

SILVER

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For the third consecutive year, the difference between the high and low prices for silver was less than \$1.00 per troy ounce. This small movement in price occurred at a time when global fabrication demand for silver decreased by 5% to 26,900 metric tons (t). Most of the decrease occurred in industrial demand, declining by more than 10% to 10,500 t. Global photographic demand was only slightly lower, while demand for silver in jewelry actually increased. Except for a brief period in January, when the high for the year of \$4.71 per ounce was reached, the silver price drifted steadily downward in 2001 to a yearly average of \$4.39 per ounce, 12% lower than the 2000 level.

According to the Silver Institute, there was a modest increase in world mine output of silver to 18,400 t compared with 18,100 t in 2000; secondary supplies from old scrap increased by about 3%, owing mostly to destocking in the United States.

Global reserves of silver in demonstrated resources from producing and nonproducing deposits at the end of 2001 were estimated to be 280,000 t by the U.S. Geological Survey (USGS). Reserves for the United States were estimated to be 30,000 t. The reserve base (reserves plus measured and indicated resources that are marginally economic and some of those resources that are currently subeconomic) for the five leading silver producing countries (Australia, Canada, Mexico, Peru, and the United States) were estimated to be about 240,000 t or 56% of the world total.

The USGS has issued a report on undiscovered gold, silver, copper, lead, and zinc deposits in the United States (U.S. Geological Survey, 2000, p. 10). The estimate of the amount of silver in undiscovered mineral deposits ranged from greater than 290,000 t at a 90% probability to greater than 660,000 t at a 10% probability. The mean estimate for silver in undiscovered deposits was 460,000 t. Total discovered silver resources in the United States were estimated to be 330,000 t.

Legislation and Government Programs

The U.S. Mint is responsible for safeguarding a significant portion of the Nation's precious metal resources and is the custodian of most of its silver. The value of the resources is reported at the lower of cost or market value. Amounts and values of custodial silver in the custody of the Mint on September 30, 2001, were 220,062 kilograms (kg) of silver with a market value of \$32.422 million (at \$4.5825 per fine troy ounce) and a statutory value of \$9.148 million. A statutory rate of \$1.29292 per fine troy ounce was used to value the custodial silver held by the Mint (U.S. Department of the Treasury, U.S. Mint, 2002¹).

¹References that include a section twist (§) are found in the Internet References Cited section.

Production

In 2001, silver was produced in the United States from precious metal ores at about 30 lode mines and from base metal ores at about 24 lode mines. More than 30 t of silver was produced at each of 11 mines; their aggregated production equaled about 80% of total domestic production. Fewer than 10 placer operations recovered silver in 2001, and the quantity recovered was less than 1% of total domestic production of 1,740 t.

Greens Creek Mine.—The Greens Creek Mine, near Juneau, AK, is a joint-venture arrangement with Hecla Mining Company, Kennecott Greens Creek Mining Company (manager of the mine), and Kennecott Juneau Mining Company. Kennecott Greens Creek and Kennecott Juneau are wholly owned subsidiaries of Kennecott Minerals Company.

The Greens Creek ore body (a polymetallic deposit containing gold, lead, silver, and zinc) lies within the Admiralty Island National Monument. The Greens Creek property includes 17 patented lode claims and one patented millsite claim in addition to property leases from the U.S. Forest Service. The Greens Creek silver/gold/zinc mine produced about 342,000 kg of silver in 2001 at an average total cash cost of \$2.41 per ounce. Greens Creek also produced about 2,700 kg of gold. The underground mine reportedly has more than 10 years of proven and probable reserves. Greens Creek was expected to produce 93,300 kg of silver at an average cash cost of about \$2.65 per ounce in 2002 (Hecla Mining Company, 2002, p. 1).

Lucky Friday Mine.—Hecla Mining Company, Coeur d'Alene, ID, announced on July 18, 2001, that operations at its Lucky Friday silver mine would be reduced effective October 2001. According to Hecla, the reduced mining level will allow the mine to remain ready to increase production within a few months of a decision to do so. A complete shutdown and placing the mine on care and maintenance would have greatly lengthened the amount of time necessary to put the mine back into full production (Hecla Mining Company, 2002, p. 2).

All currently developed working faces on the Lucky Friday main vein and in expansion areas (known as the Gold Hunter vein) will continue to be mined. There will, however, be no primary development into new areas, and secondary development will be limited to two working faces in the expansion area. Ore production averaged 22,000 metric tons per month (t/mo) through September 2001, dropping to 14,500 t/mo in October and November as developed ore was depleted. In December, ore production decreased to about 6,300 t/mo, resulting in the production of about 3,100 kilograms per month of silver. Depending on price, Hecla anticipated that production could remain at this level for about 2 years. Continued operation at Lucky Friday is dependent upon the ability of Hecla to reduce operating costs at the mine and the price of

silver (Hecla Mining Company, 2002, p. 2).

Sunshine Mine.—On February 16, 2001, Sunshine Mining and Refining Company closed its troubled Sunshine silver mine in Idaho and placed the mine on care and maintenance. The action was the result of Sunshine's failure to secure a smelter for its concentrate after the smelter that normally processed the company's material announced it was closing (Sunshine Mining and Refining Company, 2001).

McCoy/Cove Gold-Silver Mine.—The McCoy Mine and surrounding property is in Lander County, NV, about 48 kilometers (km) southwest of the town of Battle Mountain. The Cove deposit, 1.6 km northeast of the McCoy deposit, was discovered in 1987. Open pit mining of the Cove deposit began in early 1998 and was completed in July 2001. Mining in the McCoy open pit was completed in April 2000.

