

## THE MINERAL INDUSTRY OF

# TANZANIA

By George J. Coakley

The United Republic of Tanzania, including the semi-independent islands of Zanzibar, is located between Kenya and Mozambique on the east coast of Africa and has a land area of 886,040 square kilometers. The area supported a population of 29.7 million in 1997 with a gross domestic product (GDP) per capita of \$1,350. The mining and petroleum sectors, which played a relatively small role in the chiefly agrarian economy of Tanzania, accounted for less than 3% of the total nonsubsistence workforce of 168,600 and for about 5% of the GDP. In 1997, the value of mineral exports, primarily diamond (\$14.82 million), semiprecious gemstones (\$7.95 million), and gold (\$2 million), declined by 13%, to \$25.7 million, down from \$29.58 million in 1996. Encouraged by more aggressive Government investment policies and the exploration successes reported in 1996 and 1997, however, mining is on the verge of becoming a significant part of the Tanzanian economy. Although the country's natural resources include coal, cobalt, diamond, gemstones, graphite, iron ore, natural gas, nickel, and phosphate rock, gold will be the dominant mineral commodity in the foreseeable future.

Exploration results through the end of 1997, as reported by seven of the most active operators, has identified approximately 300 metric tons (t) (9.6 million troy ounces) of drill measured and indicated gold resources and an additional 252 t (8.1 million troy ounces) of inferred gold resources. Given the depressed level of gold prices, companies have been cautious about moving exploration results from the resource to the reserve category until full bankable feasibility studies are completed. The majority of discoveries to date are focused on near surface deposits grading from 2 to 5 grams per ton (g/t). One high-grade deeper deposit has been reported at Bulyanhulu with grades ranging from 12 to 14 g/t. The Government remains optimistic that several of these projects will be brought into production over the next 5 years.

Administration of the mining sector is the responsibility of the Ministry of Water, Energy and Minerals under the Mining Act of 1979. Investment in the petroleum sector was governed by the provisions of the 1980 Petroleum (Exploration and Production) Act. The Mining Law of 1979 has been modified by the Policy Issue Papers of 1983, which proposed the mineral wealth of Tanzania to be the nation's heritage and gave the state majority ownership in mining activities. The Model Agreement of 1988, however, removed the Government majority ownership requirement. The Government was reviewing the Mining Act and a new act was expected to be enacted by the Parliament in 1998. In August 1997, the National Investment (Promotion and Protection) Act of 1990 was repealed, and a new Tanzania Investment Act was enacted, creating the Tanzania Investment Centre, a one-stop-center that would promote, coordinate, and facilitate investment. Investments are now guaranteed against nationalization and expropriation. The Tanzania Investment Act

sets corporate tax rate for the mining sector at 30% and provides additional customs rates, capital allowance deductions, depreciation, and other tax incentives (Tanzania Investment Centre, 1997). Mining royalties are set at 3% of netback value, with a rate of 5% for diamond. No royalties are paid on cut and polished gemstones. The new Financial Laws (Miscellaneous Amendments) Act of 1997 also provided improved fiscal incentives for the mining sector. In October 1997, the Ministry of Water, Energy and Minerals issued a new minerals policy, giving priorities to private sector initiatives, the rationalization and organization of artisanal and small-scale mining and product marketing, and new initiatives to mitigate the adverse environmental and social aspects of mining. The Ministry's vision statement includes increasing the contribution of mining to the economy to more than 10% of the GDP and establishing a value-added gemstone-cutting and jewelry-manufacturing industry. It promotes the role of the Government as a regulator, promoter, facilitator, and service provider to the private sector and not as a direct player in production activities.

The country has been successful in attracting mineral exploration and investment and has triggered a "gold rush" in the greenstone belts at the southern end of Lake Victoria. Exploration companies from Australia, Canada, South Africa, Sweden, and the United Kingdom have been very active in Tanzania, with annual exploration expenditures increasing to about \$80 million in 1997 from \$6 million in 1992. During the 1997-98 fiscal year, 516 applications for exploration and mining licenses were received, of which 462 were approved, including 335 for gold. Other licenses covered base metals, gemstones, helium, nickel, soda ash, and uranium.

