NICKEL

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

Domestic Production and Use: The only nickel smelter in the United States operated at full capacity in 1997. The smelter, near Riddle, OR, has been producing ferronickel primarily from imported ores. The adjoining mine is operated intermittently. On a monthly or annual basis, 133 facilities reported nickel consumption. The principal consuming State was Pennsylvania, followed by West Virginia and Ohio. Approximately 49% of the primary nickel consumed went into stainless and alloy steel production, 29% into nonferrous alloys and superalloys, 15% into electroplating, and 7% into other uses. Ultimate end uses were as follows: transportation, 26%; chemical industry, 15%; construction, 10%; electrical equipment, 9%; fabricated metal products, 9%; petroleum, 8%; machinery, 8%; household appliances, 7%; and other, 8%. Total estimated value of apparent primary consumption was $1.1 billion.

Salient Statistics—United States:	**1993**	**1994**	**1995**	**1996**	**1997[e]**
Production: Mine	2,460	—	1,560	1,330	—
Plant	4,880	—	8,290	15,100	16,100
Imports: Ore	2,970	—	8,200	15,000	16,800
Primary[1]	126,000	127,000	149,000	142,000	146,000
Secondary[1]	6,710	6,070	7,930	8,060	11,000
Exports: Primary	7,180	7,420	9,750	13,100	17,300
Secondary	26,000	34,500	41,800	33,600	40,500
Consumption: Reported, primary	105,000	108,000	124,000	116,000	114,000
Reported, secondary	54,000	58,600	64,500	59,200	72,100
Apparent, primary	122,000	133,000	152,000	149,000	150,000
Price, average annual, London Metal Exchange					
Cash, dollars per metric ton	5,293	6,340	8,228	7,501	6,931
Cash, dollars per pound	2.401	2.876	3.732	3.402	3.144
Stocks: Government, yearend	31,600	26,800	19,800	15,900	9,240
Consumer, yearend	14,400	11,100	12,300	12,900	14,200
Producer, yearend[2]	15,700	10,200	12,700	11,200	11,500
Employment, yearend, number: Mine	2	1	17	8	4
Smelter	33	22	253	253	255
Port facility[3]	5	3	25	23	23
Net import reliance[4] as a percent of apparent consumption	63	64	60	59	54

Recycling: About 72,000 tons of nickel was recovered from purchased scrap in 1997. This represented about 39% of reported consumption for the year.

Import Sources (1993-96): Canada, 39%; Norway, 15%; Russia, 12%; Australia, 10%; and other, 24%.

Tariff: Item	**Number**	**Canada, Mexico, and most favored nation (MFN) 12/31/97**	**Non-MFN[5] 12/31/97**
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, not alloyed	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:

	Stockpile Status—9-30-97[6]				
Material	**Uncommitted inventory**	**Committed inventory**	**Authorized for disposal**	**Disposal plan FY 1997**	**Disposals FY 1997**
Nickel	3,830	6,290	3,830	9,070	6,430

Events, Trends, and Issues: Stainless steel accounts for two-thirds of the primary nickel consumed in the world. U.S. production of austenitic (i.e., nickel bearing) stainless steel was 12% greater than that of 1996 despite a slowdown in the second half of 1997. At the same time, U.S. production of nickel-free grades weakened, increasing the austenitic share of U.S. stainless production from 63% to 70%. U.S. stainless producers continue to face stiff competition from imports, with imports accounting for about 32% of total U.S. stainless consumption in 1996.

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The world nickel supply began to exceed demand in mid-1997, causing the London Metal Exchange (LME) cash price to fall below $6,600 per metric ton ($2.99 per pound). The drop in price reportedly was triggered when speculators, concerned about financial problems in East Asia, began selling off holdings. Sizable exports of cathode and stainless steel scrap from Russia to the European Union kept prices depressed for the remainder of 1997. For the week ending November 21, 1997, the LME cash price for 99.8%-pure nickel averaged $6,102 per metric ton ($2.77 per pound). The nickel oversupply situation is expected to continue for 4 or 5 years. The long-term outlook for the metal is more sanguine. Since 1975, world demand for stainless steel has grown at an average rate of 4.5% per year. This growth rate is projected to continue or accelerate over the next 20 years, encouraging the development of new nickel mines in North America, Australia, and Oceania. Exploration teams have discovered additional resources along the suture line dividing the Nain and Churchill geological provinces of northeastern Canada. The original discovery—four sulfide ore bodies associated with a layered intrusion near Voisey's Bay, Labrador—is now scheduled to begin production in 2002. The pentlandite concentrate produced at Voisey's Bay is to be smelted at Argentia, Newfoundland. The Argentia complex will be the largest nickel smelting and refining facility outside of Russia. In October 1997, additional nickel mineralization was found in similar terrain some 100 kilometers south of the Voisey's Bay project.

Automotive manufacturers in France, Japan, and the United States have begun mass producing electric vehicles powered by advanced nickel-metal hydride or nickel-cadmium batteries. Whether these new vehicles will help reduce greenhouse emissions remains a matter of debate. Beginning in 2003, 10% of all motor vehicles sold within California must have zero tailpipe emissions. Several manufacturers are also developing hybrid automobiles that use an electric motor to power the vehicle in low-speed, stop-and-go city driving.

World Mine Production, Reserves, and Reserve Base:

	Mine production		Reserves[7]	Reserve base[7]
	1996	1997[e]		
United States	1,330	—	43,000	2,500,000
Australia	113,134	120,000	3,700,000	7,300,000
Botswana	24,200	22,600	780,000	830,000
Brazil	25,600	27,200	670,000	6,000,000
Canada	183,059	182,000	5,300,000	15,000,000
China	43,000	41,000	3,700,000	7,900,000
Colombia	27,700	29,600	560,000	1,100,000
Cuba	51,613	52,500	5,500,000	23,000,000
Dominican Republic	45,000	47,000	1,000,000	1,300,000
Greece	20,000	18,000	450,000	900,000
Indonesia	90,000	76,000	3,200,000	13,000,000
New Caledonia	142,200	157,000	4,500,000	15,000,000
Philippines	14,700	15,000	410,000	11,000,000
Russia	230,000	230,000	6,600,000	7,300,000
South Africa	33,613	31,800	2,500,000	11,800,000
Zimbabwe	11,600	10,300	240,000	260,000
Other countries	19,906	19,700	450,000	12,000,000
World total (may be rounded)	1,080,000	1,080,000	40,000,000	140,000,000

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. In addition, there are extensive deep-sea resources of nickel in manganese crusts and nodules covering large areas of the 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.

[e]Estimated.

[1]Imports for consumption as reported by the U.S. Bureau of the Census.

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

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

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

[5]See Appendix B.

[6]See Appendix C for definitions.

[7]See Appendix D for definitions.