The McCoy/Cove property consists of approximately 946 unpatented and 9 patented claims covering approximately 7,680 hectares of U.S. Federal land administered by the U.S. Department of the Interior's Bureau of Land Management.

On February 13, 2002, Echo Bay Mines Ltd. entered into an agreement with Newmont Mining Corporation providing for sale of the McCoy/Cove Mine and its facilities in exchange for \$6 million and the assumption of all reclamation obligations at McCoy/Cove. The agreement was subject to the completion of due diligence by Newmont by July 31, 2002. In 2001, McCoy/Cove produced about 200,000 kg of silver and 2,900 kg of gold (U.S. Securities and Exchange Commission, 2002b).

Galena Mine.—The Galena Mine is immediately west of Wallace, ID, in Shoshone County. The property consists of 52 patented mining claims and 25 unpatented mining claims totaling approximately 440 hectares. Silver production at the Galena Mine in 2001 was 140,000 kg, an increase of 13% compared with 124,000 kg in 2000. The increase in production was attributed to accelerated underground development that provided improved access to higher grade vein systems. The total cash cost for 2001 increased slightly to \$4.62 per ounce compared with \$4.59 per ounce in 2000. The cash cost would have been lower in the first quarter 2002 except for difficult ground conditions that restricted full access to some of the high-grade veins and set production back from areas designed for mechanized mining and bulk stoping. Measures initiated to alleviate these problems led to operating improvements in January 2002 when cash costs declined to \$4.05 per ounce (U.S. Securities and Exchange Commission, 2002a).

Consumption

Silver has become mostly an industrial metal with demand made up almost exclusively of electrical, electronic, and photography applications. Domestic industrial consumption was down by about 480 t in 2001 to 2,450 t. Total U.S. consumption of silver, including scrap, was estimated to have been about 5,300 t, down 749 t from 2000. Photography, the largest end-use category, accounted for about 2,000 t. The second largest end-use category—batteries, electrical, and electronic products—consumed about 1,060 t. The remainder was consumed in dental and medical, jewelry, and silverplate and sterlingware. Global demand for silver was estimated to have been 27,000 t in 2001, a decrease of more than 1,400 t from demand in 2000 (Silver Institute, 2002, p. 75-76).

Prices

For the third consecutive year, the difference between the high and low price for silver was less than \$1.00. Silver prices showed some strength in the first few weeks of January, reaching the high of \$4.87 per ounce. After the January high, prices drifted lower to a low of \$4.16 per ounce. This small movement in price occurred at a time when global fabrication demand decreased by 5% to 27,000 t. Most of the decrease occurred in industrial demand, falling by more than 10% to 10,500 t. Global photographic demand was only slightly lower than in 2001, while demand for silver in jewelry actually increased. Trading in silver remained quiet until the destruction of the World Trade Center on September 11, which forced markets to close for 6 days. When the market reopened on September 17, the price of silver rose immediately to \$4.32 per ounce and increased to \$4.65 in the first weeks of October. The sharp increase was driven by concerns about the more than 900 t of silver buried in vaults under the rubble of the World Trade Center. Prices began to drift downward again in late October, reaching a low of \$4.07 per ounce in November. Prices rebounded in December, reaching \$4.65 per ounce, as investors who traditionally have turned to gold and silver in times of economic uncertainty returned to the market. This left the average for the year, \$4.39, down a significant 12% from an average \$5.00 in 2000. Another constraining factor on silver prices in 2001 was the surge in silver flowing out of China into the global market. Even though the actual volume of silver coming out of China was somewhat limited, China's potential to supply the metal at higher prices continued to cap the market.

Trade

In 2001, the United States imported 3,130 t of silver in ash and residues, ores and concentrates, doré, and refined bullion. The value of these imports was \$460 million. Canada (45%), Mexico (42%), Chile (5%), and Peru (5%) were the leading foreign sources of imports. The United States exported 963 t of silver in ore and concentrates, refined silver bullion, and doré. The value of these exports was \$163 million.

World Review

Despite sharply lower byproduct silver output from gold mines, global silver mine production increased modestly in 2001 to 18,700 t from 18,300 t in 2000 (table 6). Increases were the result of significant growth in several base-metal mines in Chile, Mexico, and Peru.

Australia.—Australia is the world's third leading mine producer of silver after Mexico and Peru. The country is primarily a zinc producer with silver being produced as a byproduct. According to Mining Journal, silver production in Australia was 1,970 t, down 4% when compared with 2000. In 2001, production at the Cannington Mine, the world's leading primary silver mine, was down 8% from 2000. Operated by BHP Billiton, Cannington is an underground mine in northwest Queensland, 300 km southwest of Mount Isa. In 2001, Cannington mined 1.8 Mt of ore to produce 982 t of silver. Some of the losses at Cannington were offset by increased production at Pasmenco's Century zinc mine, which produced

74 t of silver in its first full year of operation. Australia's major mines are situated in New South Wales (Broken Hill, Elura), Northern Territory (McArthur River), Queensland (Cannington, George Fisher, Mount Isa, Century), and Western Australia (Pillara, Golden Grove). Australia's major producers include BHP Billiton, MIM, Pasmenco, and Western Metals (Mining Journal, 2002; Silver Institute, 2002, p. 24; Mbendi Information Services (Pty) Ltd., 2002§).

China.—An expansion project at the precious metals smelter of Yuguang Gold & Lead Co. Ltd. made the company the largest silver producer in China with a capacity of 300 metric tons per year (t/yr). Yuguang began construction of the expansion project in March 2001. The expansion included two refineries and a furnace with the capacity to process 10 t of anode sludge. After a 3-month trial operation, the plant began full commercial production in September 2001. In the first 6 months of 2001, the company increased silver output by 14% to 75 t. The company acquired the right to export silver and was allotted a quota of 125 t by the Ministry of Foreign Trade and Economic Cooperation.