The 1979 Mining Act required that prospectors provide environmental statements with applications for permits before a license was issued. The National Environment Management Act of 1983 covered environmental matters and authorized a National Environmental Council to regulate environmental activities. Mining is not permitted in national parks or in the Ngorongoro Conservation Area, but is allowed by special permits in game reserves. The 1997 minerals policy document further strengthens the Government's commitment to the environmental and social sustainability of mining development and sets the stage for additional environmental regulatory and management programs.

Historically, diamonds and gold have been the most important minerals produced in Tanzania, with mining of semiprecious gemstones increasing in importance in recent years. Tanzania also produces construction materials, including cement and other industrial minerals. Fuel mineral production in Tanzania has been limited to steam coal from the mine at Kawire and a small amount of petroleum refinery products. Mineral production statistics for the period from 1993 to 1997 are noted in Table 1.

During the year, gold exploration and development planning dominated the industry news, with several companies announcing or expanding on the discovery of significant gold resources.

In November 1997, construction began on the \$47 million Golden Pride gold mine held equally by Resolute Ltd. of Australia (Resolute Tanzania Ltd.) and Samax Resources Ltd. of the United Kingdom (Samax Mabungu Ltd.). It will be the first of the new gold deposits to be developed. The Golden Pride resource base was updated in October 1997 to 33.41 million metric tons (Mt) of ore, grading 2.56 g/t of gold and containing 85,530 kilograms (kg) of gold, including an interim minable reserve totaling 12.43 Mt, grading 2.62 g/t and containing 32,380 kg of gold (Samax Resources Ltd., 1998). In response to lower gold prices, the open-pit design was optimized to yield an average ore grade of 3.2 g/t during the first 6 years by using three starter pits that will eventually be merged into one pit. The project design plans called for a conventional carbon-in-leach (CIL) plant to treat 2 million metric tons per year (Mt) of ore per year yielding about 5,600 kilograms per year (kg/yr) of gold over an 8 year mine life. The Golden Pride project is scheduled for startup in the last quarter of 1998.

Samax is also actively exploring its fully owned concessions at Geita-Kukuluma, south of Lake Victoria and adjacent to Ashanti Goldfields' proven Geita deposit. Preliminary drilling by Samax has identified two deposits, Kukuluma Hill, containing an indicated resource of 7.9 Mt tons grading 4.81 g/t of gold, and the "3 West" deposit, containing an inferred resource of 2.1 Mt of mineralization grading 4.8 g/t of gold. The combined resources have a total contained gold content of 47,870 kg (Samax Resources Ltd., 1998). The continuous and nearly vertical mineralized zones are preferentially developed in banded iron formation-chert units. During 1998, Samax will test additional nearby soil anomalies and prepare a \$6 million feasibility study on bringing the Kukuluma deposit into production at a proposed rate of 3,730 kg/yr of gold by 2000.

The Bulyanhulu gold prospect of Sutton Resources Ltd. of Canada was the largest resource delineation reported in Tanzania to date. Calculations based on drilling to December 31, 1997, increased the total identified gold resource to 17.5 Mt, grading 13.14 g/t and containing 230 t of gold. The estimate for Bulyanhulu Reef 1 included 7.37 Mt of measured resource grading 13.87 g/t; 3.55 Mt of indicated resource, grading 12.16 g/t; and 5.92 Mt of inferred resource, grading 13.00 g/t. The inferred resource at the Bulyanhulu Reef 2 was reported to be 0.71 Mt, grading 11.63 g/t. The steeply dipping (80° NE), quartz-sulfide reefs occur in a graphitic shear zone. The hanging and footwall lithologies are felsic and intermediate volcanics, respectively. During 1997, Sutton spent \$18.8 million primarily towards advancing underground development, infrastructure, feasibility studies, engineering, and exploration drilling. The company will make a production and financing decision on the project during 1998, following the completion of the full feasibility study in April. A draft feasibility study based on lower 1996 resource estimates indicated the potential for producing about 9,300 kg/yr of gold from Reef 1. Development costs, including the mine, infrastructure, and a 2,500-metric-ton-per-day treatment plant, were estimated to be \$134 million (Sutton Resources Ltd., 1998a, 1998b).

