

2009 Minerals Yearbook

TANZANIA

THE MINERAL INDUSTRY OF TANZANIA

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In 2009, 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 (George, 2010). Other domestically significant mining and mineral processing operations included cement and diamond. Tanzania was not a globally significant consumer of minerals or mineral fuels.

Minerals in the National Economy

In 2008 (the latest year for which data were available), the manufacturing sector accounted for 9.4% of the gross domestic product, and mining and quarrying, 2.6%. The value of output in the mining sector increased by 2.5% in 2008 compared with an increase of 10.7% in 2007. An estimated 500,000 artisanal miners produced colored gemstones, diamond, gold, and other commodities. It is likely that artisanal mining employment declined in late 2008 and 2009 because of reduced colored gemstone production (Bank of Tanzania, 2009, p. 233-234).

Government Policies and Programs

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

In June 2009, the Government announced plans to take a 10% stake in all Tanzanian gold mines; eliminate incentives and tax breaks for mining companies, including excise duty exemptions; and increase mining royalties. The Government planned to increase royalties on gold to 5% from 3%; rough diamond and colored gemstones, to 7% from 5%; and cut diamond and colored gemstones, to 3% from 0%. Colored gemstone and diamond producers were exempted from paying royalties for 2 years (Thompson, 2009).

Production

In 2009, bauxite production increased by 497%; marble, by 413%; tourmaline, by 140%; emerald, by 73%; lime, by an estimated 50%; aquamarine, by 45%; aggregates, by 35%; kaolin, by 34%; natural gas, by 18%; and cement, by 10%. Phosphate rock production decreased by 97%; alexandrite, by 93%; gypsum, by 85%; pozzolanic materials, by 76%; tanzanite, by an estimated 59%; other colored gemstones, by 42%; copper, by 29%; diamond, by 23%; and silver, by 21% (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 \$1.08 billion in 2009 from \$932 million in 2008. In 2009, the share of gold in total exports was 41%; diamond, nearly 1%; and colored gemstones, copper, silver, and other minerals combined, nearly 1%. The Bank of Tanzania reported that imports of petroleum products decreased in value to nearly \$1.31 billion in 2009 from \$1.84 billion in 2008. Petroleum products accounted for 21% of the value of total imports, and fertilizers, 1% (Bank of Tanzania, 2010, p. 50-51).

Commodity Review

Metals

Cobalt, Copper, and Nickel.—Barrick Gold Corp. of Canada produced copper as a coproduct at the Bulyanhulu and the Buzwagi gold mines. Total resources at Bulyanhulu and Buzwagi were estimated to be nearly 260,000 metric tons (t) of contained copper (Barrick Gold Corp., 2010a, p. 160-161).

Barrick (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 58.9 million metric tons (Mt) at a grade of 2.44% nickel; the deposit also contained cobalt, copper, and platinum. Barrick and Xstrata planned to complete a feasibility study of the development of Kabanga by July 2010 (Barrick Gold Corp., 2010a, p. 61, 161).

African Eagle Resources plc (AER) of the United Kingdom completed a scoping study at the Dutwa nickel-cobalt laterite deposit in July 2009. In November 2008, AER estimated that resources at Dutwa were 31 Mt at a grade of 1.1% nickel and 0.034% cobalt. By October 2009, AER had started a feasibility study at Dutwa; the company hoped to increase the resource by between 15 and 20 Mt of ore through a drilling program (Ryan, 2009; Thompson, 2009).

IMX Resources Ltd. of Australia planned to spend \$500,000 on exploration at the Mibango project in 2009. If the results were favorable, the company planned to commence a drilling program. In March, Lonmin plc of the United Kingdom withdrew from its joint-venture agreement with IMX to explore at Mibango. IMX and its joint-venture partner Continental Nickel Ltd. of Canada estimated that resources at the Nachingwea nickel deposit were 1.13 Mt at a grade of 2.43% nickel, 0.4% copper, and 0.06% cobalt. The companies hoped to increase the contained nickel resources at Nachingwea to between 50,000 and 100,000 t before starting a feasibility study (Andrews, 2009).

Obtala Resources plc of the United Kingdom engaged in soil sampling at the Ruhenge nickel property in 2009; Ruhenge is located near the Kabanga deposit. The company planned further exploration in 2010. Gulf Resources Ltd. of Australia withdrew from the Pare copper project in northeastern Tanzania (Obtala Resources plc, 2010, p. 5, 7).

