



2010 Minerals Yearbook

ERITREA [ADVANCE RELEASE]

THE MINERAL INDUSTRY OF ERITREA

By Harold R. Newman and Thomas R. Yager

The legal framework that governs the conduct of all mining and related operations in Eritrea is contained in the mining law that comprises Minerals Proclamation No. 68/1999, Mining Income Tax Proclamation No. 69/1995, and Regulations on Mining Operations Legal Notice No. 19/1995. All mineral resources in Eritrea are the property of the State, and licenses are required for the exploration and development of these resources (Mining Journal, 2010b).

The greenstone belt of Eritrea, which hosts base and precious metals deposits and occurrences, covers about 70% of the country. The greenstone belt contains known volcanic massive sulfide (VMS) deposits, as typified by the Bisha discovery and deposits at Adi Nefas, Asmara, Debarwa, and Emba Derho. Known gold mineralization predominately occurs in quartz veins and as disseminations within shear zones (Mining Journal, 2010b).

The United Nations (UN) Security Council passed a resolution to impose sanctions on Eritrea on December 23, 2009. The resolution accused Eritrea of supporting the Islamic al-Shabab and Hizbul-Islam insurgents attempting to overthrow the Transitional Federal Government of Somalia and expressed concerns about Eritrea's rejection of the Djibouti Agreement. The resolution imposed an arms embargo on Eritrea and banned travel by and froze the assets of certain businesses and individuals. The Eritrean Government opposed the resolution and denied the charges made by the UN. The resolution did not target mining companies operating in Eritrea (United Nations Security Council, 2009).

Minerals in the National Economy

Exploration activities conducted in the past 10 years in Eritrea have identified reserves of base and precious metals. About 20 mining companies were involved in mineral exploration in different areas in 2010. Eritrea was not a globally significant producer or consumer of minerals.

Production

In 2010, Eritrea produced a variety of minerals and mineral products, which included basalt, cement, common clay, coral, granite, gravel, gypsum, kaolin, lime, limestone, marble, pumice, quartz, salt, sand, and silica sand. Small amounts of gold were produced in western Eritrea by artisanal miners (table 1). The country had deposits of asbestos, barite, copper, feldspar, iron ore, lead, magnesium, nickel, potash, silver, talc, and zinc that were not exploited in 2010. Refined petroleum products were imported to meet domestic needs (Mining Journal, 2010b).

Structure of the Mineral Industry

Table 2 is a list of the major mineral industry facilities, their locations, and their capacities.

Commodity Review

Metals

Copper, Gold, Silver, and Zinc.—Eritrea's gold mineralization is typically hosted in two types of deposits: VMS deposits in which it is a byproduct, and quartz veins and stockworks in shear zones. Parts of both types of deposits may be weathered and contain zones of supergene enrichment. VMS deposits occur in the highlands near the capital of Asmara and include Sunridge Gold Corp. of Canada's Emba Derho prospect. Other VMS deposits, including Nevsun Resources Ltd. of Canada's Bisha and Harena projects and Sanu Resources Ltd. of Canada's Hambok project, occur in the lowlands west of Asmara (Mining Journal, 2010b).

Nevsun announced that it had begun commissioning its treatment plant at the Bisha Mine and expected to start commercial production in the first quarter of 2011. Nevsun started running low-grade ore through the plant at yearend. In the first 2 years of production, the Bisha Mine was expected to produce 47,700 kilograms per year (kg/yr) of silver and 14,000 kg/yr of gold. For the next 3 years, Nevsun planned to mine 81,000 metric tons per year (t/yr) of copper, 31,500 kg/yr of silver, and 830 kg/yr of gold at Bisha. For the last 5 years of the mine's life, Nevsun planned to produce 97,500 t/yr of zinc, 17,800 t/yr of copper, 29,200 kg/yr of silver, and 500 kg/yr of gold (Nevsun Resources Ltd., 2010, 2011).

