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In the United States, mine production of recoverable copper in 2009 declined by about 130,000 metric tons (t) to 1.18 million metric tons (Mt), and was slightly above the production level in 2007. Most of the production decline took place in Arizona and New Mexico, following the collapse of copper prices during the fourth quarter of 2008.

Despite numerous announced expansions in global mine capacity that totaled about 750,000 t, lower capacity utilization, particularly in the United States, resulted in a global copper mine production increase of only about 420,000 t compared with that in 2008. In addition to lower copper prices, numerous factors, including labor unrest, lower ore grades, technical problems, and utility and equipment shortages, continued to plague the industry and sustain a downward trend in capacity utilization.

The United States was the third leading mine producer of copper, though its share of global production decreased to 7% from 8% in 2008. In 2008, the United States had regained its position as the second leading producer of copper from Peru, only to relinquish it again in 2009. Chile remained the leading world mined copper producer, and accounted for 34% of global production. Global smelter production, which had risen steadily since 2003, declined nominally in 2009 owing to a global tight supply of concentrates and scrap. Global refinery production, however, rose slightly. The United States rose to sixth place ahead of Germany in world smelter production and remained fourth in refinery output behind China, Chile, and Japan.

According to data compiled by the International Copper Study Group (ICSG) (2010a, p. 19–20), global consumption of refined copper, which had fallen by about 185,000 t (1%) in 2008, rose nominally (130,000 t) in 2009 and remained slightly below that in 2007. Consumption declines in Europe, North America, and most major consuming regions of Asia were more than offset by an astronomical growth of almost 2 Mt (38%) in China's apparent consumption. The only other major consumer to experience growth was the Republic of Korea, where consumption rose by 120,000 t (16%).

For the second year in a row, global production of refined copper slightly exceeded demand, and reported yearend global inventories of refined copper rose by about 270,000 t in 2009 and 400,000 t during a 2-year period. Although global stocks rose to 1.43 Mt at yearend 2009 (about 4 weeks of global consumption) inventories in the second and third quarters of 2009 were at or below yearend 2008 levels, principally owing to strong imports by China (International Copper Study Group, 2010a, p. 9). Copper prices, which tumbled during the fourth quarter of 2008 following the onset of the economic crises (the average COMEX price fell from a record-high $3.76 per pound of copper in July to $1.39 per pound in December), trended upward throughout 2009, with the COMEX price averaging $3.19 per pound in December and $2.35 for the full year.

The principal mining States for copper were, in descending order of production, Arizona, Utah, New Mexico, Nevada, and Montana, accounting for 99% of domestic production; copper was also recovered at mines in Idaho and Missouri. Although copper was recovered at 29 mines in the United States, 18 mines accounted for more than 99% of production (table 2). The remaining mines were either small leach operations or byproduct producers of copper.

In 2009, copper recovered from refined or remelted scrap (about 80% from new scrap and 20% from old scrap) composed 35% of the total U.S. copper supply. The conversion of old scrap to alloys and refined copper fell by 12% to 137,000 t of recoverable copper. Copper was consumed as refined copper and as direct melt scrap at about 30 brass mills, 15 wire-rod mills, and 500 chemical plants, foundries, and miscellaneous operations.

Legislation and Government Programs

In June, the U.S. Environmental Protection Agency (EPA) issued final rules governing emissions from nonferrous foundries, including copper and copper-based alloy foundries that melt at least 600 t/yr of metal and use metal containing hazardous air pollutants (HAP). The HAP listed for copper foundries are lead or nickel in amounts greater than or equal to 0.1% by weight, and manganese in amounts greater than or equal to 1.0% by weight. The final standards, which mandated that new operations be in compliance by June 25, 2009, or upon startup, and existing operations be in compliance by June 27, 2011, require that the foundries cover or enclose melting furnaces that are equipped with covers or enclosures to the extent practicable and to purchase only scrap material that has been depleted to the extent practicable of HAP material, excluding HAP metals that are required to be added for the production of specific alloyed castings. In addition, existing and new large foundries that melt at least 6,000 metric tons per year (t/yr) of copper were required to control emissions of particulate matter by 95% [or an outlet concentration not exceeding 0.015 grain per dry standard cubic foot (gr/dscf)] and 99% (or an outlet concentration of 0.010 gr/dscf) (U.S. Environmental Protection Agency, 2009).

In September, four domestic producers of copper tube requested the imposition of antidumping duties on seamless refined-copper pipe and tube imported from China and Mexico. On October 27, the Import Administration, International Trade Administration, U.S. Department of Commerce, found that the petition had sufficient documentation and industry support to warrant the initiation of antidumping duty investigations.

The petitioners alleged that these imports were, or were likely to be, sold in the United States at less than their fair value and that such imports were materially injuring or threatening material injury to the U.S. tube industry. The investigation was continuing at yearend (U.S. Department of Commerce, 2009).

The U.S. Department of Labor Employment and Training Administration (ETA) received numerous applications for Trade Adjustment Assistance from workers who claimed that imports of copper and copper products and a shift in production to a foreign source resulted in their job loss. In June, after reconsideration of a previous negative determination, the ETA certified employees of Cerro Flow Products Inc. (Sauget, IL) who became totally or partially separated during a 2-year period beginning November 4, 2008, to receive alternate trade adjustment assistance under section 246 of the Trade Act of 1974. In separate determinations, workers from Freeport-McMoRan Tyrone LLC (Tyrone, NM) and BHP Copper Inc., Pinto Valley Operations & San Manuel Arizona Railroad Co., and BHP Billiton Ltd. (Miami, AZ) received certification to apply for trade adjustment assistance (U.S. Department of Labor, 2009a–c).

Production

Domestic mine production decreased by about 10%, or about 130,000 t, owing to closures and cutbacks announced during the fourth quarter of 2008 in response to the onset of a global recession and the plummet in copper prices. Estimated mine capacity, however, rose by about 50,000 t to 1.72 Mt owing to the startup of one operation and full-year operations at expansions begun in 2008. Capacity utilization declined to 69% from 78% in 2008 and was at its lowest level in more than 25 years. Smelter production, however, rose by about 5% owing to increased smelter availability (maintenance closures having reduced output in 2008) and lower concentrate exports. Downstream, electrolytic refined production declined by 11% owing to a shortage of anode resulting from lower net imports. Electrowon copper from leach solutions accounted for 40% and 41%, respectively, of mine and refinery production. Four primary electrolytic refineries and 15 solvent extraction-electrowinning (SX-EW) facilities operated during 2009.

Company Reviews.—Consolidated full-year production for ASARCO LLC's mines in 2009 totaled 186,000 t. The company continued to operate under Chapter 11 reorganization protection through most of 2009 and the tug-of-war between Grupo México S.A.B. de C.V. (Mexico City, Mexico) and Sterlite Industries (India) Ltd. [a subsidiary of Vedanta Resources plc (London, United Kingdom)] to gain control of Asarco continued. ASARCO Incorporated had filed for bankruptcy protection in 2005 and had been operating as ASARCO LLC. In March 2009, Asarco announced the signing of a new agreement to sell substantially all of its operating assets to Sterlite for $1.1 billion in cash plus a promissory note for $600 million, payable during 9 years. In November, however, the U.S. District Court judge overseeing the bankruptcy reorganization issued an order confirming a competing reorganization plan sponsored by Americas Mining Corp., a subsidiary of Grupo México. On December 9, Grupo México announced that the Chapter 11 restructuring of ASARCO LLC had been completed and that full control of Asarco had been returned to Grupo México. A combined $3.63 billion payment was made to Asarco's creditors ($720 million Grupo México contribution, $1.5 billion secured financing, and $1.41 billion available cash from Asarco) and a $280 million promissory note delivered to asbestos creditors. Under terms of the restructuring, these payments rendered Asarco free of environmental contingencies and liabilities from past Asarco operations (ASARCO LLC, 2009a, b; Grupo México, S.A.B. de C.V., 2009; 2010a, p. 6; 2010b, p. 9).

Augusta Resource Corp. (Vancouver, British Columbia, Canada) was proceeding with development of the Rosemont Mine, about 50 kilometers (km) southeast of Tucson, AZ. In January, the company completed an updated bankable feasibility study for an open pit copper operation. An updated mineral reserve estimate completed in November 2008 indicated proven and probable reserves of 546 Mt of sulfide ore grading 0.45% copper and 0.015% molybdenum and 70 Mt of oxide ore grading 0.17% copper. Augusta Resource anticipated building a 68,000 metric-ton-per day (t/d) mill for sulfide ore and a heap-leach SX-EW facility with a combined production of 100,000 t/yr of copper. In March, the company received notification from Arizona that its mined land reclamation plan had been approved. In July 2009, Augusta Resource signed an agreement to purchase 23 haulage trucks for an estimated $82.2 million. By yearend, the target dates for startup of leach and concentrate production had slipped by about 6 months to the first and third quarters of 2012, respectively (Augusta Resource Corp., 2010, p. 2–5).

Copper production from BHP Billiton's (Melbourne, Australia, and London, United Kingdom) residual Arizona leach operations at Miami and Pinto Valley continued to decline, the combined production falling to 6,000 t in 2009 from 6,700 t in 2008. Production of copper concentrate at Pinto Valley, which was resumed in October 2007 to "take advantage of market conditions at the time," yielded 4,400 t of payable copper in concentrates, production having been suspended during February owing to the sharp drop in copper prices and the relatively high cost and anticipated short life of the operation (BHP Billiton, 2009, p. 3, 8; 2010, p. 2).

Resolution Copper Mining, LLC [55% Rio Tinto plc (London) and 45% BHP Billiton] continued with development work and resource definition of the Resolution copper sulfide deposit located more than 2,100 meters (m) below the surface and beneath BHP Billiton's shuttered Magma Mine, with the goal of commencing production by 2020. By the end of October, Resolution had completed 530 m of a proposed 2,100 m mineshaft and by yearend, had completed a new headframe. Construction of a water treatment plant and 43-km pipeline to deliver treated water to district farmers for irrigation was completed and the anticipated 2-year dewatering of the old # 9 shaft begun. Resolution was seeking a land exchange required to access to about 3,100 hectares of Federally controlled property, and during 2009, legislation was introduced in both houses of the U.S. Congress to facilitate the exchange. By February 2009, $290 million had been invested in the project (Resolution Copper Mining, LLC, 2009, p. 6–7).

Constellation Copper Corp.'s (Denver, CO) Lisbon Valley Mine in Utah, which began production in November 2006,

continued limited electrowon production from the residual leaching of stockpiled ore. Mining ceased during the first quarter of 2008, and in December 2008, Constellation filed for assignment in bankruptcy under Canada's Bankruptcy and Insolvency Act (Deloitte & Touche Inc., 2009, p. 1–6).

Mercator Minerals Ltd. (Kingman, AZ, and Vancouver) began commercial production and shipment of copper and molybdenum concentrates at the Mineral Park Mine (Arizona) from its Phase I, 23,000-t/d mill. For 2009, mill throughput averaged 18,200 t/d of ore grading 0.21% copper and 0.023% molybdenum. Average copper and molybdenum recovery was 73% and 48.5%, respectively, significantly less than the respective design recoveries of 80.2% and 75.6%. Production of copper in concentrate was 11,400 t, and production of electrowon copper cathode was 2,000 t, which was down significantly from production of 4,800 t of electrowon copper in 2008. Yearend mill reserves totaled 428 Mt containing 549,000 t of copper, and leach reserves totaled 71 Mt grading 0.07% copper (Mercator Minerals Ltd., 2010, p. 17, 22).

In 2009, Mines Management, Inc. (Spokane, WA) spent $7.4 million on development, including rehabilitation work on its evaluation adit, at its Montanore silver-copper project in northwestern Montana. The project hosts one of the world's largest known silver-copper deposits, with estimated resources containing more than 7 million kilograms of silver and nearly 900,000 t of copper. In April, Mines Management released its draft environmental impact statement for public comment through June 29. The project had already undergone extensive engineering and was designed with an initial production capacity of approximately 12,500 t/d of ore and an estimated annual production of about 250,000 kilograms of silver and 27,000 t of copper (Mines Management, Inc., 2010, p. 1–10).

