COPPER

(Data in thousand metric tons of copper content, unless otherwise noted)

<u>Domestic Production and Use</u>: Domestic mine production in 1998 declined to 1.85 million metric tons and was valued at about \$3.3 billion. The five principal mining States, in descending order, Arizona, Utah, New Mexico, Nevada, and Montana, accounted for 99% of domestic production; copper was also recovered at mines in three other States. While copper was recovered at about 35 mines operating in the United States, 15 mines accounted for about 97% of production. Seven primary and 3 secondary smelters, 7 electrolytic and 6 fire refineries, and 15 solvent extraction-electrowinning facilities were operating at yearend. Refined copper and direct melt scrap were consumed at about 35 brass mills; 13 rod mills; and 600 foundries, chemical plants, and miscellaneous consumers. Copper and copper alloy products were consumed in building construction, 42%; electric and electronic products, 25%; industrial machinery and equipment, 11%; transportation equipment, 13%; and consumer and general products, 9%.

Salient Statistics—United States:	<u>1994</u>	<u> 1995</u>	<u> 1996</u>	<u> 1997</u>	<u> 1998°</u>
Production: Mine	1,850	1,850	1,920	1,940	1,850
Refinery: Primary ²	1,840	1,930	2,010	2,060	2,140
Secondary ³	392	352	345	383	290
Copper from all old scrap	500	442	428	496	410
Imports for consumption:					
Ores and concentrates	82	127	72	44	110
Refined	470	429	543	647	720
Unmanufactured	763	825	961	978	1,130
Exports: Ores and concentrates	261	239	195	128	40
Refined	157	217	169	93	100
Unmanufactured	752	894	683	618	450
Consumption: Reported refined	2,680	2,530	2,610	2,790	2,920
Apparent unmanufactured ⁴	2,690	2,540	2,830	2,950	3,030
Price, average, cents per pound:					
Domestic producer, cathode	111.0	138.3	109.0	106.9	80
London Metal Exchange, high-grade	104.6	133.1	104.0	103.2	76
Stocks, yearend, refined ⁵	119	163	146	314	450
Employment, mine and mill, thousands	13.1	13.8	13.3	13.2	13.0
Net import reliance ⁶ as a percent of					
apparent consumption	13	7	14	13	16

Recycling: Old scrap, converted to refined metal and alloys, provided 410,000 tons of copper, equivalent to 14% of apparent consumption. Purchased new scrap, derived from copper fabricating operations, yielded 950,000 tons of contained copper; 80% of the copper contained in new scrap was consumed at brass mills. Of the total copper recovered from scrap, copper smelters and refiners recovered 23%; ingot makers, 10%; brass mills, 63%; and miscellaneous manufacturers, foundries, and chemical plants, 4%. Copper in all old and new, refined or remelted scrap contributed 34% of the U.S. copper supply.

<u>Import Sources (1994-97)</u>: Unmanufactured: Canada, 47%; Chile, 23%; Mexico, 13%; and other, 17%. Refined copper accounted for 60% of imports of unwrought copper.

Tariff: Item	Number	Normal Trade Relations (NTR) 12/31/98	Canada and Mexico <u>12/31/98</u>	Non-NTR ⁷ <u>12/31/98</u>
Unrefined copper; anodes Refined and alloys;	7402.00.0000	0.2% ad val. ⁸	Free	6% ad val.8
unwrought	7403.00.0000	1% ad val.	Free	6% ad val.
Copper powder	7406.10.0000	1.1% ad val.	Free	49% ad val.
Copper wire (bare)	7408.11.6000	3.2% ad val.	Free	28% ad val.

Depletion Allowance: 15% (Domestic), 14% (Foreign).

<u>Government Stockpile</u>: The stockpile of about 20,000 tons of refined copper was liquidated in 1993. The stockpile of about 8,100 tons of brass was liquidated in 1994. For details on inventories of beryllium-copper master alloys (4% beryllium) see the section on beryllium.

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Events, Trends, and Issues: World mine production of copper continued its 4-year-long upward trend, rising about 4% in 1998. Most of the increase in production came from South America and Indonesia, where an estimated 700,000 tons of new capacity came on-stream. In the United States, mine production declined by an estimated 90,000 tons. In response to sustained lower copper prices, a number of companies cut back production and deferred development of previously announced projects. One mine in Arizona completely curtailed its copper sulfide concentrate operations, and several others reduced production. One mine in New Mexico revised its mine plan to reduce electrowon production over a 3-year period. At yearend, further cutbacks were announced for 1999. The growth in world refined production lagged behind that of mine production owing to reduced secondary refined production. In the United States, an increase in primary refined production, cutbacks in electrowon production, and anode feed shortages.

The global production of refined copper during 1998 exceeded consumption, and reported world-wide inventories of copper rose during the second half of the year. With sustained high inventories, copper prices remained low throughout 1998. By July, prices, in constant dollar terms, had fallen to their lowest level since the Great Depression. A large shift in global inventories to U.S. London Metal Exchange (LME) warehouses in California had industry concerned that incentives offered by the warehouse operators, coupled with other market factors, had led to a distorted market. In September, the LME announced plans to limit further stock accumulations in California.

Domestic refined copper demand grew by about 5% in 1998 owing to demand for wire mill products and substitution of refined copper for scrap at brass mills. In June, a new wire-rod mill was commissioned in Texas. Worldwide, consumption grew by only about 2% in 1998 owing to the economic crises in Asia. In 1999, continued low global demand growth and a projected increase in mine production of more than 700,000 tons is expected to generate a surplus of refined copper.

World Mine Production, Reserves, and Reserve Base:

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	Mine pi	Mine production		Reserve base ⁹				
	<u>1997</u>	<u>1998°</u>						
United States	1,940	1,850	45,000	90,000				
Australia	545	600	7,000	23,000				
Canada	657	710	10,000	23,000				
Chile	3,390	3,660	88,000	160,000				
China	414	440	18,000	37,000				
Indonesia	529	750	19,000	25,000				
Kazakhstan	316	340	14,000	20,000				
Mexico	391	400	15,000	27,000				
Peru	491	450	19,000	40,000				
Poland	414	420	20,000	36,000				
Russia	505	450	20,000	30,000				
Zambia	353	280	12,000	34,000				
Other countries	<u>1,450</u>	<u>1,550</u>	50,000	<u>105,000</u>				
World total (rounded)	11,400	11,900	340,000	650,000				

<u>World Resources</u>: Land-based resources are estimated at 1.6 billion tons of copper, and resources in deep-sea nodules are estimated at 0.7 billion tons.

<u>Substitutes</u>: Aluminum substitutes for copper in various products, such as electrical power cables, electrical equipment, automobile radiators, and cooling/refrigeration tubing. Titanium and steel are used in heat exchangers, and steel is used for artillery shell casings. Optical fiber substitutes for copper in some telecommunications applications. Plastics also substitute for copper in water pipe, plumbing fixtures, and many structural applications.

eEstimated.

¹Some electrical components are included in each end use. Estimated after Copper Development Association, 1997.

²From both domestic and imported ores and concentrates.

³From both primary and secondary refineries.

⁴Defined as primary refined production + copper from old scrap converted to refined metal and alloys + refined imports - refined exports ± changes in refined stocks.

⁵Held by industry, COMEX, and London Metal Exchange warehouses in the United States.

⁶Defined as imports - exports + adjustments for Government and industry stock changes for refined copper.

⁷See Appendix B.

⁸Value of copper content.

⁹See Appendix D for definitions.