

**ERITREA**

**MINING**

**Journal**

**ASMARA MINING CONFERENCE 2013**

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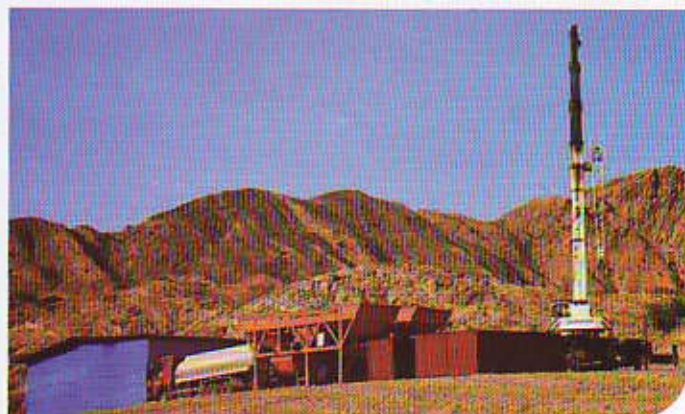
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## table of CONTENTS

- 3 Eritrea in Brief
- 5 Mineral Licensing System
- 6 Mining and Exploration  
Activities
- 8 Geology of Eritrea
- 13 Company Profiles



# // Editor's NOTE

**T**he convening of the Asmara Mining Conference, which is now a fixture in the industry's calendar, is an historic occasion in the development of the region's mining industry. Asmara GeoCongress 2010 was meticulously organized and well-attended. Likewise in 2011 and 2012 professionals, exploration companies and delegates representing public entities from Sudan, South Sudan, Yemen and Saudi Arabia have participated. Almost all Eritrean professionals have been able to attend the two days technical sessions, where a wide range of themes: related to potential opportunities for mining development in Eritrea as well as in the Arabian-Nubian Shield countries, geochemical and geophysical methods of investigation, mine financing projects in Africa, potash and its exploration and environmental issues have been covered. A wide range of issues related to the Mining Industry have been raised and discussed during the panel discussion.

Asmara Mining Conference 2012 was held at a time when we are facing the realities of the unjustifiable sanctions imposed on Eritrea. Nevertheless, the sector continued to develop.

In 2013 Bisha managed to successfully continue its commercial gold production (phase I) as well as develop and commence phase II commercial copper production. Zara Mining Sh.Co is focused on developing the Koka Gold Deposit into a low cost open-pit gold mine which is expected to produce 104,000

ounces of gold per year over a 7 year mine life. Sunridge has completed a bankable feasibility study for the three projects north of Asmara (Emba Derho, Adi Nefas and Gupo gold) in May 2013. This study considers the benefits of using a centralized operating facility at Emba Derho and weighs the concept of processing the ore from Debarwa deposit at this same centralized plant. South Boulder Mines is working on the completion of a definitive feasibility study, Social and Environmental studies and Resource recalculation for the Colluli Potash Deposit.

2013 has being a difficult year for many exploration and mining companies. The Ministry of Energy and Mines is prepared to take the necessary practical steps to weather the current financial storm and remain competitive and prepare for future challenges.

It's been two years since the dynamics of the Eritrean mining sector has imparted a change on the title of the conference, from Asmara GeoCongress to Asmara Mining Conference. Having organized a successful Geocongress two years ago, more and more people have shown interest to participate. During October 2013 there will be two days of presentations and discussions and followed by an exhibition. There will also be a one day visit to Bisha mine and advanced exploration sites and two days excursion to the pristine waters of the Red Sea Coast including a train ride verging on a time travel to the past.

This Journal is dedicated to acquaint you with the general geology, known types and areas of mineralization and the investment opportunities and environment of Eritrea. It is our intention to improve the Journal in terms of quality and content and hence look forward to your suggestions on how we can do better in 2014.

We hope, trust and very much look forward to you joining us in our shared journey of turning challenges into opportunities.

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**In this Journal, the representation of political boundaries should not be taken as authoritative.**



**The State of Eritrea  
Ministry of Energy and Mines  
Tel:- 291-1-116247  
Fax:- 291-1-127652  
P.O.Box - 5285  
Asmara, Eritrea  
Department of Mines  
Tel:- 291-1-202889  
Fax:- 291-1-124509  
P.O.Box - 272  
Asmara, Eritrea**

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## //ERITREA in brief

Soon after independence in May 1993, the government of Eritrea has been engaged in rehabilitating the war-torn economy and improving the standard of living of the people.

It created a conducive environment for the active participation of local and foreign private investors. However, since May 1998 the development of this young state has been severely curtailed by the border dispute with neighboring Ethiopia. Despite this, the Eritrean people and Government are as resolute as ever in their commitment and endeavor to work together to rebuild their country's economy, and to secure social and economic progress. The outcome of the hard work is now being realized by the emergence of a prospective country in the region. The main sectors and sub-sectors of the Eritrean economy that offer good investment opportunities and prospects for generating rapid and sustainable economic growth and development are (i) agriculture & agro-processing, (ii) fisheries and fish processing and marketing, (iii) tourism and related hospitality services, (iv) alternate energy resources (oil, gas, wind, geothermal, solar and biomass) development and conservation, (v) mining of precious, industrial and construction minerals, (vi) light fabrication and manufacturing, (vii) construction of housing and basic infrastructure, (viii) transport and communications services, (ix) domestic and foreign trade expansion and (x) deepening of banking and other financial services. These ten sectors and subsectors,

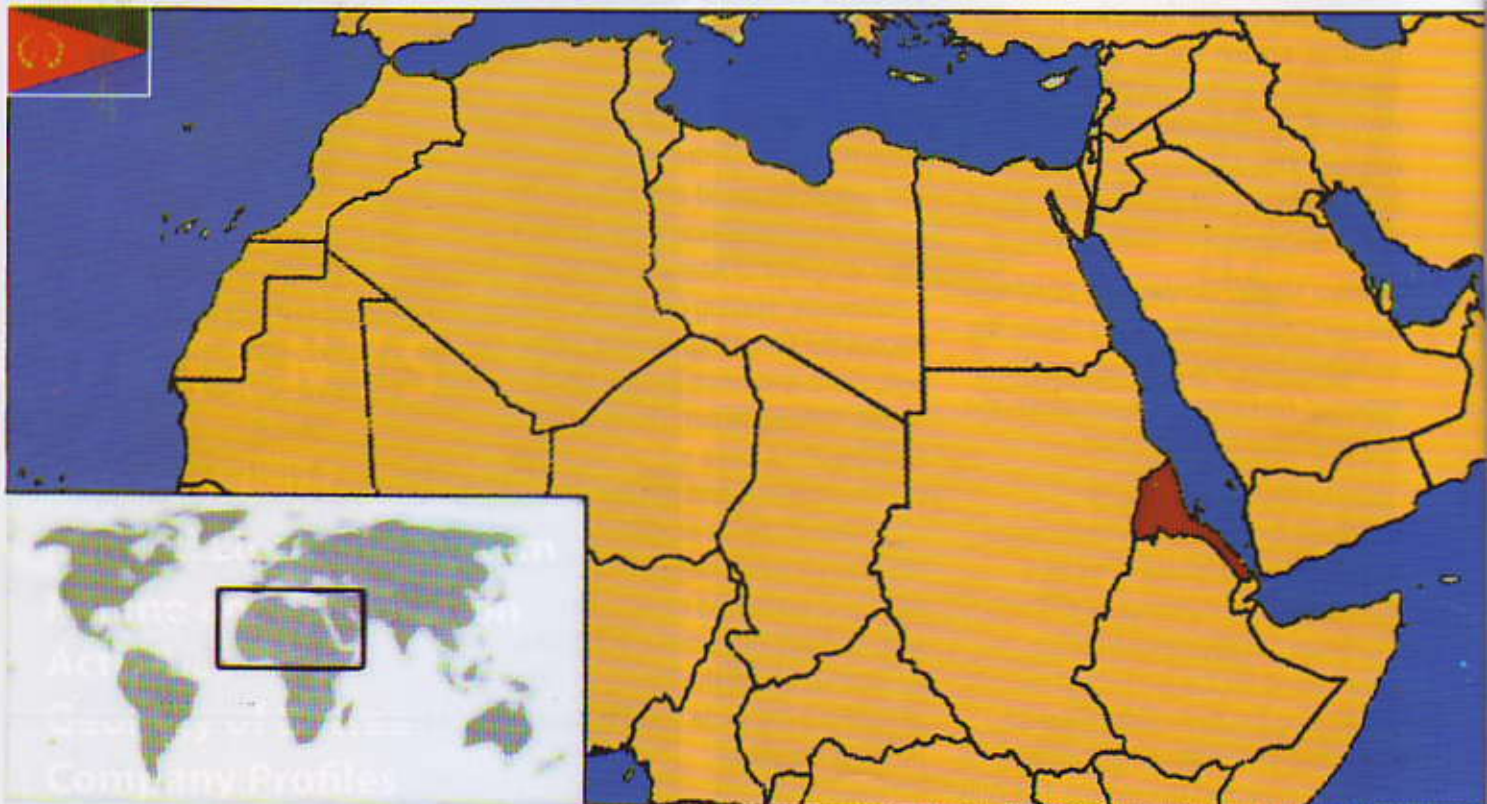
in combination, could offer significant and attractive opportunities for establishing viable public-private investment partnerships to generate rapid economic growth and development.

On the other hand a number of countries have attained economic growth making their mineral endowment as the primary driver of the economy. This primary driver serves as a stimulus to the growth of other sectors of the economy, leading to the overall growth of the National economy. Then at higher level the economy diversifies into secondary and tertiary sectors.

Whilst the actual contribution for each country varies, countries with well-developed mining sectors have derived enormous economic benefits.

The Eritrean Government recognizes that mineral resources can greatly contribute to a nation's economy. The economic benefits of mining are also reflected in the contribution to foreign exchange earnings.

Although recently there is downturn in the World economic climate nevertheless the international boom in metal prices has been a major incentive for new mining investments in Eritrea. As a result Eritrea is now an important destination for investment in mining and by 2016 it is expected that Eritrea will have four mining operations. The Bisha mine is well underway, which will be followed by Zara, Debarwa and Colluli potash mines.



The Ministry of Energy and Mines (MoEM, the Ministry) is the authorized Licensing Agency and is responsible for the administration, regulation and coordination of all types of activities in the energy and mining sectors of Eritrea. Within the Ministry the Department of Mines (DoM) is entrusted with managing the mineral sector and encompasses the Geological Survey (EGS), Mineral Resources Development (MRD) and the Mineral Resources Management (MRM) Divisions. A laboratory service is provided by a small unit in the DoM. Following the enactment of the Mining Law in 1995 and issuance of licenses in 1996 the Eritrean mining sector has shown rapid development. Pursuant to recently introduced policy large scale mining operations, exploration and mining, are administered by MRM representing MoEM, while small scale operations owned by local people for construction and industrial minerals are with the Regional Administrations under guidance from MoEM. The major tasks, among others, accomplished by the Ministry in the mineral sector through its subordinates are promotion of the sector, issuing of licenses and monitoring of compliance. The Ministry has been developing a national minerals database. It has a responsibility to provide preliminary information to exploration companies interested in conducting detailed investigations in Eritrea, and to make contribution towards enriching the geological database of the country. In line with this there are now five 1:250,000 scale geologic maps some of which are not published. 1:1,000,000 scale geologic map covering the whole country, has recently been prepared. Several major and junior exploration companies have been involved in assessing and exploring the mineral potential of the country since the first round of licensing took in 1996. Upon receipt of applications accompanied by proposals, from exploration companies, the MRM reviews the adequacy of proposals, competency of applying party, appropriateness of the work program and expenditure commitment, safety and environmental issues and provides recommendation for issuance of license. The MRM also controls and supervises exploration and mining activities to ensure that companies are working in line with the agreements signed and the directives/ guidelines issued by the Ministry. Most importantly, monitoring is done to ensure mining operations are operated in a sustainable way in adherence to international accepted practices. The EGS, as a research wing of DoM, on the other hand carries out geological mapping and mineral exploration programs by itself and in collaboration with foreign governmental agencies and international organizations.

