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Diamond rush in Northern Québec

The announcement on December 17, 2001 of the discovery of two diamantiferous kimberlite deposits by Ashton Mining of Canada and SOQUEM inc. in the Monts Otish sector triggered a real rush to stake out claims in Northern Québec. Since then, MRN has received more than 33,400 title applications, with the diamond rush accounting for 96%. This amounts to a daily average of 500 to 1,000 applications.

To date, 153 companies or individuals have made requests affecting 202 NTS map sheets. Other areas of interest in the quest for diamonds are currently being explored in Québec such as Caniapiscau, Mistassini, Nottaway, Torngat, and Wemindji.

Watch for our next issue in May 2002 to find out the status of diamond exploration in Québec.

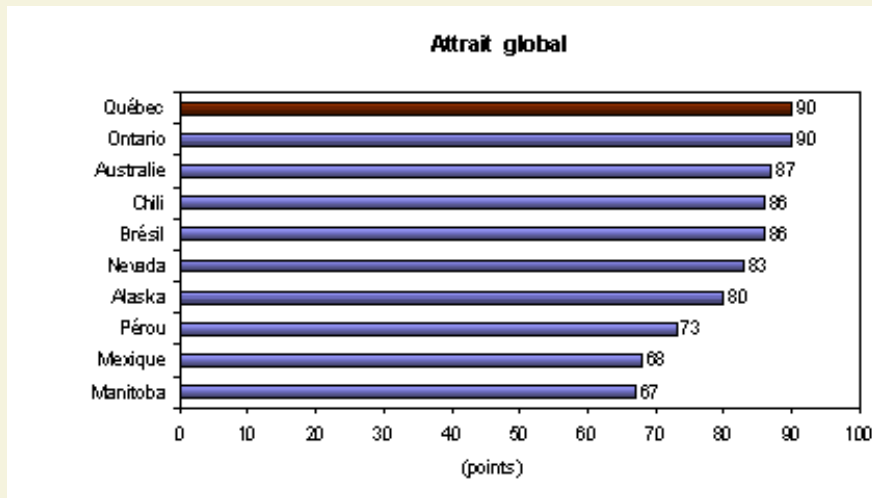


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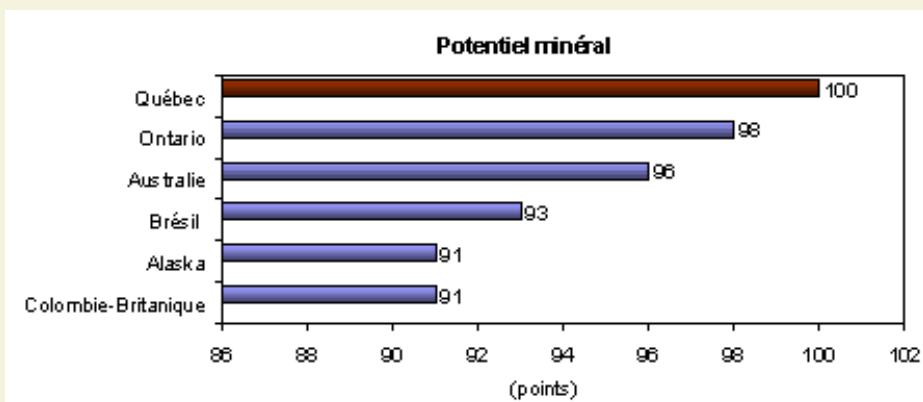
Québec ranked first worldwide for its investment climate in mineral exploration Sylvain Lacroix

Direction de la politique et de l'économie minérales

In the fifth Annual Survey of Mining Companies carried out by the Fraser Institute, which was released on December 18, 2001, Québec and Ontario tied for first place worldwide. Québec obtained the highest score, 90 points out of 100, among the forty-five jurisdictions surveyed.

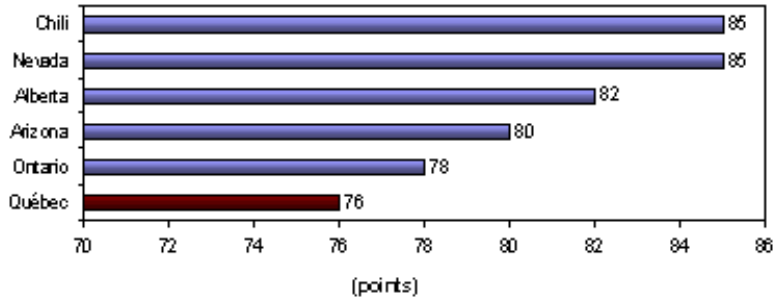


Investment attractiveness for mineral exploration investment, as assessed by the 2001/2002 Fraser Institute survey, combines mineral potential (60% of overall attractiveness) and government policy (40%). Québec ranked first for mineral potential, with a maximum score (100 points out of 100), and sixth (76 points out of 100) for government policies.



This 1st place for overall attractiveness in 2001 is the best result achieved by Québec since the initial survey by the Fraser Institute in 1997. Québec ranked ninth worldwide in 2000, second in 1999 and sixth in 1998. Québec has always finished among the top three mining jurisdictions in Canada, and came first in 1999.

Politiques gouvernementales



The companies that took part in the 2001/2002 Fraser Institute survey had worldwide exploration budgets of US\$782 million in 2000, roughly 60% in North America. This amount represents approximately 30% of worldwide exploration budgets in 2000 (US\$2.6 billion).

