EXPLORATION PLAN
ON THE
CHAMBE BASIN AREA

AKATSWIRI
RARE EARTHS

MULANJE MASSIF
SOUTHERN MALAWI

JUNE 2020

Contents

1.0 Introduction

Akatswiri Mineral Resources Pvt. Ltd. (AMR) is a Malawian owned mineral exploration, contracting and Geo-consulting company established in 2012. The company's headquarters is based in Zomba, Malawi. AMR has expertise in comprehensive core services related to geological, geotechnical, mining and environmental projects and has carried out several exploration programs within the country.

This year (2020), the company (AMR) has applied for an Exploration License (EL) over the Chambe basin area in Mulanje, southern Malawi to explore for Rare Earth Elements (REE's). The grant of the license will give permission to start carrying out the exploration activities which the company intends to do. The possibility that the Mulanje Mountain area might contain REE deposits of the ion-adsorption type was proposed by Ishikawa (2010), a geologist from the Japan International Cooperation Agency. He collected 8 samples from Chambe Basin in September of 2010.

Analyses "kaolinitic" samples collected by Ishikawa indicated that Chambe basin area hosts Rare Earth Elements (REE's) that have been referred to as "**ion-adsorption clay type**". from 475 to 739 ppm total REE of which 31% to 74 % is easily leachable.

The following year, on May 22-23 of 2011, a group of geologists from MINDECO, JOGMEC and the Geological Survey of Malawi collected 16 samples which comprised of 13 soil samples and 3 weathered rock samples.

Samples taken by MINDECO, JOGMEC and Geological Survey of Malawi were found to contain between 198 and 642 ppm total REE, and recoveries by leaching were in the range 0.1 to 30% (38% if Ce is excluded), with 8 of 13 samples having 5% or less of their total REE leachability. These results prompted MINDECO to carry out drilling of soils in Chambe from August to October of 2011 but no details are currently available, and as no analyses have yet been made there is no new information on the REE potential.

The REE mineralization in the Chambe Basin is so far known only from a very small number (total 25) of soil and rock samples, mostly collected from road cuts along old forestry tracks. The controls on mineralization and the vertical and horizontal extent of the mineralization are therefore unknown at present. Akatswiri Mineral Resources (AMR) plans to carry out detailed geological exploration activities in the Chambe basin area and Lichenya plateau in Mulanje district. The purpose of this exploration program is to come up with an estimated size of the rare earth mineral deposit in Chambe and Lichenya. Results and outcomes from this exploration program will determine the progress of this REE project. If successful, mining operations for the REE will be established.

2.0 Location of the project area

The area is located in southern region of Malawi in Mulanje district, within the Chambe Basin. The approximate latitude and longitude at the centre of the area is 15˚ 57'S, 35˚ 37' E. The EL covers Chambe Basin and Lichenya Plateau. **Chambe Basin** is a depression located right on an estimated terrain elevation above sea level which is at approximately 1893 meters and sits at almost 8 km from Mulanje Boma. Chambe Basin is covered by the 1:50,000 scale "Mulanje" topographic sheet 1535D3 (Latitude -15^0 54'40.57'' and Longitude 35^0 32'9.49''). The Lichenya Plateau also sits at the same elevation and is almost 8 km from the Mulanje Boma.

The entire area south is covered by the Blantyre 1: 250 000 scale Topographical Map and the coordinates of the area as below. The total area sought is around 128 square kilometres.

Table 1: Coordinates of the applied EL

POINT	EASTINGS	NORTHINGS
A	776000	8226000
B	768000	8226000
C	768000	8242000
D	776000	8242000
Total Area =128.0 Km^2		

