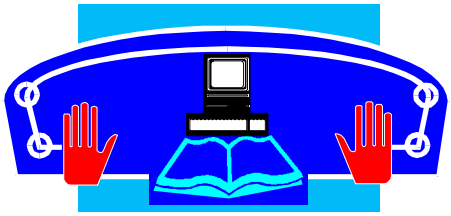


N.w.t. Mining Sector Report - 1989
Type of Study: Reference Material
Date of Report: 1990
Author: G.n.w.t. - Economic Development & Tourism
Catalogue Number: 6-3-93

1989

N.W.T. MINING SECTOR REPORT

NWT Mining Sector Report
1989

CONTENTS

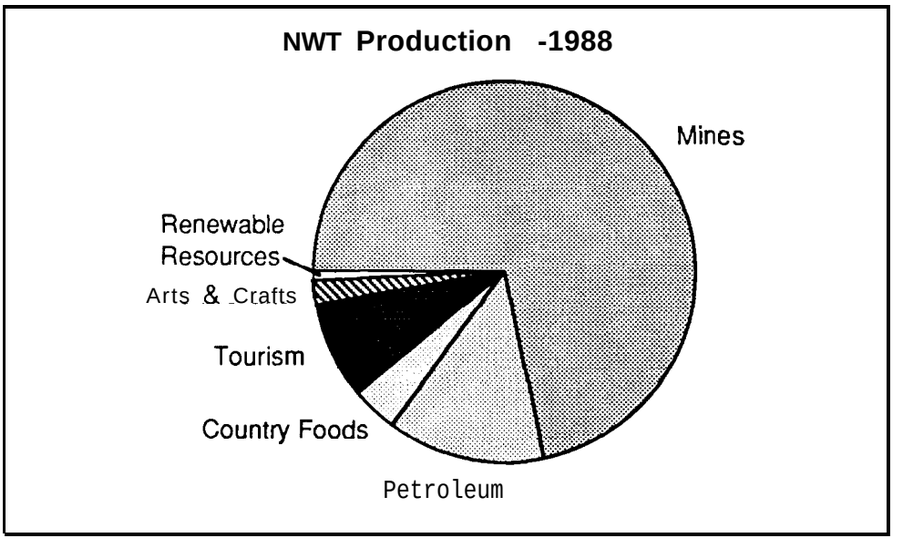
Overview of 1988

(With a Preview of 1989)

Mining continues to play an **essential** role in the NWT economy, representing the majority of non-government expenditures. In 1988, mining accounted for 76.3% of the goods produced in the NWT - a total of *$754 million. (Figure 1)

The mining industry's net contribution to the NWT economy in 1988 exceeded $190 million. Payroll accounted for $55 million of that total, with an additional $8-10 million paid to territorial governments and agencies. The balance, $126 million, was spent by the exploration and mining sectors on the purchase of goods and services.

Figure 1

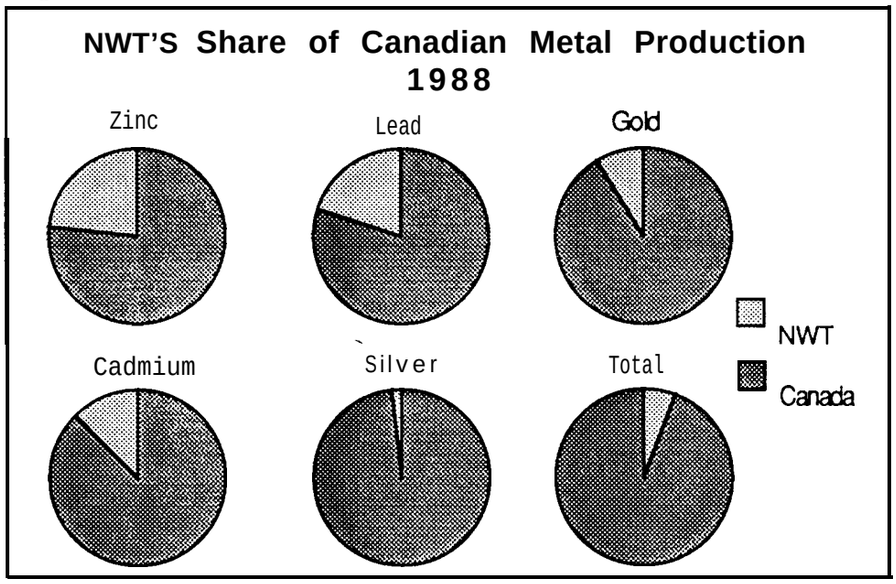


Source: Dept. of Energy, Mines & Resources, Ottawa; Dept. Economic Development & Tourism, GNWT; Tourism Industry Association (NWT).

*(Unless otherwise stated, Canadian dollars are used throughout this document.)

In 1988, the NWT ranked fifth in the value of metallic mineral production in Canada. The NWT supplied 5.5% of Canada's total metallic minerals; metal shipments were valued at $754 million, an 8.3% increase from $696 million in 1987. The NWT produced 23% of Canada's zinc, 20% of its lead, 8.9% of its gold, 12.5% of its cadmium, 1.7% of its silver and 1.5% of its antimony. (Figure 2)

Figure 2



Source: The Canadian Mineral Industry Monthly Report, Jan. 1989.

A number of government initiatives directly related to the mineral industry were announced in 1988-89. The Free Trade Agreement should have a positive effect on the mineral industry through the removal of tariffs. New rules covering services, investment, energy and trade disputes should also promote better trade relations with the United States. (Canadian Mineral Outlook Conference, Canadian Mineral industry Monthly Report, July, 1988)

In 1989, the Canadian government introduced the Canadian Exploration Incentive Program (CEIP) to assist and encourage investment in mineral exploration. The government also proposed a Goods and Services Tax, to come into effect in 1991, which will enhance the competitive position of Canadian exports.

The federal and territorial governments have continued the process of devolution of government responsibilities to the GNWT. To help prepare for an expanded territorial mandate, the Department of Energy, Mines and Petroleum Resources was established on April 1, 1989. This Department will provide the vehicle for the eventual transfer of non-renewable resource management to the territorial government.

Mineral exploration expenditures reached record levels in 1988, with more than $112 million invested in exploration ventures across the NWT. In addition, seven properties were shipping products, while eight projects were at the mine development or advanced exploration stages.