## Highlight of activities in the last few years include:

- Following a performance based evaluation up to the present;
- Conversion to Exploration and ordinary as well as extraordinary extensions of licenses were issued by MoEM
- Two deposits were converted to a mining license.
- The Nefasit and Fanco-Guluj licenses of Eri-Lib Mining Sh.Co. and the Kerkebet license of Sanu Resources were revoked.
- NGEEx Resources has relinquished the Bada potash, Lealit and Shikula licenses.
- After Zara Mining Sh. Co. acquired the Zara project, Keren Mining transferred its Mogoraib and Hurum properties to Sub- Sahara Resources.
- The EGS and the Geological survey of Iceland conducted a detailed geophysical survey consisting of Magnetotelluric (MT) and transient Electromagnetic (TEM) over the Alid geothermal prospect. The results of this survey indicate a good geothermal potential in the area.
- The first draft Regional Geological Map of Eritrea, at 1:1,000,000 scale has being finalized and is ready for distribution. In addition other geological maps at 1:250,000 scale were also produced for specific areas.
- Based on technical co-operation agreement with the China Geological Survey, geochemical exploration and mapping work have been conducted in southern Eritrea.

## MINING LAW

The legal framework governing the conduct of all mining and related operations within the territory of Eritrea is embodied in a Mining Law comprising of Minerals Proclamation No 68/1995, Mineral Proclamation 165/2011, Mining Income Tax Proclamation No. 69/1995 and Regulations on Mining Operations Legal Notice No. 19/1995.

Key Policy issues upon which the Mining Law is based include:

- All mineral resources in Eritrea are public property. The State has a duty to ensure the conservation and sustainable development of these resources for the benefit of the people;
- The intention is to create a favorable atmosphere for foreign investment in the mining sector. Due recognition is made of the significant role that foreign

investment and skills can play in the development of this sector and the capital intensive, long term, and risky nature of mining investments;

- The necessity for formulating regulations which ensure protection of the natural environment, together with sustainable development of the country's mineral resources, in accordance with sound principles of resource management and land use; The Eritrean Mining Law is up-to-date, attractive and competitive, as it provides considerable benefits and incentives to investors. For example, the law provides for:
  1. - The right to exploit any commercial discoveries made pursuant to a valid exploration license;
  2. - The right to sell locally or export, free of all duties and taxes and without being required to obtain any other authorization or permission from any other Government agency, all minerals produced pursuant to a mining license;
- A simple and fair taxation system which recognises the risky nature of mining investments, and hence allows:
- Accelerated depreciation (straight line method over 4

- years) of all capital and reproduction costs;
- Write-offs of exploration expenditure incurred anywhere in the country;
- The carrying forward of losses;
- A generous reinvestment deduction (5% of gross income);
- No dividend tax;
- A nominal rate of import duty (0.5%) on all inputs necessary for mining operations;
- Normal royalty rates as well as an option for the reduction, suspension or waiver of the royalty in appropriate circumstances;
- Equitable foreign exchange regulations permitting;
- Free and unrestricted repatriation of earnings;
- Retention of a portion of foreign currency earnings abroad in external accounts;
- Maintenance of foreign currency accounts in banks in Eritrea.
- A simple "one-stop" licensing system enabling all the formalities for all types of licenses for mining operations to be completed by a single Government agency, the Ministry of Energy and Mines.

## The Mineral Licensing System

The Mining Law permits the following types of licenses as shown below

maximum area that a single license can cover is fixed (see Table above) the Ministry allows multiple contiguous licenses under one license agreement.

License Type	License Fee (Per Licence) US\$ (approx.)	Annual Rentals (Per Km2) US\$ (approx.)	Initial Period (Years)	Renewal	Max. Area (km2)
Prospecting	80	8	1	None	100
Exploration	240	32	3	2 (1+1)	50
Mining	960	96	20	10+10+10	10

All of these licenses are exclusive and grant their holders an automatic right to obtain an Exploration License from within a Prospecting License and a Mining License from an Exploration License, subject to the fulfillment of the obligations under the preceding license. In exploration a 25% reduction of the original area has to be made at each renewal year. If after the initial three years and the subsequent ordinary extension of two years there is a strong justification to continue exploration the MoEM has a discretionary power to give extraordinary extensions. While this can reasonably continue until the license is converted to mining the Ministry has the right to reject extensions based on performance evaluation. Although the

Applications for any of these licenses may be made by individuals or legal entities of any nationality. All applications are to be made on specified forms that can be obtained from the DoM and must be accompanied by a non refundable processing (registration) fee of US\$1 per page of each application and the supporting documentation presented. Successful applicants are also subject to a payment of license fees and the first year's rental upon the issue of a license. The rate of these fees is governed by Regulation (as shown in the Table above).

# //MINING AND EXPLORATION

## A C T I V I T I E S



### Mining and Development-Stage Companies

#### Bisha Mining Share Co

**(BMSC)** is a mining company formed by a joint venture agreement between Eritrea's National Mining Corp. (ENAMCO) and Canada's Nevsun Resources Ltd. BMSC managed to successfully start and operate the first modern mine in Eritrea. The Bisha Mining Share Company transitions from a Gold producer to that of a major Copper producer in the 3rd Quarter of 2013.

#### Zara Mining Share Company

**(ZMSC)** The Koka gold deposit, located within the Zara Project area of northern Eritrea is being developed by the Zara Mining Share Company (ZMSC), a Joint Venture between ENAMCO and the SFECO Group (SFECO), a subsidiary of Shanghai Construction Group. SFECO is also the EPC contractor for the project. The Koka Gold Deposit hosts a JORC and NI 43-101 compliant Probable Mineral Reserve of 4.6 million tonnes grading 5.1 g/t gold, containing 760,000 ounces. The Company is focused on developing the Koka Gold Deposit into a low cost open-pit gold mine which is expected to produce 104,000 ounces of gold per year over a 7 year mine life at an average cash cost of US\$ 338/oz gold.

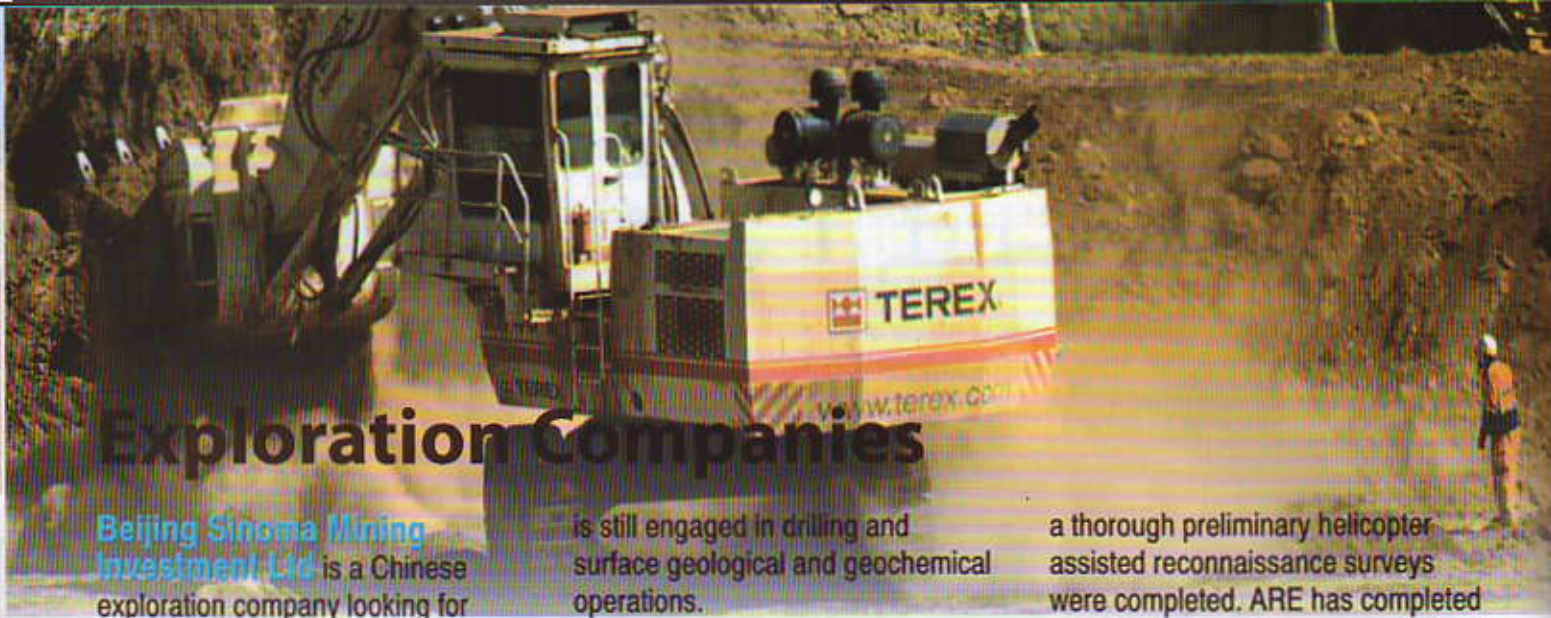
#### Sunridge Gold Corp.(SGC/

**TSX)** is a Canadian, mineral exploration and development company engaged in exploration and development of base and precious metal deposits partially surrounding Asmara. Sunridge has now shifted to the development phase of the 4 deposits on the Asmara Project, which contains significant amounts of copper, zinc, gold, and silver, with the completion of a bankable feasibility Study in May 2103. . The Study demonstrates that the mining of all four advanced deposits that make up the Asmara Project (Emba Derho, Adi Nefas, Gupo Gold and Debarwa) and processing of the ore near the large Emba Derho deposit is economically robust.

#### STB Eritrea Pty. Ltd. (ASX,

**STB)** is a subsidiary of South Boulder Mines Ltd., a junior Australian exploration company and is successfully promoting the potash resources of Colluli in Danakil area. A JORC/43-101 compliant resource has been established totaling 1.08Bt @ 18% KCl with total contained potash of 194Mt. Definitive Feasibility Study (DFS), which is expected to be completed in 2013, will consider mining and processing the Carnallite and Kainite layers.





## Exploration Companies

**Beijing Sinoma Mining Investment Ltd.** is a Chinese exploration company looking for potash deposit in Dengel area immediately west of Colluli. This year, fifteen holes the total depth of which is 1393 meters have been drilled and five of the fifteen holes have intersected potash.

**Andiamo Exploration Ltd.** is a junior UK based exploration company that has been actively engaged in regional, as well as detailed exploration based on geological mapping, using state of the art airborne geophysical survey, ground IP and gravity geophysical surveys, satellite image interpretation and rock chip and soil sampling along with drilling in the Haykota area since 2009. The company identified more than 20 potential VMS target areas including 15 targets for gold exploration.

**Land Energy Group (China) Ltd.** is a Chinese exploration company that is looking for gold and base metal deposits in Gogne area. The area extends from Gogne north to Tekawda, south of Bisha mine.

**Shandong Mining development Eritrea Ltd.** is a Chinese company operating in Dekemhare region. The company has been undergoing detailed geological mapping and geochemical sampling and produced targets. since February 2013, it has been drilling several targets. The company has intersected a 6.7 meters zone with good copper and gold values in Alar area in 2 holes out of four holes. The company

is still engaged in drilling and surface geological and geochemical operations.

**London Africa Ltd.** is a British private exploration company that has an exploration right on the 876km<sup>2</sup> Akordat-Orota licence in the Gash Barka region of western Eritrea. The license was originally granted in July 2010 for an initial three year period. The company discovered a VMS system over at least 2 km of strike following recent drilling at Kofot-Gerger intersecting sulphide mineralisation (semi-massive, stringer and disseminated)

**Subsahara Resources (Eritrea) Pty Ltd :** The 550 sq km Mogoraib North Exploration Licence, granted in January 2011, lies approximately 10 kilometres north of the Bisha polymetallic Volcanic-hosted Massive Sulphide (VHMS) deposit. The volcano-sedimentary rocks hosting the Bisha deposit extend northwards beneath the Mogoraib North EL (Fig 2) and drilling of prioritised basement conductors (58 drillholes for 10,457m) identified by an airborne electromagnetic survey resulted in the intersection of volcanogenic massive sulphide to the west of the Mogoraib River.

