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REPORT ON MINERAL EXPLORATION ACTIVITIES IN QUEBEC 2003

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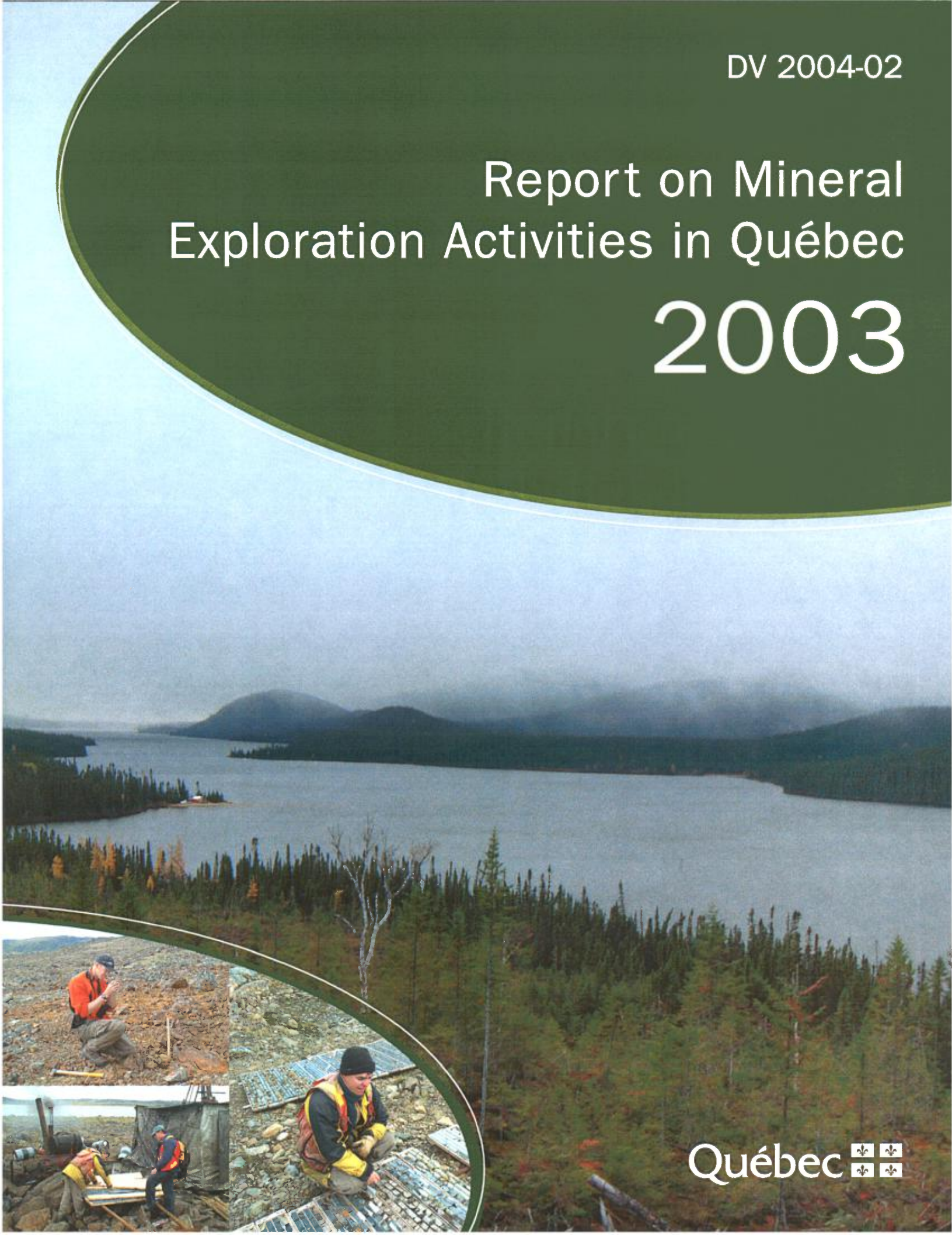

Québec

Report on Mineral Exploration Activities in Québec

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DISCLAIMER

The data compiled in this report come from a number of sources, including questionnaires addressed to prospectors, to directors of regional exploration funds, and to representatives of mining and exploration companies, as well as from their press releases. The accuracy and reliability of this information depend solely on these sources. The authors disclaim all responsibility for reproducing any errors originating from these sources but are nonetheless responsible for mistakes introduced while writing the report, this despite rigourous editing of the document by an external editor and final review of the contents by Ministry personnel.

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Highlights

The 2003 annual report on mineral exploration activities provides an overview of mineral exploration projects for each geological province and outlines the mineral potential of Québec's landmass. Since 2001, the amounts invested in exploration in Québec are on the rise. In 2002, Québec represented a particularly attractive area for mining investments. The latter increased for the second year in a row, reaching 114.2 million dollars, up 11% relative to 2001. This growth in exploration observed in Québec contrasts with the situation on a global scale. The latest study released by the Metals Economics Group (MEG) indicates that worldwide exploration budgets decreased by some 0.3 billion dollars US (14%) in 2002, to stand at 1.9 billion dollars US. The share of worldwide exploration capital allocated to Québec therefore increased by 3% in 2001 and by 3.8% in 2002.

Several elements played a role in maintaining a thriving exploration industry in Québec, namely the steady rise in gold prices, the growing variety of targeted commodities, and the very favourable perception of mineral exploration companies regarding Québec's mineral potential. The Abitibi and Far North regions of Québec (especially the Ungava Trough) were the focus of mining discoveries and staking rushes. The search for diamond-bearing kimberlites in the Near North continued at a steady pace. In fact, the **Ashton-SOQUEM** joint venture found the largest diamond in Québec in this area, a 4 carat stone.

Exploration companies are keeping an eye on the Ungava Trough, with good reason, especially since the discovery in 2002 of the Mesamax NW showing by **Canadian Royalties Inc.** Indicated resources at the Mesamax deposit are estimated at 1.45 Mt at 2.1% Ni, 2.7% Cu, 0.08% Co, 0.3 g/t Au, 1.0 g/t Pt, and 4.2 g/t Pd. In 2003, **Canadian Royalties Inc.** discovered a number of important ore zones, including the Tootoo zone, which consists of disseminated to massive sulfides enriched in Ni-Cu-Co-Pt-Pd. The high-grade portion yielded grades of 2.00% Ni, 1.91% Cu, 0.11% Co, 0.6 g/t Pt, and 2.62 g/t Pd over a 22.03 m interval. New drillholes testing the Mequillon Lake North zone revealed impressive intercepts of Ni-Cu-PGE mineralization in disseminated to massive sulphides. One intersection graded 0.94% Ni, 1.25% Cu, and 3.96 g/t PGE over 43 m. Some 120 km west of the Raglan mine, joint venture partners **Anglo American Exploration (Canada) Ltd** and **Knight Resources Ltd** discovered Ni-Cu-PGE mineralization. Drillhole WR-08 intersected 14.75 m at 3.04% Ni, 1.13% Cu, 0.08% Co, 0.90 g/t Pt, and 3.02 g/t Pd.

The James Bay region continues to attract considerable interest in terms of diamond exploration. In the Wemindji area, **Dianor Resources Inc.** discovered two microdiamonds in a heterolithic breccia on the Lac de l'Astrée property. In the Monts Otish area, the Foxtrot property held by **Ashton Mining of Canada** and **SOQUEM INC.** continues to yield promising results. For example, three new diamond-bearing kimberlitic bodies were discovered: Renard 9, 10, and Lynx. The two partners discovered a diamond weighing at least 4 carats (8.8 x 8.2 x 4.8 mm), which constitutes the largest stone found to date in Québec. The joint venture intends to extract a larger bulk sample in 2004 from several kimberlitic bodies in the Core Area, totalling at least 500 tonnes. This bulk sample will enable the two partners to establish a preliminary diamond grade for the Renard cluster. South of the Monts Otish, **Dios Exploration Inc.** discovered three kimberlite occurrences in outcrop and in drillhole. In the same area, **Ditem Explorations Inc.** intersected two multiphase kimberlite intrusions, H-3 and H-4 (H-Tichegami cluster), one of which yielded a microdiamond. Combined with the Lac Beaver kimberlite cluster, these recent discoveries confirm the strong potential for diamond exploration in this area located south of the Monts Otish.

In the Near North region, more specifically in the La Grande greenstone belt, several gold projects yielded significant results. **Matamec Explorations Inc.** (Sakami property), **Virginia Gold Mines Inc.** and **Cambior Inc.** (La Grande Sud property), and **Virginia Gold Mines Inc.** (Noella property, Caniapiscau area) reported gold grades from surface samples or in drill intercepts. **Virginia Gold Mines Inc.** and **Globestar Mining Corporation** released their first resource estimate for the Orfée zone on the Poste Lemoyne project: 203,483 metric tonnes at 14.5 g/t Au. In the Middle and Lower Eastmain greenstone belt, **Eastmain Resources Inc.** confirmed the depth extension of the Eau Claire gold deposit on the Clearwater property, and announced an 80% increase in the total tonnage and contained gold ounces at the deposit (mineral resource of 2.66 Mt at 6.75 g/t Au). **Virginia Gold Mines Inc.** defined a number of m-scale alteration zones on the Eleonore property, from which grab samples yielded up to 29 g/t Au.

In the Far North region, **Majescor Resources Inc.** and **Diamondex Resources Ltd** carried out a detailed till sampling survey on their Gayot property (diamond). The two partners have now targeted a zone from which up to 63 indicator mineral grains were recovered. During the winter 2003, **Virginia Gold Mines Inc.** and its partner **BHP Billiton** completed drillholes in order to test the extensions of the Nancy and Nancy Extension zones on the Gayot project (Ni-Cu-PGE-Co). Their fieldwork outlined some interesting electromagnetic anomalies. Over a dozen Cu-Ni-PGE showings exposed on surface were discovered over a strike length of 25 km within an ultramafic volcanic belt in the Lac Gayot area. Work by the **Nunavik Mineral Exploration Fund**, carried out on its own or in partnership with **SOQUEM INC.**, led to the discovery of lead-zinc showings associated with stromatolitic limestones and of redbed-type copper-silver showings in Paleoproterozoic volcanic rocks along the coast of Hudson Bay, near Kuujjuarapik and Umiujaq. Combined with occurrences discovered in previous years, these showings outline the mineral potential of this Paleoproterozoic volcano-sedimentary sequence.

The 2003-2004 campaign marked the sixth year of the *Far North Project* headed by **Géologie Québec**. Three map sheets (NTS 34 F, 34 G, and 34 N) were mapped at 1:250,000 scale. The purpose of this vast mapping program is to improve our geomining knowledge base, thereby generating considerable interest from mineral exploration companies. A lake sediment geochemistry survey was commissioned by Géologie Québec in the Manicouagan and Haute-Côte-Nord regional county municipalities (MRC), in partnership with the MRC de Manicouagan and the CLD (local development centre) de Manicouagan and five exploration companies (**SOQUEM INC.**, **Quinto Technology Inc.**, **Noranda Inc.**, **Falconbridge Ltd**, and **Ressources Appalaches Inc.**).

In the search for precious metals, the Abitibi-Témiscamingue region remains a prime target. Over the course of 2003, several gold projects attracted some attention. On the important Lapa project, located 10 km east of Cadillac and held by **Agnico-Eagle Mines Ltd**, a preliminary resource estimate of 4 Mt at 7.8 g/t Au was calculated. Recent drilling on this property yielded impressive results, including an intercept grading 16.8 g/t Au over 7.8 m in the Contact Zone. In 2004, **Agnico-Eagle Mines Ltd** will pursue an aggressive drilling campaign and will carry out pre-feasibility and engineering studies in order to eventually mine this ore deposit. On the contiguous Pandora property located to the west, **Queenston Mining Inc.** reported a 3.5 m intercept grading 7.6 g/t Au, confirming the extension of the Contact Zone onto their property. Additional drillholes are planned in early 2004. In the Cadillac area, **Cambior Inc.** intersected the extension of zones 1 and 2 of the Doyon mine some 2 km farther east on the Westwood property. In 2004, the company intends to drive an exploration drift of nearly 2 km in length from the Doyon mine to explore the Westwood area. **Cambior Inc.** also announced the deepening of the internal shaft at the Mouska mine by 210 m, to reach a total depth of 880 m in order to access a probable reserve of 142,000 tonnes at 15.4 g/t Au and an infer-red resource of 173,000 tonnes at 14.6 g/t Au. In northwestern Abitibi, **Aurizon Mines Ltd** discovered four new gold zones south of the Casa Berardi fault at the mine bearing the same name. Total reserves and resources at the Casa Berardi ore deposit are estimated at 12.6 Mt at a grade of 6.9 g/t Au. Surface and underground exploration programs will continue in 2004. A bulk-sampling program is also planned for analytical purposes. In the Témiscamingue region, **Vantex Oil, Gas and Minerals Ltd** released drillhole results of up to 6.25 g/t Au over 10.3 m (including 13.33 g/t Au over 4.3 m) in drillhole LE03-28 on the Lake Expanse showing (Guillet project). Finally, in the Val-d'Or area, the Sigma-Lamaque open pit mine held by **McWatters Mining Inc.** was temporarily shut down in 2003. Additional drilling is planned in 2004 in order to further delineate reserves.

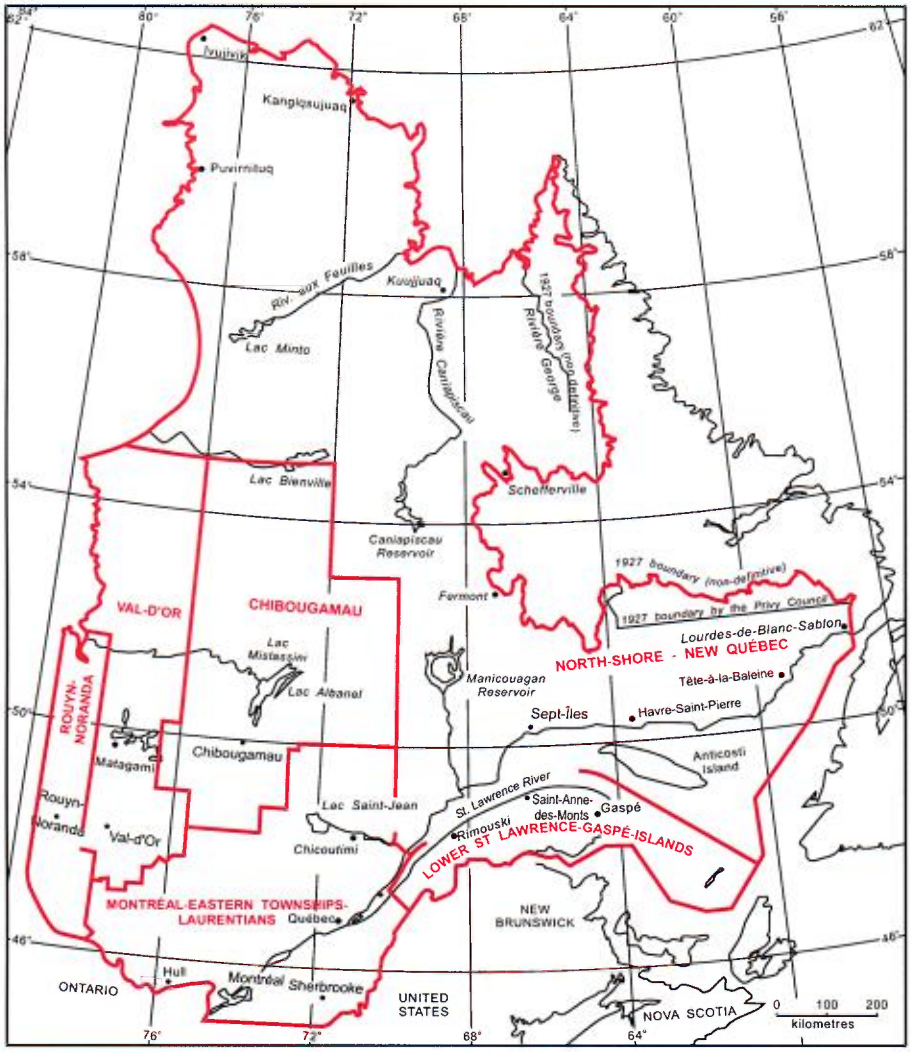
In the eastern Grenville Province (Côte-Nord region), **Ressources Appalaches Inc.** and **Marum Resources Inc.** announced that drillholes on the B20 property had intersected several massive sulphide horizons in an extensive mineralized system. This mineralized system includes sections with grades up to 0.46% Ni and up to 0.39% Cu over intervals ranging from 7.15 to 43.75 m. Near Longue-Pointe de Mingan, joint venture partners **Fancamp Exploration Ltd** and **Sheridan Platinum Group Ltd** completed 16 drillholes totalling 450 m, in order to determine the grade and extent of a hemo-ilmenite showing. Nine massive intercepts yielded an average grade of 33.9% TiO_2, 57% Fe_2O_3, and 2.2% MgO.

In the Appalachians, the Bellechasse gold property located in Bellechasse and Panet townships was re-examined. **Osisko Exploration Ltd** and **Golden Hope Mines Ltd** reported several gold intercepts from drilling on the Timmins zone. The Rico vein, the main high-grade gold structure in this zone, yielded a grade of 66.6 g/t Au over 1.05 m. On the Mont de l'Aigle property, in the Lemieux Dome area in the Gaspésie region, **Ressources Appalaches Inc.** discovered vein-type showings and iron oxide-copper breccias. One grab sample collected in a trench yielded a grade of 12.3% Cu (Hupé showing).

In the industrial minerals sectore, **Les Ressources d'Arianne Inc.** launched micronization tests on calcite from the calcitic marble deposit operated by **Les Calcites du Nord Inc.** in the Lac Saint-Jean region. The objective of the company is to market a high-purity calcium carbonate product designed to replace kaolin in paper plants in the Mauricie and Saguenay regions. At the Lac Guéret property in the Côte-Nord region, **Quinto Technology Inc.** and **SOQUEM INC.** carried out extensive work to trace the main graphite zone over a strike length of 1,150 m and a width of 100 to 150 m. The results of this campaign are quite promising and indicate the excellent graphite potential of the southern Gagnon terrane in the northeastern Grenville Province. **Timcal Graphite** began mining operations in a new open pit located northwest of the main pit at the Lac-des-Îles mine south of Mont-Laurier. Reserves contained in this ore deposit are sufficient to ensure a mine life of at least five years.

In the field of architectural stone, **SOQUEM INC.** and **Polycor Inc.** formed a new company, **NAMCA Inc.**, the purpose of which is to increase the dimension stone potential of limestone, marble, and iridescent anorthosite deposits in Québec. **A. Lacroix et Fils Granit Ltée** began extracting a blackish grey anorthosite with bluish tones near Notre-Dame-de-la-Merci. **Granitslab International Inc.** pursued its exploration efforts north of La Tuque.

Gold discoveries in the Abitibi region and convincing results in the Ungava Trough and the Monts Otish areas herald excellent opportunities for exploration throughout Québec in 2004.



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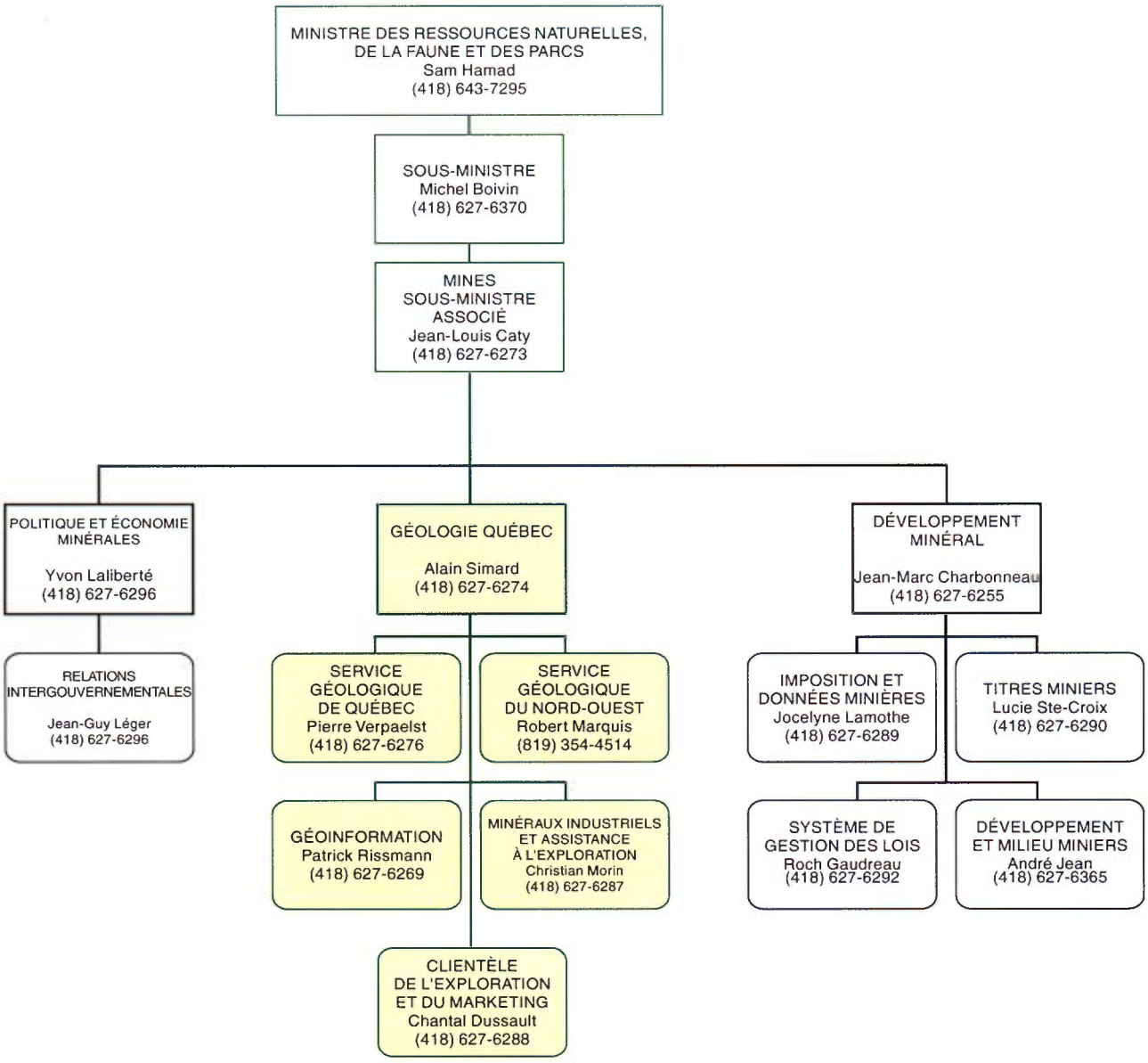

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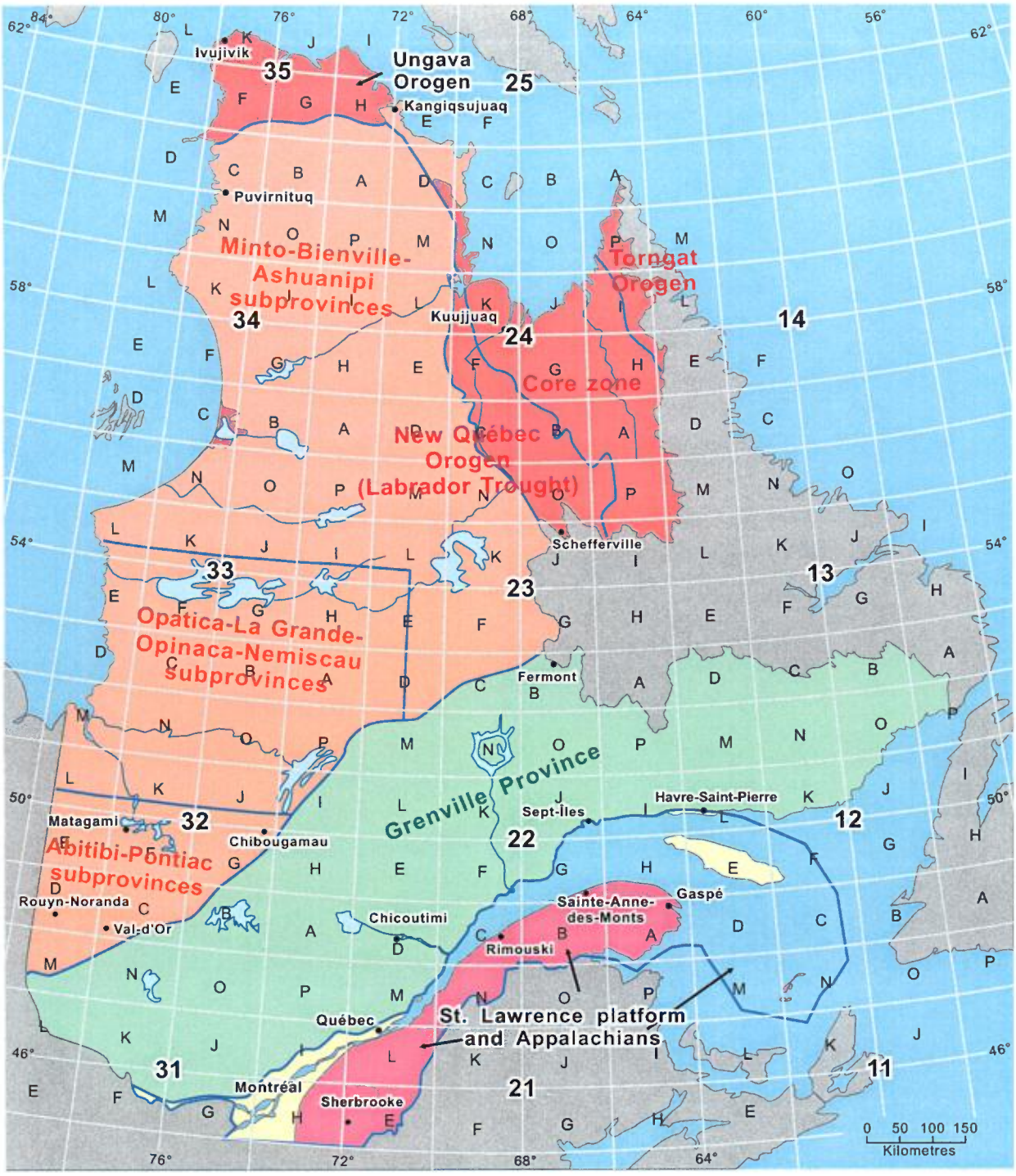

Figure 1. Geological and territorial subdivisions used in this report.

