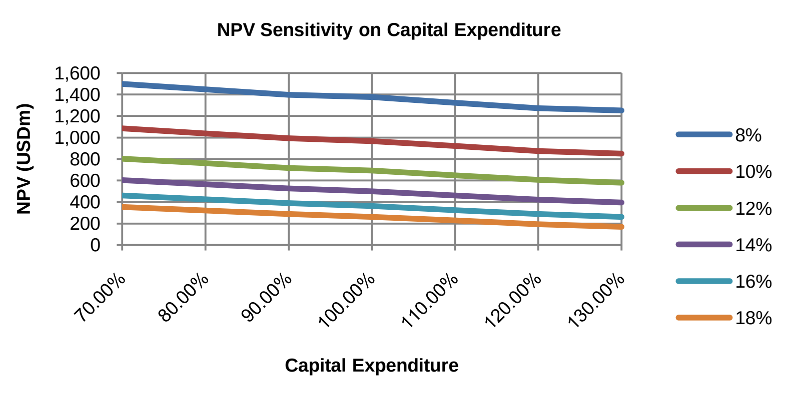


Figure 37: NPV Sensitivity on Operating Expenditure

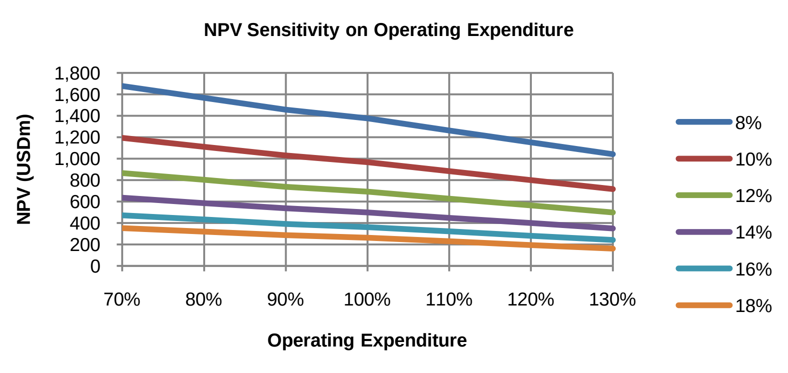


Table 44 : DCF Model

DESCRIPTION	UNITS	TOTAL	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
PROCESSING																	
Mineable Tonnes Available	(tonnes)		13,710,000	13,710,000	13,710,000	13,710,000	13,614,142	13,494,689	13,375,235	13,255,781	13,136,328	12,944,626	12,704,981	12,465,337	12,080,456	11,695,574	11,310,693
Processed Tonnes	(tonnes)	12,791,101	0	0	0	95,858	119,454	119,454	119,454	119,454	191,702	239,645	239,645	384,881	384,881	384,881	384,881
Processed TREO Grade	(%)		0.00%	0.00%	0.00%	7.96%	7.96%	7.96%	7.96%	7.96%	7.96%	7.96%	7.96%	4.96%	4.96%	4.96%	4.96%
Recoverable TREO	(tonnes)	671,360	0	0	0	7,630	9,509	9,509	9,509	9,509	15,260	19,076	19,076	19,076	19,076	19,076	19,076
Plant Recovery Factor for REO	(%)	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%
TREO Produced	(tonnes)	617,651	0	0	0	7,020	8,748	8,748	8,748	8,748	14,039	17,550	17,550	17,550	17,550	17,550	17,550
Nb2O5 Grade	(%)		0.00%	0.00%	0.00%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.15%	1.15%	1.15%	1.15%
Leaching Efficiency for Nb2O5	(%)		41.40%	41.40%	41.40%	41.40%	41.40%	41.40%	41.40%	41.40%	41.40%	41.40%	41.40%	41.40%	41.40%	41.40%	41.40%
Nb2O5 Produced	(tonnes)	62,702	0	0	0	595	742	742	742	742	1,190	1,488	1,488	1,832	1,832	1,832	1,832
CASH FLOW																	
OPERATING INCOME																	
TREO Sales	(USDm)	18,029	0	0	0	205	255	255	255	255	410	512	512	512	512	512	512
Nb2O5 Sales	(USDm)	3,135	0	0	0	30	37	37	37	37	60	74	74	92	92	92	92
Total Operating Income	**(USDm)**	**21,164**	**0**	**0**	**0**	**235**	**292**	**292**	**292**	**292**	**469**	**587**	**587**	**604**	**604**	**604**	**604**
OPERATING EXPENDITURE																	
Reagent Costs	(USDm)	(5,889)	0	0	0	(54)	(67)	(67)	(67)	(67)	(108)	(135)	(135)	(173)	(173)	(173)	(173)
NB2O5 Production Costs	(USDm)	(627)	0	0	0	(6)	(7)	(7)	(7)	(7)	(12)	(15)	(15)	(18)	(18)	(18)	(18)
Mining Costs	(USDm)	(313)	0	0	0	(3)	(3)	(3)	(3)	(3)	(5)	(6)	(6)	(9)	(9)	(9)	(9)
Labour Costs	(USDm)	(542)	0	0	0	(12)	(14)	(14)	(14)	(14)	(12)	(14)	(14)	(14)	(14)	(14)	(14)
Contingency	(USDm)	(337)	0	0	0	(3)	(4)	(4)	(4)	(4)	(6)	(8)	(8)	(10)	(10)	(10)	(10)
Maintenance	(USDm)	(202)	0	0	0	(2)	(3)	(3)	(3)	(3)	(4)	(5)	(5)	(6)	(6)	(6)	(6)
SG&A costs	(USDm)	(475)	0	0	0	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)	(13)
CFEM	(USDm)	(20)	0	0	0	(0)	(0)	(0)	(0)	(0)	(0)	(1)	(1)	(1)	(1)	(1)	(1)
Total Operating Expenditure	**(USDm)**	**(8,405)**	**0**	**0**	**0**	**(92)**	**(112)**	**(112)**	**(112)**	**(112)**	**(159)**	**(196)**	**(196)**	**(244)**	**(244)**	**(244)**	**(244)**
CAPITAL EXPENDITURE																	
Initial Capital - Phase 1	(USDm)	(406)	0	(122)	(244)	(41)	0	0	0	0	0	0	0	0	0	0	0
Initial Capital - Phase 2	(USDm)	(214)	0	0	0	0	0	0	(64)	(129)	(21)	0	0	0	0	0	0
Sustaining Capital	(USDm)	(218)	0	0	0	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)
Total Capital Expenditure	(USDm)	**(839)**	**0**	**(122)**	**(244)**	**(48)**	**(7)**	**(7)**	**(71)**	**(136)**	**(28)**	**(7)**	**(7)**	**(7)**	**(7)**	**(7)**	**(7)**
ROYALTIES AND TAXES																	
EBITDA	(USDm)	12,759	0	0	0	143	181	181	181	181	310	391	391	360	360	360	360
Depreciation	(USDm)	(868)	0	(18)	(55)	(62)	(63)	(64)	(75)	(95)	(81)	(46)	(40)	(40)	(40)	(30)	(11)
EBIT	(USDm)	11,891	0	(18)	(55)	81	118	117	106	86	229	345	351	320	320	330	349
Royalties Payable	(USDm)	(766)	0	0	0	(6)	(8)	(8)	(8)	(8)	(14)	(18)	(18)	(16)	(16)	(16)	(16)
Taxation Payable on Income	(USDm)	(3,807)	0	0	0	(25)	(37)	(37)	(33)	(26)	(73)	(111)	(114)	(103)	(103)	(107)	(113)
Project Undiscounted CashFlow	(USDm)	**7,347**	**0**	**(122)**	**(244)**	**63**	**128**	**129**	**68**	**11**	**195**	**255**	**253**	**233**	**233**	**230**	**224**
PROJECT DISCOUNT RATE	**(%)**			**10%**													
PROJECT NPV	**(USDm)**			**967**													
IRR	**(%)**			**30%**													

Table 45 : NPV Sensitivity to Real Discount Rate

REAL DISCOUNT RATE (%)	NPV (USDm)
8	1,375
9	1,150
10	967
11	816
12	691

The NPV is most sensitive to factors affecting the operating income, especially the REO basket price and the niobium price.

22.2. Valuation Summary

The valuation of exploration assets is, by nature, both subjective and uncertain.

This valuation and opinion is with respect to the face value of the mineral assets only. It does not consider any contingent liabilities that may exist with respect to the parties involved or other considerations regarding the financial state of the parties, other agreements or legal title.

The DCF value of **USD967m** in Venmyn's opinion is the "Fair Value" of the Araxá Project, having taking most technical aspects of the Araxá Project into account.

Venmyn believes that significant upside potential exists for the Araxá Project. As can be seen in Figure 6, the position of all drilling to date and the extent of the deposit across the entire licence area, allows for future exploration to be open ended in all directions. Coupled with the fact that only a small portion of the licence area has been drilled, further exploration could significantly increase the Mineral Resource estimation.

23. ADJACENT PROPERTIES (NI 23)

The Barreiro carbonatite is host to both niobium and phosphate production.

23.1. CBMM Niobium Mine

The CBMM mine is situated adjacent to the Araxá Project, as indicated on Figure 4. The mine currently extracts weathered ore using free dig opencast methods. The ore comprises both near surface residual (weathered) ore and primary (fresh) ore at depth. The residual ore is being mined to a depth of 250m, with resources being quoted at 440Mt with an average grade of approximately 3% Nb_2O_5, and a maximum grade of 11% Nb_2O_5. The primary ore has been intersected to a maximum depth of 800m in the deepest borehole drilled to date. Drilling grades have been measured at an average of 1.5% Nb_2O_5 with a maximum of 8% Nb_2O_5.

The ore is transported from the mine, via a 3.5km conveyor, to the concentration plant. The concentration plant has installed production capacity of 84ktpa and employs the processes of wet grinding, magnetic-process separation, desliming and flotation to produce a concentrate of 60% Nb_2O_5. CBMM has stated that it plans to increase the production capacity to 150,000tpa by 2013.

The tailings are disposed in tailing dams. One of these tailing dams is situated over a portion of the Araxá Project's Mineral Resources. CBMM further beneficiates the concentrate using pyrometallurgical processes (pelletizing and sintering the concentrate, reductive melting) that have been developed by the company. This product is then utilised by CBMM to produce the final niobium products using further procedures. CBMM produces the following final products:-

- standard grade ferro niobium;
- niobium oxide;
- masteralloys including ferro niobium vacuum grade and nickel niobium;
- pure niobium metal; and
- 1% niobium-zirconium alloy.