**Adobha Resources (Eritrea) Pty Ltd.,** a wholly owned subsidiary of **Gippsland Ltd,** is an Australian junior exploration company. It has two contiguous exploration licenses in the Adobha area in northern Eritrea with 2,200km<sup>2</sup> combined surface areas. Both licenses were converted from prospecting after

a thorough preliminary helicopter-assisted reconnaissance surveys were completed. ARE has completed a 5,161 line/km airborne geophysical survey over the Adobha and Gerasi South ELs covering 19 target areas selected on the basis of TM anomalies, geological interpretation, and geochemical anomalies.

**China Africa Huakan Investment Co.** has exploration licenses in Seroa, north of Keren, and Mensura area granted in 2009 and 2011 respectively.

**Zhong Chang Mining Co. Ltd.** is a Chinese company undergoing an exploration work in Mai-Mine area.

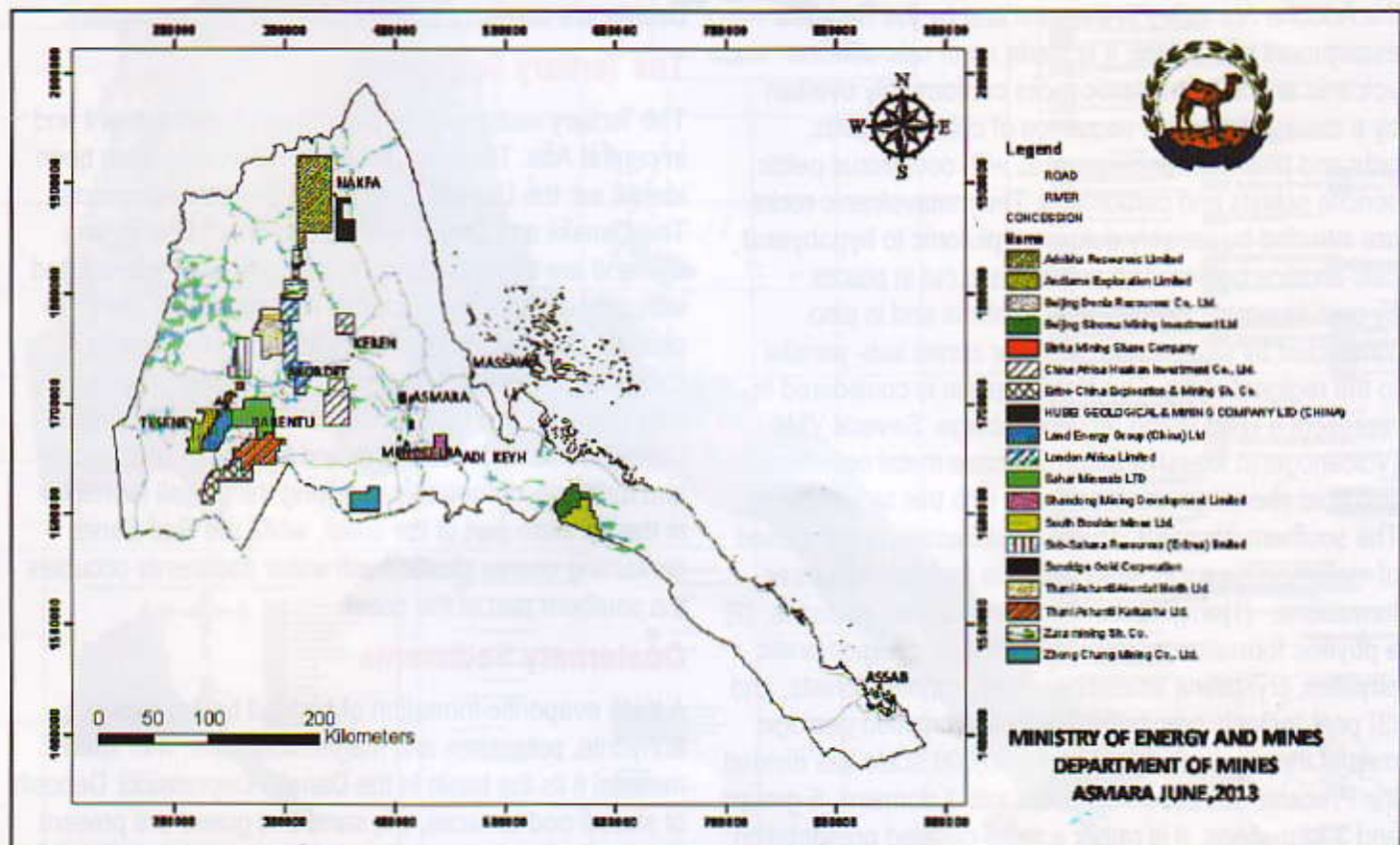
**Thani-Ashanti Akordat North Ltd. and Thani-Ashanti Kerkasha Ltd.** Are two independently registered exploration companies representing the Thani Ashanti of UAE, a recently-formed Strategic Alliance between AngloGold Ashanti and Thani Investment. The area of operation is in the Gash Barka region with partly extension of Akordat North license to the Anseba Region, making a total of 1863 km<sup>2</sup>.

**Sahar Minerals Ltd.** is a privately owned exploration company established and registered in Bermuda in early 2009. The company secured the Tambera Prospecting License in Eritrea on the 10 January 2013. The License has untested Artisanal mining areas and is ~15kms southeast of the gold rich 'Bisha' volcanogenic massive sulphide (VMS) deposit.

*For details see the company profile in the later pages of this journal*



# GEOLOGY OF ERITREA



The geological set up of Eritrea is made up of Precambrian basement rocks that are overlain unconformably by predominantly Mesozoic sedimentary rocks and Tertiary to Quaternary volcanic and sedimentary rocks.

## Precambrian Basement Rocks

Basement rocks in Eritrea cover more than 60% of the surface of the country. The basement rocks of Eritrea are part of the Arabian Nubian Shield (ANS) which are exposed in north east Africa (Egypt, Sudan, Eritrea, and Ethiopia) and in Saudi Arabia, northern and northwestern parts of Yemen and part of the western Middle East. The shield is believed to represent a mega suture between East and West Gondwana. Archean and Paleoproterozoic continental crust rocks make the older components of the shield and occupy a very small part of the basement rocks and the major part of the shield consists of Neoproterozoic (c. 870- 670 Ma) continental-marginal and juvenile intraoceanic magmatic-arc rocks. In Eritrea, the basement rocks are not well studied despite their high mineral potential. The two geological maps so far completed cover the western part of the country (Geology of Gash River Area) and the southern part of the country (Geology of Mai Dima/Kohain Area). Compilation of geologic maps at 1:250,000 scale has recently been completed for four map sheets. Other study, based largely on satellite image

interpretation aided by limited ground controls, suggest that the rocks can be subdivided into four tectonic blocks or segments, separated by tectonic boundaries. Three of these blocks, the western, central and eastern segments, underlie northern and central Eritrea, whilst the fourth, the Danakil segment, occurs in the southeastern part of the country. The western segment, the Barka Terrain is exposed in the north-western part of the country and underlies the Barka lowlands. It is made up of amphibolite, amphibolitefacies pelitic schists containing kyanite and staurolite, quartzites and marble. The central segment, referred to as the Hagar Terrain, extends from the Barka River up to the Adobha Abi valley in the east, and comprises several large elliptical bodies of various tectonic units that are dominantly composed of oceanic and accretionary wedge materials. Occasionally, layered sequences of chloritic schists are seen, inter-layered with epidotic and chloritic metabasalts, occasional thin and discontinuous marbles, and manganiferous and ferruginous cherts.

The Hagar Terrain displays an east verging thrust contact with the adjacent segment to the east. The Hagar Terrain is known to be prospective for chromite, platinum group elements, nickel, gold and copper mineralization. The eastern segment, the Nakfa Terrain, is bounded by the Adobha Abi valley in the west and by the Red Sea escarpment to the east. It is made up of calc-alkaline volcanic and volcanoclastic rocks conformably overlain by a metasedimentary sequence of chlorite schists, grits and polymict conglomerates with occasional pelitic sericite schists and carbonates. The metavolcanic rocks are intruded by variably deformed plutonic to hypabyssal calc-alkaline bodies. The sequence is cut in places by post-kinematic granites and gabbros and is also transected by several narrow shear zones sub-parallel to the regional strike. The Nakfa Terrain is considered to represent a relict island arc assemblage. Several VMS (Volcanogenic Massive Sulphide) base metal occurrences and gold showings are associated with this tectonic unit. The southern segment, The Danakil Terrain, is composed of metamorphic rocks which may be grouped into three formations:- (1) migmatitic hornblende biotite gneisses; (2) a phyllitic formation consisting of schists, conglomeratic phyllites, crystalline limestones, and graphitic schists; and (3) post-tectonic granitoids. Recently compiled geologic map of the whole country at 1:1,000,000 scale has divided the Precambrian basement rocks into 7 domains, 5 groups and 3 formations. It is rather a more detailed presentation of the rock units of the country.

### **Mesozoic Sediments**

The lower Mesozoic sediments are represented by the Merbet (Adigrat) Sandstone which outcrops in the southern part of the country and in the Danakil area, and is commonly intercalated with siltstones and haematitic layers. It lies unconformably over thin layers of conglomeratic sandstones which, in places, appear to have the characteristics of a glacial deposit.

Overlying the sandstone is the Jurassic Adailo (Antalo) Limestone. This unit is exposed over a large area in the Danakil and is made up of limestones that are compact, partly shelly, fossiliferous and layered. Alternations of quartzitic layers are present in the lower part, whilst towards the upper part the sequence becomes mainly gypsiferous to dolomitic. The Upper Sandstone forms pockets of sandstones that have been preserved from erosion. Commonly this sandstone is medium to coarse grained, light coloured, and dominantly quartzitic but partly conglomeratic.

### **Tertiary Volcanics and Sediments**

The Tertiary volcanics can be divided into three units: (1) the plateau-forming Tertiary basalts that are predominantly olivine basalts with intercalations of intermediate lavas and tuffs; (2) the lower Afar stratified basalts composed

of basaltic lava flows and tuffs that are usually found intercalated with sediments of the Danakil Formation; and (3) the Afar Basalts composed of recent lava flows and volcanic cones, with minor acid to intermediate volcanics, mainly trachytes, rhyolites and ignimbrites. The Tertiary basalts are currently actively exploited for aggregates.

### **The Tertiary Sediments**

The Tertiary sediments lie along the Rift escarpment and in central Afar. Three sedimentary formations have been identified: the Danakil, Dogali and Desset Formations. The Danakil and Dogali Formations are of late Tertiary age and are composed mainly of limestones intercalated with conglomeratic sandstones and siltstones. They are overlain by calcareous sands with coral reefs, partly consisting of pebbles of volcanic origin, and gravels with sand, silt and clay horizons. The Desset Formation comprises sandstones, clays and fine beds of anhydrite and halite unconformably overlying the Dogali formation in the northern part of the coast, while the Red Series containing coarse clastic fresh water sediments occupies the southern part of the coast.

### **Quaternary Sediments**

A thick evaporitic formation of bedded halite, gypsum, anhydrite, potassium and magnesium salts, with shell material fills the basin in the Danakil Depression. Deposits of sheetflood terraces, silt, sand and gravel are present in some locations occasionally covered by wind-blown sands. Basaltic flows and related spatter cones represent Quaternary volcanic activity in the Danakil region.

