



# 2010 Minerals Yearbook

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## TANZANIA

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# THE MINERAL INDUSTRY OF TANZANIA

By Thomas R. Yager

In 2010, Tanzania was the world's only producer of tanzanite. The country also played a significant role in the global production of gold, accounting for nearly 2% of the world's gold mine output. Other domestically significant mining and mineral processing operations included cement and diamond. Tanzania was not a globally significant consumer of minerals or mineral fuels (George, 2011).

## Minerals in the National Economy

In 2010, the manufacturing sector accounted for 10.3% of the gross domestic product, and mining and quarrying, 2.6%. The value of output in the mining sector increased by 2.7% in 2010 compared with 1.2% in 2009. It is likely that artisanal mining employment declined in late 2008 and 2009 because of reduced colored gemstone production; employment may have increased in 2010 (Bank of Tanzania, 2011, p. 47, 49).

## Government Policies and Programs

Tanzania is a signatory to the Kimberley Process Certification Scheme, which is a certification system established to reduce the trade in conflict diamond. The mining sector was regulated by the Mining Act of 1998, which, when enacted, simplified previous laws on mining and mineral trading.

In 2010, the Government passed the Mining Act of 2010, which increased royalties on gold and base metals to 4% from 3%; and rough diamond and colored gemstones, to 6% from 5%. Royalties on uranium were set at 7% and other minerals, at 3%. The new legislation also required companies to list domestically, allowed the Government to take a share in future mining projects, and restricted foreign participation in small-scale mining (Mining Journal, 2010; Thompson, 2010).

## Production

In 2010, copper and gypsum production increased by 130% each; kaolin, by 129%; aggregates, by 77%; silver, by 46%; natural gas, by 21%; cement, by 19%; and garnet, by 18%. The production of pozzolanic materials decreased by 74%; marble, by 59%; diamond, by 56%; limestone, by 32%; and salt, by 14% (table 1).

## Structure of the Mineral Industry

Tanzania's gold mines were privately owned; the Minjingu phosphate mines and the Nyanza salt mines were also owned by private investors. The Government held minority interests in the privately owned Kiwira coal mine and the Williamson diamond mine. Artisanal miners accounted for most of the country's colored gemstone production; crushed stone, diamond, and gold were also produced by artisanal miners.

## Mineral Trade

Gold exports increased in value to \$1.47 billion in 2010 from \$1.23 billion in 2009. In 2010, the share of gold in total exports was 40%; and colored gemstones, copper, diamond, silver, and other minerals combined, 1%. The Bank of Tanzania reported that imports of petroleum products increased in value to \$1.98 billion in 2010 from \$1.32 billion in 2009. Petroleum products accounted for 25% of the value of total imports, and fertilizers, 1% (Bank of Tanzania, 2011, p. 40–41).

## Commodity Review

### Metals

**Cobalt, Copper, and Nickel.**—Barrick Gold Corp. of Canada (50%) and Xstrata plc of Switzerland (50%) had a joint-venture for the exploration and development of the Kabanga nickel deposit in northwestern Tanzania. Resources at Kabanga were estimated to be 63.9 million metric tons (Mt) at a grade of 2.38% nickel; the deposit also contained cobalt, copper, and platinum. Barrick and Xstrata planned to complete a revised feasibility study on a new mine at Kabanga in the first half of 2011 (Barrick Gold Corp., 2011, p. 18, 169).

African Eagle Resources plc (AER) of the United Kingdom planned to complete a prefeasibility study on a new mine at the Dutwa nickel-cobalt laterite deposit by the end of 2011 and a feasibility study by the end of 2012. Depending on the results of the studies, AER could start production of 20,000 metric tons per year (t/yr) of nickel at Dutwa in 2015. In early October 2010, AER estimated that resources at Dutwa were 98.6 Mt at a grade of 0.93% nickel. The company also engaged at a drilling program at the Zanzui nickel-cobalt laterite deposit in northwestern Tanzania. AER hoped to identify resources of about 20 Mt at Zanzui (Mining Review Africa, 2010; Edison Investment Research Ltd., 2011).

IMX Resources Ltd. of Australia and its joint-venture partner Continental Nickel Ltd. of Canada engaged in drilling at the Nachingwea nickel sulfide deposit in late 2010. Resources at Nachingwea were estimated to be 3.1 Mt at a grade of 1.31% nickel and 0.24% copper. The companies hoped to increase contained nickel resources to at least 100,000 metric tons (t). IMX was also considering a drilling program at its Mibango project for 2011 (Andrews, 2011).