Chapter 1

Base and precious metals

1A

Northern Superior Province (Minto, Bienville, and Ashuanipi Subprovinces)

Serge Perreault

The Ungava Peninsula forms a vast landmass covering about 350,000 km². Although this region has seen little exploration, it's mineral potential is very promising. This chapter deals with the northern Superior Province, which includes the Minto, Bienville, and Ashuanipi subprovinces.

Since 1998, **Géologie Québec** has completed 20 geological surveys within the scope of the Far North Project. In 2003, two surveys were completed, one in the Kogaluk Bay area (NTS sheets 34 N and 34 M) by Maurice *et al.* (2003) and the second in the Lac Minto area (NTS sheets 34 G and the eastern half of 34 F) by Simard *et al.* (2003).

During the year 2003, in addition to its geological mapping surveys, research teams at **Géologie Québec** conducted several studies and post-graduate research projects in cooperation with various universities. These include the continuation of a study undertaken in 2002 on the 3.82 Ga supracrustal sequence of the Nuvvuagittuk belt (formerly the "Porpoise Cove" belt) in the Inukjuak area (Berclaz *et al.*, 2003), a study on the dispersal of indicator minerals in the Ashuanipi area by Beaumier (2003), a study on copper-silver occurrences in the Lac Guillaume-Delisle area (Labbé *et al.*, 2003a), and a study on platinum-group elements in the northeastern Superior Province (Labbé *et al.*, 2003b).

In 2003, a dozen exploration projects were carried out in the study area (Table 1A-1). For each commodity or group of commodities, the breakdown of exploration expenditures for the year 2003 is as follows: 30% for Ni-Cu-Co-PGE, 40% for diamonds, and 30% for base metals (Cu-Zn-Pb). Three projects were funded under the Québec Mineral Exploration Assistance Program (MEAP), from funds allocated to the **Nunavik Mineral Exploration Fund**.

The following sections detail the most significant exploration projects carried out in 2003 in the Bienville, Minto, and Ashuanipi subprovinces. Where possible, the projects are grouped according to the volcano-sedimentary belt in which they are located.

Bienville Subprovince

The Bienville Subprovince is a plutonic assemblage that lies in the southern part of the northern Superior Province. The Bienville mainly consists of variably deformed tonalitic, granodioritic, and granitic plutonic bodies, which host enclaves of supracrustal (iron formation, paragneiss, metavolcanic rock) and plutonic (ultramafic) rocks (Hocq, 1994). This subprovince also contains a few volcano-sedimentary belts, for example, the Lac Fagnant belt, which are metamorphosed to the amphibolite facies.

In 2003, the **Nunavik Mineral Exploration Fund** and individual prospectors continued their search for base and precious metals in three areas along the coast of Hudson Bay (Table 1A-1). Target areas were the Kuujjuarapik 1 and 2 areas (projects 5 and 6, Figure 1A-1) and the Umiujaq area (project 7, Figure 1A-1). In the Umiujaq area, the **Nunavik Mineral Exploration Fund**, in partnership with **SOQUEM INC.**, searched for volcanogenic redbed copper deposits in basalts. In the Kuujjuarapik area, the **Nunavik Mineral Exploration Fund** and prospectors (Table 1A-1) searched for Pb-Zn-Au occurrences in stromatolitic limestone. On the Kuujjuarapik 2 project, two new showings (41311 and 41977) were discovered. Assayed samples yielded respective grades of 5.25% Pb and 0.14% Zn, and 14% Zn and 0.75% Cd.

Ashuanipi Subprovince

The Ashuanipi Subprovince is a gneissic-plutonic assemblage that lies along eastern margin of the northern Superior Province (Card and Ciesielski, 1986). With the exception of a few restricted areas, such as the Caniapiscau Reservoir area where metamorphic conditions reached the amphibolite facies, Ashuanipi rocks are metamorphosed to the granulite facies. The Ashuanipi Subprovince is mainly composed of paragneisses (metatexites and diatexites) and mafic and felsic orthogneisses (dioritic and tonalitic) with orthopyroxene-garnet-biotite assemblages, which are intruded by synkinematic pyroxene tonalite sills and plutons (Percival, 1990). According to Thériault *et al.* (1998), the Ashuanipi Subprovince shows an intrusive relationship with the La Grande Subprovince. The Ashuanipi-La Grande assemblage is thrust onto the Opinaca Subprovince to the south.

In 2003, only one project, located in the Lac Courcy area, was reported (project 12, Figure 1A-1). **Géologie Québec** had previously reported the presence of gold showings (Courcy 1 and Courcy 2; Thériault *et al.*, 1998) in the area, associated with iron formations and mafic and felsic volcanic rocks assigned to the Soucy and Soulard formations.

Minto Subprovince

The Minto Subprovince is subdivided into lithotectonic domains (Figure 1A-1) based on the distribution of major lithological assemblages, outlined by positive aeromagnetic anomalies, and the dominantly NNW-SSE tectonic trend

(Leclair, 2003). It consists of Mesoarchean to Neoarchean units composed of a variety of plutonic rocks and scattered remains of supracrustal sequences metamorphosed to the amphibolite and granulite facies (Leclair, 2003). The bedrock in this subprovince is composed of numerous fragments of an early crust (from 3.8 to 2.8 Ga) that was reworked and partially assimilated through a series of magmatic and tectonic processes between 2.8 and 2.6 Ga (Leclair, 2003). Granitic and charnockitic complexes are associated with vast positive aeromagnetic anomalies (40 to 100 km wide), whereas volcano-sedimentary belts are confined to narrow troughs (10 to 20 km), commonly enclosed in gneissic tonalite suites. These volcano-sedimentary belts generally consist of metasedimentary and mafic metavolcanic rocks, along with minor amounts of banded iron formation, intrusive and effusive ultramafic rocks, felsic volcanic rocks, and rare carbonate horizons.

Mapping carried out by **Géologie Québec** since 1998 has led to the identification of some forty previously unknown volcano-sedimentary belts. The geological settings of these belts are comparable to those in the Kogaluk, Payne, Qalluviartuuq, and Duquet belts, known for their copper and gold potential.

VENUS BELT

Located 100 km north of the Trans-Taïga road and the Fontanges airport (NTS sheet 23 M/11), the Venus belt extends for nearly 30 km in length. It is mainly composed of basalts, gabbros, komatiitic lavas, intrusive ultramafic rocks, and felsic to intermediate tuffs. The Venus belt also contains oxide-, silicate-, and sulphide-facies iron formations.

Following mapping conducted in the summer of 1998 in the Lac Gayot area, **Géologie Québec** reported the presence of a Ni-Cu occurrence originally known as the Loup showing (2% Ni, 1% Cu, and 0.65 g/t Pd) in the Venus belt southwest of Lac Gayot (Gosselin and Simard, 2000).

In 2000, **Virginia Gold Mines Inc.** concluded an agreement with **BHP Billiton Diamonds Inc.**, granting the latter the option to acquire a 50% interest in the Gayot property by investing a total of 4.5 million dollars in exploration (project 1, Figure 1A-1). The geological setting of occurrences discovered to date on the Gayot property is similar in many ways to the Kambalda nickel mining district in Australia (48 Mt at 3.6% Ni and 0.25% Cu).

Surface exploration revealed several significant Ni-Cu-Co-Pt-Pd showings and a few mineralized boulder fields, spread out over a lateral distance of 25 km and a width of more than 5 km. The main showings are: Gagnon, Gayot (2.5% Ni, 2.9 g/t Pd+Pt over 3.35 m; former Loup showing), Base Line, MIA, Nancy (1.1% Ni, 1.32 g/t Pd+Pt over 19.9 m, including 2.55 m at 9.03% Ni, 0.6% Cu, and 9 g/t Pd+Pt), Pantoufle, and "L" (2.2% Ni, 1.4% Cu, 2.3 g/t Pd+Pt over 11.4 m). In 2003, **Virginia Gold Mines Inc.** and **BHP Billiton Diamonds Inc.** (project 1, Figure 1A-1) continued their investigations in the Nancy area, including the Nancy Extension, De Champlain, and Zone 03 showings. This year's program included surface and downhole DPEM electromagnetic surveys, drilling (9 holes totalling 1,766 m), mapping, and sampling.

During the year 2003, **Virginia Gold Mines Inc.** and **BHP Billiton Diamonds Inc.** signed a new agreement covering geological reconnaissance work, sampling, and exploration in Québec's Far North (Nunavik). Under the terms of this agreement, the partners will explore for Ni-Cu-PGE deposits in the numerous greenstone belts scattered throughout the vast Superior Province in Nunavik.

LAC QULLINAARAALUK INTRUSION

In August 2000, the **Ministère des Ressources naturelles** (MRN) announced the discovery of a significant nickel-copper showing located 10 km north of Lac Qullinaaraaluk, roughly 200 km southeast of Inukjuak (NTS sheet 34 G/10, UTM: 518675E, 6393092N). **SOQUEM INC.** obtained an exploration licence covering the discovery zone and its immediate vicinity. The following month, **SOQUEM INC.** concluded an agreement with **Falconbridge Ltd** to explore jointly the area of interest in 2001.

The Lac Qullinaaraaluk massive sulphide showing is located in the east-central part of a mafic to ultramafic intrusion (Labbé *et al.*, 2000). The irregularly shaped intrusion is roughly 750 m long by about 200 m wide on average. Dominantly pyroxenitic in composition, the rocks are massive, fine- to medium-grained, and undeformed. They intrude a suite of strongly deformed diatexites and metatexites, and are themselves intruded by late pegmatite dykes and veins. Preliminary mapping of the showing reveals that massive sulphides outcrop sporadically over some 25 m along strike. The mineralized zone ranges from 1 to 4 m wide. Disseminated sulphides are also observed throughout the intrusion, especially to the northeast of the main zone, where the rock is particularly rusty. Seven surface samples yielded grades ranging from 1.71 to 2.60% Ni, from 0.08 to 1.80% Cu, and from 0.14 to 0.27% Co.

Previous work by **Falconbridge Ltd** and **SOQUEM INC.** included a heliborne Mag-EM survey and ground EM surveys. The two partners also assessed the Ni-Cu-PGE potential of several mafic intrusions in NTS sheet 34 G. In 2003, the two companies (projects 3 and 4, Figure 1A-1) carried out lake sediment geochemistry surveys as well as anomaly follow-ups in NTS sheets 33 K, L, M, N, and O, and 34 B, C, F, G, H, J, K, and L. The geological setting is characterized by deformed or weakly deformed felsic and tonalitic intrusions, which host large mafic enclaves with Ni-Cu mineralization.

Diamonds

Moorhead *et al.* (2000) stressed the importance of major brittle structural zones, locally defined by late faults, aeromagnetic lineaments, remote-sensing lineaments, and graben-

type sedimentary basins as controlling factors for the emplacement of alkaline and kimberlitic magmas. Several major crustal lineaments transect the Far North region (Labbé, 2000; Labbé and Lamothe, 2001), including the Saindon-Cambrien corridor, the Allemand-Tasiat structural zone, and the Richmond Gulf structural zone (Moorhead *et al.*, 2000).

In the Lac Gayot area, as a result of work carried out in 2002 and in the summer 2003, **Majescor Resources Inc.** and **Diamondex Resources Ltd** (project 2, Figure 1A-1) defined indicator mineral concentrations in an area of very limited glacial dispersal. The results of a glacial sediment (till) geochemistry survey yielded mineral counts reaching 63 indicator minerals, which mostly included ilmenite, forsteritic olivine, and chrome diopside. The target area is located within the Saindon-Cambrien tectonic corridor.

In the Lac Aigneau area, **Western Hemisphere Mining Corporation** (project 8, Figure 1A-1) carried out a glacial sediment (till) geochemistry survey combined with prospecting and sampling. The results were disappointing, however, as no indicator minerals were recovered from analyzed samples.

In NTS sheet 34 P/16, **Antoro Resources Inc.** carried out a glacial sediment (till and esker) geochemistry survey in order to locate diamond indicator minerals. At the time of writing this report, the results were still pending. However, the company reported the presence of 43 erratic boulders; assays from 24 of these yielded grades above 500 ppm Ni, including grades of 0.6%, 0.3%, and 0.28% Ni, combined with anomalous Cr values.

Exploration Opportunities

Geological mapping in the Kogaluk Bay area (NTS 34 N and 34 M) revealed the presence of previously unknown volcano-sedimentary belts metamorphosed to the amphibolite and the granulite facies (Maurice *et al.*, 2003). The largest greenstone belt is the Roulier belt, which extends for more than 30 km along strike and has a maximum width of about 10 km. It contains bimodal volcanic sequences, gabbroic sills, iron formations associated with felsic volcanic rocks, and garnet-bearing aluminous paragneisses (garnet + sillimanite).

Pyrrhotite-pyrite zones associated with volcanic rocks and iron formations occur in the Roulier belt. Some of these zones are associated with the presence of metamorphosed hydrothermal aureoles containing contain cordierite and anthophyllite. Siliceous gneiss horizons are also associated with these hydrothermal rocks. Most mineralized zones occur at the contact between mafic and felsic volcanic rocks or in iron formations associated with felsic volcanic rocks. Anomalous grades reaching 810 ppb gold (0.8 g/t Au) were reported in iron formation samples. Grades reaching 0.21% Cu and 0.15% Ni were obtained in mineralized mafic rocks of the Roulier belt (Maurice *et al.*, 2003). Combined with other, smaller greenstone belts in the Kogaluk Bay area, the Roulier belt represents a new target area for gold exploration in iron formations and for VMS-type base metal deposits.

In the current economic setting, where the price of gold is reaching new peaks, and where mineral exploration financing appears promising, it is worth mentioning that several greenstone belts in the Far North host interesting gold occurrences, commonly associated with iron formations. For example, **Virginia Gold Mines Inc.** and **SOQUEM INC.** reported grades up to 60 g/t Au in grab samples, 2.85 g/t Au over 4.1 m in channel samples, and 2.20 g/t Au over 27.9 m in drillholes. These results include high-grade zones, such as 9.89 g/t Au over 2.1 m and 14.25 g/t Au over 1.5 m in drillholes on the Kogaluk property.

Work by **Virginia Gold Mines Inc.**, **SOQUEM INC.**, and **Miramar Mining** in the Duquet belt led to the discovery of some twenty gold, silver, copper, and zinc showings. The best results were 32.29 g/t Au, 533 g/t Ag, 29.9% Zn, and 2.9% Cu, obtained from among the various mineral occurrences. To the southwest, in the Fagnant belt, **Virginia Gold Mines Inc.** discovered a number of significant gold showings.

1A

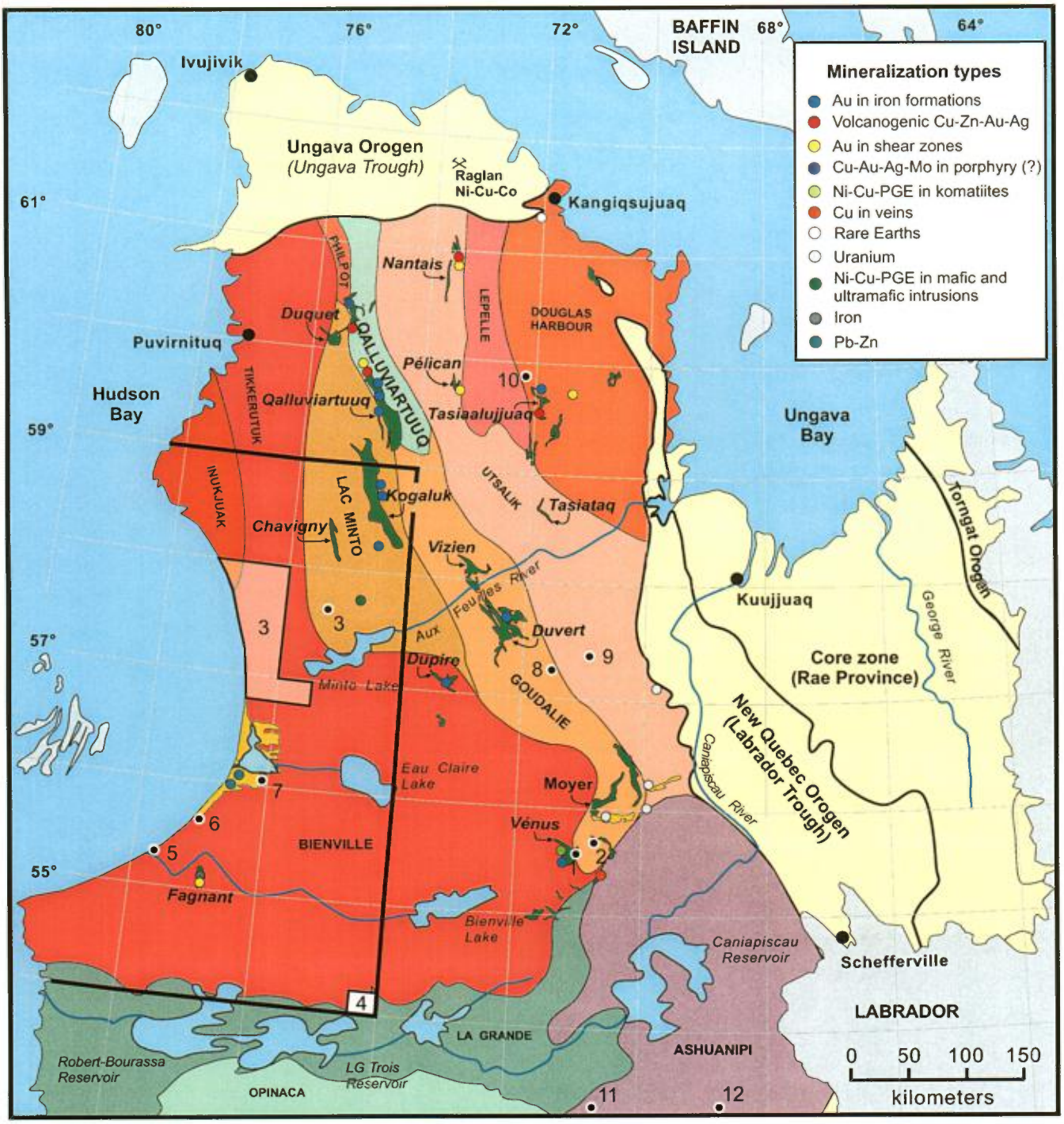

Figure 1A-1. Location of mining exploration projects in the Minto, Bienville and Ashuanipi subprovinces in 2003. Tectonic domains and the major zones of greenstone belts (in green) of the northern Superior Province are shown in different colors. The Paleoproterozoic volcano-sedimentary basins are illustraded in yellow and the Archean and Paleoproterozoic rocks of the core zone (Rae Province), of the Ungava, New Quebec and Torngat orogens are in light yellow. Projects 11 (23 D/15) and 12 (23 C/10) are located outside of this map. *Map modified from Labbé et Lacoste (2002).*

TABLE 1A-1 - Exploration projects in the northern part of the Superior Province in 2003 (see figure 1A-1).

NO	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORKS[1)]
1	23 M/11	Virginia Gold Mines Inc. / BHP Billiton Diamond Inc.	Gayot	Ni-Cu-Co-PGE	G, D(9:1766), DPEM, EM
2	23 M/07,10,15,16	Majescor Resources Inc. / Diamondex Resources Ltd	Gayot	Diamond	S, Pr, MAG,
3	34 B/13, 34 C/16, 34 F/01, 02, 07, 08, 09, 34 G/11	Falconbridge Ltd / SOQUEM INC.	East Hudson Tan	Ni-Cu-Co-PGE	S, G, Pr, Gs(sl), EM
4	33 K, L, M, N, O, 34 B, C, F, G, H, J, K, L	Falconbridge Ltd / SOQUEM INC.	East Hudson	Ni-Cu-Co-PGE	G, Pr, Gs(sl)
5	33 N/05	Moses Weetaltuk, Myua Niviaxie	Kuujjuaraapik 1	Pb-Zn-Au	Pr
6	33 N/11	Nunavik Mineral Exploration Fund	Kuujjuaraapik 2	Pb-Zn	Pr
7	34 C/01, 02	Nunavik Mineral Exploration Fund / SOQUEM INC.	Umiujaq	Cu-Ag	Pr
8	24 E/05, 06	Western Hemisphere Mining Corporation	Aigneau	Diamond	S, Pr, Gs(t)
9	24 E	Typhoon Exploration Inc.	Aigneau	Diamond	TE
10	34 P/16	Antoro Resources Inc.	Douglas Harbour	Diamond (Ni-Cu-PGE)	Pr, Gs(t)
11	23 D/15	J. Paterson	Artigny	Diamond	Pr, Gs(t)
12	23 C/10	J. Fortin	Courcy	Au-Ag	Pr

1 = Legend for abbreviations used in tables related to the types of exploration works.

1 - Legend for abbreviations used in tables related to the types of exploration works.

Prospecting and geology works

Pg	Unspecified prospecting and geological work
S	Sampling
B	Bulk sampling
Min	Mineralogical studies
G	Geological mapping
Rsi	Remote sensing interpretation
Pr	Prospection
Pt	Polishing test
D(#:m)	Diamond drilling (number : total meters)
Rcd	Reversed circulation drilling
T	Trenching and stripping
Ct	Characterization tests and analysis (peat)

Geochemical surveys

Gs	Unspecified geochemical surveys
Gs(h)	Humus geochemical survey
Gs(l)	Lake sediments geochemical survey
Gs(r)	Lithogeochemical survey (rock)
Gs(s)	Stream sediments geochemical survey
Gs(sl)	Soils geochemical survey
Gs(t)	Till geochemical survey

Geophysical surveys

Gp	Unspecified geophysical survey
AGp	Undefined airborne geophysical survey
AEROTEM	Airborne AEROTEM survey
DPEM	Drill hole pulse electromagnetic survey (borehole)
EM	Electromagnetic surveys
Grav	Gravimetry survey
Grav(A)	Airborne gravimetry survey
Grav(b)	Borehole gravimetry
Mag	Magnetic survey
Mag-EM(A)	Airbrone magnetic and electromagnetic survey
MEGATEM	MEGATEM survey
IP	Induced polarization survey
IP(b)	Borehole induced polarization survey
Rd	Radiometric survey
Rd(A)	Airborne radiometric survey
VLF	Very low frequences electromagnetic survey
MIF	Magnetometric intensed field survey

Other types of works

TE	Technical evaluation
FM	Feasability and/or market studies
Env	Environmental studies
Met	Metallurgical test
M	Mining site rehabilitation
Italic	Exploration work done on mine properties
Bold	Advanced exploration project

James Bay Region Central Superior Province (Opatica, Opinaca, Nemiscau, and La Grande Subprovinces)

Patrick Houle

The James Bay region lies in the central Superior Province and contains four geological subprovinces, including, from north to south, the La Grande, Opinaca, Nemiscau, and Opatica subprovinces. Comprising volcano-plutonic and sedimentary assemblages, these subprovinces are transected by a series of E-W to WNW-ESE and NE-SW shear zones. Exploration efforts are mainly focussed on the Frotet-Evans (Opatica Subprovince), Lower Eastmain and Upper Eastmain (Opinaca Subprovince), and La Grande (La Grande Subprovince) volcano-sedimentary belts.

During the summer of 2003, as part of a partnership involving the INRS-ETE, VRQ-DIVEX, the **Mistissini Geological Resources Centre**, and the **Ministère des Ressources naturelles, de la Faune et des Parcs**, the second phase of a study of the mineral potential of the Paleoproterozoic Mistassini basin was completed. This year's work determined the optimal sampling grid to map alteration zones associated with each type of base metal (Cu, Pb, Zn) sulphide mineralization. The results of this study will be released in a report slated for the summer of 2004 (Héroux *et al.*, 2003).

In the Near North region, at least 47 exploration projects were reported in 2003 (see Table 1B-1), compared to 55 projects in 2002.