Although 1988 saw record levels of exploration investment, the stock market crash of October, 1987, curtailed the ability of junior companies to raise risk capital. In addition, gold prices fell in 1988, and this trend continued into 1989, as high interest rates, a strong US dollar and increased gold production weakened gold prices. Silver prices also fell, but zinc prices continued to climb through 1988, as supply failed to keep pace with demand. In 1989, this shortfall began to ease, with prices falling slightly by mid-year. Lead prices were somewhat volatile in 1988, but remained essentially unchanged from early 1987 to mid-1989.

Although the NWT mining sector has encountered setbacks in the past few years, the outlook for mining in the 1990's is positive. The mining industry will continue to respond to market fluctuations and will strive to maintain viable operations in the North, as new areas are explored and new discoveries are brought into production.

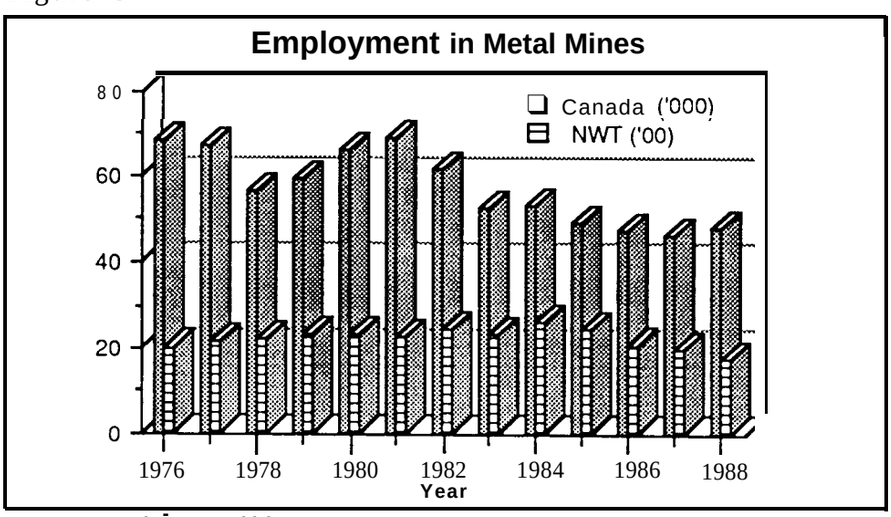
History of Mining in the NWT

The NWT has had a long association with minerals and mining. Prior to European contact, native residents utilized non-metallic minerals, such as flint and soapstone, to fashion tools and to manufacture crafts. There was even limited exploitation of metallic minerals; at least until the 1920's, native people mined copper deposits in the Coppermine River-Coronation Gulf area. Some use was also made by aboriginal people of lead from the deposits around Pine Point.

Non-native residents have been involved in mining in the NWT for many years. Mineral production began in 1876, when 14.5 tonnes of mica, worth $120,000, were mined in the Cumberland Sound area of Baffin Island. The NWT'S first mineral producer in the 1900's was the Eldorado Mine at Port Radium, which commenced operation in 1932.

The mining industry in the North has come a long way since Martin Frobisher first attempted to recover gold on Baffin Island 400 years ago. The NWT mining industry has made substantial contributions to northern development, the Canadian economy and the introduction of new technology and transportation systems.

Figure 3

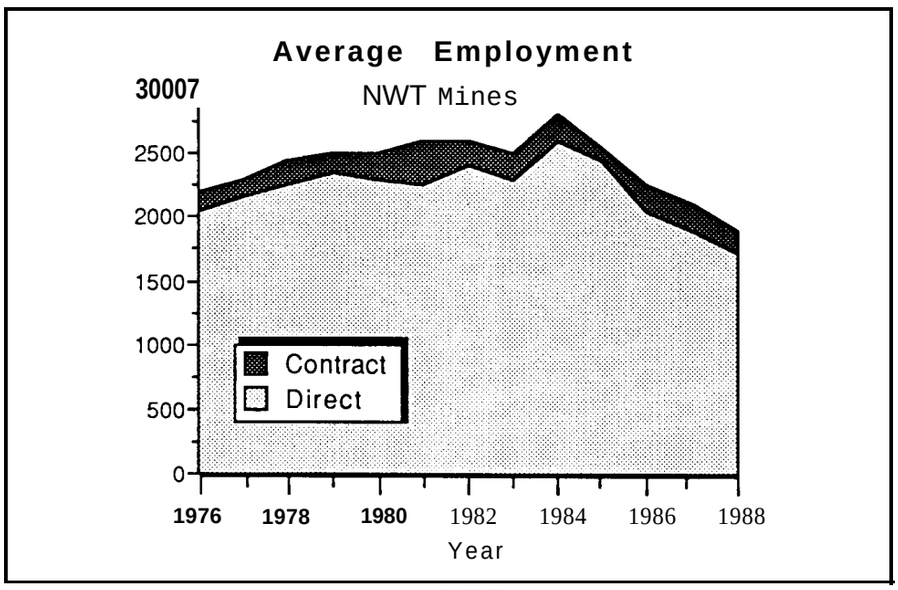


Source: Annual Census of Mines, Canadian Mineral Industry Report, Sept. 1987; Energy, Mines & Petroleum Resources, GNWT; NWT Chamber of Mines

Employment Trends

Although the NWT generally follows the Canadian employment trend for metal mines, the national figures have gradually stabilized over the past three years; whereas, employment in the NWT mining sector has declined as a result of the closure of several mines. (Figure 3) At Pine Point, two hundred and fifty-five employees were laid off in July of 1987 as mining ceased, and another 145 jobs were terminated in the spring of 1988, when the mill closed. As a result, there were approximately 1,895 people employed in the mineral industry at the end of 1988, of which more than 1,000 were resident in the NWT. Mining operations directly employed 1,725 workers and an additional 170 were on contract. (Figure 4)

Figure 4



Source: Energy, Mines & Petroleum Resources, GNWT; NWT Chamber of Mines

Current Mining Operations

NERCO Con Mine Ltd. (Nerco Con Mine)

The NERCO Con Mine is located in Yellowknife. In 1988, the mine produced 2,426,034 grams (78,000 ounces) of gold, and celebrated its 50th year of operation. During the year, surface and underground facilities were renovated, and mine development was accelerated. Early in 1989, the mine, in an effort to streamline its operation and improve unit costs, reduced its workforce by 15% to approximately 400 employees. Since that time, NERCO has reported a significant increase in productivity. NERCO has also undertaken a two year feasibility study, partly funded by the Northern Technology Assistance Program, to recover gold from mill tailings. At the end of 1988, NERCO reported 700,000 grams (22,500 ounces) of contained silver and 24.8 million grams (800,000 ounces) of contained gold in its reserves. In 1988, the company purchased approximately 3 1% of its goods and services from NWT suppliers, spending a total of $12.3 million.

