science for a changing world

2011 Minerals Yearbook

GOLD [ADVANCE RELEASE]

U.S. Department of the Interior
U.S. Geological Survey

May 2013

Gold

By Micheal W. George

Domestic survey data and tables were prepared by Wanda G. Wooten, statistical assistant, and the world production table was prepared by Lisa D. Miller, international data coordinator.

In 2011, domestic mine production of gold increased to 234,000 kilograms (kg), slightly more than that in 2009 (tables 1–2). Although production increased for the second consecutive year, production was 36% less than the record high of 366,000 kg in 1998. In 2011, the value of domestic production increased to a record high of $11.8 billion, 30% more than that in 2010, mainly because of a 28% increase in the average price of gold, and 247% more than the value in 1998 because of a 433% increase in the average price of gold since 1998. It was the 10th straight year that the value of gold production had increased. Gold recovery from Barrick Gold Corp.'s (Toronto, Ontario, Canada) Gold Strike Mine in Nevada and Rio Tinto plc's (London, United Kingdom) Bingham Canyon Mine in Utah decreased owing to the processing of lower grade ores which became profitable with higher gold prices. In 2011, production began at the Nixon Fork Mine in Alaska, and the Golden Sunlight Mine restarted production in Montana. Mines in Nevada and Alaska accounted for about 74% and 11%, respectively, of domestic gold production in 2011. The remaining production came from mines in Utah, Colorado, California, Washington, South Dakota, Montana, Arizona, and New Mexico, in descending order of production. Gold was produced at lode mines in Alaska, California, Colorado, Nevada, South Dakota, Utah, and Washington, at two large placer mines in Alaska, and numerous small placer mines, mostly in Alaska and the Western States. In addition, domestic gold was produced as a byproduct of processing base metals, primarily copper. The 30 leading operations yielded 99% of domestic gold produced (table 3).

In 2011, the domestic nonfuel mineral exploration budget increased to $1.4 billion, a 65% increase compared with that in 2010. Much of the increase was from exploration for copper and gold in Alaska and gold in Nevada. The major reasons for increased exploration were the improved economy and higher commodity prices. Globally, gold was the primary mineral exploration target and accounted for more than 50% of the 2011 worldwide nonferrous exploration budget of $16.3 billion. In 2011, the gold global exploration budget was $8.3 billion, which was 52% more than that in 2010. Gold exploration in Canada, Australia, and the United States, in descending order, accounted for more than 40% of the global gold exploration budget (Lowrey, 2011; Wilburn, 2012, p. 58–60).

Commercial-grade refined gold was produced by about two dozen domestic companies. 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, NY, and Providence, RI, areas, with other manufacturers in California, Florida, and Texas. In 2011, the estimated percentages for end use of gold were jewelry and arts, 66%; dental and medical, 12%; electrical and electronics, 5%; and other, 17%.

In 2011, the top 15 gold mining companies produced about 44% of world gold production. The top five producers (in descending order) were Barrick, Newmont Mining Corp. (Denver, CO), AngloGold Ashanti Ltd. (Johannesburg, South Africa), Gold Fields Ltd. (Johannesburg), and Goldcorp Inc. (Vancouver, British Columbia, Canada), which accounted for more than 25% of world gold production (Klapwijk and others, 2012, p. 51).

Total world mine production of gold in 2011 was 4% higher than that of 2010. Estimated mine production in China increased by 5%, and China continued to be the world's leading gold producer. Annual output in South Africa decreased for the 11th year in a row because of higher costs, lower grade ore, and labor issues. The leading producers among more than 100 gold-mining nations were, in descending order, China, Australia, the United States, Russia, and South Africa (table 8).

An estimated 171,300 metric tons (t) of gold was mined historically through 2011, with 29,500 t held by central banks as official stocks, 33,000 t held privately as investment, 84,300 t held privately as jewelry, 20,800 t in other fabricated products, and the remaining 3,600 t unaccounted (Klapwijk and others, 2012, p. 59).

Production

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

Alaska.—In 2011, Alaska produced 25,800 kilograms (kg) of gold valued at $1.31 billion in 2011, which was 8% less by weight and 17% more by value than that produced in 2010. Alaskan exploration expenditures increased to $365 million in 2011, up 38% from 2010 expenditures of $264 million. This marked the seventh consecutive year that exploration expenditures exceded $100 million. In 2011, 42 projects spent more than $1 million, and an additional 39 projects spent $100,000 or more on exploration. Porphyry copper-gold deposits accounted for 33.4% of the exploration expenditures, and other intrusion-related deposits accounted for 39.7% (Szumigala, 2012, p. 3–5).

The Pogo Mine, 145 kilometers (km) southeast of Fairbanks, a joint venture between Sumitomo Metal Mining Co., Ltd.

(Tokyo, Japan) (85%) and Sumitomo Co. (Tokyo) (15%), produced about 10,100 kg of gold during 2011, which was a 15% decrease compared with that of 2010 owing to mining of lower grade ore. Sumitomo Metal announced that a new deposit, the East Deep deposit, has been identified 300 meters northeast of the producing Liese deposit. The East Deep deposit contains an estimated 40 t of gold. The total resource for the Pogo Gold Mine was estimated to be 12.3 million metric tons (Mt) having an average grade of 12.5 grams per metric ton (g/t) gold and containing 155 t of gold (Sumitomo Metal Mining Co., Ltd., 2012).

Kinross Gold Corp.'s (Toronto) underground Fort Knox Mine, near Fairbanks, produced 9,010 kg of gold in 2011, 17% less than production in 2010. The decrease resulted from a planned shift from processing mined ore to lower grade stockpile ore. Yearend 2011 gold reserves at Fort Knox were estimated to be about 134,000 kg (Kinross Gold Corp., 2012, p. F19–F20, F138).

Hecla Mining Co. (Coeur d'Alene, ID) owned the polymetallic Greens Creek Mine on Admiralty Island near Juneau. Ore from the underground mine was milled at the mine site to produce gold and silver dore, and lead, zinc, and bulk concentrates. In 2011, gold production was 1,780 kg, 17% less than in 2010, owing to a slowdown in mining attributed to reduced availability of low cost power (Hecla Mining Co., 2012, p. 25, 40).

In 2011, during its first full year of mining, Coeur d'Alene Mines Corp.'s (Coeur d'Alene) Kensington Mine produced 2,750 kg of gold. The underground gold mine, 72 km north-northwest of Juneau, had proven and probable reserves of 40.4 t of gold (Coeur d'Alene Mines Corp., 2012, p. 10). Beginning in November 2011, the company planned to reduce ore production at the mine by 50% for 6 months to allow for new construction and improvements that were expected to increase efficiency. The activities were to include constructing an underground paste backfill plant, definition and exploration drilling, and completing several surface facilities (Coeur d'Alene Mines Corp., 2011).

Fire River Gold Corp.'s (Vancouver) Nixon Fork Mine, 56 km northeast of McGrath, restarted ore production in May, and the mill was restarted in July. The mine originally started production in 2007 but was placed on care-and-maintenance status in October 2008 because of dramatically lower grade ore than expected. In 2011, the mine produced gold in the precommercial startup phase, and full commercial production was expected by May 2012. The estimated indicated resources for the mine, including old tailings piles, at 10 g/t gold cutoff, were 221,000 t of ore grading 17.8 g/t gold and containing 3,940 kg of gold (Fire River Gold Corp., 2011, p. 3–4, 14–15).

The Pebble Limited Partnership board of directors approved $91 million in expenditures for the Pebble copper-gold-molybdenum project in southwest Alaska in 2011 in order to complete a prefeasibility study in 2012 and then initiate permitting under the National Environmental Policy Act. Anglo American plc (London) and Northern Dynasty Minerals Ltd. (Vancouver) were 50–50 partners in the Pebble project, which included the high-grade underground Pebble East deposit and the open pit Pebble West deposit. The project has a potential to produce 24 Mt of copper, 1,560 t of gold, and 1,270 t of molybdenum during 78 years, while only developing 55% of the known mineral resources. Production was expected by yearend 2016 (Northern Dynasty Minerals Ltd., 2011).

NovaGold Resources Inc. (Vancouver) entered into an agreement to sell its alluvial gold properties comprising 4,650 hectares (11,500 acres) of fee-simple patented mining claims near Nome, AK. According to the agreement, Nome Gold Alaska Corp. (Nome) would pay $21 million in three installments and provide a $4 million letter of credit for an environmental reclamation bond. NovaGold was also soliciting buyers for the balance of its properties near Nome, including in-town real estate, sand and gravel holdings, and Big Hurrah and Rock Creek gold properties. The company was selling properties to focus on advancing the Donlin Creek, Alaska, and Galore Creek, British Columbia, Canada, projects toward production (NovaGold Resources Inc., 2011b).

A second feasibility study on Barrick and NovaGold's joint-venture Donlin gold project in southwestern Alaska was released. The $6.7 billion project estimate, which was lower than the original $7 billion estimate, included $834 million for a 500-km natural gas pipeline and $984 million in contingencies. The proposed open pit operations would have a 27-year mine life and would produce an average of 34,200 kilograms per year (kg/yr) of gold at a projected average cash cost of $585 per troy ounce of gold (NovaGold Resources Inc., 2011a).

International Tower Hill Mines Ltd. (Vancouver) announced the results of an updated preliminary economic assessment for its Livengood gold project near Fairbanks. The new assessment estimated that the project could generate $3.1 billion in pretax cash flows and a $1.2 billion net present value, at a 5% discount rate and a gold price of $1,100 per troy ounce. The average costs of production were projected to be $557 per troy ounce of gold for the first 5 years and $703 per troy ounce during the 23-year mine life. The mine was projected to produce 20,700 kg/yr of gold for the first 5 years and 17,500 kg/yr during the life of the mine. In addition, an upgraded resource estimate (measured and indicated) expanded the surface mine mineralization to 513,000 kg of contained gold. A prefeasibility study was scheduled to be published in the third quarter of 2012 (International Tower Hill Mines Ltd., 2011).

Freegold Ventures Ltd. (Vancouver) released an updated mineral resource estimate for the Vinasale project in southwestern Alaska. At a cutoff grade of 0.5 g/t gold, the inferred resource was 49.3 Mt averaging 1.09 g/t gold and containing 54 t of gold (Freegold Ventures Ltd., 2012). The company also released updated resource estimates on the Golden Summit project near Fairbanks. The Dolphin zone contains indicated resources of 14.84 Mt of ore having an average grade of 0.66 g/t of gold and containing 9,830 kg of gold. The Dolphin zone has additional inferred resources of 50.5 Mt of ore averaging 0.61 g/t gold and containing 30,800 kg of gold (Freegold Ventures Ltd., 2011).

Kiska Metals Corp. (Vancouver) announced updated resource estimates for the Whistler porphyry copper-gold deposit, approximately 160 km northwest of Anchorage. The new estimated indicated resources were 79.2 Mt at a grade of 0.51 g/t gold, 1.97 g/t silver, and 0.17% copper, and the inferred resources were 146 Mt of ore at a grade of 0.40 g/t gold, 1.75 g/t silver, and 0.15% copper. Total contained metals for indicated resources were 40,400 kg of gold, 156,000 kg of silver, and 135,000 t of copper and for inferred resources were 58,300 kg of gold, 255,000 kg of silver, and 204,000 t of copper (Kiska Metals Corp., 2011).

Arizona.—In 2011, all gold mined in Arizona was recovered as a byproduct from copper mining and processing. During November, American Bonanza Gold Corp. (Vancouver) completed construction of the Copperstone underground gold project in La Paz County. According to the feasibility study, the mine was projected to produce 6,630 kg of gold during its 6.3-year mine life. The company planned to ship gold-bearing concentrates by the first quarter of 2012 to a processing facility in Nevada (American Bonanza Gold Corp., 2012, p. 4).

California.—In 2011, gold was produced at Atna Resources Ltd.'s (Golden, CO) Briggs Mine and New Gold Inc.'s (Vancouver) Mesquite Mine. Other operations produced gold as a secondary product, mainly from placer sand and gravel mines and from several small underground mines that produced primarily specimen gold products.

In 2011, the Mesquite Mine's open pit in Imperial County, 70 km northwest of Yuma, AZ, produced 4,910 kg of gold, 9% less than that produced in 2010. Production was lower because lower grade ore was processed in 2011, in accord with the mine plan (New Gold Inc., 2012, p. 8).

In 2011, Atna's Briggs Mine produced 1,350 kg of gold, 29% more than 2010 production. An updated technical report on the Briggs Mine estimated the proven and probable reserves to be 7,680 kg of gold (Atna Resources Ltd., 2012, p. 2–3).

Two projects were in the permitting stage. Sutter Gold Mining Inc. (Lakewood, CO) released a preliminary economic assessment technical report in 2011 for the Sutter Gold underground mine, which included the historic Lincoln gold mine along California's Mother Lode belt. The company expected to start construction in 2012 (Sutter Gold Mining Inc., 2011). Emgold Mining Corp. (Vancouver) submitted a revised permit application in April to the City of Grass Valley to reopen the historic Idaho-Maryland Gold Mine. The company subsequently asked the city to put the project temporarily on hold, until the company could raise sufficient funds to finance the final environmental impact statement (EIS) (Emgold Mining Corp., 2011).

Colorado.—In 2011, Colorado remained the fourth ranked gold-producing State in the country. The Nation's eighth ranked gold mine, the Cresson Mine, owned by Cripple Creek & Victor Gold Mining Co. (CC&V) (a fully owned subsidiary of AngloGold) reported that its open pit operation produced 8,300 kg of gold in 2011, a 15% increase from that in 2010 owing to the construction of a mine-life extension project that would extend the mine's life until 2016 (AngloGold Ashanti Ltd., 2012, p. 81–82).

Although LKA International Inc.'s (Gig Harbor, WA) Golden Wonder Mine in the San Juan Mountains stopped commercial gold production in the second quarter of 2006, the company's exploration activities generated 23.5 kg of gold in 2011 (LKA International, Inc., 2012).

Idaho.—Idaho produced a limited quantity of gold in 2011, mostly from small-scale mines and byproduct production from silver mines. Several companies that were developing projects in Idaho released exploration updates. Premium Exploration Inc. (Vancouver), which had several active exploration projects in Idaho, reported resources containing an estimated 37,000 kg of gold (Allan, 2011). Terraco Gold Inc. (Vancouver) estimated total gold resources (measured, indicated and inferred) at its Almaden project in Washington County to be 48.3 Mt of ore grading 0.62 g/t gold and containing 29,400 kg of gold (Terraco Gold Inc., 2011). Midas Gold Corp. (Vancouver) consolidated several deposits into the Golden Meadows project in the Stibnite-Yellow Pine mining district and collaborated with Vista Gold Corp. (Littleton, CO) to explore the area further. Midas's share of the gold resources were estimated to be 65,300 kg of indicated gold resources and 115,000 kg of inferred gold resources (Northern Miner, The, 2011).

Montana.—Barrick's Golden Sunlight Mine, 48 km east of Butte, recommenced production in early 2011 after an extended development period. The mine produced 1,930 kg of gold in 2011 (Barrick Gold Corp., 2012a, p. 68; b).

Nevada.—Gold production increased by 3% to 172,000 kg in 2011, and Nevada kept its long-standing position as the Nation's leading gold-producing State. Total exploration expenditures in Nevada increased to $295.5 million in 2011 from $214.1 million in 2010, the highest expenditures reported since the State began the survey in the mid-1990s (Price and others, 2012, p. 61).