In 2003, the main types of deposits that attracted explorationists in the James Bay region included lode gold or iron-formation-hosted gold deposits, diamond deposits associated with kimberlites, and, to a minor extent, magmatic nickel deposits (Ni-Cu, PGE) associated with mafic to ultramafic intrusions and porphyry-type Cu-Au deposits associated with felsic intrusions.

The James Bay region is divided into three areas, which are, from south to north: the Frotet-Evans area, the Eastmain area, and the La Grande area. The most significant projects currently underway are reviewed and discussed below, based on the interest generated in 2003.

Frotet-Evans Area

Located in the centre of the Opatica Subprovince, the Frotet-Evans volcano-sedimentary belt (FEVB) is primarily composed of tholeiitic and calc-alkaline volcanic formations. These volcano-sedimentary rocks are metamorphosed to the greenschist facies in the centre of the belt and to the upper amphibolite facies near the contacts with Opatica gneisses. They are intruded by various syn- to late-tectonic gabbroic to monzogranitic suites (Boily and Dion, 2002). The 250-km-long FEVB is subdivided into four lithotectonic segments, which are, from west to east: 1) Evans-Ouagama, 2) Storm-Evans, 3) Assinica, and 4) Frotet-Troilus. In the Frotet-Evans area, 11 exploration projects were inventoried in 2003.

The eastern part of the Frotet-Evans belt (Frotet-Troilus segment) hosts a few massive sulphide deposits as well as extensive porphyry-type Cu-Au-Ag deposits, such as the Troilus mine. **Inmet Mining Corporation** extended the mine life at the Troilus deposit by an extra four years, *i.e.* to the year 2010, thanks to a new total reserve of one million ounces of gold.

Still within the Frotet-Troilus segment, the **Fonds de prospection minière jamésien**, in conjunction with Messrs. **Michel Leblanc, Clermont Bouchard,** and **François Bouchard**, announced the discovery of kimberlite indicator minerals on the Savignac property (project 23, Figure 1B-1). Located 80 km north of Chibougamau, this project opens up a new area of interest for diamond exploration in the James Bay region.

Eastmain Area

The Eastmain area comprises the Lower Eastmain greenstone belt (Lower Eastmain and Middle Eastmain segments) and the Upper Eastmain greenstone belt (Upper Eastmain segment; Monts Otish area). Archean volcano-sedimentary rocks of the Lower Eastmain greenstone belt are assigned to the Eastmain Group. This group is composed of komatiitic to rhyolitic volcanic rocks and a variety of sedimentary rocks. Paragneisses of the Auclair Formation (Nemiscau and Opinaca basins) overlie this assemblage.

In the Eastmain area, 23 projects were reported in 2003. In the Lower and Middle Eastmain segments, exploration is largely focussed on lode gold or iron-formation-hosted gold deposits, volcanogenic massive sulphides, and porphyry-type Cu-Au±Ag intrusions. Diamond exploration projects are mainly concentrated in the granitic intrusions and paragneisses that border the Upper Eastmain greenstone belt (Monts Otish area).

In the Middle Eastmain segment, on the Clearwater project (project 31, Figure 1B-1), **Eastmain Resources Inc.** confirmed the extension of the main high-grade veins at the Eau Claire deposit from the surface down to a vertical depth of 600 m and over a lateral distance of at least 800 m. The deposit remains open along strike and at depth. Several other intervals, ranging from 4 to 8 m thick, with grades of 1.05 to 2.04 g/t Au, were intersected near surface and at depth. In May 2003, the company

announced an 80% increase in the total tonnage and contained ounces of gold of the deposit with respect to the tonnage estimate released on December 19, 2001. The Eau Claire deposit contains a mineral resource estimated at 2,666,493 metric tonnes at a grade of 7.37 g/t Au, for a total of 631,698 contained ounces of gold (indicated and inferred resources based on 12 veins and an uncut gold grade). Note that the Clearwater property is located just a few kilometres north of the ongoing Eastmain-1 hydroelectric development project, which is now accessible by an all-weather road that joins up with the Route du Nord and Poste Nemiscau.

Known for its gold (former Eastmain mine – NTS 33 A/08), base metal, and PGE potential, the Upper Eastmain area continues to attract considerable attention in terms of diamond exploration. In the Monts Otish area, **Ashton Mining of Canada Inc.** and **SOQUEM INC.** made several announcements concerning the Foxtrot property (project 1, Figure 1B-1) during the year 2003. *In January*, the two partners released DMS (Dense Media Separation) results for Renard 2 (65 carats per hundred tonnes [cpht] for a 2.5-tonne sample), Renard 3 (134 cpht for a 4.88-tonne sample), and Renard 4 (65 cpht for a 4.81-tonne sample). *In April*, the partners announced the discovery of Renard 9 and indicated that Renard 5 and 6 actually formed a single body, now called Renard 65. *In June*, a large diamond (8.8 by 8.2 by 4.8 mm – 4 carats minimum weight) was discovered in drillcore from Renard 65 and a 4.11-tonne bulk sample from Renard 4 yielded an estimated diamond content of 33 cpht. *In July*, DMS results for a 6.95-tonne bulk sample from Renard 65 yielded an estimated diamond content of 35 carats per hundred tonnes. *In August*, 178 diamonds were recovered from a 21.4-kg sample from Renard 9 analyzed by caustic dissolution, whereas DMS results on the latest sample to be analyzed from Renard 65 yielded an estimated diamond content of 23 cpht for a 10.67-tonne sample. *In October*, the two companies announced the discovery of Renard 10 and Lynx. On the Foxtrot property, certain geophysical anomalies linked to the presence of indicator mineral trains still remain unexplained, which demonstrates the strong potential to discover other kimberlitic sources besides those of the Renard cluster.

South of the Monts Otish, **Dios Exploration Inc.** discovered, in outcrop and in drillhole, three kimberlite occurrences on the Hotish property (project 12, Figure 1B-1), including a dyke with a minimum width of 2 m over a distance of 300 m by 100 m, open in all directions. In the same area, **Ditem Explorations Inc.** discovered, on the Tichegami property (project 10, Figure 1B-1), two multiphase kimberlite intrusions, H-3 and H-4 (H-Tichegami cluster), one of which yielded a microdiamond. Combined with the Lac Beaver cluster, which includes kimberlite dykes and a diamond-bearing hypabyssal pipe (Togola *et al.*, 2003), these recent discoveries confirm the tremendous diamond potential of the southern part of the Monts Otish area. Furthermore, south of the Monts Otish on the Mistassini property (project 11, Figure 1B-1), **Canabrava Diamond Corporation Inc.** and **Majescor Resources Inc.** discovered, in drillhole, a pegmatite with uranium mineralization, grading 0.20 wt% U_3O_8 over 4.50 m.

La Grande Area

The La Grande area comprises three major Archean assemblages, Proterozoic dykes, and a series of grabens infilled with siliciclastic sediments of the Paleoproterozoic Sakami Formation. Archean assemblages include the Bienville plutonic Subprovince to the northwest, the La Grande volcano-plutonic Subprovince in the centre, and the metasedimentary and plutonic Opinaca Subprovince to the southeast. The metamorphic grade increases from the greenschist facies in the centre of the La Grande area to the amphibolite facies towards the north and southeast.

Part of the La Grande Subprovince, the La Grande volcanosedimentary belt (LGVB) hosts the vast majority of known mineral occurrences. Parallel to the Wemindji-Caniapiscau structural corridor, the LGVB is mainly composed of mafic to felsic volcanic rocks interstratified with metasediments and oxide-facies or magnetite iron formations. Komatiitic flows and ultramafic intrusions are also present and locally host Ni-Cu±PGE and Cr occurrences. A total of 13 exploration projects were reported in the La Grande area in 2003. Exploration projects are clustered in two areas: the western and eastern La Grande segments.

At the westernmost edge of the La Grande Subprovince, **Dianor Resources Inc.** reported in January 2003 the presence of two microdiamonds in a heterolithic volcanic breccia (Bear) on the Lac de l'Astrée property (project 36, Figure 1B-1), similar in many ways to breccias in the Wawa area of Ontario. These clear white stones, respectively 0.24 x 0.14 x 0.08 mm and 0.24 x 0.12 x 0.1 mm in size, were recovered from a 24-kg sample.

In the western La Grande Subprovince, **Matamec Explorations Inc.** exposed by mechanical stripping a number of gold showings on the Sakami property (project 39, Figure 1B-1). One of these, showing 43, was initially discovered in drillhole EX-43, which intersected 6.0 m at a grade of 2.03 g/t Au. On showing 9.6, located 1.3 km west of showing 43, chip samples yielded gold assays up to 28.75 g/t Au. These gold showings are located directly within the Sakami fault. This deformation zone represents a km-scale regional structure that runs along the contact between the Opinaca and La Grande geological subprovinces.

On the Ménarik property (project 40, Figure 1B-1), **Ressources Minières Pro-Or Inc.** announced the signature of a strategic cooperation agreement with **General Motors Corporation** and **Amalgamet Canada**. This agreement relates to the development and marketing of new technological processes developed for **Ressources minières Pro-Or Inc.** by the *Institut National de la Recherche Scientifique du Québec* (INRS). Patent applications were submitted in January and July 2003 for these

processes, which will be used to market platinum-rich chromite ore from the Menarik deposit.

Motivated by the discovery in 2002 of an erratic boulder grading 22.9 g/t Au, **Virginia Gold Mines Inc.** implemented in 2003 an extensive exploration program involving mechanical stripping and sampling on the Éléonore project (project 34, Figure 1B-1). This work successfully located the source of the boulder in an altered and mineralized sedimentary sequence bordering a diorite-tonalite intrusion. The mineralization consists of finely disseminated (< 5%) arsenopyrite and pyrrhotite hosted in sediments affected by early and intense potassic alteration (microcline-biotite-sericite) that forms elongate alteration corridors. The company reported anomalous gold assays, generally ranging from a few tens to a few hundred ppbs, with higher grades locally (up to 29 g/t Au in grab samples and 3.0 g/t Au over 5.0 m in channel samples). These higher gold grades are often associated with quartz stringers and intense silicification of the wall rock. Ore styles discovered on the property, the nature of associated alteration, and the proximity of a diorite-tonalite intrusion strongly suggest the presence of a porphyry-type gold-copper system on this property.

In the eastern La Grande Subprovince, **Virginia Gold Mines Inc.** and **Globestar Mining Corporation** completed their first resource estimate for the Orfée zone on the Poste Lemoyne property (project 42, Figure 1B-1), calculated at 203,483 metric tonnes at a grade of 14.5 g/t Au. The compilation of results led to the identification of a mineralized zone some 50 m long by 3 to 9 m wide extending to a depth of 250 m, in an assemblage of siliceous sediments and iron formations. The ore zone remains open at depth. Drillholes have also encountered low-grade gold intercepts, from one to several metres wide, over a strike length of 2 km, along the structural corridor that hosts the Orfée zone. These drillholes demonstrate that the host deformation zone remains a fertile gold structure, even beyond the Orfée zone.

Virginia Gold Mines Inc. tested at shallow depth several gold zones in iron formations exposed by mechanical stripping on the Noella property (project 44, Figure 1B-1) in the Caniapiscau area. The best results were obtained in drillhole NO-03-08, which yielded 12.47 g/t Au over 1.95 m, directly beneath trench TR02-43, where channel samples graded 18.36 g/t Au over 1.2 m and 5.84 g/t Au over 1.2 m. Other drillholes testing surface gold zones and geophysical anomalies yielded several intersections up to a metre wide, with anomalous to sub-economic gold grades.

Exploration Opportunities

The Middle and Lower Eastmain greenstone belt (MLEGB), located in the centre of the James Bay region, hosts over a hundred metalliferous showings (Au, Ag, Cu, Fe, Li, Mo, Ni, Pb, Zn) that show a wide variety of ages, ore styles (disseminated sulphides, massive sulphides, veins), host rocks, and metal series. A compilation of these showings indicates the latter are not randomly scattered throughout the belt. They tend, rather, to be clustered in specific areas (for example the Lac Elmer and Lac à l'Eau Claire areas). Furthermore, these areas host occurrences ranging from synvolcanic to syntectonic in age, which suggests that synvolcanic gold was likely recycled during deformational events. Consequently, synvolcanic intrusions in the MLEGB represent priority targets for exploration.

Québec's Near North region also offers a favourable geological setting, along the contacts between the La Grande volcano-plutonic Subprovince and the metasedimentary Opinaca and Nemiscau subprovinces, for the emplacement of peraluminous monzogranitic plutons and granitic pegmatite suites with rare metal mineralization. Furthermore, the Near North represents the eastern equivalent of subprovinces in the Superior Province of northern Ontario, where rare metal occurrences were recently discovered (Gosselin and Boily, 2003). In the MLEGB, post- to late-tectonic pegmatites host lithium (Li) and molybdenum (Mo) mineralization. Thus, the entire periphery of the Kapiwak Pluton (NTS 33 C/03) offers great potential for rare metal-bearing pegmatites and remains underexplored to date (Moukhsil *et al.*, 2003).

Although no ore deposits are currently being mined in the Middle and Lower Eastmain area, the consistent increase in resources at the Eau Claire gold deposit and the identification of several potential areas suggest that this part of the James Bay region does have strong potential for the discovery of economic ore deposits (Moukhsil *et al.*, 2003).

1B

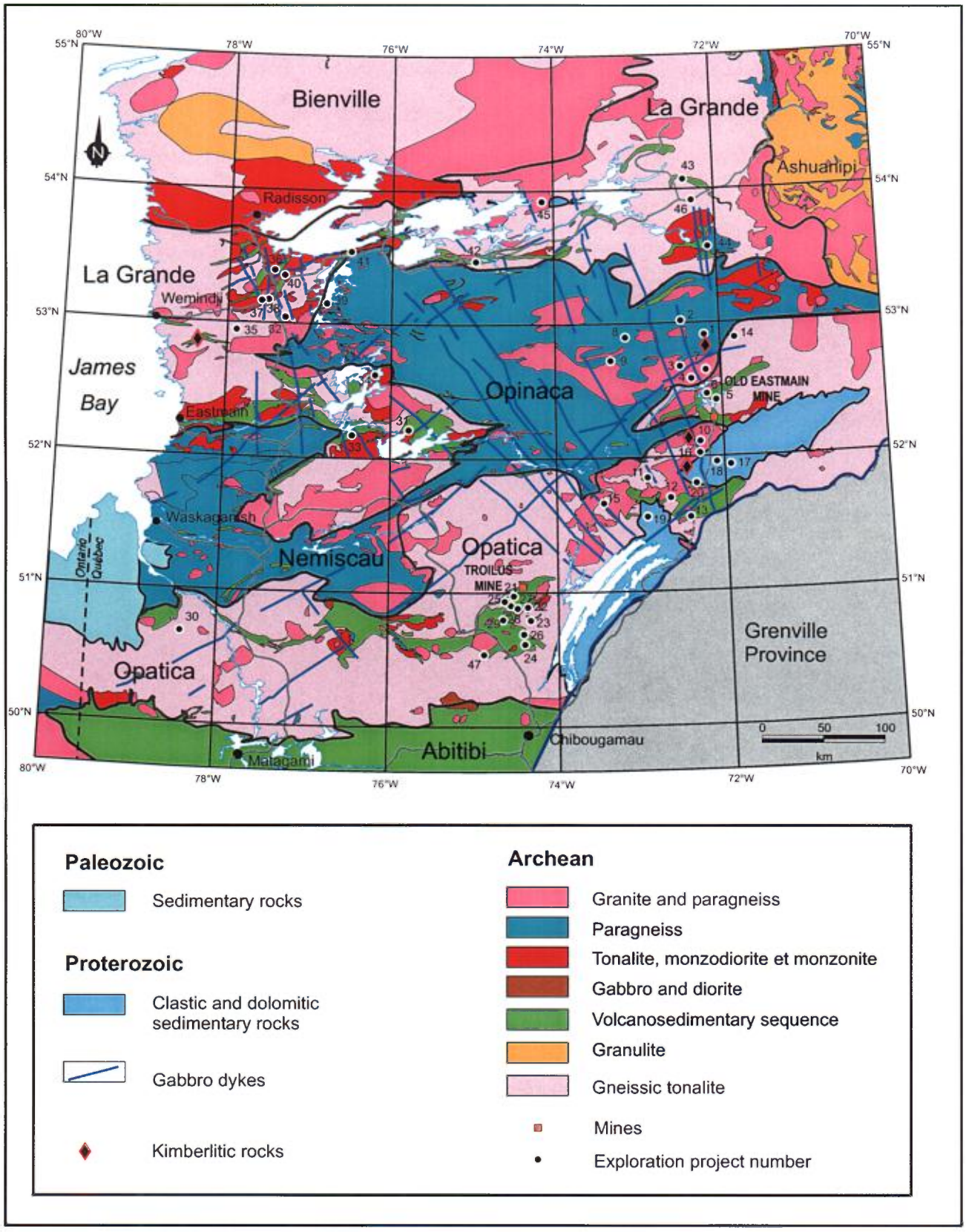

Figure 1B-1. Location of mining projects sites in James Bay area for 2003.

TABLE 1B-1 - Exploration projects in the James Bay area for 2003 (see figure 1B-1).

NO	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORKS [1]
1	33 A/09, 33 A/15,16, 33 H/01	Ashton Mining of Canada Inc. / SOQUEM INC.	Foxtrot	Diamond	S, Pr, D(69:12302), Gs(t), AGp, Mag, TE
2	33 A/01, 33 A/07, 08, 09,10, 23 D/05, 23 D/12, 23 D/14, 33 H/01, 02	Dios Exploration Inc. / De Beers Canada Exploration Inc.	33 Carats	Diamond	Pr, Gs(t), AGp, Mag
3	33 H/06, 07, 08, 09, 10, 11, 33 H/01, 02, 33 A/15, 16	Majescor Resources Inc.	Portage	Diamond	Rcd, Gs(t)
4	33 A, 32 P	Diadem Resources Ltd	Otish Mountains Diamond	Diamond	G, Gs(t)
5	33 A/08	Stratabound Minerals Corporation	Marusia	Diamond	Gs(t)
6	33 A/08	Beaufield Consolidated Resources Inc. / LEH Ventures Ltd	Otish	Diamond	Gs(t)
7	33 A/01, 08, 09	Interactive Entreprises Ltd	Eastmain Diamond, Eastmain Gem, Marc 1, Marc 2	Diamond	Rsi, Mag-EM(A)
8	33 A/14	Sparton Resources Inc.	Otish Mountains Diamond	Diamond	Gs(t)
9	33 A/11	Consolidated Thompson - Lundmark Gold Mines Ltd	Otish Diamond	Diamond	Gs(t)
10	33 A/01	Ditem Explorations Inc. / Pure Gold Minerals Inc.	Tichegami	Diamond	D(4:400), Mag
11	32 P/07, 32 P/09, 10, 11, 32 P/15, 16	Majescor Resources Inc. / Canabrava Diamond Corporation Inc. (Superior Diamonds Inc.)	Mistassini	Diamond	Gs(t), Mag-EM(A)
12	32 P/09, 10, 32 P/15, 16	Dios Exploration Inc. / De Beers Canada Exploration Inc.	Hotish	Diamond	S, G, D(37:1332), Gs(t), AGp, Mag
13	33 A/01, 02, 32 P/01, 32 P/07, 08, 09, 10, 11, 32 P/15, 16	Ashton Mining of Canada Inc. / SOQUEM INC.	Tichegami	Diamond	Gs(t), Mag
14	23 D/12	Miranda Gold Corporation / De Beers Canada Exploration Inc.	Lac Léran	Diamond	Gs(t), AGp
15	32 P/11	A. Grigorita	Mistassini	Diamond	Pr, Gs(t)
16	33 A/01	Strateco Resources Inc.	Cardinal	Diamond	D(6:500)
17	32 P/16, 22 M/13	Cameco Corporation / Cogema Resources Inc.	Camie River	Uranium	Pg
18	32 P/16	Cameco Corporation / Cogema Resources Inc.	Beaver Lake	Uranium, Diamond	Pg

TABLE 1B-1 - Exploration projects in the James Bay area for 2003 (see figure 1B-1).

NO	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORKS [1]
19	32 P/06, 07, 32 P/10, 11	Plexmar Resources Inc.	Papaskwasati	Diamond	Gs(t), AGp
20	32 P/09, 32 P/16	Plexmar Resources Inc.	Discovery	Diamond	Gs(t), AGp
21	33 O/01, 32 J/15	Beaufield Consolidated Resources Inc.	Troilus	Au-Cu-Zn	Pg
22	32 J/16	Les Ressources Tectonic	Lac La Fourche	Au	Pr, VLF
23	32 J/09, 32 J/16	Fonds de prospection minière jamésien / M. Leblanc / F. Bouchard / C. Bouchard	Savignac et Bar Lake	Diamond	Gs(t)
24	32 J/09	SOQUEM INC. / Normabec Mining Resources Ltd	Armagnac (1345)	Cu-Au-PGE	S, G, Pr
25	32 J/15	SOQUEM INC.	Diléo-Nord (1346)	Cu-Au	S, G, Pr, Gs(sl), IP
26	32 J/09	SOQUEM INC. / Lyon Lake Mines Ltd	Odon (4243)	Cu-Au-PGE	S, G, Pr
27	32 J/15	SOQUEM INC.	Testard (1314)	Cu-Au	S, G, Pr
28	32 J/15	SOQUEM INC. / Ressources Itaminéraque inc.	Troilus Free Gold (1262)	Cu-Au	S, G, Pr
29	32 J/10	SOQUEM INC. / Graniz Mondal Inc.	Troilus Sud	Cu-Zn	S, D(2:326,5), EM
30	32 L/09, 10, 32 L/15, 32 L/16, 32 M/01, 02	Majescor Resources Inc.	Nottaway	Diamond	Rcd, Mag
31	33 B/04	Eastmain Resources Inc.	Clearwater	Au	E, D(19:7366), T
32	33 B/03, 32 N/07, 33 F/08, 33 P/03, 33 F/06, 32 N/02, 32 N/07, 33 C/03	SOQUEM INC. / Inco Ltd	EM Baie	Au-Ag-Cu-Zn, diamond	Pr, D(5:750), EM
33	33 C/01	Les Explorations Carat inc.	Eastmain-1	Cu-Au	T
34	33 C/09	Virginia Gold Mines Inc.	Éléonore	Cu-Au	S, Pr, T
35	33 C/13	A. Grigorita	Wemindji	Diamond	Pr, Gs(t)
36	33 F, 33 G	Dianor Resources Inc.	James Bay	Diamond	S, G, Pr, D(18:237), Gs(sl), Gs(t), Mag
37	33 F/04	Antoro Resources Inc.	Five Diamonds	Diamond	Gs(sl), Gs(t), Mag
38	33 F/03, 04	Antoro Resources Inc.	Wapiscan - Rivière-des-peupliers	Au-Cu-Zn	Gs(sl), Gs(s), Gs(t), Mag, EM
39	33 F/02, 33 F/07	Matamec Explorations Inc.	Sakami	Au	S, Pr, T
40	33 F/06	Ressources Minières Pro-Or inc.	Ménarik	Cr-Pd-Pt-Ni-Cu	Met

TABLE 1B-1 - Exploration projects in the James Bay area for 2003 (see figure 1B-1).

NO	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORKS [1]
41	33 F/07, 33 F/09, 10	Virginia Gold Mines Inc. / Cambior Inc.	La Grande Sud	Au	G, D(8:2685), Gs(sl)
42	33 G/06	Virginia Gold Mines Inc. / Globestar Mining Corporation	Poste Lemoyne	Au	Pr, D(8:1413)
43	33 I/01, 02	SOQUEM INC. / Sirios Resources Inc.	Aquilon	Au	S, T
44	33 H, 23 E	Virginia Gold Mines Inc.	Noella	Au	S, D(34:1821), T
45	33 G/16	Sirios Resources Inc.	Tilly	Cu-Au-Ag-Mo	S, Mag-EM(A)
46	33 H/16	A. Grigorita	Pontard	Diamond	Pr, Gs(t)
47	32 J/10	S. Longchap	Assinica Lake	Cu-Ni-PGE	Pr

1 = See abbreviation list in table 1A-1.

1B

1C

Southern Part of the Superior Province (Abitibi and Pontiac Subprovinces)

Pierre Doucet
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Introduction

The Abitibi and Pontiac subprovinces form the southern part of the Superior Province in Québec. The Abitibi Subprovince is the largest, one of the most studied, and among the richest Archean greenstone belts in the world. It comprises numerous granitoid intrusions and volcanic and sedimentary belts oriented roughly E-W (Figure 1C-1), dated between 2.75 and 2.67 Ga. The Abitibi belt is transected by several major reverse or normal faults oriented E-W to NW-SE, as well as by sinistral NE-trending and dextral SE-trending faults that dissect volcano-sedimentary domains into lozenge-shaped segments cored by intrusive rocks.

The Pontiac Subprovince is separated from the Abitibi Subprovince by the Cadillac-Larder Lake Break, a structure that extends from east to west over a distance of more than 100 km in Québec and Ontario. The Pontiac Subprovince comprises granitoid intrusions and orthogneisses in its central part, along with detrital sedimentary rocks and paragneisses with a few volcanic sequences. The latter form ultramafic, mafic, and locally felsic assemblages in the southwestern part of the Pontiac. A few thin bands of mafic to ultramafic volcanic rocks are also present in the northern part of the subprovince.