In January 2008, Nord Resources Corp. (Dragoon, AZ) reported the first production of cathode since August 2003 from the leaching of stockpiles at its Johnson Camp Mine in Arizona. In February 2009, it resumed mining and in April reported its first cathode production from newly mined ore. Production rose to 3,700 t in 2009 from 1,300 t in 2008 but remained well below its target production of 11,300 t/yr owing to lower than expected copper recoveries, a well failure, and a fourth quarter drought that reduced flow rates of pregnant leach solution. In January 2010, two new wells were commissioned (Nord Resources Corp., 2010).

The past-producing Zonia Mine (Arizona) continued to change ownership when Redstone Resources Corp. (Lakewood, CO) acquired Zonia from Copper Mesa Mining Corp. (formerly Ascendant Copper Corp.), a Canadian mineral exploration and development company, that had acquired it from St. Geneviève Resources Ltd. (Montreal, Quebec, Canada) in 2008. Redstone was proceeding with five development programs aimed at generating a final feasibility study. A preliminary economic analysis completed in December determined a measured and indicated resource of 30.2 Mt grading 0.36% copper at a 0.2% cutoff grade. Before it suspended activity in November 2008, Copper Mesa had anticipated constructing an open pit mine and SX-EW processing complex that could produce an average of 9,000 t/yr of copper cathode (Copper Mesa Mining Corp., 2009, p. 1–3; Redstone Resources Corp., 2010a, b).

In July 2008, Freeport-McMoRan Copper & Gold Inc. (FCX) announced that it had initiated plans for incremental expansions at its Bagdad, Morenci, and Sierrita Mines in Arizona, and its Cerro Verde Mine in Peru, and that it had restarted mining at its Miami Mine and expected to produce 45,000 t/yr of cathode by 2010. In December 2008, however, in response to the decline in copper and molybdenum prices, FCX reversed course and announced revised production plans that included a 25% reduction in the mining and crushed-leach rates at its Morenci Mine, a 50% reduction in the mining and stacking rates at its newly commissioned Safford Mine in Arizona, a 50% reduction of its mining rate at its Tyrone Mine in New Mexico, and suspension of mining and milling activities at the Chino Mine in New Mexico. In January 2009, FCX announced an additional 25% reduction in Morenci's mining and crushed-leach rates. As a result of these and other changes, copper production from FCX U.S. operations decreased to 555,000 t from 699,000 t in 2008 (Freeport-McMoRan Copper & Gold Inc., 2008a, b, p. 9; 2010a, p. 30–31, 2010b, p. 7, 23).

Production of recoverable copper at the Morenci Mine complex decreased to 229,000 t from 334,000 t in 2008. Though the distribution between electrowon copper and copper-in-concentrate were not reported, nearly all production was electrowon. According to the revised mine plan, the mill and concentrate-leach project were closed during the first quarter of 2009 (Freeport-McMoRan Copper & Gold Inc., 2010b, p. 8, 23).

Production of 102,000 t of recoverable copper (concentrate and electrowon) at FCX's Bagdad Mine in Arizona was essentially unchanged from that in 2008. The Bagdad operation consists of a 75,000-t/yr concentrator and an 11,000-t/yr SX-EW plant that operated near full capacity throughout 2009 (Freeport-McMoRan Copper & Gold Inc., 2010b, p. 10, 23).

At the Sierrita copper-molybdenum mine, copper production decreased to 77,000 t of recoverable copper from 85,000 t in 2008. An 18,000-t/yr copper sulfate plant started in early 2004 continued to operate below capacity. The Sierrita operation includes a 93,000-t/d concentrator and the Twin Buttes elecrowinning facility, with a design capacity of about 23,000 t/yr of cathode. In December, FCX purchased property adjacent to Sierrita, including the Twin Buttes Mine, which last produced in 1994 (Freeport-McMoRan Copper & Gold Inc., 2010b, p. 9, 23).

Despite initial plans to resume mining, the Miami open pit remained on care-and-maintenance status, and electrowon production from residual leach operations declined to 7,300 t from 8,600 t in 2008. In the fourth quarter, FCX initiated plans to restart limited mining at Miami. FCX anticipated that production would ramp up to about 45,000 t/yr of cathode by the second half of 2011 for an expected 5-year mine life. At yearend, the mine leach reserves were 227,000 t of recoverable copper (Freeport-McMoRan Copper & Gold Inc., 2010b, p. 11, 23, 32).

The Safford Mine, which started up during the first quarter of 2008, produced 83,500 t of electrowon copper, up from 60,000 t in 2008, but below its capacity of 109,000 t/yr, a reflection of the cutback that reduced the mining and stacking rate by 50% in late 2008. Mined ore passed through a three-stage crushing and

agglomeration process before being transferred to leach pads via a mobile conveying system (Freeport-McMoRan Copper & Gold Inc., 2010b, p. 10).

In New Mexico, production at FCX's Chino Mine plummeted to 16,300 t of electrowon copper from 70,300 t (electrowon and concentrates) following cessation of mining at yearend 2008. Production at the Tyrone Mine rose to 39,000 t from 34,500 t in 2008 and was at its highest level since 2004, despite the 50% reduction mining rate starting in late 2008. The mining rate was restored to 80% of capacity by early 2010. The available mining fleet had the capacity to move 120,000 t/d of material, and the SX-EW operation had a capacity to produce 76,000 t/yr of cathode (Freeport-McMoRan Copper & Gold Inc., 2010b, p. 12, 23).

Formation Metals Inc. (formerly Formation Capital Corp.) (Vancouver) was proceeding with its development of the underground Idaho Cobalt Project that was projected to produce about 2,000 t/yr of copper as a byproduct of cobalt production. The company received a bankable feasibility study in July 2007, a final environmental impact statement in June 2008, and a series of permits and decisions during the first half of 2009. Construction, which began in early 2010, was expected to take 1 year to complete. Proven and probable reserves were reported to be 2.64 Mt grading 0.56% cobalt and 0.6% copper (Formation Metals Inc., 2010).

The Pebble Limited Partnership, an equal partnership between Anglo American plc (London) and Northern Dynasty Minerals Ltd. (Vancouver), allocated more than $69 million for advancement of the project in southwest Alaska during 2009, bringing the total project investment through 2009 to about $430 million. In February 2010, an updated mineral resource assessment based on additional drilling was released. The assessment increased estimates of contained copper, gold, and molybdenum by 12%, 14%, and 16%, respectively, from the December 2008 estimates. At a copper equivalent cutoff grade of 0.3% copper, the updated measured and indicated resources totaled 5.94 billion metric tons (Gt) grading 0.42% copper (0.78% copper equivalent) and containing 25 Mt of copper; the updated inferred mineral resource totaled 4.84 Gt grading 0.24% copper (0.53% copper equivalent) and containing 11.6 Mt of copper (Northern Dynasty Minerals Ltd., 2009, 2010).

PolyMet Mining Corp. (Vancouver) was proceeding with the development of the NorthMet copper-nickel-precious metals project (mine and processing plant) in northeastern Minnesota. In May 2008, the company announced revised plans and cost estimates that would shorten the preproduction construction period to less than 12 months and improve cash flow by initially selling concentrate. The estimated $290 million construction cost for the metallurgical plant to process the concentrate would be funded through the sale of concentrate. In October, Polymet announced completion of a "strategic partnership" with Glencore International AG (Baar, Switzerland) under which Glencore would purchase Polymet's output of concentrates, metals, or intermediate products at prevailing market terms for at least the first 5 years of production prior to construction of its metallurgical facilities. It also provided Glencore with options to purchase an equity stake in Polymet. At mid-2009, engineering of the project, other than that required for permitting, was slowed in response to the weak copper market, though in November, Polymet published the draft environmental impact statement (Polymet Mining Corp., 2010, p. 110).

Quadra Mining Ltd. (Vancouver) reported that copper in concentrate production at its Robinson Mine in Nevada decreased to 55,600 t from 72,400 t in 2008. Changes in the mine plan for its Veteran Pit required by the U.S. Mine Safety and Health Administration and variable metallurgical performance from ore mined in the Wedge area of the Ruth Pit accounted for the lower output. As a result, average ore grade fell to 0.64% copper from 0.68% in 2008, mill recoveries fell to 63.6% from 76.7%, byproduct gold production declined by 28%, and cash production costs rose to $1.25 per pound of copper from $1.15 per pound in 2008. At its Carlota Mine in Nevada, which produced its first cathode in December 2008, production of electrowon copper rose to 12,700 t from 360 t in 2008 but was lower than anticipated owing to diversion of mining equipment to unplanned development work (Quadra Mining Ltd., 2010, p. 7–8).

In 2009, the Bingham Canyon Mine in Utah regained its position, last held in 1983, as the leading U.S. copper mine producer. Rio Tinto reported that mill throughput at Bingham Canyon reached a record-high level in 2009 and that copper contained in concentrates rose to a record-high 303,500 t, an increase of 28% from that of 2008. Production of refined copper rose to 274,000 t from 201,000 t in 2008. Yearend reserves at Bingham Canyon were expected to be sufficient to sustain open pit mining through 2020, with additional resources that could extend pit life through 2032. A prefeasibility study was expected to be completed in 2010 that would potentially allow conversion of these additional resources to reserves. In March, Rio Tinto disclosed the discovery of a new molybdenum deposit (copper-molybdenum-gold porphyry system) beneath the current open pit that contained between 450 and 550 Mt of material grading 0.15% molybdenum (Rio Tinto plc, 2010, p. 38, 64).

In December 2008, Rio Tinto announced plans to invest $300 million to develop the Eagle nickel-copper mine near Marquette, MI. By yearend 2009, Eagle had received final approval of all necessary State permits and was nearing readiness to begin construction. The mine was expected to yield 16,000 t/yr of nickel and 15,000 t/yr of copper during at least a 7-year period from a resource grading 3.6% nickel and 2.9% copper (Rio Tinto plc, 2009, p. 56; 2010, p. 39).

Consumption

U.S. reported consumption of refined copper declined by about 18% to the lowest level since the recession of 1975. Consumption fell off sharply during the fourth quarter of 2008 following the onset of the economic crisis and remained low throughout 2009. Consumption by wire-rod producers declined by about 350,000 t (23%) in response to depressed housing demand and would have fallen further had it not been for a 35,000-t decline (90,000-t 2-year decline) in net imports of wire rod. According to data compiled by the American Bureau of Metal Statistics, Inc. (ABMS) (2010b) apparent consumption of wire rod declined for the fourth consecutive year and was down by about 365,000 t (25%) from that in 2008. In the first quarter of 2009, Asarco announced a reduction in output at its Amarillo

plant. Superior Essex Inc., which had closed its Vincennes, IN, wire-rod mill in 2008, operated only one of the two lines at its plant in Arcola, IN, during 2009.

According to ABMS, domestic shipments of copper and copper alloy mill products declined by 26% from shipments in 2008 and fell below 1 million short tons (907,000 metric tons) for the first time since 1962. Year-on-year shipments were down by more than 30% during the first half of the year but were down by only about 10% during the fourth quarter. Shipments were down in all market segments—copper and copper alloy strip and sheet fell by 38% and 20%, respectively; copper and copper alloy rod and bar fell by 21% and 31%, respectively; and copper and copper alloy tube fell by 22% and 23%, respectively. Copper tube, which represented one-third of all brass mill product shipments, fell for the fourth consecutive year. This was indicative of the poor housing construction market and the continued substitution by plastic tube in residential markets (American Bureau of Metal Statistics, Inc., 2010a, p. 14–16).