Tanzanian Royalty Exploration Corp. of the United States signed a joint-venture agreement with Jinchuan Group Ltd. of China. The joint venture planned to explore for nickel at and to develop the former company's Kabanga nickel properties, which are located about 50 kilometers (km) northwest of the Kabanga nickel deposit held by Barrick and Xstrata (Thompson, 2010).

**Gold.**—Tanzania's gold production remained nearly unchanged at 39,448 kilograms (kg) in 2010. The Bulyanhulu,

the Buzwagi, the Geita, the Golden Pride, the North Mara, and the Tulawaka Mines had a combined capacity to produce about 54,300 kilograms per year (kg/yr) of gold. Tanzania's resources amounted to more than 1,400 t of contained gold, of which nearly 670 t was reserves (tables 1, 2, and 3).

Barrick operated the Bulyanhulu, the Buzwagi, the North Mara, and the Tulawaka Mines. Copper was produced as a coproduct at the Bulyanhulu and the Buzwagi Mines. In early 2010, Barrick spun off its gold assets in Tanzania into a new company called African Barrick Gold plc (ABG) (Barrick, 75%). The Bulyanhulu Mine produced about 8,100 kg of gold in 2010 compared with about 7,700 kg in 2009. ABG planned to complete a feasibility study on increasing production at Bulyanhulu in the first half of 2011. Depending on the results of the study, production could increase at Bulyanhulu starting in 2013 or 2014. The life of the mine was estimated to be more than 25 years (Hill, 2010; African Barrick Gold plc, 2011, p. 7, 9).

In 2010, production at the North Mara open pit mine remained nearly unchanged at about 6,600 kg of gold. ABG planned to complete a feasibility study on starting an underground mine at North Mara in the first half of 2011. Depending on the results of the study, production could increase by between 1,600 and 1,900 kg/yr at North Mara starting in 2013 or 2014. The life of the mine was estimated to be 10 years (Hill, 2010; African Barrick Gold plc, 2011, p. 12, 15).

ABG produced nearly 5,900 kg of gold at the Buzwagi Mine in 2010, which was nearly unchanged from 2009. The company lost about 900 kg of production in 2010 because of fuel theft. At the end of 2009, the life of the mine was estimated to be about 13 years (African Barrick Gold plc, 2011, p. 10).

By mid-2011, ABG planned to complete a feasibility study on the Golden Ridge project, which was located about 50 km from the Buzwagi Mine. Depending on the results of the study, ABG could produce between 2,200 and 3,100 kg/yr at Golden Ridge starting in 2013 or 2014. The company planned to process ore from Golden Ridge at Buzwagi. The life of the Golden Ridge Mine was estimated to be between 7 and 8 years (Hill, 2010; African Barrick Gold plc, 2011, p. 10).

ABG and its joint-venture partner MDN Inc. of Canada produced gold at the Tulawaka open pit mine. Production at Tulawaka decreased to 1,870 kg in 2010 from 2,929 kg in 2009. In 2010, the mine life at Tulawaka was extended to mid-2012 from 2011; Barrick and MDN planned exploration to extend the life further in 2011 (MDN Inc., 2011, p. 9–10).

By 2014, ABG planned to increase output from currently producing mines to about 31,000 kg/yr; the company's total production could reach nearly 45,000 kg/yr by 2020. Possible new sources of production included the Nyazaga project, which contained the Tusker deposit. ABG planned to start a feasibility study on developing a new mine at Tusker in 2011. Production at Tusker could be more than 6,200 kg/yr of gold depending on the outcome of the study. In 2009, resources at Tusker were estimated to be 102 Mt at a grade of 1.3 grams per metric ton (g/t) gold (Mining Journal, 2009; Hill, 2010).

In 2010, Geita Gold Mining Ltd. (a subsidiary of AngloGold Ashanti Ltd. of South Africa) produced about 11,100 kg of gold at the Geita Mine compared with nearly 8,500 kg in 2009. Most of the increase in production was attributable to increased

ore grades. In 2011, output at Geita was expected to increase to between 15,100 and 15,700 kg. AngloGold Ashanti also engaged in exploration at Geita in 2010. The life of the mine was estimated to be more than 10 years (Thompson, 2010; AngloGold Ashanti Ltd., 2011, p. 101–103).

Resolute Mining Ltd. of Australia owned the Golden Pride open pit mine. In fiscal year 2010, the Golden Pride Mine produced 4,624 kg of gold compared with 3,952 kg in fiscal year 2009. Production was expected to decrease to about 3,100 kg by fiscal year 2012. The mine's remaining reserves were estimated to be about 6.3 Mt at a grade of 1.6 g/t gold. Resolute engaged in drilling at the Golden Pride West joint venture project with Barrick Gold and at prospects near the Golden Pride Mine that included the Far East and the Isunga (Resolute Mining Ltd., 2011a, b).