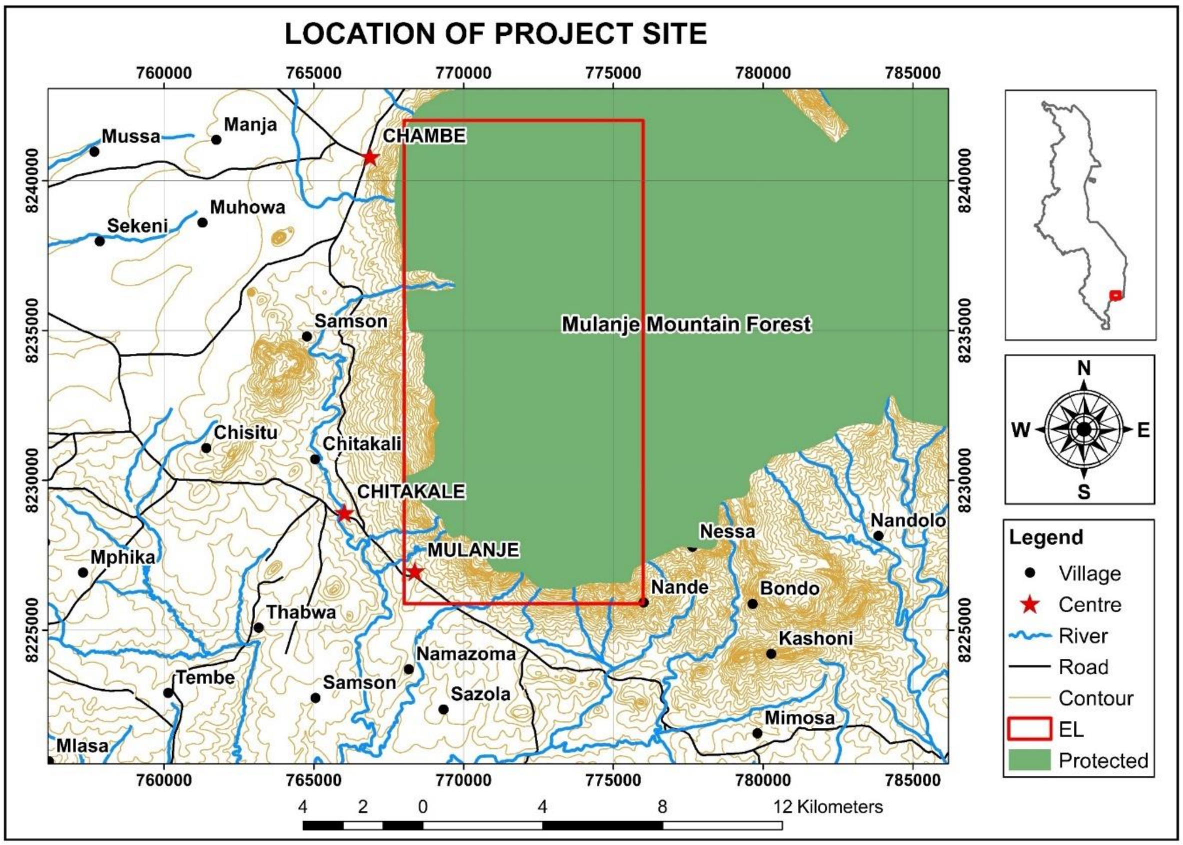

Figure 1:Map of the proposed area for rare earths elements and bauxite on Chambe and Lichenya Plateau areas on Mulanje

3.0 Accessibility, Climate, Local Resources, Infrastructure and Physiography

3.1 Topography, elevation and vegetation

The Mulanje Massif rises steeply above the densely-populated surrounding Chilwa Phalombe Plain at 650-750 m to Mt Sapitwa at 3,002 m, the highest peak in south-central East Africa. The massif is covered by the Mulanje Mountain Forest Reserve and contains a diverse and partly endemic vegetation, particularly the once more common Mulanje Cypress, (*Widdringtonia whytei*) which became scarce by the 1950's due to logging. The Mulanje Cypress is one of 4 African *Widdringtonia* species of the Family Cupressaceae and is often erroneously referred to as a "cedar", which belong to the Family Pinacea and are unrelated to cypresses. A smaller cypress (*Widdringtonia Nodiflora*) and gladioli, ground orchids, proteas, aloe, crysanthemum, ferns, mosses, wild peach, yellow wood and other plants are also present. Lists of some of the 6 endemic trees, the 66 mammals, 300 birds, 31 snakes, 25 lizards, 33 frogs, 233 butterflies and 7 fish known from the Mulanje Forest Reserve can be found in Deppe and Bishop (2010). Introduced plants include the Mexican Pine (*Pinus patula*), eucalyptus and the Himalayan raspberry.

The floor of the Chambe Basin has a rolling, subdued topography (Figure 2, 3) ranging from about 1,690 m at the southern lip to about 1,875 m and is surrounded by a circular rim, partly of bare rock (Figure 2, 3), which rises to a maximum height of 2,557 m at Chambe Peak. Chambe Basin apparently was once covered by a forest of the Mulanje Cypress, but few of these trees remain there today and the basin was later planted in Mexican pine and most of this has also now been logged. The basin today has only a thin cover of small bushes and grasses.

3.2 Means of access

Chambe Basin can be reached from Blantyre by vehicle on a good sealed road ESE about 1 hour to Chitikale Village and then east a few km to the road end at the Likhubula Forestry Station by a gravel road, which passes through Nakoya Village. Several footpaths lead to Chambe Basin from the lower southern slopes, the main one being the Skyline Path, which begins at the Likhubula Forestry Station at about 835 m and climbs to the south rim of the basin at about 1,690 m and takes 2 to 3 hours. From this point the footpath continues across the approximately 3.5 km wide basin and connects with a network of dirt roads that lead to several forestry / tourist huts.

The present access to the property by footpaths is clearly insufficient for any significant mining activity and would need to be improved. In the past a cable-way, which runs for about 2.1 km from a short road above the Likhubula Forestry Station to the Upper Skyline Station on the south rim of the basin, was used to bring logs down from the basin. The load bearing cables (about 1.5 inch) are still in place and, if the project continues, the cableway might be re-activated or replaced and used to transport materials and perhaps people to and from Chambe Basin.

Figure 2: View from the south lip of Chambe Basin north across the basin toward the east face of Chambe Peak (8,390 feet).