According to preliminary data from the Copper Development Association Inc. (2010, p. 18–21), the total supply of copper and copper alloy products to the U.S. market by fabricators (brass mills, foundries, powder producers and wire mills), which included net imports, declined by about 23% in 2009 from the revised shipments for 2008 and was down by more than 50% from its peak in 2000. Wire-mill products accounted for about 51% of total shipments to the domestic market; brass mill products, 45%; and foundry and powder products, 4%. Consumption in the building construction sector, which remained the largest end-use market, declined by 25% and accounted for about 49% of shipments. The electric and electronic products (20% market share), transportation equipment (12% market share), consumer and general products (10% market share), and industrial machinery and equipment (9% market share) sectors declined by 25%, 13%, 26%, and 15%, respectively.

Prices and Stocks

Copper prices which tumbled during the fourth quarter of 2008 in response to the onset of the economic crisis (the monthly COMEX price average fell from a record high $3.76 per pound of copper in July to $1.39 per pound in December) trended upward throughout 2009 with the COMEX price averaging $3.19 per pound in December and $2.35 for the full year. The London Metal Exchange Ltd. (LME) and U.S. producer's price trends closely tracked that of the COMEX price, averaging $2.34 per pound and $2.41 per pound, respectively, for 2009.

For the second year in a row, global production of refined copper slightly exceeded demand, and reported yearend global inventories of refined copper rose by about 270,000 t in 2009 and 400,000 t during the 2-year period. Although global stocks rose from a minimum of 870,000 t in 2005, to 1.43 Mt at yearend 2009, they remained below their peak level of more than 2 Mt in 2002. Stocks at yearend 2009 represented about 4 weeks of global supply compared with about 3 weeks at yearend 2008 and 7 weeks in 2002 (International Copper Study Group, 20010a, p. 9).

Although first quarter 2009 and yearend inventories were up compared with those at yearend 2008, inventories in the second and third quarters of 2009 were at or below yearend 2008 levels. High import levels by China resulted in a relatively tight market through much of the year and encouraged the upward trend in copper prices. Chinese imports during the second quarter of 2009 totaled more than 1 Mt, and full-year imports rose by 112% to 3.18 Mt (International Copper Study Group, 2010a, p. 29).

Commodity exchange inventories [COMEX, LME, and Shanghai Futures Exchange (SHFE)] finished 2009 at about 688,000 t, 76% higher than yearend 2008 inventories. COMEX and LME inventories held in the United States rose to 373,000 t from 137,000 t at yearend 2008.

Copper scrap prices generally followed the trend in refined copper prices. With higher refined prices, however, the discount of most grades of copper scrap to refined copper increased. According to American Metal Market price data, the discount for refiners' No. 2 scrap from the COMEX price averaged 29.6 cents per pound for the year, below the average discount of 34.4 cents per pound in 2008, and ranged between 13.4 cents per pound in May and 47.2 cents per pound in December. Lower refined copper prices and high export demand, converged to narrow the discount during the second quarter of 2009. Though following the same trend, the discount for No. 1 brass mill scrap remained much smaller, averaging 8.6 cents per pound for the year, and ranging between 3.9 cents per pound in May to 14.1 cents per pound in December.

Foreign Trade

In response to weak demand, net refined copper imports in 2009 declined for the third consecutive year, falling by about 15% to 583,000 t, and were at their lowest level since 1998. Chile, Canada, and Peru were the leading sources of refined copper in 2009, accounting for 47%, 28%, and 19%, respectively of refined imports. From 2006 through 2009, Chile was the leading source of unwrought copper products (41%), followed by Canada (33%), and Peru (13%). Refined copper accounted for 82% of unwrought copper imports during the same period. Exports of copper contained in concentrates declined by 50% to 151,000 t owing to reduced mine production from nonintegrated producers and to increased smelter operating rates at integrated producers (maintenance shutdowns had reduced smelter output in 2008).

According to U.S. Census Bureau data compiled by the Copper and Brass Fabricators Council Inc. (2010, p. 1–9), in 2009, U.S. imports of copper and copper-alloy semifabricated products (excluding wire-rod mill products) were 194,000 t (down by 30% from those in 2008), exports were 98,000 t (down by 27%), and the resulting net imports declined by 33% to 95,600 t. Canada and Mexico collectively accounted for 66% of semifabricated copper exports and 27% of imports. China, with a 26% share, was the leading source of imports but was the destination for less than 9% of exports.

ABMS adjusted trade data indicate that the United States had only nominal net imports of copper wire rod in 2007, down from 35,000 t in 2008. Imports fell to 113,000 t from 156,000

t in 2008, and exports declined to 112,000 t from 121,000 t in 2008. The decline in net imports of wire rod, which have trended downward from a record peak of 221,000 t in 2005, have somewhat moderated the decline in U.S. consumption of refined copper. Canada remained the leading source of wire-rod imports (75%), followed by Russia (16%), and Mexico (7%). Mexico, (72%) and Canada (27%) were the recipients of nearly all wire-rod exports (American Bureau of Metal Statistics, Inc., 2010b).

Exports of copper and copper alloy scrap of 842,000 t were down by 66,000 t from those in 2008. China (including Hong Kong) was the destination for 78% of domestic scrap exports and, based on import data, accounted for 68% of reported global scrap trade of 6.2 Mt (International Copper Study Group, 2010a, p. 39–42).

World Review

World production of refined copper rose by about 90,000 t, less than 1%, in 2009 as increases in electrowon and secondary refined production were countered with reduced primary electrolytic copper production. World copper use, according to revised ICSG data, rose slightly in 2009 to about 18.2 Mt but remained slightly below the record high use in 2007. Consequently, the global market balance indicated a small production surplus of about 167,000 t in 2009, up slightly from 144,000 t in 2008. The 2-year surplus of about 300,000 t was essentially equal to the revised deficit for 2007. Stocks held on the more visible commodity exchanges rose by about 300,000 t to 688,000 t, and were at their highest level in 5 years. ICSG estimates of total reported inventories (exchanges, governments, and industry) rose by about 270,000 t to 1.43 Mt. Note that with the exception of exchange inventories, inventory levels in China were not reported and were discounted in these analyses. Consumption data for China are based on apparent consumption of refined copper (production, net trade, and SHFE stock changes) and did not account for changes in industry and government stock levels (International Copper Study Group, 2010a, p. 9–20).

World mine production of copper rose by about 420,000 t, about 3% compared with that of 2008, to a record-high 15.9 Mt. World copper mine production had remained relatively flat from 2005 to 2008, increasing by about 3% during the period. This low level of growth took place despite an estimated 11% capacity growth from 2005 to 2008, according to data compiled by the ICSG. Consequently, capacity utilization at global copper mines fell from 88.9% in 2005 to 83.1% in 2008. With global mine capacity increasing by about an additional 4% in 2009, capacity utilization fell to about 81.6% in 2009. Numerous factors contributed to the downward trend, including competition for labor, power, and equipment from a global boom in mineral commodity production; labor unrest; preferential mining of coproducts; political uncertainty; and technical problems associated with aging and expanding operations. In 2009, the sharp fall in prices during the fourth quarter of 2008 led to industry curtailments and delays or deferrals of anticipated projects (International Copper Study Group, 2010c, p. 13).

Production of copper in concentrates, which rose by about 260,000 t to 12.6 Mt, was insufficient to meet growing smelter demand, and concentrate supplies remained tight through most of 2009. Smelter production capacity increased by 700,000 t in 2009 and 2.3 Mt from the 2005 to 2009 period, while production of copper in concentrate increased by only about 300,000 t during the same period (International Copper Study Group, 2010c, p. 14). According to CRU International Ltd. (2010a, p. 67–72), consumption of copper in concentrates exceeded supply by about 180,000 t and fell far short of global demand as smelter capacity utilization fell to 69.5% from 72.2% in 2008. According to CRU, the cumulative 3-year deficit was about 450,000 t of copper in concentrate. The combined spot treatment (smelting) and refining charge (TC/RC), which had fallen to about 3 cents per pound during the third quarter of 2008, spiked back above 20 cents per pound in December 2008 and January 2009 following the onset of the economic crisis and announced smelter cutbacks. With renewed buying by Chinese smelters, the combined TC/RC fell sharply throughout 2009 and reportedly was back at the 3-cent-per-pound level during the fourth quarter of 2009. Spot TC/RCs have trended lower since 2005, when they averaged about 40 cents per pound of copper. Term contracts were much less volatile and averaged about 13 cents per pound during the fourth quarter.

Global consumption of refined copper rose by about 130,000 t to about 18.2 Mt but remained slightly below the level in 2007. Based on revised data, copper consumption in 2007 had risen by almost 1.2 Mt (7%). In 2009, for the third consecutive year, Asia, where apparent consumption rose by 18%, was the only major consuming region to experience demand growth. In China, where apparent consumption rose by a relatively modest 5% in 2008, apparent consumption rose by 38% to reach 7.18 Mt. China, which emerged as the leading world consumer in 2002 when it surpassed the United States, increasingly dominated global consumption with an almost 40% market share in 2009, up from only 11% in 1999. Note, however, that apparent consumption calculations for China do not include changes in unreported inventories that were thought to have been drawn down in 2008 and then built up in 2009. During 2009, China's growth in apparent refined copper consumption exceeded its growth in semimanufacture production. It was thought that significant growth in unreported inventories of refined copper and substitution of refined copper for scrap, contributed to the disparity. In India and the Republic of Korea, consumption rose by 7% and 16%, respectively, while in Japan and Taiwan, consumption declined by 26% and 15%, respectively. Consumption in North America, which accounted for 11% of global consumption in 2009, declined by 19% from that in 2008, and in Europe, which held a 21% market share, year-on-year consumption was down by 21% (International Copper Study Group, 2009, p. 25; 2010a, p. 19–20).

Owing to the global recession and overall lower commodity prices, relatively little global realignment of the copper industry took place during 2009. Corporación Nacional del Cobré de Chile (Codelco) regained its position as the leading global mine producer of copper, having narrowly relinquished that title in 2008 to FCX following FCX's acquisition of Phelps Dodge Corp. in 2007. Production by Codelco and FCX rose by

230,000 t and 100,000 t, respectively. BHP Billiton, Xstrata plc (Zug, Switzerland) (exclusive of Glencore's approximate 30% share), and Rio Tinto retained their positions as the third, fourth, and fifth leading producers, respectively. Combined, the top five producers accounted for 35% of global mine production. Codelco retained its position as the leading producer of refined copper and Norddeutsce Affinerie AG (Hamburg, Germany), renamed Arubis AG effective April 1, 2009, rose to second place following the acquisition of Cumerio SA (Olen, Belgium) in March 2008. FCX fell to the third ranked producer, Jiangxi Copper Corp. (Guixi City, Jiangxi Province, China) rose to fourth, and Xstrata fell to the fifth position. The top 5 producers accounted for 26% of global copper mine production, and the top 10 producers accounted for 46% (CRU International Ltd., 2010b, p. 266).

Mine Production.—In 2009, world mine production capacity continued its strong upward growth and, according to ICSG estimates, increased by about 750,000 t (4%). Significant capacity growth took place in Australia (105,000 t), China (40,000 t), Congo (Kinshasa) (150,000 t), and Zambia (225,000 t). The remaining growth was attributable to small (less than 40,000-t increases) in several other countries. In Chile and Peru, the two leading growth engines for copper mine capacity in the past decade, capacity was essentially unchanged in 2009 (International Copper Study Group, 2010b, p. 17; c, p. 17).

In Australia, OZ Minerals Ltd. (Melbourne, Australia) began production in February at its Prominent Hill Mine. At capacity, it was expected to produce 110,000 t/yr of copper in concentrate for at least 4 years. In Congo (Kinshasa), capacity continued to increase at several mines that began production in 2007, including 15,000 t/yr of additional concentrate production capacity at the Frontier Mine (First Quantum Minerals Ltd., Vancouver); 30,000 t/yr of additional electrowon capacity at the Kamoto Mine (Katanga Mining Ltd., Baar, Switzerland); 60,000 t/yr of additional electrowon capacity at the Luita Mine (Cental African Mining and Exploration Co., London); and 16,000 t/yr of additional electrowon capacity at the Ruashi II Mine (Metorex Ltd., Johannesburg, South Africa). The Tenke Fungarume Mine (57.75% owned by FCX), which along with Prominent Hill were the only significant greenfield startups in 2009, began production in March and was expected to reach full capacity of 115,000 t/yr in 2010. In Zambia, the Kansanshi Mine (First Quantum Minerals) increased concentrate and electrowon capacities by 15,000 t/yr and 30,000t/yr, respectively; the Lumwana Mine (Equinox Minerals Ltd., Perth, Australia, and Toronto) reached capacity of 170,000 t/yr following a delayed startup in 2008 owing to a fire (International Copper Study Group, 2010b, p. 34–73).