23.2. Vale Phosphate Mine

Vale mines phosphate rock and produces phosphate for fertiliser from the SSP fertiliser plant, adjacent to the Araxá Project, as indicated on Figure 4.

According to The Mining Almanac, the company produced a total of ~1.2Mt of phosphate in 2010. Declared Measured and Indicated Mineral Resources (2010) amounted to 155.9Mt at a grade of 11.64g/t of P_2O_5.

The information of Vale Phosphate Mine and CBMM Niobium Mine were available in the public domain,and are not necessarily indicative of the mineralisation of the Araxá Project.

Mr Clay and Mr Ackroy have both been unable to verify the above information.

24. OTHER RELEVANT DATA AND INFORMATION (NI 24)

24.1. Valuation Methodologies

Any decision to apply a valuation technique will depend principally on the stage to which the Araxá Project has been developed. The valuation approach for a greenfields project will be substantially different from that applied to a well-drilled, extensively explored mineral asset. Furthermore, any one valuation exercise may produce different outcomes for the same mineral asset depending on which valuation method has been applied and, therefore, a realistic and reasonable range of values will be given.

Different valuation approaches was adopted in accordance to the international valuation guidelines contained in South African Code for the Reporting of Mineral Asset Valuation (the SAMVAL Code) and CIMVAL Code. The three main valuation approaches, as stipulated in the different international valuation codes are: the Cost Approach, the Market Approach/Comparative Approach and the Income Approach. The valuation approaches incorporate the respective mineral resource and mineral reserve categories on the following basis:-

- stage of development;
- level of geological confidence in the interpretation of the geology and mineralisation;
- the depth of the defined Mineral Resources and mineral reserves relative to surface i.e. whether the undeveloped Mineral Resources are likely to be mined early, or later in the production plan, and at what relative cost;
- the availability of existing mining infrastructure and mineral production within the project area, i.e. whether the undeveloped Mineral Resources and mineral reserves are likely to be mined as an extension of a pre-existing operation; and
- relative difficulty or ease of mining conditions largely due to complex geological structures, and whether or not they are conducive to mechanised mining.

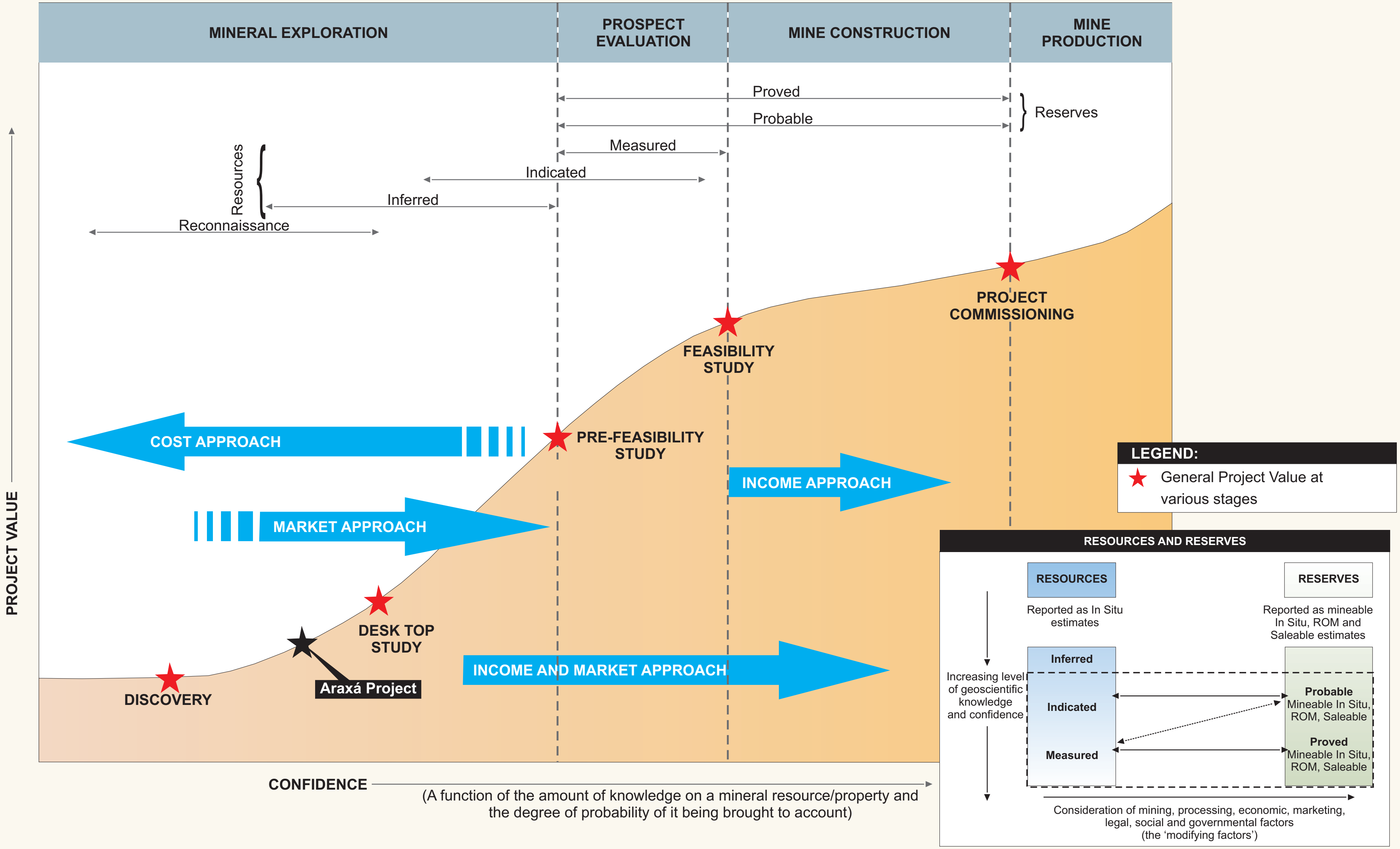
In conducting mineral asset valuations, Venmyn considers the following categories of mineral assets:-

- Exploration Areas – properties where mineralisation may or may not have been identified, but where a mineral or petroleum resource has not been identified;
- Advanced Exploration Areas – properties where considerable exploration has been undertaken and specific targets have been identified that warrant further detailed evaluation, usually by drill testing, trenching or some other form of detailed geological sampling. A resource estimate may or may not have been made but sufficient work will have been undertaken on at least one prospect to provide both a good understanding of the type of mineralisation present and encouragement that further work will elevate one or more of the prospects to the resource category;
- Pre-Development Projects – properties where mineral or petroleum resources have been identified and their extent estimated (possibly incompletely) but where a decision to proceed with development has not been made. Properties at the early assessment stage, properties for which a decision has been made not to proceed with development, properties on care and maintenance and properties held on retention titles are included in this category if mineral or petroleum resources have been identified, even if no further valuation, technical assessment, delineation or advanced exploration is being undertaken;
- Development Projects – properties for which a decision has been made to proceed with construction and/or production, but which are not yet commissioned or are not yet operating at design levels; and
- Operating Mines – mineral properties, particularly mines and processing plants, which have been commissioned and are in production.

Table 46 summarises the valuation approaches and the underlying methodologies, as stipulated in the CIMVAL Code, whilst Figure 38 gives the general movement of projects up the value curve with increasing amounts of geoscientific knowledge. In other words, Table 46 and Figure 38 illustrate the link between a project's development status and the most appropriate valuation methodology.

According to these categories, the Araxá Project has been classified as a mid to advanced stage exploration project. As the confidence in Mineral Resource estimates increases, i.e. more Measured and Indicated Mineral Resources than Inferred, so does the veracity of the valuation.

PROJECT LIFETIME VALUE AND VALUATION METHODOLOGY CURVE FOR MINERAL RESOURCE PROJECTS



Source: Venmyn

Table 46 : Acceptable Methods of Mineral Asset Valuations (CIMVAL)

VALUATION APPROACH	VALUATION METHODOLOGY	DORMANT PROPERTIES	EXPLORATION PROPERTIES	RESOURCES	DEVELOPMENT PROPERTIES	MINING PROPERTIES	DEFUNCT PROPERTIES
Cash Flow	DCF	No	No	Yes	Yes	Yes	No
Market	Comparable	Yes	Yes	Yes	Yes	Yes	Yes
Cost	Asset Recognition and Impairment Test	Yes	Yes	Yes	No	No	Yes

KEY	
░	Most acceptable method and widely used
▒	Acceptable method and quite widely used
▓	Less acceptable method, less widely used and poorly understood
□	Not acceptable

Where insufficient confidence exists in the technical parameters of a mineral deposit or mineral asset to classify resources, valuation methods mainly rely on the principle of historical cost. This implies that a mineral asset's value is related to the money spent on its acquisition, plus a multiple of the exploration expenditure, depending upon the degree to which its prospectivity has been enhanced by exploration. Once resources have been classified, then market comparisons are made on a monetary value per unit of mineralisation.

When technical studies establishing the basis for future economic exploitation have been carried out, DCF methods are applicable and all the methods used to identify a reasonable transaction value.

The CIMVAL Code, like the SAMVAL Code, requires more than one method to be used to derive a value. However, Venmyn has used all three valuation methods mentioned in Table 46, in valuing the Araxá Project. The valuation methods' descriptions and results are described in the sections to follow.

24.2. Market Approach

The Market Approach relies on the principle of "willing buyer, willing seller" and requires that the amount obtainable from the sale of the asset is determined as if in an arm's length transaction.

The Market Approach requires comparison with relatively recent transactions and valuations of assets that have similar characteristics to those of the asset being valued. Venmyn maintains a database of recent transactions, valuations and market capitalisations of mineral assets around the world. This data is then processed and categorised to form the Venmyn Commodity Valuation Curves. The Venmyn Commodity Valuation Curves plot the value per unit of mineralisation against the Mineral Resource classification based on predetermined parameters. With the curves, Venmyn can identify similar assets as the one being evaluated, and benchmarks the valuation to market trends.

With respect to the valuation of the Araxá Project, Venmyn calculated the in situ value for the niobium, phosphate and REE Mineral Resources separately. From the Venmyn valuation database, comparable niobium, phosphate and REE assets were identified but, due to the low number of comparable projects in the public domain, Venmyn deemed that plotting a valuation curve would be visually misleading and has thus not done so in this instance.