## **MINERAL POTENTIAL OF ERITREA**

Eritrea has a long history of mining. Despite this modern mining began at the beginning of the 20th century following the Italian colonization of the country. After the Second World War, mining and related operations continued throughout the country, although intermittently. In the early seventies this resulted in the development of the shortlived modern mine at Debarwa, before the independence struggle forced its closure. Eritrea is now known to host significant VMS deposits as well as shear-hosted gold deposits. The first modern mine, Bisha VMS deposit, has started production. Koka project has completed feasibility work and there are other advanced projects and many exploration operations underway. Considering much of the country remains unexplored, these discoveries indicate the high mineral potential of the country. The potential for shear hosted gold deposits is also demonstrated from the recent, gold discovery in Zara, situated along a major shear zone that runs across the country. The country is not well explored. There are many prospective areas still to be discovered. Eritrea possesses a geological setting that is favourable for both precious metals and base metal mineralization, as

## Geological Map of Eritrea

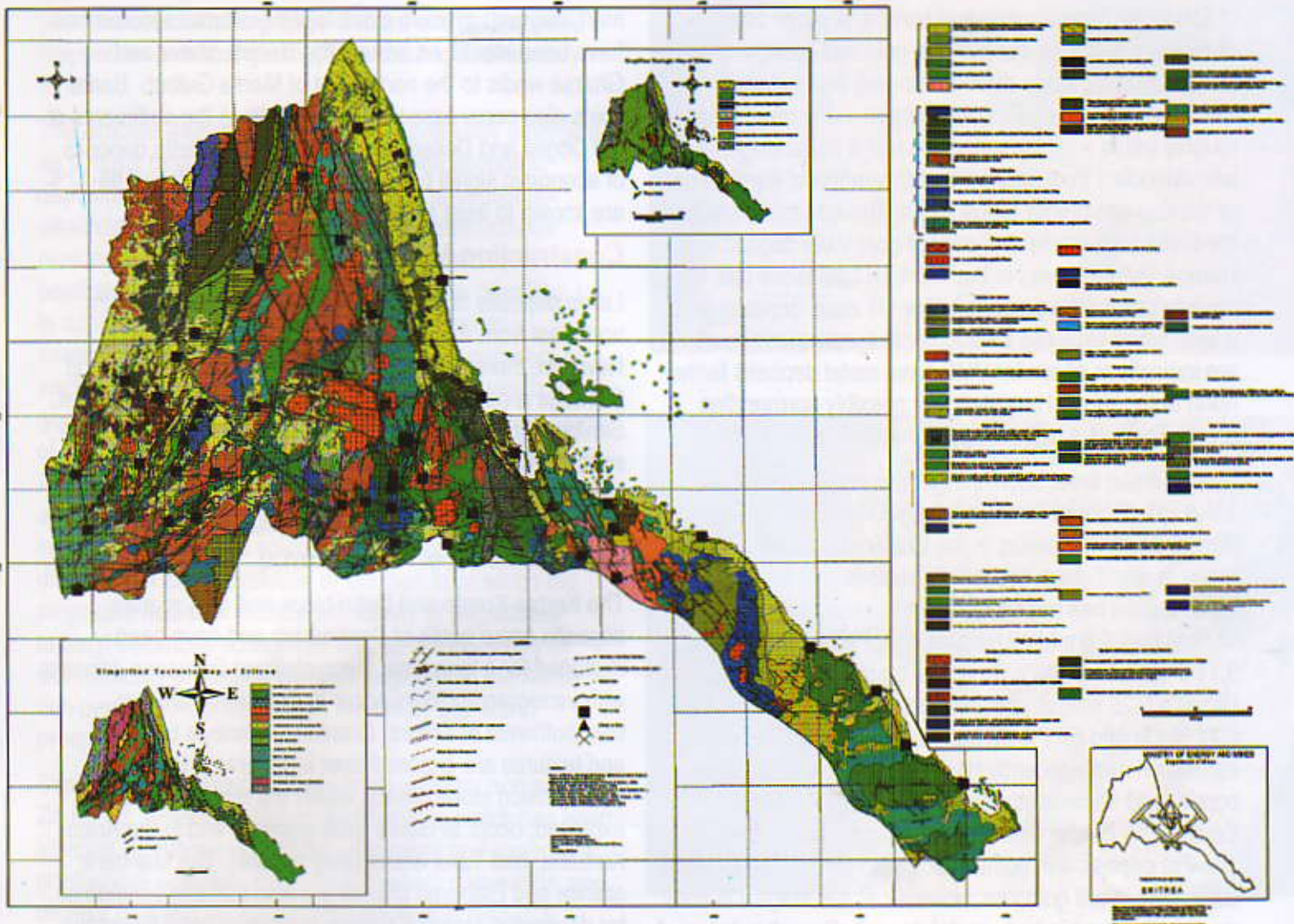


Fig. Geological map of Eritrea

well as for industrial minerals. The range of identified potential deposits covers gold and other precious metals, polymetallic massive sulphide types and quartz vein and quartz stockwork type of deposits. There is an indication for the occurrence of Nickel and chromite deposits associated to the ultrabasic rocks in the far north of the country.

Occurrences of minable potash and sulphur evaporates in the Danakil depression, has now become apparent, and a variety of construction materials, including marble, granite and others in several parts of the country is also well known.

### Gold

Recent exploration activities have proved that gold occurrences are very widespread in many parts of Eritrea and the country has great potential for developing more gold deposits. In addition to the previously known areas of primary gold occurrence in the central highlands (which includes the so called Hamasien gold field), those of Shillalo (in southwestern lowlands) area, and those of southern Eritrea, exploration activity in the last decade has shown the presence of economic gold deposits in the western lowlands and also in the northern part of the

country. The average head grades in most of the historic vein gold mines that were active during the Italian colonial time up to the late 1950s, were reported to be as high as 25 - 45 g/t, with reasonably good recoveries. Eritrea's gold mineralization is usually hosted in quartz veins and stockworks, and in particular in shear zones associated with felsic volcanic rocks, dioritic intrusions and in various schists that are frequently sub-parallel to the strike of the pronounced cleavage of the host rocks. Occurrences of gold within exhalative VMS deposits, and in the weathered and supergene zones overlying them, are becoming more evident with recent additional discoveries of gold in Debarwa and Adi Nefas (in the central highlands), and at Bisha and Harena (in the western lowlands).

Potential for low grade bulk tonnage granite hosted gold mineralizations have been indicated in various parts of the country.

### Base Metal Deposits

NNW to NNE-trending belt of gossans, exhalative cherts and altered felsic rocks that are indicators of massive sulphide mineralization are recorded in many parts of Eritrea. The ores of these massive sulphide deposits are predominantly chalcocite, pyrite with minor amounts

of sphalerite, chalcopyrite and bornite. A major belt of massive sulphide deposit with gold and base metal mineralization passes through Asmara and includes Debarwa, Adi Nefas, Embaderho and many other localities roughly within a 50 km wide belt over a strike length of 250 km, extending from, more than 50 km north of Asmara up to the Eritrean border to the south. The belt that includes the Bisha high-grade zinc-copper-gold VMS deposit and Harena VMS deposits in the Western Lowlands has already proved the presence of world class deposits and is also being explored for additional discoveries. There are indications of similar VMS base metal deposits farther north of Kerkebet, Harabsuit and possibly surrounding areas. There is a belt of copper mineralization in

Raba-Semait area, sulphide-rich gossanous rock in Mt Tullului (Bedeho) in Sahel, northern Eritrea and in Mt Seccar and Sheib areas in the Eastern Lowlands. At Bisha, a world class deposit of precious and base metal VMS deposit has been found. Exploration in Adi Nefas VMS shows 9.0 metres grading 11.91 g/t Au, 285 g/t Ag, 3.18% Cu and 11.05% Zn and in another test drill NG-043-D – 5.25 metres grading 10.81 g/t Au, 239.8 g/t Ag, 6.77% Cu and 6.77% Zn has been obtained. Reserve estimation made recently has shown that minable zinc, copper and associated gold is present in Adi Nefas. Embaderho is now emerging as a large base metals (Cu-Zn) deposit with some associated gold. Resource estimation is still going on, however at this stage it is confirmed that it is a big base metal deposit. Overall in terms of mineral potential assessment and geological work, much of the country remains unexplored, despite the several discoveries that are being made.

### Industrial Minerals

Potash, sylvite and gypsum-bearing evaporates occur at Colluli, south of Bada. South Boulder Mining Ltd, a company looking for Potash deposit in the southeastern margin of the evaporate deposits in Dankalia, have shown their hope to discover Potash deposit in billions of tones. Substantial deposits of gypsum occur at Desset area, north-west of Massawa. Large deposits of common salt also occur at several places along the Red Sea coast. Considerable quantities of high quality silica are found at Merbet, which has been exploited for glass manufacturing. In addition, deposits of silica sand with feldspar occur at various wadis of Eritrea. High purity feldspars occur in pegmatites at Lahazen, 35 kms south of Massawa. Sub economic deposits of mica, which was once exported by the Italians, are found south east of Lahazien. Large deposits of kaolin occur in the lateritic horizon in parts of Teraimni, at Adi Koteio close to Adi Kwala, Adi Keih, Zeghib, Adi Hawusha, Adi Ahderom and west and southwest areas of Himbirti. Extensive deposits of the raw materials for cement manufacture are found at Adailo, close to Tio with all the constituents including limestone,

marl, clay and gypsum close together. Barite occurrences have been identified around the Heneb, Meter and Gharsa wadis to the north west of Mersa Gulbub. Barite veins also occur associated with faults in the sediments of the Dogali and Desset Formations. Other barite deposits of economic significance, with reported grades of 95-97% are known to exist at Debarwa and Ketina.

### Construction Materials

Large deposits of marble occur as belts running north-northeast from Adi Ibrhim south to Gerenfi t areas. However, there are few quarries of Marble in Gogne and Goranda area which are situated at the middle of the belt. Similar belt also occurs further west and runs from Alebu southwards to Guluj. Far, in northern Eritrea, a belt of marble occurs in Adobha Valley area. Other significant marble deposits occur at Afhimbol, Amberbeb, and Mt. Kuruku (in the upper valley of Barka).

The Kertse-Komte and Debri black and gray marble deposits occur south of Decamhare and have been exploited for a long time. Recrystallised limestone deposits with variegated colours occur at Dichinema area, in the southwest of Eritrea. Granites of various colours and textures are exposed over large areas. Granites of dimension stone quality, which are currently being exploited, occur at Geleb (pink granite), and in the Arato, Korbaria, and Tukul areas (grey granite). The Mai-mine granite and Elabered granite are also suitable candidates for dimension stone. A narrow outcrop of coral limestone extends along the coast from the headland of Ras Kassar to the coastline of Tio. Immense deposits of limestone occur in the Adailo-Aitosh area south-west of Tio.

### Geothermal Potential

Economic exploitation of geothermal heat for power generation appears possible in rift-related volcanic rocks in the Red Sea Rift areas. Alid, Nabro, and Dubi areas are the main targets as geothermal activity in these areas is known to be intensive. Lower temperature activity also occurs at Mai Wuui, 30 kms west of Massawa. Geothermal activity, evidenced by fumaroles and hot springs with extensive alteration on the ground, are abundant in the Alid geothermal field. Studies carried out so far in this area indicate the presence of a possible subsurface high temperature reservoir. The geothermal manifestations at Nabro and Dubbi are also promising, but further study will be required to estimate the reservoir temperature.

### Other Potential

The geology of Eritrea is favorable for other types of mineral deposits:

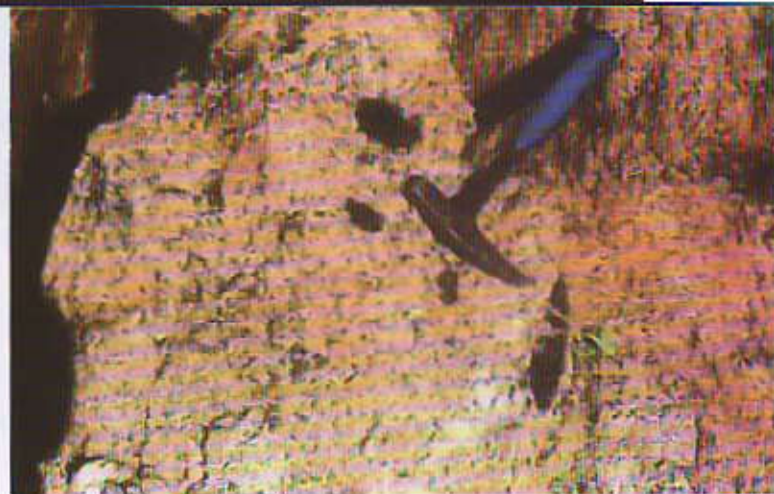
A Potential for a low-grade bulk-tonnage granite hosted gold mineralization have been indicated in various varieties of pre-syn tectonic granites and micro granites. Moreover, Cu, Cu+Ag, Cu+Ag+Au skarn systems has also

been indicated where granite-Gabbro-marble has been mapped as proximal geology in a volcano sedimentary terrain.

