

AVAILABILITY OF PRIMARY NICKEL IN MARKET-ECONOMY COUNTRIES

A Minerals Availability Appraisal

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ABSTRACT

The U.S. Bureau of Mines has evaluated the potential availability of nickel from 36 deposits or districts in 16 market-economy countries (MECs), analyzing more than 95 percent of production in those countries. This study indicates the quantity of nickel available on the basis of net production costs and total costs with a 0-pct and a 10-pct discounted cash flow rate of return (DCFROR). Costs of production are expressed in dollars per pound of recovered nickel. The study also indicates sensitivities of the cost of production to energy, labor, and other factors.

The studied deposits and properties contain approximately 33 Mmt of recoverable nickel. About 26 Mmt of nickel is potentially recoverable from laterite deposits, of which 4.5 Mmt can be produced at \$2.50/lb or less with a 0-pct DCFROR. Approximately 7 Mmt of nickel is potentially recoverable from sulfide deposits, of which about 6.3 Mmt could be produced at \$2.50/lb or less at a 0-pct DCFROR. The price of nickel averaged above \$6.00/lb in 1988.

Sensitivity studies performed for both laterite and sulfide deposits indicate that the total cost of producing nickel from laterites is most sensitive to increases in energy costs and that the total cost of producing nickel from sulfide deposits is most sensitive to increases in labor costs; sulfides are also affected by changes in revenues from byproducts.

INTRODUCTION

Nickel is considered a strategic material, a commodity whose lack of availability during a national emergency or strategic situation would seriously affect the economic, industrial, and defensive posture of the United States. This study assesses the position of the United States in relation to other nickel-producing nations to determine the availability of nickel in MECs and to provide a perspective on the resources and industry structures of the centrally planned economy (CPE) countries (see list in appendix A).

Nickel, primarily in the form of refined metal and ferro-nickel, is derived from the mining and processing of nickel sulfide and laterite deposits. Most of the nickel consumed in the world originates from sulfide ores in Canada, Australia, and the Soviet Union and from laterite ores in Cuba, New Caledonia, Indonesia, South America, and the Dominican