Pangea Goldfields Inc. (Canada) holds about 35 gold

exploration licenses in the greenstone belts south of Lake Victoria and has joint-venture agreements with the Anglo American Corp. of South Africa Ltd. to explore the Chocolate Reef and the Kahama prospects; with Ashanti Goldfields Co. Ltd. of Ghana to explore the Bulyanhulu South lease; with Minieres du Nord Ltd. (MDN) of Canada to explore the Kangele deposit; and with Randgold Resources of South Africa to explore the Golden Ridge deposit. The Golden Ridge project is the most advanced, with drilling by Randgold having defined a total indicated and inferred resource of 34 Mt grading 1.46 g/t and containing 49.6 t of gold, of which measured and indicated resources, treatable by CIL methods, were reported to be 11.61 Mt, grading 2.73 g/t and containing 31.7 t of gold. The bulk of the mineralization at Golden Ridge is located in banded ironstones in the Nyaligongo Main Zone in contact with a greywacke-tuff. Studies have confirmed the potential for an open-pit mining operation with the ore treatable by both heap leaching and conventional milling extraction techniques. Following the completion of the final feasibility study, a production decision is expected by mid-1998. Production rates ranging from 2,300 to 4,300 kg/yr were being examined. Randgold, the joint-venture manager, can increase its equity interest from 50% to 65% by completing the feasibility study and securing project financing by September 14, 2000. (Pangea Goldfields Inc., 1998).

Pangea reported an early 1997 indicated and inferred resource estimate at the Kahama/Chocolate Reef property of 13.26 Mt grading 2.87 g/t and containing 38 t of gold on the basis of a cutoff grade of 1 g/t gold. Anglo American, which holds a 70% interest in the joint venture, continued exploration drilling on the Chocolate Reef structure during the year and was expected to update the resource estimate and to complete a prefeasibility study in 1998 (Pangea Goldfields Inc., 1998).

Ashanti Goldfields' joint-venture agreements with Pangea allows Ashanti to earn a 60% to 75% interest in the Bulyanhulu South and the Robondo properties by spending \$4 million and \$3 million, respectively, completing feasibility studies, and securing development funding by October 2000. Ashanti will conduct further exploration drilling on both properties in 1998. MDN was increasing their interest in the Pangea's Kangele property from 20% to 50% by agreeing to spend \$2 million by the end of 1999, including on further exploration of mineralized structures discovered in 1997. On the basis of the second phase of diamond drilling and a cutoff grade of 1 g/t, Pangea reported an inferred resource, of 1.83 Mt, grading 4.6 g/t at their wholly owned Mguzu property, west of Geita. (Pangea Goldfields Inc., 1998).

In early 1996, Ashanti acquired an 85% interest in the old Geita gold mine and adjacent exploration property in the Lake Victoria Gold Belt through the acquisition of Cluff Resources plc. of the United Kingdom. In 1997, Ashanti increased its ownership to 100%. Ashanti's \$6 million exploration program in 1997 tripled open-pittable resource estimates at the Lone Cone-Geita Northeast Extension. The measured resource was reported to be 20 Mt, grading 2.9 g/t, equivalent to 59.1 t of gold; the indicated resource, 12 Mt, grading 2.7 g/t, and containing 31.1 t of gold; and the inferred resource 4 Mt, grading 3.6 g/t, equivalent to 15.6 t of gold. The total resource is more than 105 t of gold (3.4 million troy ounces). A prefeasibility study on the open-pit potential of Geita was completed in December 1997, and a bankable feasibility study was expected to be completed in 1998.