The Abitibi Subprovince is world-renowned for the great number and high grade of its precious metal (Au-Ag) and polymetallic (Cu-Zn-Au-Ag and Cu-Au) ore deposits. A few metallic deposits, architectural stone quarries, and industrial mineral deposits (lime, quartz, kyanite, mica, and garnet) were also mined in the Pontiac Subprovince. Exploration and mining have made this territory one of the main mining regions in Québec for close to a century.

In 2003, we compiled 178 mineral exploration projects in the Abitibi and Pontiac subprovinces, compared to 189 in 2002. This is a slight decrease of 6%. The total number of metres drilled in 2003 in the Abitibi and Pontiac subprovinces reached 551,412 metres.

For the year 2003, the number of gold exploration projects stood at 119 (Table 1C-1). Compared to 2002, this represents an increase of 29.3%. Several companies were also involved in the search for polymetallic deposits or diamonds in the Abitibi and Pontiac subprovinces in 2003. The total number of projects for these commodities stood at 59 (Table 1C-2). This is a sharp decline of 40% compared to the 97 projects reported in 2002. This drop may be explained by the fact that the focus this year was on gold exploration, thanks to a significant increase in the price of gold during the year. Three regional projects carried out by partners **Noranda Inc.**, **Virginia Gold Mines Inc.**, and **Novicourt Inc.** (project P55), by the **Fonds de prospection minière jamésien** (project P47), and by **Noranda Inc.** (project P54), covered vast areas and do not have a specific location.

In the following sections, we will discuss the most significant results from gold and base metal exploration projects. Figures numbered from 1C-1 to 1C-4 show the location of projects in the Abitibi and Pontiac subprovinces.

Exploration for Precious Metal Deposits

CASA BERARDI – MATAGAMI AREA (FIGURE 1C-1)

In this area, located in the northwesternmost part of the Abitibi Subprovince in Québec, 8 projects were reported.

Aurizon Mines Ltd Casa Berardi project (project 31) is located 130 km west-southwest of Matagami, in the Taïbi sedimentary Group. An extensive exploration program was undertaken in 2002. It consisted of 56 surface drillholes totalling 26,899 m, which delineated an inferred resource of 1.7 million tonnes at 6.1 g/t Au (cut-off grade of 3.0 g/t Au) in Zones 118-120. These zones are located along the depth extension of the Main Zone, at a distance of 300 to 700 m east of the West Mine. In 2003, a ramp was driven from the West Mine to reach Zone 113 at the 550 m level; more than 640 m were excavated during the second and third quarter. A feasibility study commissioned by **Aurizon Mines Ltd** in 2000 indicates that reserves at the West Mine stand at 6,943,000 tonnes at a grade of 6.7 g/t Au.

International Taurus Resources Inc. and **Fairstar Explorations Inc.** have joined forces on the Fénélon project (project 47), located 70 km west-northwest of Matagami. This project consists of a gold deposit composed of quartz-sulphide veins hosted in strongly silicified, sericitized, and carbonatized mafic rocks, surrounded by argillaceous sediments. Inferred and indicated resources totalling 88,390 tonnes at 10.91 g/t Au were delineated. Construction of the mine portal and access ramp began in October 2003. A surface and underground drilling campaign is planned for 2004, as well as reserve definition and a test mining phase.

LEBEL-SUR-QUÉVILLON – DESMARAISVILLE AREA (FIGURE 1C-1)

We compiled 19 gold exploration projects in this area located in the east-central Abitibi Subprovince. The Sleeping Giant mine (Au-Ag) was the only active gold producer in the area in 2003.

1C

Held by **Cambior Inc.** and **Aurizon Mines Ltd**, the Sleeping Giant mine (project 32) is located 70 km west of Lebel-sur-Quévillon. The lode gold deposit is characterized by high gold grades of up to 11 g/t Au. A project, estimated at $7 million, to deepen the shaft by 200 m, to reach a total depth of 1,060 m, was announced in March 2003. It should be completed during the second quarter of 2004, and will provide access to new gold zones (Zones 6, 7, 8, and 18).

On the Comtois property (project 34), located 15 km northwest of Lebel-sur-Quévillon, **Candor Ventures Corporation** and **Maude Lake Exploration Ltd** conducted an exploration program involving a ground magnetometer survey, detailed mapping, sampling, and 7 drillholes totalling 1,860 m. Several drillholes yielded significant intercepts, including 8.7 m at 5.75 g/t Au in drillhole COM-03-94, set up between the Osborne and Bell zones. Inferred resources for the Osborne and Bell deposits are estimated at 808,000 tonnes at an average cut grade of 9.6 g/t Au.

Strateco Resources Inc. drilled over 10,000 m on the Discovery project (project 24), located 35 km north of Lebel-sur-Quévillon. The drillholes intersected the lateral and depth extensions of gold mineralization in the East and West lenses. **Strateco Resources Inc.** is earning an interest in the property from **GéoNova Explorations Inc.**, a subsidiary of **Campbell Resources Inc.**, who estimated a resource of 2.12 million tonnes at a grade of 5.11 g/t Au for the Discovery Zone.

On the Windfall Lake property (project 101), located some 90 km east of Lebel-sur-Quévillon, **Noront Resources Ltd, Alto Ventures Ltd,** and **Fury Explorations Ltd** announced the discovery of 5 gold zones (A, B, C, D, and E) as a result of two drill campaigns totalling 21 drillholes (4,118 m). The best intersections include a 6.00 m interval at 8.9 g/t Au in drillhole FUR-03-03.

CHIBOUGAMAU AREA (FIGURE 1C-1)

In 2003, we compiled 17 gold projects in the Chibougamau area, which forms the northeastern tip of the Abitibi Subprovince. In 2003, one gold producer, the Joe Mann mine (Au-Ag), was in operation for the Chibougamau area.

On June 6, **Campbell Resources Inc.** suspended development work in the access ramp at the Copper Rand 5000 project. Following an agreement with its partners to restructure the project's financing, development work resumed in October, and the start of commercial production is scheduled for the end of 2004. The Copper Rand 5000 project contains measured and indicated resources of 1.9 million tonnes at 1.55% Cu and 3.33 g/t Au. At the Joe Mann mine operated by **Campbell Resources Inc.** (project 102), an extensive underground drilling program delineated the high-grade West Zone, which contains a measured resource of 61,507 tonnes at 16.01 g/t Au, an indicated resource of 118,661 tonnes at 12.99 g/t Au, and an inferred resource of 230,154 tonnes at 12.79 g/t Au. Mining in the West Zone is slated to begin during the second quarter of 2004.

NORMÉTAL – LA SARRE – AMOS AREA (FIGURE 1C-1)

The number of gold projects carried out in this area, located in the west-central part of the Abitibi Subprovince, stood at 10 in 2003. These projects mainly involved prospecting, geochemical and geophysical surveys. A 9-hole drill program totalling 2,051 m was completed by **Exploration Atlantis Inc.** on the Lamorandière project (project 61), located 35 km northeast of Amos. These drillholes encountered lode gold mineralization.

ROUYN-NORANDA – CADILLAC AREA (FIGURES 1C-1 AND 1C-3)

A total of 29 gold exploration projects were compiled in this area, which forms the southwestern corner of the Abitibi Subprovince in Québec. Three mines produced gold in 2003 in the area, namely the Mouska and Doyon mines (Au-Ag), and the LaRonde polymetallic mine (Au-Ag-Zn-Cu). Exploration carried out at the LaRonde mine will be described in the section on polymetallic deposits.

In late November 2001, **Richmont Mines Inc.** suspended operations at the Francoeur mine (project 5), located 20 km west of Rouyn-Noranda. Following a delineation drilling program totalling 7,801 m in the West Zone at the mine, resources increased slightly from 822,821 tonnes at 8.91 g/t Au to 884,510 tonnes at 7.89 g/t Au. With these results in hand, **Richmont Mines Inc.** decided against a resumption of mining operations. On the Wasamac property (project 7), located 6 km east of the Francoeur mine, a drill program successfully located and traced the Wasamac ductile shear zone, which hosts two gold zones along the extension of Zones 1 and 2 of the former Wasamac mine. Gold is associated with fine-grained disseminated pyrite in intense albite-hematite-carbonate alteration zones. The best intersections include 2.71 m (true thickness) at 8.57 g/t Au in drillhole WS-03-15.

At the Mouska mine (project 19), **Cambior Inc.** announced the internal shaft would be deepened by 210 m, to a total depth of 880 m. This project, estimated at $11 million, will require a production shutdown from January to October 2004. It will eventually provide access to probable resources of 142,000 tonnes at 15.4 g/t Au and inferred resources of 173,000 tonnes at 14.6 g/t Au in lenses 40, 50, and 50 South. At the Doyon mine (project 20), **Cambior Inc.** completed a drill program which outlined a new gold vein system in the J Zone, located 125 m east of existing infrastructure. A preliminary estimate of 356,000 tonnes of inferred resources at 7.5 g/t Au was calculated for zones J20, J40, and J125. Theses zones consist of pyrite-chalcopyrite-rich quartz veins with native gold.

On the contiguous Westwood property (project 105), located to the east of the Doyon mine, **Cambior Inc.** announced it had intersected the extension of Zones 1 and 2 of the Doyon mine (north corridor) with grades of 39.3 g/t Au over 0.6 m, and 11.8 g/t Au and 0.24% Cu over 3.5 m in drillhole 1158-02. In the same drillhole, the Westwood horizon yielded 4.2 g/t Au and

0.14% Cu over 9.5 m. The north corridor is characterized by locally sericitized intermediate and mafic volcanic rocks that host disseminated sulphides and quartz stringers. The Westwood horizon is composed of multiple bands and stringers of semi-massive pyrite, with sphalerite and chalcopyrite, hosted in a strongly altered dacite. With these positive results in hand, **Cambior Inc.** plans to excavate a 2 km long exploration drift from level 14 at the Doyon mine to reach the Westwood property. This drift will enable the company to carry out deep exploration in a vast area to the east of the Doyon mine.

Agnico-Eagle Mines Ltd implemented an extensive drill program to test the Contact Zone on the Lapa property (project 29), located 16 km west of Malartic, in the Cadillac Tectonic Zone. This is one of the most significant off-minesite discoveries to take place in the Abitibi over the past decade. In 2003, **Agnico-Eagle Mines Ltd** acquired **Breakwater Resources Ltd**'s interest in this project. The Contact Zone, as its name implies, lies at the contact between sheared and altered mafic and ultramafic lavas of the Piché Group and sediments of the Cadillac Group. Indicated resources in the Contact Zone are estimated at 2,268,000 tonnes at 9.94 g/t Au, with another 1,723,700 tonnes of inferred resources at 8.57 g/t Au. At depth, a new gold structure, the Contact South Zone, was detected 6 m to the southwest of the Contact Zone. The best intersections include 3.5 m at 10.97 g/t Au in drillhole 118-03-21A.

Following the discovery of the Contact Zone, **Queenston Mining Inc.** launched a drill campaign on the contiguous Pandora property (project 30), located to the west of Lapa. Drillhole PD-03-01 encountered gold mineralization (3.7 g/t Au over 11.5 m) at the contact between volcanic rocks of the Piché Group and sedimentary rocks of the Cadillac Group. This structure is interpreted as the western extension of the Contact Zone.

Queenston Mining Inc. and **Globex Mining Enterprises Inc.** completed two drillholes to test the Liz Zone on the Duquesne West property (project 44), located 25 km north of Rouyn-Noranda. The Liz Zone is a gold-bearing shear zone characterized by sericitized and ankeritized intermediate to mafic volcanic rocks with 5 to 20% pyrite. Drillhole DQ-03-16 intersected 13.6 m at a grade of 4.53 g/t Au.

MALARTIC – SENNETERRE – VAL-D'OR AREA (FIGURES 1C-1 AND 1C-4)

The number of gold projects reported in the Malartic – Senneterre – Val-d'Or area, which forms the southeastern part of the Abitibi Subprovince, stood at 34 in 2003. Two mines, Sigma-Lamaque and Beaufor (Au-Ag), produced gold in the area during the year.

Several key events marked the year 2003 in the Val-d'Or mining camp. Commercial production began in February at the Sigma-Lamaque open pit mine, held by **McWatters Mining Inc.** However, mining operations were suspended on October 1st, due to lower than expected milled ore grades. Consulting firm **RSG Global Pty Ltd** was commissioned to review the entire Sigma-Lamaque operation. The firm recommended a $2 million drill program to produce a new resource estimate. The Kiena gold mine (project 42), also held by **McWatters Mining Inc.**, was shut down in late September 2002 due to a depletion of reserves, concentrated in the main lens, Zone S-50. Following drilling conducted in 2002, new indicated resources totalling 2,894,000 tonnes at a grade of 4.26 g/t Au were discovered in Zones P and R, located in the hanging wall of Zone S-50. In November, **McWatters Mining Inc.** sold to **Western Québec Mines Inc.** the Kiena mine complex, and in December, sold to **Richmont Mines Inc.** the Fourax and East-Amphi properties. **Richmont Mines Inc.** plans to carry out a drill program on the East-Amphi property in 2004.

Metanor Resources Inc. discovered an auriferous structure, Zone 5, on its Dubuisson property (project 40), located in the western part of the city of Val-d'Or. Zone 5 is associated with a 3 to 5 m wide shear zone that strikes E-W and dips 70° north. The shear zone hosts quartz-carbonate veins associated with chlorite-sericite-fuchsite-pyrite-rich alteration zones. In 2003, 38 drillholes totalling 5,650 m identified 115,696 tonnes of measured and indicated resources at a grade of 4.15 g/t Au and 3,245,222 tonnes of inferred resources at 4.15 g/t Au. Drill intercepts namely include 4.04 g/t Au over 1.8 m in drillhole ME-03-08.

In order to test several geophysical targets, **Kalahari Resources Inc.** completed 25 drillholes totalling 6,550 m on the Lamaque property (project 12), located in the eastern part of the city of Val-d'Or. This exploration program led to the discovery of a gold zone, the Sixteen Zone, which consists of quartz-tourmaline-pyrite veins in a strongly leached granodiorite porphyry. Drillhole SX-03-07 intersected 44.5 m of mineralization; the best intercepts are 8.23 m at 7.13 g/t Au and 3.66 m at 6.62 g/t Au.

Western Québec Mines Inc. completed 10 drillholes totalling 1,657 m to test the #22 structure on the Shawkey property (project 43), located 5 km west of Val-d'Or. This structure contains quartz-tourmaline-chlorite veins with erratic gold values, hosted in a porphyry intrusion. The best results were obtained in drillhole 141-141, with 6.45 g/t Au over 3.65 m. Following the acquisition of the Kiena mine complex, **Western Québec Mines Inc.** prepared an exploration program for 2004 that involves driving an exploration drift from the Kiena mine to the Shawkey property and drilling into known gold zones.

On the Midway project (project 41), which straddles the Cadillac Tectonic Zone some 16 km west of Val-d'Or, **Northern Star Mining Corporation** drilled 9 holes totalling 1,524 m. Gold intercepts include 6.20 g/t Au over 6.13 m in drillhole NSM-03-01, in an altered gabbro with 10% sulphides. A second drill program (7,600 m) was launched in October 2003.

On the Croinor property (project 85), located 70 km west of Val-d'Or, **South-Malartic Exploration Inc.** and **Huntington Exploration Inc.** conducted an important drill program. Several drillholes yielded significant intercepts of gold-bearing quartz veins hosted in an altered and pyrite-rich diorite sill, these include 8.12 g/t Au over 5.7 m for drillhole CR-03-246 (zone 2). In 2002, a total resource of 7.1 million tonnes at a grade of 2.3 g/t Au was delineated on this project. Work to extract a 20,000 tonnes bulk sample began in November 2003 and will last until January 2004. The ore will be shipped to the Camflo mill, located near Malartic.

On the Swanson property (project 2), located near Barraute, some 65 km north of Val-d'Or, **Phoenix Matachewan Mines Inc.** launched a 1,500 m drill program. Drillhole SW-03-02 intersected 4.8 m at 8.56 g/t Au. The gold mineralization is associated with syenite dykes and carbonate-fuchsite-rich altered wall rocks. Gold occurs with pyrite in quartz veins. Measured resources were established at 421,564 tonnes at 3.26 g/t Au, with indicated resources of 687,078 tonnes at 3.11 g/t Au.

TÉMISCAMINGUE AREA (FIGURE 1C-1)

In the Témiscamingue area, underlain by the Pontiac Subprovince to the south of the Abitibi Subprovince, 2 gold projects were reported in 2003.

Vantex Oil, Gas and Minerals Ltd (project 54) reported results from an exploration program on the Guillet property, located 5 km east of Belleterre. This program included a geochemical survey, surface stripping, channel sampling, and 31 shallow drillholes totalling 2,500 m to test gold structures. Drillhole LE03-28, on the Lake Expanse zone, encountered 10.3 m grading up to 6.25 g/t Au.

Exploration for Polymetallic Deposits and Diamonds

CASA BERARDI – MATAGAMI AREA (FIGURE 1C-2)

In terms of base metal exploration, 20 projects were compiled in the Casa Berardi – Matagami area. Two base metal mines were in operation in this area in 2003, Selbaie and Bell-Allard. In October 2003, **Noranda Inc.** announced it had not yet decided to go ahead with development work on the Perseverance ore deposit, located 10 km west of Matagami. The company also stated that mining operations would cease as planned at the Bell-Allard mine during the fourth quarter of 2004, due to depletion of reserves. **SOQUEM INC.**, in partnership with **BHP Billiton**, completed 9 drillholes on the Brouillan property (project P4), 4 drillholes on the Caber project with partner **Tango Minerals Resources Inc.** (project P30), and 3 drillholes on the Du Dome-Matagami property in conjunction with **Metco Resources Inc.** (project P8). Joint venture partners **Cancor Mines Inc.** and **SOQUEM INC.** completed a drill program on the Kistabiche property (project P41), which hosts the Explo-Zinc deposit, where resources are estimated at 1.06 million tonnes at 7.13% Zn, 0.69% Cu, and 31 g/t Ag. Drillhole Kist-03-07 intersected 3.62 m at 1.29% Zn within a total interval of 16.70 m grading 0.61% Zn.

LEBEL-SUR-QUÉVILLON – DESMARAISVILLE AREA (FIGURE 1C-2)

In 2003, the number of exploration projects compiled in the central Abitibi Subprovince focussed on the search for polymetallic deposits stood at 9. In early 2003, **Breakwater Resources Ltd** completed an exploration program undertaken in 2002 at the Langlois mine, focussing on Zone 97 (project P57). In May, based on the results of 28 drillholes totalling 11,511 m, the company announced an increase in mineral reserves for Zone 97. Proven and probable reserves at the mine are now estimated at 3.323 million tonnes at 10.8% Zn, 0.8% Cu, 52 g/t Ag, and 0.1 g/t Au. In June, **Breakwater Resources Ltd** released the results of an updated feasibility study initially submitted in August 2001 by **SRK Consulting**. Company management is waiting for the price of zinc to improve and for financing to be secured before deciding to reopen the mine. Operations at the Langlois mine were suspended in November 2000. On November 20, 2003, the **Fonds de prospection minière jamésien** announced the discovery of a kimberlite indicator mineral (G10 harzburgitic pyrope) in a sample collected from an esker during a reconnaissance survey near Lebel-sur-Quévillon (project P47).

CHIBOUGAMAU AREA (FIGURE 1C-2)

In the Chibougamau area, 6 exploration projects for polymetallic deposits were reported in 2003. In September, **Inmet Mining Corporation** and **Loubel Exploration Inc.** launched an exploration program on the Lemoine property (project P34). Three deep drillholes are planned (1,100 m to 1,200 m each) to test geophysical anomalies detected in downhole PEM surveys conducted in 2002.

NORMÉTAL – LA SARRE – AMOS AREA (FIGURE 1C-2)

In 2003, 4 polymetallic exploration projects were compiled in the Normétal – La Sarre – Amos area. **Inmet Mining Corporation** conducted a drill program on the Castagnier property (project P31) and an electromagnetic survey on the Landrienne project (project P32), both located east of Amos.

ROUYN-NORANDA – CADILLAC AREA (FIGURES 1C-2 AND 1C- 3)

With 9 ongoing projects in 2003, the Rouyn-Noranda mining camp and the Cadillac area remained very active in terms of polymetallic exploration. Two base metal mines were in operation in this area in 2003, namely the LaRonde and Bouchard-Hébert mines. In March, a rock fall in two production stopes at the LaRonde mine prompted **Agnico-Eagle Mines Ltd** to forecast a 20% drop in production for 2003. In June, the company announced the launch of a feasibility study concerning a deep mining project, referred to as LaRonde II, which would involve sinking a shaft of more than 3,000 m (10,000 feet) to reach deep-

seated ore zones. Throughout the year, **Agnico-Eagle Mines Ltd** continued its deep exploration program on Zone 20 North at the mine (project P48). Drillhole 3215-60A intersected 20.2 m at 9.0 g/t Au. Finally, the company closed in September the acquisition of the Bousquet property, located immediately to the west of the LaRonde mine, from **Barrick Gold Corporation.**

Breakwater Resources Ltd concluded an important exploration campaign involving drilling and geophysical surveys to the northwest and southeast of the Bouchard-Hébert mine (project P58). Drillholes were set up to test offhole pulse EM anomalies detected in previous drillholes. On May 7, 2003, **Noranda Inc.** announced the end of a long strike, which began in June 2002, at the Horne smelter in Rouyn-Noranda.

MALARTIC – SENNETERRE – VAL-D'OR AREA (FIGURES 1C-2 AND 1C-4)

Four exploration projects for polymetallic deposits were compiled for 2003 in the Val-d'Or mining camp and the Senneterre and Malartic areas. One base metal mine was in operation in 2003, the Louvicourt mine east of Val-d'Or. **Aur Resources Inc.** carried out an important drill program on the Dunraine property, located a few kilometres southwest of the Louvicourt mine.

TÉMISCAMINGUE AREA (FIGURE 1C-2)

In the Pontiac Subprovince, 2 exploration projects for polymetallic deposits were reported. Ongoing diamond exploration in Québec and the success of companies working in the Cobalt area in northeastern Ontario prompted many companies to re-examine the diamond potential of the Témiscamingue region. In December, **Sudbury Contact Mines Ltd** announced the discovery of a kimberlite pipe, dubbed SC-118, on the Québec portion of its Timiskaming project (project P28). Analytical results to determine the presence of diamonds are expected in the new year. Additional exploration is also planned on this property in 2004.

Exploration Opportunities

PRECIOUS METALS

In the southern Abitibi Subprovince, two areas in the Cadillac mining camp attracted much attention in 2003, namely:

- an area east of the Doyon mine, where drillholes completed by **Cambior Inc.** intersected three gold zones at depth;
- a segment of the Cadillac fault centered on the Lapa property, where drillholes completed by **Agnico-Eagle Mines Ltd** intersected a new gold zone, the Contact Zone.

These new discoveries are two shining examples of the potential remaining at depth in the Abitibi, in mineralized areas long known and mined for several decades. In the next few years, this part of the Cadillac camp will undoubtedly prove to be one of the most important hot spots for gold exploration in Québec. Other segments of the Cadillac fault located to the west and east also offer promising potential at depth.

In northeastern Abitibi, a geological survey at 1:50,000 scale was conducted by the **Ministère des Ressources naturelles, de la Faune et des Parcs (MRNFP)** in 2003, under the supervision of Patrice Roy, in the Lac Charron area (NTS 32 G/08 and 09), south of Chibougamau. This survey outlined two regional gold-bearing structures along the northeastern margin of the La Dauversière pluton (LDP) (Roy *et al.*, 2003; Grenier *et al.*, 2003). The Palmer-Tippecanoe deformation zone (PTDZ), an E-W structure nearly 14 km long, runs through seven copper-gold showings, inclu-ding showing R-14 (144.29 g/t Au over 2.44 m in channel sample, mineral deposit file 32 G/09-21). These showings are similar in many ways to mineralization encountered in the vicinity of the Joe Mann mine (southwestern part of the LDP).