During most of 2001, China domestic silver prices suffered from over supply and weak demand. China silver prices at Huatong Nonferrous Metals Spot Wholesale Market in Shanghai came under further pressure by a continued weakness in the world market and a buildup of large unsold inventories. According to statistics from the China Nonferrous Metals Industry Association, China produced 700 t of silver during the first 5 months of 2001 and about 1,700 t for the entire year. In light of the oversupply caused by increased output, silver producers began to complain, especially about export restrictions. The Chinese Government reacted to local industry complaints about high domestic industry inventories and low domestic consumption by more than doubling the country's export quota. The original export quota for 2001 was 420 t, up from 280 t in 2000. The new 2001 quota was revised upwards to 920 t (Antaika, 2001).

Central America and South America.—Central America and South America produced in excess of 6,400 t of silver in 2001, equivalent to about 34% of world output. Mexico and Peru were the area's leading producers, with outputs of 2,760 t and 2,353 t, respectively. The other significant Latin American producers were Chile (1,240 t) and Bolivia (408 t). A feature of the region's silver output has been the substantial decline in production from primary silver mines and a significant increase in silver produced as a byproduct of base-metal production. For example, lead-zinc mines contributed more than 50% of Peru's silver output.

Bolivia.—Most of Bolivia's mines are large open pit operations using heap-leach recovery technology. In 2001, the most significant development in the country was the opening of Inti Raymi gold-silver mine at Kori Kollo, north of Oruro, by Battle Mountain Gold. Inti Raymi was the first mine in Bolivia to use modern open pit mining and processing techniques.

The success of the Kori Kollo project paved the way for Denver-based Apex Silver Mine's San Cristobal silver-zinc project in southwest Bolivia. The project is based on ore reserves of 240 million metric tons (Mt) averaging 68.6 grams per ton silver and 1.7% zinc, with an estimated mine life of 17 years. The initial production rate of the project was expected to be 40,000 metric tons per day (t/d) rising to 60,000 t/d under a

two-phase development plan. During the first 5 years at the 40,000 t/d processing rate, San Cristobal's output is projected to average 840 t/yr of contained silver and 260,000 t/yr of zinc.

Mexico.—Mexico ranked as the world's leading silver producer in 2001 with a production of 2,760 t. Mexico derives about one-half its production from primary silver mines and the balance as a byproduct of copper, lead, and zinc production. Mexico's leading silver producer, Industrias Peñoles, SA. de C.V., contributed 1,610 t of mined silver in 2001, more than 50% of the country's total output; refined silver output was a record 2,320 t.

Peñoles' Fresnillo Mine, reportedly the world's richest silver mine, has been in near continuous operation since 1550. The mine accounted for 56% of Peñoles' total silver production with a record 893 t. In 2001, the first full year of production with its newly expanded capacity, Fresnillo milled a total of 1.4 Mt of ore (Industrias Peñoles, SA. de C.V., 2002§).

The new San Sebastian silver/gold mine, in central Mexico, began production during 2001. The mine, owned by Hecla, is reportedly a low-cost silver operation that produced more than 31 t of silver in 2001 with an average total cash cost of \$1.81 per ounce of silver. San Sebastian is expected to double its output of silver in 2002, at an average total cash cost of less than \$2.50 per ounce (Hecla Mining Company, 2002).

Peru.—With production of 2,353 t in 2001, Peru was the world's second leading silver producer. Volcan Cia. Minera, Centromin, Cia. Minas Beunaventura, and Cia. Minera Atacocha are Peru's leading silver producers. Silver production in Peru was up by 9% from 2,145 t produced in 2000. A major part of the increase can be attributed to the new polymetallic Antamina Mine, which produced 120 t of silver in 2001. Increased output was also recorded at Volcan's operations where silver production was 26% higher at 304 t. Peru's output was increased further when Pan American Silver announced on May 15, 2001, that its Huaron Mine began mill production on April 17 and first concentrates were from the mine on April 28. Full-scale production of 50,000 t/mo was achieved by midyear resulting in an annual output of about 134 t of silver (Pan American Silver Corp., 2001; Silver Institute, 2002, p. 22).

Current Research and Technology

Silver Nanoclusters Fluoresce When Photoactivated.—Researchers at Georgia Institute of Technology, Atlanta, reported that they have successfully demonstrated binary optical storage using nanoclusters comprising two to eight silver atoms. The clusters are formed by the photoreduction of silver oxide (Ag_2O) on the surface of extremely thin [less than 20 nanometers (nm)] silver films. Illumination of the thin films with wavelengths shorter than 520 nm results in multicolored fluorescence, with nanoparticles being activated individually. After particles have been photoactivated, they fluoresce under both blue and green excitation. Continuous excitation with blue light results in "blinking" or intermittent fluorescence. When illuminated with green light, the particles emit brighter, more stable red fluorescence. According to the researchers, because each particle is individually photoactivated, the films could eventually be used for data storage, with the data being written with blue light and nondestructively read with green light. What's more, the researchers noticed individual silver particles

fluorescing in multiple colors. If the colors can be controlled, each data point could conceivably store more than one bit of data, allowing significantly higher density storage than is possible with current optical storage media (Science, 2001, p. 103-106).

Researchers at Rice University, Houston, TX, are using nanoparticles to develop novel medical procedures that have potential applications in cancer therapy, medical testing, and drug delivery. Metal nanoshells are a type of nanoparticle comprising a silica core coated with an ultrathin conductive layer of gold or silver. By systematically varying the relative core and shell thicknesses, metal nanoshells can be fabricated to absorb or scatter light at any wavelength across much of the visible and infrared range of the electromagnetic spectrum. One possible application of nanoshells is photothermally modulated drug delivery. Such a drug delivery method could be useful for implantable medicines that require periodic dispensing, such as insulin and blood pressure medicines. Also, the biosensing properties of nanoshells permit them to be used for a broad range of medical tests, such as allergy sensitivity, toxins, and viruses, including HIV (Laser Focus World, 2001; Science, 2001, p. 103-106).

