

consulting firms in Quebec. The Chinese bought mining machinery from manufacturing firms in Ontario worth over \$100 million.

At the end of 1978 Canadian Met-Chem Consultants Ltd. a subsidiary of United States Steel Corp., a consulting firm in Quebec, negotiated the development of a large mine and beneficiation plant.

A Russian delegation came to Canada in 1978 and visited iron ore mines in Ontario and Quebec to study open-pit mining operations and associated waste disposal techniques under severe climatic conditions.

## Copper

### 12.3.2

Canadian mine production of recoverable copper amounted to 657 500 t in 1978 down from 759 400 t in 1977. This was due to strikes, lockouts, mine closures and cutbacks because of low prices, and oversupplied markets for co-produced metals. Among non-communist world producers Canada ranked third in mine production after the United States and Chile. Domestic consumption of copper in Canada rose by 14% in 1978, to 228 000 t.

Copper and nickel-copper ores were smelted at six locations in Canada at the end of 1978. Inco continued to operate an oxygen flash smelter at Copper Cliff, Ont. Falconbridge operated a smelter at Falconbridge, Ont., treating nickel-copper concentrates. Ores and concentrates from most mines in the Atlantic provinces, Quebec and Ontario were processed at the Noranda smelter of Noranda Mines Ltd. or at the Murdochville smelter of Gaspé Copper Mines Ltd., both in Quebec. At Murdochville, smelter production was 50 700 t of anode copper in 1978. A strike halted operations from October 16 until well into 1979. A shortage of concentrates was experienced at Noranda in 1978 and production fell to 205 000 t of anode copper compared with peak production of 244 000 t in 1974. Hudson Bay Mining and Smelting Co. Ltd. operates a smelter at Flin Flon, Man. and produces anode copper which is refined at the Montreal refinery of Canadian Copper Refiners Ltd.

Falconbridge completed its smelter modernization program, but only one line of the new facilities operated due to the reduced level of mining operations.

Afton Mines Ltd. completed a new copper smelter at Kamloops, BC; it was officially opened in April 1978. The smelter will produce 22 000 t of blister annually to be exported under long-term contract to the United Kingdom.

Electrolytic copper refineries were operated by Inco at Copper Cliff, Ont., and by Canadian Copper Refiners at Montreal, Que. Inco's copper refining capacity at Copper Cliff was 192 000 t a year. Copper is recovered in part as a byproduct from the refining of nickel. Canadian Copper Refiners has a capacity of 435 000 t of refined copper a year, making it the world's largest copper refinery.

At Texasgulf Inc.'s Kidd Creek concentrator near Timmins, Ont. a fourth circuit started to operate in May 1978 and performed satisfactorily during the second half of the year, permitting maintenance work to be carried out on the other circuits. Construction of the copper smelter and refinery continued, with completion scheduled for 1981. By 1981 copper output is expected to increase by more than 50% at the Kidd Creek mine.

Production curtailments undertaken by Inco Ltd. and Falconbridge Nickel Mines Ltd. in response to the chronic oversupply conditions in the world nickel market substantially reduced Canada's copper supply during 1978.

At the Ruttan mine of Sherritt Gordon Mines Ltd., in Manitoba, underground stope development and initial blasthole drilling began during the third quarter of 1978.

The Quebec government signed agreements with Campbell Chibougamau Mines Ltd. and Noranda Mines Ltd. to provide financial assistance and prevent mine closures. Quebec also held exploratory talks with the French government with a view to concluding a bilateral supply and price stabilization scheme for copper.

Copper production in Newfoundland came from two mines and totalled 11 101 t valued at \$18.2 million. In New Brunswick copper production from four mines was 10 711 t valued at \$17.5 million. In Quebec production fell to 88 704 t valued at \$145.6 million; about 12 mines were operating, the main production centres being Rouyn-Noranda, Matagami, Chibougamau and Murdochville.