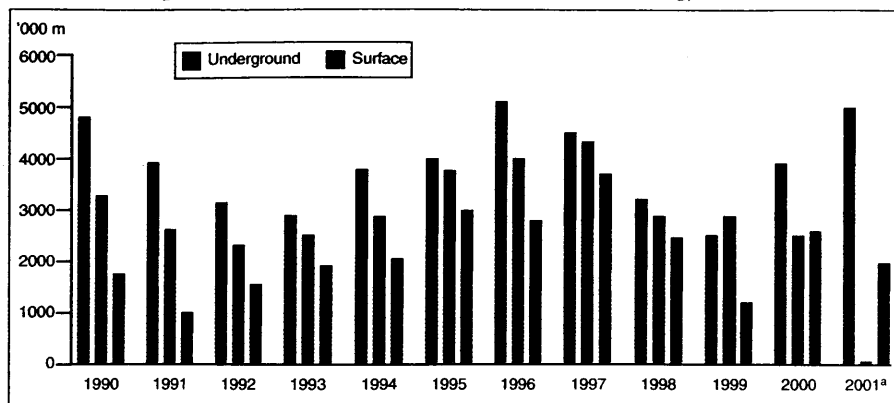


Comparison of three surveys of Canadian diamond drilling, 1990-2001



Sources: Natural Resources Canada, based on the Survey of Mineral Exploration, Deposit Appraisal and Mine Complex Development Expenditures (left bar in each cluster); contract diamond drilling survey (middle bar in each cluster); Canadian Diamond Drilling Association (CDDA) (right bar in each cluster).

\* Contract diamond data for 2001 were not yet available at press time.

Note: all data include exploration, deposit appraisal and mine development drilling.

a substantial number of discoveries in Canada that can be developed for production over the next quarter century. However, there is no certainty that discoveries will be made in all provinces and territories, and reserves of some metals are declining at a rate that is of considerable concern.

Canada produced copper worth C\$1.52 billion in 2001 (the preliminary figure for 2002, released since March, is C\$1.42 billion) but reserves and production are both declining, principally because British Columbia's porphyry copper deposits are depleting, as are the volcanogenic copper-bearing orebodies in Québec and New Brunswick. According to Mr Cranstone, Voisey's Bay, Kidd Creek, Sudbury and Flin Flon should be able to maintain production at more than half the current level for more than 25 years, but new discoveries and mines will be needed if production and reserves are to be held at current levels.

Zinc production was worth C\$1.42 billion in 2001 (C\$1.09 billion in 2002) but reserves have been declining since the early 1980s, and without increased exploration and new discoveries, production is expected to continue its rapid decline. For the next 25 years or so, Kidd Creek together with Hudson Bay Mining and Smelting Co.'s mines should be able to yield around 200,000 t/y of zinc. However, this equates to only about 20% of current Canadian output. The story for lead is even more serious. The Brunswick No.12 mine could be mined out in five to seven years, by which time Canada's reserves and production will both be zero. The value of lead output in 2001 was just C\$108 million (preliminary C\$70.7 million in 2002).

The outlook for nickel is far better. Reserves have been declining since 1981 but, at more than 40 times annual production, they were deemed too expensive to maintain and are still substantial. Current

output is running at close to 190,000 t/y and was worth C\$1.76 billion in 2001 (C\$1.88 billion). Mr Cranstone believes that production from Voisey's Bay and recently increased output from the Raglan nickel belt should increase production levels to close to the record levels of around 250,000 t/y achieved in the early 1970s, and that such production levels will be sustainable for at least 25 years.

Canada's gold production is running at near-record levels, worth C\$2.11 billion in 2001 (C\$2.29 billion in 2002). Reserves increased rapidly at the end of the 1970s and thereafter, following the rapid increase in the gold price, but there has been some decline in reserves in recent years as gold prices have fallen. The future of Canada's gold mining is dependent on higher gold prices to spur further exploration and the development of new mines. Prices are currently on a rising trend.

The prospects for silver, of which Canadian output was worth C\$268 million in 2001 (C\$314.5 million), are far poorer. All production is a by-product of base-metal and gold mining, and a single gold-silver mine, Eskay Creek in British Columbia, accounts for 41% of Canada's silver production. New discoveries will be required if the decline in reserves and production is to be stemmed.

Platinum group metals production (worth C\$569 million in 2001, and C\$449.5 million in 2002 according to the preliminary data) is forecast to advance to record levels as a result of increased production from the Raglan nickel belt and North American Palladium Ltd's mine, and should be sustained for at least 25 years. Similarly, cobalt output (worth C\$76 million in 2001, and C\$49.0 million in 2002) should, in a few years, reach record levels sustainable for at least 25 years because of production from Voisey's Bay and increased output from the Raglan nickel belt.

Reserves of iron ore (production worth C\$1.16 billion in 2001, and C\$1.39 billion in 2002) and uranium (production worth C\$676 million in 2001, and C\$608.4 million) are both deemed sufficient to maintain or increase output significantly over the next 25 years. Two mines, one each in Québec and Labrador, produce all of Canadian iron-ore production, and the country's uranium output, which reached a record 12,992 t in 2001 (preliminary 13,056 t in 2002) is dominated by the deposits in Saskatchewan where reserves are ample.

In his conclusions, Mr Cranstone identifies the Bathurst region of New Brunswick, the Abitibi region of Québec, and British Columbia as the main problem areas for metals mining in the near future. In New Brunswick, 42 massive sulphide deposits have been discovered over the past 44 years. New discoveries continue to be made and although none of the recent ones has proved viable, it is important that exploration continues. In Québec's Abitibi region a dozen mineable orebodies have been discovered in the past 15 years. The prospects for further discoveries are reasonable, but a higher level of exploration will be needed to ensure that a sufficient number of discoveries are made and thereby avert a decline in mining in the region.

The prospects for metal mining in British Columbia are not very encouraging. The province's low-grade copper porphyries cannot compete with higher-grade orebodies elsewhere in the world, and the discovery of new ore types is essential. However, this will not be possible without a substantial increase in spending on exploration.

## More needed

Mr Cranstone notes that exploration spending in Canada as a whole over the past five years has been significantly lower than the inflation-adjusted average of the past 35 years. At the same time, the cost of discovering orebodies is increasing. Hence, exploration expenditures in Canada need to be higher, not lower, than long-term historical expenditures. In only a few years, he says, without new discoveries and the development of new mines, Canada's production of copper, zinc, lead and silver will decline sharply. This would have implications for copper smelters in Québec and Ontario, for a lead smelter in New Brunswick, a copper refinery in Montreal, and zinc refineries in Québec and Ontario. They would become partially or completely dependent on imported concentrates and some would be likely to close.

\*\*Overview of trends in Canadian mineral exploration', 2002 edition. Further information from Economic and Financial Analysis Branch, Minerals and Metals Sector, Natural Resources Canada, Ottawa. Tel: +1 613 995 4577. E-mail: larsenea@nrccan.gc.ca