Ultrathin Electronic Circuitry Made With Silver.—Pure silver circuits less than one-half the width of a human hair with excellent resolution and sharpness can now be produced in a system for high-speed mass production. Based upon a new material system, researchers have succeeded in a production system in which printing successive layers of complex electronic circuitry (with an insulating layer in between) can be assembled on a continuous unfired ceramic insulating tape. The silver electronic circuits are screen-printable or photo-imageable. After all the layers of silver circuits have been printed, only one firing is required to bring the circuits into complete working components. Pure silver, which offers the highest conductivity available, permits reduction in circuit size to provide electrons with the shortest possible routes and travel time. Ultrasmall circuits are demanded for the fast response times required for automobile safety devices such as collision avoidance systems. This technology will also be vital to the next generation of hand-held wireless devices, which will require more complex circuitry in increasingly smaller spaces (Silver News, 2001).

Outlook

The recent closure of several uneconomic zinc mines owing to low zinc prices indicates a trend that may become significant to world silver output. Although some of the mines have been closed permanently, others have been placed on standby until zinc prices improve. A considerable amount of silver is a byproduct of zinc mining. Together, the recently closed zinc mines represent a loss of approximately 80 t/yr of silver. In addition, mine production cuts in copper, mainly by Phelps Dodge Corp. and ASARCO Inc., will eliminate another 60 t/yr of silver output. These zinc and copper cuts are small when compared with global silver production of more than 18,000 t in 2001. However, more cuts, which are highly probable, could significantly reduce mined silver output in 2002.

Demand for silver is projected to increase in 2002. As

industrial demand grows, restocking occurs and investment demand for silver improves. This had already been seen in the first half of 2002, when the price of silver increased 20% above its low of \$4.07 per ounce in November 2001. Silver supply is projected to be lower in 2002, with mine supply decreasing as a result of mine closings, no new silver mines coming onstream, and lower byproduct silver production owing to reduced base-metal production. As a result, the silver deficit will likely increase substantially in 2002; above ground stock of silver will decline further, tending to drive silver prices higher. Pronounced weakness in the U.S. dollar would enhance this trend; conversely, a large increase in Chinese sales would place downward pressure on silver prices.

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GENERAL SOURCES OF INFORMATION

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Other

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TABLE 1
SALIENT SILVER STATISTICS 1/

		1997	1998	1999	2000	2001
United States:						
Mine production	metric tons	2,180	2,060	1,950	1,980 r/	1,740
Value	thousands	\$329,000	\$368,000	\$329,000	\$318,000 r/	\$245,000
Refinery production:						
Domestic and foreign ores and concentrates	metric tons	2,200	2,300	2,000	2,780	2,640
Scrap (old and new)	do.	1,360	1,700	1,500	1,680	1,060
Exports, refined	do.	2,980	2,250	481	279	707
Imports for consumption, refined	do.	2,120	2,800	2,660	3,810	2,940
Stocks, December 31:						
Industry	do.	395	400	NA	462	NA
Futures exchanges	do.	3,430	2,360	2,490	2,920	3,250
Department of the Treasury	do.	484	582	617	220	220
National Defense Stockpile	do.	1,220	1,030	778	458	21
Price, average per troy ounce 2/		\$4.89	\$5.54	\$5.25	\$5.00	\$4.39
Employment, mine and mill workers 3/		1,550	1,550	1,500	1,200	1,100
World, mine production	metric tons	16,500	17,200	17,700 r/	18,300	18,700 e/

e/ Estimated. r/ Revised. NA Not available.

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

2/ Price data are the annual Handy & Harman quotations published in Platts Metals Week.

3/ Employment data are from the Mine Safety and Health Administration.

TABLE 2
MINE PRODUCTION OF SILVER IN THE UNITED STATES, BY STATE 1/

(Kilograms)

State	1999	2000	2001
Arizona	183,000	W	W
California	7,670	8,390 r/	7,590
Colorado	W	W	2,830
Idaho	416,000	W	W
Nevada	597,000	734,000 r/	544,000
South Dakota	W	W	W
Washington	W	1,560	--
Other 2/	748,000	1,240,000 r/	1,180,000
Total	1,950,000	1,980,000 r/	1,740,000

r/ Revised. W Withheld to avoid disclosing company proprietary data, included with "Other." -- Zero.

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

2/ Includes Alaska, Missouri, Montana, New Mexico, Utah, and States indicated by symbol W.