Giant Yellowknife Mines Ltd. (Giant Mine)

In 1988, Giant recovered 2.2 million grams (71,489 ounces) of gold. A new plant to process old mill tailings opened in 1988, at a cost of $25 million. The facility is scheduled to operate from May to October each year. In 1988, a total of 329,090 tomes of ore and 857,057 tonnes of tailings were processed. The mine employed 399 workers at the end of 1988, and spent $20 million on NWT services and supplies.

Echo Bay Mines Ltd. (Lupin Mine)

This underground gold mine is located 400 km northeast of Yellowknife. Lupin produced a record 6.3 million grams (202,440 ounces) of gold in 1988, an increase of 5% over 1987. In April, 1988, the company reached a milestone, recovering its one millionth ounce of gold after six years of operation. Throughout the year, the mine, employing 430 workers, processed an average of 1,687 tonnes of ore per day, with a 94.9% gold recovery rate. Northern purchasing amounted to $14 mill on in 1988.

Cominco Ltd. (Polaris Mine)

The Polaris Mine is located on Little Cornwallis Island. It is the world's most northerly base metals mine. In 1988, the mine produced 86,300 tonnes of zinc concentrate and 17,700 tonnes of lead concentrate. There were 263 employees at year-end. Under a joint venture agreement, Cominco sold 45% of the Polaris Mine and its exploration properties to Pine Point Mines Ltd., with Cominco continuing to operate the mine and market its product. Polaris spent approximately $1 million on northern purchasing in 1988.

Nanisivik Mines Ltd. (Nanisivik Mine)

Nanisivik is located on the north coast of Baffin Island. In 1988, Nanisivik Mines milled 676,000 tonnes of ore, producing 1,700 tonnes of lead concentrate and 113,100 tonnes of zinc concentrate. The mine employed approximately 200 people. In 1988, partly funded by the Northern Technology Assistance Program, the mine studied methods of recovering some of the 800,000 tonnes of ore remaining in underground pillars. Depending on ice conditions, the mine ships concentrate from late May to the middle of November. Nanisivik Mines spent $282,310 on goods and services in the NWT in 1988. This represented 2.2% of total purchases for the year.

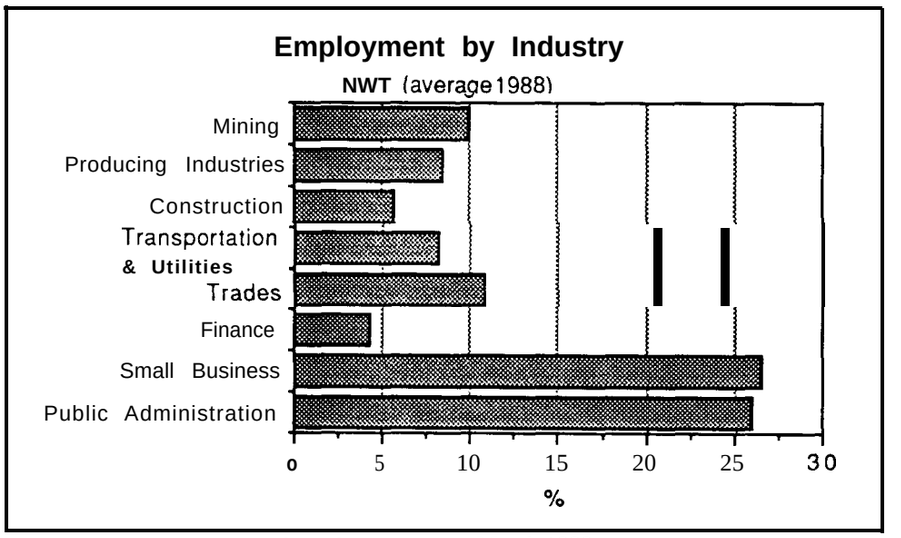
Treminco Resources Ltd. (Ptarmigan Mine)

The Ptarmigan Mine is a relatively small underground operation, located 10 km northeast of Yellowknife. Construction of a 181 tonne-per-day mill was completed in 1989, along with a headframe and hoist which will enable access to a depth of 457 m. The mine employed 35 permanent workers in 1988. Treminco spent $3.3 million dollars on goods and services in the NWT, representing 76% of their total purchases for 1988.

Pine Point Mines Ltd. (Pine Point Mine)

The Pine Point minesite is located on the south shore of Great Slave Lake. Mining activities ceased in June, 1987, and the milling of stockpiled ore was completed in April, 1988. In 1988, atotalof 888,300 tonnes ofore were milled. There were 12 employees at year-end. No further exploration is planned, and the town was officially closed on August 15, 1988. The mine expects to continue shipping zinc and lead concentrate until 1990.

Figure 5



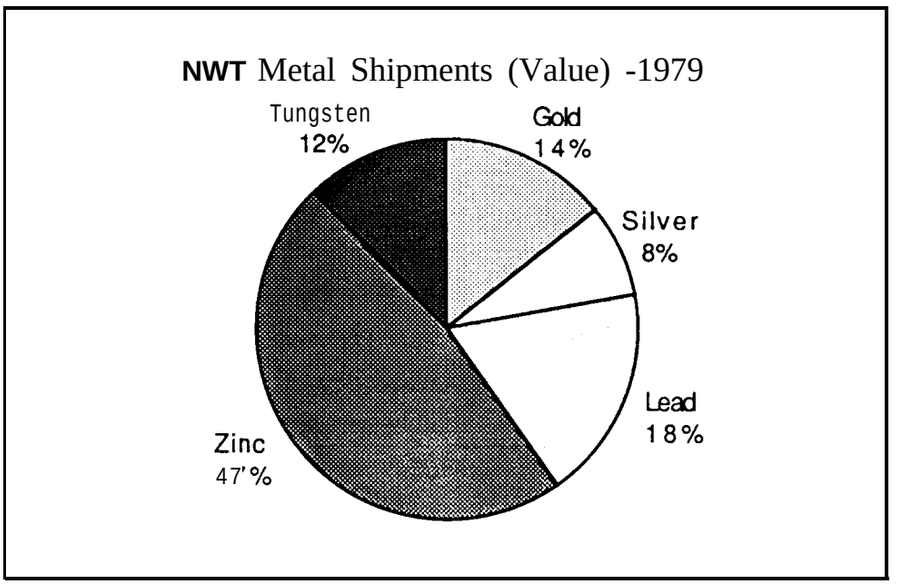
Source: GNWT Statistics Quarterly, Volume 11, No. 1, March 1989

Production Trends

Following a worldwide trend, gold is currently the NWT's most sought after metal. Gold remains a profitable commodity, overcoming some of the problems of northern mining. High freight costs and a lack of infrastructure are somewhat offset by gold's high value-to-weight ratio and its adaptability to small mining operations.