In 2011, Barrick produced 96,200 kg of gold from its fully owned Bald Mountain, Cortez, Goldstrike, Ruby Hill, and Storm Mines; its 75% share of the Turquoise Ridge Mine (a joint venture with Newmont, 25%); its 50% share of Smoky Valley Common Operation (50% owned and operated by Kinross); and its 33.33% share of the Marigold Mine (67.67% owned and operated by Goldcorp). This was 8% more than the company's Nevada gold production in 2010 because of the full year of production from the Cortez Hills open pit, which was part of the Cortez operations. The Cortez operations produced 44,200 kg of gold in 2011, 25% more than produced in 2010. Barrick announced that the U.S. Bureau of Land Management (BLM) issued a record-of-decision approving the supplemental EIS for the Cortez Hills Mine. The mine had been operating under an injunction since April 2010 that allowed mining to continue under restrictions on ore transport and dewatering. The record-of-decision removed these restrictions and allowed Barrick to resume operations as was originally planned (Barrick Gold Corp., 2011b). Open pit and underground production from Goldstrike (including the Storm Mine) was 33,800 kg of gold, a 12% decrease compared with that in 2010. The decrease was attributed to the partial shutdown of the autoclaves as the company explored new technology to extend the life of the mine. Also, the mine entered into a high-waste-stripping phase of the mine plan that reduced ore grades and ore tonnage. Production at all other Barrick operations increased or remained the same in 2011 compared with that of 2010. Production from Bald Mountain was 2,890 kg, 58% more than production in 2010 owing to a mine expansion that increased the amount of ore mined in 2011. In 2011, the Ruby Hill Mine produced

3,950 kg of gold, 57% more than that in 2010 owing to increases in sulfide ore processed. Production of gold in 2011 from partially owned mines was 11,300 kg, 5% more than that of 2010. In 2011, Barrick's share of gold production from the Marigold Mine was 1,590 kg (an 11% increase compared with 2010 gold production), 5,540 kg from the Smoky Valley Common Operation (unchanged from 2010), and 4,200 kg from Turquoise Ridge (an increase of 9% from 2010 production) (Barrick Gold Corp., 2012a, p. 68–69; b).

Newmont's Nevada operations produced 52,900 kg or 33% of Nevada's gold production from seven open pits and eight underground mines. The operations were the Eastern Nevada Mine Group (Carlin East, Gold Quarry, Leeville, North Lantern, and Pete Mines) and the Lone Tree, Midas, Mule Canyon, Phoenix, Trenton Canyon, Twin Creeks, and the joint-venture Turquoise Ridge (25% share) Mines. In 2011, gold production from Newmont's Nevada operations decreased by 4%. As of December 31, the company reported 1,080,000 kg of gold reserves, 77% of which was in open pit mines and the remainder was in underground mines (Newmont Mining Corp., 2012, p. 25–26).

In 2011, Great Basin Gold Ltd. (Vancouver) produced 2,690 kg of gold and 16,200 kg of silver from ore produced during trial mining activities at the underground Hollister Mine, which was processed at its Esmeralda mill, 467 km from the Hollister Mine. A preliminary draft EIS was completed in 2011 and a decision to proceed with the project was scheduled for the third quarter of 2012 (Great Basin Gold Ltd., 2012, p. 11–14).

In 2011, Yukon-Nevada Gold Corp. (Vancouver) produced 2,110 kg of gold from purchased ore and stockpiles at its Jerritt Canyon complex. The company restarted mining at the SSX-Steer mine complex, which was part of the Jerritt Canyon operations, located 80 km north of Elko. The SSX-Steer complex included two underground mines, which had been placed on care-and-maintenance status in August 2008, and had estimated proven and probable reserves of 1.22 Mt of ore at a grade of 5.88 g/t gold and containing 7,130 kg of gold. The estimated measured and indicated resources were 4.01 Mt of ore at a grade of 6.97 g/t gold and containing 28,000 kg of gold (Yukon-Nevada Gold Corp., 2011; 2012, p. 3).

In 2011, the Rochester Mine, owned by Coeur d'Alene Mines, produced 43,500 kg of silver and 195 kg of gold, compared with 2010 production of 62,200 kg of silver and 300 kg of gold. Production was lower because of decreased recovery from residual leaching of ores on the older leach pads. The company completed construction of a new leach pad and infrastructure to resume mining during the fourth quarter of 2011. During 2011, the company failed to pay claims fees on part of the Rochester property, and Rye Patch Gold Corp. (Vancouver) patented the claims. At yearend, the two companies were in litigation to resolve ownership disputes. The mine has a proven and probable reserve of 920,000 kg of silver and 7,680 kg of gold (Coeur d'Alene Mines Corp., 2012, p. 9, 18, 44–45).

Allied Nevada Gold Corp. (Reno, NV) updated the mineral reserves and resources of its Hycroft Mine. Measured and indicated mineral resources, including mineral reserves, were 1,540 Mt of ore at a grade of 0.34 g/t gold and 12 g/t silver. The contained mineral resources were 502 t of gold and 18,600 t of silver, more than double the December 31, 2010, mineral resource estimates. Allied Nevada also updated the Hycroft mill scoping study for 2015–24; the updates estimated the average annual production to be 17,300 kg of gold and 839,000 kg of silver (Allied Nevada Gold Corp., 2011). In 2011, the mine produced 2,740 kg of gold and 14,900 kg of silver, and planned to expand production in 2012 from 5,600 to 6,840 kg of gold and from 23,300 to 26,400 kg of silver (Allied Nevada Gold Corp., 2012).

Barrick announced two new discoveries at its 2,800-square-kilometer Cortez property. The two new discoveries, Goldrush and Red Hill, were 6 km southeast of the Cortez Hills Mine and 24 km southeast of the Pipeline Mine in northern Nevada. The company reported that the Red Hill deposit had an inferred resource of 28.8 Mt of ore at a grade of 3.8 g/t gold and contained 109,000 kg of gold (Barrick Gold Corp., 2011a).

In January, Scorpio Gold Corp. (Vancouver) began reprocessing approximately 280,000 t of material left on leach pads and in stockpiles at its 70%-owned Mineral Ridge gold project in Esmeralda County. Golden Phoenix Minerals, Inc. owned 30% of the project. The first shipment of loaded carbon was shipped for recovery of precious metals in April, and in May, the company resumed mining activities in the Drinkwater pit at Mineral Ridge. In 2011, the company sold 253 kg of gold and 151 kg of silver (Scorpio Gold Corp., 2012).

Midway Gold Corp. (Denver, CO) announced the results of a prefeasibility study of its Pan gold project in White Pine County, which determined proven and probable ore reserves to be 37.7 Mt at a grade of 0.583 g/t of gold, containing 22,000 kg of gold. The company plans called for two conventional open pits delivering 5 million metric tons per year of ore to heap-leaching pads to yield an average 2,400 kg/yr of gold for the first 8.5 years. Midway also announced initial underground inferred resource estimates for its Midway project in Nye County of about 103,000 t at a grade of 10.34 g/t of gold, containing 1,070 kg of gold (Midway Gold Corp., 2011a, b). Midway released a new resource estimate for its wholly owned Spring Valley project in Pershing County. The measured resources reportedly contained 59 Mt of ore at a grade of 0.49 g/t, and containing 30,000 kg of gold. The indicated resources were estimated to be 86 Mt of ore at a grade of 0.45 g/t and containing 38,200 kg of gold. The estimated inferred resources were 104 Mt of ore at a grade of 0.59 g/t and containing 61,300 kg of gold (Midway Gold Corp., 2011c).

International Minerals Corp. (Scottsdale, AZ) announced an increase in the mineral resource estimate for the Converse gold project. The project, in the Battle Mountain-Cortez mineralized trend in north-central Nevada, had a reported measured and indicated resource of 331 Mt of ore at a grade of 0.48 g/t, containing 160,100 kg of gold. The company anticipated the completion of the preliminary economic assessment by yearend of 2011 (International Minerals Corp., 2011a, b).

US Gold Corp. (Toronto) released the results of a preliminary feasibility study for its Gold Bar project on the Battle Mountain-Eureka-Cortez gold trend in Eureka County. The average annual production for an open pit with conventional oxide heap-leach processing was estimated to be 1,590 kg of gold during an 8-year mine life at a cash cost of $665 per troy ounce of gold.

Capital costs, including contingency costs, were estimated to be $55.8 million in initial expenditures, plus $38.5 million in sustaining capital, for a total of $94.3 million (US Gold Corp., 2011).

Lincoln Mining Corp. (Vancouver) released a preliminary economic assessment for its Pine Grove project in Lyon County. The proposed open pit and heap-leach operations would have a mine life of 6 years and a total production of 3,380 kg of gold. The total capital cost was $27.4 million. At a 0.22 g/t gold cutoff grade, total measured and indicated resources at the Pine Grove project were estimated to be 6.06 Mt at a grade of 1.06 g/t of gold, containing 6,340 kg of gold (Lincoln Mining Corp., 2011).

Nevada Copper Corp. (Vancouver) announced the results of a feasibility study for the Pumpkin Hollow copper project in Yerington. The project was scheduled to startup in mid-2015, with a mine life of 18 years and total metal contained in concentrates was projected to be 1.74 Mt of copper, 19,900 kg of gold, and 478,000 kg of silver. Initial capital costs were expected to be $1.04 billion including contingencies, but excluding $48.9 million in working capital (Nevada Copper Corp., 2012).

Coral Gold Resources Ltd. (Vancouver) released the results of the preliminary economic assessment for the Robertson gold project. The open pit and heap-leach project, 97 km southwest of Elko, had an estimated resource of 78.2 Mt of ore at a grade of 0.429 g/t of gold containing 33,600 kg of gold. The mine would have a life of 10.5 years and would produce 18,900 kg of salable gold. The initial capital cost, including development costs for an owner-operated project was $113.5 million and for a contractor-operated project was $138.6 million (Coral Gold Resources Ltd., 2012).

New Mexico.—In 2011, gold production in New Mexico was as a byproduct of copper production in Grant County at Freeport-McMoRan Copper & Gold Inc.'s (FCX) (Phoenix, AZ) Chino Mine. In late 2008, mining activities were suspended, and in 2011, FCX restarted mining and milling activities (Freeport-McMoRan Copper & Gold Inc., 2012, p. 10).

In 2011, development began at one silver and gold project, and several polymetallic deposits were explored. In March, Santa Fe Gold Corp. (Albuquerque) began limited production at the Summit silver and gold mine and anticipated that full production would be reached by midyear 2012. Full production was estimated to be 120,000 metric tons per year of ore at a grade of 4.45 g/t gold and 335 g/t silver (Santa Fe Gold Corp., 2012).

South Carolina.—Romarco Minerals Inc. (Toronto) released an updated mineral resource estimate for the Haile Gold Mine in Lancaster County, which was 29% more than that of the previous estimate. The total measured and indicated gold resource was 124 t, and the total inferred gold resource was 24 t. Based on a feasibility study, annual production for the first 5 years was estimated to be 4,700 kg of gold, at an average cash cost of $347 per troy ounce (Romarco Minerals Inc., 2012). A request by the U.S. Army Corps of Engineers for an EIS on the effects to a portion of the low-functioning and impaired wetlands and streams on the site of the Haile gold project was expected to delay the project by about 12 months (Hill, 2011).

South Dakota.—In 2011, Wharf Resources (USA) Inc. operated the Goldcorp-owned Wharf open pit gold mine near Lead, which produced about 2,100 kg of gold, 8% less than 2010 production. A reduction in the quantity of ore processed more than offset a rise in head grade. New discoveries and a new permit from the State extended the mine's life by another 7 years until 2020 (Goldcorp Inc., 2012, p. 58).

Utah.—Rio Tinto's Bingham Canyon Mine near Salt Lake City, which was operated by Kennecott Utah Copper Corp. (Magna), produced 11,800 kg of gold as a byproduct from copper mining. In 2011, Bingham Canyon was the fourth-ranked gold producer and the leading gold-producing mine outside of Nevada. Gold production decreased by 36% compared with that in 2010 because of lower ore grades as the company shifted from a high copper-gold area to high-molybdenum area of the ore body. Kennecott Utah also operated the nearby Barney's Canyon Mine; the mine closed in the first quarter of 2002 but continued gold production from residual heap leaching (Rio Tinto plc, 2012, p. 33, 46).

Rio Tinto increased the estimated mineral resources by 20 Mt to 106 Mt for the Bingham Canyon Mine through the addition of the North Rim Skarn. Total Bingham Canyon mineral resources (measured, indicated, and inferred) average grade of 0.81% copper, 0.006% molybdenum, 0.39 g/t gold, and 4.9 g/t silver and contained an estimated 0.85 Mt of copper, 10,000 t of molybdenum, 40 t of gold, and 500 t of silver. The North Rim Skarn is a high grade copper-gold deposit that is 300 meters below the current open pit and was expected to be developed by underground methods (Rio Tinto plc, 2011).

Washington.—In 2010, Kinross's underground Kettle River-Buckhorn Mine in the north-central part of the State produced 5,450 kg of gold, 12% less than production in 2010 because of lower ore grade. Ore was shipped 76 km to the Kettle River Mill adjacent to the closed Kettle River Mine Kinross Gold Corp., 2012, p. F21).

Consumption

Thomson Reuters Gold Fields Mineral Services Ltd. (GFMS) reported that total global fabrication in 2011, including the use of scrap, was 2,760 t, slightly lower than that of 2010. In 2011, gold jewelry fabrication was 1,970 t, slightly lower than that of 2010. The six leading gold jewelry manufacturing countries—India (667 t), China (496 t), Italy (94 t), Turkey (77 t), the United States (60 t), and Russia (45.2 t)—accounted for 73% of the world's jewelry production. Although, gold in jewelry production in India decreased by 18 t (3%), it was still the second highest level on record. Chinese jewelry production increased by 63.3 t (15%) more than 2010 production. Consumption of gold in jewelry in Hong Kong, Russia, and China increased, by 33%, 14%, and 13%, respectively. These increases were more than offset by consumption decreases in Egypt, Saudi Arabia, Japan, the United Arab Emirates, Italy, and the United Kingdom, which decreased by 29%, 24%, 22%, 19%, 17%, and 17%, respectively. The amount of gold used in electronics decreased slightly to 320 t in 2011, which reflected the global economic weakness. Gold used in dentistry declined by 11% to 43 t in 2011 owing to an increase in nonmetallic substitutions. Gold used in other industrial and decorative applications, 90 kg, decreased slightly because of a sharp decline in India were partially offset by gains in China. The remaining gold was used in the production of coins, medallions, and imitation coins (Klapwijk and others, 2012, p. 83–109).

Price and Investment

The Engelhard daily price of gold was volatile and rose above the $1,800-per-troy-ounce level for the first time in August. The price began the year at $1,421.56 per troy ounce and fell to the year's lowest level of $1,321.89 per troy ounce on January 28. The price then rose until peaking at $1,898.87 per troy ounce on September 6 before decreasing to $1,620.40 per troy ounce by October 5. The price recovered to $1,798.70 per troy ounce on November 8 before decreasing to $1,575.82 per troy ounce by yearend. The annual average price of $1,572.48 per troy ounce, 28% above the annual average gold price in 2010, was the highest annual average price ever, and the 10th consecutive year of an annual average price increase.