Initial metallurgical tests confirmed the nonrefractory nature of the mineralization, with recoveries exceeding 90% for the oxides and averaging 85% for the transition and sulfide ores. Ashanti also announced the discovery of a new high grade mineralized zone at Nyankanga, west of Lone Cone (Ashanti Goldfields Company Ltd., 1998). If a decision is made to go ahead with the development of the Lone Cone-Geita property, then production would begin in early 2000 at rate ranging from 5,600 to 6,220 kg/yr for 10 years, although power availability remained a concern (Vincent t'Sas, Ashanti looks at new gold mine in Tanzania, April 16, 1998, accessed April 22, 1998, at URL [http://biz.yahoo.com/finance/980416/ashanti\\_ag\\_1.html](http://biz.yahoo.com/finance/980416/ashanti_ag_1.html)).

A privately held Australian company, Afrika Mashriki Gold Mines, has been active on the Nyabirama and the Nyabigena prospects in the Musuma-Mara district near the town of Tarime, on the eastern side of Lake Victoria near the border with Kenya. The company has identified a resource of 10 Mt, grading 3.0 g/t. Anglo American is managing the development of the project which is scheduled to produce 4,000 kg/yr of gold beginning in 1999 (Mining Journal, 1997).

Exploration at Tan Range Exploration Corp. of Canada's Itetemia project was interrupted in early 1997 by the presence of 1000 illegal artisanal miners working the surface outcropping of a gold-bearing reef on the property; an agreement, however, was reached with the miners to continue working temporarily, and Tan Range proceeded with exploration of the Golden Reef structure and for possible extensions of the adjacent Bulyanhulu gold mineralization (Tan Range Exploration Corp., 1997). In early 1998, Tan Range entered a three-phase option venture with Minorca Resources Inc. of Canada, whereby Minorca can earn a 50% interest in Tan Range's Itetemia gold property by paying \$10 million and completing a bankable feasibility study (Northern Miner, 1998).

In other gold exploration activity, East African Gold Corp. of Australia was encouraged to continue exploration on their Kitongo and Rwamagaza projects on the basis of favorable drilling results in 1997. Tanganyika Gold NL of Australia continued work on its Buhemba project and on the Busolwa project on its Mawe Meru license, 40 kilometers (km) south of Geita. Near-surface resources at Buhemba were reported to be 11.45 Mt, grading 2.03 g/t, and containing 23.2 t of gold (African Mining, 1998). In December 1997, Tanganyika Gold announced plans to merge with, and absorb as a subsidiary Panorama Resources NL of Australia. Anglo American also held a 14.9% equity interest in Tanganyika Gold and was committed to expend \$2 million during 2 years in the exploration of Tanganyika Gold's Lupa Goldfield licences. Maiden Gold NL of Australia held 11 prospecting licences in southern Lake Victoria greenstone environments with the major exploration focus in 1997 on the Nyanzaga prospect and the area around the old Jubilee Reef gold mine. Serengeti Diamonds Ltd. of Canada had a joint-venture arrangement with Ormonde Mining plc. of Canada to explore the Lyaru, the Kasanga Bridge and the Makhona-Nijwa gold prospects in the Lupa Goldfields. Ormonde also had a farm-in agreement with Iscor Ltd. of South Africa whereby Iscor could earn a 50% interest in the Ormonde's Mrangi prospecting license in the Seka area. In 1997, JCI Ltd. of South Africa sold their interests in four Tanzania gold exploration projects— Busolwa, Nzega, Minala, and Ibingo— to Kimberley Resources N.L. of

Australia in return for a 37.8% interest in Kimberley.