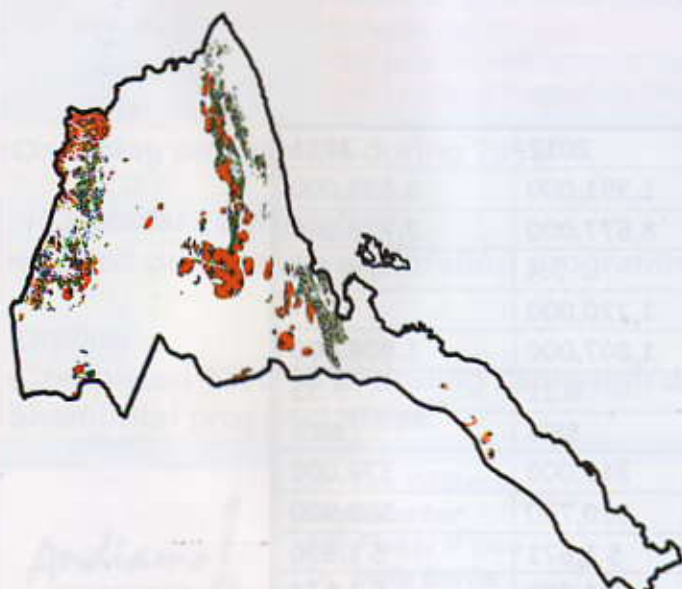
The Arabian–Nubian Shield (ANS) is presently emerging as a major tantalum mining province with economic deposits associated with 1) peralkaline arfvedsonite-alkalifeldspar granite (Ghurayyah,), 2) peraluminous muscovite–albite granite (Abu Dabbab,), and 3) peraluminous spodumene–albite pegmatite (Kenticha,). In addition, a number of subeconomic tantalum mineralizations occur in the ANS including members of each of the three deposit styles. In Eritrea, There is a good potential for Tantalum and REE along various types of pegmatites and associated pegmatitic granite belts. A portion of one of these belts has been looked at for a potential Ta+REE mineralization, a preliminary result indicates that the belt could be a prospective one. The discovery of zonal evolution of the melt from which the pegmatite bodies consolidated, affinity of pegmatites to beryl–columbite subtype as well as the discovery of economically promising types of pegmatites, the Albite-rich pegmatite–alpsites, makes the whole belt worth prospecting.

Similarly, the regional geology hosts younger non sulfide Zn-Pb-Ag systems in Mesozoic limestone which has been affected by subsequent rifting, volcanism and associated geothermal activities. Eg. Jebali (Yemen) non sulfide zinc deposit contains an appreciable geological resource. There is a similar prospective geological setting in the southern red sea region which could have a potential for, well developed, similar non-sulfide systems.

Variety of rock types are found associated with Cenozoic volcanism in Eritrea. The geological setting is favourable for various types industrial minerals, rocks and natural aggregates. Eg. Zeolites and zeolitic tuffs, perlite, pumice, various colored scoria, etc



*Photo. Pegmatites: Coarse grained black tourmaline developed within a whitish-pink feldspar (perthite) of pegmatite (top). Very coarse grained black tourmaline and red garnet dispersed on albitized perthite of pegmatite body (middle). Big blue crystals of tourmaline from k-feldspar-albite/Oligoclase-perthite-quartz-muscovite/ pegmatite (bottom)*



*Fig. Map showing gneiss belts (grey) and associated granites (pink-orange) in Eritrea*

# //Company PROFILE

## Bisha Mining Share Company BMSC

### A SOLID SET OF OPERATIONAL RESULTS FYR 2012

Looking back on FYR 2012 Eritrea's only producing mine again produced an excellent set of operational results, these results were delivered on a foundation of safe practice through our safety vision of 'everyone going home safe and healthy everyday'. The Bisha Mine recorded ZERO LTI's and a RIFR of <0.26 for the year.

These operational results (see below) are world class and are testament to the dedication and hard work of our employees and the people of Eritrea.

### TRANSITION TO COPPER PRODUCER

The Bisha Mining Share Company transitions from a Gold producer to that of a major Copper producer in the 3rd Quarter of 2013. Construction work has progressed over the last 24 months on the new Copper Flotation Plant (including concentrate transport and port facilities at Port Massawa) to wet and hot commissioning and final hand-over that is scheduled during September 2013.

The partnership between BMSC, SENET and SEGEN has resulted in this major project being completed

1. Safely - >2,5million LTIFH
2. On Time and
3. Under Budget

This is a remarkable achievement in a current industry trend of over-runs and slippage with regard to project delivery.



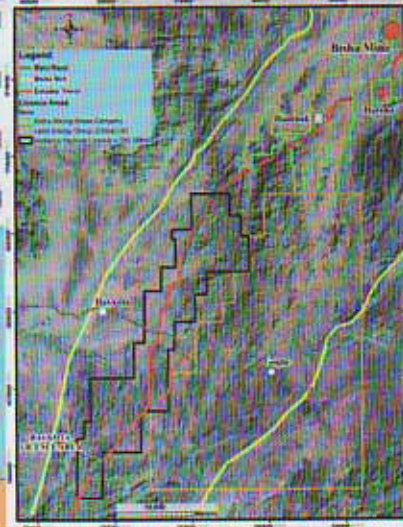
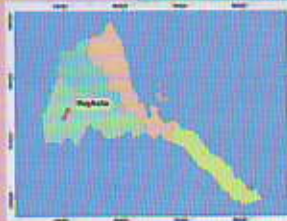
Fig. Copper Flotation Plant.(top)  
Transport trucks (bottom)

	2012	2011
Ore mined, tonnes	1,591,000	1,898,000
Waste mined, tonnes	8,677,000	7,716,000
Strip ratio, (using BCMs)	7.4	5.8
Copper phase pre-strip, tonnes	1,220,000	-
Tonnes milled	1,807,000	1,806,000
Gold grade (g/t)	6.21	7.55
Recovery, % of gold	86%	88%
Gold in doré, ounces produced	313,000	379,000
Gold ounces sold	320,700	369,900
Gold price realized per ounce	\$ 1,671	\$ 1,620
Comperative gold price	\$ 1,669	\$ 1,572
Cash cost per ounce sold	\$ 312	\$ 295

# Yacob Dewar VMS/Gold Cap an Opportunity for Small Scale Mining Development

## Andiamo: The Company

- Successful discoverer of economic gold deposit
- A private company based in London, UK.
- Operating with exclusive focus on Eritrea.
- Targeting on VMS and gold exploration.
- Has been operating in Eritrea for the last 4 years.
- Highly experienced management in Eritrea over 18 years.



## Financing

- Raised USD 10.1 M privately.



## Exploration Activities

Based on geological mapping, using state of the art airborne geophysical survey, ground IP and gravity geophysical surveys, satellite image interpretation, and rock chip and soil sampling Andiamo Exploration has identified more than 20 potential Volcanogenic Massive Sulphide (VMS) target areas including 15 targets for gold exploration.



Follow up work done and identified important VMS belt and Shambotai and Gurgur gold belt at Haykota.

So far diamond drilling programme of 8766.70m and 4475 m of RC drilling and 36m air core drilling programme has been carried out.



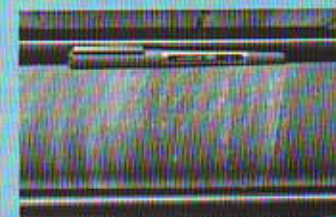
## Track Record of Discoveries

- Discovered Yacob Dewar VMS (2010), Adi Merirey VMS (2011),
- Shambotai (2011) and Jawkeray (2012) gold prospects.
- Frataka VMS (2013).



## Start of Pre-feasibility studies at Yacob Dewar

- SRK (UK) has produced a 43-101 Compliant Resource for Yacob Dewar oxide gold cap
- Mintek of South Africa produced a preliminary metallurgical testwork report.
- Social and Environmental baseline studies currently being carried out by Global Resources Development Consultants.



## On-Going programme during 2013

### Shambotai - Gurgur Belt

- Carried out intense exploration programme in Shambotai and Gurgur areas.

### Drilling

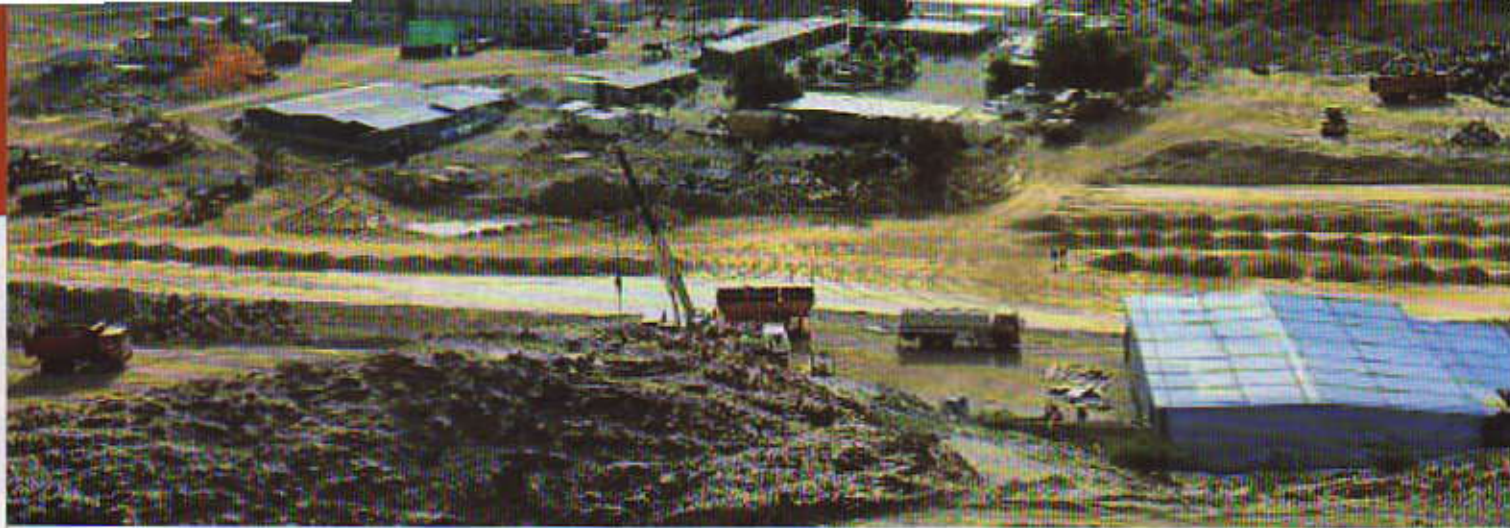
- Completed 1378.60 m drilling campaign during May-June 2013 in Frataka, Yacob Dewar and Shambotai prospect areas.



Dr. Tim Williams  
Mark Parker  
Bill Fisher P Geo  
Dr. Seife Berhe  
Dr. Stephen Francavilla  
Dan Hamer

CEO  
Non-executive Chairman  
Non-executive Director  
Country Manager, Eritrea  
Chief Financial Officer  
Exploration Manager

Wax Chandlers Hall  
5 Gresham Street  
London EC2V 7AD  
Tel: +44 20 7600 1888  
[Stephen@andiamoexploration.com](mailto:Stephen@andiamoexploration.com)  
[Tim@andiamoexploration.com](mailto:Tim@andiamoexploration.com)  
[www.andiamoexploration.com](http://www.andiamoexploration.com)



# Zara Mining Share Company ZMSC

## Developing Eritrea's Next Gold Mine

The Koka gold deposit, located within the Zara Project area of northern Eritrea is being developed by the Zara Mining Share Company (ZMSC), a Joint Venture between ENAMCO and the SFECO Group (SFECO), a subsidiary of Shanghai Construction Group. SFECO are also the EPC contractor for the project.

SFECO purchased its 60% interest in the Zara Project from Chalice Gold Mines in November 2012 for a total of US\$80 million, inclusive of a deferred payment of US\$2 million on first gold pour at the Koka Gold Mine.

The Koka Gold Deposit hosts a JORC and NI 43-101 compliant Probable Mineral Reserve of 4.6 million tonnes grading 5.1 g/t gold, containing 760,000 ounces. This reserve is included within an Indicated Resource of 5.0 million tonnes grading 5.3 g/t gold, containing 840,000 ounces of gold.

