



2009 Minerals Yearbook

SILVER

SILVER

By William E. Brooks

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In 2009, the United States produced 1,250 metric tons (t) of silver, which was equal to 2008 domestic silver production and accounted for approximately 6% of world mine production of 21,800 t of silver. Silver was produced in 11 States in 2009, and Alaska remained the country's leading silver-producing State, followed by Nevada and Idaho. Approximately 99% of domestic silver was produced from base-metal ores at 12 mines and from precious-metal ores at 13 mines.

The price of silver averaged \$14.69 per troy ounce in 2009, a slight decrease compared with the 2008 average price of \$15.02 per troy ounce, according to Platts Metals Week. The price of silver peaked at \$19.45 per troy ounce on December 2, but was still below the high price of \$50.35 per troy ounce in 1980. A rise in the price of gold, oil, and mineral commodities in general, was also an important factor in the increased silver price.

Traditional use categories for silver included coin and medal fabrication; industrial applications, including electrical and electronics components; jewelry and silverware; and photography. In 2009, the global use of silver for jewelry and photography continued to decline; however, use for silverware increased. The use of silver in industrial and electronics applications also declined in 2009, owing to the global recession. Silver is widely used in electronic applications, including flat-screen televisions and radio-frequency identification devices (RFIDs), which are used in barcodes, some high-denomination casino chips, passports, and speedpasses. Minting of bullion coins increased in 2009 owing to the surge in investment-related purchases of them, especially in the United States and Europe. The U.S. Mint led the way with a 35% increase to 1,050 t in 2009 from 780 t in 2008, and the global use of silver for coin and medal fabrication increased by 21% in 2009 (Silver Institute, The, 2010, p. 23).

U.S. imports for consumption of refined silver in 2009 decreased by 23% compared with those in 2008. U.S. exports of silver bullion decreased to 167 t in 2009 compared with 413 t exported in 2008. In 2009, Mexico was the leading source of imported refined silver into the United States, followed by Canada, Peru, and Chile. Australia was the leading destination for exported silver, followed by the Republic of Korea, the United Kingdom, and Germany. In 2009, silver was mined in approximately 65 countries; global production was slightly higher than that in 2008, and Peru was the leading producer, followed by Mexico, China, and Australia. The United States was ranked eighth in global silver production in 2009.

Legislation and Government Programs

On September 30, 2009, the amount and value of Deep Storage and Working Stock custodial silver reserves in the U.S. Mint were 498,000 kilograms (kg) of silver with a total market value of \$263 million at \$16.45 per fine troy ounce and

a statutory value of \$20.7 million. As custodian, the U.S. Mint is responsible for safeguarding much of the Nation's gold and silver. In accordance with 31 U.S. Code section 5117 (b) and 31 U.S. Code section 5116 (b) (2), a statutory rate of no less than \$1.292929292 per fine troy ounce was used to value the custodial silver held by the U.S. Mint (U.S. Mint, 2010). The U.S. Mint's six facilities are in Denver, CO; Fort Knox, KY; Philadelphia, PA; San Francisco, CA; Washington, DC; and West Point, NY.

Production

Domestic mine production data were compiled from 36 operations. Of these operations, 33 responded to the U.S. Geological Survey (USGS) canvass, representing 100% of U.S. mine production listed in table 1. Domestic mine production of silver, which totaled 1,250 t in 2009, was equal to domestic mine production in 2008.

Silver was mostly produced as a byproduct from gold and base-metal ores, although silver was produced as a principal product at Coeur d'Alene Mines Corp.'s (Coeur d'Alene, ID) Rochester Mine, an open pit operation in northwestern Nevada. Coeur announced expanded mining operations that were expected to add 90 metric tons per year of silver production through 2017 (Coeur d'Alene Mines Corp., 2009a). However, silver production decreased by 26 t in 2009 at the Rochester Mine (Coeur d'Alene Mines Corp., 2010). A Federal bankruptcy judge returned ownership of the Sunshine Mine to Sterling Mining Co. (Coeur d'Alene, ID), which had vacated the lease in February (Platts Metals Week, 2009).

In 2009, Hecla Mining Co.'s (Coeur d'Alene, ID) Lucky Friday Mine increased production by 23% owing to improved grade and increased mill throughput. Hecla's combined operations contributed 27 t of growth, and the Greens Creek Mine, ranked ninth in the world in terms of silver production, produced 3% more silver than in 2008. At Teck Resources Ltd. (Vancouver, British Columbia, Canada), byproduct silver production from its lead-zinc operations rose by 10%. At Kennecott Utah Copper Corp.'s (a subsidiary of Rio Tinto plc, London, United Kingdom) Bingham Canyon Mine, silver production rose by 45 t compared with 2008 production, owing to increased mill throughput and focus on production from zones with higher copper, gold, and silver grades (Silver Institute, The, 2010, p. 25). U.S. Silver Corp. (Toronto, Ontario, Canada) conducted an aggressive exploration and development program at its properties in the Silver Valley, ID. Rehabilitation of the Galena shaft began in 2007 and was completed in 2009. This project allowed access to lower levels in the mine and enhanced access to higher grade resources in the upper levels of the mine. Full year 2009 silver production was 75 t compared with full-year 2008 production of 54 t (U.S. Silver Corp., 2010).

At its Troy Mine in northwestern Montana, Revett Minerals Inc. (Spokane Valley, WA) reported that 1.3 million metric tons (Mt) of ore was processed and 35 t of silver was produced in 2009. Silver recovery was lower than that in 2008 owing to lower ore grades and lower recovery rates. Exploration efforts increased and focused on silver occurrences beneath and adjacent to the existing mine. Proven and probable reserves at the Troy Mine were 345 t of silver and would provide a 6-year life-of-mine at the current production rate. Revett continued to advance its Rock Creek project and worked with State and Federal agencies on implementation of wildlife and environmental protection measures (Revett Minerals Inc., 2010).

