THE MINERAL INDUSTRY OF

TANZANIA

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Following the rebirth of the Tanzanian gold industry in 1999, gold has dominated the mineral industry of Tanzania. In recent years, the mineral industry of Tanzania has also produced iron ore and steel and such industrial minerals as bentonite, kaolin, and other clays; calcite; diamond and other gemstones; graphite; gypsum; phosphate rock; salt; silica sand; and soda ash (table 1). The country also has produced coal, petroleum products, and such building materials as cement, limestone, and sand and gravel. Deposits of cobalt, copper, natural gas, nickel, and titanium also are known to occur in Tanzania.

Tanzania's gross domestic product (GDP) grew by 4.9% in 2000 compared with 4.7% in 1999 and 4% in 1998. After growing by 9.1% in 1999 and 27.4% in 1998, the value of output in the mining sector grew by 13.9% in 2000. The value of output in the mining sector nearly doubled from 1996 to 2000 owing to substantial increases in diamond and gold production. In 2000, manufacturing accounted for 8.3% of the GDP; construction, 4.6%; electricity and water, 1.7%; and mining, 2.3% (Bank of Tanzania, 2001, Gross domestic product (GDP) at factor cost by kind of economic activity at constant 1992 prices—Mainland Tanzania, accessed August 10, 2001, at URL http://www.bot-tz.org/Statistics/qreviews/table1_5.htm).

The U.S. Central Intelligence Agency (2000) estimated that Tanzania's GDP amounted to about $25.1 billion at purchasing power parity. The per capita income was $710 at purchasing power parity in 2000.

In recent years, Tanzania's mineral exports have increased substantially. Most of the increase was attributable to gold exports, which increased to $120.53 million in 2000 from $3.34 million in 1998. During the same period, diamond exports increased to $45.75 million from $12.11 million, and gemstone exports, to $18.50 million from $8.13 million. From 1998 to 2000, exports of tanzanite totaled $32 million (African Mining Intelligence, 2001; Mchihiyo, 2001).

Commodity Review

Metals

Cobalt, Copper, and Nickel.—Barrick Gold Corp. has been exploring the possibility of mining the Kabanga nickel sulfide deposits in northwestern Tanzania. Resources have been estimated to be 12.7 million metric tons (Mt) at an average grade of 2.1% nickel, 0.3% copper, and 0.16% cobalt (cutoff grade of 1.2% nickel). Previous owner Sutton Resources Ltd. had planned to produce about 17,000 metric tons per year (t/yr) of nickel, 1,600 t/yr of copper, and 1,200 t/yr of cobalt. Barrick's Bulyanhulu gold mine was expected to produce 20,000 t/yr of copper concentrates at a grade of 18% copper. Goldstream Mining NL was also exploring for cobalt, copper, and nickel at Luwumbu, Mbozi, Mibango, Mwahanza, Rukwa, and Wansisi (Jones, 1999; Goldstream Mining NL, 2000, p. 16-17; African Mining, 2001a; Mchihiyo, 2001).

Gold.—From 1995 to 2000, expenditures on exploration and mine development in Tanzania exceeded $1 billion; most of this spending has been directed toward gold (Goldstream Mining NL, 2000, p. 14-15). As a result, Tanzania's gold production has increased to 15,060 kilograms (kg) in 2000 from 318 kg in 1996 (table 1).

The Geita gold mine [owned by Anglogold Ltd. (50%) and Ashanti Goldfields Co. Ltd. (50%)] started production in August. By the end of the year, Geita had produced 5,500 kg of gold from 1.24 Mt of ore. Anglogold and Ashanti planned to increase production to about 15,600 kilograms per year (kg/yr) of gold. Total resources at the Geita Mine amounted to 90.1 Mt a grade of 4 grams per metric ton (g/t) gold. Measured resources were 47.2 Mt at a grade of 3.6 g/t gold, and indicated resources, 42.9 Mt at a grade of 4.5 g/t gold. Total reserves amounted to 63.6 Mt at a grade of 3.8 g/t gold. Proven reserves were 41.3 Mt at a grade of 3.5 g/t gold, and probable reserves, 22.3 Mt at a grade of 4.5 g/t gold (Ashanti Goldfields Co. Ltd., 2001, p. 21-22).