In April 1997, Sutton Resources Ltd. terminated its joint venture with BHP Minerals International Exploration Inc., on its Kagera nickel-cobalt project in northwestern Tanzania. As a result, Sutton regained a 100% interest in the Kagera and the Kabanga nickel properties. In July 1997, Sutton entered a new joint venture agreement with Anglo American and granted them the right to earn a 60% interest in the separate Kabanga prospect by committing to spend \$27 million, including at least \$7 million within 24 months, on exploration, feasibility studies and arrangement of project financing. Total inferred resources at the Kabanga deposit, on the basis of earlier Sutton exploration and a 0.5% nickel cutoff, were estimated to be 31 Mt, grading 1.5% nickel, 0.22% copper, and 0.13% cobalt. Subject to final feasibility and financing decisions, Anglo American expected the capital cost to establish a mine and associated facilities capable of producing from 13,600 to 18,100 metric tons per year (t/yr) of nickel at \$135 million. A 2001 production startup date was targeted (Sutton Resources Ltd., July 21, 1997, Sutton Resources Ltd. joint ventures Kabanga nickel project, accessed August 23, 1997, at URL <http://www.suttonresources.com/s/NewsReleases.asp?ReportID=692>). On the basis of a recalculation of the Kabanga resource by Anglo American based on a cutoff grade of 1.2% nickel, Sutton reported a revised estimate of 12.7 Mt, grading 2.1% nickel, 0.30% copper and 0.16% cobalt. (Sutton Resources Ltd., February 21, 1997, Property profile—Kabanga and Kagera projects—Tanzania, accessed August 23, 1998 at URL <http://www.suttonresources.com/s/Properties.asp?PropertyInfoID=114&View=All>).

Other mineral production focused on diamonds, gemstones, and graphite. Williamson Diamonds Mines Co. Ltd., owned 75% by De Beers Centenary Ag. and 25% by the State Mining Corp., operated the Williamson (Mwadi) Mine. Williamson has produced more than 3 Mt of diamond ore since De Beers acquired the mine in 1995. Plant capacity is 1.7 Mt/yr. Current production levels were equivalent to 300,000 carats per year valued at about \$10.4 million (Africa Trade and Business Bulletin, October 23, 1997, Tanzania Company News, The Williamson Diamonds Mines Co. Ltd., accessed November 17, 1997 at URL <http://www.bizafrica.com/tanzania/busbul/companies.html>). Additional diamond exploration was being conducted by De Beers, Reunion Mining of the United Kingdom at Mabuki, Tan Range at the Tabora kimberlite pipe 65 km southwest of the Williamson Mine, and Serengeti Diamonds Ltd. of Canada.

In 1996, Samax transferred its management of the Graphtan Ltd. graphite mine, near Merelani, northern Tanzania, to Phoenix Minerals Ltd. of the United Kingdom for \$2.5 million. The \$20 million mine, which began production in 1995, produced 6,776 t of graphite in its first full year of production in 1996. Sufficient reserves were initially identified for a 40-year operation at a mining rate of 15,000 t/yr of high-grade flake graphite of 97-98% purity (Ministry of Water, Energy and Minerals, Tanzania, 1998). The mine, however, ran into operational problems in 1997, and the last shipment of remaining stockpiled ore was made in February 1998. The mine will be put up for sale in 1998 (Industrial Minerals, 1998).

In the cement sector, the South African company, Alpha Ltd., acquired a 60% stake in the country's largest cement plant, Tanga

Cement. Tanga had a production capacity of 500,000 t/yr of cement and held 40% of the market share in Tanzania (African Mining, 1997; International Cement Review, 1996).