Figure 3: View of Chambe Basin west toward Chambe Peak

3.3 Proximity to population centres, nature of transport

The nearest population centre to the Chambe Basin is Nakoya Village in the lower Likhubula Valley, where many mountain porters live, about 8 km SW of the basin. Chitikale, the commercial centre of the Mulanje district, lies a few km west of the Likhubula. Forestry Station and the small town of Mulanje is about 9 km to the south on a paved road. Blantyre, the largest town (population ~730,000) and main commercial centre in Malawi, lies about 60 km in a direct line to the WNW.

3.4 Weather and Climate

The climate of Malawi is hot and wet from November to April, cool and dry from May to August and hot and dry from September to October. Annual rainfall is very different on the Mulanje Massif (>100 inches) than on the surrounding plains (~40 inches). Rain may fall at higher elevations at any time of the year, although it is more frequent and intense during the wet season. Intermittent rain and mist centred on the massif is common. Temperatures on the Phalombe Plain range from about 15˚ to 35˚C but on the massif temperatures are generally lower, especially at night, and in June and August may drop below zero and snow may fall occasionally at higher elevations. Conditions may be more difficult in the wet season, but exploration and mining operations could continue throughout the year.

4.0 Geological Setting

4.1 Regional, local and Property geology

This part of southern Malawi (Figure 4) is underlain by a basement complex (Garson and Walshaw, 1969) consisting of folded and metamorphosed rocks of Precambrian to Lower Paleozoic age, mostly paragneiss, but also including granulites, calcareous gneiss, marble, several types of amphibolite and varieties of mostly migmatitic and anatectic granite.

Intruding the basement complex are rocks of the Chilwa Alkaline Province of Upper Jurassic to Lower Cretaceous age. The major alkaline rocks are a series of overlapping sub-circular intrusions of mainly syenite, some quartz syenite and granite that form the Mulanje Massif, an inselberg (Figure 4) that rises high above the surrounding plains.

The Chambe ring structure is one of several syenite complexes of the Mulanje Massif and is about 8.5 Km across. The outer ring dike syenite(s) form a prominent bare rock rim that encloses a basin about 3.5 km across within which a central syenite plug has recessively weathered to soils that are up to about 15 m thick and contain scattered syenite boulders (Figure 7) , probably residual joint-bounded blocks ("core stones"). Leachable rare earths in these soils are the main target of the upcoming exploration.

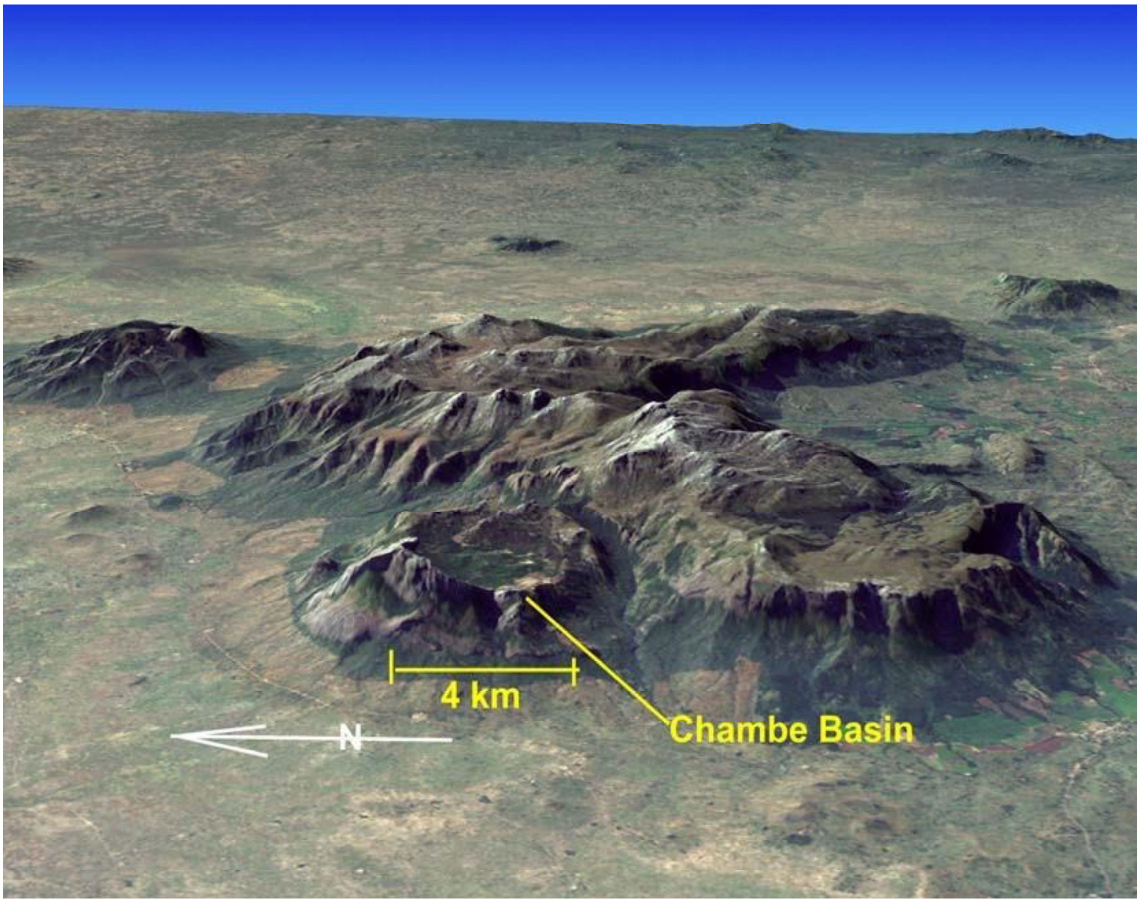

Figure 4: The Mulanje Massif, including Chambe Basin. Source: Landsat image, NASA Earth Observatory Sept 12, 2004