In 2000, the Golden Pride Mine (owned and operated by Resolute Mining Ltd.) produced 7,007 kg of gold from 2 Mt of ore mined. Measured resources were reported at 10.14 Mt at a grade of 2.3 g/t gold; indicated resources, 2.93 Mt at a grade of 3 g/t gold; and inferred resources, 2.3 Mt at a grade of 2 g/t gold. Total contained gold resources amounted to 36,700 kg. Proven reserves were 7.97 Mt at a grade of 2.9 g/t gold, and probable reserves, 432,000 metric tons at a grade of 2.7 g/t gold. Total contained gold reserves amounted to 24,300 kg (Resolute Mining Ltd., 2001, p. 5).

Barrick's Bulyanhulu gold mine was expected to start production in the second quarter of 2001; the company planned to produce 12,400 kg/yr of gold by 2004. Investment in Bulyanhulu amounted to $280 million. Resources at Bulyanhulu were reported to be 30.75 Mt containing 454,000 kg of gold. Proven reserves were 1.03 Mt containing 14,600 kg of gold. Probable reserves were 22.34 Mt containing 297,000 kg of gold (Barrick Gold Corp., 2001, Gold mineral reserves and mineral resources, accessed September 28, 2001, at URL http://www.barrick.com/op_mineral_summary.asp).

East African Gold Mines Ltd. (EAGM) announced plans to start production at the North Mara gold mine in northwestern Tanzania in the first half of 2002. EAGM planned to produce 5,800 kg/yr at a cash operating cost of $190 per ounce. The company's overall investment in the North Mara project was reported to be $90 million, of which $30 million had already been spent. Other shareholders in the North Mara project included Anglogold, Commonwealth Development Corp. (CDC) of the United Kingdom, and Macquarie Bank Ltd. of Australia. Mineral resources at North Mara were estimated to be 49.6 Mt at an average grade of 2.55 g/t gold. Reserves amounted to 19.1 Mt at a grade of 3.3 g/t gold (Africa Energy & Mining, 2000a; African Mining, 2000a, 2001b).

In 2000, Barrick took over Pangea Goldfields Inc., which

held properties with substantial gold resources in Tanzania. The company's largest project was Golden Ridge, which has resources of 68,400 kg of gold. Pangea was in a joint venture with Anglogold to explore the Village and Chocolate Reef, which has a combined resource of 56,000 kg of gold. The Tulawaka project, which has indicated resources of 1.51 Mt containing 21,900 kg of gold, was a joint venture with Explorations Minieres du Nord Ltee of Canada. The company was involved in 11 projects being held in 32 prospecting licenses (African Mining, 2000a).

Spinifex Gold Ltd. also held interests in gold projects with considerable gold resources. Nyakafuru, which was the largest deposit, has resources of 3.5 Mt at a grade of 6.3 g/t gold. The Kitongo deposit had 14,900 kg of contained gold resources, of which 28% was measured, 57% was indicated, and 15% was inferred. Buckreef has 12,100 kg of contained gold resources, of which 75% is measured, 15% is indicated, and 10% is inferred. The inferred resources at Rwamagaza amount to 1,900 kg of gold. Spinifex engaged in drilling at the Buckreef, the Kitongo, and the Nyakafuru deposits in 2000 and planned to spend $1.5 million on exploration at these deposits in 2001 (Spinifex Gold Ltd., 2001, p. 3; Tassell, 2001).

In 2000, Mincor Resources NL started drilling at its Geita gold project in the Geita Greenstone Belt about 50 kilometers (km) west of Ashanti's Geita Mine. In September, Twigg Minerals plc started a reverse circulation drilling program at the Miyabi concession. Maiden Gold NL continued its exploration at Mwagi Magi. Goldstream Mining NL explored for gold at the Buhemba and Rukwa concessions (African Mining, 2000b; Goldstream Mining NL, 2000, p. 16-17).