In the energy sector, Tanzania has been heavily dependent on petroleum imports to meet its industrial energy needs; approximately 96% of the energy for domestic use comes from firewood (Kayaya, 1997). In addition to small production from the Kiwiri Coal Ltd. underground coal mine at Songwe-Kiwiri, the Central Mine Planning and Design Institute of India was conducting exploration drilling and a feasibility study on developing a surface mine and a mine-mouth powerplant in the Muchuma sector of the Ruhuhu coal field, where more than 200 Mt of bituminous coal had been identified in Karoo System rocks west of Lake Nyasa (Mining Magazine, 1997; Hestor, B.W., ed., 1998). During the past 2-3 years, the Government has been trying to privatize its controlling interests in petroleum refining and exploration. The state-owned Tanzanian Petroleum Development Corp. has entered production sharing agreements with a number of companies to explore offshore oil and gas targets, while reducing its maximum participation in the agreements to 20%. These include Antrim Resources Inc. of Canada on the Pemba-Zanzibar blocks, Canop Worldwide Corp. of Canada on the Dar es Salaam Basin, Tanganyika Oil Co. on the Rufiji and Mandawa Basins, Tullow Oil plc of Ireland on the Mnazi Bay Block; Dublin International Petroleum Ltd. of Ireland, and Klosa of Dubai.

In 1997, the Ocelot Energy Inc. and Trans Canada Pipelines Ltd. Canadian joint venture, under contract to the Government, began development of the \$300 million Songo-Songo offshore gas production and processing project to deliver gas to a Dar es Salaam power station in 1998. During 1997, there was considerable progress on Ocelot's Songo-Songo gas-to-electricity project. All five existing gas wells in Songo-Songo were reworked and made production ready. Testing confirmed total gas deliverability of more than 2.8 million cubic meters per day (Mm<sup>3</sup>/d) at high pressure. The first phase of the project required only 1.12 (Mm<sup>3</sup>/d) of deliverability and 7 billion cubic meters of reserves, leaving capacity for subsequent phases of gas sales from Songo-Songo. At yearend, the company was awaiting the signature on final agreements that will allow the construction of a gas plant and pipeline to link Songo-Songo to an already constructed electrical power plant at Dar es Salaam (Ocelot Energy Inc. 1998, Annual Ocelot Energy report for 1997, accessed September 22, 1998 through URL <http://www.sedar.com> or at <http://www.ocelot.ca>).

The future outlook for the minerals sector in Tanzania is promising, stimulated by positive new mining and foreign investment legislation and by the success of mineral exploration in the country within the past 2 to 5 years. Decisions on proceeding with future new mining developments, particularly for gold and nickel, however, will be subject to external market forces and world commodity prices. Lack of adequate infrastructure remains a problem, but efforts, supported by international development funds, have begun to upgrade harbors, pipelines, and road and railroad transport systems. The development of domestic natural gas resources should help in cost-saving energy

import substitution and as a source of cheaper energy for new industrial developments.

## References Cited

- African Mining, 1997, Tanzanian cement producer acquired: African Mining, v. 2, no. 6, November-December, p. 60.
- 1998, Australian juniors merge: African Mining, v. 3, no. 1, January-February, p. 53.
- Ashanti Goldfields Company Ltd., 1998, Annual Ashanti Goldfields report, 1996: Ashanti Goldfields Company Ltd., March, p. 18.
- Hestor, B.W., ed., 1998, Tanzania—Opportunities for mineral resource development, 3d ed.: Government of the United Republic of Tanzania, p. 90-92.
- Industrial Minerals, 1998, Merelani graphite operation finally folds: Industrial Minerals, no. 370, July, p. 14.
- International Cement Review, 1996, The gloves are off: International Cement Review, October, p. 106-108.
- Kayaya, Musenga, 1997, Oil, wood energy eat into eastern and southern African economies: Panafrican News Agency (Dakar), April 22, 1 p.
- Mining Journal, 1997, Tanzania Country Supplement: Mining Journal [London] v. 329, no. 8452, October 24, p. 13.
- Mining Magazine, 1997, Tanzania mine and plant project: Mining Magazine, May, p. 333.
- Ministry of Water, Energy and Minerals, 1998, Tanzania mining—A new engine for growth: Dar es Salaam, Ministry of Water, Energy and Minerals, 32 p.
- Northern Miner, 1998, Tan Range deals Itetemia interest to Minorca: Northern Miner, v. 83, no. 52, February 23- March 1, p. 1.
- Pangea Goldfields Inc., 1998, Annual Pangea Goldfields Inc. report—1997: Pangea Goldfields Inc., March 20, p. 5-11.
- Samax Resources Ltd., 1998, Annual Samax Resources Ltd. report—1997: Samax Resources Ltd. p. 4-6.
- Sutton Resources Ltd., 1998a, Release of year end financial results: Vancouver, Canada, Sutton Resources Ltd. news release, March 31, 2 p.
- 1998b, Sutton Resources Ltd. Announces Bulyanhulu, Tanzania: more tonnes—higher grade: Vancouver, Canada, Sutton Resources Ltd, news release, March 26, 2 p.
- Tan Range Exploration Corp., 1997, Green light at Itetemia: Vancouver, Canada, Tan Range Exploration Corp. press release, April 29, 2. p.
- Tanzania Investment Centre, 1997, Investor's guide to Tanzania: Tanzania Investment Centre, 51 p.