The global mine capacity utilization rate fell for the fourth consecutive year to about 81.5% in 2009 and was at its lowest level in more than 10 years. Production in 2009 continued to suffer from a number of technical and geopolitical problems that plagued production in the previous several years, but was more significantly affected by project delays and cutbacks inspired by the rapid decline in copper prices. According to CRU International Ltd., almost 700,000 t of mine cutbacks or closures had been announced by the end of the first quarter of 2009 (CRU International Ltd., 2009a, p. 6). Average production costs for most producers, which had risen sharply from 2006 to 2008, stabilized or declined during 2009, in part owing to these cutbacks, and in part owing to lower input costs. FCX reported that its North American net unit cash costs decreased to $1.11 per pound of copper from $1.33 per pound in 2008, despite lower molybdenum byproduct credits, owing to cost reductions and efficiency improvements, including lower operating rates, and to lower energy costs. FCX's South American production costs, inclusive of gold and molybdenum credits, decreased to $1.12 per pound of copper from $1.14 per pound in 2008 (Freeport-McMoRan Copper & Gold Inc., 2010a, p. 6–7). Grupo México reported that Southern Copper Corp. lowered its cash operating costs to $1.34 per pound of copper, exclusive of byproduct credits, from $1.63 per pound in 2008 (Grupo México, S.A.B. de C.V., 2010a, p. 8).

Smelter and Refinery Production.—According to the ICSG, world smelter production capacity rose by about 700,000 t/yr to 18.2 million metric tons per year (Mt/yr), mostly because of increases from operations being expanded during 2006 to 2009. China (410,000 t/yr), Chile, (85,000 t/yr), Poland (60,000 t/yr), Zambia (55,000 t/yr), and the Republic of Korea (40,000 t/yr) accounted for most of the increase in smelter capacity. In Chile, expansions of the Al Norte (Xstrata) and Codelco Norte smelters were completed; in China expansions of the Guixi (Jiangxi Copper Corp.), Jinchuan (Jinchuan Nonferrous Metals Group), and Tongling II (Tongling Nonferrous Metals Corp.) smelters were completed; and in Poland, the Glogow I (KGHM) blast furnace was replaced by a higher capacity flash smelter. In Zambia, the Chambishi [China Nonferrous Metal Mining (Group) Co., Ltd.] Isasmelt process smelter (150,000 t/yr), and the Nchanga (Konkola Copper Mines) Outokumpu flash smelter (250,000 t/yr at full capacity) were the only greenfield smelters to come onstream in 2009, though the latter was a replacement for the Nkana reverberatory smelter closed during 2009 (International Copper Study Group, 2010b, p. 71–80; 2010c, p. 58–81).

Global copper refinery capacity rose by 840,000 t/yr to 23.6 Mt/yr. About 300,000 t/yr of the refinery capacity increase came from electowinning associated with mine leach operations, mostly in Congo (Kinshasa) (150,000 t/yr), Chile (115,000 t/yr), and Zambia (50,000 t/yr), partially offset by declines in Australia and the United States. Electrolytic refinery capacity increases in China (340,000 t/yr) and Zambia (110,000 t/yr) were mostly related to smelter expansions. In China, the greenfield Baiyin electrolytic refinery (Baiyin Nonferrous Metals) was constructed to match existing smelter capacity of 100,000 t/yr. Its projected capacity of 300,000 t/yr was expected to exceed the proposed expansion of the Baiyan smelter to 200,000 t/yr (International Copper Study Group, 2010b, p. 71–83; 2010c, p. 81–109).

Outlook

Refined copper prices, which began 2010 above $3.00 per pound, fluctuated sharply through several cycles during the first 9 months of the year, the LME price ranging between $2.76 per pound (June 7) and $3.65 per pound (September 30), and averaging $3.25 during the period. Though fluctuating on a

daily basis, copper prices maintained an upward trend during the fourth quarter of 2010 with the COMEX price averaging $3.77 per pound of copper in October and $3.84 per pound in November. In December, prices began a precipitous climb, the COMEX price surpassing the previous record-high price of $4.08 (July 2, 2008) on December 8 and climbing to a new record-high of $4.44 per pound at yearend. According to preliminary ICSG data, world apparent consumption of refined copper for 2010 totaled 19.4 Mt, an increase of 1.25 Mt (7%) from that in 2009, exceeding production of refined copper by about 300,000 t. While refined copper production rose by about 770,000 t in 2010 from that in 2009, world mine production rose by only about 160,000 t. Most of the discrepancy between mine and refinery production growth was attributed to increased production of secondary refined copper, which rose to 3.32 Mt from 2.79 Mt during the same comparative periods (International Copper Study Group, 2011).

In the United States, mine and refinery production continued to decline in 2010 owing to mine cutbacks instituted at yearend 2008 and lower ore grades. The White Pine electrolytic refinery in Michigan that treated imported anode closed in August. U.S. copper mine production was expected to rise by more than 100,000 t in 2011 owing to expansions and restoration of cutbacks. Domestic consumption of refined copper rose by about 5% in 2010 but remained below the 2008 level.

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TABLE 1

SALIENT COPPER STATISTICS[1]

(Metric tons, unless otherwise specified)

		2005	2006	2007	2008	2009
United States:						
Mine production:						
Ore concentrated	thousand metric tons	154,000	163,000	138,000	156,000	149,000
Average yield of concentrated ore	percent	0.37	0.40	0.46 r	0.50	0.46
Recoverable copper:						
Arizona		690,000	712,000	731,000	836,000	711,000
New Mexico		131,000	113,000	108,000	104,000	56,500
Other States		319,000	372,000	329,000	368,000	414,000
Total		1,140,000	1,200,000	1,170,000	1,310,000	1,180,000
Total value	millions	$4,360	$8,310	$8,450	$9,200	$6,290
Smelter production:						
Primary and secondary		523,000	501,000	617,000	574,000	597,000
Byproduct sulfuric acid, sulfur content	thousand metric tons	575	576	720	655	682 e
Refinery production:						
Primary materials:						
Electrolytic from domestic ores		524,000	531,000	702,000	603,000	588,000
Electrolytic from foreign materials		130,000	144,000	62,100	109,000	48,300
Electrowon		554,000	530,000	504,000	507,000	476,000
Total		1,210,000	1,210,000	1,270,000	1,220,000	1,110,000
Secondary materials (scrap), electrolytic and fire refined		47,200	44,800	46,000	53,800	46,400
Grand total		1,260,000	1,250,000	1,310,000	1,270,000	1,160,000
Secondary copper produced:						
Recovered from new scrap		769,000	819,000	767,000	697,000	638,000
Recovered from old scrap		183,000	151,000	158,000	156,000 r	137,000
Total		953,000	969,000	925,000	852,000 r	774,000
Copper sulfate production		25,600	19,500	22,600	22,000	22,400
Exports, refined		39,500	106,000	51,100	36,500	80,800
Imports, refined		1,000,000	1,070,000	829,000	724,000	664,000
Stocks, December 31:						
Blister and in-process material		44,300	18,800	26,300	24,100 r	15,500
Refined copper:						
Refineries		8,190	28,100	21,800	18,300 r	23,700
Wire-rod mills		20,400	21,500	20,600	31,700 r	25,300
Brass mills		24,500	34,500	10,400	8,340	7,610
Other industry		3,350	3,280	3,220	3,230	4,290
COMEX		6,180	30,900	13,500	31,300	90,000
London Metal Exchange (LME), U.S. warehouses		800	75,600	60,600	106,000	283,000
Total		63,500	194,000	130,000	199,000 r	434,000
Consumption:						
Refined copper, reported		2,270,000	2,110,000	2,140,000	2,020,000	1,650,000
Apparent consumption, primary refined and old scrap[2]		2,420,000	2,200,000	2,270,000	1,990,000 r	1,580,000
Price:						
Producer, weighted average	cents per pound	173.49	314.75	328.00	319.16	241.24
COMEX, first position	do.	168.23	308.94	322.17	313.35	235.42
LME, Grade A cash	do.	166.84	304.85	322.83	315.47	233.56
World, production:						
Mine	thousand metric tons	15,000	15,100 r	15,500	15,400	15,900 e
Smelter	do.	13,500 r	14,100 r	14,300	14,700	14,500 e
Refinery	do.	16,600 r	17,300	17,900 r	18,300 r	18,400 e

eEstimated. rRevised. do. Ditto.

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

[2]In 2005, 2006, 2007, 2008, and 2009, apparent consumption is calculated using general imports of 977,000 metric tons (t), 1,080,000 t, 832,000 t, 721,000 t, and 645,000 t, respectively.

TABLE 2

LEADING COPPER-PRODUCING MINES IN THE UNITED STATES IN 2009, IN ORDER OF OUTPUT[1]

Rank	Mine	County and State	Operator	Source of copper	Capacity (thousand metric tons)
1	Bingham Canyon	Salt Lake, UT	Kennecott Utah Copper Corp.[2]	Copper-molybdenum ore, concentrated and leached	300
2	Morenci	Greenlee, AZ	Freeport-McMoRan Copper & Gold Inc.	Copper-molybdenum ore, concentrated and leached	400
3	Bagdad	Yavapai, AZ	do.	do.	110
4	Ray	Pinal, AZ	ASARCO LLC	Copper ore, concentrated and leached	140
5	Sierrita	Pima, AZ	Freeport-McMoRan Copper & Gold Inc.	Copper-molybdenum ore, concentrated and leached	90
6	Safford	Graham, AZ	do.	Copper ore, leached	110
7	Mission Complex	Pima, AZ	ASARCO LLC	Copper-molybdenum ore, concentrated	70
8	Robinson	White Pine, NV	Quadra Mining Ltd.	do.	70
9	Tyrone	Grant, NM	Freeport-McMoRan Copper & Gold Inc.	Copper ore, leached	50
10	Continental Pit	Silver Bow, MT	Montana Resources	Copper-molybdenum ore, concentrated	40
11	Silver Bell	Pima, AZ	ASARCO LLC	Copper ore, leached	22
12	Chino	Grant, NM	Freeport-McMoRan Copper & Gold Inc.	Copper-molybdenum ore, leached	135
13	Phoenix	Lander, NV	Newmont Mining Corp.	Gold-copper ore, concentrated	15
14	Mineral Park	Mohave, AZ	Mercator Minerals Ltd.	Copper-molybdenum ore, concentrated and leached	17
15	Carlota	Gila, AZ	Quadra Mining Ltd.	Copper ore, leached	25
16	Miami	do.	Freeport-McMoRan Copper & Gold Inc.	do.	50
17	Pinto Valley	do.	BHP Billiton	do.	75
18	Lisbon Valley	San Juan, UT	Constellation Copper Corp.	do.	5

do. Ditto.

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

[2]Wholly owned subsidiary of Rio Tinto plc.

TABLE 3

MINE PRODUCTION OF COPPER-BEARING ORES AND RECOVERABLE COPPER CONTENT OF ORES PRODUCED IN THE UNITED STATES, BY SOURCE AND TREATMENT PROCESS[1]

(Metric tons)

	2008		2009	
Source and treatment process	Gross weight[2]	Recoverable copper	Gross weight[2]	Recoverable copper
Mined copper ore:				
Concentrated	156,000,000	773,000 r	149,000,000	683,000
Leached	NA	507,000	NA	476,000
Total	NA	1,280,000 r	NA	1,160,000
Copper precipitates shipped, leached from tailings, dumps, and in-place material	NA	3,490	NA	W
Other copper-bearing ores[3]	5,300,000	23,600 r	4,480,000	21,900
Grand total	XX	1,310,000	XX	1,180,000

rRevised. NA Not available. W Withheld to avoid disclosing company proprietary data; included with "Other copper-bearing ores." XX Not applicable.