TABLE 3
LEADING SILVER-PRODUCING MINES IN THE UNITED STATES IN 2001, IN ORDER OF OUTPUT 1/

Rank	Mine	County and State	Operator	Source of silver
1	Greens Creek	Juneau, AK	Kennecott Greens Creek Mining Company	Zinc ore.
2	McCoy/Cove	Lander, NV	Echo Bay Mines Limited	Gold ore.
3	Rochester	Pershing, NV	Coeur Rochester, Inc.	Do.
4	Red Dog	Northwest Arctic, AK	Teck Cominco Alaska Inc.	Lead-zinc ore.
5	Galena	Shoshone, ID	Silver Valley Resources Corp.	Silver ore.
6	Bingham Canyon	Salt Lake, UT	Kennecott Utah Copper Corp.	Copper-molybdenum ore.
7	Lucky Friday	Shoshone, ID	Hecla Mining Company	Silver ore.
8	Ken Snyder	Elko, NV	Euro-Nevada	Gold ore.
9	Brushy Creek	Reynolds, MO	Doe Run Resources Corp.	Lead ore.
10	Mission Complex 2/	Pima, AZ	ASARCO Incorporated	Copper ore.
11	Buick	Iron, MO	Doe Run Resources Corp.	Lead ore.
12	Montana Tunnels	Jefferson, MT	Apollo Gold Co.	Zinc ore.
13	Denton-Rawhide	Mineral, NV	Kennecott Minerals Company	Gold ore.
14	Fletcher	Reynolds, MO	Doe Run Resources Corp.	Lead ore.
15	Bagdad	Yavapai, AZ	Phelps Dodge Corp.	Copper-molybdenum ore.
16	Round Mountain	Nye, NV	Round Mountain Gold Corp.	Gold ore.
17	Sweetwater	Reynolds, MO	Doe Run Resources Corp.	Lead ore.
18	Sierrita	Pima, AZ	Phelps Dodge Corp.	Copper-molybdenum ore.
19	Viburnum #29	Washington, MO	Doe Run Resources Corp.	Lead ore.
20	Betze-Post/Goldstrike	Eureka, NV	Barrick Gold Corp.	Gold ore.
21	Carlin Mines Complex	Elko, Eureka, NV	Newmont Gold Company	Do.
22	Ray	Pinal, AZ	ASARCO Incorporated	Copper ore.
23	Lone Tree	Humboldt, NV	Newmont Gold Corp.	Gold ore.
24	Meikle	Elko, NV	Barrick Gold Corporation	Do.
25	Morenci	Greenlee, AZ	Phelps Dodge Corp.	Copper-molybdenum ore.
26	McLaughlin	Napa, CA	Homestake Mining Company	Gold ore.
27	Twin Creeks	Humboldt, NV	Newmont Gold Company	Do.
28	Wharf	Lawrence, SD	Wharf Resources, Ltd.	Do.
29	Cresson	Teller, CO	Cripple Creek & Victor Gold Mining Co.	Do.
30	Homestake	Lawrence, SD	Homestake Mining Company	Do.
31	Chino	Grant, NM	Phelps Dodge Corp.	Copper-molybdenum ore.
(3/)	Florida Canyon	Pershing, NV	Florida Canyon Mining, Inc.	Gold ore.

1/ The mines on this list accounted for 99% of U.S. mine production in 2001.

2/ Includes Eisenhower, Mission, Pima, and San Xavier Mines.

3/ Production data at Florida Canyon are withheld; the mine is among the top 32 silver-producing mines in the United States but is not shown in rank order to avoid disclosing company propriety data.

TABLE 4
U.S. EXPORTS OF SILVER, BY COUNTRY 1/

Year and country	Silver ores and concentrates		Bullion		Doré		Total	
	Silver content (kilograms)	Value (thousands)	Silver content (kilograms)	Value (thousands)	Silver content (kilograms)	Value (thousands)	Silver content (kilograms)	Value (thousands)
2000	65,100	\$9,110	279,000	\$46,100	36,000	\$6,440	380,000	\$61,700
2001:								
Argentina	--	--	--	--	--	--	--	--
Armenia	--	--	437	83	--	--	437	83
Australia	--	--	--	--	--	--	--	--
Austria	--	--	--	--	--	--	--	--
Belgium	5	3	--	--	--	--	5	3
Bolivia	--	--	--	--	--	--	--	--
Brazil	--	--	--	--	--	--	--	--
Canada	26,600	3,850	23,200	3,500	--	--	49,700	7,350
China	--	--	--	--	16	3	16	3
Colombia	485	81	--	--	--	--	485	81
Costa Rica	--	--	--	--	--	--	--	--
Côte d'Ivoire	--	--	--	--	--	--	--	--
Dominican Republic	--	--	--	--	--	--	--	--
Ecuador	--	--	--	--	--	--	--	--
Egypt	--	--	--	--	--	--	--	--
Finland	--	--	--	--	--	--	--	--
France	--	--	--	--	--	--	--	--
Germany	--	--	--	--	--	--	--	--
Guatemala	--	--	--	--	--	--	--	--
Hong Kong	280	50	51	11	19	3	350	64
India	--	--	19,100	2,680	--	--	19,100	2,680
Ireland	--	--	--	--	--	--	--	--
Israel	--	--	--	--	--	--	--	--
Italy	9	3	--	--	--	--	9	3
Jamaica	--	--	--	--	--	--	--	--
Japan	--	--	37,400	5,910	88	12	37,400	5,920
Korea, Republic of	--	--	--	--	--	--	--	--
Kuwait	--	--	--	--	--	--	--	--
Lebanon	--	--	--	--	--	--	--	--
Luxembourg	--	--	--	--	--	--	--	--
Mexico	208,000	59,700	7,760	1,190	1,600	224	218,000	61,100
Netherlands	--	--	--	--	--	--	--	--
Netherlands Antilles	--	--	--	--	29	4	29	4
New Zealand	--	--	--	--	--	--	--	--
Panama	--	--	--	--	--	--	--	--
Peru	--	--	--	--	--	--	--	--
Philippines	--	--	101	18	--	--	101	18
Saudi Arabia	--	--	--	--	--	--	--	--
Singapore	63	12	--	--	--	--	63	12
South Africa	--	--	--	--	--	--	--	--
Spain	--	--	--	--	--	--	--	--
Sweden	--	--	--	--	--	--	--	--
Switzerland	--	--	502	67	10,500	1,500	11,000	1,560
Taiwan	--	--	--	--	153	27	153	27
Thailand	--	--	--	--	--	--	--	--
Trinidad and Tobago	157	28	--	--	--	--	157	28
United Arab Emirates	--	--	--	--	--	--	--	--
United Kingdom	2,710	489	615,000	82,200	5,790	871	623,000	83,600
Uruguay	--	--	3,270	574	--	--	3,270	574
Venezuela	--	--	--	--	--	--	--	--
Other	--	--	--	--	--	--	--	--
Total	239,000	64,200	707,000	96,300	18,200	2,640	963,000	163,000

See footnotes at end of table.