24.2.1. REO Valuation

Venmyn determined an in situ value per tonne for the rare earth Mineral Resources by comparing the Araxá deposit to five similar assets based primarily on the deposit type.

Venmyn calculated the value per tonne of contained REO for each of these projects from publicly available information. The value per tonne was calculated either from:-

- a listed company's market capitalisation (market capitalisation) per attributable contained REO tonne;
- a compliant valuation done on a project for which the information is obtainable in the public domain; or
- the price paid in a publicly reported transaction.

These five similar assets, together with their calculated values per tonne, are summarised in Table 47 and Table 48. For the Mrima Hill project, a recent transaction as well as the attributable market capitalisation value is presented.

Table 47 : Market Comparative Transactions Resources, Grades and Market Capitalisation

COMPANY	PROJECT NAMES	LOCATION	INFO SOURCES	TOTAL REO TONNES (Mt)	REO GRADE (%)	CONTAINED REO (Mt)	MARKET CAP. VALUE (USDm)
Frontier Rare Earths Ltd	Zandkops-drift	South Africa	Market Cap	43.70	2.16	0.95	96.98
Rare Element Resources Ltd	Bear Lodge	USA	Market Cap	22.70	3.19	0.72	267.47
Lynas Corporation Ltd	Mount Weld	Australia	Market Cap	17.49	8.06	1.41	2,313.35
Pacific Wildcat Resources	Mrima Hill*	Kenya	Transaction	15.00	4.00	0.60	34.56
Pacific Wildcat Resources	Mrima Hill**	Kenya	Market Cap	15.00	4.00	0.60	45.74
Avalon Rare Metals Inc.	Thor Lake	Canada	Valuation	311.70	1.37	4.27	1,788.90

Table 48 : Market Comparative Transitions Value per Total Tonne of REE Resource

COMPANY	VALUE BY RESOURCES CATEGORY				
	TOTAL (USD/t)	TARGET (USD/t)	INFERRED (USD/t)	INDICATED (USD/t)	MEASURED (USD/t)
Frontier Rare Earths Ltd	102.61	5.73	38.20	152.79	267.38
Rare Element Resources Ltd	369.40	31.39	209.24	836.98	1,464.71
Lynas Corporation Ltd	1,641.06	53.90	359.31	1,437.25	2,515.19
Pacific Wildcat Resources	19.25	19.25	128.34	513.35	898.36
Pacific Wildcat Resources	25.31	25.31	168.74	674.98	1,501.80
Avalon Rare Metals Inc.	418.17	32.18	214.54	858.17	1,181.21

Venmyn also removed highest and lowest USD/t REO Mineral Resource values as they was deemed outliers. The result provides an average value of USD180.00/t REO for Mineral Resources in the inferred category, USD720/t REO for Mineral Resources in the Indicated category and USD1,262/t REO for Mineral Resources in the Measured category. The resulting value per unit of resource is summarised in Table 49.

Table 49 : Value per Total Tonne of REE Resource Summary

RESOURCE CATEGORY	PROJECT UNIT VALUE		
	LOWER (USD/t)	"FAIR " (USD/t)	UPPER (USD/t)
Measured Resource	631	1,262	1,893
Indicated Resource	361	721	1,082
Inferred Resource	90	180	270
Average	**209.46**	**418.93**	**628.39**

24.2.2. Niobium Valuation

Due to its close proximity to the Araxá Project, CBMM's niobium operation has been used to determine an in situ value per tonne for the contained niobium. A transaction between CBMM and a Chinese consortium in September 2011 was used as a benchmark. The results are summarised in Table 50.

Table 50 : Value per Total Tonne of Niobium Resource for CBMM

RESERVE CONTENT (Mt)	TRANSACTION VALUE ON 100% BASIS (USDm)	RESERVE VALUE (USD/t)	VALUE BY RESOURCE CATEGORY		
			INFERRED RESOURCE (USD/t)	INDICATED RESOURCE (USD/t)	MEASURED RESOURCE (USD/t)
11.00	12,000.00	1,090.91	155.84	623.38	1,090.91

Transaction between Chinese consortium and CBMM, Sept 2011

24.2.3. Phosphate Valuation

Vale's phosphate mining operation is adjacent to Araxá, and therefore has been used to determine an in situ value per tonne for the contained phosphates. A recent transaction between Vale and Bunge was used as the benchmark. The results are summarised in Table 51.

Table 51 : Value per Total Tonne of Phosphate Resource for Vale

RESERVE CONTENT (Mt)	TRANSACTION VALUE ON 100% BASIS (USDm)	RESERVE VALUE (USD/t)	VALUE BY RESOURCE CATEGORY		
			INFERRED RESOURCE (USD/t)	INDICATED RESOURCE (USD/t)	MEASURED RESOURCE (USD/t)
998.76	5,082.74	5.09	0.73	2.91	5.09

Transaction between Vale and Bunge, 2010

24.2.4. Combined Market Approach Valuation Result

Venmyn calculated a weighted average USD/t value for niobium, phosphate and REE Mineral Resources, using the tonnes of Mineral Resources classified in the Inferred, Indicated and Measured categories as weights. Due to the lack of publicly available information on niobium, phosphate and REE project transactions, Venmyn applied a range of 50% above and below the "fair" value for the different mineral assets to determine the Araxá Project value range.

It must be stressed that the value of the Araxá Project is reflected by this entire range and not just the mid-point. The results of the market valuation per unit of mineralisation is summarised in Table 52.

Table 52 : Value per unit mineralisation for the Araxá Project

		PROJECT UNIT VALUE		
PROJECT NAME	RESOURCE MINERAL	LOWER (USD/t)	"FAIR " (USD/t)	UPPER (USD/t)
Araxá	REO	209.46	418.93	628.39
	Phosphates	0.82	1.65	2.47
	Niobium	197.86	395.72	593.58

The result of the valuation, when multiplied by the contained tonnes of the various mineral assets (Table 23) present at Araxá, is presented in Table 53.

Table 53 : Valuation Results for Araxá

			PROJECT VALUE		
PROJECT NAME	RESOURCE MINERAL	TOTAL CONTAINED RESOURCE (Mt)	LOWER (USDm)	"FAIR" (USDm)	UPPER (USDm)
Araxá	REO	0.72	150.20	300.40	450.59
	Phosphates	1.08	0.89	1.79	2.68
	Niobium	0.13	24.77	49.55	74.32
TOTAL		**1.93**	**175.87**	**351.73**	**527.60**

The "Fair" value of **USD351.73m** is accepted by Venmyn for the Araxá Project using the Market Approach, although readers are advised to take cognisance of the entire value range.

24.3. Comparison of Global REE Deposits

In order to place the Araxá Project into context with other carbonatite deposits, it is useful to compare both the grade and size of various global deposits as well as their relative outlook coefficients. The location of the global REE producers and deposits are indicated in Figure 10.

The relative grade and tonnage of a number of global deposits in presented in Figure 39 and the sources of this information are referenced in Section 27. As is evident in Figure 39, Araxá can be considered as a medium-grade and high-tonnage deposit, when compared to world class deposits.

As described in Section 19.1 and presented in Table 33, REEs are now often split into divisions based on industrial demand, i.e. CREEs (Critical), EREEs (Excess) and UREEs (Uncritical). CREEs include Nd, Tb, Dy, Eu and Er, whilst EREEs include Ce, Ho, Tm, Yb and Lu. This classification system is quantified with the use of an outlook coefficient, K_{outl}, which is a measure of the abundance of CREEs within a mineral deposit, relative the proportion of EREEs, as in the formula:-

$$K_{outl} = (\%CREEs) / (\%EREEs)$$

A higher K_{outl} value therefore represents a project or deposit with greater economic potential for the next five to 10 years than a deposit or project with a lower value.

