

NICKEL

(Data in metric tons of nickel content, unless noted)

Domestic Production and Use: The only nickel mining and smelting complex in the United States, near Riddle, OR, reopened in March 1995. On a monthly or annual basis, 187 facilities reported nickel consumption. The principal consuming State was Pennsylvania, followed by West Virginia and New Jersey. Approximately 44% of the primary nickel consumed went into stainless and alloy steel production, 35% into nonferrous alloys and superalloys, 14% into electroplating, and 7% into other uses. Ultimate end uses were as follows: transportation, 29%; chemical industry, 14%; electrical equipment, 10%; construction, 9%; fabricated metal products, 8%; petroleum, 8%; machinery, 7%; household appliances, 6%; and other, 9%. Total estimated value of apparent primary consumption was \$1.3 billion.

| Salient Statistics—United States: | | 1991 | 1992 | 1993 | 1994 | 1995^e |
|---|--------------------------------|-------------|-------------|-------------|-------------|-------------------------|
| Production: | Mine | 5,520 | 6,670 | 2,460 | — | 1,650 |
| | Plant | 7,070 | 8,960 | 4,880 | — | 8,200 |
| Imports: ¹ | Ore | 371 | 3,580 | 2,970 | — | 8,200 |
| | Primary | 132,000 | 119,000 | 126,000 | 127,000 | 151,000 |
| | Secondary | 6,210 | 9,510 | 6,710 | 6,060 | 8,400 |
| Exports: | Primary | 9,100 | 8,560 | 7,180 | 7,440 | 9,900 |
| | Secondary | 27,800 | 25,300 | 26,000 | 34,500 | 41,900 |
| Consumption: | Reported, primary | 109,000 | 101,000 | 105,000 | 107,000 | 126,000 |
| | Reported, secondary | 53,500 | 55,900 | 54,000 | 58,600 | 65,600 |
| | Apparent, primary | 125,000 | 119,000 | 122,000 | 134,000 | 159,000 |
| Price, average annual, London Metal Exchange | | | | | | |
| | Cash, dollars per metric ton | 8,156 | 7,001 | 5,293 | 6,340 | 8,245 |
| | Cash, dollars per pound | 3.699 | 3.176 | 2.401 | 2.876 | 3.740 |
| Stocks: | Government, yearend | 33,800 | 33,800 | 31,600 | 26,800 | 16,500 |
| | Consumer, yearend | 15,900 | 17,400 | 14,400 | 10,200 | 10,800 |
| | Producer, yearend ² | 11,800 | 10,100 | 15,700 | 10,200 | 10,500 |
| Employment, yearend: | Mine | 8 | 10 | 2 | 1 | 15 |
| | Smelter | 277 | 250 | 33 | 22 | 250 |
| | Port facility ³ | — | 23 | 5 | 3 | 25 |
| Net import reliance ⁴ as a percent of apparent consumption | | 61 | 59 | 63 | 64 | 61 |

Recycling: About 66,000 tons of nickel was recovered from purchased scrap in 1995. This represented about 34% of reported consumption for the year.

Import Sources (1991-94): Canada, 47%; Norway, 15%; Australia, 11%; Dominican Republic, 6%; and other, 21%.

| Tariff: Item | Number | Canada, Mexico, and Most favored nation (MFN) | | Non-MFN⁵ |
|-----------------------------------|--------------|--|--|----------------------------|
| | | 12/31/95 | | 12/31/95 |
| Nickel oxide, chemical grade | 2825.40.0000 | Free | | Free. |
| Ferronickel | 7202.60.0000 | Free | | 6.6¢/kg. |
| Nickel oxide, metallurgical grade | 7501.20.0000 | Free | | Free. |
| Unwrought nickel | 7502.10.0000 | Free | | 6.6¢/kg. |
| Waste and scrap | 7503.00.0000 | Free | | 6.6¢/kg. |

Depletion Allowance: 22% (Domestic), 14% (Foreign).

Government Stockpile:

| Material | Stockpile Status—9-30-95 | | | |
|-----------------|---------------------------------|----------------------------|--------------------------------|--------------------------------|
| | Uncommitted inventory | Committed inventory | Authorized for disposal | Disposals Jan.-Sept. 95 |
| Nickel | 18,000 | 3,650 | 16,800 | 7,980 |

Events, Trends, and Issues: Demand for nickel-bearing stainless steel has improved substantially in the United States since 1992. However, a large part of the increase was being met by imported stainless, in decreasing order, from the European Union, Japan, and Canada. U.S. production of stainless steel increased 3% between 1993-94, with nickel-bearing grades accounting for 65% of the 1.83 million tons made in 1994. Domestic shipments of stainless sheet and strip were at an all-time high in 1995.