Apollo Gold Corp.'s (Denver, CO) Montana Tunnels Mine, MT, west of Jefferson City, produced gold, lead, silver, and zinc. In December, Apollo announced that it entered into a replacement letter of intent with Elkhorn Goldfields LLC (Aspen, CO) in which Elkhorn agreed to purchase all outstanding capital stock in Montana Tunnels (Apollo Gold Corp., 2009). Shoshone Silver/Gold Mining Co. (Coeur d'Alene, ID) announced an agreement with Merger Mines Corp. (Coeur d'Alene, ID) to lease 35 patented claims in the Coeur d'Alene District, ID. Shoshone indicated that the exploration potential for the Merger claims is important for Shoshone's future plans (Shoshone Silver/Gold Mining Co., 2009).

Consumption

Domestic consumption of silver decreased by 12% to 5,110 t in 2009 from 5,800 t in 2008, which was comparable to an overall percentage decline in the global consumption of silver during the same period (Silver Institute, The, 2010, p. 52).

Coin and Medal Fabrication.—Approximately 1,050 t of silver was used for coins and medals in the United States in 2009, a 35% increase from the 780 t used in 2008 (Silver Institute, The, 2010, p. 82). In 2009, the leading use of silver in this application was in the fashioning of medals and commemorative pieces that are produced by the U.S. Mint at its San Francisco and West Point locations. The U.S. Mint saw total minting rise by 274 t, and in 2 years, U.S. commemorative coin production had doubled (Silver Institute, The, 2010, p. 23). The use of silver in circulating coins has been mostly phased out.

Industrial Applications.—Approximately 3,000 t of silver was used in the United States in 2009 for industrial applications, a 19% decrease from the 3,700 t used in 2008 (Silver Institute, The, 2010, p. 54). Owing to silver's electrical- and thermal-conducting properties, silver was used in conductors, contacts, fuses, timers, and switches. Other industrial applications of silver included uses in conductive adhesives; in the preparation of thick-film, silver-palladium pastes for use as silkscreen circuit paths in multilayer ceramic capacitors; in the manufacture of membrane switches; in flat-screen televisions with plasma display panels; in silver-backed solar mirrors; as a film in electrically heated automobile windows; in smart cards; and in photovoltaic cells. Silver consumption for photovoltaic cells increased to 870 t in 2009, an increase of 30% compared with 2008 consumption. There are two types of photovoltaic cells—thick- and thin-film—and thick-film applications use more silver and are more widely produced (Silver Institute, The, 2010, p. 62). The high price of fossil fuels and their environmental

impact have led to increased research and investments in solar energy technology, and market research suggests that the volume of silver for this application will reach 750 t by 2016 (Commodity Online, 2009). University researchers found that adding nanosilver to the semiconductors in solar panels can boost electric current generation by 12%. Without the silver, 6.2 milliamperes per square centimeter (mA/cm²) was produced, but with the silver, 7.0 mA/cm² was produced. The silver particles allowed the semiconductor to capture a wider range of light wavelengths, which increased the electrical output (Silver Institute, The, 2009).

A small amount of silver was used as a miniature antenna in RFIDs, and the U.S. Department of State has approved the use of passports with embedded RFIDs. These passports are readable at 6 meters, include a digital signature that helps identify if the passport's data have been altered, and the signal is blocked when the passport cover is closed (Corelis, 2008). The U.S. Passport Card, which also uses RFID technology, was introduced in 2008 and allows entry from Bermuda, Canada, the Caribbean, and Mexico. RFID technology is intended to increase efficiency and security at U.S. land and sea border crossings (U.S. Department of State, undated).

In 2009, other industrial applications for silver included its use in batteries, bearings, brazing and soldering, catalysts, disinfectants, mirrors, printed electronics, solar energy production, and water purification. Silver is also used as a coating material for compact disks and digital video disks (Silver Institute, The, 2010, p. 58). Dental amalgam, though in declining use because of its mercury content, may contain 34% to 38% silver (Lawrence, 1995). Owing to silver's antibacterial properties, silver was also used in classroom notebooks, clothing, dental amalgam, laundry machines, shoes, and toothbrushes. Silver embedded in locker room surfaces is being used to reduce staph infections, and silver-based disinfectants have been introduced as a low-cost, environmentally sensitive option for use in care centers and food processing facilities. A nanosilver-based hygiene product, a hand-washing protection kit for H1N1 virus (swine flu), was marketed (Medical News Today, 2009).

Jewelry and Silverware.—In 2009, the U.S. demand for silver for jewelry and silverware was 360 t, a 10% decrease compared with the 400 t used in 2008. World consumption of silver for jewelry and silverware increased slightly, to 6,720 t in 2009, from 6,690 t in 2008 (Silver Institute, The, 2010, p. 68).

Photography.—Silver was one of the essential materials used in the manufacture of films and photographic papers, and Eastman Kodak Co. (Rochester, NY) purchased silver from numerous suppliers. The decline in the use of silver for photography began in 2000 in response to digital camera technology and the decline in the production of color film and paper. Total net sales from Kodak's Film, Photofinishing, and Entertainment Group declined to \$2.2 billion in 2009 from \$3.0 billion in 2008 (Eastman Kodak Co., 2010, p. 29). Domestic use of silver for photographic use declined by 25% to 680 t in 2009 from 910 t in 2008, which was a 69% decline compared with 2,180 t of silver used in 2000 (Silver Institute, The, 2009, p. 64). The economic downturn resulted in fewer vacations and consequently fewer pictures, and demand for 24-exposure film fell by 29% in 2009. Kodak stopped producing its most

well-known film, Kodachrome, in June 2009, owing to declining customer demand in a digital age (Thompson, 2009).