Shanta Gold Ltd. planned to start production at the new Luika Mine in the Lake Victoria goldfield in late 2011. Production at the Luika Mine was expected to be about 880 kg/yr of gold; the capital cost of the mine was estimated to be \$23 million. The estimated life of the mine was 11 years. Shanta was also engaged in a feasibility study on the development of a new mine at the Singida project. The company planned to complete the study by the end of March 2011. Resources at Singida were estimated to be 27 t of contained gold (Thompson, 2010; Mining Review Africa, 2011).

Ruby Creek Resources Inc. of the United States purchased a 70% share in the Mkuvia Gold project in southeastern Tanzania in May 2010. The company hoped to obtain permits to mine gold from alluvial deposits by the fourth quarter of 2010. The mine was estimated to have a life of between 4 and 7 years. Ruby Creek planned further exploration to increase resources at Mkuvia (Ruby Creek Resources Inc., 2010).

In 2010, AER signed a joint-venture agreement with MHM Metals Ltd. to develop the Miyabi gold deposit, which had contained gold resources of nearly 16 t. In April, Peak Resources Ltd. of Australia purchased the Igurubi project from AER. Peak Resources commenced exploration at Fort Ikoma and Nkerege in the fourth quarter of 2010; the company planned further exploration in 2011 (Thompson, 2010; Peak Resources Ltd., 2011, p. 11).

In late November 2010, Helio Resource Corp. of Canada estimated that resources at the SMP property in the Lupa Goldfield in southwestern Tanzania were 17.9 Mt at a grade of 1.33 g/t gold. MDN carried out drilling at the Ikungu and the Msasa projects; the company purchased the Nikonga license in September. Lake Victoria Mining conducted drilling at its Kinyambwiga and Singida projects in 2010. In July, BrightStar Resources Ltd. of Australia purchased the Kitongo gold project, which had resources of 4.4 Mt grading 2 g/t gold. Canaco Resources Inc. of Canada conducted a drilling program at the Handeni project in eastern Tanzania. Currie Rose Resources Inc. of Canada planned to drill at its Mabale Hills project in 2011 (Thompson, 2010; MDN Inc., 2011, p. 10–12; Northern Miner, The, 2010, 2011; Currie Rose Resources Inc., undated).

**Niobium (Columbium) and Tantalum.**—In September 2010, Peak Resources discovered niobium and tantalum mineralization at the Ngualla Carbonatite project in western Tanzania. The company planned to restart drilling after the end

of the rainy season in April or May 2011 (Peak Resources Ltd., 2011, p. 1, 3, 8–9).

### **Industrial Minerals**

**Cement.**—Tanzania’s cement production capacity amounted to about 3 million metric tons per year (Mt/yr). Tanga Cement Company Ltd. increased its capacity to 1.25 Mt/yr from 750,000 t/yr in November 2009; the company’s production increased to about 850,000 t in 2010 from 706,000 t in 2009. Tanzania Portland Cement Company Ltd. (TPCC) produced 1.19 Mt of cement in 2010 compared with about 1 Mt in 2009. In 2010, Athi River Mining Ltd. of Kenya (ARM) started construction of its new cement and clinker plants. ARM planned to complete a cement plant in Dar es Salaam with a capacity of 750,000 t/yr in early 2012. The company also planned to complete clinker and cement plants in Tanga with capacities of 1.2 Mt/yr and 750,000 t/yr, respectively, in the fourth quarter of 2012 (Athi River Mining Ltd., 2011, p. 11; Renaissance Capital LLC, 2011, p. 52).

Cement demand was estimated to be about 2.7 Mt in 2010. Cement prices were about \$130 per metric ton, which was lower than that of neighboring landlocked countries with high power and transportation costs, such as Congo (Kinshasa) (about \$400 per metric ton), Burundi (about \$350 per metric ton), Rwanda (about \$300 per metric ton), and Uganda (nearly \$200 per metric ton) (Renaissance Capital LLC, 2011, p. 9, 34).

**Diamond.**—The Williamson Mine was Tanzania’s largest diamond mine; Petra Diamonds Ltd. of the United Kingdom produced 43,560 carats at Williamson in 2010. Petra shut down all mining operations except for alluvial mining in the second half of 2010 as it refurbished the main processing plant. The company planned to reopen the expanded plant in the second quarter of 2011. Petra planned to produce 200,000 carats in fiscal year 2012 and 600,000 carats per year starting in fiscal year 2014. Resources at Williamson were estimated to be 40 million carats. The estimated capital cost of the expansion was \$50 million (Petra Diamonds Ltd., 2011a, p. 14–15, 24; 2011b, p. 13).