More information and the complete text of the 2001/2002 Fraser Institute survey report can be obtained at www.fraserinstitute.ca

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The rehabilitation of State-owned mining sites \$20 million invested

Johanne Cyr
Direction du développement minéral

The mining industry has acquired an unflattering reputation, after abandoning countless mine tailings sites to erosion by wind and water and to oxidization processes that lead to the production of acid mine drainage. Other problems include abandoned waste rock dumps, trenches and other dangerous openings, unsecured infrastructures and machinery, and badly-stored products of varying toxicity.



To ensure that situations like these will not occur in the future, the Government of Québec introduced changes to the Mining Act on March 9, 1995. Since then, whenever mineral exploration or mine extraction activities are undertaken, a rehabilitation plan must be submitted and a financial guarantee covering 70% of the foreseeable cost of rehabilitation work on stocking areas must be deposited by the mining company concerned.

The program to restore State-owned mine sites

Between 1967 and 1985, 11 mine sites, covering a total area of more than 500 hectares, were transferred back to the government by the mining industry. They are located in Abitibi-Témiscamingue (East Sullivan, Sullivan, Terrains Aurifères A, Canadian Malartic, Wood Cadillac, Preissac, Stadacona and Lorraine), Mauricie (Somex) and Gaspésie (Candego and Les Mines Madeleines). In view of the extensive environmental problems caused by these mining sites, the Department launched a rehabilitation program for State-owned mining sites in 1987. Since 1991, over \$20 million has been invested in the program.

A great deal of energy has been directed at the development of efficient, economical restoration methods. Many different experts from the university and engineering consultancy fields have contributed to the work undertaken by the Department. In several cases, an exhaustive characterization of the site concerned has led to the development of innovative technological approaches using various residual materials, such as forest residue, sludge from sewage treatment plants, septic tanks or paper mills, and ash from co-generation power plants. These technologies have reduced costs and offered a solution to the problem of stockpiling at least some of the residues concerned. Various studies have also been carried out to develop passive treatment systems adapted to the specific parameters of mine effluents (biofilters, wetlands, limestone drains, organic barriers, etc.).

As an illustration, the following pages describe the results of some of these mine rehabilitation projects.

- [The Lorraine site](#)
- [The Wood Cadillac site](#)
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Recognized expertise

The rehabilitation of State-owned sites has led to the development, within Québec, of recognized expertise in site characterization, the understanding of mine tailings alteration processes, and the development of effective and economical technologies. In addition, the use and revalorization of various types of residue, the design of passive treatment systems and the integration of wildlife habitat creation as part of the mine site rehabilitation process are entirely in keeping with a concept of sustainable development.

The MRN must now work to promote technology transfers and the diffusion of knowledge in the underworld to ensure that its expertise is put to good use, while continuing to focus on research and technological innovation. Although the restoration of the sites transferred back to the State has now been practically completed, many other sites that have been abandoned over the years still await restoration.

The mining companies that ceased their operations before the amendments to the Mining Act came into force are not required to provide rehabilitation plans or financial guarantees, but they still remain responsible for the tailings produced at their mines. However, there are around 70 sites where the companies concerned either cannot be traced or are insolvent, and are therefore unable to carry out the work required. 15 of these sites are considered to have a major impact on the environment, and must be prioritized for future work. The estimated cost of restoring these 15 sites is around \$40 million, and the total cost for all abandoned sites could reach \$70 million.

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The Lorraine site

The exploitation of nickel and copper ore at the Lorraine mine between 1964 and 1968 left over 600 kt of sulphur-rich mine tailings. The 22-hectare site includes 15 hectares of mine tailings. Total site restoration costs were \$1.8 million.



A multi-layer covering installed to control acidic mine drainage.

The spilled tailings were recovered and the surface of the tailings impoundment was re-profiled. A capillary barrier covering, generally known as a multi-layer covering, was established during the winter of 1999 on the mine tailings site to control acidic mine drainage, and limestone drains were set up at the outlet. A program to monitor system performance and changes in water quality has been in effect since the covering was placed in position. (3)



Following the establishment of *NSERC-Polytechnique-UQAT Industrial Chair in Environment and Mine Waste Management*, the site will be used as a demonstration site for various types of work carried out as Chair activities.

The Lorraine site, after completion of the work.

The Wood Cadillac site

The ore deposit at the Wood Cadillac mine was mined from 1939 to 1949, producing gold and silver, associated with tungsten and arsenic. The tailings impoundment covers an area of 17 hectares and contains roughly 300,000 t of tailings from 582,000 t of extracted ore. Spilled tailings extend over 13 hectares and stretch 3.5 km on either side of the Ruisseau Pandora to Lac Preissac.

The work to rehabilitate the tailings site was carried out in 1996-97 at a cost of \$2 million. The drainage of the site was modified to limit the amount of surface water coming into contact with the tailings. The site was covered with a layer of permeable granular material to maintain stability of the oxydo-reduction conditions prevailing in the mound of mine tailings and to limit erosion problems. An experimental biological filter was added at the outlet point to treat arsenic-contaminated run-off water. This is a bio-filter based on forest residue that uses bacteria to reduce sulphates and promotes the precipitation of arsenic in the form of arsenic sulphide (Orpiment). (2)



An experimental biological filter has been installed at the outlet to treat contaminated drainage water.