Global gold investment in 2011 fell by 10% compared with that in 2010, but remained very high because of financial and economic uncertainties; such times are traditionally when investment in gold, which is considered to be a safe investment, increases. It was estimated that global investors purchased 1,600 t of gold, with a value of $81 billion in 2011. The bulk of the investment was the purchase of 1,210 t of gold bars. Gold bars held in gold exchange-traded funds (ETFs) and physically backed Canadian funds increased by 160 t to 2,370 t. Gold held in U.S. ETFs increased by 3%, to 1,500 t, with the SPDR Gold Trust, which trades on the New York Stock Exchange, accounting for 84% of domestic gold ETF holdings. Because shares in gold ETFs represent a physical allotment of gold that is held in trust, they provide an easily accessible physical investment in gold. Gold ETFs follow market gold prices, with a fee assessed to cover administrative and storage costs. The demand for safe-haven investments kept gold coin sales high, and in 2011, 246,000 kg of global gold coins was minted, up by 15% from those minted in 2010. In 2011, the U.S. Mint sold 34,100 kg of American Eagle gold coins and 5,430 kg of American Buffalo gold coins, a decrease of 10% and 17%, respectively from quantities sold in 2010. Strong demand for Chinese and Turkish coins offset minting losses in Europe and the United States. In 2011, 87,800 kg of medals and imitation coins were sold, down slightly compared with that in 2010, with more than 90% purchased in India (Klapwijk and others, 2012, p. 21–38).

Foreign Trade

Refined bullion comprised 28% of U.S. gold imports and 85% of exports; the United States was a net exporter of 260,000 kg of bullion in 2011 (tables 4, 6). In 2011, the imports of gold bullion decreased by 28% and exports increased by 37%, from those in 2010. Canada and Mexico provided almost 49% and 32%, respectively, of the refined bullion imported in 2011. The United Kingdom (40%), Hong Kong (27%), and Switzerland (13%) were the principal destinations for refined bullion exports.

World Industry Structure

World gold mine production in 2011 was 4% higher than that in 2010, and it was the third year in a row that world production increased (table 8). Although gold production increased by more than 1 t in 20 countries, the largest increases took place in China (17,000 kg); Eritrea (11,500 kg); Mexico (11,500 kg); and Russia (10,600 kg). These increases were partially offset by gold production decreases in several countries, the largest of which took place in Indonesia (10,200 kg); South Africa (7,700 kg); Argentina (4,140 kg); Australia (3,000 kg); Sudan (2,940 kg); and Papua New Guinea (2,000 kg).

The 12 leading gold-producing countries—China, Australia, the United States, Russia, South Africa, Peru, Canada, Indonesia, Uzbekistan, Mexico, Ghana, and Papua New Guinea (in descending order) accounted for 72% of global production. The next 10 ranked gold-producing countries accounted for 16% of production, while the remaining 78 countries made up 12% of global gold production in 2011.

According to its annual review of world gold supply and demand, GFMS calculated that the total global supply of gold in 2011 was 4,490 t compared with the revised 2010 total supply of 4,460 t. GFMS reported increased mine production (3%), no net official sector sales, 6 t of net producer hedging, and no implied net disinvestment for sales of bars and coins by private investors. Old scrap production decreased by 3% in 2011 compared with that in 2010 because some consumers deferred selling scrap during the year in anticipation of higher gold prices (Klapwijk and others, 2012, p. 8).

Mergers and Acquisitions.—In 2011, gold mining companies strove to increase their reserves by merging or acquiring other companies. In February, Newmont announced that it entered into an agreement to acquire Fronteer Gold Inc. (Vancouver). Fronteer owned the Long Canyon project, which was approximately 160 km east of Newmont's existing operations in Nevada. The project had estimated measured and indicated resources of 44 t of gold and additional inferred resources of 25 t of gold. Fronteer also owned 100% of the Northumberland project and a joint-venture interest with Newmont in the Sandman project, both in Nevada. According to the agreement, a new company would be spun off to control a portion of the exploration projects, and Pilot Gold Inc. (Vancouver), the new company, would own 11 properties in Nevada (excluding Long Canyon, Northumberland, and Sandman), 2 in Turkey, and 1 in Peru. Fronteer shareholders would own 80.1% of Pilot Gold, with Newmont holding the remaining 19.9% (Newmont Mining Corp., 2011). In April, Kinross purchased the remaining 25% of the Kupol Mine in Russia from the State Unitary Enterprise of the Chukotka Autonomous Okrug (Kinross Gold Corp., 2012, p. F17). The world's leading gold producer, Barrick, purchased Equinox Minerals Ltd. (Perth, Western Australia, Australia), which mainly produced copper. Polyus Gold Mining Co. (Moscow, Russia), was the target of a reverse takeover by KazakhGold Group Ltd. (London) to form Polyus Gold International Ltd. (London). Gold Fields purchased IAMGOLD Corp.'s (Toronto) 18.9% interest in Tarkwa and Damang Mines in Ghana, increasing Gold Fields' holdings in these two mines to 90%. Gold Fields also purchased minority shareholder's stakes of the Cerro Corona copper-gold mine in Peru to increase its ownership to 98.5%. In addition, Franco Nevada Corp. (Toronto) combined with Gold Wheaton Corp. (Toronto) and AuRico Gold Inc. (Toronto) completed the takeover of Northgate Minerals Corp. (Vancouver), and Agnico-Eagle Mines Ltd. (Toronto) purchased Grayd Resources Corp. (Vancouver) (Klapwijk and others, 2012, p. 51).

World Review

Argentina.—In 2011, gold production was 59,000 kg or 7% less than that in 2010, mainly because lower production at Barrick's Veladero Mine. The mine produced 15% less than it produced in 2010, because of lower ore grades owing to the shift away from high-grade areas as dictated by the mine plan (Barrick Gold Corp., 2012a, p. 69; b).

Lower production from Bajo de la Alumbrera Mine [owned by Xstrata plc (Zug, Switzerland) (50%), Goldcorp (37.5%), Yacimientos Mineros Agua de Dionisio (Catamarca) (20%), and Yamana (12.5%)] also contributed to the overall lower production in 2011 but these were offset by the start of production at Troy Resources Ltd.'s (West Perth, Western Australia, Australia) Caposo gold-silver mine. The mine started in the first quarter of 2011 and reached designed throughput by October (Klapwijk and others, 2012, p. 46).

Australia.—Australian gold production in 2011 decreased slightly compared with that in 2010. Despite some increase in gold production from a number of new mines, production declined at several mines. AngloGold's Sunrise Dam Mine produced 7,650 kg of gold, a 38% decrease compared with 2010 gold production because a major flood in February affected the underground operations for 4 months, and in April, a wall failed in the southeastern portion of the open pit, which interrupted production for about 6 months (AngloGold Ashanti Ltd., 2012, p. 85–86).

OZ Minerals Ltd. (Melbourne) produced concentrates from its Prominent Hill copper mine, and during 2011, the mine produced 108,000 t of copper and 4,980 kg of gold. This was 18% less gold than in 2010 because the mine exhausted the high-grade area of the deposit (OZ Minerals Ltd., 2012, p. 14).

In 2011, Barrick's share of production from its five mines was 42,900 kg of gold, slightly less than that in 2010. All mines except the Kalgoorlie Mine were fully owned by Barrick. Production from Yilgarn South was 18% more than production in 2010 because of an increase in ore mined and processed and higher ore grades. Production from Kalgoorlie, a joint venture with Newmont, increased slightly in 2011 compared with production in 2010 owing to an increase in ore grade and increased mill throughput. Production increases were offset by decreases at several mines, including Cowal, 15% less; Plutonic, 15% less; and Kanowna, 10% less (Barrick Gold Corp., 2012a, p. 66, 70; b).

In 2011, Newcrest operated five mines in Australia. The Cadia Hill and Ridgeway Mines produced 16,800 kg of gold, a 24% increase compared with 2010 production as a newly developed block cave operation at Ridgeway more than offset production losses at Cadia Hill. The Telfer Mine produced 17,300 kg of gold in 2011, 18% less than that produced in 2010 following exhaustion of the high-grade section of the pit. Newcrest's 70%-owned Cracow and the 100%-owned Mt. Rawdon Mines produced 17% and 36% less gold, respectively, compared with production in 2010 (Newcrest Mining Ltd., 2012).

Newmont's Boddington Mine produced 23,000 kg of gold and 31,300 t of copper in 2011, slightly more gold than in 2010. Newmont also owned the Jundee and Tanami operations as well as the Kalgoorlie joint-venture project with Barrick. The Jundee operation sold 10,400 kg of gold in 2011, which was the same as that in 2010. Tanami sold 6,870 kg of gold, 12% less than that in 2010. Newmont also owned a 16.22% interest in Regis Resources Ltd.'s (Perth), which owned the Duketon gold project. Duketon began production in the third quarter of 2010 and produced 3,130 kg of gold in 2011, up by 2,110 kg from 2010 production (Newmont Mining Corp., 2012, p. 29).

Gold Fields produced gold from two mines in Australia—Agnew and St. Ives. In 2011, Agnew produced 6,034 kg of gold, 27% more than that produced in 2010 owing to opening of the Songvang open pit. St. Ives produced 14,500 kg of gold in 2011, about the same as 2010 production (Gold Fields Ltd., 2012, p. 72).

In 2011, six mines started or restarted production—Deutsche Rohstoff AG's (Heidelberg, Germany) Georgetown Mine, which started production in January; FMR Investments Pty. Ltd.'s (South Perth) Eloise Mine, which started production in the second quarter; Hillgrove Resources Ltd.'s (Sydney) Kanmantoo Mine, which started production in the fourth quarter; KBL Mining Ltd.'s (Sydney) Mineral Hill Mine, which started up in the third quarter; Castlemaine Goldfields Ltd.'s (Mount Clear, Victoria) Ballarat Mine, which began production in the third quarter; and St Barbara Ltd.'s (Melbourne) King of the Hills Mine, which began production in the second quarter. Mines that started up in 2010 and increased production in 2011 included Intergra Mining Ltd.'s (Perth) Aldiss-Randalls Mine, Saracen Minerals Holdings Ltd.'s (Melbourne) Carosue Dam Mine, Evolution Mining Ltd.'s (Bondi Junction, New South Wales) Edna May Mine, and Exco Resources Ltd.'s (Perth) and Polymetals Mining Ltd.'s (Samford, Queesland) White Dam Mine. Elsewhere, BHP Billiton Group's Olympic Dam Mine increased output because of a full year of operations from the repaired main shaft (Klapwijk and others, 2012, p. 47).

Burkina Faso.—In 2011, gold production was 31,800 kg, a 39% increase compared with that of 2010. The increase was attributed to the first full year of production of IAMGOLD's 90%-owned Essakane Mine. The mine, which started production in July 2010, produced 11,700 kg of gold in 2011, 176% more than that in 2010 (IAMGOLD Corp., 2012, p. 25). The increase was also attributed to a 21% increase in gold production from Avocet Mining plc's (London) Inata Mine, which also started up in 2010 that produced 5,190 kg of gold in 2011 (Avocet Mining plc, 2012).

Canada.—Canada ranked seventh in world gold production, and its output increased by 6% to 96,700 kg. The increase was from Osisko Mining Corp.'s (Montreal) Canadian Malartic Mine, which reached commercial production in May and produced 6,220 kg of gold in 2011 (Osisko Mining Corp., 2012, p. 1). Output from Vale S.A.'s (Rio de Janerio, Brazil) Sudbury Complex increased to 5,660 kg of gold from 1,310 kg in 2010, because of the ending of a year-long strike in July 2010 (Vale S.A., 2012). In addition, Golden Band Resources Inc.'s

(Saskatoon) La Ronge Mine had its first pour in January and produced more than 1,000 kg of gold in 2011. Other increases were from the continued ramp up of Lake Shore Gold Corp.'s (Toronto) Timmins West and the recommissioned St Andrew Goldfields Ltd.'s (Toronto) Holt Mines, both of which started production in 2010 and produced 1,240 kg and 809 kg of gold, respectively, in 2011 (Lake Shore Gold Corp., 2012, p. 11; St Andrew Goldfields Ltd., 2012, p. 3). Mill expansions at San Gold Corp.'s (Winnipeg, Manitoba) Rice Lake and Kirkland Lake Gold Inc.'s (Kirkland Lake, Ontario) Kirkland Lake also increased production. In 2011, Rice Lake produced 2,310 kg of gold, a 71% increase from 2010 production, and Kirkland Lake increased gold production by 1,000 kg (Klapwijk and others, 2012, p. 45; San Gold Corp., 2012, p. 3–5).

These increases were partially offset by decreases at several mines. In March, Northgate's Kemess South closed and in October, Agnico-Eagle suspended underground mining at Goldex following a rockmass failure of the ground overlying the main stope. Also, the leading Canadian gold producer, Goldcorp's Red Lake Mine, produced 19,300 kg of gold, a 12% decrease compared with 2010 production because of a decrease in ore grade (Northgate Minerals Corp., 2011; Agnico-Eagle Mines Ltd., 2012; Goldcorp Inc., 2012, p. 44).

Chile.—In 2011, gold production was 45,100 kg, 14% more than that in 2010. The production gains were attributed to several mines that were brought online and increased production from some established mines. The most notable was the startup of the Esperanza copper-gold mine, which was 70% owned by Antofagasta plc (London) and 30% by Marubeni Corp. (Tokyo). In 2011, the mine produced 90,100 t of copper and 4,890 kg of gold (Antofagasta plc, 2012). Two other startups involved the recommissioning of past producers. They included the tailings retreatment and open pit mining at the historical Guabaco Mine, owned by Australia-based Austral Gold Ltd. and Mandalay Resources Corp.'s (Toronto) Cerro Bayo Mine (Klapwijk and others, 2012, p. 45).

Kinross's Maricinga Mine produced 7,350 kg, 51% more than 2010 production owing to higher recoveries, more tons processed, and higher gold grades (Kinross Gold Corp., 2012, p. F25–F26). The country's leading gold-producing mine was Yamana Gold's El Penon Mine, which produced 9,520 kg of gold, 19% more than that in 2010 because of expanded capacity (Yamana Gold Inc., 2012, p. 49).

These increases were partiality offset by production losses at Kinross's other mine in Chile, La Coipa, which produced 5,550 kg of gold in 2011, 9% less than that in 2010 because of lower grade ore (Kinross Gold Corp., 2012, p. F25–F26). Yamana also produced 2,700 kg of gold from Minera Florida, 8% less than that in 2010 because of lower gold ore grade (Yamana Gold Inc., 2012, p. 52).

China.—China's gold production increased by 5% to 362,000 kg, compared with 2010 gold production. Much of the increase was from the primary gold mines, which accounted for 84% of China's gold production and where production was up by 8%. Output of gold as a byproduct was 59,000 kg or 3% less than 2010 production. In 2011, the top 10 gold enterprises produced about 51% of China's gold, which was about 9,000 kg more than 2010. Most notable were three companies, Shandong Gold Group Co., Ltd., Yunnan Gold Mining Group Co., Ltd., and Zhaojin Mining Industry Co. Ltd., which increased by a total of 9,000 kg (Antaike Precious & Minor Metals Monthly, 2012a, c; Klapwijk and others, 2012, p. 48).