Iron and Steel.—From 1996 to 2000, Tanzania's production of steel averaged 10,000 t/yr (table 1). Tanzania produced iron ore from the Itewe deposit near Chunya until 1997. Resources at this deposit were estimated to be 50 Mt at a grade of 32% iron. The Liganga iron ore deposit has proven resources of 45 Mt at a grade of 52% iron. State-owned National Development Corp. (NDC) was seeking investors to help develop the Liganga deposit. Resources from deposits in the Uluguru Mountains were estimated to be 8 Mt at a grade of 40% iron and 10% titanium. Goldstream Mining was exploring for iron ore at Mwahanza (Tanzania Ministry of Energy & Minerals, 1998, p. 73-74; Goldstream Mining NL, 2000, p. 17).

Industrial Minerals

Cement.—Tanzania's consumption of cement was estimated to have remained unchanged in 2000. Consumption increased by 8.3% in 1999 owing to gold mine development, infrastructure works, and large construction projects. The majority of cement consumption was attributable to the housing sector, especially concrete block manufacturers. The country's three cement producers were Tanzanian Portland Cement Co. Ltd., with a capacity of 700,000 t/yr of cement; Tanga Cement Co. Ltd., 500,000 t/yr; and Mbeya Cement Co. Ltd., 300,000 t/yr. Cement was exported to Burundi, Comoros, Rwanda, and Uganda. Tanzania's cement consumption was predicted to increase by 7.7% in 2001 (International Cement Review, 1998, 2001).

Diamond.—Production at the Williamson Mine increased substantially in 1999 and 2000 owing to the reprocessing of old tailings. In 2000, the mine produced 317,000 carats valued at $46 million from nearly 2.96 Mt of ore. From 1995 to 1999, gem-quality diamond accounted for about 85% of total diamond production in Tanzania. Diamond resources were estimated to be 114 Mt containing 6.5 million carats (DeBeers Group, 2001, p. 41, 56; Weber and Zsak, 2001, p. 222).

Gemstones.—African Gem Resources Ltd. (Afgem) acquired the rights to mine tanzanite in block C of the Merlani mining area; blocks B and D were being mined by artisanal miners. The company estimated that two-thirds of the world's known deposits of tanzanite were located in block C. Resources in block C were reported to be 2.24 Mt of ore grading 22 carats per metric ton. Afgem was developing a mine that would have a life of at least 19 years. The mine was expected to be operational in 2002 and to produce 1.5 million carats per year by 2005 (African Mining, 2000c; Mining Journal, 2001).

More than 200 different occurrences of gem minerals are known in Tanzania, particularly in the Mozambique Orogenic Belt. In recent years, alexandrite has been produced at Tunduru; aquamarine, at Mhuva; cat's eye, at Lake Manyara and Tunduru; emerald, at Lake Manyara; garnet, at Magagoni and Tunduru; opal, at Kasulu; olivine, at Gelai; ruby, at Mahenge, Matombo, Morogoro, and Tunduru; sapphire, at Songea, Tunduru, and the Umba Valley; scapolite, at Dodoma; spinel, at Tunduru; topaz, at Magagoni; tourmaline, at Mhuva and Same; and zircon, at Tunduru (Kane, 1999; Shigley and others, 2000, p. 311, 313, 315, 318-323, 325).

Limestone and Marble.—The Tanga and the Wazo Hill limestone deposits have been exploited for use in the cement industry; resources amount to more than 135 Mt at Tanga and 20 Mt at Wazo Hill. Other substantial limestone deposits include Lindi. Marble from the Mbarali deposits has been used for the production of lime. Resources from these deposits were estimated to be 137 Mt. The Msowrwa-Msehe deposit has calcitic marble resources of about 121 Mt that would be suitable as an additive in the smelting of iron ores (Bosse and others, 1996, p. 430-431, 441, 445).

Salt.—The domestic demand for salt was nearly 120,000 t/yr. Tanzania's salt production declined by 19.3% from 1996 to 2000 (table 1). Domestic salt producers included H.J. Stanley & Sons Ltd., Mtawanya Saltworks Ltd., Mtwara Oceanic Products Ltd., and Nyanza Salt Mines (T) Ltd. Substantial deposits of rock salt occur near Mandawa (Tanzania Ministry of Energy & Minerals, 1998, p. 88).