Samples of surface water run-off are taken regularly to ensure water quality.

Restoration work on the Ruisseau Pandora (the spillage zone of the Wood Cadillac site) is currently under way. Over 30 hectares of woodland have been cut to allow the stream to be re-routed outside the contaminated zone. The spillage zone and the old stream bed will be covered with a layer of roughly 500 mm of topsoil, incorporating part of the wood recovered from the site and chipped. The surface profiling has been designed to ensure that the drainage basin directs all water to the new stream, whose slope and curves were modelled using topographical data and flood forecasts.

An overall concept for replanting and stabilization of the stream banks, based on the results of the hydraulic simulations, is currently being prepared. The plan will also include the creation of wildlife habitats on the downstream segment.



Excavation work for the "new" Ruisseau Pandora.



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The East Sullivan site

The East Sullivan mine produced copper, zinc, silver and cadmium from 1949 to 1966, leaving behind around 15 Mt of tailings and over 200,000 t of acidic waste rock. The site covers a total area of 228 hectares, of which over 200 hectares are occupied by mine waste.

A 6 km long containment dam was constructed between 1992 and 1996 around the tailings site and spillage areas. A geomembrane anchored in the underlying clay ensures that the dam remains watertight, and an organic covering containing a minimum thickness of 2 metres of forest residue creates an oxygen barrier over the mine tailings. Sludge from the Val-d'Or water treatment plant is incorporated as a surface additive to allow plants to become permanently established. In 1997, a system was introduced to re-circulate drainage water from the tailings site through the organic covering to neutralize acidity and precipitate dissolved metals within the site. A natural wetland, covering approximately 35 hectares, completes the water treatment process.

The waste rock and piles of pyrite concentrate were relocated on the site and in the glory hole secured by a fence. The head frame and other infrastructures were completely dismantled, and the zone was planted with trees. Forest residue currently covers roughly 75% of the tailing, and should cover the whole area within 3 years.



1992



1999

The East Sullivan site before and after restoration work.

The restoration work at East Sullivan began in 1992 and has cost \$9.5 million to date. If the techniques generally used at the time to restore acidic sites had been implemented, the restoration would have cost almost \$50 million. The development of more effective and economical technologies for restoring the site were made possible by detailed hydrogeochemical survey, an analysis of the alteration phases between the solid, liquid and gaseous states, and many different studies of passive water treatment systems and the use of residual materials.



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The Sullivan site

Gold and silver extraction at the Sullivan mine between 1934 and 1967 generated 5.4 Mt of mine tailings, which form a 50-hectare delta alongside Lac Demontigny. The mercury contamination of the tailings results from the mercury amalgamation process used between 1934 and 1943 to recover metals from the ore.



The Sullivan site before work began in 1994.



The same site, during the restoration work in 2000.

The Sullivan site was restored in 1999-2000 at a cost of \$1.2 million. The work focused mainly on bank stabilization (enrockment, rows of fagotage wood), surface re-profiling and resurfacing of the mine tailings with a layer of clay loam, the installation of membranes and rock fill in drainage canals, and re-vegetation (wind-break hedges, small islands, aquatic grasses, wetlands). It is expected that the site will evolve in keeping with the local biophysical conditions and will become established as a productive, long-lasting ecosystem. (1)

The dumping of mine tailings in and around the lake led to the loss of several hectares of wildlife and lakeshore habitat. For this reason, the overall site restoration plan included the creation of wildlife habitats to encourage the rapid establishment of the characteristic natural environment in the region and offer integrated wildlife support potential. The Sullivan site provided an opportunity to implement plant-engineering techniques on a broad scale. The techniques proved less costly to apply than more conventional techniques, because they relied more on manpower than on machinery.



The bank stabilization join the mechanical and vegetal stabilization technics.

The Canadian Malartic site

Gold and silver were mined at the Canadian Malartic mine between 1935 and 1965, producing 9.9 Mt of mine tailings. Between 1962 and 1968, Marbridge Mines also processed 702,000 t of nickel-rich and copper-rich ore on the site. The Canadian Malartic mine tailings site consists of a 78-hectare flat base of gold ore tailings, underlying a 3 to 5 metre high mound covering 43 hectares. The acid-producing sulphur-rich tailings are spread over the surface of the mound to a thickness of between 1 and 2 metres.



The Canadian Malartic site, as it appeared in 1992 after more than 20 years of abandon.

A hydrogeochemical characterization study carried out in 1992-93 led to a considerable reduction in the cost of the rehabilitation work, initially estimated at several million dollars because of the presence of sulphurous tailings with a high potential for acid drainage, and the area of the site. The rehabilitation plan uses the neutralizing potential of the underlying gold ore tailings, and the presence of an indurated layer formed by the cementation of the secondary phases, mainly sulphates, at roughly one metre below the surface of the sulphurous tailings. The cementation considerably reduces oxygen dispersal and the oxidization rate of the sulphurous material.



The same site, after the 1996 restoration work.

The site was restored in 1996 at a cost of \$1.37 million, mainly in order to ensure that surface water could percolate through the layer of alkaline gold ore residue and to limit wind and water erosion at the surface. The work involved displacing some of the tailings, flattening overall slope, stabilizing the surface, installing a drainage system, and finally, amending and seeding the surface.