In early July 2010, Chalice Gold Mines Ltd. of Australia completed a feasibility on a new mine at the Koka gold deposit, which is part of the Zara project. Chalice planned to produce an average of about 3,200 kg/yr of gold during the 7-year life of the mine. Reserves at Koka were estimated to be 4.6 million metric tons (Mt) at a grade of 5.1 grams per metric ton (g/t) gold. Capital costs were estimated to be \$122 million. Depending on when and if the Government awards a mining license to Chalice, development could start at Koka in 2011 and production could begin in 2013 (Chalice Gold Mines Ltd., 2010, p. 3, 7, 10).

In October 2010, Sunridge commenced a feasibility study on a new mine at the Debarwa copper, gold, silver, and zinc deposit, which was part of the Asmara project. The feasibility study would consider a plant that would use a flotation process for the recovery of base and precious metals and would take into account various mining options over a forecasted mine life of 9 years. The feasibility study would further investigate the option of directly shipping high-grade ore (greater than 15% copper) to generate early cashflow. Resources at Debarwa were estimated to be 4.5 Mt, which included a supergene copper-enriched zone with resources of 1.3 Mt at grades of 5.36% copper, 33.9 g/t silver, and 1.54 g/t gold. The feasibility study was expected to be completed in the third quarter of 2011 (Mining Journal, 2010a; Sunridge Gold Corp., 2010a).

Sunridge also planned to start prefeasibility studies on the Adi Nefas, the Emba Derho, and the Gupo deposits, which were also part of the Asmara project, in early 2011. The studies were expected to be completed in the third quarter of 2011. Resources at Emba Derho were estimated to be 62.5 Mt, which included a copper-rich zone with resources of 38.4 Mt at grades of 1.02% copper and 0.99% zinc. At Adi Nefas, resources were estimated to be 2.7 Mt at grades of 8.38% zinc, 1.39% copper, 99.3 g/t silver, and 2.85 g/t gold. Resources at Gupo were estimated to be 4.5 Mt at a grade of 2.99 g/t gold (Mining Journal, 2010a; Sunridge Gold Corp., 2010a).

Antofagasta Minerals plc of Chile and Sunridge commenced a new drilling program in 2010 at the Adi Rassi copper-gold prospect within the Asmara project as a part of their joint-venture agreement. Under the agreement, Antofagasta Minerals agreed to fund \$10 million of exploration work during a 5-year period to earn a 60% interest in exploration areas of the Asmara project, excluding Adi Nefas, Debarwa, Emba Derho, and Gupo. The copper and gold mineralization at Adi Rassi was associated with quartz veins and breccia zones along a major shear zone that trends northeast and dips steeply to the west (Sunridge Gold Corp., 2010b).

Sahar Minerals Ltd. of Bermuda obtained the Augaro and the Harab Suit gold and base-metal projects in February 2010; the company planned to drill at both projects. Andiamo Exploration Ltd. of the United Kingdom engaged in exploration at the Hayoka license in 2010. Gippsland Ltd. of Australia's Adobha project was composed of a 2,100-square-kilometer (km²) exploration license plus three 100-km² prospecting licenses in the Adobha region. The project was prospective for copper, lead, and zinc. In September, Gippsland announced plans to spin off the Adobha project into a new company through an initial public offering (Gippsland Ltd., 2010; Mining Journal, 2010b).

Industrial Minerals

Cement.—In 2010, China New Era International Engineering Corp. of China was building a new cement plant at Gudem with a capacity of 360,000 t/yr. Local resources of coral and limestone were expected to be sufficient to supply the plant for between 30 and 40 years (Ghebrehiwet, 2011; China New Era International Engineering Corp., undated).

Potash.—South Boulder Mines Ltd. of Australia's Colluli project is located in the Danakil Depression region about 200 kilometers (km) east of Asmara. The project, which covers an area of 906 km², consists of buried evaporate deposits in which two shallow potash horizons were identified. The upper horizon contains sylvinites and the lower horizon contains carnallite. South Boulder reported that mineralization at Colluli had been defined across 4.5 km² and was considered open in all directions; it would provide a target ranging from 300 to 500 Mt and grading from 21% to 25% potassium chloride. South Boulder stated that the quantity and grade was conceptual in nature as there had not been sufficient exploration to define a resource. A Joint Ore Reserves Committee Code-compliant resource was expected to be completed in January 2011. South Boulder also planned to

complete a scoping study by the second quarter of 2011 on producing 1.5 million metric tons per year of potash at Colluli (South Boulder Mines Ltd., 2010, 2011).