Figure 39 : Comparison of Grade versus Tonnage for REE Deposits

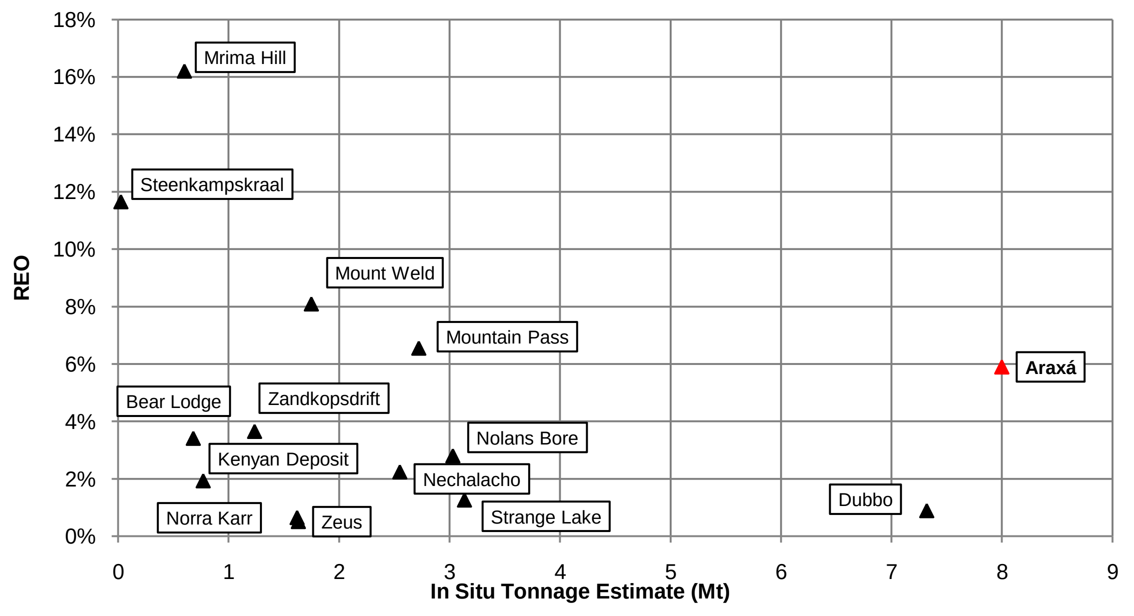
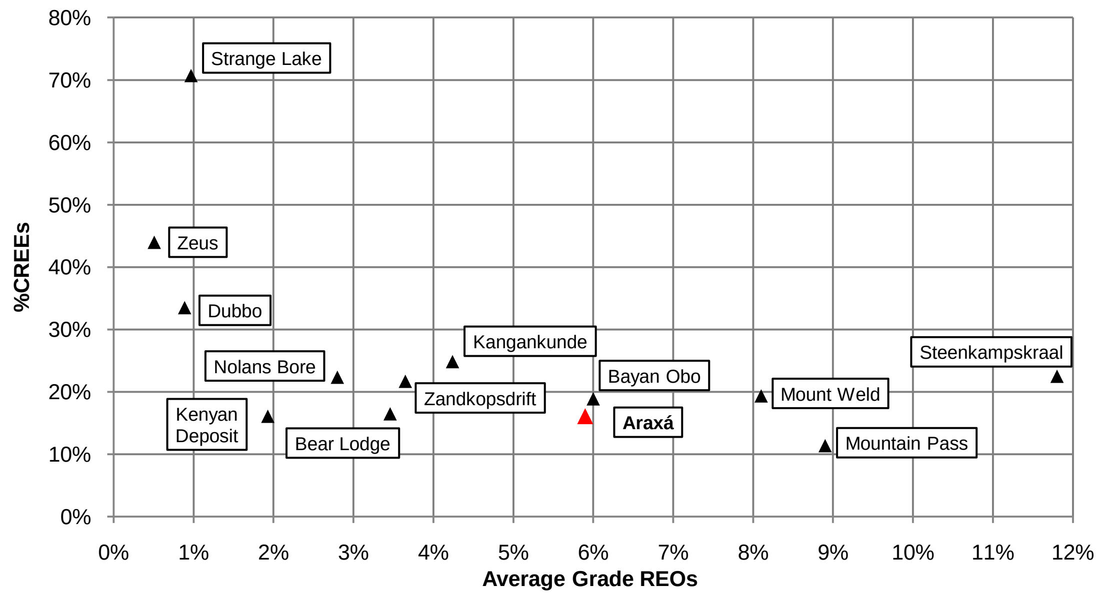
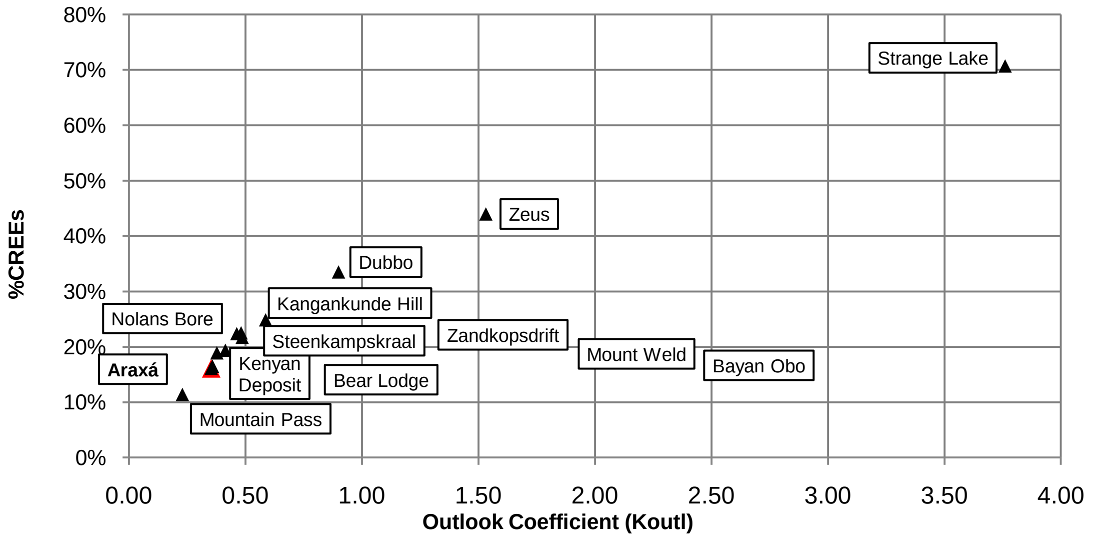


Figure 40 : Comparison of Grade versus Amount of CREEs for REE Deposits



A plot of the average grade of REE deposits in relation to their amount of CREEs is presented in Figure 40. A plot of the percentage of CREES in relation to the outlook coefficient is presented in Figure 41. The various sources for these figures are referenced in Section 27.

Figure 41 : Comparison of Percentage of CREEs versus K_{outl} for REE Deposits



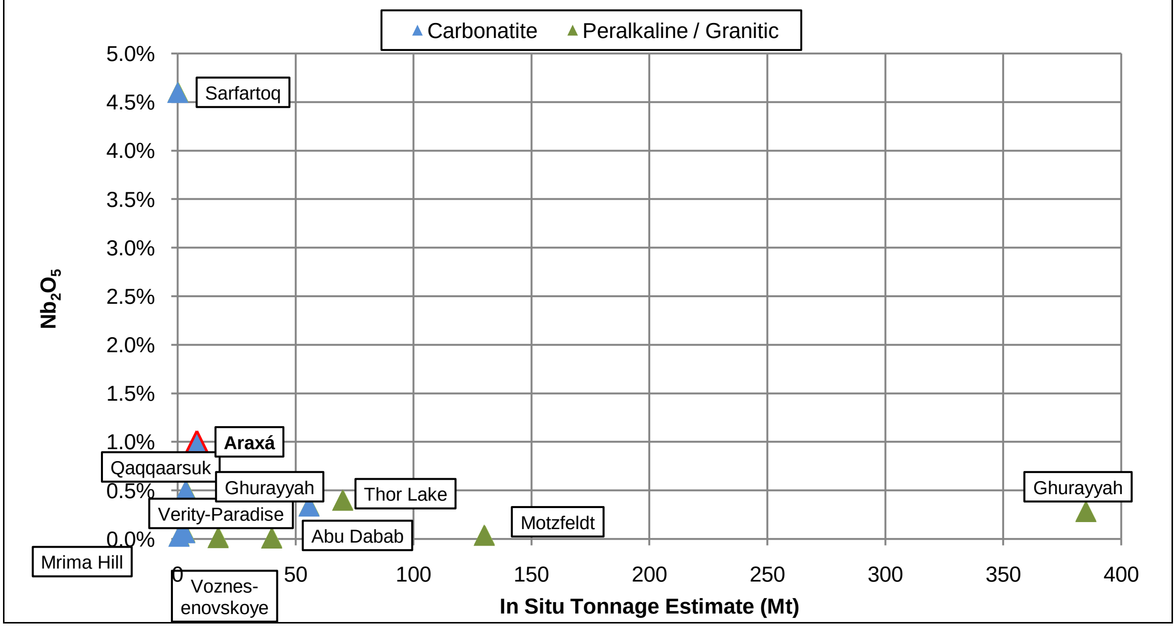
Upon considering these graphs with respect to the Araxá Project, it is evident that the moderate abundance of CREEs at Araxá implies a marginal economic potential based on the current market. A comparison of the global percentage of CREE and the average REO grade for global REE Projects compares the Araxá Project to the Bayan Obo REE mine in China.

When the grade-tonnage representations for various REE projects are considered, the average REO grade of the Araxá deposit appears to serve as the separating value between the lower and higher grade carbonatite-related REE deposits. This can again be seen when regarding the proportion of CREEs plotted against the average REO grade of related deposits. However, the Araxá deposit boasts the highest Inferred Mineral Resource tonnage of comparable global projects. The average REO grade of the Araxá deposit is very similar to that of the Mountain Pass deposit in the USA, while the Dubbo Zirconia deposit in Australia is currently the only carbonatite-related REE project that can reasonably be compared with the Araxá deposit's in situ tonnage estimate.

24.4. Comparison of Global Niobium Deposits

In order to place the Araxá Project into context with global deposits, the grade and size, in tonnes, is compared in Figure 42. It is evident from the graph that Araxá is a relatively high grade and low volume deposit with respect to its niobium content.

Figure 42 : Comparison of Grade versus Tonnage for Niobium Deposits

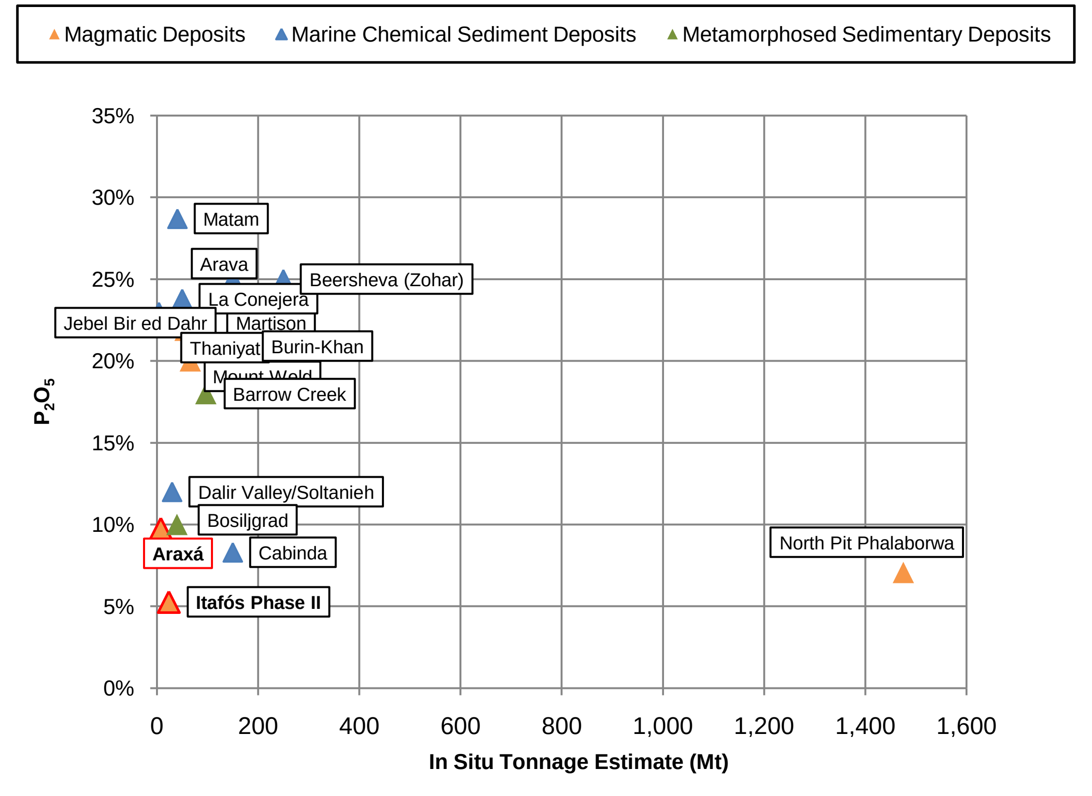


24.5. Comparison of Global Phosphate Deposits

Phosphate deposits are generally classified as being of either sedimentary or igneous origin, and the majority of known global phosphate deposits are found in a sedimentary chemical-marine setting. The 16 representative phosphate deposits are shown in Figure 43. They demonstrate a tendency towards high grades and relatively low in situ resource tonnages. Foskor's igneous Phalaborwa Project, represented on Figure 43 by the "North Pit Phalaborwa" marker, is one of a select few global deposits that does not follow this trend.