**Gemstones.**—Tanzania produced a variety of gemstones that included amethyst, aquamarine, cordierite, emerald, garnet, ruby, sapphire, spinel, tanzanite, and tourmaline. Tanzanite accounted for a majority of the value of domestic gemstone mining.

Merelani, which is located near Arusha, was the world’s only source of tanzanite. Artisanal and small-scale miners operating in Blocks B and D of the Merelani deposit accounted for most of the country’s tanzanite production. Kilimanjaro Mines Ltd. and Tanzanite Africa Ltd. operated medium-scale mines in Block A and the Block D Extension, respectively. By March 2009, only 30 of 382 mining operations were still in production in Block D and 20 of 323 mining operations were still in production in Block B. Sharp decreases in tanzanite prices resulting from the world economic crisis rendered most artisanal and small-scale mining operations subeconomic. At the end of 2010, many of the artisanal and small-scale mining operations were still shut down (Guardian, The, 2011).

TanzaniteOne Ltd. of Bermuda mined tanzanite in Block C; the company also cut high-quality tanzanite at its lapidaries in

Tanzania. In 2010, TanzaniteOne produced 441 kg of rough tanzanite compared with 383 kg in 2009; increased production was attributable to higher ore grades. The life of the mine was estimated to be as much as 20 years. TanzaniteOne also completed a new lapidary at Merelani in the fourth quarter of 2010 in response to the Government’s export ban on uncut tanzanite stones larger than 1 gram. The lapidary was expected to reach full capacity in mid-2011 (TanzaniteOne Ltd., 2011, p. 8, 12–13).

Tsavorite, which is a green grossular garnet that obtains its color from trace amounts of chromium and vanadium, was produced at Lemshuku. In 2010, TanzaniteOne conducted drilling and bulk sampling at the Lemshuku-Shamberai tsavorite project, which was located about 20 kilometers southwest of the tanzanite mines (TanzaniteOne Ltd., 2011, p. 15).

**Phosphate Rock and Rare Earths.**—Small amounts of phosphate rock were mined at Minjingu by Minjingu Mines and Fertilizers Ltd. Peak Resources conducted drilling for phosphates and rare-earth elements (REE) at the Ngualla carbonatite project in September and November 2010. The company planned further drilling starting in April or May 2011 that would focus on providing data for an initial estimate of REE resources. Montero Mining & Exploration Ltd. of Canada engaged in exploration at the Wigu Hill project in 2010. The company planned drilling at Wigu Hill in 2011 to define REE resources (Montero Mining & Exploration Ltd., 2011; Peak Resources Ltd., 2011, p. 1–7).

### **Mineral Fuels and Related Materials**

**Coal.**—Atomic Resources Ltd. of Australia and its joint-venture partner National Development Corp. (NDC) (owned by the Government of Tanzania) planned to start a new coal mine at the Ngaka coalfield in Ruvumu District. In the first phase of the project, the companies planned to produce 150,000 t of coal in 2011 and to ramp up to 1 Mt in 2013. In the second phase, Atomic and NDC planned to increase production to 2.5 Mt/yr starting in 2014. About 1.5 Mt/yr would be supplied to a new coal-fired power station with a capacity of 450 megawatts (MW). In the third phase, Atomic and NDC planned to produce an additional 5 Mt/yr for export markets. Resources at Ngaka were estimated to be about 290 Mt (Fraser, 2011).

**Natural Gas.**—In 2010, Orca Exploration Group Inc. produced 790 million cubic meters of natural gas from Songo Songo Island compared with 668 million cubic meters in 2009. The capacity of Orca’s gas processing plant was 1.14 billion cubic meters in 2010. Orca expected local natural gas demand to increase by about 200 million cubic meters per year from 2011 to 2016. The company planned to expand the capacity of the gas processing plant and the pipeline to nearly 1.45 billion cubic meters per year by the first quarter of 2013. The leading local consumers of natural gas were powerplants and TPCC’s cement plant. In 2010, total reserves at Songo Songo, Songo Songo North, and Songo Songo West were estimated to be about 65 billion cubic meters (Orca Exploration Group Inc., 2011, p. 5, 9, 11, 22–24).

Etablissements Maurel et Prom SA of France operated the Mnazi Bay offshore gas project in the Rovuma Basin.

Maurel et Prom (38.22%), Wentworth Resources Ltd. of the United Kingdom (25.4%), state-owned Tanzania Petroleum Development Corp. (20%), and Cove Energy plc of the United Kingdom (16.38%) produced 18 million cubic meters of natural gas at Mnazi Bay in 2010. Natural gas from Mnazi Bay was consumed at a power station with a capacity of 18 MW. Depending on the results of a feasibility study, the companies could supply nearly 790 million cubic meters per year to a new gas-fired plant with a capacity of 300 MW in Mtwara starting in April 2014 (Wentworth Resources Ltd., 2011, p. 9, 13).