Mineral exploration in Québec, Canada and the world

Sylvain Lacroix

Direction de la politique et de l'économie minérales

Mineral exploration activities in Québec increase in 2001

Preliminary data show that total expenditure for mineral exploration and deposit appraisal in Québec in 2001 amounted to \$119 million. This amount, which includes both "on-site" and "off-site" expenditure, represents a 13% increase compared to the total of \$103.2 million recorded for 2000.

The establishment of several new poles of attraction, in particular for diamonds in the James Bay and Mont Otish sectors, led to a major wave of applications for exploration licences covering a surface area of more than 20,000 km² (about 1,3% of the surface area of Québec). On January 1, 2002, over 39,919 claims had been registered using the map designation process, which has been the main way to acquire mineral titles in Québec since the coming into force of the new mining regime on November 22, 2000.



Québec one of the most explored mining jurisdictions in Canada over the last decade

Over the period 1991 to 2000, an average annual amount of \$124.4 million was spent in Québec on exploration and deposit appraisal. Only the Northwest Territories and Nunavut received higher exploration and deposit appraisal expenditure in the same period, with an average annual amount of \$127.3 million. Ontario and British Columbia ranked 3rd and 4th, respectively, with average annual investments of \$118.2 million and \$78.8 million.

The increase in exploration and deposit appraisal expenditure in Québec in 2001 reverses the trend of the three previous years. From 1997 to 2000, exploration and deposit appraisal expenditure fell by \$70.1 million or 40% compared to the \$173.3 million recorded for 1997. From 1992 to 1997, expenditure increased by 84% from \$94.1 million in 1992, the lowest amount recorded in the last decade.

Québec among the ten most explored territories in the world in 2001

The most recent survey by the Metals Economics Group (MEG) estimated world exploration budgets for 2001 at US\$2.2 billion (CAN\$3.385 billion), a decrease of US\$400 million or 15% compared to the US\$2.6 billion spent in 2000.



The distribution of world exploration budgets is highly concentrated in geographical terms. The expenditure for the ten most explored countries in the world, namely Australia, Canada, the United States, Peru, Chile, Brazil, Mexico, Argentina, South Africa and Indonesia, represent almost two-thirds of the total amount. With exploration and deposit appraisal expenditure of \$119 million (US\$77 million in 2001), Québec ranks eighth in the world and received roughly 3.5% of world exploration capital.

Some world mineral exploration trends over the last decade

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Some world mineral exploration trends over the last decade

- The decrease in world exploration budgets in 2001 is the fourth consecutive annual drop. Such budgets have now fallen US\$3 billion, or 58%, from the high of US \$5.2 billion recorded in 1997. Before this, world exploration budgets had increased continuously by US\$3.1 billion, or 148%, from the estimated US\$2.1 recorded in 1992.
- The trend in exploration and deposit appraisal expenditure in Québec is inversely correlated with world exploration expenditure. The share of world exploration capital spent in Québec dropped from 5.3% to 2.2% between 1991 and 1996, before increasing gradually to 3.5% in 2001.
- The absolute value of world exploration budgets has decreased for all the main substance categories over the last four years. However, the drop is particularly marked in the gold sector, which accounted for 65% of world exploration budgets in 1997 and only 43% in 2001. Over the same period, the share of world exploration budgets devoted to base metals increased from 27% to 39%, and for diamonds from 6% to 10%. The portion of world exploration budgets allocated to the platinoids was 3.4% in 2001.
- The MEG survey estimates that Canada received 41% of world exploration budgets for diamonds in 2001, placing it in first place ahead of Africa (35%) and Australia (9%). These three regions of the world together account for 85% of exploration budgets for diamonds.
- The major drop in exploration budgets over the last four years is mainly linked to low metal prices. After the eleven first months of 2001, the annual average prices for gold (US\$271/ounce) and zinc (US\$0.41/lb) were the lowest recorded in 1991-2001, while the price of copper (US\$0.72/lb) was only slightly above the low point of US\$0.71/lb reached in 1999. The price of nickel is estimated at US\$2.70/lb for 2001, a drop of 31% from the high point of US\$3.92/lb reached in 2000.
- Another significant factor is the clear desire of mining companies to increase their mineral reserves quickly through acquisitions rather than through current exploration activities. MEG estimates that merger and acquisition activities between 1996 and 2001 in the gold and base metals sector represented spending of US\$50 billion, and that an additional amount of US\$20 billion can be estimated for the diamond sector in 2000 and 2001. These amounts are far higher than the US \$19 billion allocated to world exploration expenditure since 1996.





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Québec, a promising vein! Sigéom and Gestim: two databases serving the mining industry

The Ministère des Ressources naturelles has recently issued a CD-ROM that explains to investors all the advantages of conducting exploration or mining operations in Québec.



The CD-ROM also presents two important databases accessible via the Internet: SIGÉOM, which contains geo-scientific data, and GESTIM, an electronic register of all mining rights in Québec. The operation of each database is explained using actual search examples. The CD-ROM is available in both French and English. To obtain a copy, please contact the mining service centre at 1 800 363-7233.

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The Ungava Trough Exceptional Potential for the Platinum Group Elements Serge Perreault Géologie Québec

After investing nearly 500M\$ since 1997, Raglan Mining, a 100% subsidiary of Falconbridge Ltd., now produces nearly 26,000 tonnes of nickel concentrate annually at its Raglan mine. Initially, the company forecasted an operational life of 25 years, annually producing 21,000 tonnes of nickel concentrate, 5,000 tonnes of copper concentrate, and 200 tonnes of cobalt concentrate.



