

GOLD

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Domestic gold mine production in 2001 fell to its lowest level since 1996. Primarily, the 5% drop from the 2000 level was the result of weak gold prices, the strengthening of the U.S. dollar in the global economy, and slowing retail consumption. The United States has been the second largest gold producer (behind South Africa) since 1991, when U.S. production surpassed that of the Soviet Union for the first time in five decades. Nevada produced more than three-fourths of domestic production; the remaining output came from 10 other States. Gold was produced at 53 lode mines; about a dozen large placer mines, all in Alaska; and numerous small placer mines, mostly in Alaska and the Western States. In addition, a small amount of domestic gold was produced as a byproduct of processing base metals, principally copper. Thirty mines yielded almost 99% of the gold produced in the United States. The value of U.S. gold mine production was about \$2.9 billion in 2001.

Domestic gold exploration activity dropped on a total dollar basis for the fourth consecutive year, declining sharply to \$107.2 million in 2001 from \$183.4 million in 2000. The percentage of the total world gold exploration budget going to the United States decreased by 12.6% in 2001 after increasing for 3 years, while worldwide gold exploration expenditures dropped by 22% from 2000, by 7% from 1999, by 24% from 1998, and by 29% from 1997 (diGesu and others, 2001b).

Commercial-grade refined gold came from about two dozen domestic producers. Of several thousand companies and artisans, a few dozen companies dominated the fabrication of gold into commercial products. U.S. jewelry manufacturing was heavily concentrated in the New York City, NY, and the Providence, RI, areas, with other concentrations in California, Florida, and Texas. In 2001, estimated end uses of gold were jewelry and arts, 85%; dental, 11%; and electrical and electronics, 4%.

According to the World Gold Council, 2001 was the 11th consecutive year of unit sales increases for gold jewelry in the United States. Total U.S. gold jewelry sales exceeded \$15.6 billion, up by 2% from sales in 2000, despite a year marked by economic turmoil (American Metal Market, 2002).

Trade in refined bullion comprised 83% of U.S. gold imports and 81% of exports; net exports of bullion decreased to 234,000 kilograms (kg), down by about 9% from that of 2000. As shown in tables 4 and 6, Canada provided more than 70% of the bullion imported, and Switzerland was the destination for more than 75% of the bullion exported.

The dollar price for gold was volatile in 2001, with the average price 3% less than the average gold price in 2000. Engelhard Corp.'s daily price of gold ranged from a low of

nearly \$257 per troy ounce¹ on April 2 to a high of about \$294 per ounce on September 17, soon after the terror attacks of September 11. The average for the year was, to the nearest dollar, \$272 per ounce. The previous year's prices ranged from about \$265 per ounce to \$314 per ounce and averaged \$280 per ounce.

By May, 12-month London gold lease rates rose from about 1.1% in January to 2.1% before starting a downward trend that returned to the January level in November and rose slightly to 1.2% in December. Short-term lease rates dropped to new lows of 0.2% near the beginning of the fourth quarter of 2001 before rising to 0.6% in December (CRU International Ltd., 2002).

Total world mine production of gold was about the same as the record level reached in 2000. Despite a seventh successive decline in annual output, South Africa remained the largest producer of more than 80 gold-mining nations, followed by the United States, Australia, China, and Canada. Identified world gold resources at yearend 2001 were estimated to be 100 million kilograms (Mkg), of which 15% to 20% were byproduct resources; the world reserve base was estimated to be 78 Mkg, and reserves, 50 Mkg (R.P. Ashley, U.S. Geological Survey, oral commun., 2001). [This report uses the resource and reserve terminology of the U.S. Geological Survey (USGS), which is republished annually in USGS Mineral Commodity Summaries.] South Africa had about 50% of the resources, 46% of the reserve base, and 38% of the reserves. The United States had about 9% of world resources, 8% of the reserve base, and 11% of the reserves.

About 15% of all gold mined is estimated to have been used in dissipative industrial uses or is either unaccounted for or unrecoverable (Thomas and Boyle, 1986, p. 6). Therefore, of an estimated 143 Mkg of gold mined in historic times through 2001, 122 Mkg of gold remain, with about 33 Mkg held by central banks as official stocks and about 89 Mkg held privately as bullion, coin, and jewelry.