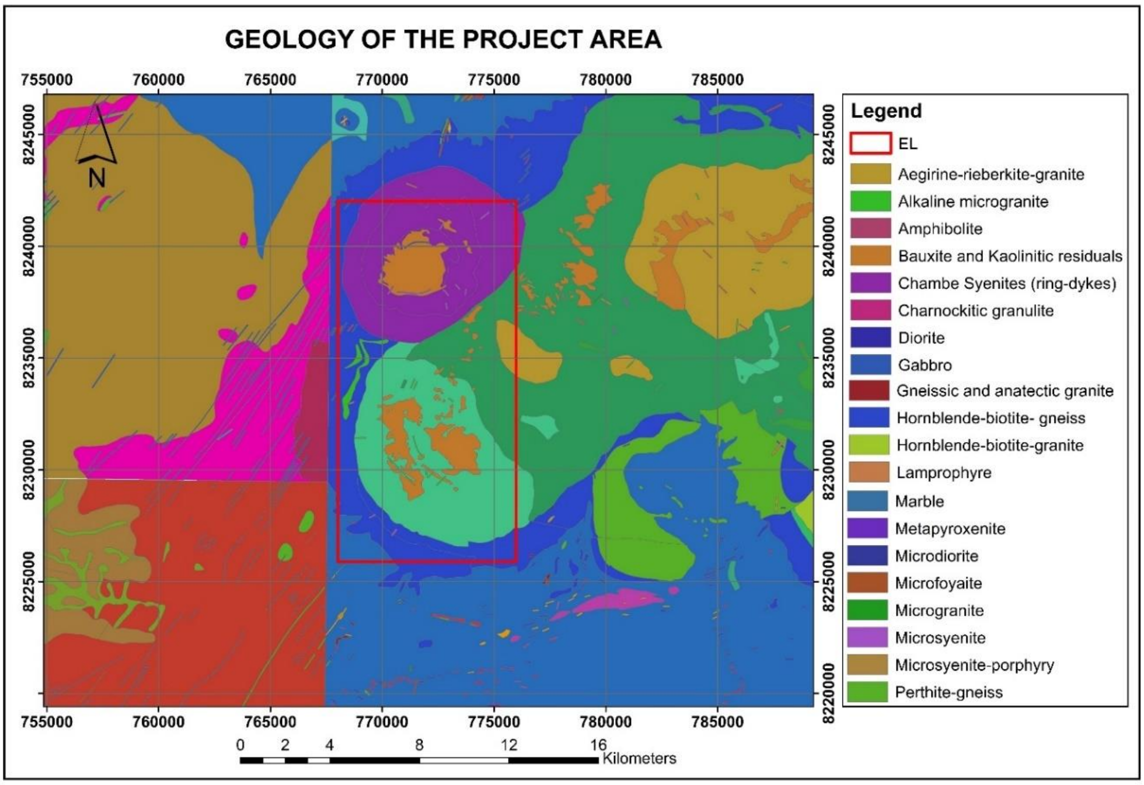

Figure 5 : geological map of the Mulanje Massif

5.0 Summary of the Exploration plan

The company has an exploration program which has been planned to commence after being granted the EL. The activities will include a reconnaissance survey, rock chip and soil sampling, detailed survey that will involve drilling and trenching, geochemical analysis, and data analysis.

Basing on the background of the geological exploration activities that Spring stone Ltd. carried out in the past years, some of the activities will either be skipped or thoroughly re done depending on the availability of data and also by considering the environmental issues that might negatively affect the environment for example situations that will involve the cutting down of trees.