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

[2]In 2009, 23,300 kilograms of gold and 274 metric tons of silver were recovered from concentrated ore. The average value of gold and silver per metric ton of ore concentrated was $3.07.

[3]Includes gold ore, lead ore, silver ore, and zinc ore.

TABLE 4

CONSUMPTION OF COPPER AND BRASS MATERIALS IN THE UNITED STATES, BY ITEM[1]

(Metric tons)

Item	Brass mills	Wire-rod mills	Foundries, chemical plants, miscellaneous users	Smelters, refiners, ingot makers	Total
2008:					
Copper scrap	739,000 [r, 2]	W	64,700 [r]	193,000 [r]	997,000 [r]
Refined copper[3]	479,000	1,490,000	45,500	4,520 [r]	2,020,000
Hardeners and master alloys	10,000	--	2,930	--	13,000
Brass ingots	--	--	77,700 [r]	--	77,700 [r]
Slab zinc	44,300	--	(4)	(4)	107,000
2009:					
Copper scrap	688,000 [2]	W	66,500	159,000	914,000
Refined copper[3]	454,000	1,140,000	49,500	4,510	1,650,000
Hardeners and master alloys	9,990	--	3,090	--	13,100
Brass ingots	--	--	55,500	--	55,500
Slab zinc	44,800	--	(4)	(4)	107,000

[r]Revised. W Withheld to avoid disclosing company proprietary data; included with "Brass mills." -- Zero.

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

[2]Includes item indicated by symbol W.

[3]Detailed information on consumption of refined copper can be found in table 5.

[4]Withheld to avoid disclosing company proprietary data; included in "Total."

TABLE 5

CONSUMPTION OF REFINED COPPER SHAPES IN THE UNITED STATES, BY CLASS OF CONSUMER[1]

(Metric tons)

Class of consumer	Cathodes	Ingots and ingot bars	Cakes and slabs	Wirebar, billets, other	Total
2008:					
Wire-rod mills	1,490,000	--	W	2,890	1,490,000
Brass mills	323,000	24,200	45,000	86,300	479,000
Chemical plants	--	--	--	344	344
Ingot makers	W	W	W	4,520 [2]	4,520
Foundries	4,670	4,440	--	11,300	20,400
Miscellaneous[3]	W	W	W	24,700 [2]	24,700
Total	1,820,000	28,600	45,000	130,000	2,020,000
2009:					
Wire-rod mills	1,140,000	--	--	4,620	1,140,000
Brass mills	313,000	24,200	43,600	72,800	454,000
Chemical plants	--	--	--	367	367
Ingot makers	W	W	W	4,510 [2]	4,510
Foundries	3,450	3,240	--	12,400	19,100
Miscellaneous[3]	W	W	W	30,100 [2]	30,100
Total	1,450,000	27,400	43,600	125,000	1,650,000

W Withheld to avoid disclosing company proprietary data; included with "Wirebar, billets, other." -- Zero.

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

[2]Includes items indicated by symbol W.

[3]Includes consumers of copper powder and copper shot, iron and steel plants, and other manufacturers.

TABLE 6
COPPER RECOVERED FROM SCRAP PROCESSED IN THE UNITED STATES,
BY KIND OF SCRAP AND FORM OF RECOVERY[1]

(Metric tons)

	2008	2009
Kind of scrap:		
New scrap:		
Copper-base	659,000	608,000
Aluminum-base	37,700 r	29,400
Nickel-base	18	18
Total	697,000	638,000
Old scrap:		
Copper-base	133,000 r	120,000
Aluminum-base	22,900 r	16,700
Nickel-base	275	267
Zinc-base	9	9
Total	156,000 r	137,000
Grand total	852,000 r	774,000
Form of recovery:		
As unalloyed copper	55,000	47,100
In brass and bronze	731,000 r	675,000
In alloy iron and steel	677	673
In aluminum alloys	60,700 r	46,100
In other alloys	8	8
In chemical compounds	5,040	5,030
Total	852,000 r	774,000

rRevised.

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

TABLE 7
COPPER RECOVERED AS REFINED COPPER AND IN ALLOYS AND OTHER FORMS
FROM COPPER-BASE SCRAP PROCESSED IN THE UNITED STATES, BY TYPE OF OPERATION[1]

(Metric tons)

	From new scrap		From old scrap		Total	
Type of operation	2008	2009	2008	2009	2008	2009
Ingot makers	15,400 r	11,500	76,500 r	62,400	91,900 r	73,900
Refineries[2]	26,900	20,800	26,900	25,600	53,800	46,400
Brass and wire-rod mills	584,000	545,000	17,000	16,500	601,000	561,000
Foundries and manufacturers	27,200	25,900	12,300	15,200	39,500	41,000
Chemical plants	5,030	5,030	6	--	5,040	5,030
Total	659,000	608,000	133,000 r	120,000	792,000 r	728,000

rRevised. -- Zero.

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

[2]Includes electrolytically refined based on source of material at smelter level.

TABLE 8
PRODUCTION OF SECONDARY COPPER AND COPPER-ALLOY PRODUCTS
IN THE UNITED STATES, BY ITEM PRODUCED FROM SCRAP[1]

(Metric tons)

Item produced from scrap	2008	2009
Unalloyed copper products:		
Refined copper	53,800	46,400
Copper powder	1,070	587
Copper castings	136	82
Total	55,000	47,100
Alloyed copper products:		
Brass and bronze ingots:		
Tin bronzes	9,050	6,890
Leaded red brass and semired brass	65,300	52,400
High leaded tin bronze	10,400	7,330
Yellow brass	5,570	4,870
Manganese bronze	7,660	7,260
Aluminum bronze	6,600	5,860
Nickel silver	1,570	1,060
Silicon bronze and brass	5,750	4,710
Copper-base hardeners and master alloys	7,660	7,670
Miscellaneous	6,270	6,090
Total	126,000	104,000
Brass mill and wire-rod mill products	725,000	678,000
Brass and bronze castings	38,600	38,300
Copper in chemical products	5,040	5,030
Grand total	949,000	873,000

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

TABLE 9
COMPOSITION OF SECONDARY COPPER-ALLOY PRODUCTION IN THE UNITED STATES[1]

(Metric tons)

	Copper	Tin	Lead	Zinc	Nickel	Aluminum	Total
Brass and bronze ingot production:[2]							
2008	106,000 r	3,810 r	5,830 r	10,500	160	12	126,000
2009	85,900	3,610	5,320	9,220	116	11	104,000
Secondary metal content of brass mill products:							
2008	601,000	1,400	2,580	118,000	1,390	18	725,000
2009	565,000	1,180	2,270	109,000	860	16	678,000
Secondary metal content of brass and bronze castings:							
2008	35,200	1,170 r	604	1,450	81	74	38,600
2009	34,800	1,170	572	1,500	134	97	38,300

rRevised.

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

[2]Includes approximately 96% from scrap and 4% from other than scrap in 2008 and 2009.

TABLE 10

CONSUMPTION AND YEAREND STOCKS OF COPPER-BASE SCRAP[1]

(Metric tons, gross weight)

Scrap type and processor	2008		2009	
	Consumption	Stocks	Consumption	Stocks
Unalloyed scrap:				
No.1 wire and heavy:				
Smelters, refiners, and ingot makers	61,800	1,240 r	45,000	968
Brass and wire-rod mills	353,000	(2)	332,000	(2)
Foundries and miscellaneous manufacturers	19,000	(2)	16,800	(2)
No. 2 mixed heavy and light:				
Smelters, refiners, and ingot makers	42,300 r	2,650 r	40,600	2,240
Brass and wire-rod mills	12,600	(2)	8,590	(2)
Foundries and miscellaneous manufacturers	3,130	(2)	6,450	(2)
Total unalloyed scrap:				
Smelters, refiners, and ingot makers	104,000	3,890 r	85,600	3,210
Brass and wire-rod mills	366,000	13,500	341,000	14,100
Foundries and miscellaneous manufacturers	22,200	1,490	23,300	1,670
Alloyed scrap:				
Red brass:[3]				
Smelters, refiners, and ingot makers	26,900 r	1,400 r	20,600	1,550
Brass mills	11,700	(2)	9,230	(2)
Foundries and miscellaneous manufacturers	5,480	(2)	5,950	(2)
Leaded yellow brass:				
Smelters, refiners, and ingot makers	11,500 r	735 r	9,970	640
Brass mills	132,000	(2)	116,000	(2)
Foundries and miscellaneous manufacturers	1,230	(2)	1,000	(2)
Yellow and low brass, all plants	143,000	509 r	127,000	525
Cartridge cases and brass, all plants	74,100	(2)	87,800	(2)
Auto radiators:				
Smelters, refiners, and ingot makers	26,000 r	666 r	20,200	774
Foundries and miscellaneous manufacturers	1,950	(2)	1,900	(2)
Bronzes:				
Smelters, refiners, and ingot makers	12,800 r	806 r	10,800	612
Brass mills and miscellaneous manufacturers	16,100	(2)	15,800	(2)
Nickel-copper alloys, all plants	13,100	148 r	8,460	117
Low grade and residues; smelters, refiners, miscellaneous manufacturers	23,300	588 r	23,300	598
Other alloy scrap:[4]				
Smelters, refiners, and ingot makers	1,140 r	230 r	1,110	191
Brass mills and miscellaneous manufacturers	4,990	(2)	5,270	(2)
Total alloyed scrap:				
Smelters, refiners, and ingot makers	89,200 r	5,080 r	73,700	5,010
Brass mills	373,000	22,200	347,000	18,300
Foundries and miscellaneous manufacturers	42,600	2,180 r	43,200	2,940
Total scrap:				
Smelters, refiners, and ingot makers	193,000 r	8,970 r	159,000	8,220
Brass and wire-rod mills	739,000	35,800	688,000	32,500
Foundries and miscellaneous manufacturers	64,700 r	3,670 r	66,500	4,610

rRevised.

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

[2]Individual breakdown is not available; included in “Total unalloyed scrap,” “Total alloyed scrap,” and “Total scrap.”

[3]Includes cocks and faucets, commercial bronze, composition turnings, gilding metal, railroad car boxes, and silicon bronze.

[4]Includes aluminum bronze, beryllium copper, and refinery brass.

TABLE 11
CONSUMPTION OF PURCHASED COPPER-BASE SCRAP[1, 2]

(Metric tons, gross weight)

Type of operation	From new scrap		From old scrap		Total	
	2008	2009	2008	2009	2008	2009
Ingot makers	34,600 r	34,500	105,000	77,600	140,000	112,000
Smelters and refineries	28,700	24,300	25,100	22,900	53,800	47,200
Brass and wire-rod mills	721,000	671,000	17,200	16,900	739,000	688,000
Foundries and miscellaneous manufacturers	50,700	48,200	14,000	18,300	64,800	66,500
Total	836,000 r	778,000	161,000	136,000	997,000 r	914,000

rRevised.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Consumption at brass and wire-rod mills assumed equal to receipts.

TABLE 12
FOUNDRIES AND MISCELLANEOUS MANUFACTURERS CONSUMPTION OF BRASS INGOT, REFINED COPPER, AND COPPER SCRAP IN THE UNITED STATES[1]

(Metric tons)

Ingot type or material consumed	2008	2009
Tin bronzes	13,800	8,340
Leaded red brass and semired brass	47,600 r	33,700
Yellow, leaded, low brass[2]	7,020 r	6,080
Manganese bronze	3,460	2,240
Nickel silver[3]	498	620
Aluminum bronze	3,580	3,020
Hardeners and master alloys[4]	2,930	3,090
Lead free alloys[5]	1,650	1,420
Total brass ingot	80,600 r	58,500
Refined copper	45,500	49,500
Copper scrap	64,800	66,500

rRevised.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Includes brass and silicon bronze.
[3]Includes brass, copper nickel, and nickel bronze.
[4]Includes special alloys.
[5]Includes copper-bismuth and copper-bismuth-selenium alloys.