There does not seem to be a preferred grade-tonnage distribution of igneous or sedimentary deposits visible on Figure 43, both deposit types conforming to the higher-grade/lower-tonnage relationship.

Figure 43 :Comparison of Grade versus Tonnage for Phosphate Deposits



25. INTERPRETATIONS AND CONCLUSIONS (NI 25)

Araxá is an igneous carbonatite containing REEs, niobium and phosphate mineralisation. When compared to world class deposits, Araxá is a high grade, high tonnage REE deposit, a high grade and low tonnage niobium deposit and a low grade and low tonnage phosphate deposit.

MBAC has undertaken a systematic exploration programme over the past year which has been successful in defining significant resources of REO's, Phosphate and Niobium.

AMS is of the opinion that MBAC has successfully confirmed the Mineral Resource potential of the Araxá Project based on the 2011 and 2012 exploration programmes, with significant further upside for the addition of Measured and Indicated Resource.

AMS considers the Araxá Project to be sufficiently robust to warrant the undertaking of further metallurgical studies to better characterise individual REE recoveries as well as the rare earth mineralisation processing parameters, while also conducting additional drilling to potentially increase the quantity and augment the confidence level of the current Mineral Resource. However, MBAC only anticipates further drilling after the project is running, since the current Measured and Indicated Resources are enough for more than 20 years of the forecasted life of mine.

Venmyn is of the opinion that a number of strategic issues need to be highlighted with respect to the PEA carried out on the Araxá Project for MBAC:-

- the extent of current exploration has demonstrated that the mineralisation is open ended both laterally and vertically. Therefore, additional exploration outside the current limits may significantly increase the resource base;

- the metallurgical testwork that has been carried out to-date has demonstrated that concentration prior to cracking is not feasible. As a result, whole ore cracking will be employed and this has been confirmed through the bench-scale testwork that has been carried out on the Araxá Project. REO recoveries of 92% have been attained from this testwork;
- more metallurgical testwork of representative samples needs to be undertaken to determine the process route for the extraction of phosphate from the Project to increase the potential revenue of the Araxá Project. MBAC is already engaging in the preparation of the pilot plant phase as 18t of ore has been collected, and a portion of this material is already prepared (crushed, grinded and dried) for the pilot plant. The pilot plant is expected to be operational by the end of 2012. The 18t of ore that has been collected at the future mine is representative of the 4 main types of mineralisation described so far and the pilot plant will run using these four types;
- the Araxa Project will be mined using an open pit mining method with benches, while the mineralisation zone will be mechanically excavated and transported from the mine to the processing plant by road;
- due to the expected low feed rate of 120kt in the first five years of operation, the mining operation will not require large equipments, hence the Araxá Project requires a low capital cost relative to many other globally operating REE mines;
- the proximity of the Araxá Project to neighbouring CBMM niobium mine and Vale Fertilizantes phosphate mine shows that the Araxá Project is located in an area with established infrastructure, and this may reduce the capital cost of establishing the mine;
- The Araxa Project is currently in the PEA stage and, as such, an EIA has not been no completed. However, preliminary evaluation of the potential environmental impact and their respective measures for mitigation has been undertaken by MBAC independent consultant;
- the proximity to established mines suggest that there will be a pool of labour familiar with mining that can be readily accessed when mining begins;
- the proximity to established mines is an indication that the Araxá Project should be able to access proven technology for the extraction of the niobium and phosphate in the orebody, thereby increasing the economic potential of the Project;
- Venmyn found the DCF Approach was most appropriate for the valuing of the Araxá Project, hence ascribing a “Fair Value” of **USD 967m** to the Araxá Project.

In conclusion, the PEA carried out by Venmyn on the Araxá Project shows that the Project has a positive NPV base at current market condition. However, this financial model was developed based on a number of assumptions, and once the above mentioned work is done, confidence in the assumptions as well as the NPV of the project will increase.

26. RECOMMENDATIONS (NI 26)

In Venmyn’s opinion the studies that have been carried out on the Araxá Project satisfy the requirement for a PEA and MBAC should proceed to undertake a PFS on the Araxá Project.

The PFS will include the various component studies summarised in Table 54 and the estimated cost for the programme are also presented in Table 54. A decision to proceed onto a DFS will be contingent upon the successful completion of the PFS.

Table 54: Estimated Cost for the PFS Programme

DESCRIPTION	COSTS (USD)
Metallurgical Pilot Test Work	1,500,000
Mine Design	200,000
Process Plant Design	750,000
Design of Mine Tailings Disposal Facilities	250,000
Groundwater Drilling and Assessment	850,000
Desalination Plant and Sea Water Extraction Design	200,000
Environmental Assessment	650,000
Process Consultants	150,000
Risk Assessment	10,000
PFS Documentation Review and Overall Report Compilation	550,000
Sub-Total	**5,110,000**
15% Contingency	**766,500**
TOTAL	**5,876,500**

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28. DATE AND SIGNATURE PAGE

The “qualified persons” (within the meaning of NI43-101) for the purposes of this report are Andy Clay, who is the Managing Director of Venmyn Rand (Pty) Limited, and Bradley Ackroyd, who is an employee of Andes Mining Services Limited.

Section 1 -5, 13, 15 -26	
Dated at Johannesburg, South Africa	A. N Clay
25th January 2013	M.Sc. (Geol.), M.Sc. (Min. Eng.), Dip. Bus. Pr Sci Nat, MSAIMM, FAusIMM, FGSSA Managing Director and Qualified Person Venmyn
(Signature)	
Section 6 – 12 and 14	
Dated at Johannesburg, Brazil	B. Ackroyd
25th January 2013	MAIG Consulting Geologist Consulting Geologist and Qualified Person Andes Mining Services
(Signature)	

Effective Date of Report: - 1st October 2012.

Amendment Date of Report: - 25th January 2013.

Appendix 1 : Qualified Persons Certificates

VENMYN RAND (PTY) LIMITED

I, **Andrew Neil Clay**, M.Sc.(Geol), M.Sc.(Min.Eng) Dip.Bus.M, MSAIMM, FAusIMM, FGSSA, MAIMA,SPE Pr.Sci.Nat., do hereby certify that:-

1. I am a Corporate Minerals Advisor of Venmyn Rand (Pty) Limited
   First Floor, Block G
   Rochester Place
   173 Rivonia Road
   Sandton, 2146
   South Africa

2. I have more than 30 years experience in the minerals industry, from field geology, research, and mineral resource management to commercial due diligence and evaluation of a wide range of local and international mineral assets. In addition, I have more than 20 years of experience working with commercial banks and financial institutions on transactions in the minerals industry, and have been involved in the preparation of numerous codes and rules for compliance and reporting in the public domain.

3. I am a member/fellow of the following professional associations:

CLASS	PROFESSIONAL SOCIETY	YEAR OF REGISTRATION
Member	Canadian Institute of Mining, Metallurgy and Petroleum	2006
Advisor	JSE Limited Listings Advisory Committee	2005
Issuer	JSE Issuer Services	2008
Member	JSE Issuer Mining Sub-committee	2009
Associate Member	American Association of Petroleum Geologists	2005
Member	South African Institute of Directors	2004
Fellow	Geological Society of South Africa	2003
Member	American Institute of Mineral Appraisers	2002
Member	South African Institute of Mining and Metallurgy	1998
Fellow	Australasian Institute of Mining and Metallurgy	1994
Member	Natural Scientist Institute of South Africa	1988
Member	Investment Analysts Society of South Africa	1990

4. I am a "qualified person" as that term is defined in National Instrument 43-101 Standards of Disclosure for Mineral Projects (the "Instrument").

5. I am responsible for section 1 to 5, 13, and 15 – 26 of the technical report dated effective 1st October 2012, as amended 25th January 2013 and titled " A Preliminary Economic Assessment in the form of an Independent Technical Report on MBAC Fertilizer Corp Araxá Project located in Minas Gerais State, Brazil, as amended" (the Report).

6. I have read the Instrument and Form 43 – 101F1 (the "Form") and the Report has been prepared in compliance with the Instrument and the Form.

7. I am independent of MBAC and its subsidiaries as described in section 1.5 of the Instrument.

8. I have made no personal inspection of the Project.

9. As of the effective date of the Report, to the best of my knowledge, information and belief, the Report contains all scientific and technical information required to be disclosed to make the Report not misleading.

Dated this 25th January 2013 at Johannesburg, South Africa

A.N. CLAY
M.Sc. (Geol.), M.Sc. (Min. Eng.), Dip. Bus.
Pr Sci Nat, MSAIMM, FAusIMM, FGSSA
MANAGING DIRECTOR AND QUALIFIED PERSON
VENMYN

ANDES MINING SERVICES LIMITED

I, **Bradley Ackroyd**, do hereby certify that:-

1. I have been working since 2012 as a Principal Consulting Geologist with the firm Andes Mining Services Ltd. of Avenue Diagonal 550, Departmento 203, Miraflores, Lima, Peru 18. My residential address is Jose Pardo 1040, Miraflores, Lima, Peru 27.
2. I am a practising geologist with 11 years of Mining and Exploration geological experience. I have worked in Australia, PNG, West Africa and the Americas. I am a member of the Australian Institute of Geoscientists - Member (MAIG).
3. I am a graduate of the University of Western Australia (UWA) and hold a Bachelor of Science Degree in Geology (Hons) (2000).
4. I have practiced my profession continuously since 2001.
5. I am a "qualified person" as that term is defined in National Instrument 43-101 Standards of Disclosure for Mineral Projects (the "Instrument").
6. I have visited the Araxá Project between the 5th and 6th of April 2012.
7. I am responsible for section 6 to 12, and 14 of the technical report dated effective 1st October 2012, as amended 25th January 2013 and titled "A Preliminary Economic Assessment in the form of an Independent Technical Report on MBAC Fertilizer Corp Araxá Project located in Minas Gerais State, Brazil, as amended" (the Report).
8. I am independent of MBAC Fertilizer Corp pursuant to section 1.5 of the Instrument.
9. I have read the Instrument and Form 43-101F1 (the "Form") and the Report has been prepared in compliance with the Instrument and the Form.
10. I have had prior involvement with the Araxá Project of MBAC Fertilizer Corp as a Qualified Person and author of the previously filed Technical Report entitled "Mineral Resource Estimate – Araxá Rare Earth Oxide-Phosphate-Niobium Project, Minas Gerais State, Brazil, As Amended and Restated" with an Effective Date of 1st June 2012, as amended and restated on 27th August 2012.
11. As of the effective date of the Report, to the best of my knowledge, information and belief, the Report contains all scientific and technical information required to be disclosed to make the Report not misleading.