The USGS has issued a report on undiscovered gold, silver, copper, lead, and zinc deposits in the United States (U.S. Geological Survey, 2000). In the report, the amount of gold in undiscovered U.S. mineral deposits is estimated to range between greater than 13 Mkg (90% probability) and greater than 22 Mkg (10% probability). The mean value of gold in the undiscovered deposits is 18 Mkg with nearly one-quarter of the gold estimated to be contained in undiscovered porphyry copper deposits. Other major gold deposit types considered in the report were hot spring gold, epithermal vein, plutonic porphyry

¹Elsewhere in this report, ounce by itself refers to troy ounce; 1 kilogram is equivalent to 32.1507 troy ounces.

gold, sediment-hosted gold, gold-silver-tellurium veins, and low-sulfide gold-quartz vein deposits. Total discovered gold resources in the United States were estimated to be 27 Mkg; identified U.S. gold resources were estimated to be 15 Mkg, and all U.S. gold production in 2001 totaled 11 Mkg.

Production

Domestic mine production data for gold were derived by the USGS from two separate voluntary surveys of U.S. operations—one for monthly production of copper, gold, lead, silver, and zinc from lode mines and the other for the same types of data surveyed annually.

A survey was sent to all 64 lode gold producers believed to be operational in 2001; 63 responded. Eleven of the 63 respondents reported that their mines were closed and another 6 remained on care-and-maintenance status by the end of 2001. The individual company production and performance data listed in table 3 and cited elsewhere in this report were obtained from published sources, such as company annual reports.

Of the total domestic gold produced during 2001, about 92% was extracted from gold ore, and the remaining 8% was derived from other precious-metal ores, base-metal ores, and placer deposits. By comparison, similar data assembled for 1980 indicated a 63% to 37% ratio. In both years, the contribution from placer mines amounted to less than 2% of the total gold produced.

Alaska.—The State's Division of Geology and Geophysical Surveys reported that gold output decreased to 16,700 kg (536,000 ounces) worth \$145 million in 2001 from an estimated 17,200 kg (552,000 ounces) worth \$154 million in 2000, or an approximate decrease in production of 3% and a decrease in associated value of about 6% (Szumigala and Swainbank, 2002a). Placer production dropped to 700 kg (23,000 ounces) from 1,400 kg (46,000 ounces) of gold.

The underground Fort Knox gold mine operated by Kinross Gold Corp. near Fairbanks began to produce gold in 1997. Kinross reported that the mine produced about 12,800 kg (411,000 ounces) of gold in 2001, making it the country's seventh largest gold producer (Kinross Gold Corp., 2002, p. 2).

The Greens Creek Mine on Admiralty Island, off Juneau, completed its fifth year at full production levels. Ore from the underground trackless mine was milled at the mine site. The mill produced gold and silver doré, lead, zinc, and bulk concentrates. Swainbank and Szumigala (2002a, p. 14) reported that the mine produced 2,300 kg (73,200 ounces) of gold. Greens Creek was a joint venture between Kennecott Greens Creek Mining Co. (70.3%) and Hecla Mining (29.7%).

USMX Inc.'s Illinois Creek gold mine in west-central Alaska was placed on care and maintenance. However, the mine continued to produce gold as the existing heaps were rinsed (Szumigala and Swainbank, 2002a, p. 12).

Nova Gold Resources Inc. intends to acquire a 70% interest in the Dolin Creek gold deposit, which is considered to be one of the largest undeveloped gold deposits in the world. Resources are estimated to be 215,000 kg (6.9 million ounces), with another inferred gold resource of 187,000 kg (6 million ounces). Under an agreement with Placer Dome Inc. and Alaska's Calista Corp., Nova Gold will spend at least \$10 million within 10

years toward the exploration and development of the Dolin Creek project (American Metal Market, 2001b).

Owners continued to develop the Kinross Fort Knox/True North gold mine, Teck Cominco American Inc.'s Pogo Mine east of Fairbanks, and Kennecott/Hecla's Green Creek Mine near Juneau (Swainbank and Szumigala, 2002b, p. 45).