TABLE 4--Continued
U.S. EXPORTS OF SILVER, BY COUNTRY 1/

Year and country	Other unwrought silver		Metal powder		Silver nitrate		Semimanufactured forms 2/		Waste and scrap	
	Gross weight (kilograms)	Value (thousands)	Gross weight (kilograms)	Value (thousands)	Gross weight (kilograms)	Value (thousands)	Gross weight (kilograms)	Value (thousands)	Gross weight (kilograms)	Value (thousands)
2000	57,500	\$11,500	444,000 r/	\$89,700	217,000	\$29,400	150,000 r/	\$35,200	1,670,000	\$377,000
2001:										
Argentina	--	--	--	--	--	--	228	40	--	--
Armenia	31	5	--	--	--	--	--	--	5,280	686
Australia	--	--	--	--	360	34	--	--	231	30
Austria	--	--	505	104	--	--	24	8	--	--
Belgium	--	--	334	57	327	62	1,200	221	172,000	46,800
Bolivia	12	3	--	--	--	--	119	26	--	--
Brazil	--	--	--	--	--	--	3,150	583	21,500	2,710
Canada	20,800	4,810	17,300	2,730	136,000	16,600	59,400	8,000	673,000	141,000
China	--	--	7,310	1,630	1,000	126	1,050	213	167,000	22,700
Colombia	33	13	2,710	467	--	--	963	171	--	--
Costa Rica	--	--	18	3	--	--	--	--	1,400	193
Côte d'Ivoire	--	--	111	32	--	--	--	--	--	--
Dominican Republic	3,590	789	--	--	--	--	25	9	--	--
Ecuador	--	--	--	--	--	--	24	4	--	--
Egypt	--	--	--	--	22	4	788	219	--	--
Finland	--	--	3,730	747	--	--	--	--	--	--
France	214	60	9,740	1,490	--	--	5,990	1,420	--	--
Germany	3,860	656	34,100	5,630	28	3	5,140	1,390	183,000	28,600
Guatemala	37	43	--	--	--	--	--	--	--	--
Hong Kong	472	149	1,390	239	15	3	2,810	545	468	157
India	--	--	137	32	--	--	24	6	481	63
Ireland	16	4	1,550	192	--	--	471	165	4	6
Israel	30	9	39	7	349	66	368	95	5	5
Italy	74	32	308	60	--	--	2,560	456	188,000	27,300
Jamaica	35	8	--	--	20	6	(3/)	3	--	--
Japan	289	70	13,100	4,130	--	--	41,800	7,970	41,600	10,300
Korea, Republic of	5,550	1,110	28,400	5,660	--	--	2,720	568	2,060	9,180
Kuwait	--	--	--	--	72	5	--	--	--	--
Lebanon	--	--	732	124	--	--	--	--	--	--
Luxembourg	77	19	--	--	--	--	--	--	--	--
Mexico	3,140	685	29,700	5,000	4,270	744	35,800	8,810	255	45
Netherlands	120	46	711	106	--	--	4,990	936	926	173
Netherlands Antilles	192	42	--	--	--	--	--	--	4	8
New Zealand	54	12	23	3	--	--	336	94	--	--
Panama	45	10	--	--	--	--	360	61	--	--
Peru	--	--	--	--	--	--	210	56	--	--
Philippines	--	--	--	--	--	--	46	10	--	--
Saudi Arabia	23	5	--	--	23	3	(3/)	8	81,200	14,900
Singapore	12	8	1,930	370	--	--	2,380	529	1,300	169
South Africa	--	--	13	3	--	--	25	5	4,610	610
Spain	53	12	--	--	--	--	14,100	2,960	--	--
Sweden	--	--	5,190	466	--	--	33	22	2,490	337
Switzerland	54	37	285	99	40	6	7,970	3,670	3,120	1,970
Taiwan	15,000	2,370	24,100	6,970	762	149	3,530	808	23	9
Thailand	45	23	--	--	--	--	72	16	--	--
Trinidad and Tobago	--	--	--	--	--	--	344	66	--	--
United Arab Emirates	--	--	--	--	--	--	106	23	--	--
United Kingdom	4,080	890	8,140	1,640	164	27	3,180	2,630	264,000	118,000
Uruguay	--	--	--	--	--	--	1,610	275	--	--
Venezuela	--	--	--	--	93	8	--	--	22	3
Other	18	4	--	--	--	--	204	47	683	91
Total	57,900	11,900	192,000	38,000	143,000	17,900	204,000	43,100	1,810,000	426,000

r/ Revised. -- Zero.

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

2/ Containing 99.5% or more by weight of silver.

3/ Less than 1/2 unit.

Source: U.S. Census Bureau.