The overall decline in silver use in the photographic industry is also reflected in the film sector itself, in which 747 million rolls of silver-bearing film were sold in 2009, compared with 1.0 billion rolls sold in 2008. Silver-bearing photographic paper consumption declined to 1,050 million square meters in 2009 from 1,160 million square meters in 2008 (Silver Institute, The, 2010, p. 64). Other broad photographic-use categories included commercial photography, dental and industrial x rays, graphic arts, and medical x rays.

Prices

In 2009, the average price of silver was \$14.69 per troy ounce, which was slightly below the 2008 average price of \$15.02 per troy ounce. On December 2, the price peaked at \$19.45 per troy ounce. Owing to the movement of physical silver to the Exchange Traded Fund (ETF) inventory agency in London, domestic exports of silver rose dramatically in 2006. In 2009, the opening of a new silver ETF, ETFS Silver Trust, and rising investment demand boosted the price of silver (Zhou, 2009). Silver inventories in iShares Silver Trust, ETF Securities, and Swiss Zürcher Kantonalbank, totaled approximately 12,370 t at yearend 2009, compared with 8,250 t at yearend 2008 (Silver Institute, The, 2010, p. 100).

Foreign Trade

U.S. imports of refined silver decreased to 3,590 t in 2009 from 4,680 t of refined silver in 2008. Exports of refined silver decreased to 356 t in 2009 from 550 t in 2008. In 2009, principal import sources of silver ores and concentrates, ash and residues, bullion, and dore were Mexico (2,050 t), Canada (747 t), and Peru (261 t) (table 6). Principal export destinations in 2009 were Australia (115 t), the Republic of Korea (56 t), and the United Kingdom (55 t) (table 4). However, U.S. exports of bullion to the United Kingdom continued to decline after a previous high of 1,180 t of bullion shipped in 2006 for the startup ETF inventories in London. Silver bullion imports into India decreased to 1,260 t in 2009 after 5,000 t, an alltime record, was imported in 2008 (Silver Institute, The, 2010, p. 46).

World Review

World mine production of silver was 21,800 t in 2009, a slight increase from the 21,300 t of silver produced in 2008 (table 8). According to the U.S. Geological Survey, in Peru, the world's leading silver-producing country, silver production increased by 4%. Silver production also increased in Mexico (10%) and in China (4%), the world's second and third ranked silver producers, respectively. Regionally, silver production increased in the Commonwealth of Independent States (CIS) by 6% to 2,100 t in 2009 from 1,990 t in 2008; in Asia by 10% to 4,000 t in 2009 from 3,630 t in 2008; and in Latin America by 8% to 7,260 t in 2009 from 6,700 t in 2008. Silver produced from primary silver mines increased by 7% to 6,650 t in 2009 from 6,200 t in 2008; silver produced as a byproduct of gold mining increased by 21%; and silver supplied from base metals was unchanged (Silver Institute, The, 2010, p. 26).

Argentina.—Pan American Silver Corp. (Vancouver) reported an overall increase of 23% in silver production, a new company record, which was owing to smooth startup at its Manantial Espejo Mine, in Santa Cruz. At Manantial Espejo, approximately 110 t of silver was produced at a cash cost of \$0.84 per ounce. Beginning in 2010, proven and probable reserves of 1,020 t of silver, improvement of silver recovery, and throughput of 2,000 metric tons per day of ore were expected to make Manantial Espejo Pan American Silver Corp.'s leading silver-producing mine (Pan American Silver Corp., 2010).

Australia.—Silver production decreased by 14% to 1,490 t in 2009 from 1,750 t in 2008. The overall decrease resulted from a first-quarter 28% decline in production at BHP Billiton's Cannington Mine, the world's second leading producer of silver as a principal product. A decline in head grade and high rainfall, which led to flooding at the mine, affected mine output in 2009 (Silver Institute, The, 2010, p. 29).

Bolivia.—Silver production increased by 31% to 1,330 t in 2009 from 1,015 t in 2008 (Silver Institute, The, 2010, p. 26).

In March, Sumitomo Corp. (Tokyo, Japan) took over full ownership of Minera San Cristobal S.A., in the Potosi District of southwestern Bolivia, from its former U.S. partner, Apex Silver Mines Ltd. (Denver, CO), which was reorganized in March under a management agreement as Golden Minerals Co. (Lakewood, CO) (Sumitomo Corp., 2010). San Cristobal reportedly has reserves of 3.2 Mt of zinc, 1.2 Mt of lead, and 12,600 t of silver (Mining Journal, 2009). Production increased by 62 t of silver after a drawn-out ramp-up period (Silver Institute, The, 2010, p. 28). Pan American Silver's mill expansion at San Vicente in the third quarter increased mine output by 57 t (Silver Institute, The, 2010, p. 28). Coeur d'Alene Mines Corp.'s San Bartolome Mine produced 210 t in 2009, its first full year of production, compared with 80 t produced in 2008 (Coeur d'Alene Mines Corp., 2010, p. 24).

China.—Silver production from China increased by 4% to 2,900 t in 2009 from 2,800 t in 2008 (table 8). However, other information indicates that production may have increased by as much as 18% to 2,770 t in 2009 from 2,350 t in 2008 (Silver Institute, The, 2010, p. 26, 28). Silver was produced mainly as a byproduct from copper or lead and zinc mining. Silvercorp Metals Inc. (Vancouver), the leading silver producer in China, has several silver-lead-zinc properties, projects, and mines in China and one property in northern British Columbia Canada. The company generated \$54 million in silver sales in 2009 (Silvercorp Metals, Inc., 2010).