California.—Gold production in California decreased by more than 20% in 2001, as shown in table 2. In northern California, Homestake's McLaughlin Mine remained the State's largest gold producer even though mining ceased in 1996; gold continues to be processed from low-grade ore that was stockpiled during the life of the mine. The second largest gold producer, the Briggs Mine in southern California, is owned by Canyon Resources Corp. Mining, which continued at the main pit and began at the North Briggs and Goldtooth deposits, produced 3,000 kg (96,000 ounces) of gold (Canyon Resources Corp., 2002).

Gold production at the McLaughlin Mine is expected to continue through 2002. Newmont Gold Company's Mesquite Mine, near Brawley, ceased mining operations in the second quarter, with the depletion of the main ore body. Production from residual heap leaching yielded 2,900 kg (92,600 ounces) of gold. A permitting process for expansion is underway (Newmont Gold Company, 2002, p. 16).

Glamis Gold Ltd., through its wholly owned Glamis Rand Mining Co., produced 1,800 kg (59,000 ounces) of gold at its Rand Mine near Randsburg. Production was much lower because stripping was completed at the Yellow Aster Pit (Glamis Gold Ltd., 2002, p. 2).

Near the Nevada-California State line, in San Bernardino County, CA, the Castle Mountain Mine produced an estimated 2,400 kg (77,000 ounces) of gold (Viceroy Resource Corp., 2002, p. 4). Castle Mountain was a joint venture between Viceroy Resource Corp. (75%) and MK Gold Company (25%).

Colorado.—Gold production in the State was 14% lower with a significant decrease in production from the Nation's tenth largest gold mine, the Cresson Mine, in the Cripple Creek District of Teller County. AngloGold Ltd. (2002, p. 18) reported that this open pit mining operation produced 6,700 kg (214,000 ounces) of gold in 2001.

Settlement was reached concerning the environmental cleanup of the Summitville gold mine located in Colorado. The settlement, which remained subject to approval by the Federal District Court in Denver, would end 4½ years of lawsuits and counterclaims. Summitville was owned and operated by a Galactic Resources Ltd. subsidiary that opened the gold mine in June 1986 and closed it in December 1992. During that time, more than 9,300 kg (300,000 ounces) of gold was produced. In the following year, Galactic filed for bankruptcy and abandoned the Summitville operation. Despite a \$150 million remediation effort the site does not meet the water standards set by the U.S. Environmental Protection Agency (Mining Journal, 2001).

Idaho.—Meridian Gold Inc.'s closure of its Beartrack Mine near Salmon in 2001 left Idaho with no active gold mines. Beartrack produced more than 580 kg (19,000 ounces) of gold, about 74% less than in 2000. Leaching of crushed ore is expected to continue to produce gold over the next year on a declining basis (Meridian Gold Inc., 2002, p. 19).

Montana.—Exploration for gold continued to be depressed,

with no major company activity. The few existing exploration programs are privately funded (McCulloch, 2002, p. 67).

Placer Dome Inc.'s wholly owned Golden Sunlight Mine near Whitehall was Montana's largest gold-producing mine with 6,100 kg (195,500 ounces) of gold in 2001, about 8% less than in 2000. Mining of the open pit was completed in August. Future gold production will come from the processing of low-grade ore stockpiles, which should continue through 2002 (Placer Dome Inc., 2002, p. 7).

Nevada.—Nevada maintained its longstanding position as the Nation's dominant gold-producing State. Of the Nation's top 30 gold-producing mines, 14 were in the Silver State. Primary gold production decreased to 256,000 kg (8.2 million ounces).

Newmont Gold Company produced 84,000 kg (2.7 million ounces) of gold from 9 open pit operations, 5 underground mines, and 17 processing facilities in Elko, Eureka, Humboldt, and Pershing Counties (Newmont Gold Company, 2002, p. 16). Newmont plans to open various new gold mines in Nevada, including the Leeville underground mine. The Twin Creeks, Gold Quarry, and Phoenix Mines will be expanded. The latter mine was acquired when Newmont bought Battle Mountain Gold Co. Before opening Leeville, a small underground mine called Chukar will be developed at the Gold Quarry open pit site (Platts Metals Week, 2001d).