Gold.—Tanzania's gold production increased to 39,112 kilograms (kg) in 2009 from a revised 36,434 kg in 2008. The Bulyanhulu, the Buzwagi, the Geita, the Golden Pride, the North Mara, and the Tulawaka Mines had a combined capacity to produce about 53,300 kilograms per year (kg/yr) of gold. Tanzania's resources amounted to about 1,400 t of contained gold, of which about 690 t was reserves (tables 1-3).

Barrick operated the Bulyanhulu underground gold mine, which produced copper and silver as coproducts, and the North Mara open pit mine. In 2009, the Bulyanhulu Mine produced about 7,700 kg of gold compared with about 6,200 kg in 2008. Increased recovery rates and volumes of ore mined more than offset decreased ore grades. In 2009, production at the North Mara open pit mine amounted to about 6,600 kg of gold compared with 6,100 kg in 2008. The increased production was attributable to higher ore grades and recovery rates (Barrick Gold Corp., 2010b).

Barrick and its joint-venture partner MDN Inc. of Canada produced gold at the Tulawaka open pit mine. Production at Tulawaka decreased to 2,929 kg in 2009 from 6,574 kg in 2008 because of the cessation of surface mining. In 2010, production from underground mining operations was expected to be nearly 2,300 kg. Barrick and MDN hoped to discover sufficient new resources from exploration in 2010 and 2011 to extend the life of the mine to at least 2012 (MDN Inc., 2010, p. 12-13, 27).

In May 2009, Barrick completed construction of a new open pit mine at the Buzwagi deposit. By yearend, Barrick had produced nearly 5,900 kg of gold at Buzwagi. The company planned to produce nearly 7,800 kg/yr of gold and 4,100 metric tons per year (t/yr) of copper starting in 2010; the life of the mine was estimated to be 10 years (Mining Review Africa, 2007; Barrick Gold Corp., 2010a, p. 39).

In 2010, Barrick planned to produce between 24,900 and 26,400 kg of gold at Bulyanhulu, Buzwagi, North Mara, and Tulawaka, which was an increase of between 1,800 and 3,300 kg from 2009. Increased production would be attributable to the first full year of mining operations at Buzwagi and higher ore grades at Bulyanhulu. Decreased production at North Mara and Tulawaka because of lower ore grades was expected to partially offset the increases at Bulyanhulu and Buzwagi (Barrick Gold Corp., 2010a, p. 12, 58-59).

Barrick and Sub Sahara Resources NL of Australia were engaged in a joint venture for the exploration and development of the Tusker gold deposit. Indago Resources Ltd. of Australia purchased Sub Sahara's share in March 2009. Barrick and Indago planned to start a feasibility study on mining at Tusker in February or March 2010. A scoping study completed in 2009 estimated that production could be about 4,600 kg/yr during the possible 10-year life of the mine. Resources at Tusker were estimated to be 102 Mt at a grade of 1.3 grams per metric ton (g/t) gold (Mining Journal 2009d; Thompson, 2009).

In 2009, Geita Gold Mining Ltd. (a subsidiary of AngloGold Ashanti Ltd. of South Africa) produced nearly 8,500 kg of gold at the Geita Mine compared with about 8,200 kg in 2008. Production was constrained by mechanical problems in the first quarter of 2009. In 2010, output at Geita was expected to increase to between 10,500 and 11,000 kg. AngloGold Ashanti also engaged in exploration at Geita in 2009 (AngloGold Ashanti Ltd., 2010, p. 87-89, 127).

Resolute Mining Ltd. of Australia owned the Golden Pride open pit mine. In fiscal year 2008-09, the Golden Pride Mine produced 3,952 kg of gold compared with 4,672 kg in fiscal year 2007-08. Production was expected to decline to about 3,100 kg by fiscal year 2011-12. The mine's remaining reserves were estimated to be about 7 Mt at a grade of 1.7 g/t gold. Resolute engaged in drilling at the Nyakafuru project and at prospects near the Golden Pride Mine that included the Airport West, the China, the GP West, the Kavsav, and the Kibali, The company planned further drilling at the Kavsav deposit prior to making an initial resource estimate (Resolute Mining Ltd., 2009, p. 25-26; 2010).