As illustrated in Figures 6 and 7, the relative value of gold shipments has almost doubled since 1979. In relation to other metals, the value of lead shipments has been reduced by half, and zinc has increased by 17%. Zinc will continue to dominate NWT mineral production, until concentrates stockpiled at Pine Point are exhausted in 1990.

Figure 6



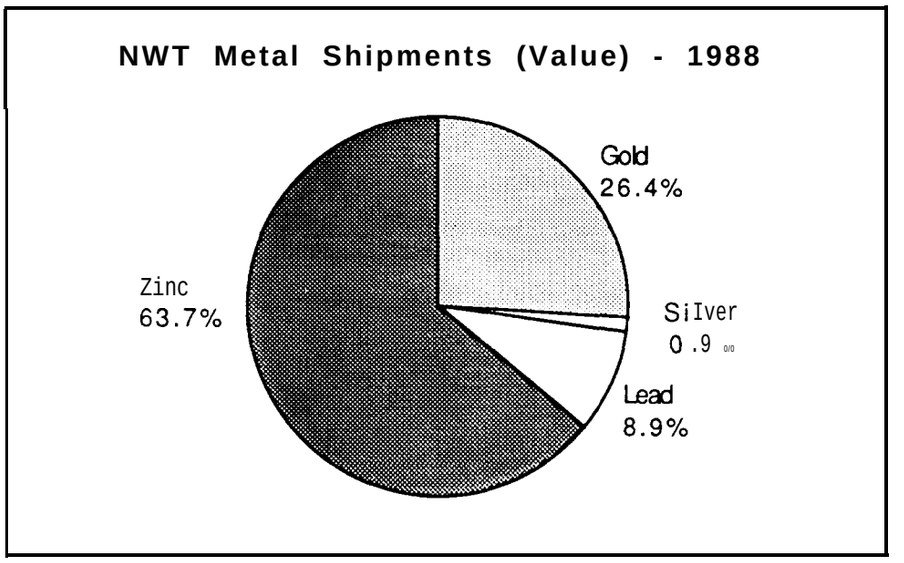
Source: Statistics Canada; Canada's Mineral Production, Cat 26-202

The four graphs on pages 11 and 12 compare the total value and quantity of gold, zinc, lead and silver shipments from the NWT during the 1980's.

Gold accounted for 26.4% of the value of NWT metal shipments in 1988. Since 1984, the volume of gold produced has remained relatively constant, declining slightly after 1986. (Figure 8) Gold production experienced a small reduction to

11,422 kg in 1988, from 11,740 kg in 1987. As a result of lower gold prices, there was an 11%- drop in the value of gold shipments, from $223.5 million in 1987 to $197.9 million in 1988; although, actual gold shipments over the same period fell by only 2.7%.

Figure 7



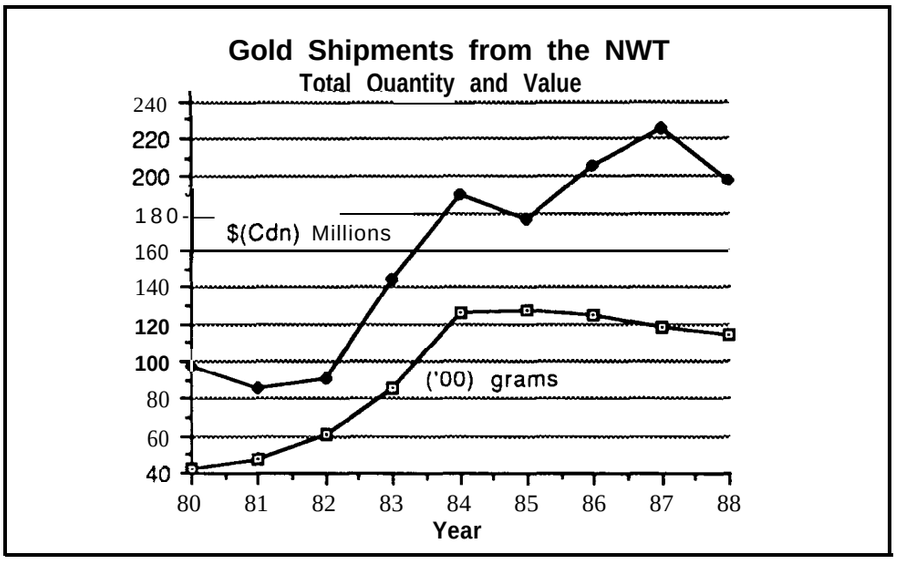
Source: The Canadian Mineral Industry Monthly Report, January 1989

Zinc shipments from the NWT have climbed throughout the 1980's, rising 12.4% from 258,000 tonnes in 1987 to 290,000 tonnes in 1988. (Figure 9) Higher zinc prices dramatically increased the value of these shipments, from $328.8 million in 1987 to $477.6 million in 1988.

Lead shipments plummeted 49% in 1988 to 67,000 tonnes (from 132,000 tonnes in 1987) due to sharply reduced lead sales by Pine Point. (Figure 10) In response, the value of lead shipments fell from $139.4 million in 1987 to $67.2 million in 1988.

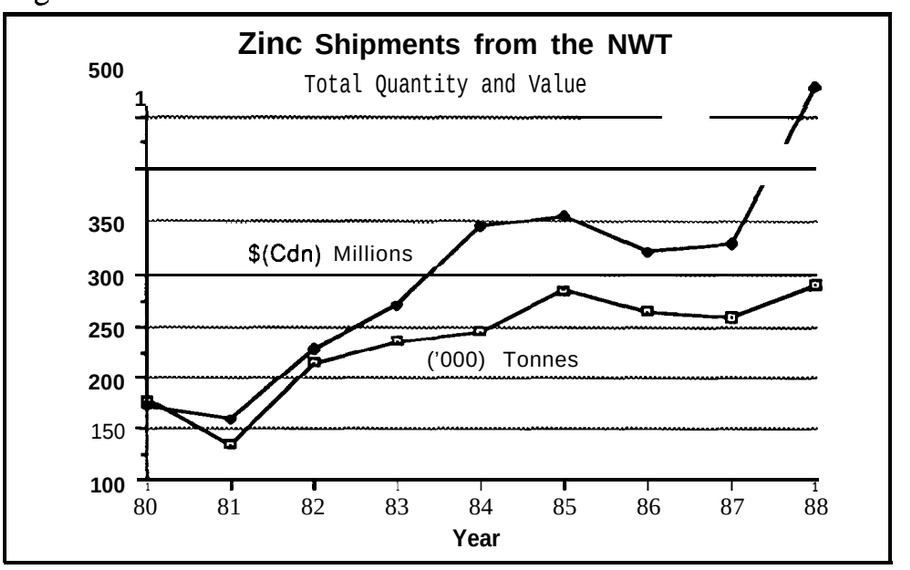
Silver production declined steadily between 1983 and 1986, in response to significantly lower prices; however, over the past three years shipments have rebounded slightly, reaching 27 tonnes in 1988. (Figure 11) Production was valued at $6.8 million in 1988.