NGEx Resources Inc. of Canada announced that it had been granted the Bada potash exploration license located in the Danakil Depression. The license encompassed an area of more than 431 km² and was located 30 km inland from the Red Sea Port of Mersa Fatma and 150 km southeast of Asmara. The Bada license is situated within the northern portion of an evaporate basin that extends southward into Ethiopia. The Danakil Depression was known to extend northeast from Colluli and was believed to have the potential for potash-bearing beds on the Bada license. Exploration at Bada was scheduled to start in 2011 (NGEx Resources Inc., 2010).

Mineral Fuels

Petroleum.—The Minister of Energy and Mines was responsible for granting petroleum rights, executing petroleum contracts, and implementing the petroleum law. Administration was carried out by the Hydrocarbon Division. Petroleum exploration and production activities were governed by the Revised Petroleum Proclamation No. 108 of 2000. Terms, most of which were negotiable, included a sliding-scale royalty; a 35% income tax rate; and land tenure for up to 8 years of exploration and 25 years of production, which could be extended for another 10 years of production (Government of Eritrea, 2000, p. 5, 13).

Outlook

An impending mining boom and the development of metallic deposits in the near future could have a positive effect on Eritrea's mineral industry. Exploration for gold, specifically, and copper is expected to continue. The potential for shear zone-hosted gold deposits is demonstrated from the gold discovery at Zara. Exploration for industrial minerals, particularly potash, could increase as the demand for these materials increases. Eritrea's proximity to Europe and the Middle East could offer access to export markets if mining develops. The country's relatively liberal mining laws are expected to remain in place and are likely to encourage foreign mining companies to explore in Eritrea. The UN sanctions reportedly are unlikely to have a direct effect upon mining operations; it is uncertain if mining companies could be indirectly affected (Saywell, 2010).

References Cited

- Chalice Gold Mines Ltd., 2010, Annual report 2010: West Perth, Western Australia, Australia, Chalice Gold Mines Ltd., 83 p.
- China New Era International Engineering Corp., [undated], Eritrea GEDEM cement plant: China New Era International Engineering Corp. (Accessed September 19, 2011, at http://www.cnme.com.cn/en/dxxm_nei.asp?id=22.)
- Ghebrehiwet, Kesete, 2011, A vision beyond meeting local demand: Eritrea Profile [Asmara, Eritrea], September 7, p. 2.
- Gippsland Ltd., 2010, Spin off IPO of Eritrea and Tasmanian assets: Claremont, Western Australia, Australia, Gippsland Ltd. press release, September 28, 7 p.
- Government of Eritrea, 2000, Revised Petroleum Proclamation No. 108/2000: Asmara, Eritrea, Government of Eritrea, 20 p.

Mining Journal, 2010a, Prefeasibility study announced, *in* Supplement to Mining Journal—Eritrea: Mining Journal, August 20, p. 15.

Mining Journal, 2010b, Hot spot in the Arabian Nubian Shield, *in* Supplement to Mining Journal—Eritrea: Mining Journal, August 20, p. 2–8.

Nevsun Resources Ltd., 2010, Management’s discussion & analysis—Annual fiscal 2009: Vancouver, British Columbia, Canada, Nevsun Resources Ltd., 14 p.

Nevsun Resources Ltd., 2011, Management’s discussion & analysis—Annual fiscal 2010: Vancouver, British Columbia, Canada, Nevsun Resources Ltd., 10 p.

NGEx Resources Inc., 2010, Eritrea grants a major potash project: Vancouver, British Columbia, Canada, NGEx Resources Inc. press release, December 6, 2 p.

Saywell, Trish, 2010, UN sanctions against Eritrea to impede miners?: *Northern Miner*, v. 95, no. 47, January 11-17, p. 1, 10.