China remained one of the leading consumers of gold and in 2011, consumption was reported to be 761,000 kg, up 33% compared with consumption in 2010. Gold bar consumption reached 214,000 kg, which was 50% more than that in 2010. The consumption for gold ornamentation, including jewelry, was 457,000 kg and gold coins were 21,000 kg. Gold used in industrial uses, including electronics, was 53,200 kg, and gold used in other uses was 16,500 kg (Antaike Precious & Minor Metals Monthly, 2012b).

Colombia.—In 2011, gold production increased by 4% compared with that in 2010. A substantial portion of the increase came from small-scale mines. The formal sector was also seeing gains from Mineros SA's (El Bagre) Ye Mine, which continued to ramp up from its startup in 2010, and Gran Colombia Gold Corp.'s (Toronto) underground mines (Klapwijk and others, 2012, p. 46).

Côte d'Ivoire.—In 2011, production of gold was 9,870 kg, 86% more than that in 2010, because of the ramp up of production at Randgold Resources Ltd.'s (London) Tongon Mine, which started production in the fourth quarter of 2010. The mine produced 7,790 kg of gold during the year, which was 6,910 kg more than 2010 production, and the mine was projected to produce 8,860 kg in 2012 (Randgold Resources Ltd., 2012, p. 40–45).

Production at other mines in the country, Newcrest's Bonikro Mine and Cluff Gold plc's (London) Angovia Mine, were temporarily suspended because of civil unrest after the President declined to cede power in early 2011. Production resumed at Bonikro in May and reached full capacity in June. In 2011, the mine produced 1,880 kg of gold, 36% lower than that in 2010. Production at Angovia remained suspended because of depletion of existing reserves; however, the mine was still producing gold from residual leaching (Klapwijk and others, 2012, p. 43; Newcrest Mining Ltd., 2012).

Egypt.—In 2011, gold production was 6,600 kg, up from 5,000 kg in 2010. All of the production came from Centamin plc's (London) Sukari Gold Mine, in the eastern desert of Egypt, which continued to ramp up production (Centamin plc, 2012, p. 1).

Eritrea.—Output in 2011 increased from 500 kg to 12,000 kg because the Bisha Mine reached commercial production in February 2011. Nevsun Resources Ltd. operated and owned 60% of the mine (30% owned by Eritrean National Mining Corp. and 10% owned by the Government of Eritrea) and produced 11,800 kg of gold in 2011 (Nevsun Resources Ltd., 2012).

Ethiopia.—Sharp increases in gold prices led to additional small-scale and artisanal mining operations in Ethiopia. In 2011, production was estimated to have reached 11,000 kg, up 85% from 2010 production. Almost all of the mine production came from artisanal, placer, and small scale-mining (Klapwijk and others, 2012, p. 44).

Ghana.—Production of gold in 2011 was 80,100 kg, which was 5% higher than that of 2010. Two new mines started up in 2011, Endeavour Mining Corp.'s (Monte Carlo, Monaco) Nzema Mine, which reached commercial production on April 1 and produced 2,800 kg of gold for 2011, and Perseus Mining Ltd.'s (Subiaco, Western Australia, Australia) Edikan Gold Mine, which first produced gold on August 21 and produced 1,440 kg of gold in 2011 (Endeavour Mining Corp., 2012; Perseus Mining Ltd., 2012, p. 1–5).

Some of the increase was partially offset by production losses at other mines. Production of gold at Golden Star Resources Ltd.'s (Littleton, CO) Bogoso and Wassa Mines was 9,370 kg, 15% less compared with 2010 production. The production was affected by higher than normal rainfall in 2011 (Golden Star Resources Ltd., 2012, p. 2, 9). Leading gold producer in Ghana, Gold Field's Tarkwa Mine, produced 22,300 kg of gold, a slight decrease compared with that of 2010 owing to power supply interruptions and excessive rainfall. Gold Fields other mine in Ghana, the Damang Mine, produced 6,780 kg of gold, 4% less than 2010 production because of power supply interruptions (Gold Fields Ltd., 2012, p. 96–99).

Guatemala.—Gold was produced at only one mine, Goldcorp's Marlin Mine. In 2011, the mine produced 11,900 kg of gold, 29% higher than that of 2010 as the final high-grade portion of the open pit was mined. The mine was expected to transition into an underground operation, and production was projected to decrease in 2012 (Goldcorp Inc., 2012, p. 18).

Indonesia.—In 2010, gold production decline to 96,100 kg, a 10% decrease compared with 2010 gold production. Some of the leading gold producers were copper mines that produced byproduct gold. Freeport McMoRan's Grasberg Mine and Newmont-operated Batu Hijau Mine account for 47% (44,900 kg) and 10% (9,890 kg), respectively, of Indonesian gold production in 2011. Production at Grasberg was 26% lower than production in 2010 because of an 8-day strike in July followed by a 3-month strike that ended in December. Also, milling operations were temporarily suspended in the fourth quarter owing to damage to concentrate and fuel pipelines from civil unrest during the strike. In 2011, Batu Hijau's production was 57% less than 2010 production owing to processing lower grade stockpiled ore because the mine entered into a higher waste stripping phase (Freeport-McMoRan Copper & Gold Inc., 2012, p. 40–41; Newmont Mining Corp., 2012, p. 30, 62).

Kazakhstan.—In 2011, gold production was 36,700 kg, 22% more than 2010 production. The main reason for the increase was the continued ramp up of Kazzinc JCS'sVasilkovskoje Mine, which started production in the second quarter of 2010 and was a satellite mine of the Altyntau Kokshetau Mine. Kazzinc produced 13,300 kg of gold in 2011 from ore produced from their own mines and third party sources, which was 23% more than 2010 gold production. In April, Glencore International AG agreed to increase its stake in Kazzinc to 93% from 48.7% by purchasing most of Verny Investments SPA's 48.7% shares for $3.2 billion (Glencore International AG, 2012, p. 53–54).

Mali.—In 2011, gold production was 35,700 kg, a slight decrease compared with 2010 gold production. The decreases were from the Yatela Mine, 25 km north of Kayes (AngloGold and IAMGOLD, 40% each, and the Government of Mali, 20%), which produced 2,260 kg of gold, a 52% decrease compared with 2010 production. The mine was originally scheduled to close in 2011, although the life has been extended by opening Alamoutala, a new satellite deposit. Production decreased in 2011 because of a reduction in ore grade processed (AngloGold Ashanti Ltd., 2012, p. 28, 64). Also, the Loulo Mine produced 6,480 kg, 34% less than 2010 production owing to a decrease in ore grade. Randgold owned 80% of the Loulo Gold Mine and the other 20% was owned by the Government of Mali (Randgold Resources Ltd., 2012, p. 27–28).

These decreases were partially offset by increases from the startup of production in June from Randgold's Gounkoto Mine, a satellite of Loulo Mine, which added 4,230 kg of gold and from the continued ramp up of the Resolute Mining Ltd.'s (Perth) Syama Mine and a 4% increase from the Sadiola Mine (AngloGold and IAMGOLD, 41% each, and the Government of Mali, 18%) (AngloGold Ashanti Ltd., 2012, p. 61; Randgold Resources Ltd., 2012, p. 27–28).

Mexico.—In 2011, Mexican gold production reached an alltime high of 84,100 kg, a 16% increase from 2010 production. Production increases from mines opened within the past 3 years was the principal factor in increased production.

Goldcorp operated three mines in Mexico—El Sauzal, Los Filos, and Penasquito. The Penasquito Mine started commercial production in September 2010 and in 2011 produced 7,900 kg, a 51% increase compared with 2010 production. In 2011, El Sauzal produced 3,130 kg gold, a 34% decrease compared with gold production in 2010 owing to lower ore grades. The Los Filos Mine produced 11,400 kg of gold in 2011, 19% more than that produced in 2010 because of higher tonnage mined and the higher ore grade (Goldcorp Inc., 2012, p. 49–53).

Other mines that had increased production in 2011 were Agnico-Eagle's Pinos Altos Mine in Chihuahua State, which started production in 2009 and produced 6,360 kg of gold in 2011, 55% more than that in 2010 (Agnico-Eagle Mines Ltd., 2012). Fresnillo plc's (London) Soledad-Dipolos Mine, which started up in 2010, produced 10,200 kg in 2011, 13% more than 2010 production (Fresnillo plc, 2012, p. 56).

Nicaragua.—All the country's gold production came from the La Libertad and Limon Mines, which were owned by B2Gold Corp. (Vancouver). In 2010, the mines produced 4,500 kg of gold, which was 73% more than 2010 production owing to improved mill throughput and increased gold recoveries (B2Gold Corp., 2012).

Papua New Guinea.—In 2011, gold production from Papua New Guinea mines deacreased by 2,000 kg or 3% compared with that of 2010. Much of the decrease was from the leading gold-producing mine, Newcrest's Lihir Island operations, which produced 20,300 kg of gold, 19% less than that of 2010. Newcrest also owned 50% of the Hidden Valley Mine, which started production in late 2009, and produced 6,460 kg of gold in 2011, a 23% increasing from 2010 production (Newcrest Mining Ltd., 2012). Production at Ok Tedi Mining Ltd.'s (Tabubil) Ok Tedi Mine was 13,000 kg in 2011, 14% less than 2010 production because of unscheduled mill downtime (Ok Tedi Mining Ltd., 2012, p. 4, 23).

Barrick owned 95% of the Porgera Mine, and the Papua New Guinea Government held the remaining 5%. Barrick's share of production was 15,600 kg of gold in 2011, which was 4% less than 2010 production owing to lower average head grades from processing low-grade stockpiles (Barrick Gold Corp., 2012a, p. 70; b).

Peru.—In 2011, gold production was 164,000 kg, which was the same as 2010 production. Newmont and Cia de Minas Buenaventura S.A.A. (Lima) jointly owned the Yanacocha Mine in the Cajamarca District, which produced 40,200 kg of gold in 2011, 12% less than that in 2010. The production decline was attributed to mine sequencing resulting in increased waste mining and lower grade ore (Newmont Mining Corp., 2012, p. 89).

Barrick's Lagunas Norte Mine produced 23,700 kg of gold in 2011, 9% less than production in 2010, because of processing less ore. The company was undergoing an expansion prefeasibility study on the deep sulfide ore and for an additional heap-leaching pad, which was expected to be completed in 2012. The deep sulfides expansion was expected to startup in 2016. Barrick's other operation in Peru, the Pierina Mine, neared the end of its economic mine life produced 4,730 kg of gold, 20% less than that in 2010 (Barrick Gold Corp., 2012a, p. 44; b).

These decreases were offset by increases from mines that started in 2010 and 2011. Rio Alto Mining Ltd.'s (Vancouver) La Arena Mine commenced production in May 2011 and achieved commercial production in December (Rio Alto Mining Ltd., 2012, p. 8). Buenaventura owned or partly owned 11 other mines that produced gold in 2011. In 2011, excluding production from the Yanacocha Mine, Buenaventura produced 14,700 kg of gold, 8% more than production in 2010 because of the ramp up of La Zanja (53.06% owned by Buenaventura and 46.94% by Newmont), after pouring the first gold in September 2010. The Tantahuatay copper mine (Southern Copper Corp. owned 44.25%, Buenaventura owned 40.1%, and local interests owned the remainder) started production in July 2011 (Cia de Minas Buenaventura S.A.A., 2012, p. 35).

Russia.—In 2011, Russian gold production was 200,000 kg, 6% more than 2010 production. Much of the growth in production was from new startups or the ramp up of mines that started in 2010.

The leading gold producer in Russia was Polyus Gold with 46,500 kg of production from five mines and several alluvial deposits, an 8% increase compared with 2010 production. Some of the increase was attributed to continued ramp up of the Blagodatnoye Mine in the Krasnoyarsk Region, which in 2011 produced 11,300 kg, a 45% increase from 2010 production (Polyus Gold Mining Co., 2012, p. 19).

In 2011, production from Polymetal International plc's (St. Petersburg) 18 gold-producing mines in Russia was 10,900 kg, 4% less than that in 2010. Production decreases were from the Khakanja and Voro operations. Some of the production decreases were offset by Amursk POX, which started in the second quarter 2010 (Polymetal International plc, 2012, p. 26–45).

In 2011, the Kupol Mine (100% owned by Kinross) produced 20,300 kg of gold equivalent, 12% less than production in 2010. Production was lower because of a 26% decrease in ore grade resulting from planned mining sequencing (Kinross Gold Corp., 2012, p. F22).

In 2011, Petropavlovsk plc (London) produced 19,600 kg of gold, an increase of 24% compared with production in 2010. Petropavlovsk produced gold from four open pit mines (Albyn, Malomir, Pioneer, and Pokrovskiy), alluvial operations, and joint ventures. Much of the increase was attributed to the improved mining practices, higher grades, and the addition of a third resin-in-pulp processing plant at Pioneer. The startup of the Albyn Mine in December also increased total production. Some of this increase in production was offset by production losses at Pokrovskiy, where the mine was reaching its end of life (Petropavlovsk plc, 2012, p. 48–57).

Solomon Islands.—The country began producing gold after Allied Gold Mining plc's (Milton, Queensland, Australia) Gold Ridge Mine began in March and produced 1,700 kg of gold in 2011(Klapwijk and others, 2012, p. 47).

South Africa.—Mine production in South Africa decreased for the ninth consecutive year to the lowest level since 1906. In 2011, South Africa's gold production of 181,000 kg was a 4% decrease from that in 2010 owing to decreased ore grades and high mining costs from increased labor costs, higher electricity costs, and higher costs associated with deep-level shafts. Also, power supply issues, a workers strike in the third quarter of 2011, and temporary closure of shafts owing to mine accidents continued to affect the industry (CPM Group, 2012, p. 113–121).

In 2011, three companies operated mines that accounted for almost 80% of South African gold production. They were, in descending order of production, Gold Fields, AngloGold, and Harmony Gold Mining Co., Ltd. (Randfontein).

In 2011, Gold Fields's three South African operations produced 53,500 kg of gold, 8% less than that in 2010. Safety related work stoppages reduced output at Beatrix Mine and Kloof Driefontein Complex and lower ore grades limited production at the South Deep Mine (Gold Fields Ltd., 2012, p. 78–87).

AngloGold operated six deep-level mines and two surface operations in the West Wits and Vaal River regions that combined, produced 50,500 kg of gold in 2011, 9% less than that in 2010. The reason for the decrease in production was the work stoppages owing to safety issues, an industry wide strike in the third quarter, and a decision to stop mining the main shaft of Tau Tona in the West Wits because of safety risks (AngloGold Ashanti Ltd., 2012, p. P40).

Harmony operated 12 underground mines, 2 surface operations, and several other gold-producing operations in South Africa. In 2011, production from Harmony's operations was 37,700 kg of gold, 3% less than that in 2010. Underground operations produced 3% less gold in 2011 than that of 2010. Much of the decrease came from Bambanani (1,920 kg less), Unisel (1,670 kg less), and Masimong (1,100 kg less). Some of this was offset by increases at Doornkop (947 kg more), Kusasalethu (881 kg more), and Joel (855 kg more). In 2010, Harmony closed shafts at Bambanani, Masimong, and Unisel because of mine accidents. In 2011, production from surface operations decreased by 11% from 2010 production, which resulted from lower ore grades (Harmony Gold Mining Co., Ltd., 2012, p. 6–9).

Tanzania.—In 2011, gold production increased by 12% to 44,000 kg, compared with 2010 production. The main reason for the increase was AngloGold's Geita Mine production of 15,400 kg of gold in 2011, which was 38% more than production in 2010. Improvement in ore grades was the main reason for the increase (AngloGold Ashanti Ltd., 2012, p. P67–P68).