Mexico.—In 2009, Mexico was the world's second-ranked producer of silver; however, 2009 silver production increased by 10% from 2008 production levels. In 2008, Fresnillo plc (London, United Kingdom) was spun off from parent company Industrias Peñoles S.A. de C.V., and became the world's leading primary silver producer and an important producer of gold, lead, and zinc from its mines and properties in Mexico. Overall company silver production increased by 5%, to 1,000 t in 2009 from 960 t in 2008, mainly from the company's namesake mine, the Fresnillo Mine in Zacatecas (Fresnillo plc, 2010). Coeur d'Alene Mines' new mine, the Palmarejo Mine, began production of gold and silver in the second quarter of 2009 and produced 85 t of silver in its first partial year of production. The

mine has the capacity to produce 220 to 250 t of silver annually (Coeur d'Alene Mines Corp., 2009b; 2010, p. 2).

Peru.—As in 2008, Peru was the world's leading silver producer in 2009. Production increased by 5% to 3,850 t in 2009 from 3,680 t in 2008. The increase was owing to increased production at Hochschild Mining plc's (Lima) Pallancanta Mine, where production increased by 50% after completion of the Selene mill expansion, to 3,000 t per day from 2,000 t per day in the second half of 2008. Pallancanta produced 260 t of silver in 2009 (Hochschild Mining plc, 2010). In 2009, 4 mines in Peru were among the top 15 silver-producing mines in the world (Silver Institute, The, 2010, p. 99). In decreasing order of production, these include Cia. Minas Buenaventura's Uchucchacua Mine, Hochschild Mining plc's Arcata Mine and Pallancanta Mine, and Pan American Silver Corp.'s Huaron Mine. However, owing to a decline in ore grade, production decreased by 8% at Buenaventura's Uchucchacua Mine, to 3,280 t in 2009 from 3,550 t in 2008 (Silver Institute, The, 2010, p. 99). Pan American Silver Corp. (Vancouver) reported that its Quirulvilca Mine produced 40 t of silver at a cash cost of \$8.64 per ounce in 2009 (Pan American Silver Corp., 2010). Previously, however, the company had considered suspending operations at Quirulvilca owing to the mine's 80-year longevity, increased reliance on zinc production, and declining base-metal prices that made reserves uneconomic (Pan American Silver Corp., 2009).

Outlook

In 2009, world silver consumption was approximately the same as that in 2008 (Silver Institute, The, 2010, p. 79). World silver use in photography continued to fall; however, silver use in photography was expected to level off as silver continues to be used in high-quality paper prints from digital sources. The photovoltaic industry has emerged as a significant industrial-use sector for silver and was expected to be a major segment of silver demand in the future. Silver is known for its antibacterial qualities and was used in bandages, catheters, and other medical applications. Because of these qualities, nanoparticle silver was also used in air cleaners, air conditioners, clothing, and washing machines and dryers. Silver oxide batteries and conductive inks were increasingly being used in the electronics field. A computer mouse, keyboards, paper, pens, and telephones that use antimicrobial silver technology are now being offered. Silver-based biocides were expected to increasingly be used and indicate a new generation of safe and environmentally friendly use of silver for the control of bacterial, viral, and fungal infections, on hard surfaces and in water systems, and as a wood preservative. The use of RFIDs for tracking stock and shipments, including silver-base high-data-capacity tags, readers, and computer systems, was expected to increase. The use of silver in these tags ranges from 6 to 10 milligrams per tag. ETF inventories continued to increase and indicated continued investor interest.

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TABLE 1
SALIENT SILVER STATISTICS¹

		2005	2006	2007	2008	2009
United States:						
Mine production:						
Quantity	metric tons	1,230	1,160	1,280	1,250	1,250
Value	thousands	\$289,000	\$431,000	\$554,000	\$600,000	\$588,000
Refinery production:						
Domestic and foreign ores and concentrates	metric tons	2,530	2,210	791	779	796
Scrap (old and new)	do.	981	1,110	1,130 ^r	1,210 ^r	1,340
Exports:						
Ore and concentrate	kilograms	3,680	3,150	15,800	130,000	122,000
Refined ²	do.	338,000	1,670,000	781,000	555,000	356,000
Waste and scrap	metric tons	3,640	2,240	238	2,570	2,480
Imports for consumption:						
Ore and concentrate	kilograms	433	--	381	32	87
Refined	do.	4,530,000	4,830,000	4,980,000	4,680,000	3,590,000
Waste and scrap	do.	3,640,000	2,240,000	3,420,000	5,190,000	4,760,000
Stocks, December 31:						
Industry	metric tons	86	98	70	153	150
Futures exchanges	do.	3,380	3,150	4,130	4,160	4,000
U.S. Department of the Treasury	do.	220	220	220	220	220
Price, average ³	dollars per troy ounce	7.34	11.61	13.43	15.02 ^r	14.69
Employment, mine and mill workers ⁴		900	900	900	900	850
World, mine production	metric tons	20,800	20,300	21,000 ^r	21,300	21,800

¹Revised. do. Ditto. -- Zero.

²Data are rounded to no more than three significant digits, except prices.

³Includes refined bullion, dore, and other unwrought silver.

⁴Price data are the annual Handy & Harman quotations published in Platts Metals Week.

⁵Employment data are from the U.S. Department of Labor, Mine Safety and Health Administration.

TABLE 2
MINE PRODUCTION OF SILVER IN THE UNITED STATES, BY STATE¹

(Kilograms)

State	2007	2008	2009
Nevada	243,000	235,000	203,000
Other ²	1,040,000	1,020,000	1,040,000
Total	1,280,000	1,250,000	1,250,000

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

²Includes Alaska, Arizona, California, Colorado, Idaho, Missouri, Montana, New Mexico, South Dakota, and Utah.