### KOKA GOLD PROJECT Progress to Date

1. Finalisation of Purchase Nov 2012
2. SFECO Design Approved Feb 2013
3. Resettlement Koka Valley Mar 2013
4. Commencement of Devt Apr 2013
5. Site Prep Start – Segen Apr 2013
6. Award EPC Contract May 2013
7. Construction Camp Jun 2013
8. Loan Approved (\$107m) July 2013

### Timeline to Commissioning

1. Processing Equip Install Q1 2015
2. TSF & all Services Q2 2015
3. Plant Commissioning Q3 2015

ZMSC continue the high standards set by Chalice, with no Lost Time Injuries to date.

Planned mine production is planned to commence by the third Qtr. 2015. A seven year mine life is planned, based on a design milling rate of 660,000 tonnes per annum. Capital costs for the mine development are forecast at US\$147 million.

The Koka Gold Mine will employ 350 people when in production and will consist of the following infrastructure:

**Open Pit** - The Koka mineralised zone has a total strike length of more than 650 m. The mining rate will be 25,000 tonnes per day, and will be mined with a fleet of trucks and backhoe excavators in 5m bench configuration. Most of the fleet will be procured from China. The pit will be developed in stages to provide sufficient stockpiled ore to allow the process plant to commence commissioning as early as possible.

**Process Plant** - The plant design will have a nominal plant capacity of 2,000 tonnes per day. Due to the location

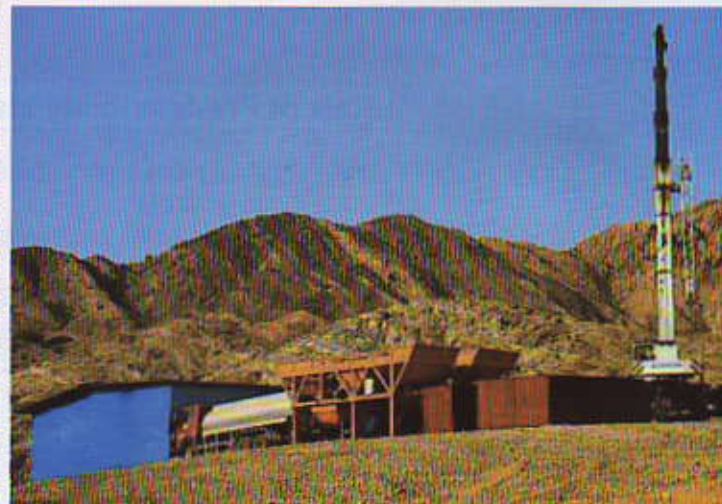


Fig 2 – Concrete Batching Plant

of the ore body little or no oxide ore will be processed. The plant process is a simple one, with a three stage one closed-circuit crushing & single stage grinding to produce a P80 grind size of 106  $\mu\text{m}$ ; Gravity Concentration to remove coarse gold; Pre-Leach thickening prior to Carbon-in-Leach processing; with a final Elution circuit to produce gold doré.



**Tailings Storage Facility** - The TSF site is 2 km west of the plant; and will be formed by the construction of a cross valley embankment at a maximum 50m high, using mine waste and borrow within the basin area. Tailings will be treated to reduce cyanide levels. A 1.5mm HDPE liner will be placed throughout the basin and side slopes. A system of monitoring boreholes will be drilled around the TSF to determine the amount of any seepage.

**Waste Rock Stockpiles** - Due to the steep topography limited waste dumping locations are available. In addition to the initial waste dump, a main waste rock pile will be located immediately west of the pit and adjacent to the process plant. The main waste rock pile will be over 100 m high and has sufficient storage for 80% of the pit waste.

#### **Other Infrastructure**

**Upgrading the access road** - The section of western access road between Kerkebet and Rikeb has been upgraded reducing the travel time from 4.5 to 2 hours.

**Water Supply** - Water will be supplied at a rate of 34 L/s, from a bore field to be drilled in the alluvial gravel aquifers of the Zara River.

**Electrical power supply** - The power supply will be provided from an on-site diesel generation power station located within the process plant, comprising five 1,800 kW diesel generators, one for standby

**Accommodation village** - To be constructed using pre-fab buildings assembled on site.

**Helipad** - The existing helipad located close to the process plant will be used for bullion transfers, for emergency evacuations of medical cases and the occasional transport of employees from Asmara.

#### **COMMUNITY & ENVIRONMENT**

ZMSC considers its community relations & environmental responsibilities highly. This has been demonstrated with the continued good will between the company the community. Resettlement commitments of a permanent water supply and housing for the resettled community will be high on its list of priorities during the construction period as will its environmental commitments.

#### **EXPLORATION POTENTIAL**

The potential of the Zara Project Area to realise further mining potential is high with past drilling to the north and south of the Koka gold deposit, identifying interesting targets. The deposit continues at depth to the South.

Drilling, geological mapping and rock chip sampling has defined another gold-bearing microgranite at the Debre Konate Prospect which is located immediately below the summit of Konate Mountain.

Tracks and drill pads have also been prepared to the Debre Tsaeda gold-bearing veins hosted by granite and



*Fig 4 – Site Preparation*

located on top of a mountain to the south of the Konate Prospect.

#### **CONTACT**

**Zara Mining Share Company**

**Mr. Mike Kelly, General Manager**

**SA Building, Warsay Avenue, Asmara, Eritrea**

**Tel: +291 1 12 53 34**

**ENAMCO:**

## **Sunridge Gold Corp – 2013**

Sunridge Gold has been exploring for VMS base and precious metal deposits in Eritrea since 2003. The Company has successfully defined 4 deposits on the Asmara Project located outside of Asmara which contain significant amounts of copper, zinc, gold, and silver. Sunridge has now shifted to the development phase of the project with the completion of a Feasibility Study in May 2103. The Study demonstrates that the mining of all four advanced deposits that make up the Asmara Project (Emba Derho, Adi Nefas, Gupo Gold and Debarwa) and processing of the ore near the large Emba Derho deposit is economically robust with a Net Present Value ("NPV") of \$692 million with a 10% discount applied (1.791Billion NPV with zero discount) and the internal rate of return (IRR) is 34%.

The Study outlines a three-phase staged start-up mining plan which would initiate production almost one year earlier than was envisaged in the previous prefeasibility

study and reduces the initial capital requirements to be financed by over \$130 million.

The Study concluded that the processing of gold and silver ores from Emba Derho, Gupo Gold and Debarwa by heap-leaching as well as the processing of copper and zinc ores from Emba Derho, Adi Nefas and Debarwa by milling and flotation at facilities near Emba Derho provides the optimum economic scenario. The Emba Derho, Debarwa and Gupo deposits will be mined by open-pit methods and the Adi Nefas deposit by underground mining methods.

The mining plan consists of a 3 phase start up in order to reduce initial capital costs. In Phase I, the high-grade copper (Phase IA) (direct shipping ore "DSO") will be mined, crushed to less than 10 mm, loaded into containers and transported 120 km to the port facility at Massawa for shipping to a smelter.

In addition, (Phase IB) near surface gold and silver ore will be mined from the Debarwa, Emba Derho and Gupo deposits and trucked to the same crushing facility near Emba Derho and processed in the gold recovery heap-leach facility. The heap-leach facility is located inside the tailings storage facility and available until Year 5 of operations.

During Phase II, supergene copper ores will be mined from both Debarwa and Emba Derho and processed at a central flotation plant at Emba Derho at a nominal rate of 2 million tonnes per annum. Copper concentrate with gold and silver byproduct will be transported to the Port of Massawa and shipped to smelters.

Full Production will be achieved in Phase III. Primary copper and zinc ores from Debarwa, Adi Nefas and Emba Derho deposits will be processed at a flotation plant at Emba Derho at a nominal rate of 4 million tonnes per annum. Metal production over the first 8 years of full

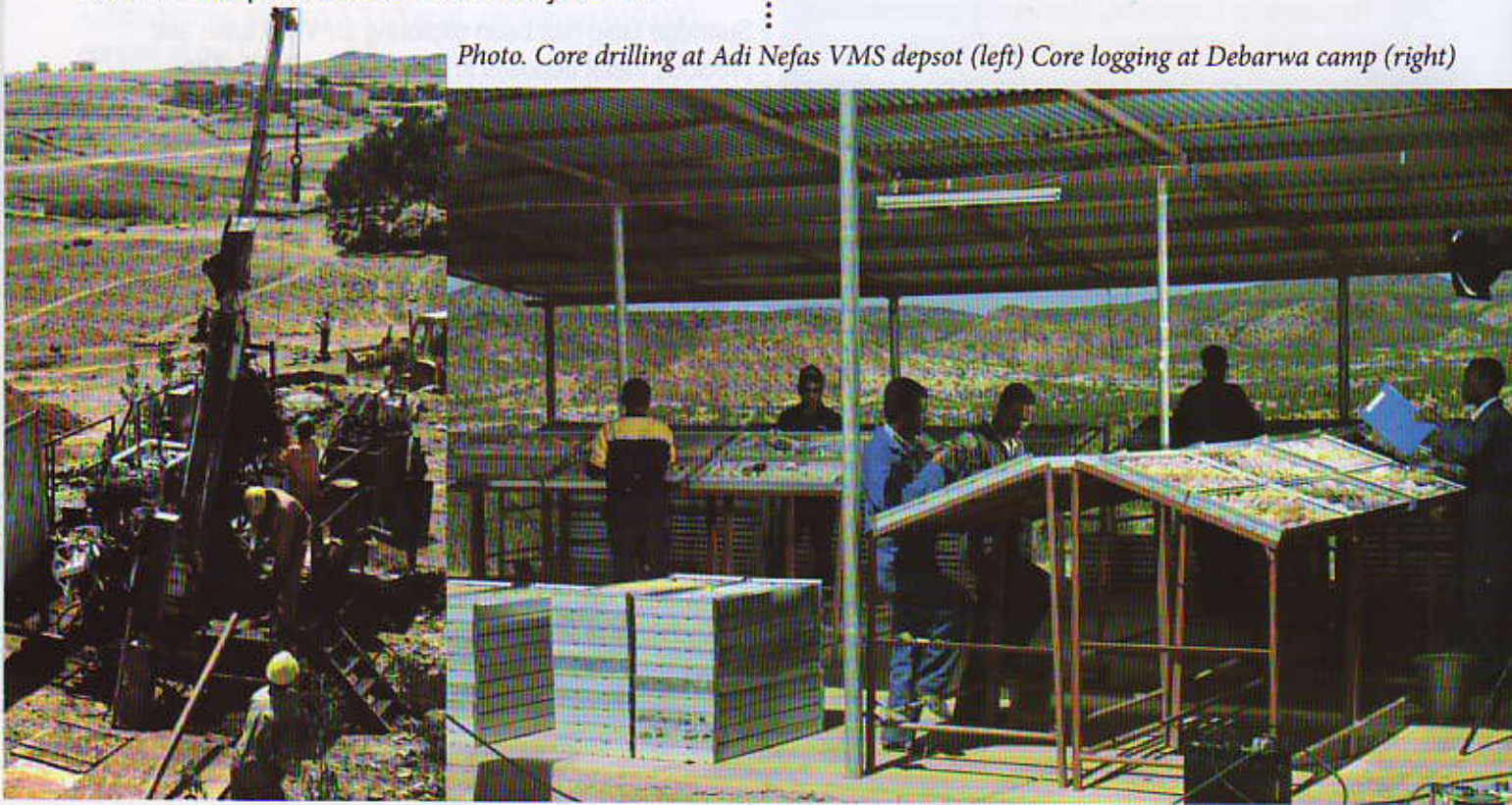
production will average 65 million pounds of copper, 184 million pounds of zinc, 42 thousand ounces of gold, and 1.0 million ounces of silver per year. Copper concentrate with gold and silver byproduct and zinc concentrate will be transported to the port facility at Massawa for shipping to smelters.

Power will be generated onsite using a combination of diesel and medium fuel oil generators. Water supply is sourced from the capture of rainfall in ponds and recycled within the plant.