Barrick Gold Corporation was the Nation's second largest gold mining company in 2001 and reportedly recovered 48,200 kg (1.5 million ounces) of gold at its Betze-Post Mine/Goldstrike in Eureka County. In nearby Elko County, Barrick continued the development of its Meikle Mine/Goldstrike, an underground operation that produced 22,200 kg (713,000 ounces) of gold; it was the Nation's largest underground gold mine (Barrick Gold Corporation, 2002, p. 8). The mine had an underground cooling system to keep temperatures around 80° F even though the temperature of the surrounding rock can be as much as 140° F (Gold News, 1998). Barrick's Rodeo underground gold mine moved into full production and produced 2,200 kg (70,000 ounces) of gold in 2001. It was merged into one operation with the Meikle Mine, integrating services and sharing one maintenance shop. An underground connection was made between the mines. Ore mined at Rodeo is hauled underground to Meikle and raised to the surface (Platts Metals Week, 2001a). These Barrick operations on the Carlin Trend were developed within a 2,800-hectare landholding known as the Goldstrike property.

Northwest of Elko, AngloGold Ltd. and Meridian Gold Inc. produced about 11,800 kg (380,000 ounces) of gold at their Jerritt Canyon Mine, the Nation's eighth largest gold mine (AngloGold Ltd., 2002, p. 18; Meridian Gold Inc., 2002, p. 19). Other gold mines in Humboldt County included the Hycroft (formerly the Crowfoot/Lewis) and the Marigold Mines.

South of and parallel to the Carlin Trend, the Battle Mountain/Eureka Trend runs from southeastern Humboldt County southeast through Lander and Eureka Counties. Gold mining operations along this trend in Lander County include the McCoy/Cove gold and silver mine, which produced 2,900 kg (94,600 ounces) (Echo Bay Mines Ltd., 2002, p. 11); and the country's third largest gold mine, the Cortez Mine, owned by Placer Dome (60%) and Kennecott Minerals Company (40%), which produced 37,000 kg (1.2 million ounces) and included

3,400 kg of gold that was sent as an ore for milling and processing to the Jerritt Canyon Mine (Placer Dome Inc., 2002, p. 7).

At Round Mountain, about 95 kilometers north of Tonopah, the Round Mountain Gold Corporation mine of Echo Bay Mines Ltd. produced about 23,200 kg (747,000 ounces) of gold during the year (Echo Bay Mines Ltd., 2002, p. 11). The property is the sixth largest U.S. gold mine.

Battle Mountain Gold Company continued its exploration project by extending the Phoenix Zone at the Battle Mountain Complex, thereby adding about 31,000 kg (1 million ounces) of gold to its reserve base. In addition, Dynatec Corporation continued to develop the Rossi-Storm Deposit at the Ken Snyder Mine, which poured its first gold on December 9, 1998. Ken Snyder's third full year of commercial production was about 6,200 kg (199,000 ounces) of gold (Driesner and Coyner, 2002, p. 13).

Exploration continued to decline in the State. Newmont and Barrick carried out property exploration along the Carlin Trend. Newmont's Leeville project and Barrick's Rodeo project were the primary targets. Other exploration properties were Placer Dome's Crossroads and Pediment deposits in the Bullion and Cortez Districts of Lander and Eureka Counties (Tingley and LaPointe, 2002, p. 69).

South Dakota.—Gold production increased by more than 9% compared with that of 2000. Homestake Mining Company's 124-year-old Homestake Mine at Lead was shut down at the end of 2001. Homestake planned to produce about 7,500 kg (240,000 ounces) of additional gold before closure and expected to spend more than \$66 million during 8 years on final reclamation and remediation (American Metal Market, 2000).

Goldcorp Inc. operated an open pit gold mine, the Wharf Mine, near Lead, which produced about 3,200 kg (104,000 ounces) of gold (Goldcorp Inc., 2002, p. 2).