TABLE 3
LEADING SILVER-PRODUCING MINES IN THE UNITED STATES IN 2009, IN ORDER OF OUTPUT¹

Rank	Mine	County and State	Operator	Source of silver
1	Red Dog	Northwest Arctic, AK	Teck Alaska Inc.	Zinc-lead ore.
2	Greens Creek	Juneau, AK	Hecla Mining Co.	Zinc-silver ore.
3	Bingham Canyon	Salt Lake, UT	Kennecott Utah Copper Corp.	Copper-molybdenum ore.
4	Lucky Friday	Shoshone, ID	Hecla Mining Co.	Silver ore.
5	Galena	do.	U.S. Silver Corp.	Do.
6	Rochester	Pershing, NV	Coeur d'Alene Mines Corp.	Do.
7	Midas	Elko, NV	Newmont Mining Corp.	Gold ore.
8	Troy	Lincoln, MT	Revett Minerals Inc.	Copper-silver ore.
9	Bagdad	Yavapai, AZ	Freeport-McMoRan Copper & Gold Inc.	Copper-molybdenum ore.
10	Mission Complex ²	Pima, AZ	ASARCO LLC	Do.
11	Continental Pit	Silver Bow, MT	Montana Resources	Do.
12	Smoky Valley Common Operation	Nye, NV	Kinross Gold Corp.	Gold ore.
13	Carlin Mines Operations ³	Elko, Eureka, Humboldt, Lander, NV	Newmont Mining Corp.	Gold-copper ore.
14	Wharf	Lawrence, SD	Wharf Resources Ltd.	Gold ore.
15	Hollister	Elko, NV	Great Basin Gold Ltd.	Do.
16	Denton-Rawhide	Mineral, NV	Kennecott Minerals Co.	Do.
17	Goldstrike ⁴	Eureka, NV	Barrick Gold Corp.	Do.
18	Ray	Pinal, AZ	ASARCO LLC	Copper ore.
19	Montana Tunnels	Jefferson, MT	Apollo Gold Corp.	Gold ore.
20	Mineral Park	Mohave, AZ	Mercator Minerals Ltd.	Copper-molybdenum ore.
21	Cresson	Teller, CO	AngloGold Ashanti Ltd.	Gold ore.
22	Hycroft	Humboldt and Pershing, NV	Allied Nevada Gold Corp.	Do.
23	Brushy Creek	Reynolds, MO	Doe Run Resources Corp.	Lead ore.
24	Fletcher	do.	do.	Do.
25	Florida Canyon	Pershing, NV	Jipangu Inc.	Gold ore.

Do., do. Ditto.

¹The mines on this list accounted for more than 99% of U.S. mine production in 2009.

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

³Includes Carlin East, Deep Post, Gold Quarry, Lone Tree, Mule Canyon, Pete, Rain/Emigrant, and Twin Creeks Mines.

⁴Formerly listed as Betze-Post Mine.

TABLE 4
U.S. EXPORTS OF SILVER, BY COUNTRY¹

Year and country	Silver ores and concentrates			Bullion			Dore			Total		
	Silver content (kilograms)	Value (thousands)	Value (\$203,000)	Silver content (kilograms)	Value (thousands)	Value (\$36,200)	Silver content (kilograms)	Value (thousands)	Value (\$289,000)	Silver content (kilograms)	Value (thousands)	Value (\$289,000)
2008	130,000	\$50,300	\$203,000	413,000	\$203,000	\$36,200	94,800	\$36,200	\$289,000	638,000	\$289,000	\$289,000
2009:												
Australia	35	21	42,200	76,100	42,200	18,200	38,800	18,200	60,500	115,000	18,200	60,500
Bolivia	--	--	--	--	--	82	168	82	82	168	82	82
Brazil	--	--	347	827	347	--	--	--	347	827	--	347
Canada	--	--	6,360	12,100	6,360	44	175	44	6,410	12,300	44	6,410
Czech Republic	--	--	44	126	44	--	--	--	44	126	--	44
Dominican Republic	576	199	--	--	--	--	--	--	199	576	--	199
Finland	--	--	303	841	303	66	162	66	369	1,000	66	369
France	18	3	--	--	--	--	--	--	3	18	--	3
Germany	14,900	8,100	22,900	35,900	22,900	10,300	7,620	10,300	33,200	43,500	10,300	33,200
Hong Kong	383	78	2,750	4,580	2,750	--	--	--	2,830	4,960	--	2,830
Ireland	4,180	767	33	69	33	--	--	--	800	4,250	--	800
Italy	87	18	8	19	8	9	22	9	26	106	9	26
Japan	--	--	25	51	25	--	--	--	25	51	--	25
Korea, Republic of	56,500	25,800	--	--	--	--	--	--	25,800	56,500	--	25,800
Latvia	1,160	208	--	--	--	--	--	--	208	1,160	--	208
Lebanon	--	--	67	111	67	--	--	--	67	111	--	67
Malaysia	--	--	39	69	39	--	--	--	39	69	--	39
Mexico	7,400	3,900	15,900	29,900	15,900	7	18	7	19,800	37,300	7	19,800
Netherlands	--	--	73	140	73	--	--	--	73	140	--	73
New Zealand	--	--	186	403	186	189	537	189	375	940	189	375
Norway	--	--	--	--	--	919	2,240	919	919	2,240	919	919
Panama	--	--	--	--	--	523	1,250	523	523	1,250	523	523
Peru	--	--	--	--	--	260	605	260	260	605	260	260
San Marino	--	--	36	78	36	--	--	--	36	78	--	36
Singapore	--	--	672	1,360	672	851	2,170	851	1,520	3,530	851	1,520
Slovakia	17	3	--	--	--	--	--	--	3	17	--	3
Spain	--	--	17	37	17	266	950	266	283	987	266	283
Sweden	34,800	15,700	--	--	--	--	--	--	15,700	34,800	--	15,700
Switzerland	--	--	1,430	3,720	1,430	9,430	21,900	9,430	10,900	25,600	9,430	10,900
Thailand	972	376	4	7	4	--	--	--	380	979	--	380
United Kingdom	1,030	199	88	164	88	31,500	53,700	31,500	31,800	54,900	31,500	31,800
Vietnam	--	--	6	25	6	--	--	--	6	25	--	6
Other (5 countries)	66	21	8	14	8	--	--	--	29	80	--	29
Total	122,000	55,400	93,600	167,000	93,600	72,700	130,000	72,700	214,000	404,000	72,700	214,000

-- Zero.