TABLE 13
AVERAGE PRICES FOR COPPER SCRAP, BY TYPE

(Cents per pound)

			Dealers' buying (New York)	
Year	Brass mills No. 1 scrap	Refiners No. 2 scrap	No. 2 scrap	Red brass turnings and borings
2008	300.55	279.08	217.11	143.85
2009	226.83	205.85	159.16	112.93

Source: American Metal Market.

TABLE 14

U.S. EXPORTS OF UNMANUFACTURED COPPER (COPPER CONTENT), BY COUNTRY[1]

	Ore and concentrate[2]		Matte, ash, and precipitates		Refined		Unalloyed copper scrap		Blister and anodes		Total	
Country	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
2008	301,000	$1,530,000	46,200	$99,200	36,500	$182,000	278,000	$1,320,000	23,500	$112,000	686,000 r	$3,240,000 r
2009:												
Belgium	1	7	609	1,080	16	27	2,160	7,750	118	384	2,900	9,250
Canada	22,400	96,900	35,700	52,100	11,200	51,300	6,320	34,800	14,100	35,800	89,800	271,000
China	57,500	284,000	1,260	6,230	41,400	190,000	190,000	617,000	573	3,350	291,000	1,100,000
Germany	--	--	1,690	2,270	99	564	1,510	6,510	3,300	15,000	6,600	24,300
Hong Kong	(3)	3	--	--	3,570	21,100	15,600	63,100	1,740	10,100	20,900	94,300
India	--	--	--	--	59	154	356	1,480	148	844	563	2,470
Japan	21,400	124,000	176	997	81	463	3,220	15,900	478	2,860	25,400	144,000
Korea, Republic of	9,030	50,500	--	--	23	88	8,400	36,500	2,920	18,900	20,400	106,000
Mexico	36,700	166,000	--	--	7,950	36,200	1,580	8,770	44	257	46,200	211,000
Taiwan	--	--	75	347	534	2,240	6,980	23,300	441	2,020	8,030	27,900
Other	3,770	22,100	1,420	813	15,900	72,700	8,420	40,900	2,070	9,210	31,600	146,000
Total	151,000	743,000	40,900	63,800	80,800	375,000	245,000	856,000	26,000	98,600	543,000	2,140,000

rRevised. -- Zero.

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

[2]Data for 2009 adjusted by the U.S. Geological Survey to reflect estimated copper content.

[3]Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 15

U.S. EXPORTS OF COPPER SEMIMANUFACTURES, BY COUNTRY[1]

Country	Pipes and tubing		Plates, sheets, foil, bars		Bare wire, including wire rod[2]		Wire and cable, stranded		Copper sulfate	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
2008	24,900	$226,000	31,900	$283,000	139,000	$1,160,000	20,700	$196,000	5,430	$9,700
2009:										
Australia	26	219	25	199	8	104	55	626	--	--
Brazil	20	203	32	401	3	96	17	310	1	4
Canada	4,640	39,300	9,160	54,600	34,600	185,000	5,910	36,400	2,420	4,810
China	121	1,180	2,100	9,020	1,780	7,300	578	9,960	399	744
Denmark	(3)	5	9	368	1	5	5	185	--	--
France	1	44	28	394	8	144	37	1,220	1	4
Germany	3	63	99	2,170	382	9,310	47	2,630	36	61
Hong Kong	15	86	100	1,190	172	773	82	1,960	--	--
Italy	18	320	27	219	15	289	8	190	79	63
Japan	3	36	127	2,410	13	227	236	2,230	6	5
Korea, Republic of	71	806	490	3,410	22	305	165	3,160	11	37
Malaysia	19	147	107	1,210	75	2,900	14	470	23	30
Mexico	13,500	99,600	6,420	48,700	86,900	446,000	8,890	54,400	141	231
Netherlands	38	345	50	1,070	15	263	28	1,300	72	73
Saudi Arabia	1,080	7,620	64	422	--	--	149	1,680	56	45
Singapore	17	143	74	523	19	131	144	2,060	5	6
Sweden	--	--	6	20	39	346	3	69	1	5
Taiwan	--	--	1,120	5,020	8	192	34	826	754	1,040
Thailand	19	246	39	540	26	264	15	287	--	--
United Kingdom	410	2,330	23	373	78	665	238	2,430	--	--
Other	1,250	11,300	588	5,450	1,430	13,600	3,760	40,300	1,880	2,550
Total	21,200	164,000	20,700	138,000	126,000	668,000	20,400	163,000	5,880	9,700

-- Zero.

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

[2]Total exports of wire rod in 2008 were 126,000 metric tons (t) valued at $1,010 million, and in 2009, wire rod exports were 112,000 t valued at $594 million.

[3]Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 16

U.S. IMPORTS FOR CONSUMPTION OF UNMANUFACTURED COPPER (COPPER CONTENT), BY COUNTRY[1]

	Ore and concentrate		Matte, ash, and precipitates		Blister and anode		Refined		Unalloyed scrap		Total	
Country	Quantity (metric tons)	Value[2] (thousands)	Quantity (metric tons)	Value[2] (thousands)	Quantity (metric tons)	Value[2] (thousands)	Quantity (metric tons)	Value[2] (thousands)	Quantity (metric tons)	Value[2] (thousands)	Quantity (metric tons)	Value[2] (thousands)
2008	640	$1,030	1,170	$5,140	122,000	$912,000	724,000	$5,290,000	32,800	$172,000	881,000	$6,380,000
2009:												
Belgium	--	--	7	33	--	--	5	32	--	--	12	65
Brazil	--	--	--	--	--	--	10,800	49,300	--	--	10,800	49,300
Canada	137	271	420	1,260	61,800	303,000	189,000	919,000	7,340	32,500	259,000	1,260,000
Chile	--	--	--	--	--	--	312,000	1,460,000	25	151	312,000	1,460,000
Costa Rica	--	--	--	--	--	--	--	--	275	436	275	436
Dominican Republic	--	--	--	--	--	--	--	--	753	1,100	753	1,100
Finland	--	--	--	--	266	1,210	(3)	5	--	--	266	1,210
Germany	--	--	22	139	(3)	11	2,510	13,300	88	54	2,620	13,500
Honduras	--	--	--	--	--	--	--	--	474	933	474	933
Japan	--	--	66	38	6	569	3,600	22,600	16	35	3,690	23,200
Mexico	--	--	--	--	6,270	82,800	19,600	96,900	4,840	11,500	30,700	191,000
Peru	--	--	--	--	--	--	124,000	552,000	--	--	124,000	552,000
Taiwan	--	--	15	56	--	--	--	--	--	--	15	56
United Kingdom	--	--	--	--	6	269	(3)	27	--	--	7	297
Other	--	--	229	741	137	979	1,510	9,330	2,480	5,300	4,360	16,400
Total	137	271	759	2,260	68,400	389,000	664,000	3,120,000	16,300	52,000	749,000	3,570,000

-- Zero.

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

[2]Cost, insurance, freight value at U.S. port.

[3]Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 17

U.S. IMPORTS FOR CONSUMPTION OF COPPER SEMIMANUFACTURES, BY COUNTRY[1]

	Pipes and tubing		Plates, sheets, foil, bars		Bare wire, including wire rod[2]		Wire and cable, stranded		Copper sulfate	
Country	Quantity (metric tons)	Value[3] (thousands)	Quantity (metric tons)	Value[3] (thousands)	Quantity (metric tons)	Value[3] (thousands)	Quantity (metric tons)	Value[3] (thousands)	Quantity (metric tons)	Value[3] (thousands)
2008	970	$11,100	61,700 r	$560,000 r	163,000	$1,220,000	18,600	$172,000	56,800	$125,000
2009:										
Australia	--	--	--	--	20	134	(4)	11	--	--
Belgium	--	--	155	2,000	(4)	3	--	--	1	5
Brazil	--	--	849	4,690	2	15	1	11	--	--
Canada	7	90	442	3,140	89,500	458,000	302	2,740	4,350	6,540
Chile	8	64	3,390	18,300	--	--	--	--	4,140	7,120
China	219	681	1,800	10,900	63	1,070	60	444	5,320	13,400
Finland	94	1,300	1,740	14,400	300	1,880	49	238	1	5
France	1	157	1,630	9,480	22	839	25	531	--	--
Germany	319	3,450	16,300	117,000	692	5,260	450	3,560	342	376
Israel	--	--	16	99	144	1,050	--	--	--	--
Italy	(4)	15	24	223	4	137	10	138	(4)	3
Japan	(4)	9	1,510	14,800	262	5,350	(4)	39	32	581
Korea, Republic of	(4)	20	749	3,910	7	101	1,080	6,120	--	--
Luxembourg	--	--	1,170	12,600	--	--	--	--	--	--
Mexico	982	6,630	4,170	23,700	9,020	42,800	465	2,490	31,300	54,000
Peru	--	--	3,950	22,200	325	1,590	8	37	266	417
Russia	--	--	--	--	18,300	61,300	--	--	1,020	1,890
Sweden	--	--	3,240	22,000	110	1,360	--	--	--	--
Taiwan	1	12	144	1,840	126	700	15	322	2,320	3,540
Turkey	--	--	1	7	22	113	7,470	44,800	--	--
United Kingdom	(4)	26	455	3,460	82	198	1	58	--	--
Other	43	216	782	5,460	1,300	11,400	950	8,010	269	433
Total	1,670	12,700	42,500	290,000	120,000	594,000	10,900	69,600	49,300	88,200

rRevised. -- Zero.

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

[2]Total imports of wire rod in 2008 were 156,000 metric tons (t) valued at $1.15 billion, and in 2009, wire rod imports were 113,000 t valued at $542 million.

[3]Cost, insurance, freight value at U.S. port.

[4]Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 18

U.S. EXPORTS OF COPPER SCRAP, BY COUNTRY[1]

	Unalloyed copper scrap				Copper-alloy scrap			
	2008		2009		2008		2009	
Country	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Belgium	2,570	$7,370	2,160	$7,750	17,900	$41,700	14,900	$31,800
Canada	9,830	65,900	6,320	34,800	39,000	156,000	32,300	91,500
China	186,000	787,000	190,000	617,000	421,000	977,000	416,000	693,000
Germany	4,280	14,200	1,510	6,510	10,300	48,500	6,600	31,900
Hong Kong	21,200	124,000	15,600	63,100	50,800	100,000	37,400	85,600
India	1,970	3,570	356	1,480	9,340	26,900	11,100	23,200
Japan	8,720	59,400	3,220	15,900	13,100	65,500	10,200	46,200
Korea, Republic of	19,800	123,000	8,400	36,500	21,900	86,500	21,500	48,800
Mexico	1,960	12,800	1,580	8,770	5,970	37,200	9,990	41,300
Taiwan	4,900	26,400	6,980	23,300	9,920	16,800	6,510	5,680
Other	17,800	95,300	8,420	40,900	30,600	86,700	31,200	52,300
Total	278,000	1,320,000	245,000	856,000	630,000	1,640,000	598,000	1,150,000

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

Source: U.S. Census Bureau.

TABLE 19

U.S. IMPORTS FOR CONSUMPTION OF COPPER SCRAP, BY COUNTRY[1]

	Unalloyed copper scrap		Copper-alloy scrap		
Country or territory	Quantity (metric tons)	Value[2] (thousands)	Gross weight (metric tons)	Copper content[3] (metric tons)	Value[2] (thousands)
2008	32,800	$172,000	73,500	53,000	$313,000
2009:					
Canada	7,340	32,500	24,900	17,900	97,300
Chile	25	151	230	166	1,060
Costa Rica	275	436	1,290	929	4,760
Dominican Republic	753	1,100	907	653	1,020
Guatemala	272	490	433	312	1,300
Honduras	474	933	355	256	1,320
Jamaica	198	303	334	241	402
Mexico	4,840	11,500	22,900	16,500	64,400
Nicaragua	666	1,180	441	317	517
Peru	--	--	650	468	3,700
Other	1,450	3,420	3,100	2,230	9,620
Total	16,300	52,000	55,500	40,000	185,000

-- Zero.