Soda Ash.—In 1999, Tanganyika Gold NL acquired a 100% interest in the Lake Natron soda ash project. In 2000, the company, which changed its name to Renewable Energy Corporation Ltd., allowed its license on the project to lapse after unsuccessfully searching for a joint partner. Lake Natron, which is located in northern Tanzania, is a soda-rich saline lake that contains large areas of evaporite crust and an underlying brine layer. Crust resources were estimated to be 109 Mt at a grade of 40% sodium carbonate, and brine resources, 27 Mt at a grade of 18% to 21% sodium carbonate (African Mining, 1999, 2000b).

Mineral Fuels

Coal.—The Kiriwa coalfield produced about 35,000 t/yr of bituminous coal, most of which was consumed by a nearby

powerplant. Bituminous coal resources at Kiriwa were estimated to be 140 Mt. Deposits known to occur in the Ruhuhu coalfield include the Mchuchuma, with resources of 199 Mt; the Mbalawala, 98 Mt; the Mbuyura, 15 Mt; and the Ketewaka. NDC held a prospecting license for the Mchuchuma and the Ketewaka deposits and was seeking financing from investors to develop these deposits. Other bituminous coalfields included the Njuga, with resources of 23 Mt; and the Gahula, with resources of 2 Mt. The largest subbituminous coalfield was the Mhukuru, which has estimated resources of 150 Mt. The Ufipa coalfield has estimated subbituminous resources of 10 Mt in the Muze sector, and 7.5 Mt in the Namwele sector (Tanzania Ministry of Energy & Minerals, 1998, p. 92).

Natural Gas.—The Mnazi Bay gasfield was estimated to have reserves of about 28 billion cubic meters PanAfrican Energy Corp. Ltd. (formerly Ocelot International Ltd.) operated the Songo Songo gasfield, which has recoverable reserves of about 14 billion cubic meters and total reserves of about 28 billion cubic meters. The Songas project, which consisted of exploitation of the Songo Songo field and the construction of a 232-km pipeline to Dar es Salaam, was held up by environmental and financing concerns. The World Bank planned to provide $200 million to finance the project but was still studying the plans at the end of 2000. Other partners in the project included AES Corp. of the United States and CDC. The Songas project was expected to start production in 2003 (Indian Ocean Newsletter, 2000; Mbendi Information Services, October 4, 2000, Oil and gas industry—Tanzania—Natural gas, accessed October 25, 2001, at URL http://mbendi.co.za/indy/oilg/gas_/af/ta/p0005.htm).

Petroleum.—The petroleum refinery at Dar es Salaam had a capacity of 14,900 barrels per day. In February, the Government agreed to shut down the refinery on the grounds that it was no longer competitive. For the fiscal year ending in June 2000 (fiscal year 1999-2000), the value of imported petroleum products increased to $153.4 million compared with $104.1 million in fiscal year 1998-99. For calender year 1999, the country consumed an estimated 5.49 million barrels of refined petroleum products (Cross, 2001; U.S. Energy Information Administration, March 2001, Great Lakes region fact sheet—Burundi, Kenya, Rwanda, Tanzania, and Uganda, accessed April 19, 2001, at URL http://www.eia.doe.gov/emeu/cabs/eafrica2.html).

Tanzania Petroleum Development Co. initiated the country's first offshore licensing round in September. The inventory included six deepwater blocks covering a total of 64,050 square kilometers in the Mafia offshore deep-sea basin. In December, Dublin International Petroleum (Tanzania) Ltd. announced that it was drilling a new exploratory well in the Mandawa concession (Cross, 2001; U.S. Energy Information Administration, March 2001, Great Lakes region fact sheet—Burundi, Kenya, Rwanda, Tanzania, and Uganda, accessed April 19, 2001, at URL http://www.eia.doe.gov/emeu/cabs/eafrica2.html).