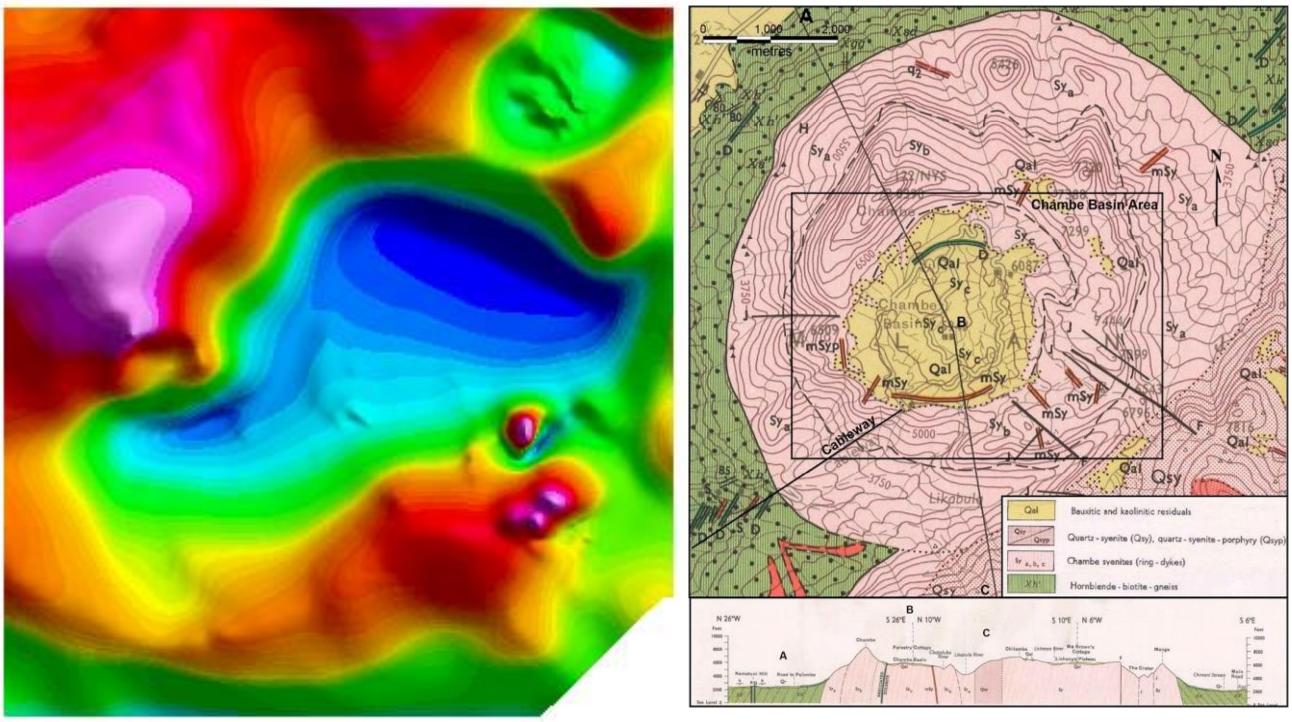

Figure 6: Total magnetic map and general geology of the chamber basin

Figure 6 a is a magnetic map of the chambe basin area. According to the total magnetic map the chamber basin is characterized by low magnetic anomaly. This low anomaly reflects the kaolinitic clays and synites. Our exploration will focus on these low magnetic areas.

6.0 Exploration plan

Exploration at chamber will comprise of the following:

6.1 Outcrop Sampling

AMR will collect outcrop samples from within the project area. These will be predominantly peralkaline intrusive rocks associated with low magnetic anomalies. The locations of the outcrop samples will be marked using handheld GPS.

6.2 Soil Sampling (systematic drilling exercise)

Soil sampling will be done by systematic drilling of the soils. Chambe hill is characterized by low magnetic anomalies in the basin. The magnetic anomaly clearly shows that there is something that is giving those low magnetic signatures. The low magnetic anomaly coincides with clays that host rare earth elements (Figure 7). We will therefore sample these clays in the basin. Shallow, vertical holes will be drilled through the basin drilling soils only. Systematic drilling will be employed to determine the thickness of ionic clay regolith within the project area where 200 holes will be made at 25 meters interval each with a diameter of 6cm and a maximum depth of 50 meters or when we reach the bedrock. Proposed drill locations are shown in figure 8. Drilling will be done using two hand-portable drills rig (Banka drill rig) and the diesel-powered YBM-05 drill rig (Figure 9). Drilling will be mostly be dry to prevent ground water contamination. Chemicals will not be used and holes will be backfilled to have minimal disturbance of the environment. Prior to setting up drilling equipment and other earthmoving activities, positioning of the drill holes will be done by AMR geologist using a handheld GPS receiver whose waypoints will be marked by pegs made prominent by use of reflective tape and bright spray paint.

Concurrent to this, observations will be made on each drill hole to ensure proper alignment of the drill rig.