Dated in Lima, Peru, on the 25th January 2013.

____

B. ACKROYD
BSc(Geo), Member (MAIG)
PRINCIPAL CONSULTING GEOLOGIST

Appendix 2 : Abbreviations and Units of Measurement

ABBREVIATION / ACRONYM	DEFINITION
%	Percentage
+	Plus
±	Approximately
º	Degrees
µ	Microns
<	Less than
>	Greater than
/	Per
3D	Three Dimensional
Amazon	AMS Ltda
amsl	Above mean sea level
mamsl	Meters above mean sea level
AusIMM	Australian institute of Mining and Metallurgy
ASX	Australian Stock Exchange
BMP	Best Management Practices
Canopus	Canopus Holding SA
CBMM	Companhia Brasileira de Metalurgia e Mineracao
Ce	Cerium, a LREE
CIF	Companhia Industrial Fluminense
CIM	Canadian Institute of Mining, Metallurgy and Petroleum
CONAMA	Brazilian Environmental Council
CoV	Coefficient of variation
CREE	Critical Rare Earth Elements
CRO	Contract Research Organisation
DD	(Diamond Drilling) Method of obtaining cylindrical core of rock by drilling with a diamond set or diamond impregnated bit.
DCF	Discounted cash flow
DFS	Definitive Feasibility Study
DNPM	Departamento Nacional de Producao Mineral
DTM	Digital Terrain Model
Dy	Dysprosium, a HREE
EIA	Environmental Impact Assessment
EIAR	EIA Report
EIMS	Environmental Impact Management Services
EMP	Environmental Management Plan
EMPR	Environmental Management Programme Report
Env. Man	Environmental Management
Er	Erbium, a HREE
EREE	Excess Rare Earth Elements
Eu	Europium, a HREE
Extramil	Extramil Ltda
Gd	Gadolinium, a HREE
GDP	Gross Domestic Product
GIS	Geographical Information System - any system that captures, stores, analyses, manages, and presents data that are linked to location. In the simplest terms, GIS is the merging of cartography and database technology
GPS	Global geographic positioning system
g/t	grams per tonne
ha	hectares
Ho	Holmium, a HREE
HCL	Hydrochloric acid
HREE	Heavy Rare Earth Elements – Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Y and Lu
IBAMA	Brazilian Institute for the Environment and Renewable Natural Resources
ICP-OES	Inductively Coupled Plasma Optical Emission Spectrometry – analytical method used for elemental analyses.
ICP-MS	Inductively Coupled Plasma Mass Spectrometry
IPR	Instituto de Pesquisas Radioativas
ISO	International Organisation for Standardisation
Itafos	Itafos Mineracao Ltda
ITR	Independent Technical Report
JORC	Joint Ore Reserve Committee
JICA	Japan International Cooperation Agency
KANU	Kenya African National Union
K outl	Outlook Coefficient
Ksh	Kenya Shillings
kt	Kilo tonnes
kWh	Kilowatt hour
La	Lanthanum, a LREE
LOI	Loss on ignition. A test used to drive off volatile substances and is reported as part of an elemental or oxide analyses of a mineral.
LoM	Life of Mine
LREE	Light Rare Earth Elements
Lu	Lutetium, a HREE
m	metres
Ma	Million years
mamsl	Meters above mean sea level
MBAC	MBAC Fertiliser Corporation

ABBREVIATION / ACRONYM	DEFINITION
mbs	Metres below surface
MER	Mineral Experts Report
msl	Mean sea level
Mt	Million tonnes
MW	Mega watt of power
my	million years
Nd	Neodymium, a LREE
NEMA	National Environmental Management Authority
NMI	Nicolas Mining Industries
NPV	Net present value
NSR	Net Smelter Returns
OPEX	Operating Expenditure
OTR	Óxido de Terras Raras
pa	per annum
PEM	Prospectivity Enhancement Multiplier
PFD	Process Flow Diagram
PFS	Preliminary Feasibility Study
Pm	Promethium, a LREE
PR	Prospecting Right
Pr	Praseodymium, a LREE
PSD	Particle Size Distribution
QA/QC	Quality Assurance / Quality Control
REE	Rare Earth Elements
REO	Rare earth oxides
ROM	Run of Mine
RC drilling	(Reverse Circulation) A percussion drilling method in which the fragmented sample is brought to the surface inside the drill rods, thereby reducing contamination.
SEM	Scanning electron microscope
SG	Specific Gravity
SISNAMA	Brazilian Environmental System
SLP	Social and Labour Plan
Sm	Samarium, a LREE
SMU	Smallest Mining Unit
SREC	Separated rare earth concentrate
t	tonnage
Tb	Terbium, a HREE
TEU	Twenty-foot Equivalent Units
TOR	Terms of Reference
tph	Tonne/s per hour
tpm	Tonnes/s per month
Tm	Thulium, a HREE
tpa	Tonnes per annum
TREE	Total Rare Earth Elements
TSX	Toronto Stock Exchange
UREE	Uncritical Rare Earth Elements
USD	United States Dollar
ValMIN	Code for the Technical Assessment and Valuation of Mineral and Petroleum Assets and Securities for Independent Expert Reports
XRD	X-Ray Diffraction – a non destructive mineralogical method that provides detailed information about the chemical composition and crystallographic structure of minerals
XRF	X-Ray Fluorescence – used a routine relatively non destructive method to determine major and trace elements in geological materials
Y	Yttrium, a HREE
Yb	Ytterbium, a HREE

Appendix 3 : Glossary of Terms

GLOSSARY	DEFINITION
airborne magnetic surveys	Surveys flown by helicopter or fixed wing aircraft to measure the magnetic susceptibility of rocks at or near the earth's surface.
natectic	From anatexis: refers to the differential or partial melting of rock in the upper levels of the crust during metamorphism
alkaline rocks	Rocks containing an excess of sodium and or potassium.
amphibolite	A metamorphic rock comprised mainly of amphibole, generally with an orientated fabric.
apatite	A mineral $Ca_5(F,Cl)(PO_4)_3$ found in igneous rocks which is the main source of phosphate.
Archaean	The oldest rocks of the Precambrian era, older than about 2 500 million years.
basement	The igneous and metamorphic crust of the earth, underlying sedimentary deposits.
betafite	A mineral in the pyrochlore group, $(Ca,U)_2(Ti,Nb,Ta)_2O_6(OH)$ and typically occurs as a primary mineral in granite pegmatites, and rarely in carbonatites.
brecciated/breccia	Condition applied to an intensely fractured body of rock.
Carbonate	A rock, usually of sedimentary origin, composed primarily of calcium, magnesium or iron and CO_3. Essential component of limestones and marbles.
Cambrian	The oldest of the systems into which the Palaeozoic stratified rocks are divided, 545 to 490 million years ago.
carbonate	A rock, usually of sedimentary origin, composed primarily of calcium, magnesium or iron and CO_3. Essential component of limestones and marbles.
carbonatite	An alkaline, carbonate-rich magmatic rock.
carbothermal	Using a combination of heat and carbon
cheralite	Cheralite is a variety of monazite which can contain up to 30% ThO_2
churchite	A rare REE-bearing mineral - $(Y,Er)PO_4\text{-}2H_2O$
Competent Person	A person with the relevant knowledge and experience in a particular field to be deemed competent by the required code for reporting
crandallite	A secondary REE bearing phosphate mineral – $CaAl_3(PO_4)(PO_3OH)(OH)_6$
craton	Large, and usually ancient, stable mass of the earth's crust comprised of various crustal blocks amalgamated by tectonic processes. A cratonic nucleus is an older, core region embedded within a larger craton.
Cretaceous	Applied to the third and final period of the Mesozoic era, 141 to 65 million years ago.
diatreme	A volcanic vent or pipe created by gaseous magma sourced from the mantle.
dolomite	A mineral composed of calcium and magnesium carbonate; a rock predominantly comprised of this mineral is also referred to as dolomite or dolostone.
dyke	A tabular body of intrusive igneous rock, crosscutting the host strata at an oblique angle.
extrusive rock	A volcanic rock which has flowed out to the surface of the earth
fault	A fracture or fracture zone, along which displacement of opposing sides has occurred.
fenitisation	Metasomatic alteration of host rocks surrounding a carbonatite intrusion
fold	A planar sequence of rocks or a feature bent about an axis.
glimmerite	An ultrabasic rock consisting almost entirely of phlogopite or biotite
gneiss	A coarse grained, banded, high grade metamorphic rock.
gorgecite	$(Ba,REE)Al_3(PO_4)_2(OH_5.H_2O)$
gossan	The leached and oxidised near surface part of a vein containing sulphides, especially iron bearing ones.
granitoid	A generic term for coarse grained felsic igneous rocks, including granite.
granulite	A metamorphic rock of regional metamorphic origin having a granular texture
Great Rift Valley	continuous geographic trench, approximately 6,000 kilometres in length, that runs from northern Syria in Southwest Asia to central Mozambique in South East Africa
hydrometallurgical	Processing of ore by acid or caustic leaching
hydrothermal	Using a combination of water and heat
hyperbyssal	An igneous rock that originates at medium to shallow depths within the crust and contains intermediate grain size and often porphyritic texture.
imaging	Computer processing of data to enhance particular features.
igneous rock	Rock formed from the cooling down from molten magma or lava
intrusive rock	A volcanic rock that remained in the earth's crust
Landsat imagery	Photographs of the earth's surface, collected by satellite, and taken at different wave-lengths of light, processed to enhance particular features.
limestone	A sedimentary rock containing at least 50% calcium or calcium-magnesium carbonates.
limonite	A group term for a range of mixtures of hydrated iron oxides and iron hydroxides
lineament	A significant linear feature of the earth's crust.
magma	Molten rock under the earth's surface
magnetite	An important iron-bearing mineral Fe_3O_4
magnetic susceptibility	The degree of magnetisation of a material in response to an applied magnetic field.
mafic	Descriptive of rocks composed dominantly of magnesium and iron rock-forming silicates.
mantle	The layer of the earth between the crust and the core. The upper mantle, which lies between depths of 50 and 650km beneath continents, is the principal region where diamonds are created and stored in the earth.
melilite	A rare igneous mineral, usually associated with olivine.
melnoite	Acronym for (melilite plus alnöite) as a stem name for all ultramafic lamprophyres
Meso Proterozoic	Middle Proterozoic era of geological time, 1,600 to 1,000 million years ago.
metamorphism	Alteration of rock and changes in mineral composition, most generally due to increase in pressure and/or temperature.
metasomatism	A metamorphic change in the rock which involves the introduction of material from another source via hydrothermal fluids
mobile zone	An elongate belt in the earth's crust, usually occurring at the collision zone between two crustal blocks, within which major deformation, igneous activity and metamorphism has occurred.
monazite	A rare earth mineral found as an accessory mineral in acid igneous rocks, pegmatite dykes and heavy mineral sands
olivine	A common mineral found in mafic igneous rocks, $(Mg,Fe)_2SiO_4$
Ordinary Kriging	Is a geostatistical approach to modeling. Instead of weighting nearby data points by some power of their inverted distance, OK relies on the spatial correlation structure of the data to determine the weighting values