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

Source: U.S. Census Bureau.

TABLE 5
U.S. EXPORTS OF SILVER, BY COUNTRY¹

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)
2008	47,700	\$15,700	890,000	\$473,000	34,900	\$3,260	720,000	\$199,000	2,570,000	\$4,290,000
2009:										
Argentina	--	--	--	--	34	9	160	82	--	--
Australia	272	123	23	15	380	52	427	212	--	--
Austria	30	14	115	52	--	--	74	37	--	--
Bahrain	--	--	103	22	--	--	57	28	--	--
Belgium	--	--	4,750	2,390	276	55	42	22	467,000	99,700
Bolivia	560	128	--	--	--	--	46	23	--	--
Brazil	1,080	509	--	--	--	--	42	26	--	--
Canada	17,500	6,290	25,000	5,640	13,900	840	430,000	204,000	116,000	286,000
China	935	487	138,000	73,700	1,820	286	2,090	1,150	15,900	35,400
Costa Rica	233	132	--	--	599	36	44	23	--	--
Cote d'Ivoire	--	--	--	--	--	--	--	--	393	10,000
Czech Republic	--	--	524	135	--	--	--	--	104	39
Denmark	10	4	--	--	--	--	86	43	--	--
Dominican Republic	1,110	471	404	217	95	6	826	418	231	100
Egypt	--	--	--	--	--	--	329	165	--	--
Estonia	--	--	--	--	--	--	140	78	--	--
Finland	--	--	196	53	--	--	83	37	--	--
France	23	5	40,300	20,700	37	3	3,850	2,090	13	66
Germany	761	275	24,300	12,600	262	80	14,100	6,040	845,000	173,000
Guatemala	822	417	--	--	--	--	14	6	10	5
Honduras	166	76	23	10	--	--	--	--	--	--
Hong Kong	7,400	3,620	94,600	52,500	--	--	10,600	5,330	2,330	4,650
India	16,000	4,680	--	--	266	37	4,080	2,050	1,350	5,140
Indonesia	434	227	--	--	--	--	98	48	10	49
Ireland	--	--	270	129	--	--	412	206	--	--
Israel	320	66	543	255	5	7	239	119	--	--
Italy	35	7	199	91	46	4	810	408	817,000	270,000
Japan	17	7	114,000	62,100	--	--	6,770	3,390	4,340	42,700
Jordan	123	35	--	--	--	--	251	125	--	--
Korea, Republic of	86	19	66,900	33,000	32	6	198	104	3,330	9,320
Kuwait	--	--	--	--	42	6	18	7	--	--
Malaysia	--	--	66	24	128	23	1,120	624	50	249
Mexico	3,790	1,560	12,000	5,580	8,280	1,010	36,800	19,100	613	1,980
Netherlands	--	--	12,500	6,800	86	30	86	42	158	460
Netherlands Antilles	61	16	--	--	--	--	--	--	--	--

See footnotes at end of table.

TABLE 5—Continued
U.S. EXPORTS OF SILVER, BY COUNTRY¹

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)
2009—Continued:										
New Zealand	64	\$17	--	--	245	\$26	--	--	--	--
Nigeria	--	--	--	--	375	45	--	--	--	--
Pakistan	--	--	--	--	--	--	--	--	2,850	\$1,670
Paraguay	100	45	--	--	--	--	--	--	--	--
Philippines	100	15	--	--	94	19	370	\$191	--	--
Saudi Arabia	--	--	--	--	15	6	665	332	863	7,130
Singapore	407	160	5,890	\$2,770	--	--	2,390	1,230	1,200	363
South Africa	10	5	--	--	71	16	--	--	9	92
Spain	61	16	50	24	--	--	--	--	38	188
Sweden	--	--	336	158	79	12	267	\$171	32,500	25,200
Switzerland	88	19	851	419	--	--	779	416	104,000	3,160,000
Taiwan	16	3	208,000	112,000	178	12	969	497	721	1,340
Thailand	3,290	626	6,990	3,120	--	--	1,520	811	15	88
Trinidad and Tobago	--	--	9	5	--	--	47	21	--	--
Turkey	--	--	--	--	227	5	6	3	26	131
United Arab Emirates	1,840	796	--	--	--	--	25	12	--	--
United Kingdom	52	26	76,900	39,400	--	--	3,270	1,600	62,500	166,000
Venezuela	28	6	--	--	105	21	127	63	--	--
Vietnam	1,100	267	--	--	100	9	13	6	156	779
Other (5 countries)	64	29	48	33	38	25	213	114	63	737
Total	59,000	21,200	834,000	434,000	27,800	2,690	525,000	251,000	2,480,000	4,300,000

-- Zero.

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

²Containing 99.5% or more by weight of silver.

Source: U.S. Census Bureau.