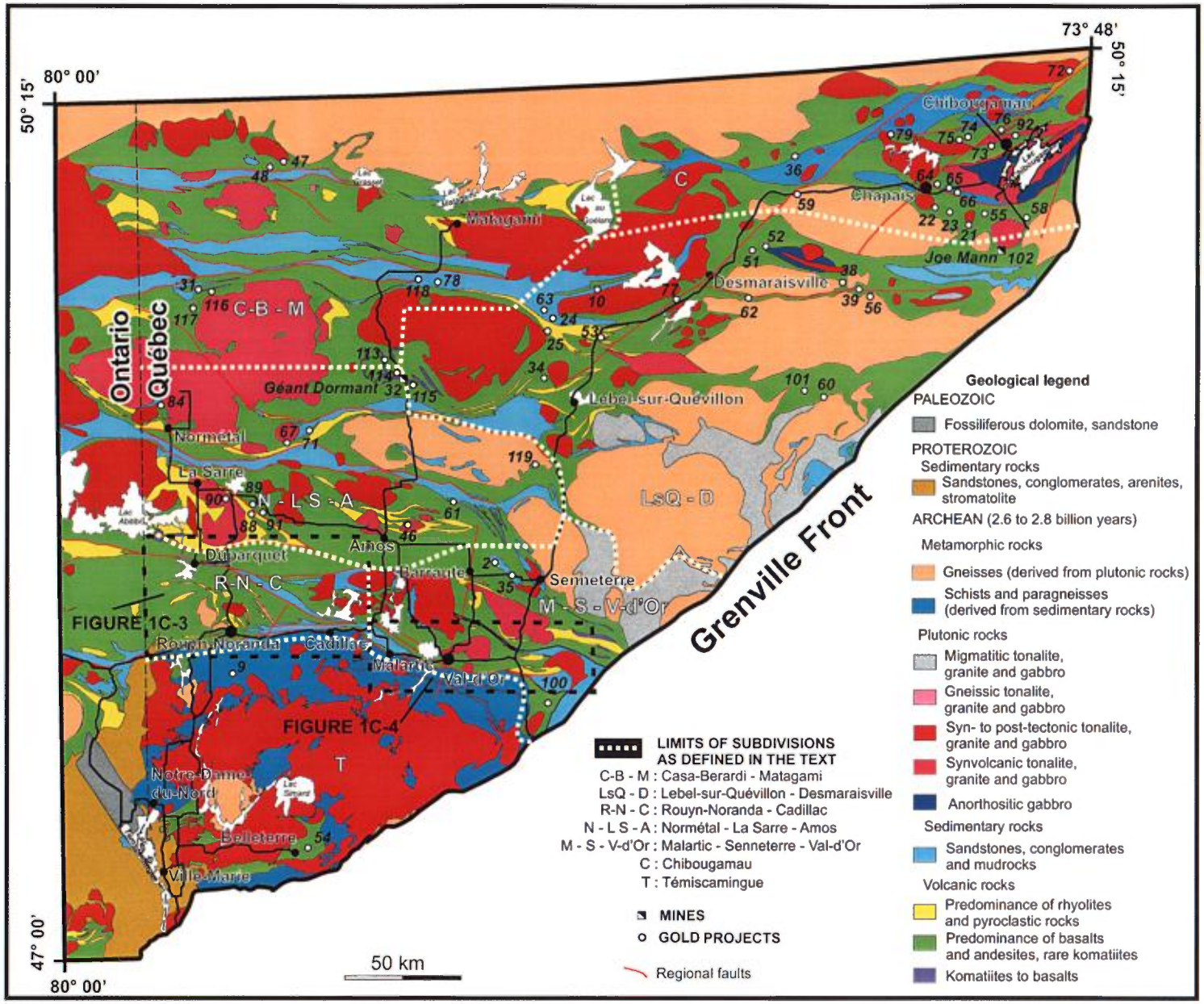
The junction between the PTDZ and the Lac Dufresne deformation zone, a NE-SW structure wedged between the LDP and the Boisvert pluton, which hosts a gold showing, is marked by the presence of sericite-iron carbonate schists with anomalous gold (100 pbb Au, grab sample, summer 2003). This zone, several kilometres long by nearly one kilometre wide, hosts several unexplained "INPUT" electromagnetic anomalies. These anomalies appear to extend eastward into an area which may contain additional conductors, but where no detailed geophysical surveys have been conducted.

BASE METALS

Mapping conducted by the **MRNFP** to the east of Matagami, in the Lac Olga area (NTS 32 F/11 and 14) in 2002 (Goutier *et al.*, 2002) and in the Lac au Goéland area (NTS 34 F/10 and 11) in 2003 (Goutier and Doyon, 2003), traced the eastward extension of volcanic units found along the northern limb of the Galinée anticline. Volcanogenic massive sulphide (VMS) deposits in the Matagami camp are associated with the Key Tuffite, a marker horizon of silica and sulphide-rich tuffs occurring at the contact between volcanic rocks of the Lac Watson Group and basalts of the Wabassee Group. Goutier and Doyon (2003) traced the extension of volcanic rocks (rhyodacites) of the Lac Watson Group into the Lac au Goéland area. They also reported the presence of garnet and anthophyllite, which suggests these rocks were affected by a volcanogenic alteration system. These features indicate that the mineralized interface at Matagami, where the vast majority of Zn-Cu-Ag ore deposits in the mining camp occur, extends eastward for more than 15 km. This opens up a vast area to the east of Matagami for the search of volcanogenic massive sulphide deposits, and creates a high-potential opportunity in the northern Abitibi Subprovince. In the third phase of the project, slated for the summer 2004, **MRNFP** mapping will cover map sheet 32 F/15, the western half of 32 F/09, and the southern half of 32 K/02.

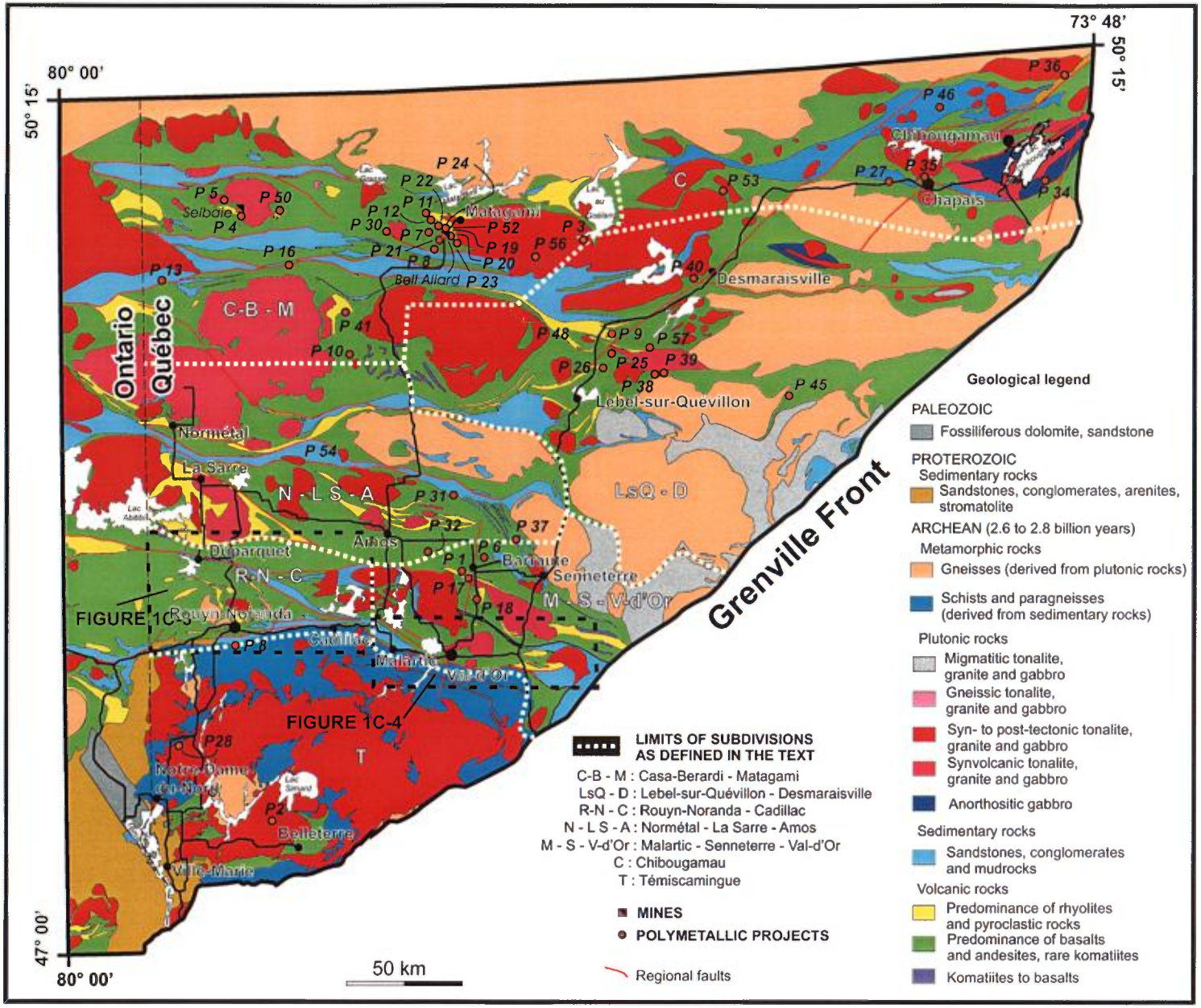
The Lebel-sur-Quévillon base metal mining camp also offers a significant potential. The Grevet-Mountain volcanic complex,

located in the Cameron deformation zone, hosts the Langlois mine where **Breakwater Resources Ltd** is actively exploring in order to eventually resume mining operations. It also hosts the Grevet B (indicated resource of 306,000 tonnes at 9.92% Zn, 0.52% Cu, 22.8 g/t Ag, and 0.07 g/t Au) and Orphée (inferred resource of 1.8 million tonnes at 4.2% Zn, 0.5% Cu, and 12 g/t Ag) deposits. The mineralized structural corridor, which trends E-W towards the east and NW-SE towards the west, is more than 1.5 km wide and extends for nearly 20 km. **Metco Resources Inc.**, on its own or in partnership with **Breakwater Resources Ltd**, continued their investigations in this area, following the discovery of induced polarization anomalies in 2002.



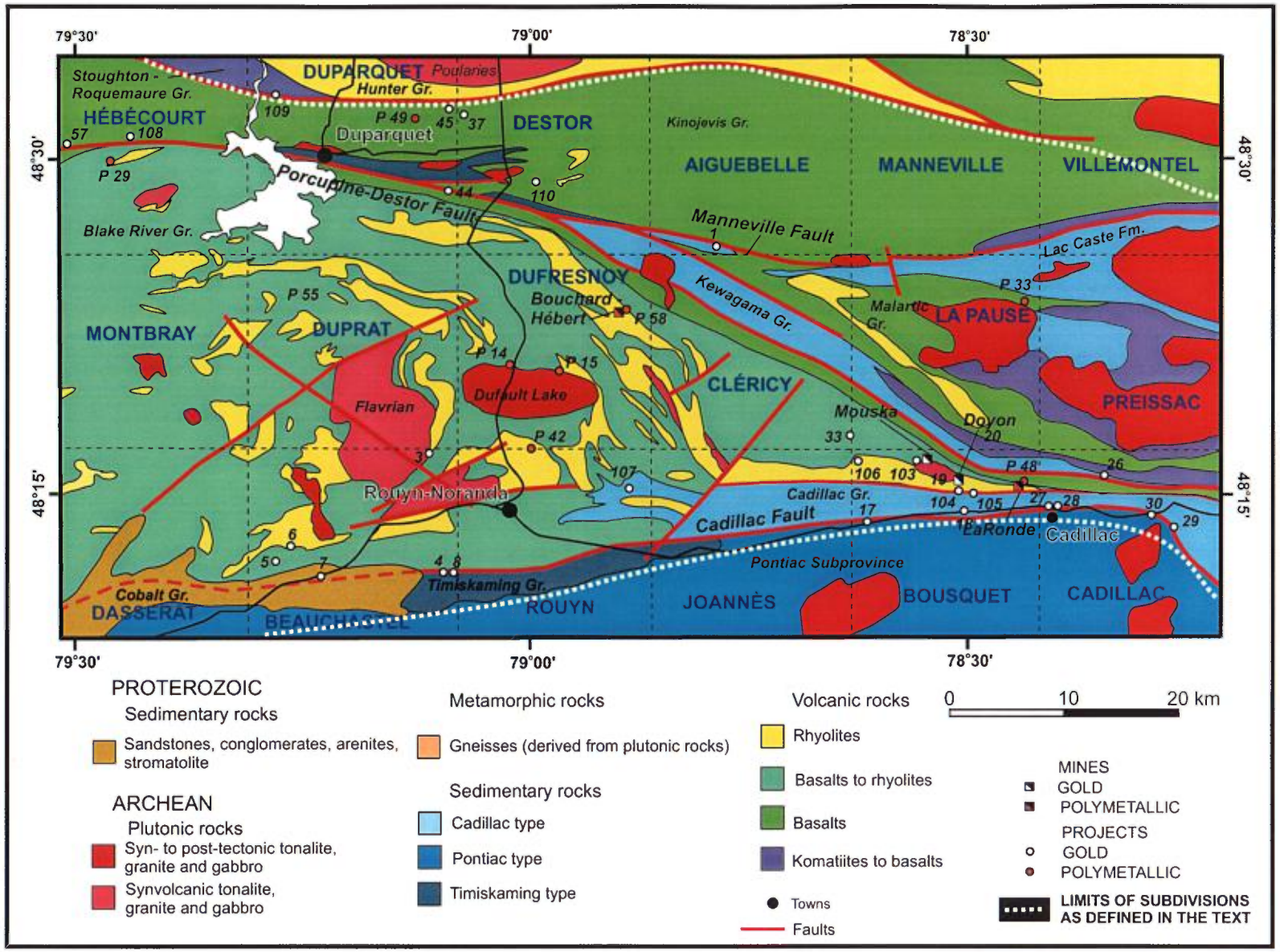
Modified from Hocq and Verpaelst (1994).

Figure 1C-1. Location of exploration projects and gold operations in the Abitibi and Pontiac subprovinces for 2003.



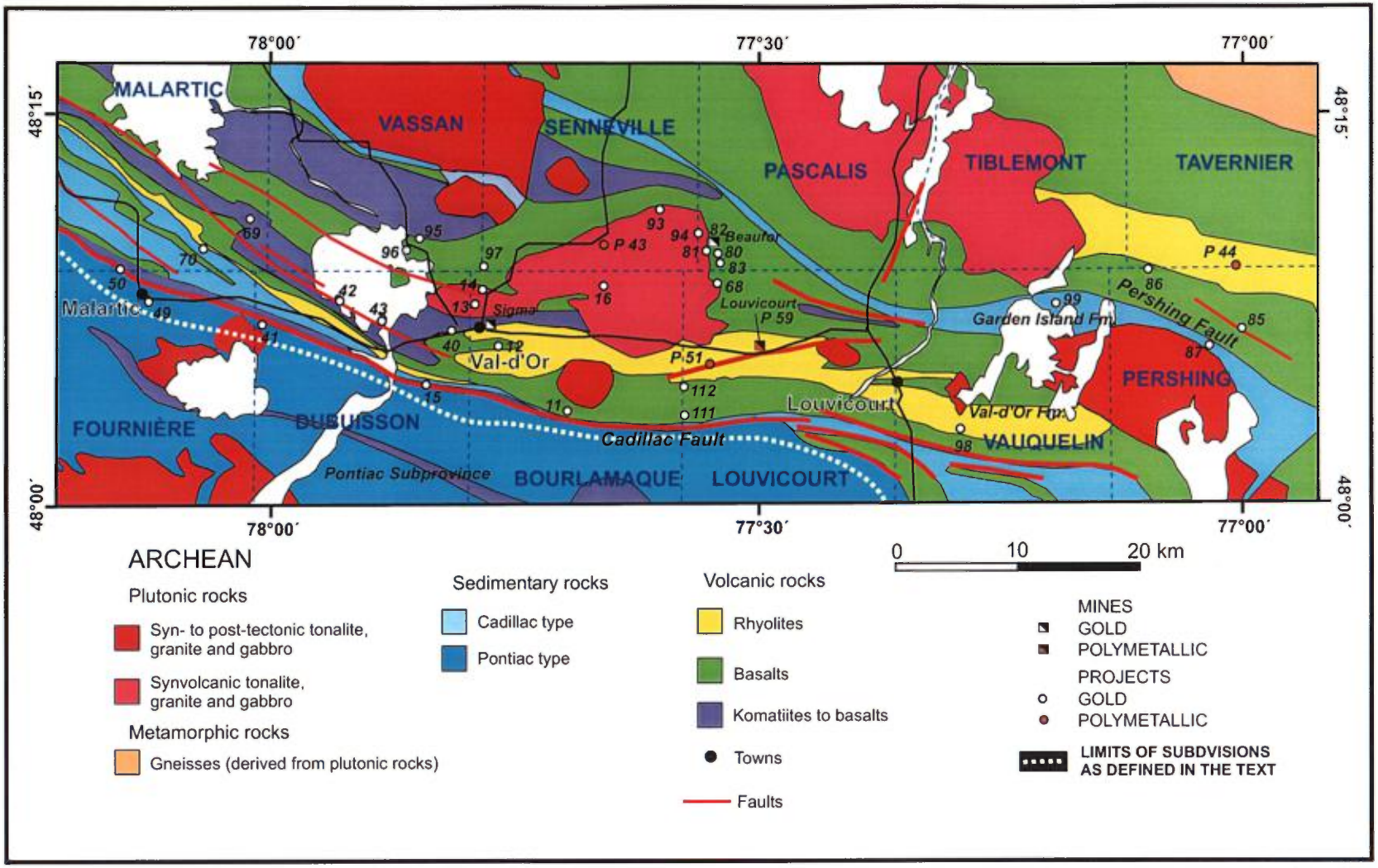
Modified from Hocq and Verpaelst (1994).

Figure 1C-2. Location of exploration projects and polymetallic operations in the Abitibi and Pontiac subprovinces for 2003.



Modified from Avramtchev and Lebel-Drolet (1981); Couture (1991).

Figure 1C-3. Location of exploration projects and mines in the Rouyn-Noranda - Cadillac area in 2003.



Modified from Avramtchev and Lebel-Drolet (1981); Couture (1991).

Figure 1C-4. Location of exploration projects and mines in the Malartic - Val-d'Or area in 2003.

TABLE 1C-1 - Exploration for gold projects in the Abitibi and Pontiac subprovinces in 2003.

NO	TOWNSHIPS	FIG.	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORKS (1)
1	Aiguebelle	1C-3	32 D/07	Typhoon Exploration Inc.	Fayolle	Au	Pg, Mag, IP
2	Barraute	1C-1	32 C/05	Phoenix Matachewan Mines Inc.	Swanson	Au-Zn-Ag	D(11:1520)
3	Beauchastel	1C-3	32 D/06	Abcourt Mines Inc.	Mine Elder	Au	Pg, FM
4	Beauchastel	1C-3	32 D/03	Lake Shore Gold Corp.	Bazooka	Au	D(17:5000), Mag-EM(A)
5	Beauchastel	1C-3	32 D/03	Richmont Mines Inc.	Francoeur	Au	D(12:8626)
6	Beauchastel	1C-3	32 D/03	Richmont Mines Inc.	Norex	Au	D(8:3013), T
7	Beauchastel	1C-3	32 D/03	Richmont Mines Inc.	Wasamac	Au	D(14:9899)
8	Beauchastel	1C-3	32 D/03	Yorbeau Resources Inc.	Astoria II	Au	B
9	Bellecombe	1C-1	32 D/03	R. Bergeron	Bergeron	Au-Cu-Ag-Soapstone	Gs(r)
10	Bergères	1C-1	32 F/07, 10	Explorateurs Innovateurs de Québec inc. / Freewest Resources Canada Inc.	Syndicat	Au-Cu-Zn	S, T, Mag
11	Bourlamaque	1C-4	32 C/04	Alexis Minerals Corp. / Aur Resources Inc.	Cadillac Group	Au	G, D(5:934)
12	Bourlamaque	1C-4	32 C/04	Kalahari Resources Inc. / Teck Cominco Ltd	Lamaque	Au	Pr, D(17:7500), Gs(s), IP
13	Bourlamaque	1C-4	32 C/04	SOQUEM INC.	St-Edmond (1342)	Au	Gs(t)
14	Bourlamaque	1C-4	32 C/04	2629-2482 Québec Inc. / Aur Resources Inc.	Harricana	Au-Cu-Zn	Pg, Mag, VLF, TE
15	Bourlamaque, Dubuisson	1C-4	32 C/04	McWatters Mining Inc.	Bigué	Au	S, D(1:401), T, Gs(r)
16	Bourlamaque, Senneville, Pascalis	1C-4	32 C/04	Alexis Minerals Corp. / Aur Resources Inc.	Aubel	Au	G, D(2:597)
17	Bousquet	1C-3	32 D/02	Twin Mining Corp. / Breakwater Resources Ltd	Normar	Au	D(31:11008)
18	Bousquet	1C-3	32 D/02	Agnico-Eagle Mines Ltd / Breakwater Resources Ltd	Norgold	Au	D(3:947), S
19	*Bousquet*	*1C-3*	*32 D/02*	*Cambior Inc.*	*Mine Mouska*	*Au*	*D(134:16507)*
20	*Bousquet*	*1C-3*	*32 D/02*	*Cambior Inc.*	*Mine Doyon*	*Au-Ag*	*D(239:39324)*
21	Brongniart	1C-1	32 G/10	Les Ressources Tectonic inc.	Eau Jaune	Au	Pr
22	Brongniart	1C-1	32 G/10	Lake Shore Gold Corp.	Brongniart	Au	Pr, Gs(s), Gs(t)
23	Brongniart, Rale	1C-1	32 G/10	Metco Resources Inc.	Eau Jaune	Au	Pg
24	Bruneau, Desjardins	1C-1	32 F/06	Metco Resources Inc. / GéoNova Explorations Inc.	Discovery	Au	D(25:11250), TE
25	Bruneau, Desjardins	1C-1	32 F/06	Metco Resources Inc. / GéoNova Explorations Inc.	Cameron	Au	Pr, D(2:942), Mag, IP

TABLE 1C-1 - Exploration for gold projects in the Abitibi and Pontiac subprovinces in 2003.

NO	TOWNSHIPS	FIG.	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORKS [1]
26	Cadillac	1C-3	32 D/08	Groupe Minier Ayotte-Martel	Ayotte-Martel	Au-Cu	D(1:150), IP
27	Cadillac	1C-3	32 D/01	Radisson Mining Resources Inc.	O'Brien	Au	S, D(4:237), T, Met
28	Cadillac	1C-3	32 D/01	Radisson Mining Resources Inc.	Kewagama	Au	D(1:176)
29	Cadillac	1C-3	32 D/01	Agnico-Eagle Mines Ltd	Lapa	Au	S, D(87:50000)
30	Cadillac	1C-3	32 D/01	Queenston Mining Inc.	Pandora	Au	D(16:11632)
31	Casa-Berardi	1C-1	32 E/10, 11	Aurizon Mines Ltd	Casa Berardi	Au	D(?:21500), Grav
32	*Chaste*	*1C-1*	*32 F/04*	*Cambior Inc. / Aurizon Mines Ltd*	*Mine Géant-Dormant*	*Au-Ag*	*Pg, D(?:81009)*
33	Cléricy	1C-3	32 D/07	Twin Mining Corp. / Breakwater Resources Ltd	Mouskar	Au	D(10:2191)
34	Comtois	1C-1	32 F/03	Maude Lake Exploration Ltd	Comtois	Au	S, D(8:2183), Mag
35	Courville	1C-1	32 C/06	M. Ouellet	Ouellet	Au-Ag-Cu-Zn	T, Mag
36	Daine	1C-1	32 G/13	Lake Shore Gold Corp.	Daine North	Au	Pr, Gs(s), Gs(t)
37	Destor	1C-3	32 D/11	Golden Valley Mines Ltd	Double Trouble	Au	Pr
38	Drouet, Gradis, Druillettes	1C-1	32 G/06, 11	Lake Shore Gold Corp.	Drouet	Au	Pr, Gs(s), Gs(t)
39	Druillettes	1C-1	32 G/07	Lake Shore Gold Corp.	Lac des Vents	Au	Pr, Gs(t)
40	Dubuisson	1C-4	32 C/04	Metanor Resources Inc.	Dubuisson	Au	D(40:5653)
41	Dubuisson	1C-4	32 C/04	Northern Star Mining Corp.	Midway	Au	D(24:7261)
42	Dubuisson	1C-4	32 C/04	McWatters Mining Inc.	Mine Kiena	Au	Pg, D(23:8222), Gs(r)
43	Dubuisson	1C-4	32 C/04	Western Québec Mines Inc.	Shawkey	Au	D(10:1657)
44	Duparquet	1C-3	32 D/06	Queenston Mining Inc. / Globex Mining Entreprises Inc.	Duquesne West	Au	D(7:3785)
45	Duparquet	1C-3	32 D/11	Golden Valley Mines Ltd	Mona Lisa	Au	Pr
46	Duverny	1C-1	32 C/12	Les Explorations Carat inc.	Duverny	Au	Pg, Mag
47	Fénelon	1C-1	32 E/15	International Taurus Resources Inc. / Fairstar Explorations Inc.	Fénelon	Au	T, FM
48	Fénelon, Gaudet	1C-1	32 E/15	Pro-Veinor Resources Inc. / J. Frigon / G. Robert / P. Gregheur	Fénelon-Gaudet	Au	Pg, D(6:1040)
49	Fournière	1C-4	32 D/01	McWatters Mining Inc.	Complexe East Malartic	Au	Pg, S, Gs(r)

TABLE 1C-1 - Exploration for gold projects in the Abitibi and Pontiac subprovinces in 2003.