In November 2009, Shanta Gold Ltd. applied for a mining license for the Chunya project in southwestern Tanzania. Shanta planned to establish an open pit and underground mine that would produce about 730 kg/yr of gold. Contained gold resources at Chunya were estimated to be about 20 t. In September, Douglas Lake Minerals Inc. of Canada applied for a mining license for the Mkuvia alluvial gold project (Shanta Gold Ltd., 2009; Thompson, 2009).

In May 2009, AER estimated that resources at Igurubi amounted to about 8 Mt at a grade of 2.76 g/t gold. AER also conducted exploration at Miyabi in 2009. The company planned to focus on exploration at the Dutwa nickel-cobalt deposit (Mining Journal, 2009a).

Great Basin Gold Ltd. (GBG) of South Africa completed its initial resource estimates for the Imerwu and the Lubando properties in the Lake Victoria goldfield in northwestern Tanzania and for the N'kuluwisi property in the Lupa goldfield in southwestern Tanzania. In 2009, GBG estimated that total contained gold resources at Imerwu, Lubando, and N'kuluwisi were about 17 t. The company planned further exploration in the Lake Victoria and the Lupa goldfields in 2010 (Great Basin Gold Ltd., 2010, p. 54-57).

In 2009, MDN carried out soil sampling and drilling at the Ikungu and the Isambara projects. The Ikungu project was a joint venture with Lakota Resources Inc. of Canada. MDN planned further drilling at the Ikungu, the Isambara, the Msasa, and the Viyonza projects in 2010 (MDN Inc., 2010, p. 13-15).

In July 2009, Lake Victoria Mining Co. Inc. of the United States purchased Kilimanjaro Mining Co. Inc., which had 13 gold projects in the Lake Victoria Greenstone Belt. Lake Victoria Mining conducted exploration at its Geita, Kinyambwiga, and Singida projects in 2009 (Thompson, 2009).

Helio Resource Corp. of Namibia conducted a drilling program at the SMP property in the Lupa goldfield. Obtala Resources explored at the Buckreef and the Busolwa projects. In 2009, Peak Resources Ltd. of Australia explored at Igunga; the company planned to start a drilling program at Igunga and exploration at its Ikoma, Imweru, and North Mara properties in 2010. Canaco Resources Inc. of Canada conducted a drilling

program at Magambazi. Tanzanian Royalty Exploration Corp. of the United States started drilling at Kigosi in early 2009. Currie Rose Resources Inc. of Canada completed a drilling program at its Mabale Hills project in late 2009 (African Mining, 2009; Thompson, 2009; Winter, 2010).

IAMGOLD Corp. of Canada ceased exploration activities in Tanzania in 2009. The company returned the licenses for the Buckreef project to the Government because preliminary metallurgical studies indicated that low recovery rates would lead to much higher capital costs to develop a new mine (Mande, 2009).

Industrial Minerals

Cement.—Tanzania's cement production capacity amounted to about 3 million metric tons per year (Mt/yr), and cement demand, about 2 Mt/yr. Tanga Cement Company Ltd. increased its capacity to 1.25 Mt/yr from 750,000 t/yr in November 2009. The cost of the expansion was \$46 million. In 2009, Athi River Mining Ltd. of Kenya (ARM) continued work on its new cement plant at a reduced pace because of delays in project funding. ARM planned to complete the plant, which had a planned capacity of 1.5 Mt/yr, by December 2011 (Tanga Cement Company Ltd., 2009; Athi River Mining Ltd., 2010, p. 10).

Diamond.—The Williamson Mine was Tanzania's leading diamond mine; Petra Diamonds Ltd. of the United Kingdom produced 133,526 carats at Williamson in 2009. Petra planned to shut down mining operations at Williamson before June 2010 and subsequently to begin a 3-year expansion of the mine. After the resumption of mining in 2013, production was expected to be 600,000 carats per year during the 20-year life of the mine. Capital costs of the expansion were estimated to be \$51 million (Petra Diamonds Ltd., 2010a, p. 10; 2010b, p. 13, 24).

Midex Gold Corp. of the United States explored for diamond at the Magembe property adjacent to the Williamson Mine. The company formed a joint venture with Douglas Lake to explore at Magembe in August 2009 (Thompson, 2009).