**Petroleum.**—Maurel et Prom abandoned the Kianika-1 exploration well at the Mandawa projects in 2010. The company was in the process of farming out its interests in Tanzania. Tullow Oil plc of the United Kingdom and its joint-venture partners drilled an exploration well in its Rovuma Basin license in southeastern Tanzania in early 2010 (Petroleum Economist, 2010; Etablissements Maurel et Prom SA, 2011, p. 35).

**Uranium.**—In 2010, Mantra Resources Ltd. of Australia completed a prefeasibility study at the Mkuju River project. The study estimated that the Nyota property could support a new uranium mine with average production of nearly 1,700 t/yr of uranium oxide ( $U_3O_8$ ). Mantra subsequently started a feasibility study on developing a new mine; the study was likely to be completed in the first quarter of 2011. The company also started a prefeasibility study on increasing production by mining and heap leaching lower grade ore. In November, Mantra estimated that resources at Nyota were 108.9 Mt at a grade of 0.04%  $U_3O_8$  (Mantra Resources Ltd., undated).

Uranex NL of Australia (IMX Resources NL, 39.5%) was engaged in a prefeasibility study on developing a new mine at the Manyoni project with a 7-year life and a capacity of between 350 and 400 t/yr of  $U_3O_8$ . In January, Uranex announced plans to extend the study to consider heap leaching that could increase production and mine life. At the end of June, the company announced a revised resource estimate of 92 Mt at a grade of 0.014%  $U_3O_8$ . Uranex also explored at the Mkuju project in southwestern Tanzania in 2010 (Uranex NL, 2010a, p. 4–5; 2010b).

In October 2010, Uranium Resources plc of the United Kingdom completed the first phase of its drilling program at Mtonya and started on the second phase. AER sold its uranium assets to Jacana Resources Ltd. of Australia (Uranium Resources plc, 2010; Edison Investment Research Ltd., 2011).

## Outlook

Tanzania's production of cement, coal, diamond, gold, and natural gas is expected to increase in the near future. Cement production is likely to increase in 2012 and 2013; coal and diamond, from 2011 to 2014; and natural gas, in 2013 and 2014. Increased gold output from the Bulyanhulu, the Geita, and the North Mara Mines and the opening of the Golden Ridge and the Luika Mines is likely to more than offset the shutdown of the Golden Pride and the Tulawaka Mines. Depending on the results of prefeasibility studies, cobalt and nickel mining could start by 2015. The recovery of colored gemstone production depends on improvements in world market conditions.

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TABLE 1  
 TANZANIA: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