South Boulder Mines Ltd., 2010, Drilling defines additional shallow potash at Colluli: West Perth, Western Australia, Australia, South Boulder Mines Ltd. press release, December 15, 4 p.

South Boulder Mines Ltd., 2011, More potash intersected and exploration target increased: West Perth, Western Australia, Australia, South Boulder Mines Ltd. press release, January 4, 4 p.

Sunridge Gold Corp., 2010a, First quarter report for the three months ended November 30, 2010: Vancouver, British Columbia, Canada, Sunridge Gold Corp., 9 p.

Sunridge Gold Corp., 2010b, Sunridge Gold and Antofagasta minerals exploration joint-venture update, Asmara project, Eritrea: Vancouver, British Columbia, Canada, Sunridge Gold Corp. press release, May 12, 3 p.

United Nations Security Council, 2009, Resolution 1907 (2009): New York, United Nations Security Council, S/RES/1907 (2009), December 23, 6 p.

TABLE 1
ERITREA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ^{2,3}	2006	2007	2008 ^e	2009 ^c	2010 ^c
Basalt	211,053	45,335 ⁴	50,000	45,000	50,000
Cement ^c	45,000	45,000	45,000	45,000	45,000
Clays:					
Common	29,000	3,700 ⁴	4,000	4,000	4,500
Kaolin	129	183 ⁴	200	175	200
Coral	59,900	67,332 ⁴	65,000	60,000	58,000
Gold kilograms	46	87 ⁴	30 ^f	30 ^f	35
Granite	144,775	21,394 ⁴	25,000	25,000	25,000
Gravel	187,826	79,913 ⁴	80,000	78,000	80,000
Gypsum	634	874 ⁴	800	800	800
Laterite	NA	NA	NA	NA	NA
Lime	164,227	165,000	165,000	165,000	170,000
Limestone ^{e,5}	3,000	3,000	3,000	3,000	3,000
Marble:					
Block square meters	1,860,146	31,010 ⁴	35,000	32,000	36,000
Chip	4,058	NA	NA	NA	NA
Pumice	1,072	55	60	60	60
Quartz	83	90	100	100	100
Salt	9,737	7,448 ⁴	7,500	7,500	7,800
Sand thousand metric tons	2,100 ^c	2,309 ⁴	2,200	2,200	2,200
Silica sand ^c	1,025	NA	NA	NA	NA

^eEstimated; estimated data are rounded to no more than three significant digits. ^fRevised. NA not available.

¹Table includes data available through June 30, 2011.

²Values converted from cubic meters to metric tons. Specific gravity, in grams per cubic meter—basalt, 2.8; clay, 1.09; kaolin, 1.03; gypsum, 1.60; laterite, 2.55; lime, 1.54; marble chips, 2.56; pumice, 0.64; quartz, 1.55; salt, 1.44; sand, 2.08; and silica sand, 1.44.

³In addition to the commodities listed, feldspar and talc reportedly were produced, but information is inadequate to confirm output.

⁴Reported figure.

⁵For other than cement.

TABLE 2
ERITREA: STRUCTURE OF THE MINERAL INDUSTRY IN 2010

(Metric tons unless otherwise specified)

Commodity		Major operating companies	Location	Annual capacity
Cement		Eritrea Cement Works	Massawa	45,000
Gold	kilograms	Bisha Mining Share Co. (Nevsun Resources Ltd., 60%, and Eritrean National Mining Corp., 40%)	Bisha Mine near Bishia	12,800
Granite	cubic meters	Margran plc	Gogne	3,000 ^e
Lime		Badme Construction Co.	Plants at Gogne ¹	7,300 ^e
Do.		do.	Plant at Barentu	3,600 ^e
Marble		Margran plc	Gheleb	NA
Salt		Assab Salt Works	Assab	180,000
Do.		Salina Salt Works	Massawa	80,000
Silver	kilograms	Bisha Mining Share Co.	Bisha Mine near Bishia	22,000

^eEstimated. Do., do. Ditto. NA Not available.

¹Not producing at the end of 2010.