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. In October 2008, nearly 200 mining operations in Blocks B and D suspended production. By March 2009, only 30 of 382 mining operations were still in production in Block D and 20 of 323 mining operations remained in operation in Block B. Sharp decreases in tanzanite prices resulting from the world economic crisis rendered most artisanal and small-scale mining operations subeconomic (Ihucha, 2009).

TanzaniteOne Ltd. of Bermuda mined tanzanite in Block C; the company also cut high-quality tanzanite at its lapidaries in Tanzania. In 2009, TanzaniteOne produced 383 kg of rough

tanzanite compared with 441 kg in 2008; decreased production was attributable to the worldwide economic crisis and lower ore grades. The company planned to increase its production to about 440 kg in 2010 and to a long-term average of 600 kg/yr starting in 2013 (TanzaniteOne Ltd., 2010, p. 2, 6-7, 11, 51).

Tsavorite, which is a green grossular garnet that obtains its color from trace amounts of chromium and vanadium, was produced at Ruangwa by about 300 artisanal miners. Gemini Exploration and Mining Co. also operated a mechanized mine at Ruangwa. Small amounts of tsavorite were mined at Tunduru. Swala Gem Traders operated a mechanized tsavorite mining operation at Lemshuku. In 2009, TanzaniteOne conducted drilling and bulk sampling at the Lemshuku-Shamberai tsavorite project, which was located about 20 kilometers southwest of the tanzanite mines. The company planned to complete a resource estimate in the third quarter of 2010 (Pardieu and Hughes, 2009; TanzaniteOne Ltd., 2010, p. 12).

Artisanal miners produced high-quality ruby and sapphire from primary deposits at Winza in central Tanzania. Production was substantially lower than that of 2008. Many miners and dealers left Winza in September 2008 because of the depletion of the near-surface alluvial deposits and the discovery of the M'sawize ruby deposit in Mozambique. Lower-quality ruby and sapphire from M'sawize was much more amenable to treatments that increased its value than comparable gemstones from Winza (Pardieu and others, 2009, p. 6-7).

Ruby and sapphire were also mined at Longido in the Arusha District; at the Honolulu and the Visakaze Mines near Matombo in the Morogoro District; at Chipa, Lukande, and Mayote near Mahenge; at deposits in the Umba River valley; and at Songea and Tunduru in southern Tanzania. In March 2009, Obtala signed an agreement with Gemstones of Africa plc (GOA) of the United Kingdom that gave GOA the right to mine ruby and other gemstones on Obtala's properties near Lake Manyara and Morogoro (Obtala Resources plc, 2010, p. 6-7).

Artisanal and small-scale miners produced alexandrite and emerald from mines near Lake Manyara in north-central Tanzania. Alexandrite was also produced at Tunduru, and emerald, in the Sumbawanga District. National alexandrite production decreased to 1 kg in 2009 from 15 kg in 2008 and emerald production increased to 19 kg from 11 kg. In December 2009, the Government announced that the mines near Lake Manyara would be closed in the near future because of the planned expansion of Lake Manyara National Park (Arusha Times, 2009; G.A. Shoo, Statistician, Ministry of Energy and Minerals, written commun., October 27, 2010).

Spinel was produced near Mahenge by 11 small-scale mining companies with various levels of capital intensity that employed at least 750 workers in late 2009. Green tourmaline was produced in the Usambara Mountains, and orange kyanite, at Loliondo.

Lime.—ARM of Kenya produced lime for consumption in gold mining, sugar refining, and water treatment at its plant in Tanga. In the third quarter of 2009, ARM commissioned a second lime kiln that doubled the plant's capacity to 40,000 t/yr (Athi River Mining Ltd., 2010, p. 10).

Phosphate Rock.—Small amounts of phosphate rock were mined at Minjingu by Minjingu Mines and Fertilizers Ltd. Peak

Resources conducted geochemical and rock chip sampling for phosphates at the Ngualla carbonatite in southwestern Tanzania; the company planned to start drilling at Ngualla by May 2010 (Winter, 2010).

Mineral Fuels and Related Materials

Coal.—In 2009, Atomic Resources Ltd. of Australia and its joint-venture partner National Development Corp. (owned by the Government of Tanzania) were engaged in a feasibility study on developing the Ngaka subbituminous coal deposit. The companies planned to complete the study by October 2010; a new mine with a capacity of between 3 and 4 Mt/yr could be built depending on the results of the study. Starting in 2013, a new coal-fired power station at Nagaka was expected to consume between 1.2 and 1.5 Mt/yr of coal from the mine. Resources at Ngaka were estimated to be more than 210 Mt (Gold and Minerals Gazette, 2010).