As a result of the positive outcome of the Study, Sunridge continues to work towards bringing the Asmara project into production as soon as possible, by completing required environmental studies, applying for the mining license, arranging debt financing, commencing detailed engineering work and hiring new key employees. Management estimates that initial production on the Asmara Project will commence in mid-2015.

Sunridge also continues to explore its "pipeline deposits" on the Asmara Project. In the last 12 months initial resources were established for both Adi Rassi, a large copper-gold deposit, and Kodadu, an at surface gold oxide gossan.

*Photo. Core drilling at Adi Nefas VMS deposit (left) Core logging at Debarwa camp (right)*



# South Boulder Mines Limited (ASX: STB, South Boulder)

chloride and gypsum. The close proximity of the resource to the coast gives these products long term potential in the global market. Taking into account the resource size, depth of mineralisation, infrastructure and target markets, the Colluli Project is expected to demonstrate competitive operating and capital costs relative to other greenfield developments. The open cut mining method

is amenable to a scalable, modular operating model that has speed to market advantage over conventional underground developments.

As part of the ongoing DFS, STB has been focused on:

- (i) social and environmental baseline studies;
- (ii) infrastructure, processing, mine planning, geotechnical and maritime design; and
- (iii) resource recalculation and resource block developing.

The company has also been working on project development options that ensure a balance between the economics, scale and life of the project.

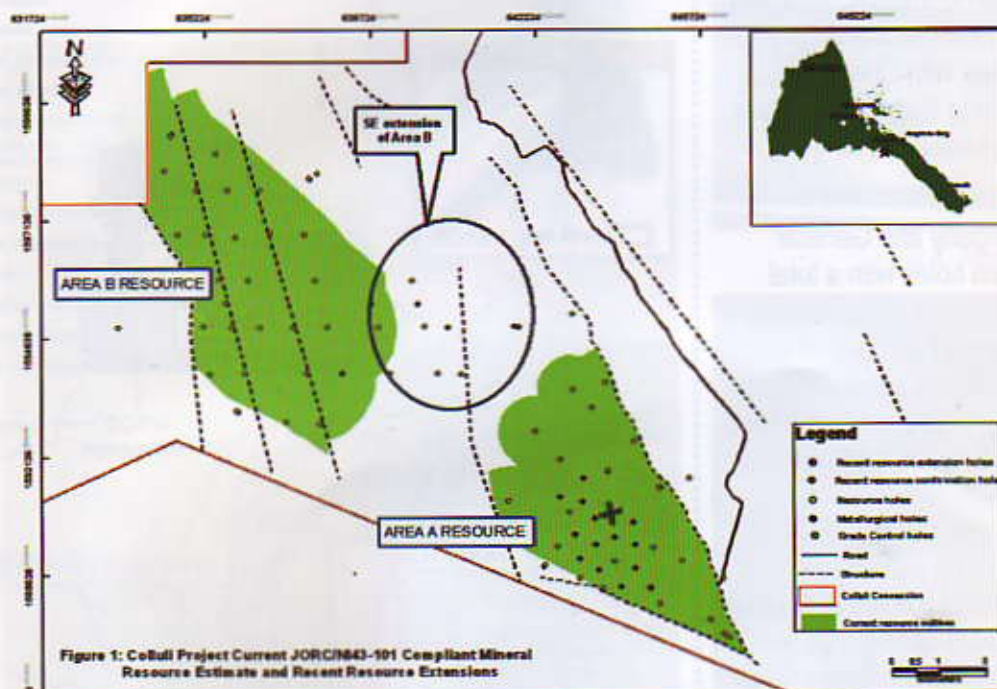


Figure 1: Colluli Project Current JORC1043-101 Compliant Mineral Resource Estimate and Recent Resource Extensions

South Boulder Mines Limited (ASX: STB, South Boulder) is an Australian based exploration and mining company with exploration license for the Colluli concession in south-east Eritrea. The concession is situated in a uniquely young and shallow evaporite basin called the Danakil Depression, which became highly relevant for potash exploration and development when fertiliser prices escalated in 2007 due to a global supply deficit. The STB exploration program commenced in 2009, and discovered a world class evaporite deposit containing high amounts of potassium, magnesium, sodium and calcium bearing salts. The current potash resource contains 1.08 billion tones @ 18% KCl with three forms of potassium bearing salts: sylvinite [KCl], carnallite [KMgCl<sub>3</sub>.6(H<sub>2</sub>O)] and kainite [MgSO<sub>4</sub>KCl.3(H<sub>2</sub>O)]. Growth of the fertiliser market in the future is supported by good market fundamentals, including population growth and changing dietary preferences of emerging economies.

In May 2013 the formation of the Colluli Mining Share Company was announced, which is a 50:50 joint venture between STB and Enamco. This company will take the project forward following completion of the DFS, which has been progressing throughout the year with the key objective of developing a processing circuit that recovers all potassium bearing salts from the resource. STB is also assessing the economics of utilising other salts within the resource, including rock salt, industrial salt, magnesium

## Contacts:

CEO: Paul Donaldson Phone +61 8 6315 1444  
pdonaldson@southbouldermines.com.au

Country Manager: Zeray Leake Phone +291 1 1111 62  
zleake@southbouldermines.com.au

Company Administrator: Solomon Tewelde  
Phone +291 1 1111 62  
stewelde@southbouldermines.com.au

# Beijing Sinoma MINING INVESTMENT ERITREA LTD

## PROGRESS IN THE YEAR 2013

Beijing Sinoma Mining Investment Eritrea Ltd signed a consultancy contract with Ercosplan Company regarding designing of the drilling hole, guidelines for the drilling activities and to provide the company with Chemical Assays of the core samples. Following that, the company signed a contract with General Exploration Drilling Company for the drilling project.

In cooperation with Ercosplan Company and General Exploration Drilling Company, fifteen holes with a total depth of which is 1393 meters have been drilled, including one in the low gravity sub-basin during February – April, 2013. Five out of fifteen holes intersected potash minerals. Ercosplan interpreted that there is a fault zone in the north of the site and potash beds may exist at 350-800 meters depth stratum.

## PLAN FOR THE NEXT STAGE:

The next project, the company planned 6 holes in the fault zone in the north of the site. Deep hole drilling may prove difficult as there are a lot of uncontrolled conditions. The company expects to employ the right equipment with an experienced crew.

Considering these conditions, the company started to negotiate with the drilling companies in Eritrea for the next step of the drilling in the May, 2013. Once the company manages to sign a contract with any of the drilling companies, it will start drilling in the October or November, 2013.

Address: Beijing Sinoma Mining Investment Eritrea Ltd  
1A866:3881-12 No.42 Asmara  
Tel: 08204130  
Email: beijingsinomamining@gmail.com

Photo: drilling work



# Sub Sahara Resources (Eritrea) Pty Ltd

## MOGORAIB RIVER VMS DISCOVERY

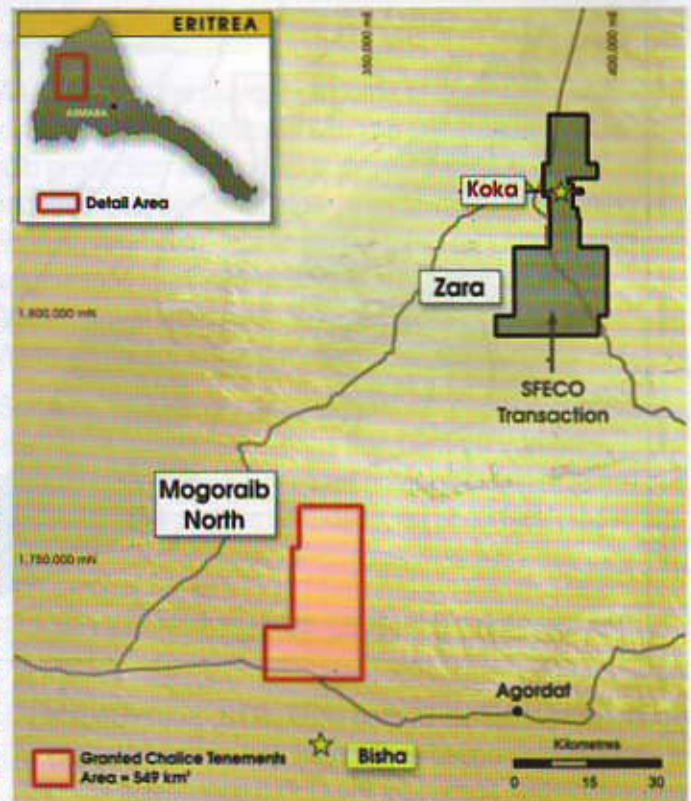


Fig 1. Location of Licences

The 550 sq km Mogoraib North Exploration Licence (Fig 1), granted in January 2011, lies approximately 10 kilometres north of the Bishapolymetallic Volcanic-hosted Massive Sulphide (VHMS) deposit where gold production from an oxide cap commenced in early January 2011.

The volcano-sedimentary rocks hosting the Bisha deposit extend northwards beneath the Mogoraib North EL (Fig 2) and drilling of prioritised basement conductors (58 drillholes for 10,457m) identified by an airborne electromagnetic survey resulted in the intersection of volcanogenic massive sulphide to the west of the Mogoraib River. Further drilling of other conductors defined a six kilometre long sulphide mineralisation zone to the west of the Mogoraib River. Drilling at the southern end of the mineralised trend penetrated two stacked sulphide-rich intervals both of which contained massive sulphide. Metal grade intersections for this drillhole (MOGD 53) and the discovery drillhole (MOGD 21) follow:

MOGD53 upper zone(Fig 3):

7m @ 7.04g/t Ag, 0.52% Cu, 1% Zn

MOGD53 lower zone:

5.6m @ 8.91g/t Ag, 0.95% Cu, 0.68% Zn includes 3.6m at 13.06g/t Ag, 1.38% Cu, 1.03% Zn

MOGD21 discovery hole:

5m @ 7.48g/t Ag, 0.86% Cu, 1.33% Zn includes up to 1.78% Cu and 2.76% Zn



Fig 2. Mogoraib North geological setting

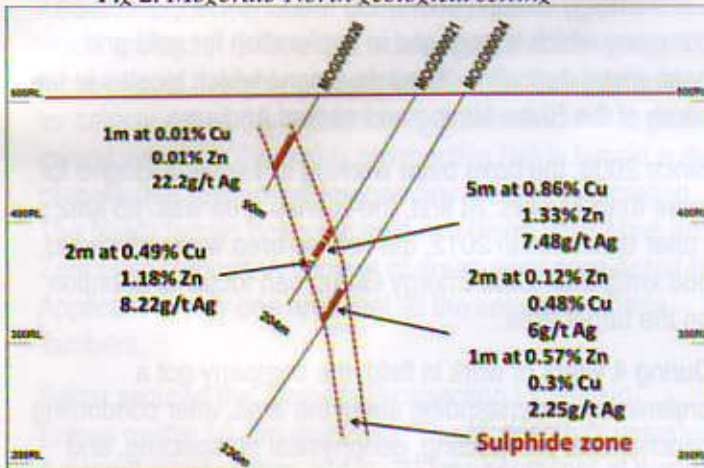


Fig 3. Drill cross-section for target T209.

A mineralogical study of the massive sulphide shows that the chalcopyrite and sphalerite are recrystallised and exhibit simple grain boundary relationships (Fig 5) which mean that they should be recoverable via flotation at an appropriate grind size.