TABLE 6
U.S. IMPORTS FOR CONSUMPTION OF SILVER, BY COUNTRY¹

Year and country	Silver ores and concentrates			Ash and residues			Bullion			Dore			Total		
	Silver content (kilograms)	Value (thousands)		Silver content (kilograms)	Value (thousands)		Silver content (kilograms)	Value (thousands)		Silver content (kilograms)	Value (thousands)		Silver content (kilograms)	Value (thousands)	
2008	32	\$31	\$1,280	4,850	\$1,280	\$1,850,000	3,860,000	\$717,000	\$717,000	574,000	\$1,850,000	\$717,000	4,440,000	\$2,570,000	\$2,570,000
2009:															
Argentina	--	--	--	--	--	--	--	21,100	21,100	26,500	21,100	21,100	26,500	21,100	21,100
Australia	--	--	--	--	17,900	17,900	40,300	--	--	--	17,900	--	40,300	17,900	17,900
Belgium	--	--	--	--	688	187	688	--	--	--	688	--	688	187	187
Bolivia	--	--	--	--	--	--	131,000	57,800	57,800	131,000	57,800	57,800	131,000	57,800	57,800
Canada	--	--	--	--	747,000	349,000	747,000	--	--	--	349,000	--	747,000	349,000	349,000
Chile	--	--	--	--	125,000	54,000	125,000	2,940	1,460	2,940	54,000	1,460	128,000	55,500	55,500
Colombia	--	--	--	--	3,510	1,690	3,510	814	346	814	1,690	346	4,330	2,030	2,030
Costa Rica	--	--	--	--	--	--	--	37	15	37	--	15	37	15	15
Dominican Republic	--	--	--	--	504	65	504	1,560	567	1,560	65	567	2,060	632	632
Germany	--	--	--	--	60	24	60	--	--	--	24	--	60	24	24
Guatemala	--	--	--	--	--	--	--	7,280	11,300	7,280	--	11,300	7,280	11,300	11,300
Israel	87	9	--	--	--	--	--	--	--	--	--	--	87	9	9
Italy	--	--	--	--	83	15	83	468	162	468	15	162	551	177	177
Japan	--	--	10	21	10	--	--	--	--	--	--	--	21	10	10
Korea, Republic of	--	--	--	--	36,100	17,600	36,100	--	--	--	17,600	--	36,100	17,600	17,600
Malaysia	--	--	9	41	9	--	--	--	--	--	--	--	41	9	9
Mexico	--	--	--	--	1,630,000	775,000	1,630,000	425,000	284,000	425,000	775,000	284,000	2,050,000	1,060,000	1,060,000
Netherlands Antilles	--	--	--	--	2	3	2	--	--	--	3	--	2	3	3
Panama	--	--	--	--	26	13	26	766	316	766	13	316	792	329	329
Peru	--	--	--	--	204,000	85,600	204,000	57,100	61,900	204,000	85,600	61,900	261,000	147,000	147,000
Taiwan	--	--	132	443	132	9,630	15,800	--	--	15,800	9,630	--	16,200	9,760	9,760
United Kingdom	--	--	--	--	534	111	534	--	--	--	111	--	534	111	111
Total	87	9	151	505	151	1,310,000	2,800,000	439,000	439,000	653,000	1,310,000	439,000	3,450,000	1,750,000	1,750,000

-- Zero.

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

Source: U.S. Census Bureau.

TABLE 7
U.S. IMPORTS FOR CONSUMPTION OF SILVER, BY COUNTRY¹

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)
2008	245,000 ^r	\$88,000	61,000	\$8,860	10,700	\$4,280	418,000	\$134,000	5,190,000	\$681,000
2009:										
Argentina	--	--	--	--	--	--	--	--	42,200	911
Aruba	--	--	--	--	--	--	--	--	6	43
Australia	--	--	(3)	2	--	--	666	273	697	6,400
Austria	--	--	--	--	--	--	--	--	7	173
Bahamas	--	--	--	--	--	--	--	--	64	433
Barbados	--	--	--	--	--	--	--	--	14	3
Belgium	--	--	--	--	--	--	--	--	677	309
Bolivia	--	--	--	--	--	--	--	--	966	408
Brazil	169	91	--	--	--	--	2,230	572	8,940	1,740
Canada	62,000	22,000	14,400	649	16	2	130,000	64,600	588,000	130,000
Chile	--	--	--	--	--	--	--	--	23,000	1,610
China	--	--	90	19	--	--	--	--	332,000	29,500
Christmas Island	--	--	--	--	--	--	--	--	143	4
Colombia	--	--	--	--	--	--	597	240	138,000	4,720
Costa Rica	--	--	--	--	--	--	--	--	37,300	1,860
Czech Republic	--	--	--	--	--	--	--	--	8	16
Dominican Republic	--	--	76	20	--	--	--	--	5,950	8,450
El Salvador	--	--	--	--	--	--	--	--	8,010	35
Finland	--	--	--	--	--	--	--	--	1	46
France	--	--	816	174	--	--	--	--	51,100	581
Germany	430	16	8,140	1,480	32	12	7,730	1,790	1,160,000	92,000
Guatemala	--	--	--	--	--	--	--	--	31,000	5,470
Honduras	--	--	--	--	--	--	--	--	40,500	586
Hong Kong	--	--	--	--	--	--	--	--	1	56
India	4	3	--	--	420	120	52	34	52,100	7,100
Ireland	--	--	--	--	--	--	--	--	15	12
Israel	--	--	--	--	--	--	--	--	21,600	218
Italy	89	82	(3)	3	--	--	48	32	329	3,650
Jamaica	--	--	--	--	--	--	--	--	(3)	5
Japan	(3)	2	204,000	33,000	31	7	341	123	11,200	8,860
Korea, Republic of	4,000	1,030	6	7	--	--	352	80	122	16
Malaysia	--	--	1,170	118	--	--	--	--	334,000	8,460

See footnotes at end of table.