NO	TOWNSHIPS	FIG.	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORKS [1]
50	Fournière, Malartic	1C-4	32 D/01	McWatters Mining Inc.	East Amphi / Fourax	Au	Pg, Gs(r), Mag-EM(A), FM
51	Gand	1C-1	32 G/12	SOQUEM INC.	Gandior (1292)	Au	Pg, T, Gs(r)
52	Gand	1C-1	32 G/12	SOQUEM INC. / Graniz Mondal Inc.	Opawica (1318)	Au	D(2:303), Gs(r)
53	Grevet	1C-1	32 F/07	Lake Shore Gold Corp.	Cameron East	Au	Pr, Gs(s), Gs(t)
54	Guillet	1C-1	31 M/07	Vantex, Oil, Gas and Minerals Ltd	Guillet	Au	D(13:1183)
55	Hauy	1C-1	32 G/09, 10	Les Ressources Tectonic inc.	Hygrade	Au	Pg, VLF
56	Hazeur	1C-1	32 G/07	Lake Shore Gold Corp.	Caopatina	Au	Pr, Gs(t)
57	Hébécourt	1C-3	32 D/12	Golden Valley Mines Ltd	Borderline	Au	Mag, IP
58	La Dauversière, Charron	1C-1	32 G/09	R. Simard	Lac Dufresne	Au-Cu	S, T
59	La Ribourde	1C-1	32 G/13	Lake Shore Gold Corp.	La Ribourde	Au	Pr, Gs(s), Gs(t)
60	Lacroix	1C-1	32 G/03	Jean Descarreaux et Ass. ltée	Lac Lacroix	Au	S, Pr, T
61	Lamorandière	1C-1	32 C/12	Exploration Atlantis Inc.	Lamorandière	Au	D(9:2051)
62	Le Tac	1C-1	32 F/08	Exploration Orbite VSPA inc.	Le Tac	Au-Cu-Zn-Ag-Diamond	D(17:2297)
63	Le Tardif	1C-1	32 F/06	Lake Shore Gold Corp.	Le Tardif	Au	Pr, Gs(s), Gs(t)
64	Levy	1C-1	32 G/15	2736-1179 Québec inc.	Cooke (Mine) - Chapais	Au-Base metals	D(3:1000)
65	Levy	1C-1	32 G/15	Lake Shore Gold Corp.	Lac Laura West	Au	Pr, Gs(s), Gs(t)
66	Levy, Scott	1C-1	32 G/15	Lake Shore Gold Corp.	Lac Laura East	Au	Pr, Gs(t)
67	Ligneris	1C-1	32 D/15	Lake Shore Gold Corp.	Ligneris	Au	Pr, Gs(s), Gs(t)
68	Louvicourt	1C-4	32 C/04	Richmont Mines Inc. / Louvem Mining Inc.	Courvan	Au	Pg
69	Malartic	1C-4	32 D/01	Twin Mining Corp. / Breakwater Resources Ltd	Malartic H et annexe	Au	S(20:9392), IP, Mag
70	Malartic	1C-4	32 D/01	Richmont Mines Inc. / SOQUEM INC.	Camflo NO	Au	D(?:1597)
71	Mazarin	1C-1	32 E/01	Lake Shore Gold Corp.	Mazarin	Au	Pr, Gs(s), Gs(t)
72	McCorkill	1C-1	32 G/16, 32 J/01, 32 H/13	Typhoon Exploration Inc.	Monexco	Au-Ag	S, T, Mag, IP

TABLE 1C-1 - Exploration for gold projects in the Abitibi and Pontiac subprovinces in 2003.

NO	TOWNSHIPS	FIG.	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORKS [1]
73	McKenzie	1C-1	32 G/16	SOQUEM INC. / Itamineraque Resources Inc.	Brosman (1230)	Au-Cu	Pg, T, Gs(r), Gs(s)
74	McKenzie	1C-1	32 G/16	SOQUEM INC. / Itamineraque Resources Inc.	McKenzie (4581)	Au-Cu	Pg, D(2:646), Gs(r)
75	McKenzie, Obalski	1C-1	32 G/16	SOQUEM INC. / Itamineraque Resources Inc.	David (1165)	Au-Cu	D(6:1293), Gs(r)
76	McKenzie, Roy	1C-1	32 G/16	SOQUEM INC.	Bruneau (1303)	Au-Cu	Pg, T, Gs(r)
77	Nelligan	1C-1	32 F/08	Lake Shore Gold Corp.	Nelligan	Au	Pr, Gs(s), Gs(t)
78	Noyon	1C-1	32 F/12	SOQUEM INC.	Noyard (1132)	Au	D(3:771)
79	Opémisca	1C-1	32 G/14, 15	SOQUEM INC. / Nimsken Corporation Inc.	Michwacho (1340)	Au-Cu-PGE	Pg, Gs(r), IP
80	Pascalis	1C-4	32 C/04	Richmont Mines Inc. / Louvem Mining Inc.	Pascalis	Au	Pg, D(55:7415), T
81	Pascalis	1C-4	32 C/04	Richmont Mines Inc. / Louvem Mining Inc.	Beaufor	Au	Pg, D(55:9432), T
82	*Pascalis*	*1C-4*	*32 C/04*	*Richmont Mines Inc.*	*Mine Beaufor*	*Au*	*D(113:18527)*
83	Pascalis, Louvicourt	1C-4	32 C/04	Richmont Mines Inc. / Louvem Mining Inc.	Colombière	Au	Pg, D(3:?), T
84	Perron	1C-1	32 E/03	D. Béland / G. Béland	Normétal	Au-Ag-Cu-Zn	Pr, Gs(r)
85	Pershing	1C-4	32 C/03	South-Malartic Exploration Inc. / Huntington Exploration Inc.	Croinor	Au	B, Pr, D(162:18265), T, Mag, IP
86	Pershing	1C-4	32 C/03	South-Malartic Exploration Inc. / Huntington Exploration Inc.	Bel-Rive	Au	Pr
87	Pershing	1C-4	32 C/03	South-Malartic Exploration Inc.	Pershing	Au	Mag, IP
88	Poularies	1C-1	32 D/10	Golden Valley Mines Ltd	Hand Grenade	Au	Mag, IP, EM
89	Poularies	1C-1	32 D/10	Golden Valley Mines Ltd	Poularies North	Au-Base metals	Mag, IP, EM
90	Poularies, Privat	1C-1	32 D/10	Lake Shore Gold Corp.	Noranda North	Au	Pg, Gs(s), Mag-EM(A)
91	Poularies, Privat	1C-1	32 D/10	Golden Valley Mines Ltd	Rivière Loïs	Au-Base metals	Mag, IP
92	Roy	1C-1	32 G/16	SOQUEM INC. / Nimsken Corporation Inc.	Cummings (1307)	Au-Cu	Pg, Gs(s)
93	Senneville	1C-4	32 C/04	Golden Valley Mines Ltd	North Contact	Au	D(?:450)
94	Senneville, Pascalis	1C-4	32 C/04	Richmont Mines Inc.	Perron	Au	Pg, D(3:1440)
95	Vassan	1C-4	32 C/05	Pro-Veinor Resources Inc. / Atlantis Resources Inc.	Atlantis-Vassan	Au-Ag	Pg, D(2:?)
96	Vassan	1C-4	32 C/04	Mines d'Or Wesdome inc.	Siscoe	Au	D(2:300)
97	Vassan, Senneville	1C-4	32 C/04	JCML Resources Inc.	Val d'Or	Au-Cu	Pr, Mag, VLF
98	Vauquelin	1C-4	32 C/03	Ressources Frenchie inc.	Vauquelin	Au-Ag-Cu	Pg, D(?:153)

TABLE 1C-1 - Exploration for gold projects in the Abitibi and Pontiac subprovinces in 2003.

NO	TOWNSHIPS	FIG.	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORKS [1]
99	Vauquelin	1C-4	32 C/03	South-Malartic Exploration Inc. / Huntington Exploration Inc.	Vauquelin	Au	Pr, IP
100	Villebon	1C-1	31 N/14	F. Valiquette / Gestion Lemco inc.	Lac Cooper	Au	Mag
101	Urban	1C-1	32 G/04	Noront Resources Ltd / Alto Ventures Ltd / Fury Explorations Ltd	Windfall Lake	Au	D(21:4118)
102	*Rohault*	*1C-1*	*32 G/08*	*Campbell Resources Inc.*	*Mine Joe Mann*	*Au-Cu*	*D*
103	Bousquet	1C-3	32 D/02	Cambior Inc.	Mouska-Authier	Au-Cu	Pg
104	Bousquet	1C-3	32 D/02	Cambior Inc.	Doyon	Au	Pg
105	Bousquet	1C-3	32 D/02	Cambior Inc.	Westwood-Warrenmac	Au	D(3:4201), Gs(r), DPEM
106	Bousquet	1C-3	32 D/02	Cambior Inc. / Breakwater Resources Ltd	Bousquet-Ferris	Au-Cu	Pg, D(3:843)
107	Rouyn, Joannès	1C-3	32 D/02	Cambior Inc.	Routhier	Au-Base metals	Pg, D(8:1389)
108	Hébécourt	1C-3	32 D/11	Cambior Inc. / Cogema Resources Inc.	Porcupine	Au	D(12:6794)
109	Duparquet, Palmarolle	1C-3	32 D/11	Cambior Inc. / SOQUEM INC.	Hunter-Duparquet	Au	Pr, Gs(t), Mag, IP
110	Destor	1C-3	32 D/10	Cambior Inc.	Lépine	Au	Pr, Mag, IP
111	Bourlamaque, Louvicourt	1C-4	32 C/03, 04	Cambior Inc.	Akasaba	Au	D(2:616)
112	Bourlamaque, Louvicourt	1C-4	32 C/03, 04	Cambior Inc. / Aur Resources inc.	Valdora	Au	Pg, D(5:1477)
113	Maizerets	1C-1	32 E/01	Cambior Inc.	Harricana	Au	D(5:825)
114	Maizerets, Soissons, Glandelet, Chaste	1C-1	32 E/01, 32 F/04	Cambior Inc. / Aurizon Mines Ltd	Géant Dormant	Au	Pg
115	Chaste, Glandelet	1C-1	32 E/01, 32 F/04	Cambior Inc. / Aurizon Mines Ltd	Dormex	Au	Pg, Pr
116	Estrées	1C-1	32 F/10	Cambior Inc. / Canley Developments Inc.	Estrées-Caribou	Au-Cu-Zn	Pg, Pr, IP
117	Casa-Berardi, Laberge	1C-1	32 E/06, 11	Cambior Inc. / Cancor Mines Inc.	Gémini-Turgeon	Au-Cu-Zn	Pg, D(13:5405), Gs(r), Mag, IP
118	Vezza	1C-1	32 F/12	Cambior Inc.	Vezza-Newmont	Au	Pg, Pr, IP
119	Bartouille	1C-1	32 C/14	Cambior Inc.	Bartouille	Au-Cu-Zn-Ag	IP, Mag

1 = See abbreviation list in table 1A-1.

TABLE 1C-2 - Exploration for pollymetallic projects in the Abitibi and Pontiac subprovinces in 2003.

NO	TOWNSHIPS	Fig.	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORKS [1]
P1	Barraute	1C-2	32 C/12	Abcourt Mines Inc.	Abcourt-Barvue	Zn-Ag	B, TE
P2	Blondeau, Brodeur	1C-2	31 M/07, 10	Aurora Platinum Corporation	General Temiscaming	Pt-Pd-Ni-Cu	Pr
P3	Bourbaux	1C-2	32 F/10	Explorateurs Innovateurs de Québec inc.	Lac au Goéland	Ni-Cu-Pt-Pd	S, T, Gp
P4	Brouillan	1C-2	32 E/15	SOQUEM INC. / BHP Billiton	B-26 Brouillan	Zn-Cu-Au	D(9:2537), DPEM
P5	Brouillan	1C-2	32 E/14	SOQUEM INC.	Wagosic (1338)	Zn-Cu-Au	Mag
P6	Carpentier	1C-2	32 C/06	Sudbury Contact Mines Ltd	Carpentier	Cu-Zn-Au-Ag	D(9:4300), DPEM
P7	Cavelier	1C-2	32 F/12	Noranda Inc. / Phelps Dodge Corporation	Phelps Dodge II	Zn-Cu-Ag-Au	Pr
P8	Cavelier, Galinée	1C-2	32 F/12	SOQUEM INC. / Metco Resources Inc.	Du Dôme-Matagami	Zn-Cu	D(3:638), DPEM
P9	Currie	1C-2	32 F/07	Xemac Resources Inc. / Hudson Bay Exploration and Development Co. Ltd	Lac Esther	Cu-Zn-Ag-Au	D(1:140), Mag, EM
P10	Dalet	1C-2	32 E/01	M. Morin	-	Cu-Zn-Au-Ag	TE
P11	Daniel	1C-2	32 F/13	Noranda Inc.	Daniel I / Daniel I Sud	Zn-Cu-Ag-Au	D(2:843), DPEM
P12	Daniel	1C-2	32 F/13	Noranda Inc. / SDBJ	Persévérance	Zn-Cu-Ag-Au	D(3:1845), DPEM
P13	Dieppe, Casa Berardi, Collet, Laberge	1C-2	32 E/06	1232448 Ontario Inc. / Sea Green Capital Corp.	Scorpio / New Dawn	Cu-Zn-Ag-Au	D(1:200)
P14	Dufresnoy	1C-3	32 D/06, 07	Metco Resources Inc.	D'Alembert	Cu-Zn-Au-Ag	Gp
P15	Dufresnoy	1C-3	32 D/07	Concopper Enterprises Inc.	Gilbec	Cu-Zn-Au	D(2:530)
P16	Estrades, Estrées	1C-2	32 E/10	Inmet Mining Corp.	Estrades / Newiska	Cu-Zn-Au-Ag	EM
P17	Fiedmont	1C-2	32 C/05	Abcourt Mines Inc.	Vendôme	Zn-Cu-Ag-Au	TE
P18	Fiedmont	1C-2	32 C/05	3421856 Canada Inc.	Fiedmont EGP	Pt-Pd	S, G
P19	Galinée	1C-2	32 F/12	Noranda Inc.	Bell Allard	Zn-Cu-Ag-Au	D(3:2555), DPEM
P20	Galinée	1C-2	32 F/12	Noranda Inc.	Bracemac	Zn-Cu-Ag-Au	D(3:3433), DPEM
P21	Galinée	1C-2	32 F/12	Noranda Inc.	Galinée Veract	Zn-Cu-Ag-Au	IP
P22	Galinée	1C-2	32 F/12	Noranda Inc.	McLeod	Zn-Cu-Ag-Au	Pr
P23	Galinée	1C-2	32 F12	Noranda Inc.	Orchan	Zn-Cu-Ag-Au	D(4:5015), DPEM
P24	Galinée, Comporté, Daniel, Tardif, Lozeau	1C-2	32 F/11, 12, 13, 14	Noranda Inc.	Exploration régionale	Zn-Cu-Ag-Au	Pr

TABLE 1C-2 - Exploration for pollymetallic projects in the Abitibi and Pontiac subprovinces in 2003.

NO	TOWNSHIPS	Fig.	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORKS [1]
P25	Grevet	1C-2	32 F/07	Metco Resources Inc.	Grevet A	Zn-Cu-Ag-Au	Gp
P26	Grevet	1C-2	32 F/02	Xemac Resources Inc. / Hudson Bay Exploration and Development Co. Ltd	Lac Clément	Cu-Zn-Ag-Au	D(2:370)
P27	Guercheville, La Ronde, Du Guesclin	1C-2	32 G/06, 11, 12	SOQUEM INC.	Wachigabau (1324)	Pt-Pd-Ni	Pr
P28	Guigues, Baby	1C-2	31 M/06, 11	Sudbury Contact Mines Ltd	Timiskaming	diamond	D(6:680), Mag
P29	Hécécourt	1C-3	32 D/05, 06	Inmet Mining Corp. / Osisko Exploration Ltd	Hébécourt	Cu-Zn-Au-Ag	EM
P30	La Gauchetière, Desmazures	1C-2	32 E/09, 16	SOQUEM INC. / Tango Minerals Resources Inc.	Caber (1309)	Zn-Cu	D(4:1550), DPEM
P31	La Morandière	1C-2	32 C/12	Inmet Mining Corp.	Castagnier	Cu-Zn-Au-Ag	D(2:651), DPEM
P32	Landrienne	1C-2	32 C/05	Inmet Mining Corp.	Landrienne	Cu-Zn-Au-Ag	EM
P33	La Pause	1C-3	32 D/08	P. Gosselin / F. Turcotte / G. Laberge	Gosselin 2002	Cu-Zn-Au-Ag	Pr
P34	Lemoine	1C-2	32 G/16	Inmet Mining Corp. / Loubel Exploration Inc.	Lemoine	Cu-Zn-Au-Ag	D(3:3044), DPEM
P35	Levy	1C-2	32 G/15	Explorateurs Innovateurs de Québec inc.	Opémisca	Cu	T, Gp, Mag
P36	McCorkill	1C-2	32 I/14	Typhoon Exploration Inc.	McCorkill	Cu-Zn-Au-Ag	S, T, Mag, IP
P37	Montgay	1C-2	32 C/11	Xemac Resources Inc. / Hudson Bay Exploration and Development Co. Ltd	Lac Noir	Cu-Zn-Au-Ag	D(3:606), DPEM, EM
P38	Mountain	1C-2	32 F/01	Metco Resources Inc. / Breakwater Resources Ltd	Mountain A	Zn-Cu-Ag-Au	Gp
P39	Mountain, Ruette	1C-2	32 F/01	Metco Resources Inc.	Mountain B	Zn-Cu-Ag-Au	Gp
P40	Nelligan	1C-2	32 F/08, 09	Ressources Or-Bert inc.	Nelligan-1	Cu-Ni-Au	Mag, VLF
P41	Poirier, Joutel	1C-2	32 E/08	Cancor Mines Inc. / SOQUEM INC.	Kistabiche	Cu-Zn-Au-Ag	D(6:3536), Gs(r), DPEM
P42	Rouyn	1C-3	32 D/06, 07	Metco Resources Inc.	Rouyn	Cu-Zn-Au-Ag	Gp
P43	Senneville	1C-4	32 C/04	SOQUEM INC.	Manytwo (1350)	Zn-Cu	Gp
P44	Tavernier, Pershing	1C-4	32 C/02, 03	SOQUEM INC.	Machi-Manitou (1352)	Zn-Cu	S
P45	Urban	1C-2	32 G/04	Urbana Corporation	Macho River	Cu-Zn-Au	Mag
P46	-	1C-2	32 J/02, 03	Nimsken Corporation Inc.	-	Cu-Zn-Au-Ni	Gp
P47	-	1C-2	32 F, 32 G	Fonds de prospection minière Jamésien	-	diamond	Gs(t)

TABLE 1C-2 - Exploration for pollymetallic projects in the Abitibi and Pontiac subprovinces in 2003.

NO	TOWNSHIPS	Fig.	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORKS [1]
P48	*Cadillac*	*1C-3*	*32 D/08*	*Agnico-Eagle Mines Ltd*	*Mine LaRonde*	*Cu-Zn-Au-Ag*	*D(336:49697), DPEM*
P49	Duparquet	1C-3	32 D/06, 07	Golden Valley Mines Ltd	Rivière D'Alembert	Cu-Zn-Au-Ag	D(?:450), Mag, EM
P50	Beschefer	1C-2	32 E/15	Yorbeau Resources Inc. / Explorers Alliance Corp.	Beschefer-CBO	Cu-Au-Ag-Zn	D(5:1896), DPEM, Mag
P51	Louvicourt	1C-4	32 C/04	Aur Resources Inc.	Dunraine	Cu-Zn-Ag-Au	D(15:11000)
P52	*Galinée*	*1C-2*	*32 F/12*	*Noranda Inc.*	*Mine Bell Allard*	*Zn-Cu-Au-Ag*	*D(4:1164), DPEM*
P53	Montalembert	1C-2	32 F/16	Antoro Resources Inc.	Montalembert	Cu-Zn-Au-Pb-diamond	Pr, Gs(t)
P54	-	1C-2	-	Noranda Inc.	Abitibi	Cu-Zn	D(45:10000), DPEM, Mag, MEGATEM
P55	-	1C-3	-	Noranda Inc. / Virginia Gold Mines Inc. / Novicourt Inc.	Abitibi MEGATEM JV	Cu-Zn	D(76:16815), Mag, MEGATEM
P56	Pouchot	1C-2	32 F/11	Hinterland Metals Inc.	Plateau PGE	Pt-Pd	T
P57	*Mountain, Grevet*	*1C-2*	*32 F/02*	*Breakwater Resources Ltd*	*Mine Langlois*	*Zn-Cu-Au-Ag*	*D(28:11511)*
P58	*Dufresnoy, Cléricy*	*1C-3*	*32 D/07*	*Breakwater Resources Ltd*	*Mine Bouchard-Hébert*	*Zn-Cu-Au-Ag*	*D(?:6714), DPEM, IP*
P59	*Louvicourt*	*1C-4*	*32 C/03*	*Aur Resources Inc.*	*Mine Louvicourt*	*Cu-Zn-Au-Ag*	*D(1:59), DPEM*

1 = See abbreviation list in table 1A-1.

New Québec and Torngat Orogens, Southeastern Churchill Province (core zone), and Cape Smith Belt

Abdelali Moukhsil

Introduction

The New Québec (Labrador Trough), Torngat, and Ungava (Cape Smith belt) orogens, composed mainly of Paleoproterozoic rocks, occupy a major portion of northeastern and northern Québec (figures 1D-1 and 1D-2). The Southeastern Churchill Province includes the New Québec and Torngat orogens, as well as their common hinterland (the core zone, composed largely of Archean rocks and occasionally referred to as the Rae Province, James *et al.*, 1996; Wardle *et al.*, 2002; Figure 1D-1).

The main targeted commodities in the New Québec Orogen, the core zone, and the Torngat Orogen were copper, nickel, platinum group elements (PGE), zinc, and cobalt. The search for diamonds also generated considerable interest in these regions (Figure 1D-1). The Cape Smith Belt (Ungava Trough) attracted several exploration companies in the search for copper, nickel, and PGE. In 2003, the number of exploration projects in this region has more than doubled, triggering a staking rush (see Table 1D-1).

New Québec and Torngat Orogens, and core zone

GEOLOGICAL OVERVIEW

The New Québec Orogen, also referred to as the Labrador Trough or *the Trough* in the present article, is located in northeastern Québec and forms a NNW-SSE-trending belt of rocks roughly 160 km wide by 1,200 km long, which extends from Hudson Strait in the north to the Grenville Front in the south (Clark, 1994). The Trough is composed of folded (SW-verging), faulted (strike-slip and/or thrust faults), and metamorphosed sedimentary and igneous rocks. The Trough rocks belong to the Kaniapiskau Supergroup, subdivided into three cycles separated by erosional unconformities (Clark, 1994). The first cycle is composed, at its base, of conglomerates and red sandstones (Chakonipau Formation) with intercalated mildly alkalic lava flows and, higher up, of platform dolomites and arenites, flyschoid sedimentary rocks, and tholeiitic basalts (Howse zone). The second cycle consists of quartz arenites at the base (Wishart Formation), overlain by cherts, pelites, and iron formation (Ruth and Sokoman formations), and capped by turbidites and tholeiitic basalts. The third cycle is marked by fluviatile sandstones and polymictic conglomerates (Tamarack River and Chioak formations; Clark, 1994). Finally, lateral variations occur from west to east across the Trough (Clark, 1994). For example, the Schefferville and Chioak zones to the west consist of platform and marine basin sediments as well as fluviatile sediments. In the centre, the Howse, Doublet, and Baby zones consist of volcanic rocks and deeper basin sediments. Eastward, the Laporte domain and the Rachel zone are composed of gneiss and schist (Figure 1D-1).

The term *core zone*, which designates the Trough hinterland, located in the Southeastern Churchill Province, was originally proposed by James *et al.* (1996) and more recently used by Wardle *et al.* (2002). The core zone is composed mainly of Archean gneisses, based on radiometric ages. It may be subdivided into several lithotectonic domains separated by major shear zones. The northern part of the core zone is formed in part by the Paleoproterozoic Lake Harbour Group (pelitic gneiss, quartzite, and marble), metamorphosed to the amphibolite facies. The southeastern part of the core zone contains high-grade, metaplutonic and metavolcanic sequences (Wardle *et al.*, 2002). The western border of the zone is composed of the De Pas and Kuujjuaq batholiths (1.81 to 1.84 Ga) and the Kuujjuaq terrane (formed of supracrustal rocks and tonalitic and granitic gneiss). The eastern part is subdivided into several domains, composed largely of granulites (North River, Lac Henrietta, Anaktalik, Tasisuak, and Konrad Brook domains). The centre of the core zone is represented by the George River Domain, which consists of mafic and intermediate volcanic and intrusive rocks, ultramafic rocks, volcaniclastic rocks, paragneisses, and leucogranites. In the southeastern part of the core zone lies the Mistinibi-Raude Domain (migmatitic paragneiss, granite, and mafic to ultramafic rocks), and the volcano-sedimentary Ntshuku Complex. To the east, Paleoproterozoic and Mesoproterozoic plutonic suites intrude the core zone (anorthositic rocks of the Michikamau Intrusive Suite; granites and adamellites of the Mistastin Complex).