TABLE 5
U.S. IMPORTS FOR CONSUMPTION OF SILVER, BY COUNTRY 1/

Year and country	Silver ores and concentrates		Base metal ores and concentrates		Ash and residues		Bullion		Doré		Total	
	Silver content (kilograms)	Value (thousands)	Silver content (kilograms)	Value (thousand dollars)	Silver content (kilograms)	Value (thousands)	Silver content (kilograms)	Value (thousands)	Silver content (kilograms)	Value (thousands)	Silver content (kilograms)	Value (thousands)
2000	1,420	\$229	--	--	55,800	\$7,340	3,810,000	\$629,000	74,100 r/	\$17,600	3,940,000	\$654,000
2001:												
Australia	--	--	--	--	2,480	428	269	40	87	13	2,830	481
Belgium	--	--	--	--	--	--	847	116	--	--	847	116
Brazil	--	--	--	--	--	--	--	--	--	--	--	--
Canada	7,550	2,750	--	--	13,700	2,170	1,370,000	203,000	2,460	1,730	1,400,000	210,000
Chile	--	--	--	--	--	--	63,900	8,810	104,000	15,300	168,000	24,100
China	--	--	--	--	--	--	18,300	2,540	--	--	18,300	2,540
Colombia	--	--	--	--	--	--	2,270	293	2,200	293	4,470	586
Costa Rica	--	--	--	--	--	--	--	--	--	--	--	--
Dominican Republic	--	--	--	--	--	--	--	--	--	--	--	--
Finland	--	--	--	--	--	--	--	--	--	--	--	--
France	--	--	--	--	--	--	--	--	29	--	29	6
Germany	--	--	--	--	--	--	84	12	--	--	84	12
India	--	--	--	--	--	--	--	--	--	--	--	--
Ireland	--	--	--	--	--	--	--	--	--	--	--	--
Italy	--	--	--	--	--	--	--	--	--	--	--	--
Japan	--	--	--	--	--	220	--	--	--	--	2	220
Jordan	--	--	--	--	--	--	--	--	--	--	--	--
Korea, Republic of	--	--	--	--	--	--	--	--	--	--	--	--
Kuwait	--	--	--	--	--	--	--	--	--	--	--	--
Malaysia	--	--	--	--	--	--	--	--	--	--	--	--
Mexico	--	--	--	--	8,810	1,510	1,280,000	181,000	34,700	6,780	1,330,000	189,000
Morocco	--	--	--	--	--	--	--	--	--	--	--	--
Netherlands	--	--	--	--	--	--	--	--	--	--	--	--
New Zealand	--	--	--	--	--	--	--	--	--	--	--	--
Peru	--	--	--	--	--	--	171,000	25,400	--	--	171,000	25,400
Philippines	--	--	--	--	--	--	--	--	--	--	--	--
Poland	--	--	--	--	--	--	7,390	1,050	--	--	7,390	1,050
Portugal	--	--	--	--	--	--	--	--	--	--	--	--
Russia	--	--	--	--	--	--	20,000	2,660	--	--	20,000	2,660
Singapore	--	--	--	--	--	--	--	--	--	--	--	--
South Africa	--	--	--	--	--	--	4	4	--	--	4	4
Spain	--	--	--	--	--	--	--	--	--	--	--	--
Switzerland	--	--	--	--	--	--	--	--	--	--	--	--
Taiwan	--	--	--	--	--	--	--	--	--	--	--	--
United Kingdom	--	--	--	--	13,000	2,060	140	10	7,270	1,610	20,400	3,680
Zimbabwe	--	--	--	--	--	--	--	--	--	--	--	--
Other	--	--	--	--	--	--	474	58	332	56	806	114
Total	7,550	2,750	--	--	38,000	6,390	2,940,000	425,000	151,000	25,800	3,130,000	460,000

See footnotes at end of table.

TABLE 5--Continued
U.S. IMPORTS FOR CONSUMPTION OF SILVER, BY COUNTRY 1/

Year and country	Other unwrought silver (gross weight)		Metal powder (gross weight)		Silver nitrate (gross weight)		Semimanufactured forms 2/ (gross weight)		Waste and scrap (gross weight)	
	Gross weight (kilograms)	Value (thousands)	Gross weight (kilograms)	Value (thousands)	Gross weight (kilograms)	Value (thousands)	Gross weight (kilograms)	Value (thousands)	Gross weight (kilograms)	Value (thousands)
2000	204,000	\$37,200	235,000	\$46,500	24,200	\$1,770	140,000	\$25,800	1,130,000	\$134,000
2001:										
Australia	--	--	--	--	--	--	--	--	2,070	586
Belgium	--	--	--	--	25,300	1,390	115	31	271	139
Brazil	--	--	--	--	--	--	92,100	12,100	676	1,230
Canada	112,000	24,900	563	79	40	5	16,700	2,720	534,000	49,000
Chile	597	754	--	--	--	--	2,860	508	3	55
China	--	--	--	--	--	--	--	--	811	134
Colombia	318	52	--	--	--	--	--	--	--	--
Costa Rica	--	--	--	--	--	--	--	--	15,700	626
Dominican Republic	--	--	--	--	--	--	--	--	4,270	3,660
Finland	--	--	36	6	--	--	414	101	61	1,500
France	11	12	3,000	284	--	--	901	253	26,700	548
Germany	--	--	885	184	254	29	20,700	2,800	170,000	22,900
India	3	5	--	--	--	--	779	163	--	--
Ireland	--	--	--	--	--	--	--	--	913	91
Italy	209	65	44	10	--	--	2,190	272	3	52
Japan	32	16	18,600	5,400	307	56	2,310	844	188	5,330
Jordan	--	--	--	--	--	--	--	--	50	867
Korea, Republic of	--	--	459	93	--	--	9,870	904	18,800	2,920
Kuwait	--	--	--	--	--	--	--	--	162,000	8,040
Malaysia	--	--	--	--	--	--	--	--	17,300	2,390
Mexico	136,000	18,900	--	--	--	--	1,730	123	36,100	27,200
Morocco	--	--	--	--	--	--	--	--	12,300	55
Netherlands	(3/)	5	(3/)	14	--	--	122	79	5,530	777
New Zealand	--	--	--	--	--	--	--	--	153	719
Peru	--	--	--	--	--	--	--	--	--	--
Philippines	--	--	--	--	--	--	--	--	29,100	14,000
Poland	7	7	--	--	--	--	344	40	31	5
Portugal	--	--	--	--	--	--	--	--	5,700	35
Russia	107	14	20	3	--	--	--	--	--	--
Singapore	--	--	--	--	--	--	--	--	6,530	1,110
South Africa	--	--	--	--	--	--	--	--	9	353
Spain	--	--	--	--	--	--	--	--	260	845
Switzerland	--	--	10	3	--	--	61	17	882	725
Taiwan	--	--	--	--	--	--	47	5	147	695
United Kingdom	104	45	163	31	40	13	2,680	539	55,300	10,200
Zimbabwe	--	--	--	--	--	--	--	--	3,220	602
Other	18	10	--	--	--	--	138	50	1,180	1,840
Total	249,000	44,700	23,800	6,100	26,000	1,490	154,000	21,600	1,110,000	159,000