| Commodity <sup>2</sup>                       | 2006                   | 2007                   | 2008                   | 2009                   | 2010                 |
|--|------------------------|------------------------|------------------------|------------------------|----------------------|
| Bauxite                                      | 5,373                  | 5,003                  | 20,601                 | 122,920                | 130,000 <sup>e</sup> |
| Calcite                                      | 100                    | 1,500                  | 112                    | --                     | 152                  |
| Cement, hydraulic                            | 1,370 <sup>r</sup>     | 1,630                  | 1,756                  | 1,941                  | 2,312                |
| Coal, bituminous                             | 17,940                 | 27,198                 | 15,242                 | --                     | --                   |
| Copper, contained in concentrates and doré   | 3,284                  | 3,275                  | 2,852                  | 2,319 <sup>r</sup>     | 5,326                |
| Diamond <sup>3</sup>                         | 272,204                | 282,786                | 237,676                | 181,874                | 80,498               |
| Gemstones, excluding diamond: <sup>e,4</sup> |                        |                        |                        |                        |                      |
| Alexandrite                                  | NA                     | NA                     | 15 <sup>5</sup>        | 1 <sup>5</sup>         | -- <sup>5</sup>      |
| Amethyst                                     | 270                    | 270                    | 200                    | 150                    | 160                  |
| Aquamarine                                   | 280                    | 280                    | 323 <sup>5</sup>       | 468 <sup>5</sup>       | 466 <sup>5</sup>     |
| Cordierite (iolite)                          | 310                    | 310                    | -- <sup>5</sup>        | -- <sup>5</sup>        | --                   |
| Emerald                                      | NA                     | NA                     | 11 <sup>5</sup>        | 19 <sup>5</sup>        | --                   |
| Garnet                                       | 5,900                  | 5,900                  | 4,400                  | 8,448                  | 9,934 <sup>5</sup>   |
| Ruby   | 2,700                  | 2,700                  | 2,000                  | 1,500                  | 1,600                |
| Sapphire                                     | 1,300                  | 1,300                  | 1,000                  | 750                    | 800                  |
| Tanzanite                                    | 5,894 <sup>5</sup>     | 8,187 <sup>5</sup>     | 6,100                  | 2,500                  | 3,000                |
| Tourmaline                                   | NA                     | NA                     | 3,865 <sup>5</sup>     | 9,283 <sup>5</sup>     | 9,530 <sup>5</sup>   |
| Other  | 2,480,000              | 1,280,000              | 1,840,000              | 1,060,000              | 1,130,000            |
| Total  | 2,498,637 <sup>5</sup> | 1,294,485 <sup>5</sup> | 1,858,287 <sup>5</sup> | 1,068,481 <sup>5</sup> | 1,160,000            |
| Gold   | 47,000 <sup>e</sup>    | 40,193                 | 36,434                 | 39,112                 | 39,448               |
| Gypsum and anhydrite, crude                  | 32,556                 | 52,759                 | 55,730                 | 8,105                  | 18,568               |
| Kaolin                                       | --                     | 1,020                  | 13,926                 | 18,624                 | 42,649               |
| Lime <sup>e</sup>                            | 20,000                 | 15,000                 | 20,000                 | 30,000                 | 30,000               |
| Natural gas <sup>6</sup>                     | 510 <sup>r</sup>       | 558 <sup>r</sup>       | 569 <sup>r</sup>       | 668 <sup>r</sup>       | 808                  |
| Phosphate rock:                              |                        |                        |                        |                        |                      |
| Gross weight                                 | 2,881                  | 8,261                  | 28,684                 | 752                    | 800                  |
| P <sub>2</sub> O <sub>5</sub> content        | 860                    | 2,500                  | 8,600                  | 230                    | 240                  |
| Salt, all types                              | 34,798                 | 35,224                 | 25,897                 | 28,444 <sup>r</sup>    | 24,281               |
| Silver, contained in concentrates and doré   | 14,906                 | 12,381                 | 10,388                 | 8,231                  | 12,040               |
| Steel, semimanufactured                      | 50,654                 | 46,016                 | 75,274 <sup>r</sup>    | 122,318 <sup>r</sup>   | 126,054              |
| Stone, sand, and gravel:                     |                        |                        |                        |                        |                      |
| Aggregates                                   | 160,000 <sup>e</sup>   | 180,000 <sup>e</sup>   | 63,821                 | 86,112                 | 152,781              |
| Dolomite <sup>e</sup>                        | 950                    | 169 <sup>5</sup>       | 170                    | 170                    | 170                  |
| Limestone, crushed                           | 1,607,570              | 1,322,023              | 1,281,805              | 1,370,852              | 928,464              |
| Marble                                       | 337                    | 400 <sup>e</sup>       | 522                    | 2,679                  | 1,109                |
| Pozzolanic materials                         | 129,295                | 184,070                | 260,403                | 171,904 <sup>r</sup>   | 45,240               |
| Sand <sup>e</sup>                            | 7,577,210 <sup>5</sup> | 8,400,000              | 8,500,000              | 8,500,000              | 8,500,000            |

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. <sup>r</sup>Revised. Do. Ditto. NA Not available. -- Zero.

<sup>1</sup>Table includes data available through December 14, 2011.

<sup>2</sup>In addition to the commodities listed, modest quantities of crude construction materials, including brick clay, are produced, but available information is inadequate to make reliable estimates of output.

<sup>3</sup>Diamond figures are estimated to represent 85% gem-quality or semigem-quality stones and 15% industrial-quality stones. Does not include smuggled artisanal production.

<sup>4</sup>Other precious and semiprecious stones produced include alexandrite, chrysoprase, emerald, kyanite, moonstone, opal, peridot, quartz, spinel, and tourmaline. Does not include smuggled artisanal production.

<sup>5</sup>Reported figure.

<sup>6</sup>Orca Exploration Group Inc. only in 2007, 2008, and 2009; Artumas Group Inc. also produced small amounts of natural gas.

TABLE 2  
TANZANIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2010

(Metric tons unless otherwise specified)