Figure 8



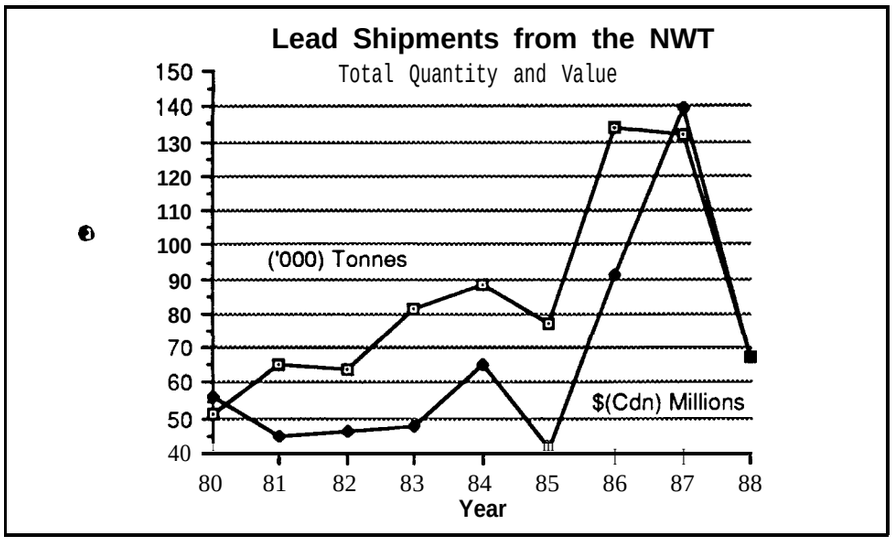
Source: Statistics Canada; Canada's Mineral Production, Cat. 26-202; The Canadian Mineral Industry Monthly Report, January 1989.

Figure 9



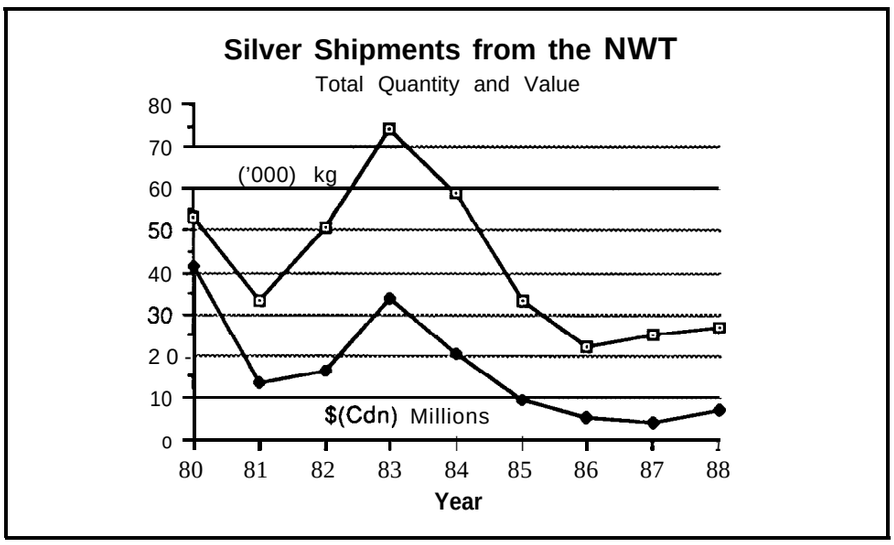
ource: Statistics Canada; Canada's Mineral Production, Cat. 26-202; The Canadian Mineral Industry Monthly Report, January 1989,

Figure 10



Source: Statistics Canada: Canada's Mineral Production. Cat. 26-202: The Canadian Mineral Industry Monthly Report, January 1989.

Figure 11



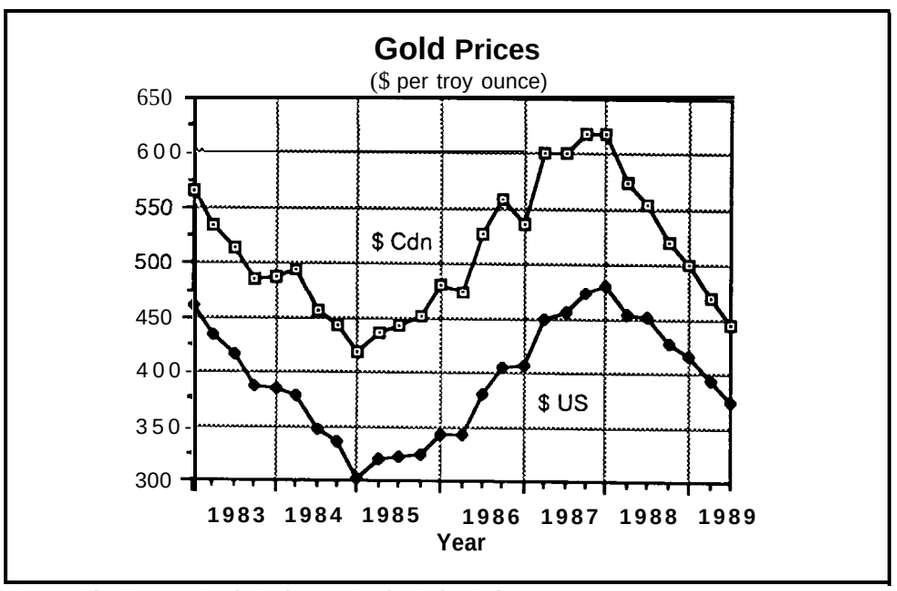
Source: **Statistics Canada; Canada's** Mineral Production, Cat. 26-202; The Canadian Mineral Industry Monthly Report, January 1989; DIAND.