TABLE 7—Continued
U.S. IMPORTS FOR CONSUMPTION OF SILVER, BY COUNTRY¹

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)
2009—Continued:										
Mauritius	--	--	20	\$11	--	--	--	--	--	--
Mexico	60,300	\$31,200	15,300	476	--	--	284,000	\$89,500	1,300,000	\$17,700
Netherlands	5,690	1,030	36	10	--	--	267	81	17,200	139
New Zealand	--	--	--	--	--	--	1	7	--	--
Norway	--	--	--	--	--	--	--	--	1	17
Panama	10	5	--	--	--	--	--	--	570	86
Peru	577	393	--	--	6	\$2	49,000	18,100	48,000	645
Philippines	--	--	--	--	--	--	--	--	29,500	2,260
Poland	77	15	--	--	--	--	434	206	--	--
Saudi Arabia	--	--	--	--	--	--	--	--	91	4,000
Singapore	--	--	39	7	--	--	--	--	56,400	2,400
South Africa	--	--	--	--	--	--	--	--	(³)	3
Spain	--	--	--	--	--	--	--	--	2,480	76
St. Lucia	--	--	--	--	--	--	--	--	2	28
Switzerland	18	10	757	129	--	--	--	--	9,750	213
Taiwan	--	--	--	--	--	--	52	10	27,200	17,400
Thailand	6	4	179	31	--	--	9	7	257	2,670
Trinidad and Tobago	--	--	30	4	--	--	--	--	148	9
United Arab Emirates	--	--	--	--	--	--	--	--	366	65
United Kingdom	1,310	263	1,590	234	330	97	414	87	378,000	10,200
Venezuela	--	--	--	--	--	--	--	--	19	535
Total	135,000	56,200	247,000	36,400	835	241	476,000	176,000	4,760,000	372,000

¹Revised. -- Zero.

²Data are rounded to no more than three significant digits; may not add to totals shown.

³Containing 99.5% or more by weight of silver.

⁴Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 8
SILVER: WORLD MINE PRODUCTION, BY COUNTRY^{1,2}

(Metric tons)

Country	2005	2006	2007	2008	2009
Algeria	(3)	(3)	(3)	(3)	(3)
Argentina	264	245	256	356 ^r	350 ^e
Armenia ^c	4	4	4	4	4
Australia	2,417	1,727	1,879	1,926	1,635
Bolivia	419 ^r	472	525	1,114	1,325 ^p
Brazil ^d	38	30	36	37 ^r	37 ^p
Bulgaria ^e	55	65	55	55	55
Burma	2	1	(3)	--	(3)
Canada	1,124	995	860	728	608
Chile	1,400	1,607	1,936	1,405	1,301
China ^c	2,500	2,600	2,700	2,800	2,900
Colombia	7	8	10	9 ^r	9 ^e
Congo (Kinshasa)	54	68	76	34	--
Ecuador	(3)	(3)	(3)	(3)	(3) ^e
Ethiopia	1	1	1 ^r	1 ^r	1 ^e
Finland ^c	49 ⁵	50	50	70 ^{r,5}	70
France ^c	1	1	1	1	1
Ghana	4	3	3	3	3 ^e
Greece	79 ^e	25	26	28	30 ^e
Guatemala	7	50	88	100	128
Honduras	54	55	50 ^e	12	15 ^e
India	32	31	82	96	95
Indonesia	321	261	269	226 ^r	215
Iran ^c	25	25	26	25	25
Ireland ^e	6 ⁵	4 ⁵	4	4	4
Italy ^{e,6}	(3)	(3)	(3)	(3)	(3)
Japan	54	11	5	2	2
Kazakhstan	832	806 ^r	723 ^r	646 ^r	678
Korea, North ^c	20	20	20	20	20
Korea, Republic of	4	2	1	1	2 ^e
Malaysia	(3)	(3)	(3)	(3) ^e	(3) ^e
Mexico	2,894	2,970	3,135	3,236	3,554
Mongolia ^c	28	28	10 ^r	10 ^r	10
Morocco ^e	196	195 ⁵	195	190	195
Namibia ^c	30 ⁵	31 ⁵	30	30	30
New Zealand	43	27	11	18 ^r	14
Nicaragua ^c	3 ⁵	3 ⁵	3	3	3
Oman	(3) ^e	(3) ^r	(3) ^r	(3) ^r	(3)
Papua New Guinea	51	51	51	51	52 ^e
Peru	3,206	3,471	3,494	3,686	3,854
Philippines	19	24	28	14 ^r	34

See footnotes at end of table.

TABLE 8—Continued
SILVER: WORLD MINE PRODUCTION, BY COUNTRY^{1,2}

(Metric tons)

Country	2005	2006	2007	2008	2009
Poland	1,263 ^r	1,266 ^r	1,199 ^r	1,161 ^r	1,206
Portugal	24	20	24	24	--
Romania ^e	15	18	18	18	18
Russia ^c	1,350 ⁵	1,250	1,200	1,300	1,400
Saudi Arabia	14	9 ^e	9	8	10 ^e
Serbia ^c	3 ^{5,7}	2	4 ⁵	4	4
South Africa	88	87	70	75	78
Spain	3 ^r	2 ^r	3 ^r	3 ^r	4 ^{p,e}
Sudan ^c	3	2 ⁵	2 ⁵	2	2
Sweden	310	268	270	265	265 ^e
Tajikistan ^c	5	5	5	5	5
Tanzania	13	15	12	11 ^r	12 ^e
Tunisia ^c	1 ⁵	--	--	--	--
Turkey	138	167	198	180	180 ^e
United States	1,230	1,160	1,280	1,250	1,250
Uzbekistan ^c	83	83	83	83	85
Zimbabwe	3	1	1	1 ^e	1 ^e
Total	20,800	20,300	21,000 ^r	21,300	21,800

^eEstimated. ^pPreliminary. ^rRevised. -- Zero.

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

²Recoverable content of ores and concentrates produced unless otherwise specified. Table includes data available through August 19, 2010.

³Less than ½ unit.

⁴Reported figure.

⁵Includes the following quantities, in kilograms, indentified as secondary silver: 2005—43,000 (revised); 2006—39,000 (revised); 2007–08—32,000 (revised); and 2009—32,000.

⁶Includes production from imported ores.

⁷Montenegro and Serbia formally declared independence in June 2006 from each other and dissolved their union.