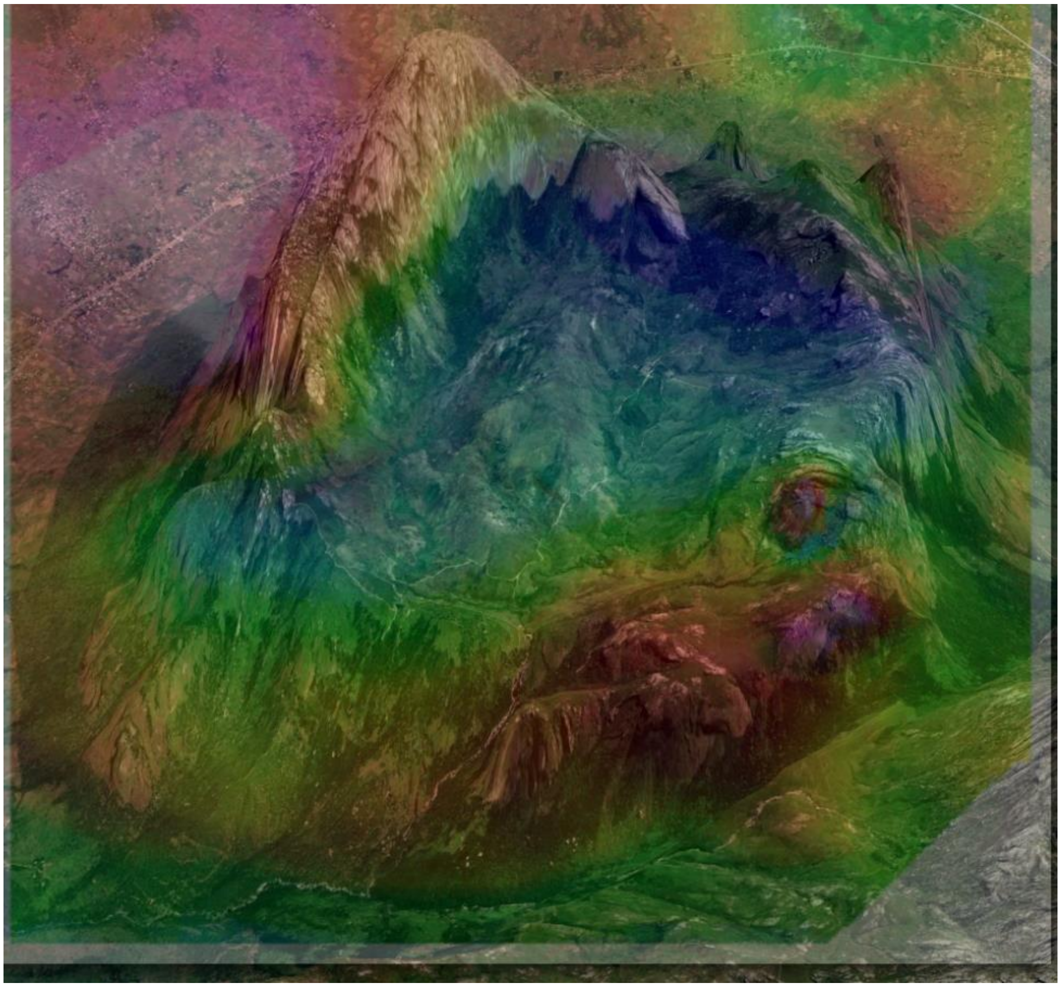

Figure 7. Google earth map fused with total magnetic map. Chambe basin, clays in the basin charecterised by low magnetic signatures.