Raglan Mining facilities.

The Ungava Trough has a long history of exploration for nickel and copper, with the first mention dating back to the end of the 19th century. It wasn't until 1937, however, that the first indications of copper and nickel in the Cape Smith - Wakeham Bay area were discovered by Murray Watts. They were then developed in over subsequent decades by different companies.



The Ungava Trough: An Exceptional but Barely Developed Potential.

During the 1950's, a number of companies became interested in the Ungava Trough at the same time that geological mapping work was being carried out by the Government of Quebec. Many showings and deposits were discovered at that time, including the Delta and Expo-Ungava deposits as well as a number of deposits in the Raglan mining camp ([Figure 1](#)). Around mid 1980's, the Ungava Trough became a target area for platinum exploration.

In 1997, High North Resources, under Ungava Minerals Corporation's option, carried out a drilling program (1,038 m), mapping, and airborne / land-based geophysical surveys of the Expo-Ungava property. The program revealed that the Expo-Ungava deposit was formed of massive sulfide lenses at the base of ultramafic sills injected into the Povungnituk Group. The geochemical signature of these ultramafic sills is similar to ultramafic suites of sills and cogenetic flows forming the Chukotat Group (Picard et al. 1995, MB 94-30). The geological model suggests that sulfides accumulated in troughs at the base of a continuous ultramafic lava flow or sill that opens towards the west. The trough is truncated to the west by a thrust fault that juxtaposes sedimentary and volcanic rocks. A number of remobilized massive sulfide lenses occur within the sediment in the fault walls.

In 2001, Canadian Royalties Inc., under Ungava Minerals Corporation's option ([Figure 1](#)) uncovered significant amounts of platinum and palladium as the result of a new analysis of cores taken during the 1997 drilling program. During the initial program, drill cores were assayed for nickel, copper, and cobalt, but not for the platinum group elements (platinum, palladium, and rhodium).

Furthermore, works carried out by the company in summer 2001 revealed mineralization along a length of 732 m in the east-west axis, averaging 107 m along the north-south axis.

During the same period, Canadian Royalties Inc. discovered significant amounts of platinum, palladium, nickel, and copper as the result of works done on a new showing (Phoenix), located on the TK property, 20 km south of the Raglan mining camp and 7 km northeast of Expo-Ungava. The mineralization comprises massive sulfides near the base of an ultramafic sill (TK sill) similar to Raglan.

Perspectives

The work carried out by Canadian Royalties reveals an outstanding potential for PGE's associated to ultramafic sills cogenetic to the Chukotat Group injected into the Povungnituk Group. Indeed, the Povungnituk is currently one of the most promising sectors for mineral exploration in Quebec due to its significant amounts of lava and mafic and ultramafic sills. All that remains now is to find sufficient volume to make mining of these elements economically feasible, which looks exceptionally promising.



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Québec mining exploration Highlights 2001

Given the number of important discoveries made throughout the year, the diversification of targeted commodities, and the very favourable perception of mineral exploration companies regarding Québec's mineral potential, the number of exploration projects and the amounts invested remained stable relative to last year. A significant increase in the number of diamond exploration projects in the Near North region was noted, however.

The Abitibi Subprovince

This region remains a prime target for base metal and precious metal exploration. **Maude Lake Exploration** obtained promising drill results on its Comtois property, located west of Lebel-sur-Quévillon. **South Malartic Exploration** continued stripping and drilling programs, which yielded interesting gold intersections. A bulk sampling program on the Fenelon project, located 95 km northwest of Matagami, was completed by **International Taurus Resources** and **Fairstar Explorations**. Approximately 14,000 metric tonnes of ore were extracted and processed, from which 4,213.4 ounces of gold were recovered. **Major General Resources** and **Cameco Gold** continued their drill program on the Despinassy property, located 55 km northeast of Amos. **Cambior** and **Aurizon Mines**, joint owners of the Sleeping Giant mine, located 70 km north of Amos, announced an increase of their mining reserve estimate following an exploration program. In the Desmaraisville area, stripping by **Ressources Nomans** helped outline a new gold-bearing vein system. On the Fenton property, south of Chapais, investigations by **Sudbury Contact Mines** confirmed the highly auriferous nature of the deposit.

On August 17th, **Agnico-Eagle Mines** inaugurated the Penna shaft at the Laronde mine. An important exploration program is underway at depth on zones 20 North and 20 South and on the El Coco property, adjacent to the Laronde mine. **The Explorers Alliance Corporation** obtained encouraging results on its Bonhomme property in Beschefer Township. West of Joutel, **Cancor Mines** continued their work on the Gemini project. **Southern Africa Minerals Corporation** completed a 2-hole drill program on the Caber North property and, in partnership with **SOQUEM INC.**, a 4-hole program on the Caber property. In the Chibougamau area, **Loubel Exploration** and **Inmet Mining Corporation** completed a drill program on the Lemoine property. **Aurora Platinum Corporation** released drill results throughout the year from the Midrim-Belleterre projects in the Témiscamingue region. The company also revealed it had discovered a kimberlite pipe on the property. In September, **Loubel Exploration** announced the first results from its prospecting campaign on the Kelly Lake property. These new discoveries, combined with the advanced exploration programs conducted on known deposits, illustrate the attractive mineral potential of the Abitibi and Pontiac subprovinces.