GLOSSARY	DEFINITION
orogeny	A deformation and/or magmatic event in the earth's crust, usually caused by collision between tectonic plates.
palaeo	Prefix often used meaning "ancient, of past times"
Palaeozoic	An era of geologic time between the Late Precambrian and the Mesozoic era, 545 to 251 million years ago.
peralkaline	Rocks which have a deficiency of aluminium such that sodium and potassium are in excess of that needed for feldspar
percussion	A drilling method whereby the rock is broken up and pulverised by action of a hammer and rotary action of a drill bit.
plug	An intrusive near vertical circular feed channel of a volcano
potasic	Potassium rich
Precambrian	Pertaining to all rocks formed before Cambrian time (older than 545 million years).
primary	First order
Rift valley/ basin	Is a linear-shaped lowland between highlands or mountain ranges created by the action of a geologic rift or fault
prospecting right	A mineral right conferred to a 3rd party by the South African Department of Mineral Resources.
Proterozoic	An era of geological time spanning the period from 2,500 to 545 million years before present.
Pyrometallurgical	Processing of ore through heating
pyrite	Most widespread sulphide mineral, Fe_2S
pyrrhotite	An unusual iron sulphide mineral with a variable iron content.
pyrochlore	A mineral - $(Na,Ca)_2Nb_2O_6(OH,F)$ characteristically associated with carbonatites
radiometrics	Radiometrics is a measure of the natural radiation in the earth's surface, and is often also known as Gamma-Ray Spectrometry
sodic	A disproportionately high concentration of Sodium (Na)
sandstone	A sedimentary rock composed of cemented or compacted detrital minerals, principally quartz grains.
schist	A crystalline metamorphic rock having a foliated or parallel structure due to the recrystallisation of the constituent minerals.
scintillometer	A scintillation counter measures ionizing radiation.
Sievert (sv)	Unit of radiation absorbed
silicic	Containing an abundance of silica; rocks which have been extensively replaced by silica are referred to as silicified.
siltstone	A rock intermediate in character between a shale and a sandstone. Composed of silt sized grains.
sövite	The coarse-grained variety or facies of a carbonatite intrusive. Sövite is often a medium to coarse grained calcite carbonatite with variable accessory amphibole, biotite, pyrite, pyrochlore and fluorite.
supergene	Meaning process involving circulation of surface waters throughout an ore deposit, which can result in remobilisation and enrichment of metals and minerals.
Standard Atlantic Kenya Pty. Ltd	Mining company in Kenya
strike	Horizontal direction or trend of a geological structure.
syenite	An intrusive igneous rock composed essentially of alkali feldspar, with little or no quartz and ferromagnesian minerals.
tectonic	Pertaining to the forces involved in, or the resulting structures of, movement in the earth's crust.
terrane	A fragment of crustal material that has been transported laterally and may be accreted onto others.
trough	A large sediment-filled and fault-bounded depression resulting from extension of the crust.
Valuator	A person who estimates the value of assets.
Venmyn	Specialist advisors in mineral project valuation and statutory compliance to the international minerals industry and investors
zircon	A silicate of zirconium, $(ZrSiO_4)$, and a very common detrital heavy mineral. Can be dated using uranium-lead methods.

Appendix 4 : Araxa Drilling Table

BH No	EOH	LREE					HREE										LREE	HREE	TREO	P_2O_5	Nb_2O_5
		La_2O_3	CeO_2	Pr_6O_{11}	Nd_2O_3	Sm_2O_3	Eu_2O_3	Gd_2O_3	Tb_4O_7	Dy_2O_3	Ho_2O_3	Er_2O_3	Tm_2O_3	Yb_2O_3	Lu_2O_3	Y_2O_3					
	(m)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)				(%)	(%)
AAX-DD-001	65.15	1.124	1.940	0.196	0.524	0.049	0.010	0.022	0.002	0.006	0.001	0.001	0.000	0.001	0.000	0.021	3.832	0.065	3.898	7.010	0.840
AAX-DD-002	81.36	1.072	1.851	0.188	0.540	0.052	0.012	0.027	0.003	0.010	0.001	0.002	0.000	0.001	0.000	0.034	3.704	0.090	3.794	7.340	0.680
AAX-DD-003	65.75	1.101	1.935	0.204	0.591	0.064	0.016	0.035	0.004	0.013	0.002	0.003	0.000	0.001	0.000	0.043	3.896	0.116	4.012	7.200	0.730
AAX-DD-004	51.75	0.889	1.716	0.168	0.514	0.057	0.014	0.029	0.003	0.011	0.001	0.003	0.000	0.001	0.000	0.043	3.345	0.106	3.451	6.910	0.770
AAX-DD-005	51.13	1.094	2.127	0.205	0.629	0.072	0.018	0.036	0.004	0.015	0.002	0.004	0.000	0.002	0.000	0.062	4.126	0.144	4.270	7.710	0.970
AAX-DD-006	55.55	1.000	1.868	0.179	0.552	0.065	0.016	0.034	0.003	0.013	0.002	0.003	0.000	0.001	0.000	0.044	3.664	0.115	3.780	8.040	0.770
AAX-DD-007	40.55	2.696	4.677	0.415	1.253	0.125	0.028	0.058	0.006	0.023	0.003	0.007	0.001	0.004	0.000	0.095	9.166	0.225	9.391	12.940	2.080
AAX-DD-008	40.20	2.570	4.520	0.414	1.213	0.116	0.026	0.051	0.006	0.023	0.003	0.007	0.001	0.004	0.000	0.097	8.833	0.219	9.052	9.160	1.580
AAX-DD-009	38.81	2.402	4.574	0.422	1.335	0.140	0.031	0.066	0.006	0.022	0.003	0.006	0.000	0.003	0.000	0.089	8.872	0.228	9.100	3.900	1.860
AAX-DD-010	40.20	1.508	2.744	0.249	0.734	0.072	0.016	0.033	0.003	0.014	0.002	0.004	0.000	0.002	0.000	0.063	5.307	0.139	5.446	9.080	1.150
AAX-DD-011	41.80	0.999	1.992	0.189	0.580	0.060	0.014	0.027	0.003	0.011	0.001	0.003	0.000	0.002	0.000	0.047	3.820	0.107	3.927	5.330	0.970
AAX-DD-012	40.90	1.346	2.416	0.227	0.679	0.067	0.015	0.031	0.003	0.012	0.002	0.003	0.000	0.002	0.000	0.051	4.735	0.118	4.853	6.080	1.140
AAX-DD-013	31.40	2.648	4.864	0.478	1.458	0.149	0.035	0.073	0.007	0.026	0.003	0.006	0.000	0.002	0.000	0.088	9.598	0.242	9.839	8.520	1.900
AAX-DD-014	60.38	1.565	2.819	0.247	0.740	0.074	0.016	0.033	0.003	0.014	0.002	0.004	0.000	0.002	0.000	0.056	5.445	0.131	5.576	9.910	1.430
AAX-DD-014A	10.00	3.959	7.613	0.747	1.828	0.194	0.044	0.096	0.010	0.043	0.006	0.013	0.001	0.006	0.001	0.190	14.339	0.409	14.748	13.800	2.320
AAX-DD-015	60.80	1.315	2.453	0.230	0.708	0.075	0.016	0.034	0.003	0.013	0.002	0.004	0.000	0.002	0.000	0.055	4.781	0.129	4.910	7.890	1.310
AAX-DD-016	60.70	1.382	2.623	0.236	0.703	0.070	0.016	0.032	0.003	0.012	0.002	0.003	0.000	0.002	0.000	0.046	5.013	0.116	5.129	10.720	1.020
AAX-DD-017	60.00	2.076	3.580	0.339	1.017	0.105	0.024	0.049	0.005	0.024	0.004	0.008	0.001	0.004	0.000	0.110	7.117	0.228	7.345	9.770	1.650
AAX-DD-018	60.45	1.577	2.886	0.272	0.834	0.087	0.019	0.041	0.005	0.021	0.003	0.006	0.001	0.003	0.000	0.089	5.657	0.188	5.845	9.140	1.480
AAX-DD-019	60.20	1.525	2.777	0.245	0.720	0.067	0.014	0.029	0.003	0.013	0.002	0.004	0.000	0.002	0.000	0.059	5.334	0.127	5.461	9.020	1.320
AAX-DD-020	60.40	1.364	2.484	0.216	0.614	0.064	0.014	0.029	0.003	0.012	0.002	0.003	0.000	0.002	0.000	0.045	4.742	0.109	4.851	6.410	0.820
AAX-DD-021	60.43	1.113	2.044	0.189	0.586	0.061	0.014	0.029	0.003	0.012	0.002	0.004	0.000	0.002	0.000	0.049	3.992	0.114	4.106	8.240	0.810
AAX-DD-022	60.36	1.532	2.868	0.271	0.829	0.084	0.018	0.038	0.004	0.015	0.002	0.004	0.000	0.002	0.000	0.061	5.584	0.145	5.729	8.260	1.390
AAX-DD-023	60.45	0.937	1.787	0.163	0.503	0.055	0.013	0.026	0.003	0.011	0.001	0.003	0.000	0.002	0.000	0.044	3.445	0.103	3.547	11.100	0.730
AAX-DD-024	60.00	1.131	2.093	0.199	0.606	0.064	0.015	0.029	0.003	0.010	0.001	0.002	0.000	0.001	0.000	0.036	4.093	0.097	4.190	4.210	1.120
AAX-DD-025	59.40	1.362	2.434	0.232	0.688	0.070	0.016	0.032	0.003	0.012	0.002	0.003	0.000	0.002	0.000	0.042	4.786	0.110	4.897	4.500	1.120
AAX-DD-026	61.69	1.393	2.610	0.256	0.789	0.082	0.019	0.038	0.004	0.015	0.002	0.004	0.000	0.002	0.000	0.056	5.129	0.141	5.270	5.230	1.050
AAX-DD-027	60.32	1.152	1.974	0.174	0.503	0.048	0.010	0.020	0.002	0.008	0.001	0.002	0.000	0.001	0.000	0.032	3.851	0.078	3.929	4.470	0.740
AAX-DD-028	61.55	1.463	2.760	0.257	0.769	0.081	0.018	0.037	0.004	0.015	0.002	0.004	0.000	0.002	0.000	0.057	5.330	0.140	5.470	4.560	0.920
AAX-DD-029	60.15	1.497	2.880	0.272	0.858	0.094	0.021	0.042	0.004	0.017	0.002	0.005	0.000	0.003	0.000	0.068	5.601	0.163	5.764	9.950	1.120
AAX-DD-030	60.17	1.704	3.127	0.284	0.835	0.084	0.019	0.038	0.004	0.015	0.002	0.004	0.000	0.002	0.000	0.059	6.034	0.143	6.177	12.360	1.410
AAX-DD-031	60.00	1.316	2.514	0.250	0.779	0.084	0.019	0.038	0.004	0.015	0.002	0.004	0.000	0.002	0.000	0.057	4.944	0.142	5.085	9.670	0.770
AAX-DD-032	116.39	1.249	2.067	0.183	0.513	0.047	0.010	0.018	0.002	0.007	0.001	0.002	0.000	0.001	0.000	0.026	4.060	0.066	4.125	6.420	0.620
AAX-DD-033	61.30	1.218	2.275	0.214	0.640	0.068	0.015	0.030	0.003	0.012	0.002	0.003	0.000	0.002	0.000	0.046	4.416	0.114	4.530	10.220	0.910
AAX-DD-034	60.20	0.891	1.690	0.165	0.510	0.061	0.013	0.027	0.003	0.010	0.001	0.003	0.000	0.002	0.000	0.040	3.316	0.100	3.416	10.920	0.860
AAX-DD-035	40.30	0.804	1.549	0.149	0.479	0.058	0.014	0.026	0.003	0.011	0.001	0.003	0.000	0.002	0.000	0.046	3.040	0.106	3.146	9.840	0.580
AAX-DD-036	40.30	1.243	2.278	0.214	0.632	0.066	0.015	0.028	0.003	0.012	0.001	0.003	0.000	0.002	0.000	0.049	4.434	0.114	4.547	11.790	1.500
AAX-DD-037	40.40	1.246	2.187	0.201	0.623	0.066	0.015	0.031	0.003	0.014	0.002	0.004	0.000	0.002	0.000	0.057	4.322	0.130	4.452	8.840	0.980
AAX-DD-038	40.15	1.531	2.656	0.233	0.671	0.063	0.013	0.026	0.002	0.010	0.001	0.003	0.000	0.002	0.000	0.043	5.154	0.101	5.255	9.210	0.960
AAX-DD-039	41.50	2.162	3.297	0.285	0.789	0.065	0.014	0.028	0.003	0.011	0.002	0.003	0.000	0.002	0.000	0.043	6.599	0.104	6.703	11.690	0.630
AAX-DD-040	40.40	1.681	2.810	0.248	0.742	0.067	0.014	0.028	0.003	0.012	0.002	0.003	0.000	0.002	0.000	0.044	5.547	0.108	5.655	8.160	0.530
AAX-DD-041	40.00	1.577	2.638	0.239	0.713	0.070	0.015	0.031	0.003	0.013	0.002	0.003	0.000	0.002	0.000	0.046	5.237	0.114	5.351	9.700	0.930
AAX-DD-042	40.00	1.423	2.419	0.225	0.681	0.070	0.015	0.030	0.003	0.013	0.002	0.004	0.000	0.002	0.000	0.051	4.818	0.119	4.937	12.710	1.060
AAX-DD-043	40.40	1.252	2.302	0.218	0.654	0.070	0.015	0.032	0.003	0.014	0.002	0.004	0.000	0.002	0.000	0.054	4.496	0.127	4.623	8.020	0.900