African Barrick Gold plc (London) (ABG), 73.9% owned by Barrick, owned shares in four gold mines. ABG's share of gold production from Tanzania operations was 22,200 kg, a slight decrease from that in 2010. In 2011, Buzwagi Mine production was 6,110 kg of gold, 6% more than production in 2010, owing to higher ore grade; however, power disruptions hampered production. Production from Balyanhulu was up slightly compared with 2010 production. The North Mara Mine had a higher strip ratio and in 2011, production decreased by 19% compared with 2010 production. Production from the Tulawaka gold mine [70% owned by ABG and 30% owned by MDN Inc. (Montreal)] was 2,620 kg of gold in 2011, an increase of 40% compared with production in 2010 because of higher ore grade (African Barrick Gold plc, 2012, p. 30–37).

Turkey.—Gold production was 24,000 kg, an increase of 41% compared with that of 2010 because of a full year of production from Alacer Gold Corp.'s (Englewood, CO) Çöpler Mine, which produced 5,770 kg of gold in 2011, after achieving its first pour in late December 2010 (Alacer Gold Corp., 2012). Production increases also came from Eldorado Gold Corp.'s (Vancouver) Kişladağ Mine, the leading gold mine in Turkey, which produced 8,850 kg of gold, 4% more than that in 2010, and from the startup of production from Eldorado's Efemçukuru Mine (Eldorado Gold Corp., 2012).

Uzbekistan.—In 2011, gold production increased slightly because of expansion of the mining fleet and the commissioning of an in-pit conveyor at Navoi Mining and Metallurgical Combine's Muruntau open pit. The new conveyor, which moved ore from the bottom of the pit to the new 270-meter-level reloading station, increased ore throughput and gold production (Klapwijk and others, 2012, p. 50).

Outlook

Worldwide and domestic gold production was expected to increase in 2012 because of new mines starting production and older mines expanding production, however, ore grades are expected to continue to decrease with higher gold prices because lower grade material will be considered valuable ore. Gold consumption was expected to continue to increase because jewelry consumption in China and India was expected to continue to increase. The increases in China and India were likely to outpace the declines in jewelry consumption in the rest of the world and from decreases in consumption in other end uses because of high gold prices. Investment in gold in various forms was expected to continue to increase as investors purchase gold as a safe haven, a hedge against economic failures, a portfolio diversifier, and as a store of wealth.

References Cited

African Barrick Gold plc, 2012, A strong platform for growth—Annual report—2011: London, United Kingdom, African Barrick Gold plc, 186 p. (Accessed June 7, 2012, at http://www.africanbarrickgold.com/~/media/Files/A/African-Barrick-Gold/Attachments/pdf/reports-and-presentations/ar-2011.pdf.)

Agnico-Eagle Mines Ltd., 2012, Agnico-Eagle reports fourth quarter and full year 2011 results; record full year operating cash flows; dividend increased 25%—Declared for 30th consecutive year; provides three year production guidance; Meadowbank partially written down—Optimized mine: Toronto, Ontario, Canada, Agnico-Eagle Mines Ltd. news release, February 16. (Accessed September 11, 2012, at http://www.agnico-eagle.com/English/Investor-Centre/PressReleases/Details/2012/Agnico-Eagle-Reports-Fourth-Quarter-and-Full-Year-2011-Results-Record-Full-Year-Operating-Cash-Flows-Dividend-Increased-25/default.aspx.)

Alacer Gold Corp., 2012, Alacer Gold announces fourths quarter mine production and 2012 guidance: Engelwood, CO, Alacer Gold Corp. press release, January 24, 8 p. (Accessed November 26, 2012, at http://www.alacergold.com/files/2012_01_24_q4_ops_2012_guidance_final.pdf.)

Allan, Matthew, 2011, Hunting for gold in the Gem State: The Northern Miner, v. 97, no. 31, September 19–25, p. 1–2, 22.

Allied Nevada Gold Corp., 2011, Allied Nevada doubles Hycroft combined mineral reserves and resources to 16.1 million ounces of gold and 598.1 million ounces of silver (26.6 million ounces Aueq); updated mill scoping study indicates average annual production of 556,200 ounces of gold and 27.0 million ounces of silver at an annual cost of $304 per gold ounce and an initial capital cost of $894 million: Reno, NV, Allied Nevada Gold Corp. press release, March 31, 8 p. (Accessed April 18, 2011, at http://www.alliednevada.com/investors/news/pdf/3312011-1.pdf.)

Allied Nevada Gold Corp., 2012, Allied Nevada provides preliminary 2011 operating results and 2012 operating guidance with gold production expected to double in 2012; adjusted cash cost expected to be similar to 2011: Reno, NV, Allied Nevada Gold Corp. press release, January 25, 3 p. (Accessed December 19, 2012, at http://www.alliednevada.com/investors/news/pdf/1252012-1.pdf.)

American Bonanza Gold Corp., 2012, Annual report—2011: Vancouver, British Columbia, Canada, American Bonanza Gold Corp., 54 p. (Accessed September 11, 2012, at http://www.americanbonanza.com/i/pdf/2011-Annual-Report-Final.pdf.)

AngloGold Ashanti Ltd., 2012, Annual financial statements—2011: Johannesburg, South Africa, AngloGold Ashanti Ltd., 332 p. (Accessed August 8, 2012, at http://www.aga-reports.com/11/financial-statements/.)

Antaike Precious & Minor Metals Monthly, 2012a, China gold output ranks no.1 in the world for five years: Antaike Precious & Minor Metals Monthly, March, no. 144, p. 2.

Antaike Precious & Minor Metals Monthly, 2012b, Chinese gold consumption up in 2011: Antaike Precious & Minor Metals Monthly, March, no. 144, p. 3.

Antaike Precious & Minor Metals Monthly, 2012c, The growth rate of Chinese gold output down 2.68%: Antaike Precious & Minor Metals Monthly, March, no. 144, p. 4.

Antofagasta plc, 2012, Quarterly production report—Q4 2011: London, United Kingdom, Antofagasta plc press release, February 1, 8 p. (Accessed December 3, 2012, at http://www.antofagasta.co.uk/pdf/press_releases/2012/Aplc11Q4prodreport20120201.pdf.)

Atna Resources Ltd., 2012, Annual report—2011: Golden, CO, Atna Resources Ltd., 80 p. (Accessed September 12, 2012, at http://www.atna.com/i/pdf/v310839_ATNA_AnnualReport_WebFinal.pdf.)

Avocet Mining plc, 2012, Full year results—2011: London, United Kingdom, Avocet Mining plc news release, February 23. (Accessed November 14, 2012, at http://online.hemscottir.com/ir/avm/ir.jsp?page=news-item&item=931851136954379.)

B2Gold Corp., 2012, B2Gold Corp. reports on record fourth quarter and full year 2011 gold production and guidance for 2012 production and development and exploration plans and budgets: Vancouver, British Columbia, Canada, B2Gold Corp. news release, January 23, 6 p. (Accessed December 3, 2012, at http://b2gold.mwnewsroom.com/Files/96/962ac609-c95a-4d3a-b8c4-b07f97751f041.pdf.)

Barrick Gold Corp., 2011a, Barrick announces two gold discoveries in Nevada: Toronto, Ontario, Canada, Barrick Gold Corp. news release, September 7. (Accessed November 5, 2011, at http://www.barrick.com/investors/news/news-details/2011/Barrick-Announces-Two-Gold-Discoveries-in-Nevada1126509/default.aspx.)

Barrick Gold Corp., 2011b, Barrick receives record of decision on Cortez Hills: Toronto, Ontario, Canada, Barrick Gold Corp. news release, March 16. (Accessed April 18, 2011, at http://www.barrick.com/investors/news/

news-details/2011/Barrick-Receives-Record-of-Decision-on-Cortez-Hills1124526/default.aspx.)
Barrick Gold Corp., 2012a, A symbol of value—Annual report—2011: Toronto, Ontario, Canada, Barrick Gold Corp., 175 p. (Accessed June 6, 2012, at http://www.barrick.com/Theme/Barrick/files/docs_annual/2012/Barrick-Annual-Report-2011.pdf.)
Barrick Gold Corp., 2012b, Supplemental information—Fourth quarter & year-end mine statistics: Toronto, Ontario, Canada, Barrick Gold Corp., 7 p. (Accessed June 6, 2012, at http://www.barrick.com/Theme/Barrick/files/docs_annualquarterly/2011/Q4-Mine-Stats.pdf.)
Centamin plc, 2012, Results for the quarter ended 31 December 2011—Correction: London, United Kingdom, Centamin plc press release, January 31, 45 p. (Accessed November 13, 2012, at http://www.centamin.com/centamin/uploads/press/Q4ResultsCorrection310112.pdf.)
Cia de Minas Buenaventura S.A.A., 2012, Annual report—2010: Lima, Peru, Cia de Minas Buenaventura S.A.A., 126 p. (Accessed November 20, 2012, via http://www.buenaventura.com/.)
Coeur d'Alene Mines Corp., 2011, Coeur posts all-time record quarterly sales and operating cash flow: Coeur d'Alene, ID, Coeur d'Alene Mines Corp. press release, November 7. (Accessed January 17, 2012, at http://www.coeur.com/news/news-archive/2011/2011/11/07/coeur-posts-all-time-record-quarterly-sales-and-operating-cash-flow#.UM96X2_AeSo.)
Coeur d'Alene Mines Corp., 2012, Annual report—2011: Coeur d'Alene, ID, Coeur d'Alene Mines Corp., 156 p. (Accessed July 9, 2012, at http://thomson.mobular.net/thomson/7/3291/4626/.)
Coral Gold Resources Ltd., 2012, Coral Gold Resources receives positive preliminary economic assessment for open pits and heap leaching operations at its 100% owned Robertson gold project in Nevada: Vancouver, British Columbia, Canada, Coral Gold Resources Ltd. press release, January 18. (Accessed March 6, 2012, at http://www.coralgold.com/s/NewsReleases.asp?ReportID=502401&_Type=News-Releases&_Title=Coral-Gold-Resources-Receives-Positive-Preliminary-Economic-Assessment-For-...)
CPM Group, 2012, The CPM Group gold yearbook 2012: New York, NY, CPM Group, 245 p.
Eldorado Gold Corp., 2012, 2011 operating results—2012 operating guidance dividend payment increases 50%: Vancouver, British Columbia, Canada, Eldorado Gold Corp. press release, January 9. (Accessed November 26, 2012, at http://www.eldoradogold.com/s/NewsReleases.asp?ReportID=500058.)
Emgold Mining Corp., 2011, Emgold announces non-brokered private placement: Vancouver, British Columbia, Canada, Emgold Mining Corp. news release, June 16. (Accessed September 12, 2012, at http://www.emgold.com/s/News-2011.asp?ReportID=487090.)
Endeavour Mining Corp., 2012, Endeavour Mining reports Q4 and full year 2011 gold production and 2012 guidance for production, development and exploration: Monte Carlo, Monaco, Endeavour Mining Corp. press release, January 30, 5 p. (Accessed December 3, 2012, at http://www.endeavourmining.com/i/pdf/2012-01-30_NR.pdf.)
Fire River Gold Corp., 2011, Annual management discussion and analysis for Fire River Gold Corp. for 31 October 2011: Vancouver, British Columbia, Canada, Fire River Gold Corp., 16 p. (Accessed June 4, 2012, at http://www.firerivergold.com/i/pdf/2011_4thqtr_FAU.pdf.)
Freegold Ventures Ltd., 2011, Freegold announces 43–101 resources estimate for Golden Summit project, Alaska: Vancouver, British Columbia, Canada, Freegold Ventures Ltd. news release, December 13, 3 p. (Accessed February 14, 2012, at http://www.freegoldventures.com/i/pdf/121311FVL.pdf.)
Freegold Ventures Ltd., 2012, Freegold outlines 1.7 million ounces of gold at Vinasale, Alaska: Vancouver, British Columbia, Canada, Freegold Ventures Ltd. news release, March 29. (Accessed May 7, 2012, at http://www.freegoldventures.com/s/NewsReleases.asp?ReportID=515509&_Type=News-Releases&_Title=Freegold-Outlines-1.7-Million-Ounces-of-Gold-at-Vinasale-Alaska.)
Freeport-McMoRan Copper & Gold Inc., 2012, Annual report—2011: Phoenix, AZ, Freeport-McMoRan Copper & Gold Inc., 118 p. (Accessed August 8, 2012, at http://www.fcx.com/ir/AR/2011/FCX_AR_2011.pdf.)
Fresnillo plc, 2012, Annual report—2011: London, United Kingdom, Fresnillo plc, 208 p. (Accessed September 11, 2012, at http://fresnilloplc.com/~/media/Files/F/Fresnillo/Annual Reports/Fresnillo_AR11.pdf.)
Glencore International AG, 2012, Annual report—2011: Baar, Switzerland, Glencore International AG, 164 p. (Accessed November 21, 2012, at http://www.glencore.com/documents/Annual_Report_2011.pdf.)
Gold Fields Ltd., 2012, Integrated annual report—For the six months ending 31 December 2011: Johannesburg, South Africa, Gold Fields Ltd., 170 p. (Accessed September 24, 2012, at http://www.goldfields.co.za/reports/ar_dec_2011/pdf/integrated_ann_rev_2011.pdf.)
Goldcorp Inc., 2012, One company thousands of stories—Annual report—2011: Toronto, Ontario, Canada, Goldcorp Inc., 179 p. (Accessed August 8, 2012, at http://www.goldcorp.com/theme/goldcorp/files/april-24-2012/_docs/Goldcorp_AR_2011_Complete.pdf.)
Golden Star Resources Ltd., 2012, Annual report—2011: Littleton, CO, Golden Star Resources Ltd., 56 p. (Accessed December 3, 2012, at http://phx.corporate-ir.net/External.File?item=UGFyZW50SUQ9MTM1Mjc1fENoaWxkSUQ9LTF8VHlwZT0z&t=1.)
Great Basin Gold Ltd., 2012, Management's discussion and analysis—Year ending December 31, 2011: Vancouver, British Columbia, Canada, Great Basin Gold Ltd., 36 p. (Accessed December 18, 2012, at http://www.greatbasingold.com/c_investorcentre/Financials/FY2011/4Q/GBG_2011_Year_End_MDandA.pdf.)
Harmony Gold Mining Co., Ltd., 2012, Quarterly report for the quarter ending 31 December 2011: Randfontein, South Africa, Harmony Gold Mining Co., Ltd., 36 p. (Accessed November 14, 2012, at http://www.harmony.co.za/downloads/finish/22-q2-fy2012/17-results-for-the-period-ended-31-december-2011.)
Hecla Mining Co., 2012, Form 10–K—2011: U.S. Securities and Exchange Commission, 158 p. (Accessed June 4, 2012, at http://www.hecla-mining.com/documents/Hecla201110-KFinal_02-22-12.pdf.)
Hill, Liezel, 2011, Romarco touts silver lining as EIS order delays project by 12 months: Creamer Media's Mining Weekly Online, July 4. (Accessed July 11, 2011, at http://http://www.miningweekly.com/article/romarco-touts-silverlining-as-eis-order-delays-project-by-12-months-2011-07-04.)
IAMGOLD Corp., 2012, Management's discussion and analysis of financial position and results of operations—2011: Toronto, Ontario, Canada, IAMGOLD Corp., 140 p. (Accessed November 14, 2012, at http://www.iamgold.com/files/pdf/2011_Financial Review.pdf.)
International Minerals Corp., 2011a, International Minerals announces positive preliminary economic assessment at Converse gold project, Nevada: Scottsdale, AZ, International Minerals Corp. news release, December 19. (Accessed February 14, 2012, at http://www.intlminerals.com/news/2011-news/380-international-minerals-announces-positive-preliminary-economic-assessment-at-converse-gold-project-nevada.)
International Minerals Corp., 2011b, International Minerals reports increased resources estimate at Converse gold project in Nevada: Scottsdale, AZ, International Minerals Corp. news release, August 24. (Accessed October 12, 2011, at http://www.intlminerals.com/news/2011-news/426-international-minerals-reports-increased-resource-estimate-at-converse-gold-project-in-nevada-5-1-million-gold-ounces-in-measured-and-indicated-resources.)
International Tower Hill Mines Ltd., 2011, International Tower Hill announces surface mine measured & indicated resources expansion to 16.5 Moz contained gold and robust preliminary economic assessment at Livengood project, Alaska: Vancouver, British Columbia, Canada, International Tower Hill Mines Ltd. press release, August 23, 8 p. (Accessed October 19, 2011, at http://www.ithmines.com/_resources/pdfs/nr_2011_08_23.pdf.)
Kinross Gold Corp., 2012, Annual report—2011: Toronto, Ontario, Canada, Kinross Gold Corp., 166 p. (Accessed July 9, 2012, at http://kinross.com/media/230034/kinross 2011 annual report final.pdf.)
Kiska Metals Corp., 2011, Kiska publishes revised Whistler resource estimate and provides further details for 2011 programs, Whistler Project, Alaska: Vancouver, British Columbia, Canada, Kiska Metals Corp. news release, January 12. (Accessed March 6, 2011, at http://www.kiskametals.com/s/News.asp?ReportID=437453.)
Klapwijk, Phillip, Newman, Phillip, Meader, Neil, Ryan, Peter, Tankard, William, Alexander, Cameron, O'Connell, Rhona, Burton, Paul, Piggott, Matthew, Heathman, Oliver, Liang, Junlu, Furuno, Ayako, Coles, George, and Litosh, Saida, 2012, Gold survey 2012: London, United Kingdom, Thomson Reuters GFMS Ltd., April, 124 p.
Lake Shore Gold Corp., 2012, Annual report—2011: Toronto, Ontario, Canada, Lake Shore Gold Corp., 92 p. (Accessed November 26, 2012, at http://lsgold.com/files/doc_financials/LSG2011_AR_v001_d6ttjm.pdf.)