James Bay

In the James Bay region, numerous exploration programs yielded significant results for gold, base metals, platinum group elements, and diamonds. For instance, **Matamec Explorations** announced drill intersections in iron formation on the Sakami property. A study conducted by the INRS (Institut national de la recherche scientifique) confirmed the economic potential for chromium and PGE, of the Menarik property held by **Ressources Minières Pro-Or**. On the La Grande Sud project, work by **Cambior** and **Virginia Gold Mines** led to the discovery of a new auriferous zone. Sirios Resources and **SOQUEM INC.** outlined a new type of gold mineralization on the Aquilon property. Investigations by Virginia Gold Mines on the Eleonore property led to the discovery of new corridors with porphyry-type copper, gold, and silver mineralization in dioritic to tonalitic intrusions.

In the Eastmain area, **SOQUEM INC.** and **Eastmain Resources** detected several new highly auriferous veins, west of the Clearwater deposit.

James Bay-Diamond exploration

Majescor Resources continued its till sampling program and geophysical surveys in the Wemindji area. Their results confirmed the potential for the discovery of kimberlite pipes. In the same area, **Dianor Resources** announced the presence of a clear yellow, octahedral to cubic microdiamond in a lamprophyre dyke on the Yasinski North property. In the James Bay Lowlands sector, Poplar Resources announced the discovery of kimberlitic indicator minerals on the Nottaway property.

In the Monts Otish area, **Ashton Mining of Canada** and **SOQUEM INC.** announced they had intersected in drillhole two kimberlitic bodies spaced one kilometre apart. Following this announcement, several exploration groups acquired properties in this area and north of Lac Mistassini, making the region one of the prime target areas for diamond exploration in Québec. Given the new discoveries of gold mineralization, porphyry-type, and massive sulphide mineralization, as well as the confirmed diamond potential of the Near North region, the level of interest should remain fairly high in this area for the year 2002.

St. Lawrence and Appalachians

In 2001, **Niocan** continued the procedures to obtain an authorization certificate in order to finance the production startup costs of its niobium deposit in the Oka Carbonatite Complex. Near Thetford-Mines, **Ressources Allican** discovered PGE concentrations in chromitites from the Hall deposit and from the Starcore showing. On the Sainte-Marguerite property near Causapscal, **Ressources Appalachies** cut two new quartz and massive sulfide veins in drillholes. In Boisbuisson Township, **Système Géostat International** cut important Cu and Ag values in the Cu-Ag-rich cap rocks of the old Mines Madeleine deposit.

Ungava Through

In the Ungava Trough, **Canadian Royalties** and **Ungava Minerals** outlined interesting PGE mineralization in the Expo-Ungava zone and on a new property (Phoenix). The mineralization consists of massive sulphides and is located near the base of a Raglan-type ultramafic sill (TK sill). In the Rae Province (or southeast Churchill), the company **WMC Exploration** completed several thousand kilometres of airborne geophysical surveys, as well as prospecting, geological mapping, and drilling programs for their Quebec-7 project. A few Cu-Ni showings were discovered and drill-tested during the summer and fall, 2001. In the fall of 2000, **WMC** had acquired mineral exploration licences covering nearly 13,000 km².

Côte-Nord

Appalaches Resources and **Marum Resources** outlined an important EM conductor south of the B-20 property. This property, along with the Baie des Sables property, are located along the northeastern and eastern margins, respectively, of the Rivière-Pentecôte anorthosite.

Geological mapping

In the Far North region of Québec, geological mapping at 1:250,000 scale by Géologie Québec helped detail the geology and assess the mineral potential of the northeastern Superior Province, thus opening new territories to mineral exploration. NTS sheets 34K, 34L, 34O, 35B, and the southern half of sheet 35G were mapped.

Dimension stone

The search for new dimension stone deposits was concentrated in three areas. In the

Portneuf region (NTS 31P/01), A. Lacroix et Fils Granite proceeded with stripping and sampling work in a greyish black, coarse-grained tonalitic and dioritic gneiss. The property is identified as the Lac-Gaulois property. In the Saguenay – Lac-Saint-Jean region (NTS 22E/14), **A. Lacroix et Fils Granite** also began stripping and sampling work in a greyish pink, medium-grained migmatized gneiss, on the Rivière-des-Prairies property. In both cases, the properties were developed and operations began over the course of 2001. In the Bas-Saint-Laurent region (NTS 21N/07), **Glendyne** conducted an extensive drill program in order to increase reserves in its black slate deposit mined for the production of roof tiling.

Industrial minerals

The Magnola plant operated by **Noranda**, located in Asbestos in the Eastern Townships, increased its magnesium metal output. **McKenzie Bay International**, in partnership with **SOQUEM INC.**, commissioned a bankable feasibility study on the Chibougamau vanadium project. **Raymor Industries** acquired the facilities at the former Beacon mine east of Val-d'Or, with the objective of building a pilot plant to produce lithium metal from spodumene extracted from the LaMotte deposit located near Amos, in the Abitibi region. In conclusion, industrial mineral prospecting activities in southern Québec remained stable in 2001, mainly due to the efforts of the various regional mining exploration funds.



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Important changes at MRN

Over the last year, the Secteur Mines of the Ministère des Ressources naturelles (MRN) has been proceeded to a major reorganization of its administrative units. Part of the activities of the Direction de l'industrie minérale and the Direction des redevances et des titres miniers have been merged to create a new administrative unit: Direction du développement minéral.