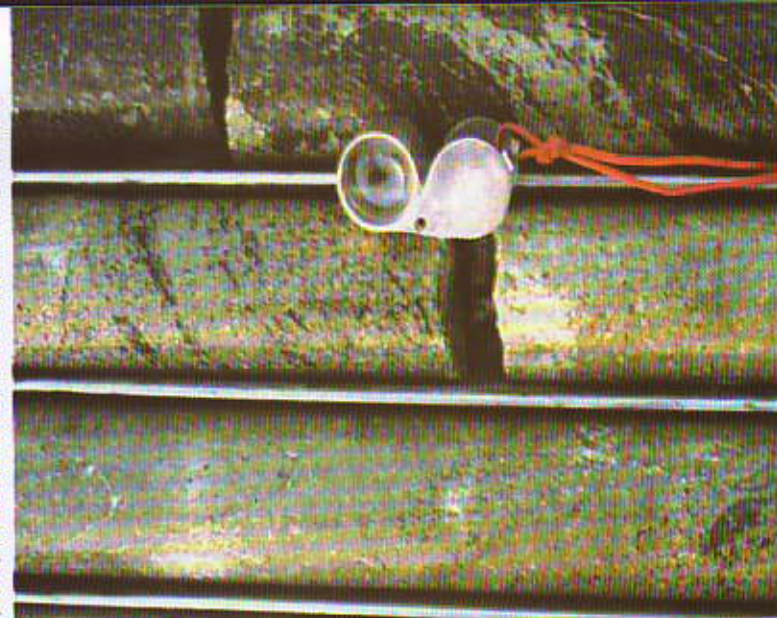


Fig 4. Massive sulphide from MOGD21

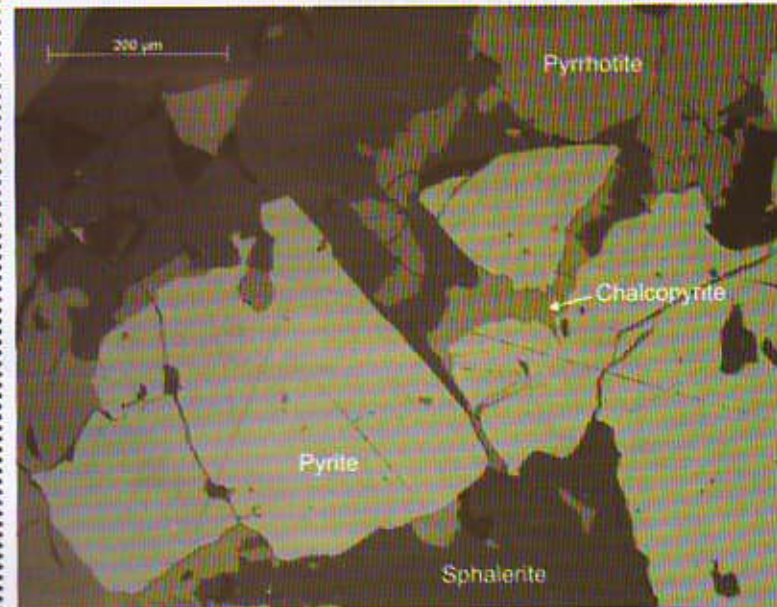


Fig 5. Photomicrograph of massive sulphide.

## CONTACT

Chalice Gold Mines Ltd  
 Dr Doug Jones, Technical Director  
 Dr Harry Wilhelmij, Exploration Manager  
 Level 2, 1292 Hay Street  
 West Perth, Western Australia 6005  
 PO Box 2890 Perth 6001  
 Western Australia  
 Tel: +618 9322 3960  
 Mobile: +61 4 38 872 090  
 Sub Sahara Resources:  
 Level 5, SA Building,  
 Warsay Avenue, Asmara, Eritrea  
 Tel: +291 1 12 53 34  
 Mobile: +291 7 30 84 99  
 E-mail: hwillhelmij@chalicegold.com  
 Website: www.chalicegold.com

# London Africa Ltd

London Africa Ltd is a British resources company that holds the 876km<sup>2</sup> Akordat-Orota exploration licence in the Gash Barka region of central Eritrea. The licence was originally granted in July 2010 for an initial three year period and was recently renewed (first renewal). 2013 so far has been very successful with several milestones for the company. These include:

- Discovery of a VMS system over at least 2 km of strike following recent drilling at Kofot-Gerger intersecting sulphide mineralisation (semi-massive, stringer and disseminated).
- Completion of NI 43-101 technical report on the licence (by Dr Tucker Barrie)

Exploration to date has identified four highly prospective areas:

1. Himbol district: containing the (i) Yakare and (ii) Kofot-Gerger gold and base metal prospects located approximately 6 km along strike from each other. Rock chip sampling identified up to 4.02 g/t Au, 121.6 g/t Ag and 3.6% Cu from gossaneous material, and soil sampling defined an approximately 2.7 by 0.6 km gold and copper in-soil anomaly with an associated (>0.5 mgal) gravity anomaly at Kofot-Gerger. Along strike at Yakare, several small copper and gold anomalies as well as a gravity anomaly were also identified. In addition, both these prospects have several robust VTEM conductor targets, which are spatially associated with the geochemical and gravity anomalies making them highly prospective as VMS targets. Recent drilling (1991 m of reverse circulation) at Kofot-Gerger intersected massive, stringer and disseminated sulphide mineralisation in holes over 2.5 km of strike at shallow depths (<100 m), e.g. 43 m from 75 m down hole at 0.6% Cu, 0.3 g/t Au and 13.2 g/t Ag, including 7 m at 1.09% Cu, 0.29 g/t Au and 24.23 g.t Ag and 3 m at 1.41% Cu, 2.67 g/t Au and 23.03 g.t Ag. Three 1 m intersections graded over 2% Cu. An oxide surface cap identified over 2 km of strike is also recognised with elevated values of copper, e.g. 39 m from 10 m down hole at 0.24% Cu.
2. Taninay district: comprises the (i) Taninay and (ii) Tablet-Tablet south gold prospects. Both are quartz vein hosted and are part of the same regional quartz vein system that intermittently outcrops for over 6 km. Rock chip samples of up to 231 g/t Au and 8.5 g/t Ag are recorded and soil sampling has identified over 11 km of prospective land along strike to the north and south of the Taninay prospective. Channel sampling at Taninay revealed values of up to 1.5 g/t over 22 m, including 4.5 g/t over 6 m from the quartz veins at

surface. Drilling (770 m of diamond drilling) revealed values of 1.37 g/t Au over 11 m from 35 m down hole, including 3.63 g/t Au over 3 m in the quartz veins.

3. Hawegu district: comprises the (i) Melih base metal prospect, (ii) Naddet gold and base metal prospect, (iii) Hawegu-Ber Noray gold prospect, and (iv) Huruf gold prospect. Rock chip samples of up to 9.7 g/t Au, 9.9 g/t Ag and 0.23% Cu are recorded and both quartz vein-hosted gold and VMS occurrences are prospective in this district. Soil sampling has identified several gold and copper in-soil anomalies worthy of follow-up exploration.
4. Engerne district: comprising the (i) Engerne, (ii) Degasay, (iii) Garsay-Ketin, and (iv) Adinjera gold prospects. Rock chip samples of up to 101 g/t Au and 60.8 g/t Ag are recorded from quartz veins and follow-up channel sampling with values of up to 18.58 g/t Au over 1 m.



**London Africa Limited**  
Suite 1a, 38 Jermyn Street, London,  
SW1Y 6DN, United Kingdom

Floor 4, S.A. Building, Warsai  
Street,  
Asmara, Eritrea

[www.londonafrica.co.uk](http://www.londonafrica.co.uk)

E-mail: [info@londonafrica.co.uk](mailto:info@londonafrica.co.uk)

## Land Energy Group (China) Limited, Eritrea

Land Energy Group (China) Ltd is a Chinese exploration company which is engaged in exploration for gold and base metal deposit in Tekawda-Gogne which locates in the south of the Bisha Mining and east of Andiamo.

Since 2009, they have been working in Tekawda-Gogne for more than 4 years. At first, the license area was 785 km<sup>2</sup>; after extension in 2012, the license area was reduced to 588 km<sup>2</sup>, thus Land Energy Group can focus its attention on the target area.

During 4 years of work in field, the company got a preliminary understanding about the area, after conducting geochemical prospecting, geophysical prospecting, and drilling activities. And it is performing drilling in the field right now. According to the results of drilling, it is looking promising to find gold and other base metal deposit.

**Land Energy Group (China) Ltd., Eritrea**  
Add: No. 36, kushet, shewit, Asmara, Eritrea  
Phone & Fax: 0820413

# Sahar Minerals Eritrea Ltd

Sahar Minerals is a privately held exploration company, focused on the discovery of world class economic gold & base metals deposits in Eritrea, located in the highly prospective Arabian Nubian shield that runs on either side of the Red Sea.

The Company was established in early 2009 to pursue opportunities arising from depressed asset prices occurring as a result of the world wide 'Credit Crunch' in late 2008. The project evaluation & negotiation process commenced in May 2009 with opportunities assessed across a number of East African countries including Kenya, Tanzania, Mozambique, Sudan, Egypt and Zimbabwe. After an extensive evaluation process the Company secured two properties in Eritrea, namely:

- Augaro - gold /base metal Project (held in a JV structure)
- Harab Suit - gold / base metal Project (100% held in an Exploration License Area)

During Q3 2012, it became clear to Sahar that it needed to secure new licenses in Eritrea as, expenditure commitments on the existing Licenses (Augaro and Harab Suit) could not be justified by exploration results to date.

- The Augaro Exploration License was returned to JV Partners (ECEM) on the 31 December 2012. Sahar retains no rights to the Augaro License Area.
- The Harab Suit Exploration License was returned to the Ministry of Mines on the 26 December 2012. Sahar retains no rights to the Harab Suit License Area.

As a consequence, Sahar undertook an evaluation of 'open' ground in Eritrea that would meet the company focus of gold in highly prospective terrain. Prime criterion for selection was the existence of Colonial/Artisanal gold mining activity in the highly prospective Nakfa terrain suite of rocks that had not undergone any modern exploration. The Nakfa terrain hosts the gold rich Bisha VMS Mine and Zara Gold Deposit. A number of areas were considered for Application, only one area met all the selection criteria – Tambera.

Sahar secured the Tambera Prospecting License in Eritrea on the 10 January 2013. The License has untested Artisanal mining areas and is ~15kms southeast of the gold rich 'Bisha' volcanogenic massive sulphide (VMS) deposit.

## History

The Tambera Prospecting License Area hosts a Colonial (Italian) Mining Plant with 'tailings', historical mining

activity and recent Artisanal activity. Ore during the Italian era was trucked to a central processing facility from small mines in the area. No resources, grade and/or tonnage of gold mined is mentioned in historical literature (Usoni 1952 - Jelance 1966).

## Exploration Carried out by Sahar Minerals to Date

- An appraisal of historical data and establishment of a GIS database
- Set up of field camp, personnel and equipment
- Acquisition of Landsat Imagery for geological/fact mapping
- Prospect geological mapping at Tambera, Abarom and Tombita prospects, and rock chip sampling programmes
- Regional geological mapping/rock chip sampling programmes
- Regional Stream sediment sampling programme for chalcophile elements related to base and precious metal mineralization

Website: [www.saharminerals.com](http://www.saharminerals.com)

Managing Director: Alasdair Smith

Email: [Alasdair.smith@saharminerals.com](mailto:Alasdair.smith@saharminerals.com)

Address: S.A. Building, Warsay Avenue, Asmara,, Eritrea

Tel: +291 1 110008

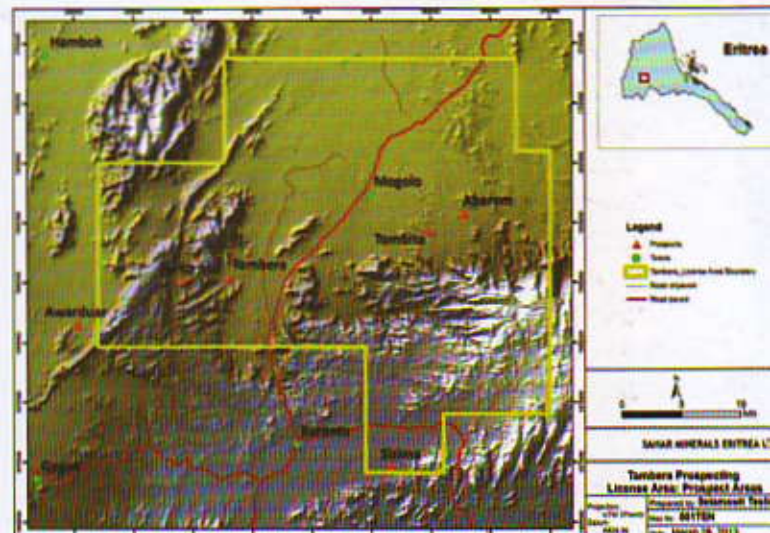


Fig. Tambera Prospect Areas on Topography

Meeting The Challenges  
**FOR SUSTAINABLE MINING**