Lincoln Mining Corp., 2011, Lincoln Mining announces positive preliminary economic assessment at its Pine Grove project, Lyon County, Nevada: Vancouver, British Columbia, Canada, Lincoln Mining Corp. news release, December 8, 4 p. (Accessed February 16, 2012, at http://www.lincolnmining.com/_resources/news/nr_2011_12_09.pdf.)
LKA International, Inc., 2012, Gold ore sales exceed exploration expenditures in 2011 at LKA's Golden Wonder Mine: Gig Harbor, WA, LKA International, Inc. press release, January 31. (Accessed July 9, 2012, at http://www.prnewswire.com/news-releases/gold-ore-sales-exceed-exploration-expenditures-in-2011-at-lkas-golden-wonder-mine-138401364.html.)
Lowrey, Jim, ed., 2011, Overview of trends among surveyed companies, *in* Strategic Report: Halifax, Nova Scotia, Canada, Metals Economics Group, v. 24, no. 6, November–December, p. 5–10.
Midway Gold Corp., 2011a, Midway Gold announces initial underground resource for Midway project, Nevada: Denver, CO, Midway Gold Corp. news release, April 1. (Accessed June 24, 2011, at http://www.midwaygold.com/s/NewsReleases.asp?ReportID=450015.)
Midway Gold Corp., 2011b, Midway Gold announces positive prefeasibility study for Pan gold project, Nevada: Denver, CO, Midway Gold Corp. news release, April 4. (Accessed June 24, 2011, at http://www.midwaygold.com/s/NewsReleases.asp?ReportID=450165.)
Midway Gold Corp., 2011c, Midway's Spring Valley, Nevada gold project experiences substantial resource growth: Denver, CO, Midway Gold Corp. news release, May 2. (Accessed July 24, 2011, at http://www.midwaygold.com/s/NewsReleases.asp?ReportID=454535.)
Nevada Copper Corp., 2012, Nevada Copper announces positive feasibility study results: Vancouver, British Columbia, Canada, Nevada Copper Corp. press release, January 23. (Accessed March 14, 2012, at http://www.nevadacopper.com/s/NewsReleases.asp?ReportID=503178&_Type=News-Releases&_Title=Nevada-Copper-Announces-Positive-Feasibility-Study-Results.)
Nevsun Resources Ltd., 2012, Nevsun 2011 annual financial results: Vancouver, British Columbia, Canada, Nevsun Resources Ltd. press release, March 21. (Accessed November 13, 2012, at http://www.nevsun.com/news/2012/march21/.)
New Gold Inc., 2012, Annual report—2011: Vancouver, British Columbia, Canada, New Gold Inc., 32 p. (Accessed September 12, 2012, at http://www.newgold.com/Theme/NewGold/files/New Gold Annual Review 2011.pdf.)
Newcrest Mining Ltd., 2012, Quarterly report Newcrest Mining Ltd. for the three months ending 31 December 2011: Melbourne, Victoria, Australia, Newcrest Mining Ltd., 8 p. (Accessed November 14, 2012, at http://www.newcrest.com.au/media/quarterly_reports/FINAL_Dec_2011_Quarterly_Report_240112.pdf.)
Newmont Mining Corp., 2011, Newmont expands Nevada growth potential with acquisition of Fronteer Gold: Denver, CO, Newmont Mining Corp. press release, February 3. (Accessed April 12, 2011, at http://www.newmont.com/our-investors/press-releases/2011/02032011.)
Newmont Mining Corp., 2012, Form 10–K—2011: U.S. Securities and Exchange Commission, 170 p. (Accessed September 12, 2012, at http://www.newmont.com/sites/default/files/u87/10_K.pdf.)
Northern Dynasty Minerals Ltd., 2011, $91 million work program underway to prepare Pebble project for permitting in 2012: Vancouver, British Columbia, Canada, Northern Dynasty Minerals Ltd. news release, May 2. (Accessed July 12, 2011, at http://www.northerndynastyminerals.com/ndm/NewsReleases.asp?ReportID=454588&_Type=News-Releases&_Title=91-million-work-program-underway-to-prepare-Pebble-Project-for-permitting-i....)
Northern Miner, The, 2011, Midas explores consolidated Idaho gold property: The Northern Miner, v. 97, no. 30, September 12–18, p. 3.
Northgate Minerals Corp., 2011, Northgate Minerals reports first quarter results: Vancouver, British Columbia, Canada, Northgate Minerals Corp. news release, May 10. (Accessed November 26, 2012, at http://www.auricogold.com/doc_download/433-northgate-minerals-reports-first-quarter-results.html.)
NovaGold Resources Inc., 2011a, NovaGold passes key milestone on path to becoming premier North American gold producer: Vancouver, British Columbia, Canada, NovaGold Resources news release, December 5, 9 p. (Accessed February 12, 2012, at http://www.novagold.com/upload/news_releases/2011/2011-12-05_NGPR_Donlin-FSU2.pdf.)
NovaGold Resources Inc., 2011b, NovaGold sells placer gold claims: Vancouver, British Columbia, Canada, NovaGold Resources Inc. news release, March 14, 2 p. (Accessed May 15, 2011, at http://www.novagold.com/upload/news_releases/2011/NGPR14Mar2011NomeGold.pdf.)
Ok Tedi Mining Ltd., 2012, Annual report—2011: Tabubil, Papua New Guinea, Ok Tedi Mining Ltd., 94 p. (Accessed November 14, 2012, at http://www.oktedi.com/images/stories/corporate_repoorts/ok tedi 2011 annual review.pdf.)
Osisko Mining Corp., 2012, Management's discussion and analysis—For the year ended December 31, 2011: Montreal, Quebec, Canada, Osisko Mining Corp., 37 p. (Accessed November 26, 2012, at http://www.osisko.com/pdfs/en_mda_2011.PDF.)
OZ Minerals Ltd., 2012, Annual report—2011: Melbourne, Victoria, Australia, OZ Minerals Ltd., 108 p. (Accessed November 19, 2012, at http://www.ozminerals.com/Media/docs/ASX-20120424-OZ-annual-report-2011-23afee15-7e6b-4e1b-911c-6cdac8075378-0.pdf.)
Perseus Mining Ltd., 2012, December 2011 quarterly activity report: Subiaco, Western Australia, Australia, Perseus Mining Ltd., January 19, 26 p. (Accessed December 3, 2012, at http://www.perseusmining.com/aurora/assets/user_content/pru dec dec 2011(2).pdf.)
Petropavlovsk plc, 2012, Delivering on our promises and sustaining future growth—Annual report—2011: London, United Kingdom, Petropavlovsk plc, 188 p. (Accessed September 13, 2012, at http://www.petropavlovsk.net/images/stories/documents/Petropavlovsk_AR_2011_websafe.pdf.)
Polymetal International plc, 2012, Delivering sustainable value—Annual report—2011: St. Petersburg, Russia, Polymetal International plc, 77 p. (Accessed September 13, 2012, at http://www.polymetalinternational.com/~/media/Files/P/Polymetal/Attachments/pdf/polymetal-annualreport-2011.pdf.)
Polyus Gold Mining Co., 2012, Annual report—2011: Moscow, Russia, Polyus Gold Mining Co., 233 p. (Accessed September 11, 2012, at http://www.polyusgold.com/upload/results/Polyus_Gold_2011_FINAL_INTERACTIVE5.pdf.)
Price, Jonathan, Coyner, Alan, Muntean, John, and Driesner, Doug, 2012, Update on production and exploration—2011: Northwest Mining Association's 118th Annual Meeting, Exposition & Short Courses, Spokane, WA, December 2–7, 2012, presentation, 112 p. (Accessed December 10, 2012, at http://www.nbmg.unr.edu/_docs/Presentations/NWMAupdate11.pdf.)
Randgold Resources Ltd., 2012, Annual report—2011: London, United Kingdom, Randgold Resources Ltd., 189 p. (Accessed November 19, 2012, at http://www.randgoldresources.com/randgold/applications/randgold/templates/annual_report_2011/downloads/Annual Report 2011.pdf.)
Rio Alto Mining Ltd., 2012, Consolidated financial statements—For the seven month financial year ended December 31, 2011 and the year ended May 31, 2011: Vancouver, British Columbia, Canada, Rio Alto Mining Ltd., 46 p. (Accessed November 20, 2012, at http://www.rioaltomining.com/_resources/financials/RIO_Dec_31-11_Final_Eng.pdf.)
Rio Tinto plc, 2011, Rio Tinto announces a 730,000 tonne increase of contained copper in mineral resources at Kennecott Utah Copper: London, United Kingdom, Rio Tinto plc media release, September 20. (Accessed November 7, 2011, at http://www.riotinto.com/media/18435_media_releases_20972.asp.)
Rio Tinto plc, 2012, Annual report—2011: London, United Kingdom, Rio Tinto plc, 224 p. (Accessed August 8, 2012, at http://www.riotinto.com/documents/Investors/Rio_Tinto_2011_Annual_report.pdf.)
Romarco Minerals Inc., 2012, Romarco resource at Haile grows to 4.0 million ounces gold measured and indicated: Toronto, Ontario, Canada, Romarco Minerals Inc. news release, February 7. (Accessed April 13, 2012, at http://www.romarco.com/Newsroom/News-Releases/News-Releases-Details/2012/Romarco-resource-at-Haile-grows-to-40-million-ounces-gold-measured-and-indicated1128155/default.aspx.)
San Gold Corp., 2012, Management's discussion and analysis—For the twelve months ended December 31, 2011: Winnipeg, Manitoba, Canada, San Gold Corp., 31 p. (Accessed November 26, 2012, at http://www.sangold.ca/i/pdf/2011_Q4_mda.pdf.)
Santa Fe Gold Corp., 2012, Santa Fe Gold achieves commercial production at Summit silver-gold mine: Albuquerque, NM, Santa Fe Gold Corp. news release, April 4, 2 p. (Accessed August 8, 2012, at http://santafegoldcorp.com/home/sites/default/files/_pdfs/4-4-12_Update.pdf.)
Scorpio Gold Corp., 2012, Scorpio Gold reports 2011 operations review and achievements at the Mineral Ridge Gold Mine: Vancouver, British Columbia, Canada, Scorpio Gold Corp. news release, February 8. (Accessed December 19, 2012, at http://www.scorpiogold.com/s/news.asp?ReportID=506047.)

St Andrew Goldfields Ltd., 2012, Management's discussion and analysis of financial condition and results of operations—2011: Toronto, Ontario, Canada, St Andrew Goldfields Ltd., 41 p. (Accessed November 26, 2012, at http://www.sasgoldmines.com/i/pdf/2011_Q4_MDA.pdf.)
Sumitomo Metal Mining Co., Ltd., 2012, New ore deposit identified in Pogo Gold Mine, Alaska, USA: Tokyo, Japan, Sumitomo Metal Mining Co., Ltd. news release, March 27, 3 p. (Accessed May 7, 2012, at http://www.smm.co.jp/E/uploaded_files/120327e.pdf.)
Sutter Gold Mining Inc., 2011, Sutter Gold announces positive preliminary economic assessment for the Lincoln Mine gold project: Lakewood, CO, Sutter Gold Mining Inc. news release, May 4. (Accessed September 12, 2012, at http://www.suttergoldmining.com/s/NewsReleases.asp?ReportID=455046&_Type=News-Releases&_Title=Sutter-Gold-Announces-Positive-Preliminary-Economic-Assessment-for-the-Linc...)
Szumigala, D.J., 2012, Alaska's mineral industry 2011—Exploration activity: Alaska Division of Geology and Geophysics Surveys Special Report 67, 15 p.
Terraco Gold Inc., 2011, Terraco reports drill results at its Almaden project (Idaho) including 51 meters averaging 1.09 gpt gold Terraco continues to improve grade/thickness of the gold resources at Almaden through core drilling and discovers new mineralized gold zone: Vancouver, British Columbia, Canada, Terraco Gold Inc. news release, October 5. (Accessed December 18, 2011, at http://www.terracogold.com/s/NewsReleases.asp?ReportID=483566&_Type=News-Releases&_Title=Terraco-Reports-Additional-Drill-Results-at-its-Almaden-Project-Idaho-Inclu....)
US Gold Corp., 2011, US Gold announces positive preliminary feasibility study for Gold Bar project, Nevada: Toronto, Ontario, Canada, US Gold Corp. news release, November 28. (Accessed January 16, 2012, at http://www.mcewenmining.com/Media-Events/News-Releases/News-Releases-Details/2011/US-Gold-Announces-Positive-Preliminary-Feasibility-Study-for-Gold-Bar-Project-Nevada/default.aspx.)
Vale S.A., 2012, Vale—Production report 2011: Rio de Janeiro, Brazil, Vale S.A., 12 p. (Accessed November 26, 2012, at http://www.vale.com/EN/investors/Quarterly-results-reports/Quarterly-results/QuarterlyResults/PREPORT4T11_i.pdf.)
Wilburn, D.R., 2012, Exploration review: Mining Engineering, v. 64, no. 5, May, p. 58–75.
Yamana Gold Inc., 2012, Annual report—2011: Toronto, Ontario, Canada, Yamana Gold Inc., 75 p. (Accessed December 3, 2012, at http://www.yamana.com/files/2011 Yamana AR-E 21-03-12-electronic-spreads.pdf.)
Yukon-Nevada Gold Corp., 2011, Yukon-Nevada Gold Corp. starts mining at SSX-Steer mine complex: Vancouver, British Columbia, Canada, Yukon-Nevada Gold Corp. news release, October 3. (Accessed December 18, 2011, at http://www.verisgold.com/s/NewsReleases.asp?ReportID=530216&_Type=News-Releases&_Title=Yukon-Nevada-Gold-Corp.-Starts-Mining-at-SSX-Steer-Mine-Complex.)
Yukon-Nevada Gold Corp., 2012, Management's discussion and analysis for the year ended December 31, 2011: Vancouver, British Columbia, Canada, Yukon-Nevada Gold Corp., 84 p. (Accessed December 18, 2012, at http://www.verisgold.com/i/pdf/financials/Year-End-2011.pdf.)