The Paleoproterozoic Torngat Orogen, oriented NW-SE, is bounded to the east by Archean rocks of the Nain Province and to the west by the core zone (Figure 1D-1). This orogen is divided into lithotectonic domains and complexes separated by mylonitic shear zones (*e.g.* Abloviac shear zone). The axial zone of the orogen is represented by the Tasiuyak Domain (mylonitized paragneiss, granitic diatexite with paragneiss, and enderbite). This zone is juxtaposed with the Lac Lomier Complex, formed of paragneiss, tonalitic gneiss, and enderbite, which are deformed into alternating, km-scale bands of granulite-grade and amphibolite-grade rocks. North of the orogen, the Burwell Domain is formed of a magmatic arc composed of metaplutonic rocks (diorite-tonalite-granodiorite and charnockite-enderbite) ranging from the amphibolite to the granulite facies. To the east (foreland), in Labrador, lies the Ramah Group.

Various classifications have been established for deposits with Ni, Cu, and/or platinum group element (PGE) mineralization. We have used the classification proposed by Thériault *et al.* (2002) in the map showing Ni-Cu-PGE occurrences in Québec.

CU-NI-DOMINATED MAGMATIC DEPOSITS

During the summer of 2003, **Virginia Gold Mines Inc.**, in partnership with **Placer Dome Inc.**, conducted a prospecting and sampling program in NTS sheet 24K, in the northern Labrador Trough (project 01, Figure 1D-1). The two partners are searching for Cu-Ni-PGE deposits associated with gabbroic sills, where disseminated sulphides occur in pegmatitic zones (Fosse Pd-Pt project). A few scattered showings were discovered, with assays grading up to 12 g/t PGE.

SEDIMENT-HOSTED ZN-CU-AU-AG±PB DEPOSITS

Several Zn-Cu-Au-Ag sulphide deposits are known in the sandy-pelitic sequences within the second cycle of the Baby and Howse zones (Clark, 1994). In these areas, encountered lithologies include black shales and iron formations; the latter host the Kan deposit. Showings are also reported in carbonate sequences of the Abner Formation. Overall, these showings appear to represent Besshi-type deposits, a variation on the VMS theme, in which the proportion of sedimentary rocks is greater than that of volcanic rocks. NNE of Schefferville, **Metco Resources Inc.** reported encouraging results from a soil geochemistry survey on its Lac La Touche property (project 02, Figure 1D-1). Two geochemical anomalies were detected with values up to 0.22 g/t Au, 10.1 g/t Ag, and up to 594 ppm Cu. The mineralization is concentrated in mm- to cm- scale beds parallel to the foliation, in exhalite, black shale, mudstone, mudslate, and dolomitic sandstone. Gabbros also outcrop in the vicinity. The mineralized zone is interpreted as a stratiform exhalative massive sulphide. It is probably hosted in rocks of the Thompson Lake Formation, in the Retty lithotectonic zone. The mine-ralization mainly consists of thin beds or conformable laminations of massive pyrrhotite. Minor chalcopyrite is observed locally, in laminations or mm-scale aggregates within the massive pyrrhotite. Pyrite cubes are occasionally associated with the chalcopyrite aggregates. This type of mineralization may be syngenetic and the result of submarine exhalative hydrothermal activity.

DIAMONDS

In early 2003, **Twin Mining Corporation** released analytical results from 15 samples collected in two segments of a kimberlite dyke (segments of 900 m and 400 m; project 05, Figure 1D-1) in the Torngat North area. The 2.3-m-wide kimberlite dyke outcrops over a distance of 73 km. The company reported a total of 349 diamonds (0.174 carat) in the 900-m segment and 197 diamonds (0.129 carat) in the 400-m segment. Aggregate samples of 578.52 kg and 432 kg were respectively collected in the two dyke segments. A total of 94 macrodiamonds were identified (stones larger than 0.5 mm in one direction). In the 900-m segment, the largest diamond measures 2.90 mm by 2.50 mm by 1.80 mm, whereas the largest stone recovered from the 400-m segment measures 1.85 mm by 1.25 mm by 1.07 mm. These diamonds were described as very white, mostly transparent, and of high preservation, according to the **Lakefield Research laboratory**. Since 1999, **Twin Mining Corporation** has reported a total of 2,690 diamonds, including 1,936 macrodiamonds. These diamonds were recovered from roughly 387 tonnes of kimberlitic bulk samples. The largest stone to date is a 4.97-mm diamond weighing 0.685 carat. In partnership with **Tandem Resources Ltd, Diamond Discoveries International Corp.** released analytical results from several kimberlite dykes sampled during the 2002 field season on its property in the Monts Torngat area (project 06, Figure 1D-1). Sixteen samples contained fragments of diamonds and indicator minerals such as pyrope garnet, chrome diopside, and olivine; furthermore, 12 new diamond-bearing kimberlite dykes were discovered. Since the onset of diamond exploration in this area, **Diamond Discoveries International Corp.** has outlined 58 kimberlite dykes totalling 108 km in strike length; of these, 15 dykes are diamondiferous. Moreover, out of three kimberlite dykes totalling 8 km in strike length, 14 diamonds were discovered (2 macros, 12 micros), while over 900 red rubies (20 macros) were recovered from dykes totalling 3 km in strike length. On July 23, 2003, **Tandem Resources Ltd** announced the discovery of two diamond-bearing kimberlite dykes on its Torngat property (project 07, Figure 1D-1). Tests conducted by the **Lakefield Research laboratory** show that the two dykes contain diamond fragments. In the field, the two dykes of unknown length strike NE; they are about 1.4 m wide at the discovery site, and spaced about 500 m apart.

The Cape Smith Belt

GEOLOGICAL OVERVIEW

The Paleoproterozoic Cape Smith belt (also called here the Ungava Trough or the Ungava Orogen), located in northernmost Québec, consists of volcano-sedimentary rocks that extend for 370 km along an ENE axis (Figure 1D-2) between Kangiqsujuaq on the coast of Hudson Strait and Akulivik on the coast of Hudson Bay (St-Onge and Lucas, 1990). The area is divided into four main tectonic units: i) the autochthonous Archean basement of the Superior Province, ii) the allochtho-nous accretion belt or the Ungava Trough *s.s.*, formed of south-verging thrust slices, iii) the Paleoproterozoic Narsajuaq Terrane, and iv) the parautochthonous Archean basement that locally separates the allochthonous accretion belt from the Narsajuaq Terrane along the Kovik antiform (Figure 1D-2; Lamothe, 1994).

The Ungava Orogen is divided into southern and northern lithotectonic domains, separated by the Bergeron fault. These domains comprise seven tectono-stratigraphic units (Lamothe, 1994).

The southern domain is composed of three groups, which are mentioned below from south to north. The Lamarche Group

is formed of proximal to distal sediments, intruded by several gabbro sills. The Povungnituk Group overlies the Archean basement, along an angular unconformity. A detachment fault developed later along the unconformity (Moorhead, 1996). The Povungnituk Group is composed of continental, tholeiitic basalt flows (Cecilia and Beauparlant formations), with intercalated detrital sediments (Nuvilic and Dumas formations). The entire sequence is invaded by numerous mafic to ultramafic sills. The Chukotat Group consists mainly of komatiitic to tholeiitic basalts. It is thrust onto the Povungnituk and also marks the transition from a continental to an oceanic environment.

The northern domain is represented by a single formation and four groups. The Chassé Formation consists of a thin parautochthonous detrital unit. Sedimentary and metavolcanic rocks of the Watts Group are cross-cut by ultramafic and mafic (peridotite, pyroxenite, and gabbro) to felsic intrusions and thrust onto the Chukotat Group to the south, along the Bergeron fault. To the north, they are separated from the Archean basement by a detachment zone (Deception Complex). The Parent Group is formed of an assemblage of tholeiitic basalt flows and tuffs, which are associated with felsic tuffs and dacitic to rhyolitic domes. The Spartan Group is composed mainly of psammites, pelites, semipelites, and sandstones, with local felsic tuff units and thick mudstone beds. The Perrault Group consists of a detrital assemblage of wackes, conglomerates, feldspathic sandstones, and mudstones (Lamothe, 1994).

NI-CU-DOMINATED MAGMATIC DEPOSITS

The **Société minière Raglan du Québec Ltée**, a wholly-owned subsidiary of **Falconbridge Ltd**, operates an open pit and underground mine since 1998. The ore deposit consists of several massive sulphide lenses associated with Proterozoic ultramafic flows, which occur along the contact between tholeiitic basalts and sediments of the Povungnituk Group and komatiitic basalts of the Chukotat Group. Twenty-three samples from the Raglan mine yielded an average grade of 4.49% Ni, 1.22% Cu, 2.9 g/t Pd, and 1.3 g/t Pt. Reserves are estimated at 9.0 Mt grading 3.06% Ni and 0.89% Cu. On the Raglan project (project 09, Figure 1D-2), **Falconbridge Ltd** carried out a series of electromagnetic and magnetic geophysical surveys (airborne and underground) as well as sampling programs. In 2003, the company completed 161 drillholes covering some 50 km. This work led to the discovery of six new Ni-Cu-PGE zones on the Raglan property. The mineralization consists of massive, net-textured and disseminated pyrrhotite, pentlandite, and chalcopyrite. On the Delta-Kenty property (project 10, Figure 1D-2) located some 50 km west of the Raglan mine, **Melkior Resources Inc.**, in partnership with **Falconbridge Ltd**, conducted heliborne AEROTEM, electromagnetic, and total magnetic field intensity surveys, along with some sampling. The Delta-Kenty property contains a historically calculated geological reserve of 817,000 tonnes at a grade of 3.05% Ni, 1.26% Cu, and 2.65 g/t PGE. These resources are hosted in three ore zones (D8, D8 South, and D9). The AEROTEM survey detected several anomalies and further defined known ore zones; two new AEROTEM targets were also delineated. A few kilometres away, **Novawest Resources Inc.** and **Cascadia International Resources Inc.** carried out a multi-phase exploration program on their Raglan Project property (project 12, Figure 1D-2). Extensive prospecting, sampling, and 13 drillholes were completed following airborne and ground geophysical surveys (Table 1D-1). This work confirmed the presence of Ni-Cu-Co-PGE-Au-bearing sulphides. The best results are: 26.76 g/t Pd, 9.3 g/t Pt, and 9.32% Cu.

Since 2001, **Canadian Royalties Inc.** and **Ungava Minerals Corporation** have completed several drillholes and made a number of discoveries on their Expo-Ungava and Phoenix properties in Nunavik, about 15 km south of the Raglan mine in northern Québec. The ultramafic host unit has been traced for at least 20 km and is associated with a series of ultramafic units that extend for 40 km along strike, on the property jointly held with **Expo-Ungava**. On September 12, 2003, **Canadian Royalties Inc.** reported that the Mesamax deposit (project 13, Figure 1D-2) was larger than originally thought. Results from the latest drillhole confirm that the deposit consists of a large, near-surface, continuous body of disseminated and massive sulphides (Ni-Cu-PGE). Mineralized zones consist of irregular lenses with a variety of textures (disseminated, fine-grained, or massive sulphides). On April 15, the company released a resource estimate for the Mesamax deposit (prepared by **Strathcona Mineral Services Ltd**) of 1.45 Mt (indicated resources) at a grade of 2.1% Ni, 2.7% Cu, 0.08% Co, 0.3 g/t Au, 1.0 g/t Pt, and 4.2 g/t Pd. Inferred resources are estimated at 130,000 tonnes at a grade of 2.1% Ni, 2.5% Cu, 0.09% Co, 0.3 g/t Au, 1.1 g/t Pt, and 3.9 g/t Pd. Near-surface reserves are estimated at 150,000 tonnes. Jointly held by **Canadian Royalties Inc.** and **Ungava Minerals Corporation**, the TK Area on the Phoenix property, located some 3.5 km west of the Mesamax project and 20 km south of the Raglan mining camp, hosts a very promising ore zone (project 14, Figure 1D-2). The ore zone consists of massive sulphides occurring near the base of a Raglan-type ultramafic sill ("TK" sill). Reserve calculations were carried out on the TK zone. Theoretical mineral reserves for the sulphide zone are estimated at 90,000 tonnes at 1.6% Ni, 1.2% Cu, 0.10% Co, 0.1 g/t Au, 0.4 g/t Pt, and 2 g/t Pd, with inferred resources of about 7,000 tonnes at 1.6% Ni, 1% Cu, 0.11% Co, 0 g/t Au, 0.4 g/t Pt, and 1.6 g/t Pd.

In 2003, **Canadian Royalties Inc.** discovered the Tootoo zone. This new massive sulphide zone is enriched in Ni-Cu-Co-Pt-Pd (project 15, Figure 1D-2). It is located 25 km west of the Mesamax zone. Drillhole TT-02-02, testing the Tootoo pyroxenite, encountered disseminated to massive sulphides composed of pyrrhotite, pentlandite, and chalcopyrite. The high-grade portion yielded grades of 2.00% Ni, 1.91% Cu, 0.11% Co, 0.6 g/t Pt, and 2.62 g/t Pd over a 22.03-m interval. In 2003, a new zone was intersected in two drillholes located some 300 m NW of 2002 drillholes in the Tootoo area. Drillhole TT-03-13 yielded 3.02% Ni, 2.81% Cu, 0.14% Co, 0.49 g/t Au, 3.0 g/t Pt, and 10.30 g/t Pd

over 5.75 m, within a 24-m-thick sulphide zone. The entire mineralized interval yielded an average grade of 1.17% Ni, 1.98% Cu, and 7.56 g/t Pt+Pd.

The ore zones discussed above and the Cominga and Mequillon Lake showings (projects 16 and 17, Figure 1D-2) are part of the Expo-Ungava property held by **Ungava Minerals Corporation** and in which **Canadian Royalties Inc.** owns a 70% interest. On September 5, 2003, **Canadian Royalties Inc.** reported that drillholes had intersected thick Ni-Cu-PGE mineralization at the Expo deposit. Drillhole EX-03-01 encountered 17.3 m of massive sulphides grading 2.82% Ni, 2.82% Cu, 0.14% Co, 2.28 g/t Pd, 0.80 g/t Pt, and 1.05 g/t Au. In 2003, the company completed 12 new drillholes to test the Mequillon Lake North mineralized zone, a Ni-Cu-PGE-bearing disseminated to massive sulphide zone that extends for 400 m along strike. Drillhole MQN-03-12, located 100 m east of the area drill tested in 2002, yielded grades of 0.94% Ni, 1.25% Cu, and 3.96 g/t PGE over 43 m. The first 11 drillholes testing the Cominga area, located 2.5 km west of the Expo deposit, encountered Ni-Cu-PGE mineralization associated with disseminated sulphides. Assays from drillhole CMG-03-08 yielded grades of 1.09% Ni, 1.04% Cu, and 3.77 g/t PGE. Another new zone, the New Expo Northeast zone, was discovered by **Canadian Royalties Inc.** (project 18, Figure 1D-2). In January 2004, the latter released assay results of 0.87% Ni, 0.69% Cu, 0.26 g/t Pt, and 1.40 g/t Pd (drillhole EX-03-62) over a total interval of 108.2 m.

On September 8, 2003, joint venture partners **Anglo American Exploration (Canada) Ltd** and **Knight Resources Ltd** announced the discovery of new Ni-Cu-PGE zones in drillhole (project 19, Figure 1D-2). In addition to magnetic surveys, more than 2,303 m of drilling were carried out in 18 drillholes in the discovery area. Drilling was focused in three areas (Frontier, Povungnituk, and Rain Day). However, only drillholes from the Frontier area yielded significant results. The latter is further subdivided into four zones: South, East, Central, and West.

In the South zone, two drillholes (WR-08 and 09) yielded grades ranging from 3.04 to 3.69% Ni, from 0.92 to 1.13% Cu, from 0.03 to 0.08% Co, from 0.27 to 0.87 g/t Pt, and from 0.92 to 2.93 g/t Pd. In the Central zone, the best interval (8.75 m) yielded grades of 3.26% Ni, 1.40% Cu, 0.06% Co, 0.95 g/t Pt, and 3.22 g/t Pd. The best grades were obtained over a 0.80-m interval in drillhole WR-16 (7.15% Ni, 3.56% Cu, 0.16% Co, 1.21 g/t Pt, and 2.99 g/t Pd). From June to September 2003, **Goldbrook Ventures Inc.**, in partnership with **Inlet Resources Ltd**, carried out airborne surveys (totalling 1,020 line km), along with pros-pecting and mapping on the Wakeham property (project 20, Figure 1D-2). This work program led to the discovery of the Nancy showing and of a zone of peridotite and pyroxenite boulders termed the Mercille Train. At the Nancy showing, assay results reached 1.5 g/t PGE and 0.77% Ni+Cu (sample WA03R-7045). Assay results from drillcore in this area are disappointing however. Samples from the Mercille Train yielded grades up to 2.1 g/t PGE.

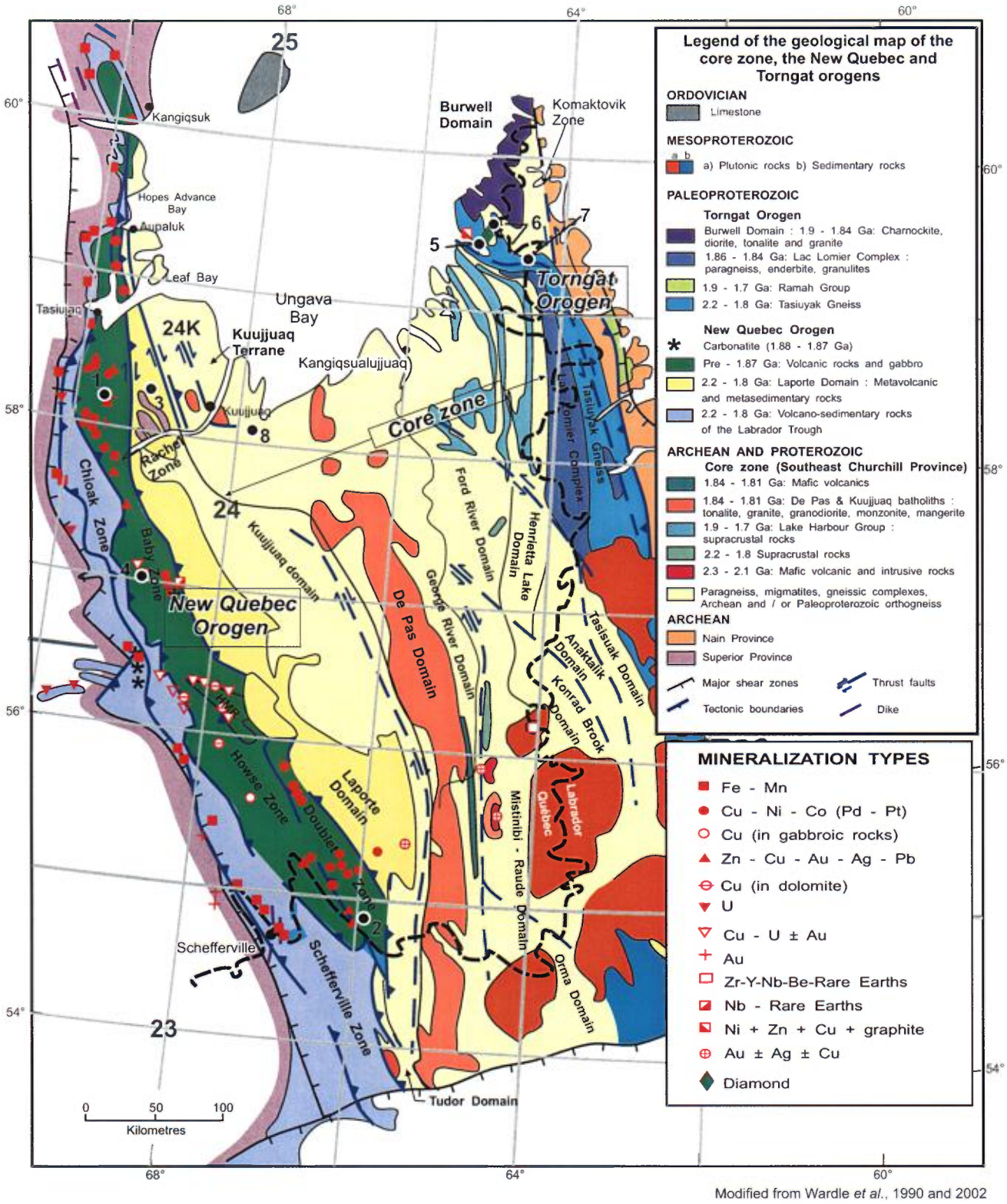
During the summer of 2003, **Goldbrook Ventures Inc.** conducted detailed magnetic and electromagnetic geophysical surveys on a number of other projects (Bélanger property, Ungava project, and Nuvilik property). Two zones, named Echo East and West Showing, were discovered on the Bélanger property (project 21, Figure 1D-2). The mineralization is interesting although its size is difficult to assess. Grades reaching 4.08 g/t PGE, 1.34% Ni, and 1.87% Cu were obtained in the two zones. On the Ungava project (project 22, Figure 1D-2), following airborne magnetic and electromagnetic geophysical surveys, **Goldbrook Ventures Inc.** carried out prospecting, sampling, and drilling programs. On the Nuvilik property (project 24, Figure 1D-2), which hosts known showings such as the Ekwan showing drill tested in 1957, a compilation study was carried out.

Exploration Opportunities

A significant number of showings have been discovered over the years in the New Québec Orogen (Clark, 1994). Discovered commodities are as variable as their host rocks (Fe, Mn, Ni, Pd, Pt, Zn, Au, U, Zr, Y, Nb, Be, and rare earth elements in igneous, sedimentary, and metamorphic rocks). This area offers a high mineral potential for base and precious metals, especially for deposits associated with iron formations (for example in the Middle Baby Zone). According to Clark and Wares (in preparation), the economic potential of the New Québec Orogen lies mainly in lithologies that host exhalative massive sulphides with Zn-Pb-Cu-Ag-Au, sediment-hosted stratiform copper deposits, magmatic Cu-Ni-PGE deposits in picritic flows and sills, and lode gold deposits. With this in mind, several areas are recommended. The Lac Fortune area appears to have a promising potential for exhalative massive sulphide deposits with Zn-Pb-Cu-Ag-Au. The Baby and Menihek formations represent prime targets for this type of mineralization. Known for its disseminated and vein-type Cu deposits, the Lac Romanet area constitutes a highly prospective area, especially in the Dunphy Formation, which offers a very promising exploration potential (Clark, 1994). The Lac Retty and Lac Gerido areas are known to host a number of massive and disseminated sulphide deposits, hosted in mafic to ultramafic sills (Clark, 1994). These areas should be explored for magmatic Cu-Ni-PGE deposits. Although known Cu-Ni occurrences in these areas are low grade, other lenses may be discovered through additional exploration.

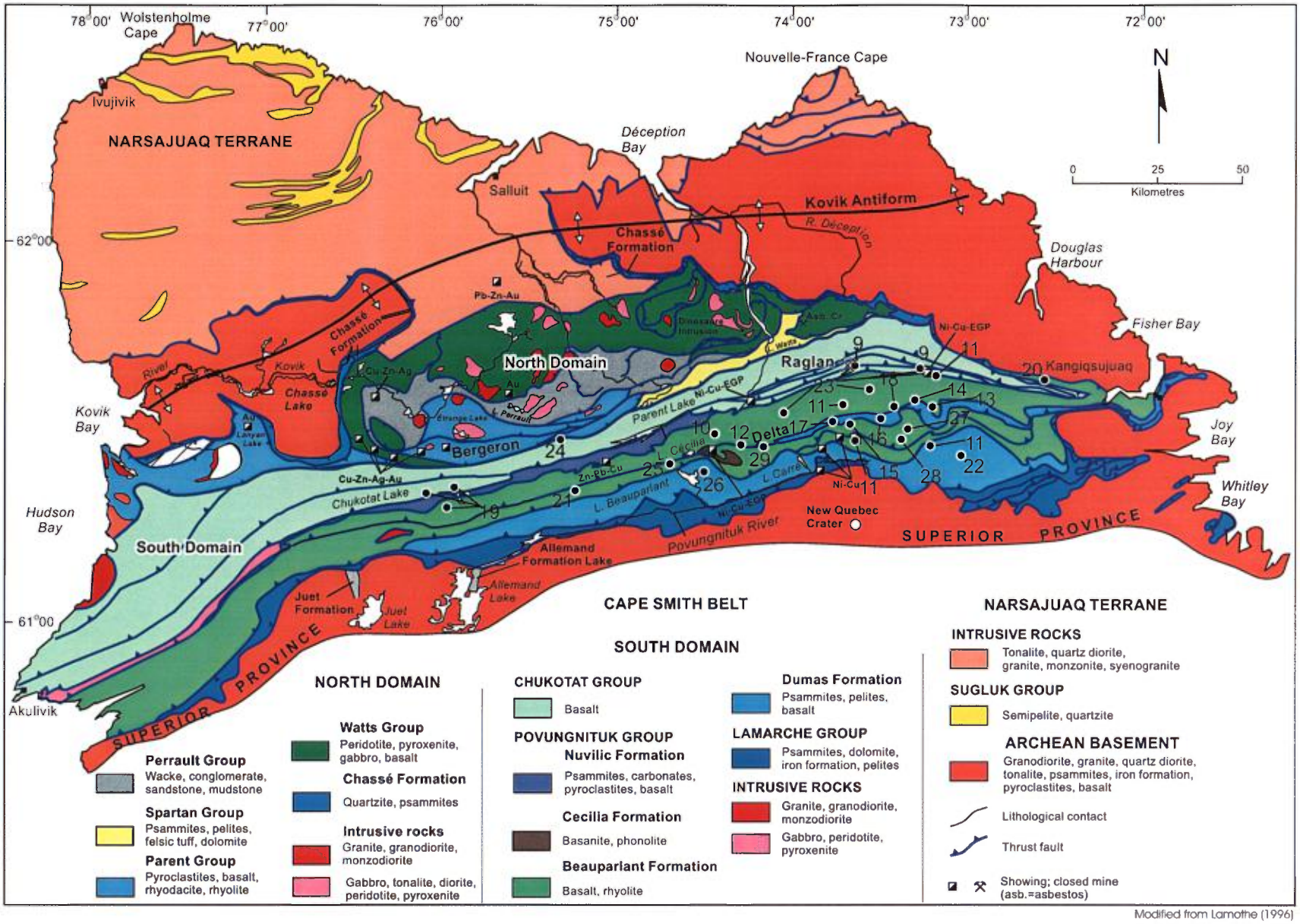
In the Cape Smith Belt, results reported by **Canadian Royalties Inc.** from work conducted in 2002 and 2003 outline the excellent potential for Ni-Cu-PGE deposits. This mineral potential is associated with ultramafic sills cogenetic with the Chukotat Group and injected in the Povungnituk Group. Other parts of this belt beg to be explored; for example the western part of the belt has seen very little exploration (except for work currently underway in the proposed Monts Povungnituk Park). In the North Domain, the Lac Hubert area (NTS 34 F/01, 35 F/02, 35 F/07,

and 35 F/08) was mentioned by Moorhead (1987). This area remains a very interesting exploration target for stratiform massive sulphides in volcaniclastic rocks of the Parent Group and for Ni-Cu-Co-PGE deposits in gabbro sills injected into this group. In the same area, the southern part of the Parent Group contains ultramafic rocks that locally host mineralization (Moorhead, 1996). To the west of the Lac Hubert area, the top of the Povungnituk Group also constitutes an attractive target, where several showings are already known (Giovenazzo *et al.*, 1991).