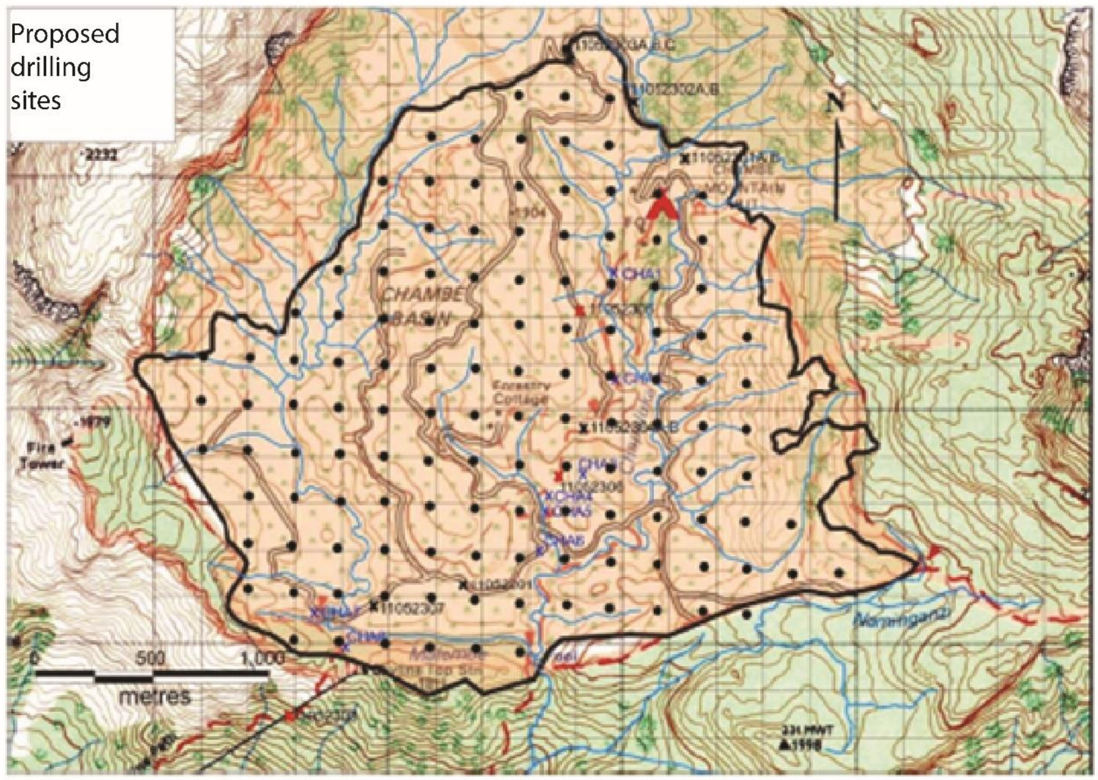

Figure 8 proposed drill sites at chamber basin

Figure 9 Banka drill rig and the diesel-powered YBM-05 drill rig respectively

6.3 Core Logging and Sampling Procedures

AMR geologist will continuously monitor the core drilling exercise to ensure continuous extraction of the core and ensure that the core is marked at each meter interval while observing the mineral associations and contacts in the vertical drill holes. Upon extraction the drill cores will be moved to a tray. The onsite drill core observations like grain size, colour, rock type, etc with their corresponding drill hole IDs, timestamp and depth intervals (from-to) will be done. This will be augmented with onsite handheld XRF semi-quantitative measurements and the data will be sent to AMR offices in spreadsheet format for visualization and comparison with impending ICP-MS/OES analyses while keeping the original copy on file for audits.

Once drilled the core will be placed in wooden core boxes and wooden depth markers will be inserted. Prior to being manually transported from the drill-site to the field camp, the boxes will be sealed with a plywood lid to prevent core displacement. Once at the field camp sample preparation facility, the core will be logged and photographed by AMR geologists and marked-up for sampling.

6.4 Pitting and Trenching

AMR will excavate a total of 20 pits for the purposes of assessing regolith hosted REE mineralisation. These samples will mainly be used for leaching tests. The pits will be excavated manually. They will be vertical pits typically 1 m by 1 m with a vertical depth of up to 10m. Ideally the pits will be excavated to bedrock. However, for safety reasons the pits will not be excavated deeper than 10 m. All of the pits will be backfilled as soon as geological observations, density measurements, moisture readings and sampling are completed.

6.5 Pit Logging and Sampling Procedures

Once a pit is excavated, the sampling methodology will involve marking out the samples on the same wall of each pit at 1.0 m intervals. Samples will be collected from the lowermost interval first to minimise contamination. Collection of the samples will involve using the pointed end of a rock pick or machete to create a continuous vertical channel with the displaced material collected in a bucket or a polythene sample bag with an average sample weight of 1.8 kg. A unique, predefined sample tag will then be placed into the bag and the bag closed with a plastic cable tie. Once bagged, the samples will manually be carried to the field camp. Once the sample arrives at the field camp preparation site, the density of the sample will be weighed once more to validate the humid weight before drying. As the density sample is dried in ovens, it is weighed at regular intervals to ensure that the sample is completely dry without the causing dehydration of mineralogical volatiles.

7.0 Sample Quality Assurance and Quality Control (QAQC)

AMR will implement their own Quality Assurance and Quality Control (QAQC) procedure, to validate the sample results, whereby one blank, one standard and one duplicate material will be inserted within every 35 samples. Duplicate samples will also be used to provide a measure of the entire error of sampling. They will be collected, prepared and assayed in the same method as the originals to test for analytical precision at the laboratory.

8.0 Sample Preparation And Analysis

8.1 Rock Samples - Bedrock Intersections

1. The samples will be crushed to minus 2 mm using a jaw crusher. After each sample, blank material (locally sourced gneiss material) will be crushed and the equipment cleaned with compressed air and a vacuum cleaner in order to minimise sample contamination.

2. The crushed samples will then be split twice using a riffle splitter in order to produce a quarter of the sample. Of this homogenised material, 250 g to 350 g will be collected using a plastic scoop and bagged for analysis. Sample numbers will be written onto the polythene sample bags with permanent marker pen and an aluminium tag inscribed with the sample number is also placed into the bag.

8.2 Drill Core Samples - Regolith Intersections

1 Due to its consistency, the core will be split in half using a geological hammer;

2. The samples will then be weighed (inclusive of moisture) and emptied into stainless steel bowls in preparation for drying;

3. The samples will then be dried in a gas oven at a temperature of 135°C for four to eight hours, depending on the moisture content of the samples;

4. Once dried, the samples will be re-weighed and the weight recorded;

5. If the dried samples are observed to contain any rock fragments, they will be crushed to minus 2 mm using a jaw crusher. After each sample, blank material will be crushed, and the equipment will be cleaned with compressed air and a vacuum cleaner in order to minimise contamination.

6. If the dried samples contain no rock fragments, they will manually be pulverised in the stainless steel bowls using a large wooden pestle;

7. The crushed samples will then be split twice using a riffle splitter in order to produce a quarter of the sample. Of this homogenised material, 250 g to 350 g will be collected using a plastic scoop and bagged for analysis. Sample numbers will be written onto the polythene sample bags with permanent marker pen and an aluminium tag inscribed with the sample number is also placed into the bag.

The remaining coarse reject material will be retained and stored at the AMR sample preparation facility.