GENERAL SOURCES OF INFORMATION

U.S. Geological Survey Publications

Geology and Resources of Gold in the United States. Bulletin 1857, 1998.
Gold. Ch. in Flow Studies for Recycling Metal Commodities in the United States, Circular 1196–A—M, 2004.
Gold. Ch. in Mineral Commodity Summaries, annual.
Gold. Ch. in United States Mineral Resources, Professional Paper 820, 1973.
Gold. Mineral Industry Surveys, monthly.
Historical Statistics for Mineral and Material Commodities in the United States, Data Series 140.
Principal Gold Producing Districts of the United States. Professional Paper 610, 1968.
Principles of a Resource/Reserve Classification for Minerals. Circular 831, 1980.

Other

Gold. Ch. in Mineral Facts and Problems, U.S. Bureau of Mines Bulletin 675, 1985.
World Gold—A Minerals Availability Appraisal. U.S. Bureau of Mines Special Publication 24, 1994.

TABLE 1

SALIENT GOLD STATISTICS[1]

		2007	2008	2009	2010	2011
United States:						
Production:						
Mine:						
Quantity	kilograms	238,000	233,000	223,000	231,000	234,000
Value	thousands	$5,350,000	$6,550,000	$7,000,000	$9,130,000	$11,800,000
Gold recovered by cyanidation:						
Extracted in vats, tanks, closed containers[2]	kilograms	W	W	W	W	W
Leached in open heaps or dumps[3]	do.	202,000 r	197,000 r	185,000 r	193,000 r	201,000
Refinery:						
Concentrates and dore	do.	176,000	168,000	170,000	175,000	220,000
Recycled materials (new and old scrap)	do.	135,000	181,000	189,000	198,000	263,000
Exports, refined	do.	392,000	459,000	281,000	295,000	403,000
Imports for consumption, refined	do.	113,000	118,000	127,000	199,000	143,000
Net deliveries from foreign stocks in Federal Reserve Bank of New York	do.	189,000	220,000	--	--	3,670
Stocks, December 31:						
Industry[4]	do.	1,140	W	9,200	6,810	6,470
Gold exchange traded funds holdings, United States only[5]	do.	683,000	847,000	1,220,000	1,450,000	1,500,000
COMEX	do.	229,000	265,000	305,000	361,000	353,000
U.S. Department of the Treasury	metric tons	8,140	8,140	8,140	8,140	8,140
U.S. Gold Futures Trading[6]	do.	77,900	11,900	110,000	139,000	153,000
Consumption:						
American Buffalo Bullion gold coin[7]	kilograms	4,250	5,890	6,220	6,500	5,430
American Eagle gold coin[7]	do.	12,800	35,600	44,300	38,000	34,100
In industry and the arts	do.	180,000	176,000	173,000 r	180,000	168,000
Price, average[8]	dollars per troy ounce	698.95	873.50	974.68	1,227.51	1,572.48
Employment, mine and mill only[9]		9,130	9,560	9,650	10,300 r	11,200
World:						
Production, mine	kilograms	2,350,000	2,280,000	2,490,000 r	2,570,000 r	2,660,000 e
Official bullion reserves[10]	metric tons	29,900	28,700	30,400 r	30,700 r	31,100

[e]Estimated. [r]Revised. do. Ditto. W Withheld to avoid disclosing company proprietary data. -- Zero.

[1]Data are rounded to no more than three significant digits, except prices.

[2]May include small quantities recovered by gravity methods.

[3]May include tailings, waste-ore dumps, and previously mined ore at some inactive mines.

[4]Unfabricated refined gold held by refiners, fabricators, dealers, and the U.S. Department of Defense.

[5]Data from CPM Group.

[6]COMEX only.

[7]Data from U.S. Mint.

[8]Engelhard quotation.

[9]Data from the Mine Safety and Health Administration.

[10]Held by central banks, governments, and international monetary organizations. Data from the International Monetary Fund.

TABLE 2

MINE PRODUCTION OF GOLD IN THE UNITED STATES, BY STATE[1]

(Kilograms)

State	2010	2011
Alaska	28,100	25,800
Nevada	166,000	172,000
Other States[2]	36,900	36,100
Total	231,000	234,000

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Includes Arizona, California, Colorado, Idaho, Montana, New Mexico, South Dakota, Utah, and Washington.

TABLE 3
LEADING GOLD-PRODUCING MINES IN THE UNITED STATES IN 2011, IN ORDER OF OUTPUT[1]

Rank	Mine	County and State	Majority owner	Quantity (kilograms)
1	Nevada Operations[2]	Various, NV	Newmont Mining Corp.	54,151
2	Cortez[3]	Lander, NV	Barrick Gold Corp.	44,198
3	Goldstrike[4]	Elko and Eureka, NV	do.	33,841
4	Bingham Canyon[5]	Salt Lake, UT	Kennecott Utah Copper Corp.[6]	11,788
5	Smoky Valley Common Operation	Nye, NV	Kinross Gold Corp.	11,329
6	Pogo	Southeast Fairbanks, AK	Sumitomo Metal Mining Co.	10,053
7	Fort Knox	Fairbanks North Star, AK	Kinross Gold Corp.	9,014
8	Cresson	Teller, CO	AngloGold Ashanti Ltd.	8,305
9	Turquoise Ridge	Humboldt, NV	Barrick Gold Corp.	5,599
10	Kettle River-Buckhorn	Okanogan, WA	Kinross Gold Corp.	5,452
11	Mesquite	Imperial, CA	New Gold Inc.	4,914
12	Marigold	Humboldt, NV	Goldcorp Inc.	4,759
13	Ruby Hill	Eureka, NV	Barrick Gold Corp.	3,950
14	Bald Mountain	White Pine, NV	do.	2,893
15	Kensington	Juneau, AK	Coeur d’Alene Mines Corp.	2,750
16	Hycroft	Humboldt and Pershing, NV	Allied Nevada Gold Corp.	2,743
17	Hollister	Elko, NV	Great Basin Gold Ltd.	2,691
18	Jerritt Canyon	do.	Yukon-Nevada Gold Corp.	2,107
19	Wharf	Lawrence, SD	Wharf Resources (USA) Inc.[7]	2,099
20	Golden Sunlight	Jefferson, MT	Barrick Gold Corp.	1,928
21	Greens Creek	Juneau, AK	Hecla Mining Co.	1,781
22	Briggs	Inyo, CA	Atna Resources Ltd.	1,353
23	Robinson	White Pine, NV	Quadra FNX Mining Ltd.	927
24	Rochester	Pershing, NV	Coeur d’Alene Mines Corp.	195
(8)	Denton-Rawhide	Mineral, NV	Rawhide Acquisition Holdings	NA
(8)	Florida Canyon	Pershing, NV	Jipangu Inc.	NA
(8)	Mission Complex	Pima, AZ	ASARCO LLC[9]	NA

do. Ditto. NA Not available.

[1]Data are rounded to no more than three significant digits; the mines on this list accounted for more than 99% of U.S. mine production in 2011.

[2]Includes Carlin East, Gold Quarry, Leeville, Midas, North Lantern, Pete, Phoenix, and Twin Creek Mines.

[3]Includes Cortez Hills and Cortez Pipeline Mines.

[4]Includes Storm Mine.

[5]Quantity refers to total quantity of gold produced in concentrates.

[6]Wholly owned subsidiary of Rio Tinto plc.

[7]Wholly owned subsidiary of Goldcorp Inc.

[8]The rank order is not shown to avoid disclosing company proprietary data.

[9]Wholly owned subsidiary of Grupo México, S.A.B. de C.V.

Sources: Company annual reports, company 10–K reports submitted to the U.S. Securities and Exchange Commission, company news releases, and Nevada Bureau of Mines and Geology.

TABLE 4

U.S. EXPORTS OF GOLD, BY COUNTRY[1, 2]

	Ores and concentrates[3]		Dore and precipitates		Refined bullion[4]		Total	
Year and country	Quantity (kilograms)	Value (thousands)	Quantity (kilograms)	Value (thousands)	Quantity (kilograms)	Value (thousands)	Quantity (kilograms)	Value (thousands)
2010	3,460	$102,000	84,400	$3,160,000	295,000	$11,400,000	383,000	$14,700,000
2011:								
Australia	157	8,060	--	--	18,000	633,000	18,200	641,000
Austria	--	--	--	--	21	985	21	985
Belgium	43	1,800	--	--	1	45	44	1,850
Brazil	--	--	--	--	899	39,600	899	39,600
Canada	28	574	351	15,400	1,090	53,200	1,460	69,200
China	2,420	88,100	--	--	2,740	156,000	5,150	244,000
Costa Rica	245	5,400	--	--	--	--	245	5,400
France	2	10	--	--	63	2,200	65	2,210
Germany	1,340	58,600	--	--	92	3,820	1,440	62,400
Guatemala	--	--	13	567	--	--	13	567
Hong Kong	65	3,350	--	--	111,000	5,630,000	111,000	5,640,000
India	31	1,080	--	--	15,500	768,000	15,500	770,000
Indonesia	--	--	--	--	9	421	9	421
Ireland	79	1,400	--	--	29	796	108	2,200
Italy	2	26	--	--	122	5,140	123	5,170
Japan	21	947	--	--	557	25,300	577	26,300
Korea, Republic of	102	5,330	--	--	--	--	102	5,330
Laos	--	--	--	--	21	872	21	872
Malaysia	--	--	--	--	180	8,420	180	8,420
Mexico	3,840	107,000	--	--	1,320	56,000	5,160	163,000
Netherlands Antilles	--	--	6	238	--	--	6	238
Oman	--	--	--	--	589	27,000	589	27,000
Pakistan	--	--	--	--	30	1,370	30	1,370
Peru	--	--	--	--	24	1,070	24	1,070
Poland	1	8	--	--	4	193	5	201
Singapore	--	--	--	--	1,080	52,200	1,080	52,200
South Africa	--	--	--	--	11,900	530,000	11,900	530,000
Switzerland	7	292	52,600	2,100,000	52,500	2,240,000	105,000	4,350,000
Thailand	4	23	--	--	21,200	1,060,000	21,200	1,060,000
Turkey	--	--	--	--	2,510	109,000	2,510	109,000
United Arab Emirates	--	--	9,450	307,000	877	38,100	10,300	345,000
United Kingdom	7	140	143	2,790	161,000	8,140,000	161,000	8,140,000
Uruguay	--	--	136	6,300	--	--	136	6,300
Vietnam	--	--	--	--	19	489	19	489
Other	9	101	2	72	9	329	20	501
Total	8,400	282,000	62,800	2,430,000	403,000	19,600,000	474,000	22,300,000

-- Zero.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Ash and residues data were zero for listed years.

[3]Includes base-metal ores, concentrates, and matte destined for refining.

[4]Bullion also moves in both directions between U.S. markets and foreign stocks on deposit in the Federal Reserve Bank. Monetary gold is excluded.

Source: U.S. Census Bureau.

TABLE 5
U.S. EXPORTS OF GOLD, BY COUNTRY[1]

	Waste and scrap		Metal powder		Gold compounds	
Year and country	Quantity (kilograms)	Value (thousands)	Quantity (kilograms)	Value (thousands)	Quantity (kilograms)	Value (thousands)
2010	660,000	$2,180,000	2,340	$74,700	4,270,000	$107,000
2011:						
Australia	1	5	(2)	10	458	8
Austria	--	--	--	--	1,070	19
Bahamas, The	--	--	--	--	300	5
Canada	88,700	1,600,000	40	684	670,000	12,100
Chile	--	--	--	--	1,870	34
China	--	--	2	36	519,000	16,100
Costa Rica	--	--	4	138	--	--
Czech Republic	7	115	--	--	--	--
Denmark	20	155	--	--	--	--
Dominican Republic	26	549	3	28	168,000	3,020
Ecuador	--	--	--	--	213	17
France	--	--	6	166	4,070	73
Germany	144,000	50,000	10	181	13,000	233
Guatemala	--	--	13	336	--	--
Haiti	--	--	--	--	849	15
Hong Kong	168	1,620	33	811	11,700	207
India	--	--	147	4,370	8,900	160
Ireland	--	--	--	--	1,180	21
Israel	--	--	12	488	1,600	29
Italy	14,700	22,200	--	--	194	4
Japan	291	12,700	97	2,570	290	8
Korea, Republic of	6,090	122	--	--	13,800	249
Lebanon	--	--	--	--	167	3
Malaysia	--	--	--	--	440,000	10,800
Mexico	(2)	5	21	646	620,000	11,200
Netherlands	--	--	--	--	81,600	1,470
Norway	--	--	--	--	305	5
Panama	--	--	1	9	170	3
Saudi Arabia	--	--	--	--	309	6
Singapore	4	4	14	269	1,230,000	40,500
Spain	--	--	1	4	319	6
Switzerland	111,000	5,480,000	(2)	7	165	3
Taiwan	--	--	10	301	122,000	2,200
Thailand	3	25	1	29	3,240	58
Trinidad and Tobago	--	--	--	--	439	12
United Arab Emirates	1,800	52,200	92	3,240	--	--
United Kingdom	260,000	292,000	152	4,640	11,100	203
Vietnam	--	--	--	--	350	12
Other	5	155	11	105	--	--
Total	626,000	7,510,000	670	19,100	3,930,000	98,700

-- Zero.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 6
U.S. IMPORTS FOR CONSUMPTION OF GOLD, BY COUNTRY[1]