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Growing demand for austenitic stainless steel in the developing countries and an improving global economy have turned nickel prices around after 3 years of recession. Nickel supply and demand have been closely balanced since early 1995, lifting prices to more traditional levels. On Nov. 27, 1995, the London Metal Exchange (LME) cash price for 99.8%-pure nickel stood at \$8,497 per metric ton (\$3.85 per pound), up significantly from late 1993. Increased speculation in cut cathode and briquets has caused the price to be more volatile than in the past. LME inventories peaked at 151,000 tons on Nov. 24, 1994, and have been falling ever since. Some analysts are forecasting an undersupply situation for the 1996-99 period. Prices continue to be kept in check by large exports of cathode and powder from Russia to the West.

The prospects of undersupply have encouraged producers to open new mines in Australia and New Caledonia and upgrade older operations elsewhere. The discovery of a world class nickel-copper-cobalt deposit at Voisey Bay, Labrador, drastically altered the nickel supply picture and changed long-range thinking about future exploration targets in other parts of the Subarctic. In June 1994, a Canadian company entered into a joint venture with the Government of Cuba to upgrade mining and beneficiating operations at Moa Bay. Since then, two other prominent companies—one based in Australia and one in South Africa—have begun actively exploring for nickel in Cuba.

Programs were underway in the European Union, Japan, and the United States to develop advanced nickel-based batteries for electric vehicles. Beginning in 1997, 2% of all motor vehicles sold within California must have zero tailpipe emissions—a requirement only electric vehicles can presently satisfy.

World Mine Production, Reserves, and Reserve Base:

| | Mine production | | Reserves ⁶ | Reserve base ⁶ |
|-----------------------|-----------------|-------------------|-----------------------|---------------------------|
| | 1994 | 1995 ^e | | |
| United States | — | 1,650 | 23,000 | 2,500,000 |
| Australia | 79,000 | 80,000 | 2,200,000 | 6,800,000 |
| Botswana | 20,600 | 22,000 | 480,000 | 900,000 |
| Brazil | 32,000 | 34,000 | 670,000 | 4,300,000 |
| Canada | 150,000 | 150,000 | 6,200,000 | 14,000,000 |
| China | 36,900 | 37,000 | 730,000 | 900,000 |
| Colombia | 26,100 | 27,000 | 560,000 | 740,000 |
| Cuba | 26,900 | 28,000 | 18,000,000 | 23,000,000 |
| Dominican Republic | 30,500 | 31,000 | 450,000 | 680,000 |
| Finland | 7,190 | 7,100 | 80,000 | 100,000 |
| Greece | 18,800 | 19,000 | 450,000 | 900,000 |
| Indonesia | 81,200 | 83,000 | 3,200,000 | 13,000,000 |
| New Caledonia | 96,000 | 100,000 | 4,500,000 | 15,000,000 |
| Philippines | 9,850 | 10,000 | 410,000 | 11,000,000 |
| Russia | 240,000 | 235,000 | 6,600,000 | 7,300,000 |
| South Africa | 30,100 | 32,000 | 2,500,000 | 2,600,000 |
| Ukraine | 4,000 | 4,000 | 90,000 | 90,000 |
| Zimbabwe | 13,500 | 14,000 | 77,000 | 100,000 |
| Other countries | 3,800 | 4,400 | 160,000 | 10,000,000 |
| World total (rounded) | 906,000 | 920,000 | 47,000,000 | 110,000,000 |

World Resources: Identified world resources in deposits averaging 1% nickel or greater contain a total of 130 million tons of nickel. About 60% of the nickel is in laterites and 40% is in sulfide deposits. World resources of lower-grade nickel deposits are very large. In addition, there are extensive deep-sea resources of nickel in manganese crusts and nodules covering large areas of ocean floor, particularly in the Pacific Ocean.

Substitutes: With few exceptions, substitutes for nickel would result in increased cost or some tradeoff in the economy or performance of the product. Present and potential nickel substitutes include aluminum, coated steels, and plastics in the construction and transportation industries; nickel-free specialty steels in the power generating, petrochemical, and petroleum industries; titanium and plastics in severe corrosive applications; and platinum, cobalt, and copper in catalytic uses.

^eEstimated.

¹Imports for consumption.

²Stocks of producers, agents, and dealers held only in the United States.

³Employment at port facility in Coos Bay, OR, used exclusively for drying and transshipping imported nickel ore.

⁴Defined as imports - exports + adjustments for Government and industry stock changes.

⁵See Appendix B.

⁶See Appendix C for definitions.