Metal Prices

Gold

At the end of 1987, gold was selling at close to $481 US an ounce. (Figure 12) By the end of 1988, gold had dropped to $415 US. This downward trend was in response to economic conditions and developments both within and outside of the industry. Forward sales, gold loans, a rising US dollar and lower oil prices kept many investors away from gold. Higher interest rates and an easing of inflation increased the demand for money-market and fixed-income securities, at the expense of the more traditional gold investments.

Figure 12

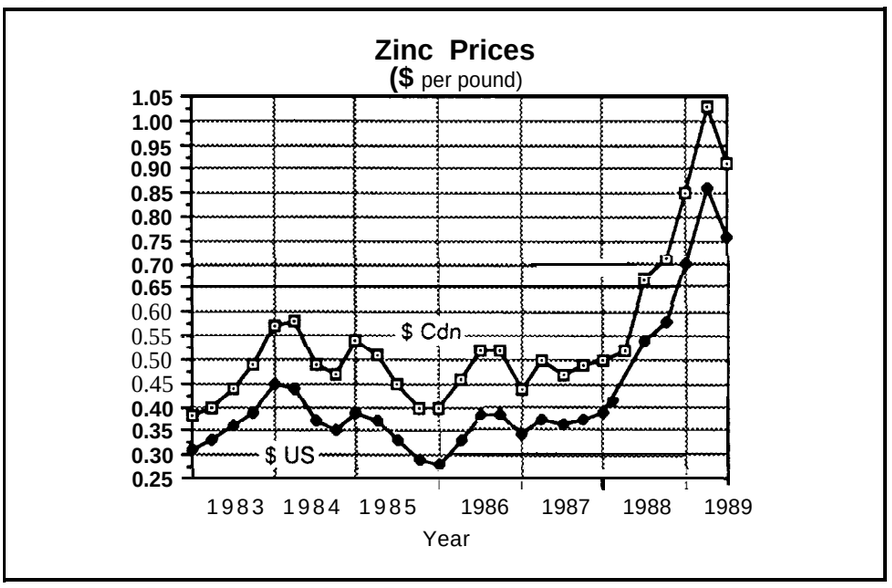


Source: The Toronto Stock Exchange, Stock Market Indices.

Zinc

Zinc prices on the London Metals Exchange (L. M. E.) were close to 40 cents US a pound at the end of 1987. (Figure 13) Strong demand for zinc in the die-casting and galvanizing industries pushed the price of zinc to 70 cents US by the close of 1988. Speculative pressures, low world stocks and supply disruptions (partly due to production problems in Peru, the 3rd largest western producer), also pushed zinc prices up. As predicted by analysts, zinc prices have declined in the latter half of 1989, as consumers find cheaper substitutes.

Figure 13

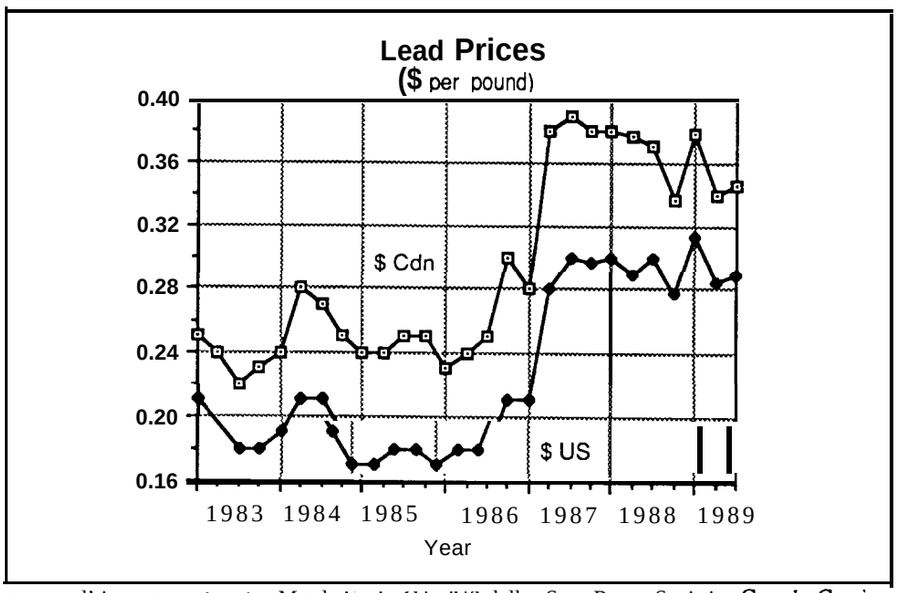


Source: Price Record, London Metals Exch.; Cdn./US dollar Spot Rates, Statistics Canada; Cominco Metals

Lead

Consumption of lead in the western world increased by 3% in 1988, due to an increased demand from the lead acid battery market. Lead metal production rose by 0.8 per cent to 4,260,000 tonnes in 1988. The seasonal demand for batteries and reduced production in Peru, caused by a seven week miners strike, resulted in a strengthening price trend; however, lead prices continued to be unsettled in response to tight market conditions. Prices fell in the third quarter of 1988 as battery sales slumped, yet rebounded in the fourth quarter when winter sales of batteries increased. (Figure 14)

Figure 14

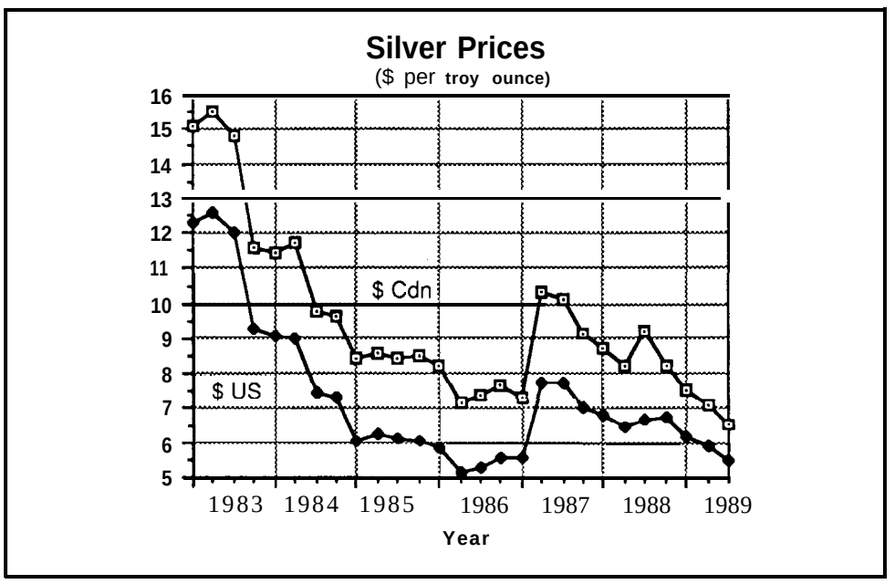


Source: Price Record, London Metals Exch.; Cdn./US dollar Spot Rates, Statistics Canada; Cominco Metals

Silver

Silver prices closed at $6.80 US per ounce at the end of 1987. (Figure 15) Prices slowly climbed in 1988, but fell at year end to $6.22.