| Commodity                           | Major operating companies   |  | Location of main facilities                                     | Annual capacity                        |         |
|-------------------------------------|---|--|---|--|---------|
| Cement                              | Tanzania Portland Cement Company Ltd. (TPCC)<br>(HeidelbergCement AG, 69.3%)      |  | Plant at Wazo Hill  | 1,400,000.                             |         |
| Do.                                 | Tanga Cement Company Ltd. (Holcim Mauritius<br>Investment Holdings Ltd., 62.5%)   |  | Plant at Tanga  | 1,250,000.                             |         |
| Do.                                 | Mbeya Cement Company Ltd. (LaFarge Group, 58%)                                    |  | Plant at Mbeya  | 350,000.                               |         |
| Coal, bituminous                    | Kiwira Coal and Power Ltd. (Tanpower Resources<br>Ltd., 85%, and Government, 15%) |  | Kiwira Mine <sup>1</sup>  | 150,000 run of mine;<br>93,000 washed. |         |
| Copper, in concentrates<br>and dore | African Barrick Gold plc (Barrick Gold Corp., 73.9%)                              |  | Bulyanhulu Mine near Kahama                                     | 7,300.                                 |         |
| Do.                                 | do.   |  | Buzwagi Mine  | 5,500.                                 |         |
| Diamond                             | Williamson Diamonds Ltd. (Petra Diamonds Ltd., 75%,<br>and Government, 25%)       |  | Williamson Mine near Shinyanga <sup>1</sup>                     | 4,000,000 ore processing.              |         |
| Do.                                 | carats  | do.  | do.   | 250,000 diamond.                       |         |
| Do.                                 | do.   | El Hillal Minerals Ltd.  | Near Williamson Mine  | 24,000. <sup>c</sup>                   |         |
| Glass                               | Kioo Ltd.   |  | Dar es Salaam   | 55,000.                                |         |
| Gold                                | Geita Gold Mining Ltd. (AngloGold Ashanti Ltd., 100%)                             |  | Geita Mine near Nyakabale                                       | 5,200,000 ore processing.              |         |
| Do.                                 | kilograms   | do.  | do.   | 17,000 gold.                           |         |
| Do.                                 | African Barrick Gold plc (ABG)  |  | Bulyanhulu Mine near Kahama                                     | 1,100,000 ore processing.              |         |
| Do.                                 | kilograms   | do.  | do.   | 13,000 gold.                           |         |
| Do.                                 | do.   |  | North Mara Mine in Tarime District                              | 2,900,000 ore processing.              |         |
| Do.                                 | kilograms   | do.  | do.   | 9,300 gold.                            |         |
| Do.                                 | do.   |  | Buzwagi Mine  | 4,400,000 ore processing.              |         |
| Do.                                 | kilograms   | do.  | do.   | 7,100 gold.                            |         |
| Do.                                 | Resolute Mining Ltd.  |  | Golden Pride Mine near Isanga                                   | 3,000,000 ore processing.              |         |
| Do.                                 | kilograms   | do.  | do.   | 4,800 gold.                            |         |
| Do.                                 | Pangea Minerals Ltd. (African Barrick Gold plc, 70%,<br>and MDN Inc., 30%)        |  | Tulawaka Mine   | 480,000 ore processing.                |         |
| Do.                                 | kilograms   | do.  | do.   | 3,100 gold.                            |         |
| Do.                                 | Tangold Ltd.  |  | Buhemba Mine, 47 kilometers<br>southeast of Musoma <sup>1</sup> | 1,300,000 ore processing.              |         |
| Do.                                 | kilograms   | do.  | do.   | 2,600 gold.                            |         |
| Lime                                | Athi River Mining Ltd. (ARM)  |  | Plant at Tanga  | 40,000.                                |         |
| Natural gas                         | million<br>cubic meters   | Orca Exploration Group Inc.  |   | Gasfield on Songo Songo Island         | 1,140.  |
| Do.                                 | do.   | Artumas Energy (Tanzania) Ltd. (subsidiary of<br>Artumas Group Inc.) |   | Gasfield at Mnazi Bay                  | 100.    |
| Phosphate rock                      | Minjingu Mines and Fertilizers Ltd.   |  | Mine at Minjingu  | 100,000.                               |         |
| Salt                                | Nyanza Mines (Tanganyika) Ltd.  |  | Nyanza Mines at Uvinza  | 60,000.                                |         |
| Silver                              | kilograms   | African Barrick Gold plc (ABG)                                       |   | Bulyanhulu Mine near Kahama            | 10,000. |
| Steel                               | MM Integrated Steel Mills Ltd.  |  | Plant at Dar es Salaam  | 36,000 <sup>c</sup> rolled.            |         |
| Do.                                 | Aluminum Africa Ltd.  |  | do.   | 33,000 <sup>c</sup> rolled.            |         |
| Do.                                 | Steel Masters Ltd.  |  | do.   | 22,000 rolled.                         |         |
| Do.                                 | MM Integrated Steel Mills Ltd.  |  | do.   | 36,000 galvanized.                     |         |
| Do.                                 | Aluminum Africa Ltd.  |  | do.   | 33,000 galvanized.                     |         |
| Tanzanite                           | TanzaniteOne Ltd.   |  | Mine at Merelani, Block C <sup>2</sup>                          | 120,000 ore processing.                |         |
| Do.                                 | kilograms   | do.  | do.   | 1,400 tanzanite.                       |         |
| Do.                                 | do.   | Tanzanite Africa Ltd. (IPP Media Ltd.)                               | Mine at Merelani, Block D Extension                             | NA.                                    |         |
| Do.                                 | do.   | Kilimanjaro Mines Ltd.   | Mine at Merelani, Block A                                       | NA.                                    |         |
| Do.                                 | do.   | Small-scale and artisanal miners                                     | Mines at Merelani, Blocks B and D                               | 7,500. <sup>c</sup>                    |         |

<sup>c</sup>Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

<sup>1</sup>Not operating at the end of 2010.