8.3 Trench and Pit Samples

1. The samples will be weighed (inclusive of moisture) and emptied into stainless steel bowls in preparation for drying;

2. The samples will then be dried in a gas oven at a temperature of 135°C for four to eight hours, depending on the moisture content of the samples;

3. Once dried, the samples will be re-weighed and the weight recorded;

4. If the dried samples are observed to contain any rock fragments, they will be crushed to minus 2 mm using a jaw crusher;

5. If the dried samples contain no rock fragments, they will manually be pulverised in the stainless steel bowls using a large wooden pestle;

6. The crushed samples will then be split twice using a riffle splitter in order to produce a quarter of the sample. Of this homogenised material, 250 g to 350 g will be collected using a plastic scoop and bagged for analysis. Sample numbers will be written onto the polythene

sample bags with permanent marker pen and an aluminium tag inscribed with the sample number will also be placed into the bag.

9.0 Analytical Method

The soils will be pulverized to 85% -75 microns. Samples will be analysed for for total REE (La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu Y etc) using Inductively Coupled Mass Spectrometry (ICP-MS). This method will involve fusing the sample to a glass with Li tetraborate, dissolution in acids and analysis by ICP-MS and is intended to break down refractory minerals and provide total contents of the elements analyzed.

Furthermore splits of the samples will be dried at 105° C for 24 hours, ground to 2 mm, and 50 g will be leached in 500 mg of 2% ammonium sulphate for 6 hours. The leach liquor will be separated by centrifuge and analyzed by ICP-MS and by ICP-AES,

9.1 Leaching Tests:

Batch leaching tests will be performed to assess the recoverability of the REE. 50 g of dry sample material will be added to 100 mL of leaching agent (i.e. Solids/Liquids = 1/2) in 250 mL Erlenmeyer flasks plugged with rubber stoppers. The flasks will be equipped with Teflon-coated stirring bars and placed on a stirring magnetic plate for 30 minutes, to ensure solid suspension. At the end of the experiment, the solids will be separated by filtration, washed with distilled water of pH 5 and denaturated alcohol, dried in the fume hood under ambient temperature and pressure, weighted and stored for further analysis (by aqua regia digestion and ICP-MS).

10.0 Mineral Resource Estimates

Based on the exploration outcome, if the exploration is promising, mineral resource estimate modelling will be completed in Genesis software and geostatistics will be completed in Geostat+. The methodologies that will be used for modelling and grade interpolation will be according to industry standards and with the development of methods specifically for the geometry of the deposit in question. The most frequent method for resource modelling is by sectional interpretation to create a 3D model of the deposit. The following steps will be followed for the resource estimation:

- Reception of the data and visits
- Validation of the drill hole database
- Selection of the mineralized intervals for each drill hole for each layer
- Selection of the topography surface to be used for the model
- Creation of volume models of the layers in 2D (2D XY model including thickness and Z position)
- Variogram modeling in 2D for 19 variables for each layer
- Conversion in 3D block model to use in Genesis software (3D XYZ model with PED and SAP tags)
- Estimation of the grades for 19 variables for each layer in the 3D block model
- Classification of the resource according to drill hole spacing
- Creation of solids within barren areas to constrain the resource
- Validation of the density for each layer and for each prospect (
- Queries on the 3D block model but with cut-off grade applied on the average grade over the total thickness

11.0 Environmental Screening

Akatswiri Mineral Resources is committed when it comes to transparency of its exploration activities. This phase will encompass consultation meetings with various stakeholders to identify potential impacts of the exploration program within Chambe basin and the nearby Nakoya Village. The proponent will see to it that the District Officer of Mulanje, Traditional Authority (T/A), Group village Heads (GVHs), Village Heads (VHs), Likhubula Forestry Office of the Department of Forestry, The Mulanje Mountain Conservation Trust and the surrounding community are engaged.

The proponent is fully aware that Chambe Basin is a water catchment area which lies within Mulanje Mountain Forest Reserve. The catchment area supplies fresh water to the surrounding community. They are several tourist/forest huts within the project area. The area has also had problems with logging of the indigenous Mulanje Cypress and Mexican pine since the early 1900’s.

Understanding the social sensitivity of the local community and the rich biophysical environment in the area the project proponent intends to measure baseline parameters of interest prior any exploration exercise. Water, air and land quality data will have to be measured consistently and compared against the baseline values upon project inception. This is considering the lack of both local and international standards of concentrations of REE in all the above biophysical components (Balaram, 2019). Under this constraint the proponent intends to use peer reviewed literature to model potential biophysical implications of any significant fluctuations in the concentrations.

Regardless of the hindrances to modelling the critical concentrations of REEs the proponent intends to control dust emissions to reduce atmospheric, hydrological and land pollution by controlling dust, avoiding discharge of adsorbed regolith slurry into aquifers land resources.

12.0 Reporting

Quarterly stakeholder reports will be produced to inform relevant stakeholders on the progress of the project. These stakeholders include the Mulanje District Council, Department of Mines and the Environmental Affairs Department. Geotechnical reports will also be made and can be provided on request from AMR in Zomba among other records, the geotechnical reports will include a comprehensive database of the drill profile, its 3D model and the results of each REE analysis phase.

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