Natural Gas.—Orca Exploration Group Inc. produced natural gas from Songo Songo Island. The company produced 663 million cubic meters in 2009 compared with 561 million cubic meters in 2008. The capacity of Orca's gas processing plant was 930 million cubic meters in 2009. Orca expected local natural gas demand to increase by about 200 million cubic meters per year from 2010 to 2016. The company planned to expand the capacity of the gas processing plant and the pipeline to nearly 2.1 billion cubic meters per year by 2012 and 2016, respectively. The leading local consumers of natural gas were powerplants and TPCC's cement plant (Orca Exploration Group Inc., 2010, p. 3, 6-8, 19, 22).

In 2009, Aminex plc of the United Kingdom estimated that total natural gas resources at the Kilwani and the Nyuni prospects near Songo Songo amounted to about 7 billion cubic meters. Aminex and its joint-venture partner Key Petroleum Ltd. of Australia planned to explore at the Songo Songo West prospect (Aminex plc, 2010).

Petroleum.—Etablissements Maurel et Prom SA of France drilled exploration wells at the Bigwa-Rufiji-Mafia and the Mandawa projects in 2009. The company abandoned the Mohoro-1 well at Bigwa-Rufiji-Mafia and the Mihambia-1 well at Mandawa. Tullow Oil plc of the United Kingdom and its joint-venture partners planned to drill an exploration well in the Rovuma Basin in southeastern Tanzania by January 2010 (Etablissements Maurel et Prom SA, 2010, p. 23; Petroleum Economist, 2010).

Uranium.—In June 2009, Mantra Resources Ltd. of Australia completed a scoping study at the Mkuju River project. The study estimated that the Nyota property could support a new uranium mine with average production of about 1,100 t/yr of uranium oxide (U₃O₈) during a minimum 10-year life. Mantra subsequently started a prefeasibility study on developing a new mine. Capital costs of the project were estimated to be about \$197 million. In December, Mantra estimated that resources at Nyota were 44.4 Mt at a grade of 0.046% U₃O₈. The company planned further drilling and an updated resource assessment in the first quarter of 2010 (Mining Journal, 2009b, c).

Uranex NL of Australia (IMX Resources NL, 39.5%) was engaged in a prefeasibility study on the Manyoni project. In

the fourth quarter of 2009, the company announced a revised resource estimate of 57 Mt at a grade of $0.015\%~U_3O_8$. Uranex planned to complete the prefeasibility study on developing a new mine with a 7-year life and a capacity of between 350 and $400~t/yr~of~U_3O_8$ in the third quarter of 2010. The company also planned drilling at its Mkuju project in 2010 to define a resource and to explore at the Bahi project (Uranex NL, 2010).

Indago also explored for uranium; the company hoped to develop a uranium resource at its Mtonya project in southern Tanzania. In October 2009, Uranium Resources plc of the United Kingdom agreed to purchase Indago's shares in the Mtonya, the Ruhuhu, and the Ruvuma projects. Kilimanjaro Mining held 11 uranium projects in central and southern Tanzania (Thompson, 2009).

Outlook

Tanzania's production of cement, coal, copper, lime, and natural gas is expected to increase in the near future. Depending on the results of prefeasibility studies, cobalt, nickel, and uranium production could start. In 2010, increased gold output from the Bulyanhulu, the Buzwagi, and the Geita Mines is likely to more than offset reduced output from the North Mara and the Tulawaka Mines. Gold production is expected to decline after 2012 because of the shutdown of the Golden Pride Mine. Diamond production is likely to decrease in 2010 because of the planned shutdown of the Williamson Mine and to increase starting in 2013 when the expansion of the mine is planned to be completed. The recovery of colored gemstone production depends on improvements in world market conditions.