Utah.—Rio Tinto Ltd.'s Bingham Canyon Mine, which was operated by Kennecott Utah Copper Corp., produced about 18,400 kg (592,000 ounces) of gold as a byproduct of its copper mining operations near Salt Lake City. Long ranked as one of the Nation's principal gold-producing mines, Bingham Canyon was the eighth largest gold producer in 2001. Kennecott also operated the nearby Barney's Canyon Mine, an open pit and heap-leaching operation that produced 4,400 kg (140,000 ounces) of gold (Rio Tinto Ltd., 2002, p. 4).

Washington.—Echo Bay Mines's Kettle River underground mine, in the northeastern part of the State, produced 1,600 kg (50,000 ounces) of gold in its 11th year of production (Echo Bay Mines Ltd., 2002, p. 11).

World Review

World gold mine production was about the same as in 2000. Increased production from mines in China, Indonesia, and Russia was enough to help offset a continuing decline in gold output from South Africa and Australia. According to its annual review of world gold supply and demand, Gold Fields Mineral Services Limited calculated that the total global supply of gold in 2001 was 3.87 Mkg (124 million ounces) compared with the previous year's total supply of 3.97 Mkg (128 million ounces) (Klapwijk and others, 2002, p. 7). Gold Fields Mineral

Services also reported a slight increase in mine production (0.8%); increases in official sector sales (3.1%); no net producer hedging; and an implied net disinvestment of 53,000 kg (1.7 million ounces), which was sales of bars and coins by private investors. Old gold scrap levels increased by more than 16% in 2001.

On the demand side, Gold Fields Mineral Services reported 249,000 kg (8 million ounces) less than its 2000 level. Jewelry fabrication decreased by 171,000 kg (5.5 million ounces) to a 5-year low, due mainly to lower demand in Egypt, Saudi Arabia, and Turkey. Bar hoarding rose by 7%, largely as a result of higher Japanese demand and partly as a result of bank-related concerns. Coin fabrication was up by about 18% from the record low set in 2000, largely due to the release of a German commemorative coin. The largest percentage decline, however, was the amount of gold used in the electronics market, which fell 28% with lower demand for computers and other electronic products (Klapwijk and others, 2002, p. 10).

With regard to gold exploration, the Metals Economics Group, Halifax, Nova Scotia, Canada, determined from its annual survey of worldwide exploration budgets for 679 companies that \$849 billion (42.5%) of the 2001 world exploration budget total for nonferrous metals was directed to gold, with 400 companies reporting active gold programs (diGesú and others, 2001a). The expenditures for gold were \$241 million less than the \$1.09 billion (47% of the total) reported for gold exploration in 2000. As in the preceding 7 years, Latin America received the highest expenditure for gold—\$220.7 million (26% of the reported 2001 world total exploration dollars) (diGesú and others, 2001b).

Australia.—Australian gold mine production dropped by about 4% from 2000. However, Australia retained its position as the world's third largest gold-producing nation. Of the 285,400 kg (8.9 million ounces) of gold mined in 2001, Western Australia, Queensland, and Northern Territory accounted for about 70%, 11%, and 7%, respectively (Australian Bureau of Agricultural and Resource Economics, 2002, p. 15); Western Australia's production was derived principally from mining operations near Kalgoorlie. Other Australian gold-producing States, in descending order of output, were New South Wales, Tasmania, South Australia, and Victoria.

Higher grades and extra output from processing low-grade stockpiles of ore at the Bronzewing Mine resulted in a 58% increase in gold produced and a 30% decline in cash cost to about \$150 per ounce. At the Jundee Mine similar gold output gains resulted from higher grades, which contributed to a 15% decrease in cash costs. Conversely, the Kanowna Bell Mine reported a decrease in the ore grade, which contributed to 10% higher cash costs of almost \$160 per ounce. Low-grade stockpiles were the predominate mill feed at the Mount Leyshon Mine, which led to a 23% increase in cash costs. Overall, the weighted average cash cost for Australian gold mines decreased to \$175 per ounce in 2001 from \$190 per ounce in 2000 (Klapwijk and others, 2002, p. 46).