BH No	EOH			LREE							HREE										
	(m)	La_2O_3 (%)	CeO_2 (%)	Pr_6O_{11} (%)	Nd_2O_3 (%)	Sm_2O_3 (%)	Eu_2O_3 (%)	Gd_2O_3 (%)	Tb_4O_7 (%)	Dy_2O_3 (%)	Ho_2O_3 (%)	Er_2O_3 (%)	Tm_2O_3 (%)	Yb_2O_3 (%)	Lu_2O_3 (%)	Y_2O_3 (%)	LREE	HREE	TREO	P_2O_5 (%)	Nb_2O_5 (%)
AAX-DD-044	30.90	1.895	3.566	0.348	1.056	0.104	0.024	0.048	0.005	0.021	0.003	0.005	0.000	0.002	0.000	0.077	6.970	0.186	7.155	10.150	1.180
AAX-DD-045	154.40	1.506	2.545	0.230	0.673	0.070	0.016	0.031	0.003	0.013	0.002	0.003	0.000	0.002	0.000	0.049	5.024	0.120	5.144	10.860	1.110
AAX-DD-046	156.95	1.054	1.898	0.178	0.547	0.060	0.014	0.028	0.003	0.012	0.002	0.003	0.000	0.002	0.000	0.048	3.737	0.113	3.850	11.650	0.790
AAX-DD-047	30.40	1.401	2.584	0.250	0.762	0.078	0.017	0.033	0.003	0.012	0.002	0.003	0.000	0.001	0.000	0.040	5.075	0.110	5.185	4.760	1.480
AAX-DD-048	30.40	0.983	1.860	0.184	0.579	0.064	0.014	0.030	0.003	0.012	0.002	0.003	0.000	0.002	0.000	0.048	3.670	0.115	3.784	7.240	1.020
AAX-DD-049	30.00	1.448	2.700	0.261	0.831	0.092	0.020	0.043	0.004	0.016	0.002	0.004	0.000	0.002	0.000	0.061	5.333	0.153	5.486	10.630	0.940
AAX-DD-050	30.70	1.330	2.506	0.242	0.761	0.082	0.018	0.037	0.003	0.014	0.002	0.004	0.000	0.002	0.000	0.053	4.922	0.134	5.056	11.750	0.990
AAX-DD-051	113.40	1.263	2.201	0.205	0.611	0.062	0.014	0.029	0.003	0.012	0.002	0.003	0.000	0.002	0.000	0.043	4.341	0.107	4.448	9.720	0.950
AAX-DD-052	31.35	1.624	2.898	0.276	0.865	0.091	0.021	0.042	0.004	0.016	0.002	0.004	0.000	0.002	0.000	0.054	5.754	0.145	5.899	8.960	1.210
AAX-DD-053	30.55	2.346	3.735	0.325	0.936	0.090	0.020	0.039	0.004	0.016	0.002	0.004	0.000	0.002	0.000	0.063	7.432	0.151	7.582	10.160	1.130
AAX-DD-054	30.00	2.660	4.243	0.388	1.176	0.119	0.026	0.055	0.005	0.023	0.003	0.006	0.001	0.003	0.000	0.095	8.585	0.218	8.803	12.850	1.500
AAX-DD-055	30.10	1.766	2.795	0.248	0.732	0.077	0.017	0.039	0.004	0.017	0.002	0.005	0.000	0.002	0.000	0.071	5.619	0.158	5.777	10.080	1.020
AAX-DD-056	30.00	2.333	3.774	0.348	1.013	0.098	0.022	0.044	0.005	0.020	0.003	0.005	0.000	0.002	0.000	0.074	7.566	0.175	7.741	10.660	1.090
AAX-DD-057	30.00	1.757	2.912	0.253	0.743	0.079	0.018	0.036	0.004	0.016	0.002	0.004	0.000	0.002	0.000	0.064	5.744	0.146	5.890	10.280	0.840
AAX-DD-058	31.05	0.742	1.428	0.146	0.468	0.059	0.014	0.031	0.003	0.014	0.002	0.004	0.000	0.002	0.000	0.057	2.844	0.127	2.971	5.670	0.580
AAX-DD-059	41.25	1.022	1.811	0.171	0.520	0.059	0.014	0.029	0.003	0.013	0.002	0.003	0.000	0.002	0.000	0.048	3.584	0.113	3.697	7.800	1.500
AAX-DD-060	70.35	1.225	1.921	0.182	0.466	0.049	0.011	0.021	0.003	0.008	0.001	0.002	0.000	0.001	0.000	0.037	3.844	0.085	3.929	7.890	0.630
AAX-DD-061	60.05	0.537	1.110	0.122	0.425	0.061	0.016	0.034	0.004	0.016	0.002	0.004	0.000	0.002	0.000	0.070	2.254	0.149	2.403	7.990	0.410
AAX-DD-062	63.85	0.603	1.321	0.144	0.508	0.072	0.018	0.036	0.004	0.015	0.002	0.003	0.000	0.002	0.000	0.053	2.648	0.132	2.781	6.500	0.320
AAX-DD-063	60.70	1.136	1.843	0.164	0.481	0.050	0.012	0.024	0.003	0.011	0.002	0.003	0.000	0.002	0.000	0.048	3.674	0.105	3.779	5.910	0.290
AAX-DD-064	60.05	1.220	2.094	0.185	0.523	0.051	0.011	0.023	0.002	0.009	0.001	0.002	0.000	0.001	0.000	0.033	4.073	0.082	4.155	7.090	0.500
AAX-DD-065	160.35	1.318	2.217	0.203	0.586	0.055	0.012	0.023	0.002	0.010	0.001	0.003	0.000	0.001	0.000	0.038	4.379	0.091	4.469	7.700	0.930
AAX-DD-066	113.95	0.645	1.164	0.117	0.337	0.036	0.008	0.020	0.002	0.007	0.001	0.002	0.000	0.001	0.000	0.029	2.299	0.071	2.370	5.150	0.360