Figure 15

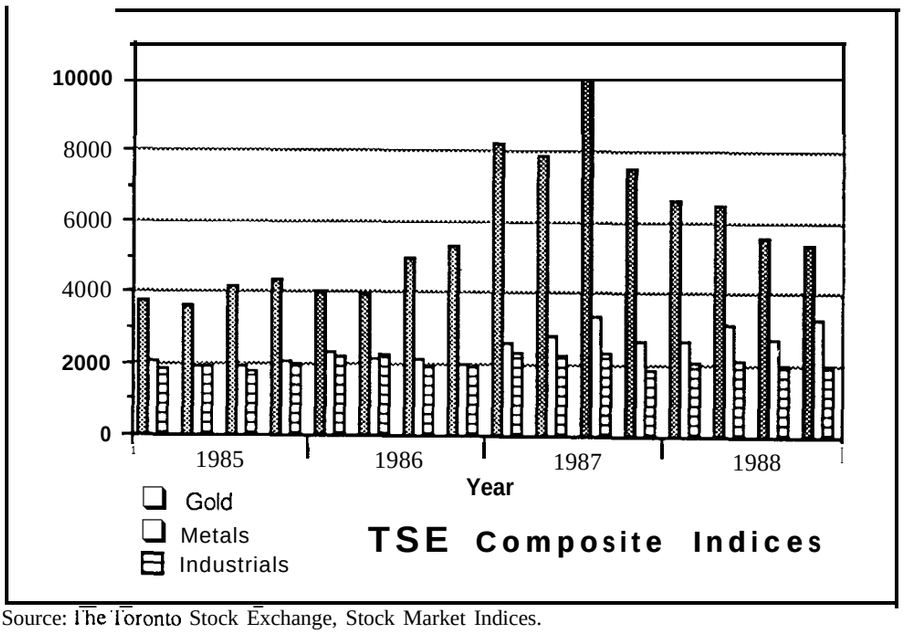


Source: Price Record, London Metals Exch.; Cdn./US dollar Spot Rates, Statistics Canada; Cominco Metals

Equity Markets

The Toronto Stock Exchange (TSE) indicated that, while interest in base metals shares strengthened, precious metals stocks declined in 1988. (Figure 16) The resurgence in the value of base metals shares was mainly in response to the increased production and prices of nickel and zinc, while falling gold prices pulled down the share values of precious metals producers.

Figure 16



Source: The Toronto Stock Exchange, Stock Market Indices.

Canada/NWT
Mineral Development Agreement

The Canada/NWT Mineral Development Agreement (MDA) was implemented in 1988. It is part of a four year, Canada/NWT Economic Development Agreement which terminates in 1991. The MDA is divided into three programs: Geoscience, Northern Technology Assistance (NTAP) and Northern Mining Information. The objectives of these initiatives are to: map potential economic mineral sites; publish index maps, bibliographies and data files; aid in the development of innovative technologies, and inform the public of the important economic and social roles of the NWT mineral industry.

The Geoscience Program is strongly supported by the mineral exploration community. It has been successful in bringing geological mapping expertise to regions of current interest where baseline scientific data is wholly inadequate.

NTAP was slow to attract the interest of potential clients - the operating mines. During the past year, however, most producers, in co-operation with the Canada Centre For Mineral and Energy Technology (CANMET), have initiated research studies designed to improve recoveries and prolong life expectancies at their operations.

The Northern Mining Information Program (NMIP) has distributed posters, brochures and a video throughout the NWT, with particular emphasis on educational institutions. In addition, the NWT Chamber of Mines distributes a newsletter across the NWT and in southern Canada. Directed towards a non-industry readership, *Mining Industry News* reviews current exploration activities and issues facing the mining community.

Federal Taxation Changes

Canadian Exploration Incentive Program (CEIP)

The original Flow-Through Share (FTS) tax incentive program, with the Mineral Exploration Depletion Allowance (MEDA) as its centerpiece, was replaced by the CEIP on January 1, 1989. The principal concepts of this program are outlined below.

-The incentive rate is 30%, after January 1, 1989, for exploration expenses in Canada .

-Incentives apply only to exploration expenditures. Pre-production expenses are excluded.

-Only expenditures financed via flow-through shares are eligible.

-An expenditure ceiling of $10 million per calendar year must be shared with associated partners. Extended rules were established to determine when businesses are associated.

(Energy, Mines and Resources Canada, IC-CEIP-89-1)

As originally structured in the early 1980's, FTS financing provided attractive tax incentives to invest in high risk mineral exploration, culminating in record exploration investment in 1988, both in the NWT and across Canada.

Following several record-setting years of investor uptake in flow-through share offerings, reaction to the CEIP was cautious - both by offering companies and by the investment community. This deliberation resulted from insufficient information regarding operational specifics of the program. In addition, steady erosion of their market value has lowered the attractiveness of junior equities as financing vehicles.