Delta Gold Ltd. and Goldfields Ltd. merged their operations to create a 31,000 kilogram-per-year (kg/yr) (1-million-ounce-per-year) gold producer that is about the same size as Normandy Mining Ltd. and Newcrest Mining Ltd. Delta's managing

director heads the merged company named Durion Gold Ltd. (Platts Metals Week, 2001c).

WMC Resources Ltd. sold its St. Ives and Agnew gold operations in Western Australia to South African-based Gold Fields Ltd. for \$232 million in cash and shares plus royalties. All employees at the operations were able to keep their positions with Gold Fields (Metal Bulletin, 2001).

Brazil.—During 2001, gold production remained level at about 52,400 kg (1.7-million-ounces). Output from the informal, noncorporate mining sector, the *garimpeiros*, also was estimated to be about the same as in 2000 at 10,400 kg (330,000 ounces) of gold. The largest decline in the corporate sector came from the Paracatu Mine, which reported an 18% drop in gold output, reflecting the unscheduled shutdown of its two ball mills in the first quarter. Both the Almas and Cateté operations were closed (Klapwijk and others, 2002, p. 37).

Canada.—Canada remained fifth in the ranking of world gold producers, as its output rose by 2% to 160,000 kg (5.13 million ounces). Canada's principal gold-producing Provinces were Ontario (50%), Quebec (21%), British Columbia (15%), and Manitoba (4%). Gold was also produced in Alberta, New Brunswick, Newfoundland, Nunavut, Saskatchewan, the Northwest Territories, and Yukon Territory. The increase in production can largely be attributed to the reopening of the Red Lake Mine in northwestern Ontario. The development of a high-grade zone at deeper levels of the mine produced more than 15,000 kg (482,000 ounces) of gold. Additional production came from the LaRonde Mine where 2 years of expansion has more than doubled its gold output (Klapwijk and others, 2002, p. 36).

Chile.—Gold output in Chile decreased to 42,700 kg (1.37 million ounces) owing to continued mine closures. The closures included the Petorca Mine, which suspended operations in August, and the Refugio Mine, which closed in May. Other losses came from the 3-month shutdown of the El Indio Mine, the completion of residual leaching at the Guanaco operation, and lower grades and unscheduled repairs at the Copia Mine (Klapwijk and others, 2002, p. 37).

China.—The Chinese produced an estimated 185,000 kg (5.95 million ounces) of gold in 2001, up 3% from the 180,000 kg (5.6 million ounces) of gold produced in 2000 (Antaike Precious & Minor Metals Monthly, 2002).

Gold jewelry is one of 106 commodities that now are allowed to be priced freely in China. Before price deregulation, the People's Bank of China set standard gold prices, and gold stores could only vary the prices slightly. The Government's relaxed attitude toward price controls for gold jewelry is expected to increase consumption and encourage design quality (Platts Metals Week, 2001b).

India.—India's budget proposal included a reduction of gold import duties from 400 rupees (\$8.58) per 10 grams to 250 rupees (\$5.36) per 10 grams starting next fiscal year [2001-2002]. A smaller duty should reduce smuggling, which is estimated to be 60,000 kg/yr (1.93 million ounces per year) of gold that arrives illegally through Nepal and neighboring Bangladesh (American Metal Market, 2001a).

Indonesia.—Gold output rose to 130,000 kg (4.18 million ounces) in 2001. Most of the increase came from the Grasberg Mine, which produced more than 108,000 kg (3.47 million

ounces) of gold. Gold output at this copper mine reached a new peak due to exceptionally high grades of ore. Growth at another copper mine, Batu Hijau on the island of Sulawesi, contributed to further increase gold output. The Kelian gold mine returned to normal operation and also reported higher output. However, Minahasa, a mine on the island of Sumbawa, ceased mining late in 2001 but continued to process lower grade gold stockpiles (Klapwijk and others, 2002, p. 39).

Mexico.—Gold production was about the same at 26,000 kg (846,000 ounces) in 2001. This was despite the fact that gold production at La Herradura, Mexico's largest gold mine, doubled to almost 4,000 kg (129,000 ounces) (Klapwijk and others, 2002, p. 37).