## Major Sources of Information

- Ministry of Water, Energy and Minerals  
P.O. Box 2000  
Dar es Salaam, Tanzania  
Telephone: 255-51-31433/9  
Fax: 255-51-44071
- Geological Survey of Tanzania  
P.O. Box 903  
Dodoma, Tanzania  
Telephone: 255-61-23281/5  
Fax: 255-51-44071
- Tanzania Investment Centre  
P.O. Box 938  
Dar es Salaam, Tanzania  
Telephone: 255-51-113365 or 34200  
Fax: 255-51-112761

## Other Publication

- Mining Journal [London], Tanzania Country Supplement, October 24, 1997, v. 329, no. 8452, 16 p.

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

(Metric tons unless otherwise specified)

Commodity 3/	1993	1994	1995	1996	1997 e/	
Calcite	180	540	37	40 r/ e/	40	
Cement, hydraulic e/	540,000	490,000	800,000	800,000	800,000	
Clays:						
Bentonite e/	70	70	70	75	75	
Kaolin	-- e/	541	596	1,332	1,300	
Coal, bituminous	51,270	45,000	43,200	52,000	35,000	
Diamond 4/	carats	40,847	17,177	49,538	126,670	115,750 5/
Gemstones, precious and semiprecious excluding	Kilograms	34,826	48,509	111,403	142,160	142,000
Gold, refined	do.	3,264	2,861	320	318	300
Graphite	--	--	359	6,776	11,000	
Gypsum and anhydrite, crude	1,205	7,536	1,052	8,765	8,800	
Lime, calcined and hydrated	356	101	-- e/	-- e/	--	
Limestone, crushed	527,120	648,474	1,062,081	120,000	120,000	
Mica, sheet	(6/)	(6/)	(6/)	(6/)	(6/)	
Phosphate minerals:						
Apatite e/	11,400	--	6,700 r/ e/	3,380	3,000	
P <sub>2</sub> O <sub>5</sub> content 7/	3,541	--	2,080 r/ e/	1,050 r/ e/	930	
Salt, all types	17,740	84,289	105,000	86,700	90,000	
Sand, glass e/	4,200	4,200	4,200	4,200	4,200	
Soda ash e/	300	300	300	300	300	
Tin, mine output, Sn content	12	9	3	-- e/	--	

e/ Estimated. r/ Revised.

1/ Includes data available through August 11, 1998.

2/ Estimated data are rounded to 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/ Diamond figures are estimated to represent 70% gem-quality or semigem-quality and 30% industrial-quality stones.

5/ Reported figure.

6/ Less than 1/2 unit.

7/ P<sub>2</sub>O<sub>5</sub> figures are reported and represent 31% of estimated apatite (Ca<sub>5</sub>Cl(PO<sub>4</sub>)<sub>3</sub>) output.