r/ Revised. -- Zero.

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

2/ Containing 99.5% or more by weight of silver.

3/ Less than 1/2 unit.

Source: U.S. Census Bureau.

TABLE 6
SILVER: WORLD MINE PRODUCTION, BY COUNTRY 1/ 2/

(Metric tons)

Country	1997	1998	1999	2000	2001 e/
Algeria e/	2	2	1	1	1
Argentina	53	36	74	78	153 3/
Australia	1,106	1,474	1,720	2,060	2,100
Bolivia	387	404	422	434	408 3/
Brazil 4/	27	34	42	41 e/	41
Bulgaria	32	24	25 e/	25 e/	25
Burma	2	3	4	2 r/	2 3/
Canada	1,224	1,196	1,246 r/	1,212 r/	1,271 p/ 3/
Chile	1,091	1,340	1,380 e/	1,242	1,240
China e/	1,300	1,300	1,320	1,600	1,800
Colombia 5/	4	5	8 r/	8	7 3/
Congo (Kinshasa) e/	1	1	1	1	1
Costa Rica e/	(6/)	(6/) 3/	(6/)	(6/)	(6/)
Dominican Republic	12	7	3	-- r/	--
Ecuador e/	2 3/	2	2	2	2
El Salvador	(6/)	(6/)	(6/)	-- r/	--
Fiji	3	2	2	1	2
Finland e/	32	30	32	24	23 3/
France	2	1 r/	1	1	1
Ghana e/	3	4	4	4 r/	3
Greece	45	45 e/	46	37	36
Honduras	35 e/	43	38 r/	32 r/	35
India	50	52	54 e/	40	53 3/
Indonesia	219	349	288	256 r/	270
Iran e/	30 r/	19	21	22 r/	22
Ireland	13	13 e/	15 r/	25 r/	23
Italy e/ 7/	10	10	10	4	4
Japan	87	94	94	104	80 3/
Kazakhstan e/	690	726	905 r/	927	982 3/
Korea, North e/	50	50	40 r/	40 r/	40
Korea, Republic of 5/	268	339	489	591	600
Macedonia e/	19	20	22	20	15
Malaysia	10	7	4	(6/)	(6/) 3/
Mali e/	1	1	1	1	1
Mexico	2,679	2,686	2,467	2,620 r/	2,760
Mongolia e/	23	20	20	25	27
Morocco	261	307	278	289 e/	240
Namibia	41	23	10 r/	9 r/	13 3/
New Zealand	32	23	24	23 e/	23
Nicaragua	3	4	2 r/	2 r/	2
Oman	(6/) r/	(6/)	(6/) r/	(6/) r/	(6/)
Panama	2	2 e/	2	2 e/	2
Papua New Guinea	49	59	67	73 e/	73
Peru	2,090	2,025	2,231	2,145 r/	2,353 p/ 3/
Philippines	20	18	18	17 e/	17
Poland	1,038	1,108	1,100	1,100 e/	1,100
Portugal	34	32	27	21 r/	23
Romania e/	60	60	50	50	50
Russia e/	400	350	375	370	380
Saudi Arabia	17	14	10	9 e/	9
Serbia and Montenegro	43	34	8	9 r/	6 3/
Solomon Islands	(6/) e/	2	2	(6/) e/	--
South Africa	144	144	152 r/	144	110 3/
Spain	66 e/	47	96 e/	66 r/	60
Sweden	304	299	284 r/	304 r/	295 3/
Tanzania	--	--	--	--	7
Tajikistan	NA	5	5	5	5
Tunisia	(6/) r/	3	4	4	4
Turkey e/	90	110	100 r/	110	100

See footnotes at end of table.

TABLE 6--Continued
 SILVER: WORLD MINE PRODUCTION, BY COUNTRY 1/ 2/

(Metric tons)

Country	1997	1998	1999	2000	2001 e/
United States	2,180	2,060	1,950	1,980 r/	1,740 3/
Uzbekistan	85 r/ e/	85 r/ e/	89 r/	90 r/	80
Zambia 8/	7	8	5	5 e/	5
Zimbabwe	6	7	5	4	3 3/
Total	16,500	17,200	17,700 r/	18,300	18,700

e/ Estimated. p/ Preliminary. r/ Revised. NA Not available. -- 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/ Recoverable content of ores and concentrates produced unless otherwise specified. Table includes data available through August 13, 2002.

3/ Reported figure.

4/ Includes the following quantities, in kilograms, identified as secondary silver: 1997--32,000; 1998--40,000; 1999-2000--50,000; and 2001--50,000 (estimated).

5/ Smelter and/or refinery production.

6/ Less than 1/2 unit.

7/ Includes production from imported ores.

8/ Year beginning April 1 of that stated.