Year and country	Ores and concentrates[2] Quantity (kilograms)	Ores and concentrates[2] Value (thousands)	Dore and precipitates Quantity (kilograms)	Dore and precipitates Value (thousands)	Refined bullion[3] Quantity (kilograms)	Refined bullion[3] Value (thousands)	Total Quantity (kilograms)	Total Value (thousands)
2010	257,000	$58,000	148,000	$4,520,000	199,000	$7,020,000	604,000	$11,600,000
2011:								
Argentina	--	--	4,660	9,060	--	--	4,660	9,060
Aruba	--	--	41	1,820	--	--	41	1,820
Australia	2	37	--	--	2,860	156,000	2,860	156,000
Bahamas, The	--	--	48	1,740	1	20	49	1,760
Barbados	--	--	91	2,470	1	48	93	2,520
Belgium	--	--	3	134	16	720	19	855
Benin	--	--	--	--	38	1,280	38	1,280
Bolivia	--	--	2,780	145,000	194	9,280	2,980	154,000
Brazil	--	--	1	62	3,520	167,000	3,520	167,000
Burkina Faso	--	--	--	--	67	1,900	67	1,900
Canada	4,660	13,000	384	17,800	69,800	3,300,000	74,900	3,330,000
Chile	--	--	1,830	95,500	3,050	147,000	4,880	242,000
Colombia	--	--	35,600	1,520,000	5,400	256,000	41,000	1,780,000
Congo (Kinshasa)	--	--	--	--	107	2,920	107	2,920
Costa Rica	--	--	334	13,500	--	--	334	13,500
Cote d'Ivoire	--	--	--	--	23	780	23	780
Curacao	--	--	7,530	397,000	1	97	7,530	397,000
Dominican Republic	--	--	571	25,500	144	5,390	715	30,800
Ecuador	--	--	316	14,800	126	5,520	442	20,300
El Salvador	--	--	3	72	2	115	5	187
France	--	--	--	--	229	10,400	229	10,400
Germany	--	--	2	79	445	19,400	447	19,500
Ghana	--	--	68	2,140	61	2,190	129	4,330
Guatemala	--	--	2,960	140,000	--	--	2,960	140,000
Guinea	--	--	3	130	128	2,530	131	2,660
Guyana	--	--	3,550	179,000	2,130	106,000	5,680	285,000
Honduras	--	--	847	32,000	1,250	60,100	2,100	92,100
Hong Kong	--	--	--	--	222	11,500	222	11,500
Israel	--	--	--	--	33	1,540	33	1,540
Italy	--	--	--	--	28	1,630	28	1,630
Jamaica	--	--	293	10,100	27	594	320	10,700
Mali	--	--	1	42	11	347	12	389
Mexico	198,000	99,800	84,300	3,640,000	46,000	1,450,000	329,000	5,180,000
Netherlands	--	--	403	20,000	--	--	403	20,000
Netherlands Antilles	--	--	2,540	112,000	476	19,300	3,010	131,000
New Zealand	--	--	1	38	12	380	14	418
Nicaragua	--	--	1,710	86,400	8	243	1,720	86,600
Panama	--	--	327	15,300	599	20,600	926	36,000
Paraguay	--	--	--	--	42	2,330	42	2,330
Peru	63	2,730	9,210	415,000	228	11,800	9,500	429,000
Philippines	--	--	34	1,340	--	--	34	1,340
South Africa	--	--	--	--	349	15,500	349	15,500
Sweden	--	--	--	--	22	550	22	550
Switzerland	--	--	16	783	4,170	201,000	4,180	202,000
Taiwan	--	--	--	--	26	359	26	359
Trinidad and Tobago	--	--	7	192	3	79	10	271
United Arab Emirates	--	--	--	--	25	1,440	25	1,440
United Kingdom	--	--	--	--	1,220	20,700	1,220	20,700
Venezuela	--	--	246	12,600	2	66	248	12,600
Other	--	--	24	1,190	17	897	41	2,090
Total	203,000	115,000	161,000	6,910,000	143,000	6,010,000	507,000	13,000,000

-- Zero.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Includes base-metal ores, concentrates, and matte destined for refining.

[3]Bullion also moves in both directions between U.S. markets and foreign stocks on deposit in the Federal Reserve Bank. Monetary gold is excluded.

Source: U.S. Census Bureau.

TABLE 7
U.S. IMPORTS FOR CONSUMPTION OF GOLD, BY COUNTRY[1]

Year and country	Waste and scrap Quantity (kilograms)	Waste and scrap Value (thousands)	Metal powder Quantity (kilograms)	Metal powder Value (thousands)	Gold compounds Quantity (kilograms)	Gold compounds Value (thousands)
2010	46,100	$722,000	652	$11,500	43,500	$1,480
2011:						
Antigua and Barbuda	44	682	--	--	--	--
Aruba	176	2,430	--	--	--	--
Bahamas, The	401	6,070	--	--	--	--
Barbados	53	836	--	--	--	--
Belize	37	397	--	--	--	--
Bermuda	326	4,590	--	--	--	--
Bolivia	530	17,700	--	--	--	--
Canada	20,800	202,000	20	511	--	--
Cayman Islands	77	1,350	--	--	--	--
Chile	131	4,020	--	--	--	--
China	42	657	--	--	--	--
Colombia	55	2,390	--	--	--	--
Costa Rica	2,440	38,800	--	--	--	--
Curacao	97	2,990	--	--	--	--
Czech Republic	51	661	--	--	--	--
Dominican Republic	10,700	200,000	5	70	--	--
Ecuador	97	2,380	--	--	--	--
El Salvador	3,910	90,500	--	--	--	--
French Polynesia	70	1,150	--	--	--	--
Gabon	10	204	--	--	--	--
Germany	2	24	179	1,980	11,400	400
Ghana	--	--	58	1,290	--	--
Guatemala	1,730	22,300	--	--	--	--
Honduras	3,820	88,500	--	--	--	--
Hong Kong	7	200	--	--	--	--
Ireland	45	442	--	--	--	--
Italy	141	2,800	(2)	10	--	--
Jamaica	665	11,200	--	--	--	--
Japan	--	--	1	12	25,200	1,170
Korea, Republic of	787	14,000	(2)	5	--	--
Malaysia	15	229	--	--	--	--
Mexico	6,480	55,700	65	899	--	--
Netherlands	15	392	--	--	--	--
Netherlands Antilles	110	2,730	--	--	--	--
Nicaragua	1,780	40,900	3	93	--	--
Panama	622	15,800	--	--	--	--
Peru	49	124	--	4	--	--
Philippines	431	2,260	--	--	--	--
Samoa	33	179	--	--	--	--
Sao Tome and Principe	18	499	--	--	--	--
Sierra Leone	--	--	21	791	--	--
Singapore	38	234	--	--	--	--
Sint Maarten	132	2,410	--	--	--	--
South Africa	320	4,020	20	612	--	--
St. Lucia	49	495	--	--	--	--
Switzerland	--	--	49	774	--	--
Taiwan	44	1,990	--	--	--	--
Trinidad and Tobago	19	256	--	--	--	--
United Kingdom	26	50	13	424	1,060	58
Venezuela	2	101	--	--	--	--
Other	56	929	3	105	--	--
Total	57,400	849,000	437	7,570	37,600	1,630

-- Zero.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 8

GOLD: WORLD MINE PRODUCTION, BY COUNTRY [1, 2]

(Kilograms)

Country	2007	2008	2009	2010	2011[e]
Algeria	236	656	1,010	723 [r]	341 [3]
Argentina	42,021	42,046	46,588	63,138 [r]	59,000
Armenia	1,300 [e]	1,359	944	2,000	2,200
Australia	247,000 [e]	215,000	224,000	261,000 [e]	258,000 [3]
Azerbaijan	--	--	353	1,900	1,775 [3]
Belize[e]	5	5	5	--	--
Benin[e]	19	20	20	20	20
Bolivia	8,818	8,406	7,217	6,394	6,513 [3]
Botswana[e]	2,800	3,300	2,000	1,774 [r, 3]	1,800
Brazil[4]	49,613	54,666	60,330 [r]	62,047 [r]	62,100 [p]
Bulgaria	3,964	4,160	4,482	4,400 [r, e]	4,400
Burkina Faso	2,250	6,033 [r]	11,581 [r]	22,939 [r]	31,774 [3]
Burma[e]	100	100	100	100	100
Burundi[e]	750	750	750	750	750
Cameroon[e]	1,500	1,500	1,600	1,600	1,600
Canada	102,211	95,004	97,367	91,024	96,726 [3]
Central African Republic[e]	10	43	61	60	100
Chad[e]	150	100	100	100	100
Chile	41,527	39,162	40,834	39,494 [r]	45,317 [3]
China[e]	275,000	285,000	320,000	345,000	362,000
Colombia	15,482	34,321	47,837	53,605	55,908 [3]
Congo (Brazzaville)[e]	100	100	100	150 [r]	150
Congo (Kinshasa)[e]	5,100	3,300	3,500	3,500	3,500
Costa Rica	2,065	154	209	200 [e]	100
Cote d’Ivoire	1,243	4,205 [r]	6,947 [r]	5,310 [r]	9,871 [3]
Denmark[5]	1,861	1,665	1,117	-- [r]	153 [3]
Dominican Republic	--	47	375	500 [e]	500
Ecuador[6]	3,186	800	2,092	2,000	2,000
Egypt	--	--	95 [r]	5,000 [r]	6,600
Equatorial Guinea[e]	200	200	200	200	200
Eritrea[e]	30	30	30	500 [r]	12,000
Ethiopia[7]	4,368	3,465 [r]	6,251 [r]	5,936 [r]	11,000
Fiji	837	871	1,040	1,856	1,622 [3]
Finland[e]	5,000	5,000	7,000	7,000	7,000
France[e]	1,500	1,500	1,500	1,500	1,500
French Guiana[e]	2,000	2,000	2,000	2,000	2,000
Gabon[e, 8]	300	300	300	300	300
Georgia[e]	2,000	2,000	2,000	2,000	2,100
Ghana	72,209	72,980	79,883	76,332 [r]	80,122 [3]
Greece	--	400	500	500	600
Guatemala	7,497	7,837	8,897	9,213 [r]	11,898 [3]
Guinea	15,628	19,945	18,091	15,217	15,695 [3]
Guyana	7,412	8,131	9,492 [r]	9,594 [r]	9,600 [p]
Honduras	3,275	2,561	2,127	2,200	2,000
India[9]	3,000 [e]	2,700	2,800	2,700 [e]	2,600
Indonesia[10]	117,851	64,390	140,488 [r]	106,316 [r]	96,100
Iran	252	303 [r]	340 [r]	341 [r, e]	400
Italy[e]	450	450	450	450	450
Japan	8,869	6,868	7,708	8,544 [r]	8,691 [3]
Kazakhstan	22,564	20,825	22,839 [r]	29,941	36,670 [3]
Kenya	3,023	340	1,055	2,035 [r]	2,100
Korea, North[e]	2,000	2,000	2,000	2,000	2,000
Korea, Republic of	162	175	274	300 [e]	200
Kyrgyzstan	10,559	18,132	16,950	18,300	18,500
Laos	5,137	4,333	5,033	5,061	5,100
Liberia	311 [e]	624	524	666 [r]	469 [3]
Madagascar[11]	1 [r]	50 [r]	31 [r]	15 [r, e]	--

See footnotes at end of table.

TABLE 8—Continued

GOLD: WORLD MINE PRODUCTION, BY COUNTRY [1, 2]

(Kilograms)

Country	2007	2008	2009	2010	2011[e]
Malaysia	2,913	2,489	2,794	3,766 [r]	4,215 [3]
Mali	48,850	41,160	42,364	36,360 [r]	35,728 [3]
Mauritania	2,251	6,254	8,000	8,325 [r]	8,200
Mexico	39,355	50,365	51,393	72,596	84,118 [3]
Mongolia	17,473	15,184	9,803	6,037	5,703 [3]
Morocco[e]	1,200	1,200	1,200	1,200	1,200
Mozambique	97	298	511	106 [r]	500
Namibia	2,496	2,126	2,022	2,675	2,053 [3]
New Zealand	10,638	13,402	13,442	13,494 [r]	14,324 [3]
Nicaragua[e]	3,300	2,960	2,590	2,600	4,500
Niger	3,427	2,314	1,985 [r]	1,596 [r]	1,453 [3]
Nigeria[e]	180	200	600	600	600
Oman	124	46	28	12 [r]	10
Panama	--	--	800	1,300 [e]	2,100
Papua New Guinea	57,549	67,463	67,800	68,000 [r, e]	66,000
Peru[12]	170,236	179,870	182,403	164,084 [r]	164,013 [3]
Philippines	38,792	35,726	37,047	40,847	41,000
Poland[e]	500 [r]	500 [r]	500 [r]	500 [r]	500
Romania[e]	400	400	400	400	400
Russia[13]	156,975	172,031	192,832	189,000 [r]	199,642 [3]
Rwanda[11]	-- [r]	40 [r]	30 [r]	3 [r]	4
Saudi Arabia	4,440	4,527	4,857 [r]	4,476 [r]	4,500
Senegal	600 [e]	600 [e]	5,055 [r]	4,381 [r]	4,089 [3]
Serbia[e]	500	712 [r]	452 [r]	356 [r]	360
Sierra Leone	212 [e]	196	157	270 [r]	164 [3]
Slovakia	198	92	346	340 [e]	300
Solomon Islands	--	--	--	--	1,700
South Africa	252,598	212,571 [r]	197,628	188,701	181,000
Spain	3,500 [e]	3,400	3,450	3,500 [e]	3,500 [p]
Sudan[11]	6,049 [r]	7,508 [r]	14,914 [r]	26,317 [r]	23,379 [3]
Suriname	9,360	9,798	16,497 [r]	20,686 [r]	21,000 [p]
Sweden[e]	5,000	5,000	5,000	5,000	5,000
Tajikistan	2,000	1,672	1,361	2,049	2,240
Tanzania	40,193	36,434	39,112	39,448 [r]	44,000
Thailand	3,401	2,721	5,400	4,215 [r]	4,500
Turkey	9,920	11,016	14,469	17,000 [e]	24,000
Uganda[e]	1,600	1,500	1,600	1,600	1,500
United Kingdom	--	164	185	171 [e]	202
United States	238,000	233,000	223,000	231,000	234,000 [3]
Uruguay	2,820	2,182	1,690 [r]	1,736 [r]	1,725 [3]
Uzbekistan[e]	85,000	85,000	90,000	90,000	91,000
Venezuela	10,100	10,100 [e]	11,880	12,000 [e]	12,000
Vietnam[e]	3,000	3,000	3,000	3,500	3,500
Zambia	1,270	1,930	3,100	3,400 [e]	3,500
Zimbabwe	6,750 [r]	3,579	4,965 [r]	9,100 [r]	12,824 [3]
Total	2,350,000	2,280,000	2,490,000 [r]	2,570,000 [r]	2,660,000

[e]Estimated. [p]Preliminary. [r]Revised. -- Zero.

[1]World totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown.

[2]Table includes data available through July 16, 2012.

[3]Reported figure.

[4]Officially reported figures are as follows, in kilograms: Major companies: 2007—44,443 (revised); 2008—46,066 (revised); 2009—52,207 (revised); 2010—55,292 (revised); and 2011—54,447. Garimpieros: 2007—5,170 (revised); 2008—8,600 (revised); 2009—8,123 (revised); 2010—6,455 (revised); and 2011—7,650 (estimated).

[5]All production from Greenland.

[6]Includes undocumented artisanal production.

[7]Year ending July 7 of that stated.

[8]Undocumented artisanal production.

[9]Refinery output.

[10]Excludes production from so-called people's mines, which may be as much as 20,000 kilograms per year, but includes gold recovered as byproduct of copper mining.

[11]Reported exports.

[12]Includes documented production from placer artisanal production.

[13]Mine output including gold recovered as a byproduct, but excludes secondary gold production, which for Russia, in kilograms, was 2007—5,867; 2008—8,140; 2009—14,534; 2010—12,592 (revised); and 2011—9,334.