Une partie des activités de la Direction de l'industrie minérale et de la Direction des redevances et des titres miniers ont été fusionnées au sein d'une nouvelle unité administrative : la Direction du développement minéral.

This branch now comprises:

- **Service des titres miniers;**
- **Service des systèmes de gestion des lois;**
- **Service du développement et du milieu miniers;**
- **Service de l'imposition et des données minières;**
- **Bureau de la conversion et des litiges miniers.**

This department's main responsibilities are:

- Managing and applying the sections of the **Mining Act**.
- Delivering and renewing **prospecting licences**.
- Issuing **staking tags**.
- Recording **deeds** related to **mineral titles**.
- Updating the **register of holders of mineral titles**.
- Receiving **royalties from the mining of surface mineral substances**.
- Administering the provisions of the **Mining Duties Act**.
- **Rehabilitating mining sites**.

- Administering **measures supporting the development of the mining industry.**
- Collating, processing, and disseminating **data pertaining to Quebec's mineral industry.**

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Le Service des titres miniers

The Service des titres miniers issues and renews mining titles in accordance with the provisions of the Mining Act and its attendant regulations. The purpose of this department is developing mineral substances from Québec's subsoil.

In addition, it receives and analyzes statements and reports of work that holders of mining titles must carry out in order to renew their titles. The service also maintains a public register of mineral titles and records all liens and transfers that have been filed with respect to these titles.

Lastly, it receives declarations of extraction of surface mineral substances and the related royalties. The service uses inspectors to exercise control in the field. They are also in charge of planning and supervising the rehabilitation of exhausted or inactive mining sites.

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Le Service des systèmes de gestion des lois (SSGL)

- Customer Service

This department provides support and information to customers and is coordinated by the MRN's staff at the Centre de service des mines.

- Mineral Titles Register (XBF-GESTIM)

The XBF (database) team manages Québec's official register of mineral titles and must also respond to internal and external queries.

The mineral titles management system team (GESTIM) must update the register's graphical data, which require frequent modification. GESTIM is also responsible of the

production of digital maps for the mineral titles that are distributed to customers.

The team constantly strives to improve the system. As a result of their efforts, the system's geomatics support will be changed in the near future and a number of modifications will be made to the panoramas and queries available to customers at the GESTIM Web site:

<http://gestim.mrnfp.gouv.qc.ca>

- Register Integrity

A multidisciplinary task force has just been set up to ensure integrity of the data among the XBF register, the GESTIM system, and the digital maps for mineral titles. This group is currently developing new procedures to optimize the validation and updating of the register and maps for mineral titles.

- Upcoming Project

The current system for managing titles, which dates from 1989, is becoming outdated. XBF will be replaced by the ODM (awarding of mineral rights) project. The ODM system, which is now being designed, will make use of new technologies such as geomatics, e-commerce and the Internet. The main development phase will begin during fiscal year 2002-2003. Furthermore, this Oracle-based system will be connected to GESTIM for dissemination on the Internet.

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Le Service du développement et du milieu miniers

The mandate of this service consists of:

- Monitoring the mining industry and certain related processing industries primarily by conducting research, analysis, and studies to follow growth in the industrial sectors of mining, mainly with respect to project and production components within Quebec in order to define their major characteristics, troubleshoot problems, and identify business opportunities.

SDMM offers technical support on a broad selection of topics, such as financing, technology, and markets, to firms involved in extracting, processing, and marketing of Québec's mineral substances.

- Promoting investment and technological-innovation projects through the application of financial, tax-related and other support measures.
- Promoting investment and technological-innovation projects through the application of financial, tax-related and other support measures.
- Proposing, if necessary, the implementation of support measures responding to the needs of Québec's mining industry.

- Cooperating, if required, in monitoring national and international markets that could have an impact on mining operations or projects in Québec.
- Cooperating with firms and organizations in the mining sector in order to identify and select R&D projects with a view towards enhancing the competitiveness and security of Quebec companies in the mining sector.

SDMM's main mandates with respect to the environment are:

- Ensuring application of provisions of the Mining Act related to the rehabilitation of mining sites. The activities ensuing from this mandate are reception, analysis, and consultations with stakeholders with a view towards approving rehabilitation plans and managing the deposit of financial guarantees related to such plans. Mining site safety is an important issue for SDMM. Monitoring this aspect of mining site rehabilitation makes it possible to ensure public safety.
- In close cooperation with the Ministère de l'Environnement du Québec (Québec's Environment Department), developing and updating minimum requirements for mining site rehabilitation in a guide produced specifically for mining customers.
- Ensuring administrative follow-up of requests to abandon mineral titles, site verification as a result of such requests, and the carrying out of corrective work.
- Completing rehabilitation work at mining sites belonging to the Crown and implementing a program to rehabilitate inactive mining sites.

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Le Service de l'imposition et des données minières

The Service de l'imposition et des données minières comprises divisions for mining data and mining taxation.

The mining data division brings together, under the provisions of the Mining Act, the economic knowledge related to activities in the mining industry and to the context in which these occur, thereby enabling MRN authorities and intervening parties in the sector to develop and apply economic policies likely to contribute to the industry's development.

This division collects, checks, and processes statistical data concerning conducted by producers and exploration companies such as mineral production, expenditures, labor, inventory, reserves, and investments.