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

[2]Cost, insurance, freight value at U.S. port.

[3]Content is estimated by the U.S. Geological Survey to be 72% of gross weight.

Source: U.S. Census Bureau.

TABLE 20

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

(Metric tons)

Country	2005	2006	2007	2008	2009
Argentina	187,317	180,144	180,200	156,893 r	143,084
Armenia	16,400	18,000 e	17,600 e	18,800	22,600
Australia:					
Concentrates	865,300	806,400	828,000 e	833,000 e	831,000
Leaching, electrowon	51,000	52,400	42,000 e	53,000 e	23,000
Total	916,300	858,800	870,000 e	886,000 e	854,000
Bolivia	32 r	218	606	731	734
Botswana[e]	26,100	24,000	24,000	29,000	30,000
Brazil	133,325	147,836	205,728	219,676 r	213,100
Bulgaria	95,000	110,000	116,157 r	107,195 r	110,652
Burma, leaching, electrowon	34,478	19,500	15,100	6,900 r	5,000 e
Canada:					
Concentrates	595,383	603,295	594,749 r	605,399 r	489,800
Leaching, electrowon	--	--	1,500	1,600	800
Total	595,383	603,295	596,249	606,999	490,600
Chile:[3]					
Concentrates	3,735,900	3,669,000	3,724,900	3,356,600	3,276,900
Leaching, electrowon	1,584,600	1,691,800	1,832,100	1,971,000 r	2,112,700
Total	5,320,500	5,360,800	5,557,000	5,327,600 r	5,389,600
China:[e]					
Concentrates	762,000	873,000	928,000	940,000	970,000
Leaching, electrowon	15,000	16,000	18,000	20,000	25,000
Total	777,000	889,000	946,000	960,000	995,000
Colombia	2,189 r	725 r	1,050 r	1,310 r	1,420 e
Congo (Kinshasa):[4]					
Concentrates[e]	48,000 r	89,000 r	107,000 r	182,000 r	150,000 e
Leaching, electrowon	49,538	53,285	41,361 r	60,902 r	151,000 e
Total	97,538 r	142,285 r	148,361 r	242,902 r	301,000 e
Cyprus, leaching, electrowon	--	--	300 e	300 e	300 e
Dominican Republic	--	--	--	2,600	11,500
Finland	15,093 r	13,316 r	13,646 r	13,440 r	14,198
Georgia[e]	10,000	9,000	11,000	11,000	11,000
India	26,900	27,400	33,900	30,600 r	31,000
Indonesia[4]	1,064,200	818,000	796,900	632,600	996,000
Iran:[e]					
Concentrates	150,000	208,000	241,000	241,000	255,000
Leaching, electrowon	10,000	9,000	8,000	8,000	7,000
Total	160,000	217,000	249,000	249,000	262,000
Kazakhstan[e]	422,000	457,000	405,000	420,000	390,000
Korea, North[e]	12,000	12,000	12,000	12,000	12,000
Korea, Republic of	4,000	3,000	6,000	4,000	14,000
Laos:					
Concentrates	--	--	--	24,929	54,019
Leaching, electrowon	30,480	60,803	62,541 r	64,075	67,561
Total	30,480	60,803	62,541 r	89,004	121,580
Macedonia	--	33,591	33,467	38,337	35,430
Mauritania	--	5,031	31,956	33,073	35,000

See footnotes at end of table.

TABLE 20—Continued

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

(Metric tons)

Country	2005	2006	2007	2008	2009
Mexico:					
Concentrates	336,376	241,536	230,500	172,093	170,597
Leaching, electrowon	92,675	86,000	107,000	74,500	57,151
Total	429,051	327,536	337,500	246,593	227,748
Mongolia	126,547	129,693	130,160	126,800 r	129,800
Morocco	3,800	4,600	5,572	5,600	5,500
Namibia	10,900	6,262	6,580 r	7,471 r	--
Pakistan	17,700	19,100	18,800	18,700	18,500
Papua New Guinea	192,978	194,355	169,184	159,650	166,700
Peru:					
Concentrates	844,369	874,601	1,018,156	1,107,789	1,106,025
Leaching, electrowon	165,530	173,871	172,118	160,078	168,700
Total	1,009,899	1,048,472	1,190,274	1,267,867	1,274,725
Philippines	16,323	17,161	22,862	21,235	49,060
Poland	512,000	497,000	452,000	429,000	444,000
Portugal	89,541	78,660 r	90,247 r	89,070 r	86,900
Romania[5]	15,000	12,132	2,213	2,732 r	585
Russia[e]	700,000	725,000	740,000	750,000	725,000 e
Saudi Arabia	668	730	750 e	1,465 r	2,000
Serbia	12,900 [6]	12,000	16,500	18,800 e	19,000 e
South Africa	88,600	89,500	97,000	97,185 r	92,852
Spain:					
Concentrates	4,892 r	6,616 r	6,281 r	7,071 r	15,400
Leaching, electrowon	--	--	--	--	5,600
Total	4,892	6,616	6,281	7,071	21,000
Sweden	97,800	86,746	62,905	57,400 e	56,000
Tanzania, in concentrates and bullion	3,661 r	3,284 r	3,275 r	2,700 e	5,800 e
Turkey[e, 5]	54,000	46,000	81,000	83,000	70,000
United States:[4]					
Concentrates	586,000	667,000	665,000	801,000	705,000
Leaching, electrowon	554,000	530,000	504,000	507,000	476,000
Total	1,140,000	1,200,000	1,170,000	1,310,000	1,180,000
Uzbekistan[e]	110,000	100,000	95,000	95,000	95,000
Zambia:[e]					
Concentrates	330,000	350,000 [7]	341,000 [7]	383,000	547,000
Leaching, electrowon	102,000 [7]	124,000	168,000	163,000	150,000
Total	432,000	474,000	509,000	546,000	697,000
Zimbabwe, concentrates[e]	2,570 [7]	2,581 [7]	3,000	2,000	3,000
Grand total	15,000,000 r	15,100,000 r	15,500,000	15,400,000	15,900,000
Of which:					
Concentrates	12,300,000 r	12,300,000	12,600,000	12,400,000	12,600,000
Leaching, electrowon	2,690,000 r	2,820,000 r	2,970,000 r	3,090,000 r	3,250,000

[e]Estimated. [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 represent copper content by analysis of concentrates produced (includes cement copper, if applicable), except where otherwise noted. Table includes data available through July 28, 2010.

[3]Reported by Comision Chilena del Cobre. Includes recoverable copper content of nonduplicative mine and metal products produced from domestic ores and concentrates and leach production for electrowinning.

[4]Recoverable content.

[5]Excludes copper content of pyrite.

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

[7]Reported figure.

TABLE 21

COPPER: WORLD SMELTER PRODUCTION, BY COUNTRY[1, 2]

(Metric tons, gross weight)

Country	2005	2006	2007	2008	2009
Armenia, primary	9,881	8,791	6,954	6,480 r	6,858
Australia, primary	410,000	377,000	399,000	449,000	422,000
Austria, secondary	52,700 r	65,900 r	80,200 r	94,200 r	90,800 p
Belgium, secondary	99,200	114,600	115,000 e	124,500	114,400
Botswana, primary[3]	26,704	24,255	19,996	23,146	24,382
Brazil:					
Primary	159,043 r	179,700 r	178,367 r	181,000 r, e	176,000 e
Secondary[e]	40,000	40,000	40,000	39,000	31,000
Total	199,043	219,700	218,367	220,000	207,000
Bulgaria:					
Primary	225,000	217,000	217,600	257,100	256,200
Secondary[e]	15,000	24,000	11,500	21,200	20,000
Total	240,000	241,000	229,100	278,300	276,200
Canada:					
Primary	441,325	484,675	470,713	443,798	316,510
Secondary	30,525	35,826	46,101	41,777	29,733
Total	471,850	520,501	516,814	485,575	346,243
Chile, primary	1,558,100	1,565,400	1,514,300	1,369,200	1,522,300
China:[e]					
Primary	1,700,000	1,920,000	2,110,000	2,500,000	2,650,000
Secondary	540,000	700,000	800,000	870,000	800,000
Total	2,240,000	2,620,000	2,910,000	3,370,000	3,450,000
Congo (Kinshasa), primary, electrowon	10,000	10,000 e	1,800	--	--
Finland:					
Primary	175,216 r	162,300 r	141,000 r	172,354	137,710
Secondary[e]	2,000	2,000	2,000	2,000	2,000
Total	177,216 r	164,300 r	143,000 r	174,354	139,710
Germany:					
Primary	257,200	273,800	270,200	295,000	251,100 p
Secondary	251,400	266,300	273,400	293,300	282,700 p
Total	508,600	540,100	543,600	588,300	533,800 p
India:					
Primary	486,600	610,000	700,000	651,000	705,100
Secondary[e]	38,000	15,000	15,000	11,000	10,000
Total	524,600	625,000	715,000	662,000	715,100
Indonesia, primary	275,000 e	201,200	277,100	253,300 r	295,900
Iran, undifferentiated[e, 4]	227,000 [6]	242,000	250,000	248,000	260,000
Japan:					
Primary	1,319,247	1,409,087	1,367,310	1,366,310	1,297,943
Secondary	198,516	219,203	245,208	259,060	243,859
Total	1,517,763	1,628,290	1,612,518	1,625,370	1,541,802
Kazakhstan, undifferentiated	404,817 r	426,000 e	392,834 r	392,575 r	369,000 e
Korea, North, primary and secondary[e]	15,000	15,000	15,000	15,000	15,000
Korea, Republic of:					
Primary	436,600	449,200	475,000	500,000 e	455,000 e
Secondary	49,900	34,800	40,000	44,300 e	44,000 e
Total	486,500	484,000	515,000	544,300 e	499,000 e
Mexico:					
Primary	301,200	260,200	222,600 r	200,200	153,700
Secondary[e]	5,000	5,000	5,000	5,000	5,000
Total	306,200	265,200	227,600 r	205,200	158,700

See footnotes at end of table.