Infrastructure

In 1999, Tanzania generated 2,250 gigawatthours (GWh) of electricity, of which 78% was provided by hydroelectric power sources, and 22%, by fossil fuels. In the same year, Tanzania imported an estimated 40 GWh of electricity; the Government of Uganda was considering increasing its electricity exports to Tanzania. The country had installed capacity of 620 megawatts (MW) in 1999, of which 381 MW was for hydroelectric power. Hydroelectric power stations included Kidatu, with a capacity of 204 MW; Mtera, 80 MW; Pangani Falls, 68 MW; and Hale, 21 MW. Thermal power stations included Umbongo with a capacity of 112 MW. The Kihansi hydroelectric power station increased national capacity by 180 MW in 2000 (Africa Energy & Mining, 1999, 2000b). Tanzania's exploitable potential hydroelectric energy has been estimated to be 20,000 MW (World Resources Institute and others, 1996, p. 288). Potential areas for development of geothermal power include Kisaki Tagalala, Mbeya, and Ngorongoro.

Tanzania had about 88,200 km of roads, of which approximately 3,700 km was paved, and a 3,600-km rail network. The country had 982 km of crude petroleum pipelines. Lakes Nyasa, Tanganyika, and Victoria were being used as the principal waterways. The major import/export harbor was at Dar es Salaam; other lake and Indian Ocean ports were at Bukoba, Kigoma, Kilwa Masoko, Lindi, Mtwara, Mwanza, Pangani, Tanga, Wete, and Zanzibar (U.S. Central Intelligence Agency, 2000).

Outlook

Tanzania's mineral industry, particularly gold mining, is likely to grow substantially in the near future. With the opening of mines at Bulyanhulu, Geita, and North Mara, the country's gold production is likely to increase to more than 30,000 kg in 2001. Increases in the capacities of these mines and the opening of other new mines could boost gold production to nearly 53,000 kg in 2007. Planned investment of $1.5 billion from 2000 to 2007 could increase capacity by 50,000 kg. The International Cement Review (2001, p. 286) predicted that cement consumption would grow by nearly 8% in 2001, which may lead to higher demand for domestic gypsum and limestone.

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TABLE 1
TANZANIA: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity 3/		1996	1997	1998	1999	2000
Calcite e/		40	40	40	40	40
Cement, hydraulic	thousand tons	726 r/	621 r/	778 r/	833 r/	833
Clays:						
Bentonite e/		75	75	75	75	75
Kaolin		1,332	1,000 r/	1,200 r/	1,500 r/	1,500 e/
Coal, bituminous e/		52,000 4/	35,000	35,000	35,000	35,000
Diamond 5/	carats	126,670	123,100	97,800 r/	234,800 r/	354,400
Gemstones, excluding diamond 6/	kilograms	142,160 r/	509,489 r/	48,518	95,200 r/	150,800
Gold, refined	do.	318	232 r/	427 r/	4,767 r/	15,060
Graphite		6,776	11,000	--	--	--
Gypsum and anhydrite, crude		55,400	46,300	59,100 r/	40,000 r/	60,000
Iron ore		86,400	91,200	--	--	--
Limestone, crushed		1,200,000	-- r/	1,181,200 r/	1,241,200 r/	1,500,000
Petroleum fuels		336,000	313,000	312,000	287,000	117,000
Phosphate minerals:						
Apatite		28,020	3,000	1,935	--	--
P_2O_5 content		8,686	930	600	--	--
Salt, all types		86,700	72,500 r/	75,000 r/	35,000 r/	70,000
Sand, glass e/		4,200	4,200	4,200	4,200	4,200
Soda ash e/		300	300	300	300	300
Steel		7,733	12,498	9,522	8,982	11,182

e/ Estimated. r/ Revised. -- Zero.

1/ Includes data available through March 2000.

2/ Estimated data are rounded to no more than three significant digits.

3/ In addition to the commodities listed, modest quantities of unlisted varieties of crude construction materials (other clays, sand and gravel, and stone) presumably are produced, but output is not reported quantitatively, and available information is inadequate to make reliable estimates of output levels.

4/ Reported figure.

5/ Diamond figures are estimated to represent 85% gem-quality or semigem-quality and 15% industrial-quality stones.

6/ Precious and semiprecious stones produced included amethyst, chrysoprase, emerald, peridot, rhodolite, ruby, tanzanite, and tourmaline.