<sup>2</sup>Formerly the graphite processing plant at Merelani operated by Phoenix Minerals Ltd.

TABLE 3  
TANZANIA: GOLD RESOURCES AND RESERVES IN 2010

| Project                         | Major operating companies   | Tonnage<br>(million metric tons) | Grade<br>(grams per<br>metric ton) | Contained gold<br>(metric tons) |
|---------------------------------|---|----------------------------------|------------------------------------|---------------------------------|
| <b>Reserves:</b>                |   |                                  |                                    |                                 |
| Bulyanhulu <sup>1</sup>         | African Barrick Gold plc (Barrick Gold Corp., 73.9%)                    | 29.3                             | 11.7                               | 343                             |
| Geita <sup>2</sup>              | Geita Gold Mining Ltd. (AngloGold Ashanti Ltd., 100%)                   | 40.9                             | 3.2                                | 131                             |
| Buzwagi <sup>1</sup>            | African Barrick Gold plc  | 55.6                             | 1.6                                | 90                              |
| North Mara <sup>1</sup>         | do.   | 27.6                             | 3.2                                | 88                              |
| Golden Pride <sup>2</sup>       | Resolute Mining Ltd.  | 6.3                              | 1.6                                | 10                              |
| Tulawaka                        | Pangea Minerals Ltd. (African Barrick Gold plc, 70%, and MDN Inc., 30%) | 0.5                              | 6.5                                | 3                               |
| <b>Total</b>                    |   | <b>160.2</b>                     | <b>3.7</b>                         | <b>665</b>                      |
| <b>Resources:</b>               |   |                                  |                                    |                                 |
| Bulyanhulu                      | African Barrick Gold plc  | 40.4                             | 10.7                               | 432                             |
| Geita                           | Geita Gold Mining Ltd.  | 102.3                            | 3.4 <sup>3</sup>                   | 350                             |
| North Mara                      | do.   | 46.3                             | 3.1                                | 145                             |
| Tusker                          | African Barrick Gold plc  | 102.0                            | 1.3                                | 133                             |
| Buzwagi                         | do.   | 73.7                             | 1.5                                | 108                             |
| Golden Pride                    | Resolute Mining Ltd.  | 30.7                             | 1.6                                | 50                              |
| Golden Ridge                    | African Barrick Gold plc  | 33.1                             | 1.5                                | 46                              |
| Nyakafuru                       | Resolute Mining Ltd.  | 19.4                             | 1.7                                | 33                              |
| Singida                         | Shanta Gold Ltd.  | 9.4                              | 2.8                                | 27                              |
| SMP                             | Helio Resource Corp.  | 17.9                             | 1.3                                | 24                              |
| Igurubi                         | Peak Resources Ltd.   | 8.0                              | 2.8                                | 22                              |
| Chunya                          | Shanta Gold Ltd.  | 8.4                              | 2.4                                | 20                              |
| Imerwu, Lubando, and N'kuluwisi | Great Basin Gold Ltd.   | 8.6                              | 2.0                                | 17                              |
| Miyabi                          | African Eagle Resources plc   | 12.4                             | 1.3                                | 16                              |
| Kitongo                         | BrightStar Resources Ltd.   | 4.4                              | 2.0                                | 9                               |
| Tulawaka                        | Pangea Minerals Ltd.  | 1.2                              | 5.9                                | 7                               |
| <b>Total</b>                    |   | <b>517</b>                       | <b>2.6</b>                         | <b>1,430</b>                    |

<sup>1</sup>Definitions of resources and reserves are based on National Instrument 43-101, as required by Canadian securities regulatory authorities.

<sup>2</sup>Definitions of resources and reserves are based on the Australasian Code for the Reporting of Identified Mineral Resources and Ore Reserves issued by the Joint Committee for the Australasian Institute of Geoscientists and the Australian Mining Industry Council.

<sup>3</sup>Note that, in most cases, the grade of resources is lower than the grade for reserves, but in this case, the grade of the less economic material is higher, leading to the paradox of a higher resource grade.

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