TABLE 21—Continued

COPPER: WORLD SMELTER PRODUCTION, BY COUNTRY[1, 2]

(Metric tons, gross weight)

Country	2005	2006	2007	2008	2009
Namibia, primary[e, 5]	23,300	22,000	21,000	16,271 [r, 6]	16,300
Oman, primary	25,000 [e]	20,710 [r]	13,940 [r]	11,906 [r]	12,000 [e]
Pakistan, primary	18,600	23,600	18,200 [e]	17,800 [e]	17,500
Peru, primary	381,600	381,300	296,100	360,400	345,500
Philippines, primary	201,300	239,600	220,000 [r]	246,700	230,100
Poland:					
Primary	527,000	445,000	438,100	438,600 [r]	408,200
Secondary	30,000	80,000	40,000	43,900 [r]	68,800
Total	557,000	525,000	478,100	482,500 [r]	477,000
Romania, secondary[e]	-- [r]	-- [r]	-- [r]	--	--
Russia:[e]					
Primary	696,000	635,000	650,000	630,000	580,000
Secondary	262,000	312,000	290,000	235,000	220,000
Total	958,000	947,000	940,000	865,000	800,000
Serbia:[e]					
Primary	30,000 [7]	40,000 [r]	30,200 [r]	31,900 [r]	32,000
Secondary	1,000 [7]	1,000	1,000	1,000	1,000
Total	31,000 [7]	41,000 [r]	31,200 [r]	32,900 [r]	33,000
Slovakia, secondary	15,500	22,000 [e]	20,600 [e]	27,500	34,200
South Africa, primary	92,000	100,000	105,000	92,972 [r]	89,453
Spain:					
Primary	278,600	263,100	249,400	256,900	261,000
Secondary[e]	5,600	6,482 [6]	6,700	3,000	4,000
Total	284,200	269,582	256,100	259,900	265,000
Sweden:					
Primary	134,300 [r]	138,800 [r]	132,500 [r]	128,500 [r]	126,000
Secondary[e]	57,700 [r]	55,000 [r]	46,500 [r]	53,800 [r]	39,600
Total	192,000 [r]	193,800 [r]	179,000 [r]	182,300 [r]	165,600
Thailand:[e]					
Primary	28,600	1,000	5,600 [6]	--	--
Secondary	2,000	100	500	--	--
Total	30,600	1,100	6,100 [6]	--	--
Turkey, undifferentiated[e, 8]	27,600 [6]	30,000	30,000	35,000	30,000
United States, undifferentiated	523,000	501,000	617,000	574,000	597,000
Uzbekistan, undifferentiated[e]	105,000	95,000	92,000	92,000	92,000
Vietnam, primary	--	--	--	2,200 [e]	6,000 [e]
Zambia, primary	270,000	290,000	224,000	232,000 [e]	334,000
Grand total:	13,500,000 [r]	14,100,000 [r]	14,300,000	14,700,000	14,500,000
Of which					
Primary:					
Electrowon	10,000	10,000 [e]	1,800	--	--
Other	10,500,000 [r]	10,700,000 [r]	10,800,000 [r]	11,100,000 [r]	11,100,000
Secondary	1,700,000 [r]	2,000,000 [r]	2,080,000 [r]	2,170,000 [r]	2,040,000
Undifferentiated	1,300,000 [r]	1,310,000	1,400,000 [r]	1,360,000 [r]	1,360,000

[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]This table includes total production of smelted copper metal, including low-grade cathode produced by electrowinning methods. The smelter feed maybe derived from ore, concentrates, copper precipitate or matte (primary), and (or) scrap (secondary). To the extent possible, primary and secondary output of each country is shown separately. In some cases, total smelter production is officially reported, but the distribution between primary and secondary has been estimated. Table includes data available through July 28, 2010.

[3]Copper content of nickel-copper matte exported to Norway for refining.

TABLE 21—Continued

COPPER: WORLD SMELTER PRODUCTION, BY COUNTRY[1, 2]

[4]Data are for year beginning March 21 of that stated. Secondary production is estimated to be about 5% of total.

[5]Includes 8,000 to 10,000 metric tons per year for 2005–06 produced from imported toll concentrates.

[6]Reported figure.

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

[8]Secondary production is estimated to be about one-third of total.

TABLE 22

COPPER: WORLD REFINERY PRODUCTION, BY COUNTRY[1, 2]

(Metric tons)

Country	2005	2006	2007	2008	2009
Argentina, secondary[e]	16,000	16,000	16,000	16,000	16,000
Australia, primary:					
Electrowon	50,900	52,400	42,000	53,000	23,000
Other	418,100	377,000	400,000	450,000	423,000
Total	469,000	429,400	442,000	503,000	446,000
Austria, secondary	72,300	72,600	81,400	106,700	96,200 [p]
Belgium:					
Primary[3]	252,900	238,000 [e]	228,500	233,100 [r]	220,600
Secondary[e]	130,000	153,000	165,600	162,700 [r]	153,100
Total	382,900	391,000 [e]	394,100	395,800 [r]	373,700
Brazil, primary	199,043	219,700	218,367	226,800 [r]	213,400
Bulgaria:[e]					
Primary	60,500	65,500 [4]	69,900	126,700 [r, 4]	183,600 [4]
Secondary	3,000	3,000	5,000	13,000	13,200
Total	63,500	68,500	74,900	139,700 [r, 4]	196,800 [4]
Burma, electrowon	34,500	19,500	15,100	--	3,500
Canada:					
Primary	484,123	465,000	407,000	400,000	305,296
Secondary	31,000	36,000	46,000	42,000	30,600
Total	515,123	501,000	453,000	442,000	335,896
Chile, primary:					
Electrowon	1,584,600	1,691,800	1,832,100	1,971,000 [r]	2,112,700
Other	1,239,400	1,119,500	1,104,400	1,086,600	1,159,100
Total	2,824,000	2,811,300	2,936,500	3,057,600 [r]	3,271,800
China:[e]					
Primary					
Electrowon	15,000	20,000	20,000	20,000	25,000
Other	1,850,000	2,000,000	2,280,000	2,680,000	2,750,000
Secondary	750,000	1,000,000	1,200,000	1,200,000	1,400,000
Total	2,615,000 [4]	3,020,000	3,500,000	3,900,000	4,175,000
Congo (Kinshasa), electrowon	--	--	6,784 [r]	45,821 [r]	159,000 [e]
Cyprus, electrowon	--	1,000	2,900	2,986 [r]	2,380
Egypt, secondary[e]	4,000	4,000	4,000	4,000	4,000
Finland:					
Primary	108,994 [r]	120,674 [r]	100,987 [r]	127,952 [r]	95,549
Secondary[e]	16,000	16,000	10,000	10,000	10,000
Total	124,994 [r]	136,674 [r]	110,987 [r]	137,952 [r]	105,549
Germany:					
Primary	293,812	312,092	301,702	300,470	290,200
Secondary	344,446	350,246	363,815	389,300	378,700
Total	638,258	662,338	665,517	689,770	668,900
Hungary, secondary[e]	10,000	10,000	10,000	--	--
India:					
Primary, electrolytic	477,000	614,000	698,600	654,200	705,100
Secondary[e]	20,000	15,000	15,000	15,000	10,000
Total	497,000	629,000	713,600	669,200	715,100
Indonesia, primary	262,900	217,600	277,000 [r]	254,000 [r]	289,200

See footnotes at end of table.

TABLE 22—Continued

COPPER: WORLD REFINERY PRODUCTION, BY COUNTRY[1, 2]

(Metric tons)

Country	2005	2006	2007	2008	2009
Iran:					
Primary:[e, 5]					
Electrowon	10,000	9,000	8,000	7,000	7,000
Other	123,100 [4]	140,000	145,000	140,000	150,000
Secondary	40,000 [4]	45,000 [4]	55,000	53,000	53,000
Total	173,100 [4]	194,000	208,000	200,000	210,000
Italy, secondary	32,200	36,400	28,600	24,200 [e]	6,500 [e]
Japan:					
Primary	1,227,528	1,342,350	1,369,814	1,328,157	1,238,012
Secondary	167,756	189,705	207,004	211,681	201,831
Total	1,395,284	1,532,055	1,576,818	1,539,838	1,439,843
Kazakhstan, primary	418,356	427,723	406,091	398,141 [r]	368,000
Korea, North, primary[e]	15,000	15,000	15,000	15,000	15,000
Korea, Republic of:					
Primary	481,566	541,492	536,467	495,925 [r]	489,701
Secondary	45,000	34,000	45,000	42,000	42,000 [e]
Total	526,566	575,492	581,467	537,925 [r]	531,701
Laos, electrowon	30,480	60,803	62,541	64,100	67,562
Mexico:					
Primary:					
Electrowon	92,675	89,076	107,000	74,500	65,700 [e]
Other	317,700	284,300	238,900	215,500	190,000 [e]
Secondary[e]	6,000	6,000	6,000	6,000	5,000
Total	416,375	379,376	351,900	296,000	260,700
Mongolia, electrowon	2,475	2,618	3,007	2,587 [r]	2,470
Norway, primary[6]	38,500	38,500 [e]	43,000	32,000	30,000
Oman, primary[e]	24,000	21,000 [r]	14,000 [r]	12,000 [r]	12,000
Peru, primary:					
Electrowon	165,530	173,871	172,118	160,078	162,800
Other	346,206	333,839	241,789 [r]	303,855	260,500
Total	511,736	507,710	413,907 [r]	463,933	423,300
Philippines, primary	172,000	181,000	160,200	173,600	175,000
Poland:					
Primary	530,000	476,100	493,200	483,000	450,700
Secondary	30,000	80,500	39,800	43,700	52,200
Total	560,000	556,600	533,000	526,700	502,900
Romania:					
Primary	18,739	18,583	15,584	10,323 [r]	15,000
Secondary[e]	2,000	3,000	3,000	3,000	3,000
Total	20,739	21,583	18,584	13,323 [r]	18,000
Russia:					
Primary	684,000	635,000	650,000	610,000	650,000 [e]
Secondary	249,000	312,000	289,000	250,000	220,000 [e]
Total	933,000	947,000	939,000	860,000	870,000 [e]
Serbia:					
Primary	30,100 [7]	40,000	30,600	32,800	33,000
Secondary[e]	1,000 [7]	1,000	1,000	1,000	1,000
Total	31,100 [7]	41,000	31,600	33,800	34,000
South Africa, primary[6]	99,439	104,052	113,166 [r]	92,972	89,451

See footnotes at end of table.

TABLE 22—Continued

COPPER: WORLD REFINERY PRODUCTION, BY COUNTRY[1, 2]

(Metric tons)

Country	2005	2006	2007	2008	2009
Spain:					
Primary	242,700	235,300	243,000	257,000 r	268,000
Secondary[e]	66,000	64,000	65,000	62,000 r	67,000
Total	308,700	299,300	308,000	319,000 r	335,000
Sweden:					
Primary	222,482 r	187,800	175,500	184,674	164,759
Secondary	22,000 r	41,200	38,500	43,100	41,000
Total	244,482 r	229,000	214,000	227,774	205,759
Taiwan, secondary[e]	4,000	4,500	4,500	4,500	4,500
Thailand:					
Primary	13,700 r	25,300 r	11,900 r	--	--
Secondary	2,100 r	1,750 r	814 r	438 r	--
Total	15,800 r	27,050 r	12,714 r	438 r	--
Turkey:[e]					
Primary	90,000	101,000	94,600 r	83,000 r	30,000
Secondary	5,000	5,000	5,000	5,000	4,000
Total	95,000	106,000	99,600 r	88,000 r	34,000
Ukraine, secondary[e]	20,000 r	20,000 r	20,000 r	20,000 r	20,000
United States:					
Primary:					
Electrowon	554,000	530,000	504,000	507,000	476,000
Other	654,000	675,000	764,000	713,000	636,000
Secondary	47,200	44,800	46,000	53,800	46,400
Total	1,260,000	1,250,000	1,310,000	1,270,000	1,160,000
Uzbekistan, primary	103,870	92,300 e	89,655	71,000 r	80,000
Vietnam, primary	--	--	--	-- r	6,000 e
Zambia, primary:[e]					
Electrowon[8]	155,000 [4]	178,000	200,000	175,000	145,400 [4]
Other	244,000	240,000	230,000	240,000	269,000 [4]
Total	399,000	418,000	430,000	415,000	414,400 [4]
Zimbabwe, primary[e]	7,000	7,000	6,798 [4]	3,072 [4]	3,000
Grand total	16,600,000 r	17,300,000	17,900,000 r	18,300,000 r	18,400,000
Of which:					
Primary:					
Electrowon	2,690,000	2,830,000	2,980,000	3,080,000 r	3,250,000
Other	11,800,000 r	11,900,000	12,200,000 r	12,400,000 r	12,300,000
Secondary	2,140,000	2,560,000 r	2,770,000 r	2,780,000 r	2,880,000

[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]This table includes total production of refined copper whether produced by pyrometallurgical or electrolytic refining methods and whether derived from primary unrefined copper or from scrap. Copper cathode derived from electrowinning processing is also included. Table includes data available through July 28, 2010.

[3]Includes reprocessed leach cathode from Congo (Kinshasa).

[4]Reported figure.

[5]Data are for Iranian years beginning March 21 of that stated.

[6]May include secondary.

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

[8]Electrowon covers only high-grade electrowon cathodes reported as “finished production leach cathodes.”