This information is disseminated in four publications:

- *Bilan et faits saillants de l'industrie minière du Québec;*
- *Industrie minière du Québec;*
- *Production et investissements de l'industrie minière du Québec statistiques;*
- *Informations sur l'industrie minière du Québec - Trimestriel.*

The division aims to add an electronic exchange module to the MAGMA computer system

that would allow firms to transmit their data by Internet. Implementation is slated for the first quarter of 2002.

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Le Bureau de la conversion et des litiges miniers

The Bureau's mandates are:

- Conducting inspections and managing conflicts concerning the staking and relocation of claims as well as other matters resulting from the application of the *Mining Act*.
- Conducting inspections and managing issues related to occupants without rights.
- Conducting inspections resulting from suspect declarations of work and cases of fraud.
- Converting staked claims and exploration licences for surface mineral substances into map-designated claims.
- Substituting map-designated claims for claims whose parcels correspond to the divisions determined by the Ministère.
- Withdrawing territories from mining activities used for purposes other than mining (parks, preserves, hydroelectric lines).
- Conducting title research for instances of mine-site rehabilitation files.
- Managing cases of revocation of mining rights for lands of the private domain.
- Preparing ministerial decisions and managing appeals to the Court of Quebec.
- Managing cases of criminal offences.

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Summary and Highlights of the Québec mining industry in 2001

Although most analysts had predicted a slowdown in the world economy in 2001, the slump was worse than expected. The drop in economic activity began in the United States and spread to almost all areas of the world. Signs of the slowdown were already perceptible before the September 11 terrorist attacks and grew stronger after the attacks, meaning that, in most parts of the world, the downward adjustments to the 2001 growth forecasts were greater than would otherwise have been expected. This was the first time in twenty years that all OECD countries had experienced such a synchronized economic slowdown. The world economy is estimated to have grown by 2.4% in 2001.

The decline in the US economy, which began in the third quarter of 2000, was even more marked in 2001. Industrial production continued to drop, as did business investments and exports. The US economy was particularly affected by a decreased demand for goods in the information and communications technology sector. The events of September 11 rattled the confidence of economic agents, especially consumers whose spending was at the time the main driving force behind the US economy. The United States, after its longest-ever expansion cycle, saw its real GDP shrink by 1.3% in the third quarter, and on November 26, the National Bureau of Economic Research (NBER) announced that the country was officially in recession. For 2001 as a whole, the growth in real GDP is estimated at 1.1%.

In the euro zone, growth had already begun to falter in late 2000, and was hit harder than expected. Domestic demand dropped, especially in terms of investment, and the flow of exports slowed. The growth in real GDP during the second and third quarters was only just above zero, and the terrorist attacks led to a further decline in the economic situation of the euro zone, although it should be able to avoid a recession.

Japan moved into recession for the third time in the last ten years. In fact, the Japanese economy is stalled since mid-2000, owing to the collapse of the information and communications technology sector and the drop in outside demand. Japan is also facing major structural problems, including an extremely high public debt and a banking sector that has to deal with a large number of loan defaults.

Economic activity in Canada went into decline in the fourth quarter of 2000, and the growth of the Canadian economy was strongly compromised by a drop in exports, especially to the United States. Household spending remained relatively high, while business investment, in particular in machinery and equipment, plummeted. After a reduction in the GDP in the third quarter, partly attributable to the terrorist attacks, Canada was considered by most analysts to have slipped into recession. For the year as a whole, Canada's real GDP probably grew by 1.3%. Clearly, Québec was also affected by the difficulties experienced by its two major trading partners, the United States and Canada. The Québec economy, hit hard by a drop in exports to the United States, especially in the field of information and communications technologies, was almost in recession in the first quarter, and the growth in Québec's GDP for 2001 was probably around 1.1%.

This major slowdown in the world economy obviously reduced demand for most minerals, leading to larger inventories and a drop in prices, which had already begun to move downwards in the last months of 2000. This was particularly true in the case of base metals, which recorded average prices in December 2001 that were 20% below the comparable prices at the end of the previous year. Gold prices ran counter to this trend, because of the September 11 events but still, they only rose slightly.

Outlook for 2002

The recovery of the world economy will depend largely on the economic performance of the United States. According to most forecasts, the recession in the United States will be short-lived. The easing of monetary policy in 2001, along with the implementation of important tax and spending measures in the federal budget, should result in a gradual recovery of the US economy during the first quarter of 2002 and a return to growth in the second half of the year provided, of course, that the geopolitical context and confidence levels do not worsen. Growth in world GDP is expected to average around 2.5%.

An easing of monetary policy and a strong recovery in the United States would allow the economy of the euro zone to gather speed by the end of 2002. In Japan, not only will the recession continue into the first two quarters, but no recovery is expected before the end of the year, and then only if the situation improves in the United States and the structural problems of the Japanese economy are resolved. The economy in Canada and Québec will obviously benefit from the expected recovery in the United States, and also from various internal factors, such as the set of macro-economic instruments brought into play by both the federal and provincial governments. The two economies should therefore return progressively to a growth situation during the first half of the year.

In 2002, the demand for mineral products will increase as the world economy recovers. Prices for base metals should begin to turn around, especially during the third and fourth quarters. However, the pace and strength of the recovery will also depend greatly on the ability to match production to demand.

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