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 $\label{eq:table 1} \text{TANZANIA: PRODUCTION OF MINERAL COMMODITIES}^1$

(Metric tons unless otherwise specified)

Commodity ²		2005	2006	2007	2008	2009
Bauxite		1,640	5,373	5,003	20,601 ^r	122,920
Calcite		40 ^e	100	1,500	112 ^r	
Cement, hydraulic	thousand metric tons	1,366	1,432 ^r	1,630	1,756	1,941
Coal, bituminous	<u> </u>	30,795	17,940	27,198	15,242 ^r	
Copper, contained in concentrates and doré		3,661	3,284	3,275	2,852 ^r	2,019
Diamond ³	carats	219,639	272,204	282,786	237,676 ^r	181,874
Gemstones, excluding diamond: ^{e, 4}	<u>.</u>					
Alexandrite	kilograms	NA	NA	NA	15 5	1 5
Amethyst	do.	270	270	270	200	150
Aquamarine	do.	280	280	280	323 r, 5	468 5
Cordierite (iolite)	do.	310	310	310	r, 5	5
Emerald	do.	NA	NA	NA	11 5	19 5
Garnet	do.	5,900	5,900	5,900	4,400	3,300
Ruby	do.	2,700	2,700	2,700	2,000	1,500
Sapphire	do.	1,300	1,300	1,300	1,000	750
Tanzanite	do.	1,307 5	5,894 5	8,187 5	6,100	2,500
Tourmaline	do.	NA	NA	NA	3,865 5	9,283 5
Other	do.	616,000	2,480,000	1,280,000	1,840,000 ^r	1,060,000
Total	do.	627,797 5	2,498,637 5	1,294,485 5	1,858,287 r, 5	1,068,481 5
Gold	do.	47,270	47,000 ^e	40,193	36,434 ^r	39,112
Gypsum and anhydrite, crude		23,119	32,556	52,759	55,730 ^r	8,105
Kaolin				1,020	13,926 ^r	18,624
Lime ^e		20,000	20,000	15,000	20,000	30,000
Natural gas ⁶	million cubic meters	408	504	544	561	663
Phosphate rock:						
Gross weight		7,096	2,881	8,261	28,684 ^r	752
P ₂ O ₅ content		2,100	860	2,500	8,600 ^r	230
Salt, all types		51,166	34,798	35,224	25,897 ^r	27,393
Silver, contained in concentrates and doré	kilograms	12,480	14,906	12,381	10,388 ^r	8,231
Steel, semimanufactured		47,652	50,654	46,016	77,365	80,000 e
Stone, sand, and gravel:						
Aggregates ^e		140,000	160,000	180,000	63,821 r,5	86,112 5
Dolomite ^e	-	1,400	950	169 5	170	170
Limestone, crushed	-	2,006,407	1,607,570	1,322,023	1,281,805 ^r	1,370,852
Marble		NA	337	400 r, e	522 ^r	2,679
Pozzolanic materials		163,499	129,295	184,070	260,403 ^r	61,501
Sand ^e		5,800,000	7,577,210 ⁵	8,400,000	8,500,000 r	8,500,000
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^eEstimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. ^rRevised. Do. Ditto. NA Not available. -- Zero.

¹Table includes data available through December 1, 2010.

²In 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.

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

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

⁵Reported figure.

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

$\label{eq:table 2} \text{TANZANIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009}$