Papua New Guinea.—Gold production in Papua New Guinea remained the same at 74,000 kg (2.38 million ounces). Lower gold output from the Porgera Mine was a result of open pit depletion and a need to use lower grade stockpiles to supplement shortfalls in production. In addition, mining was completed at the Misima Mine in May, with subsequent production coming from lower stockpiled ore (Klapwijk and others, 2002, p. 39).

Peru.—Latin America's largest gold producer reported a small (4%) increase to reach 138,000 kg (4.44 million ounces) of gold output. Peru's largest gold mine, Yanacocha, contributed to the gain with close to 60,000 kg (1.93 million ounces) of gold, which was 6% more than in 2000. The new La Quinua Mine had delays in startup and a longer-than-anticipated leach recovery cycle for gold. Increased gold production was also reported at the Pierina Mine, which increased by 11% to 28,000 kg (900,000 ounces) (Klapwijk and others, 2002, p. 36).

Russia.—Production in Russia grew by 6% to 152,000 kg (4.89 million ounces) of gold, keeping the country in the sixth position among the top gold producing countries. Over 30% of the country's gold output is estimated to have come from 15 companies, which suggests concentration taking place in Russia's highly fragmented gold industry—as many as 600 enterprises engaged in gold mining in 2001. Commercial banks were thought to have purchased more than 140,000 kg (4.50 million ounces) of gold in 2001, or about 92% of production. A new Presidential decree, effective January 2002, allows the mining companies to export bullion directly. In addition, another ruling canceled the 5% export duty on refined gold, which had been in force since 1998. The removal of this charge is expected to contribute to a greater output of Russian gold in 2002 (Klapwijk and others, 2002, p. 40).

South Africa.—Gold production in South Africa, the world's largest gold-producing nation, declined for the eighth consecutive year to 402,000 kg (12.90 million ounces) of gold, about 6% less than that of 2000, and left gold production at its lowest level in 48 years. South Africa has not had a year-on-year increase in gold output since 1993, and consequently, with the increase in gold production in Russia, South Africa's share fell to roughly 15% in 2001 from 30% of the world's gold output in 1993. The declines can be explained, in part, by operational difficulties related to the maturity of the industry and the nature of the ore deposits (narrow veins in hard rock being mined at deep levels). In 2001, gold production was affected by continued downscaling of mines, shaft closures, and lower gold output from mines that changed ownership as a

result of industry consolidation (Klapwijk and others, 2002, p. 33).

The tonnage and grade of ore milled during 2001 by the mines, comprising the membership of the Chamber of Mines of South Africa, amounted to almost 83 billion kilograms at a grade of 4.13 grams per metric ton (g/t) of gold ore; this compares with a higher total tonnage of 84 billion kilograms at a higher grade of 4.51 g/t that was milled by Chamber members in 2000.

Of the top 15 gold-producing companies in the world during 2001, 4 were South African. AngloGold Ltd., listed on the Australian Stock Exchange only 2 years earlier, remained the leading gold-producing company in the world. Gold Fields Ltd. was fourth in the world. The other two companies were Harmony Gold Mining Company Ltd. (9th) and Durban Roodepoort Deep Limited (11th). Durban Roodepoort Deep was listed on the Australian Stock Exchange just 2 years earlier in March 1999 (Klapwijk and others, 2002, p. 31).

Uzbekistan.—Gold production in Uzbekistan rose slightly to 87,000 kg (2.8 million ounces). Gold output at the Zarafshan-Newmont Gold joint venture, which processes high-grade tailings from the state-owned Murantau Mine at Zarafshan, fell to just over 13,000 kg (418,000 ounces) of gold in 2001 from 17,000 kg (547,000 ounces) of gold in 2000, primarily due to changes in grade decline (Klapwijk and others, 2002, p. 41).

Outlook

Consolidation will continue in the gold industry worldwide as gold producers seek to secure their assets, cut costs, and exploit gold prices, which are expected to rise within the next 2 to 3 years.

The U.S. gold industry, which has been closing its gold mines (10 in 1999, 12 more in 2000, and another 11 in 2001) also will continue to consolidate. World exploration spending for new gold resources will begin increasing after several consecutive years of decreases, with most of the development happening within Latin American countries.

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