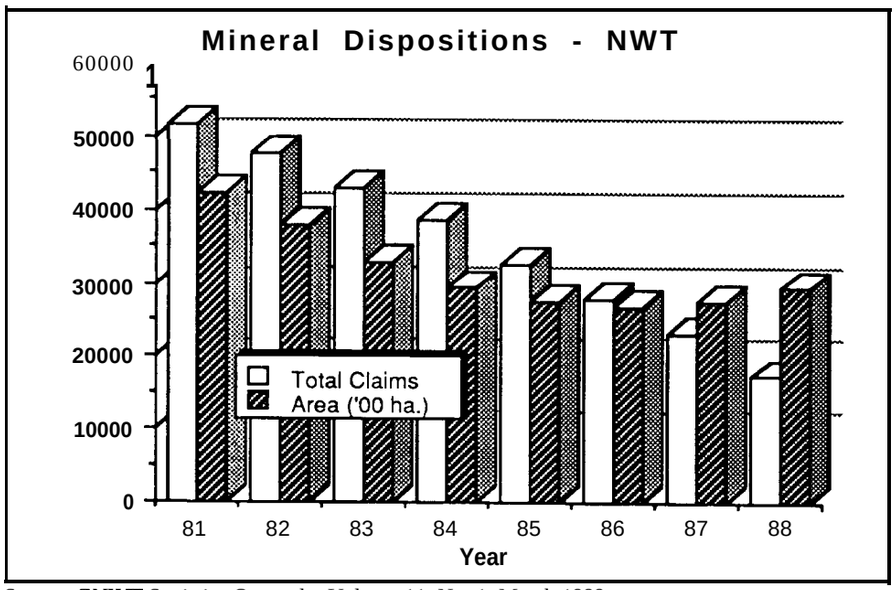
Exploration

General Summary

According to a recent NWT Chamber of Mines survey, $112.64 million, 62% of which was financed via flow-through shares, was spent on exploration in the NWT in 1988. Exploration expenditures rose by 60% from the $70 million spent in 1987. This increase was mainly due to the extensive use of flow-through share financing in the final year of this tax-based incentive program, as well as reflecting an increased interest in gold. Companies spent $78.34 million in the Mackenzie region, $32.67 million in the Keewatin and $1.63 million in the Arctic Islands.

Although actual numbers of mineral claims in good standing declined in 1988, there was an increase in the total number of hectares (ha) staked. (Figure 17) During 1988, an area covering 674,807 ha was staked, while over the same period 439,228 ha lapsed. Claims in good standing at the end of 1988 totalled 16,702, covering 2,940,000 ha.

Figure 17



Source: GNWT Statistics Quarterly, Volume 11, No. 1, March 1989

In the Arctic Islands, lead-zinc exploration was confined to areas around the Nanisivik and Polaris mines. No new areas have been staked in the past two years.

Exploration activity in the Keewatin District was up from 1987. In 1988, exploration companies staked 260,600 ha, compared to 88,900 ha in the previous year. At least 33 properties were prospected for their gold potential, and three companies explored for uranium deposits in the Keewatin, with activity centered around the Kiggavik (Lone Gull) project.

In the southeastern part of the Mackenzie District, south of the East Arm, 22,000 ha were staked in 1988; whereas, only 1,900 ha were staked in 1987. Exploration companies assessed the precious and base metals potential of properties in this region. No claims were actively explored in the Pine Point area.

The Slave Structural Province, which underlies the area between Yellowknife and the Coronation Gulf, was the most active mineral exploration region in the NWT in 1988. Companies staked mineral claims covering 423,500 ha, up 14% from 1987. These figures reflect the intense interest in gold-bearing deposits. Areas surrounding Lupin, Colomac and the Tundra project received the most attention.

Staking in the area of the East Arm of Great Slave Lake increased from 600 ha in 1987 to 23,600 ha in 1988. Exploration focused on rare earths and precious metals.

There were 12,700 ha staked in the Bear Structural Province north of Great Bear Lake, in 1988, compared with 67,100 ha in the previous year. Exploration targeted gold and platinum group precious metals.

In the Cordilleran District, 1,800 ha were claimed. One project was undertaken by the Liard River Exploration and Mining Company to define methods of placer gold recovery from the Liard River.

Advanced Exploration and Development

A number of important projects were in the advanced stages of exploration and development in the NWT, in 1988. Neptune Resources Ltd. announced that their Colomac gold property, located 212 km north-northwest of Yellowknife, should begin production by the second quarter of 1990. A 10,000 tonne-per-day mill is currently under construction. The mine will use conventional milling and gold recovery techniques on this high tomage, low-grade gold deposit.

Noranda Exploration Ltd., with joint venture partners Total Energold Corporation and Hemlo Gold Mines Inc., continued exploratory work on the Tundra Project, located at Courageous Lake, 240 km northeast of Yellowknife. Approximately 29.5 Mt, grading 6.96 g/t gold, have been outlined, at a cutoff grade of 4 g/t. Early in 1989, the joint venture partners began sinking a 480 m deep shaft to confirm this overall grade and to determine the mineability of the mineralized zone.

Urangesellschaft Canada Ltd. sought regulatory approval for its Kiggavik (Lone Gull) uranium project west of Baker Lake. A feasibility study was commissioned in the spring of 1988. Environmental studies and geotechni cal drilling took place to evaluate a potential mill site, tailings disposal area, airstrip and docksite facilities. CEGB Exploration (Canada) Ltd. has obtained a 20% interest in the project, and Daewoo Corporation of Korea also holds a 1% interest in the property. Proven and probable reserves stand at 3.2 million tonnes, grading 0.5% uranium.

Highwood Resources Ltd. and joint venture partner Hecla Mining Co. spent $1.9 million on evaluation of the beryllium, yttrium and rare earth mineralization at Thor Lake. Mapping, trenching and 2,100 m of diamond drilling were carried out at the site, located 113 km southeast of Yellowknife. Mineralogical research was conducted by the University of Alberta, and the Geological Survey of Canada performed metrological and geophysical studies in the area. The company modified its pilot plant equipment, installed at Lakefield Research in Ontario, to convert concentrate into beryllium hydroxide. Market studies continued,

in the attempt to ensure the economic feasibility of the project. Beryllium, yttrium and rare earth elements have important uses in nuclear power generation and in the missile, aircraft, electronics and scientific equipment industries. Beryllium is also used as an alloying agent with copper, nickel, iron, aluminium and magnesium, contributing high electrical conductivity and heat resistance. Mineral Resources International acquired an additional 462,000 shares of Highwood Resources, increasing its stake to 1,127,000 shares or 15.2%.

The Back River Joint Venture has spent an average of $1 million per year over the past six years, carrying out extensive exploration on its iron-formation-hosted gold deposits, located 500 km northeast of Yellowknife.

Aber Resources Ltd., in a joint venture with Hemisphere Development Ltd., spent $1.5 million on their Sunrise Lake property, situated 112 km east of Yellowknife. The property hosts a volcanogenic massive sulphide deposit, with probable and possible reserves of 1.6 million tonnes, grading 10.0% zinc, 4.2% lead, 493.71 grams per tonne (14.4 oz/ton) silver and 0.79 grams per tonne (0.023 oz/ton) gold, to a depth of 579 m. A decision to go underground will depend on 1989 exploration results.

Canada Tungsten Mining Corp. shut down the Western " World's largest tungsten mine in 1986, due to stiff competition from China. The company anticipated that the price of tungsten would rise sufficiently to reopen the mine in 1989; however, continued oversupply by the Chinese has kept tungsten prices too low to permit renewed operations at this time.