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Cement	Tanzania Portland Cement Company Ltd. (TPCC) (HeidelbergCement AG, 69.3%)	Plant at Wazo Hill	1,400,000.
Do.	Tanga Cement Company Ltd. (Holcim Mauritius Investment Holdings Ltd., 62.5%)	Plant at Tanga	1,250,000.
Do.	Mbeya Cement Company Ltd. (LaFarge Group, 58%)	Plant at Mbeya	300,000.
Coal, bituminous	Kiwira Coal and Power Ltd. (Tanpower Resources Ltd., 85%, and Government, 15%)	Kiwira Mine	150,000 run of mine; 93,000 washed.
Copper, in concentrates and doré	Bulyanhulu Gold Mine Ltd. (Barrick Gold Corp., 100%)	Bulyanhulu Mine near Kahama	7,700.
Do.	Barrick Gold Corp.	Buzwagi Mine	5,100.
Diamond	Williamson Diamonds Ltd. (Petra Diamonds Ltd., 75%, and Government, 25%)	Williamson Mine near Shinyanga	4,000,000 ore processing.
Do. carate	do.	do.	230,000 diamond.
Do. do	. El Hillal Minerals Ltd.	Near Williamson Mine	24,000. ^e
Garnet	Swala Gem Traders	Mine at Lemshuku	NA.
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.	17,000 gold.
Do.	Bulyanhulu Gold Mine Ltd. (Barrick Gold Corp., 100%)	Bulyanhulu Mine near Kahama	1,100,000 ore processing
Do. kilograms		do.	12,800 gold.
Do.	Barrick Gold Corp.	Buzwagi Mine	4,400,000 ore processing
Do. kilograms	-	do.	6,600 gold.
Do.	North Mara Gold Mine Ltd. (Barrick Gold Corp., 100%)	North Mara Mine in Tarime District	2,900,000 ore processing
Do. kilograms		do.	8,400 gold.
Do.	Resolute Mining Ltd.	Golden Pride Mine near Isanga	3,000,000 ore processing
Do. kilograms		do.	5,100 gold.
Do.	Pangea Minerals Ltd. (Barrick Gold Corp., 70%, and Explorations Minières du Nord Ltée (MDN), 30%)	Tulawaka Mine	480,000 ore processing.
Do. kilograms		do.	3,400 gold.
Do.	Tangold Ltd.	Buhemba Mine, 47 kilometers southeast of Musoma ¹	1,300,000 ore processing
Do. kilograms	s do.	do.	2,600 gold.
Lime	Athi River Mining Ltd. (ARM)	Plant at Tanga	40,000.
Natural gas millior cubic meters	Orca Exploration Group Inc.	Gasfield on Songo Songo Island	930.
Do. do	Artumas Energy (Tanzania) Ltd. (subsidiary of 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	40,000.
Silver kilograms		Bulyanhulu Mine near Kahama	9,800.
Steel	MM Integrated Steel Mills Ltd.	Plant at Dar es Salaam	36,000 ^e rolled.
Do.	Aluminum Africa Ltd.	do.	33,000° 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 ²	120,000 ore processing.
Do. kilograms		do.	1,200 tanzanite.
Do. do		Mine at Merelani, Block D Extension	NA.
Do. do		Mine at Merelani, Block A	NA.
Do. do		Mines at Merelani, Blocks B and D	7,500. ^e
Pro :			

^eEstimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

¹Not operating at the end of 2009.

²Formerly the graphite processing plant at Merelani operated by Phoenix Minerals Ltd.

TABLE 3
TANZANIA: GOLD RESOURCES AND RESERVES IN 2009

		Grade			
		Tonnage	(grams per	Contained gold	
Project	Major operating companies	(million metric tons)	metric ton)	(metric tons)	
Reserves:					
Bulyanhulu ¹	Bulyanhulu Gold Mine Ltd. (Barrick Gold Corp., 100%)	27.6	11.6	321	
Geita ²	Geita Gold Mining Ltd. (AngloGold Ashanti Ltd., 100%)	47.4	3.3	158	
Buzwagi ¹	Barrick Gold Corp.	72.6	1.5	102	
North Mara ¹	North Mara Gold Mine Ltd. (Barrick Gold Corp., 100%)	31.9	2.9	92	
Golden Pride ²	Resolute Mining Ltd.	7.1	1.7	12	
Tulawaka	Pangea Minerals Ltd. (Barrick Gold Corp., 70%, and	0.6	7.1	4	
	Exploration Minières du Nord Ltée, 30%)				
Total		187.2	3.7	689	
Resources:					
Bulyanhulu	Bulyanhulu Gold Mine Ltd.	39.0	11.1	432	
Geita	Geita Gold Mining Ltd.	100.7	3.5 3	356	
Tusker	Barrick Gold Corp., 51%, and Indago Resources Ltd., 49%	102.0	1.3	133	
North Mara	North Mara Gold Mine Ltd.	40.7	2.9	119	
Buzwagi	Barrick Gold Corp.	93.2	1.4	127	
Golden Pride	Resolute Mining Ltd.	33.0	1.7 3	56	
Golden Ridge	Kahama Mining Corp. Ltd.	33.1	1.5	46	
Nyakafuru	Resolute Mining Ltd.	19.4	1.7	33	
Singida	Shanta Gold Ltd.	9.4	2.8	27	
Igurubi	African Eagle Resources plc	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	
Tulawaka	Pangea Minerals Ltd. (Barrick Gold Corp., 70%, and	0.9	6.5	6	
	Exploration Minières du Nord Ltée, 30%)				
Total		509	2.6	1,410	

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

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²Definitions 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.

³Note 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.