Modified from Wardle *et al.*, 1990 and 2002

Figure 1D-1. Location of 2003 mining exploration in the New Quebec orogen, Torngat orogenand in the core zone.



Modified from Lamothe (1996)

Figure 1D-2. Location of mining exploration projects in the Cape Smith Belt in 2003.

TABLEAU 1D-1 - Mineral exploration projects in New Quebec, Torngat Orogens, core zone and Cape Smith Belt for 2003.

NO	FIG.	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORKS [1]
New Quebec Orogen						
1	1D-1	24 K	Virginia Gold Mines Inc. / Placer Dome Inc.	Fosse Pd-Pt	Cu-Ni-PGE	S, Pr
2	1D-1	23 I/13	Metco Resources Inc.	Lac La Touche	Zn-Cu-Au-Ag	Gs(sl)
3	1D-1	24 K	BHP Billiton	Labrador Trough / Central Laporte	Cu / Zn-Ag	Gs
4	1D-1	24 F/02, 24 C/15,16	Golden Valley Mines Ltd	Marymac	Ni-Cu-PGE	Pr, AGp
Core zone and Torngat Orogen						
5	1D-1	24 P/06	Twin Mining Corporation	Torngat North	Diamond	B
6	1D-1	24 P/07, 11	Diamond Discoveries International Corp. / Tandem Resources Ltd	Monts Torngat	Diamond	B, Gs, Gs(sl), Mag
7	1D-1	24 P/07	Tandem Resources Ltd	Torngat	Diamond	B
8	1D-1	24 J/04	Falconbridge Ltd	False River	Ni-Cu-PGE	Pr, EM
Cape Smith Belt						
9	1D-2	35 H/11, 12	Société Minière Raglan du Québec Ltée / Falconbridge Ltd	Raglan	Cu-Ni-Co-PGE	S, D(161:5000), DPEM, EM, Mag
10	1D-2	35 G/08	Falconbridge Ltd / Melkior Resources Inc.	Lac Kenty	Cu-Ni-Co-PGE	S, Pr, AEROTEM,
11	1D-2	35 H/05, 06, 11, 12	Falconbridge Ltd	SR 1 to 5	Ni-Cu-PGE	G, D(2:539), AEROTEM
12	1D-2	35 G/08	Novawest Resources Inc. / Cascadia International Resources Inc.	Raglan	Cu-Ni-Co-PGE	S, Pr, D(13), T, Gp, AEROTEM
13	1D-2	35 H/11	Canadian Royalties Inc.	Mesamax	Ni-Cu-PGE	S, G, Pr, D
14	1D-2	35 H/11, 12	Canadian Royalties Inc. / Ungava Minerals Corporation	Tk Area	Ni-Cu-PGE	S, D
15	1D-2	35 H/11, 12	Canadian Royalties Inc.	Tootoo	Ni-Cu-Co-PGE	D
16	1D-2	35 H/11, 12	Canadian Royalties Inc. / Ungava Minerals Corporation	Cominga	Ni-Cu-PGE	D(11)
17	1D-2	35 H/11, 12	Canadian Royalties Inc. / Ungava Minerals Corporation	Mequillon	Ni-Cu-PGE	D

TABLEAU 1D-1 - Mineral exploration projects in New Quebec, Torngat Orogens, core zone and Cape Smith Belt for 2003.

NO	FIG.	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORKS [1]
18	1D-2	35 H/11	Canadian Royalties Inc.	New Expo NE	Ni-Cu-PGE	Pr, D(7:960), EM, Mag
19	1D-2	35 G/05, 35 F/08	Anglo American Exploration (Canada) Ltd / Knight Resources Ltd	West Raglan	Ni-Cu-PGE	D(18:2303), Gs, Gp, EM
20	1D-2	35 H/10	Goldbrook Ventures Inc. / Inlet Resources Ltd	Wakeham	Ni-Cu-PGE	G, Pr, AGp
21	1D-2	35 G/06	Goldbrook Ventures Inc.	Bélanger	Ni-Cu-PGE	S, AGp
22	1D-2	35 H/06	Goldbrook Ventures Inc.	Ungava	Ni-Cu-PGE	S, G, Pr, D, Mag, EM
23	1D-2	35 H/12, 35 G/09	Masuparia Gold Corporation / Goldbrook Ventures Inc.	Ungava	Ni-Cu-PGE	S, G, Pr, D, AEROTEM, EM, Mag
24	1D-2	35 G/06	Goldbrook Ventures Inc.	Nuvilik	Ni-Cu-PGE	Compilation
25	1D-2	35 G/07, 08	Golden Valley Mines Ltd / Little Mountain Resources Ltd	West Shoot out	Ni-Cu-Au-PGE	Pr, AEROTEM, Mag
26	1D-2	35 G/07, 08	Golden Valley Mines Ltd	Shoot out East	Ni-Cu-Au-PGE	Pr, AEROTEM, Mag
27	1D-2	35 H/11	Boulder Mining Corporation / Canadian Royalties Inc.	Colts	Cu-Ni-PGE	S, Pr, D(3), AEROTEM, EM
28	1D-2	35 H/06	Boulder Mining Corporation / Canadian Royalties Inc.	Breakaway	Cu-Ni-PGE	S, Pr, D(3), AEROTEM, Mag-EM
29	1D-2	35 G/08	Montoro Resources Inc.	South Trend Prospect	Cu-Ni-PGE	G, Pr, Mag, Maxmin

1 = See abbreviation list in table 1A-1.

1D

1E

Grenville Province

Serge Perreault
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Introduction

The Grenville Province extends for more than 2,000 km along the north shore of the St. Lawrence River and ranges from 300 to 600 km wide. It forms the southeastern part of the Canadian Shield, from Labrador (northeast) to the Great Lakes (southwest). The Grenville Province is divided into three major lithotectonic elements: the Parautochthonous Belt, the Allochthonous Monocyclic Belt, and the Allochthonous Polycyclic Belt (Rivers *et al.*, 1989). Archean rocks of the Superior Province and Paleoproterozoic rocks of the Otish basin and New Québec Orogen are separated from the Parautochthonous Belt by the Grenville Front (Figure 1E-1), a major and complex structure oriented northeast-southwest. The Front is characterized by a northwest-verging thrust movement and by late strike-slip movements (Hocq, 1994).

The Allochthonous Monocyclic Belt comprises allochthonous terrains that underwent a single orogenic cycle. In the western part of the Grenville, the Allochthonous Monocyclic Belt is composed of the Morin and Mont-Laurier terranes, and in the eastern part, of the Wakeham terrane. These terranes consist mainly of supracrustal rocks intruded by mafic and ultramafic dykes and sills, anorthositic suites (Morin Complex), and granitoids.

In the immediate vicinity of Sept-Îles, Grenvillian rocks are intruded by the Eocambrian (565 Ma) Sept-Îles Layered Igneous Complex. Farther east, in the Baie des Moutons area, an Eocambrian syenite complex intrudes Grenvillian bedrock.

In the following two sections, the most significant exploration projects undertaken in the Grenville Province in 2003 will be described according to the type of deposit under investigation. The first section deals with the western part of the Grenville Province (which includes the Outaouais, Laurentides, Lanaudière, Mauricie, Portneuf, Québec, Charlevoix, and Saguenay – Lac-Saint-Jean regions), whereas the second focuses on the eastern Grenville (the entire North Shore region).

Western Grenville Province

In 2003, **Géologie Québec** carried out a new geological survey at 1:50,000 scale in the Lac Pine area (NTS sheet 31 O/02), located northeast of Mont-Laurier in the western Grenville Province (Nantel and Giroux, 2003). This mapping program was carried out within the scope of a mineral potential assessment of prospective areas for SEDEX-type copper and zinc deposits, industrial minerals, and dimension stone.

MAGMATIC NI-CU (CO-PGE) DEPOSITS

The western Grenville Province contains a number of anorthositic massifs as well as several generations of mafic dykes, plutons, and complexes, which offer an excellent potential for magmatic Ni-Cu (Co-PGE) deposits. Prospective areas appear to be associated with major regional structures that serve as terrane boundaries and that transect or border anorthositic complexes. Significant mineral occurrences are associated with peridotite bodies intruding small anorthositic complexes or occur in mineralized pyroxenite dykes injected into peridotite or amphibolite stocks (Clark and Hébert, 1998a and 1998b).

Virginia Gold Mines Inc. and **SOQUEM INC.** continued their investigations in the northeastern part of the Lac-Saint-Jean Anorthositic Suite in the Chute-des-Passes area (NTS sheets 22 E/14 and 22 E/15), located 140 km north of Chicoutimi (project 11, Figure 1E-1). In this area, the complex is composed of anorthosite, leucogabbro, leucotroctolite, olivine gabbro, and pyroxenite, which intrude a sequence of mixed gneisses. The two companies are searching for magmatic sulphide deposits located at the base of the intrusive complex or in its feeder conduits. A series of massive to semi-massive and locally brecciated sulphide lenses, ranging from cm-scale to m-scale, occur within a layered sequence. In 2003, **SOQUEM INC.** and **Virginia Gold Mines Inc.** completed eight drillholes totalling 1,147 m. The purpose of this drill campaign was to test gravity and electromagnetic anomalies detected along the border of or coinciding with mineralized zone MHY-A. The best results were obtained in drillholes 03-40 and 03-45, with respective grades of 1.03% Ni, 0.08% Cu, and 0.12% Co over 10.25 m, and 0.74% Ni, 0.43% Cu, and 0.1% Co over 9.50 m, including a 3-m section at a grade of 1.20% Ni, 0.43% Cu, and 0.16% Co.

In 2003, **Virginia Gold Mines Inc.** and partner **BHP Billiton** (project 1, Table 1E-1) continued their geological reconnaissance and prospecting program in several parts of the Grenville Province, in the search for Ni-Cu-PGE deposits. Their results outline a number of areas considered to be prospective for Cu-Ni-Co deposits associated with troctolitic rocks that coincide with electromagnetic and magnetic anomalies (EM-Mag).

SEDIMENTARY EXHALATIVE (SEDEX) AND VOLCANOGENIC (VMS) CU-ZN-AG±AU, ZN-PB, AND CU-AU-AG DEPOSITS

In the Québec City area, the Montauban polymetallic deposits are syngenetic deposits related to exhalites in the Allochthonous Monocyclic Belt. The Montauban Group, which hosts the polymetallic deposits, consists of a sedimentary pelitic sequence associated with mafic and felsic volcanic horizons. From 1983 to 1989, the Muscocho mine produced 2.8 tonnes of gold and 14.4 tonnes of silver from the North, South, and Marcor zones. In 2003, **Mirabel Resources Inc.** (project 9, Figure 1E-1) conducted a resource evaluation study of the North and South zones at the Montauban ore deposit. Measured and indicated mineral resources stand at 398,039 tonnes at 3.02 g/t Au.

In the Mauricie region, remnants of Archean volcano-sedimentary belts occur in the Parautochthonous Belt along the west-central border of the Grenville Province. At Langlade, a volcanogenic copper-rich sulphide horizon is exposed in trenches. The mineralized zone is hosted in a phlogopite-garnet gneiss containing variable amounts of sulphide, gedrite, sillimanite, hercynite, cordierite, and magnetite. In 2000, grades of 0.7% Cu and 24 g/t Ag were obtained from this zone associated with an EM conductor. On the same property, another horizon yielded up to 5% Cu and 16% Zn. Drillholes testing this mineralized zone intersected 6.5 m at a grade of 1.5% Zn and 1.5% Cu, and 1.0 m at 9.3% Zn and 5.5% Cu. In 2003, **Tango Mineral Resources Inc.** (formerly known as **Southern Africa Minerals Inc.**) completed an electromagnetic survey in order to delineate new drilling targets (project 3, Figure 1E-1).

MAGMATIC ILMENITE, TITANIFEROUS MAGNETITE, AND APATITE DEPOSITS

In an area northeast of Chicoutimi, several Ni-Cu showings and ilmenite, apatite, and titaniferous magnetite occurrences are associated with the Lac-Saint-Jean Anorthositic Suite, more specifically with the Saint-Fulgence lobe. **Les Ressources d'Arianne Inc.** (project 14, Figure 1E-1) carried out sampling programs on many of its properties, which include several former ilmenite producers in the Laurentides, Charlevoix, and Saguenay – Lac-Saint-Jean regions. In 2003, the company conducted characterization tests on various types of ilmenite ore recovered from these deposits. The company identified four types of ore: 1) hemo-ilmenite, 2) clear granular ilmenite, 3) magnetite with ulvöspinel exsolutions and granular ilmenite, and 4) ilmenite with rutile.

NIOBIUM DEPOSIT

The Saint-Honoré carbonatite complex, in the Saguenay – Lac-Saint-Jean region, hosts a niobium ore deposit mined by **Mazarin Inc.** and **Cambior Inc.** (project 13, Figure 1E-1). Ore from the Niobec mine consists of pyrochlore, which is converted into ferroniobium. Following a profitability study to evaluate a potential mill expansion at the Niobec mine, an initial investment estimated at $7 million resulted in a 20% increase in production during the third quarter of 2000. The second phase of expansion will require an additional investment of $3 million, in order to increase output gradually by another 20%, to meet worldwide demand for niobium. The Niobec mine is currently the only niobium producer in North America and the third largest producer in the world. When it opened in 1976, the Niobec mine initially produced a niobium pentoxide concentrate (Nb_2O_5). Since 1994, following the construction of a converter, the mine now produces ferroniobium. Production figures for 2002 stood at 4,887 tonnes of ferroniobium.

Eastern Grenville Province

The Côte-Nord region lies in the eastern Grenville Province. In 2003, some 4,490 m of drilling were completed off-minesite in this region. Exploration was mainly focused on the search for copper-nickel deposits, as well as platinum group elements (PGE) and industrial minerals (graphite and titanium). Once again this year, the area southwest of the Manicouagan Reservoir was the focus of intense exploration by many junior companies and individual prospectors; this flurry of activity led to the discovery of numerous showings.

As part of its Grenville Project, **Géologie Québec** carried out geological reconnaissance and non-systematic mapping in the vicinity of the Daniel-Johnson (Manic 5) dam and in the De La Blache area (NTS sheets 22 F, 22 K, and 22 N). In partnership with the MRC (regional county municipality) and the CLD (local development centre) de Manicouagan and five exploration companies (**SOQUEM INC.**, **Quinto Technology Inc.**, **Noranda Inc.**, **Falconbridge Ltd**, and **Ressources Appalaches Inc.**), **Géologie Québec** conducted a lake sediment sampling program and geochemistry survey in the Manicouagan and Haute-Côte-Nord regional county municipalities. The results of this work will be released in 2006.

MAGMATIC NI-CU (CO-PGE) DEPOSITS

In the Manic 5 area, **SOQUEM INC.** and partner **Quinto Technology Inc.** excavated 32 trenches over a strike length of 4,613 m and carried out an airborne magnetic survey in the vicinity of the Nickel Bay showing (project 15, Figure 1E-1). Four grab samples from this showing yielded grades from 1.41 to 1.65% Ni and from 0.06 to 3.07% Cu, with 0.87 to 1.23 g/t Pd. The host rock is a leucogabbro, with massive to disseminated sulphides composed of chalcopyrite, pyrite, and pyrrhotite. In the same area, **Ressources Manicouagan Inc.** (project 30, Figure 1E-1) conducted aeromagnetic and pulse-EM geophysical surveys, and also completed six drillholes totalling 2,700 m, in the search for Ni-Cu-PGE mineralization.

On March 13, 2003, **Ressources Appalaches Inc.** and **Marum Resources Ltd** released the results of five drillholes totalling 1,262 m on their B20 property, located near Port-Cartier (project 17, Figure 1E-1). The drillholes were set up and oriented to intercept electromagnetic anomalies delineated in a downhole UTEM survey. According to **Ressources Appalaches Inc.**, these drillholes confirmed the existence of several massive sulphide horizons within a large, near-surface mineralized system. Mineralized intercepts reached 43.75 m in thickness. Assay results from these five drillholes range from 0.17 to 0.46% Ni and from 0.14 to 0.39% Cu over widths of 7.15 to 43.75 m. All drillholes completed to date on this property have delineated an extensive, low-grade nickel-copper system covering an area of more than 500 m by 200 m, down to a vertical depth of at least 150 m.

At Lac Méchant, northeast of Sept-Îles (project 18, Figure 1E-1), **Ressources Appalaches Inc.** (optioned from **Fancamp Exploration Ltd**) delineated drill targets based on a gravity survey conducted in the early spring of 2003. This survey detected anomalies that

may correspond to deep-seated mineralized bodies. Several geophysical anomalies were ground-checked, and the best assay results were 1.10% Ni, 0.25% Cu, and 0.11% Co (grab sample in a gabbro). In 1997, in this area, **Kennecott Canada** had intersected low-grade Cu-Ni-Co mineralization associated with a gabbroic complex and mineralized paragneiss. In 1998, **Fancamp Exploration Ltd** obtained assay results from surface samples reaching 3% Cu, 1.3% Ni, and 0.01% Co (0.8 g/t Au).

The broad reconnaissance project covering the entire Grenville Province undertaken by **Virginia Gold Mines Inc.** and **BHP Billiton** in 2002 was renewed in 2003 (project 1, Table 1E-1). Several mafic to ultramafic intrusions known to host magmatic Ni-Cu±PGE mineralization were re-examined. Prospecting and sampling led to the discovery of a few disseminated sulphide zones hosted in mafic rocks.

IRON FORMATIONS

The Fermont area is characterized by the presence of abundant iron ore deposits. These deposits occur in metamorphosed iron formations of the Gagnon Group, which represent the Grenvillian metamorphic equivalents of iron formations in the Labrador Trough. Extracted minerals include hematite and specular hematite. These orebodies have been mined since the 1950s by the **Québec Cartier Mining Company** in Québec, and by **IOC** and **Wabush Mines** in Labrador. In 2003, the **Québec Cartier Mining Company** did not perform any exploration.

MAGMATIC MASSIVE ILMENITE DEPOSITS

Anorthositic suites in the North Shore region are known for their ilmenite and titaniferous magnetite ore deposits. **QIT-Fer et Titane Inc.**, a wholly-owned subsidiary of the Anglo-American group **Rio Tinto**, is one of the largest mining companies in the world. Since 1950, this company has been extracting ilmenite at the Tio open pit mine (project 19, Figure 1E-1) near Havre-Saint-Pierre. It also operates a metallurgical complex in Sorel-Tracy, where the ore is processed to produce titanium dioxide, pig iron, and high-quality steel. The Lac Tio ore deposit is the second largest in the world, with proven reserves of 75 million tonnes at a grade of 86.9% combined iron and titanium oxide (34.2% TiO_2, 27.5% FeO, and 25.2% Fe_2O_3; 4.3% SiO_2, 3.5% Al_2O_3, 3.1% MgO, 0.9% CaO, 0.1% Cr_2O_3, and 0.41% V_2O_5). In 2003, in the vicinity of the Tio mine and the Lac Bat-le-Diable (projects 19 and 20, Figure 1E-1), **QIT-Fer et Titane Inc.** carried out a mapping and sampling program, and conducted airborne geophysical surveys.

In 2003, **Fancamp Exploration Ltd** and **Sheridan Platinum Group Ltd** jointly explored their Mingan Titanium Option property (project 21, Figure 1E-1). Following gravity and magnetic surveys, the two companies completed 16 delineation drillholes totalling 540 m in massive ore zones. The mineralization consists of an assemblage of hemo-ilmenite (coarse ilmenite grains with 25 to 35% hematite lamellae) and accessory spinel. Results reported for nine massive hemo-ilmenite samples collected from drillhole no. 3 (vertical) over a width of 25 m are: 32.1 to 36.2% TiO_2, 54.4 to 63.2% Fe_2O_3, and 1.7 to 2.9% MgO, whereas seven grab samples yielded an average grade of 37% TiO_2. Drillhole no.1 intersected 8.3 m of massive hemo-ilmenite and ended in the host anorthosite at 35 m depth, whereas drillhole no.2 intersected anorthosite intercalated with hemo-ilmenite beds over roughly 29 m.

Exploration Opportunities

A leuconorite body roughly 6 km in diameter outcrops between the Rivière aux Outardes to the west and the Rivière du Bois Long to the east, in the northern part of map sheet 22 K/11. The borders of the intrusion are foliated and the core ranges from massive to weakly foliated. The rock is composed of orthopyroxene, plagioclase, clinopyroxene, biotite, and magnetite. Beds from 10 cm to less than 1 m in thickness, enriched in ferromagnesian minerals, locally define a well-developed layering. In a few locations, cm-scale sulphide spots were noted, and a rusty leuconorite with minor pyrrhotite and trace chalcopyrite outcrops to the south of a small lake (Gobeil, personal communication). The entire leuconorite body warrants further attention given its Cu-Ni potential.

Several areas within the Grenville Province are characterized by metallogenic settings where calc-silicate rocks associated with volcano-sedimentary sequences, composed of paragneiss, marble, and amphibolite and injected by felsic intrusions, constitute prime targets for copper and precious metal (gold and silver) exploration. In addition to the Montauban and Grandes-Bergeronnes areas, which are fairly well known, we have defined three areas of interest; two are located in the Mont-Laurier Terrane, and the third is in the Basse-Côte-Nord region.

The Lac Pine (31 O/02) and the Lac Duplessis (31 O/06) areas were the focus of geological mapping programs over the past two years (Nantel *et al.*, 2002; Nantel and Giroux, 2003). These two areas are underlain by rocks of the Central Metasedimentary Belt (CMB). The CMB offers good potential for base metals, especially zinc in dolomitic marbles and copper in calc-silicate rocks, as well as for industrial minerals and architectural granite.

In the Lac Duplessis area, the Lac Watson showing, known for several years, consists of copper mineralization, namely chalcopyrite and bornite, hosted in a sequence of marble and calc-silicate gneiss. Note also the presence of a gold showing, the Lac Ransom showing, composed of disseminated pyrite and chalcopyrite in a quartzofeldspathic orthogneiss at the contact with gabbroic bands.

In the Lac Pine area, diopside-scapolite-epidote-bearing calc-silicate rocks host anomalous copper (180 to 1,700 ppm), zinc (200 ppm), and silver (1 to 2.1 ppm), and also contain trace amounts of gold. These rocks are commonly associated with biotite paragneisses with variable amounts of garnet, sillimanite,

and graphite. The Lac Riberys showing is characterized by copper-silver mineralization (0.57% Cu, 4.3 g/t Ag, and 42 ppb Au) hosted in a rusty, chloritized diorite. This mineralized rock is associated with a lithological assemblage of aluminous paragneiss, quartzite, biotite paragneiss, and garnet-sulphide amphibolite.

An outcrop of diopsidite and garnetite associated with scapolite-bearing calc-silicate rocks intruded by monzogranites of the Brockaby Suite exhibits a geological setting similar to that observed at the Lachabel showing (Cu-Ag-W), located 16 km to the west.

The Baie des Oies is located southwest of Saint-Augustin, along the Gulf of St. Lawrence. A sequence of scapolite-diopside calc-silicate rocks, calcitic marble, and biotite paragneiss with local garnet and sillimanite is intruded by porphyritic granites. Davies (1963) reported the presence of disseminated chalcopyrite in the calc-silicate rocks. The geological setting at the Baie des Oies is similar to other areas described above.

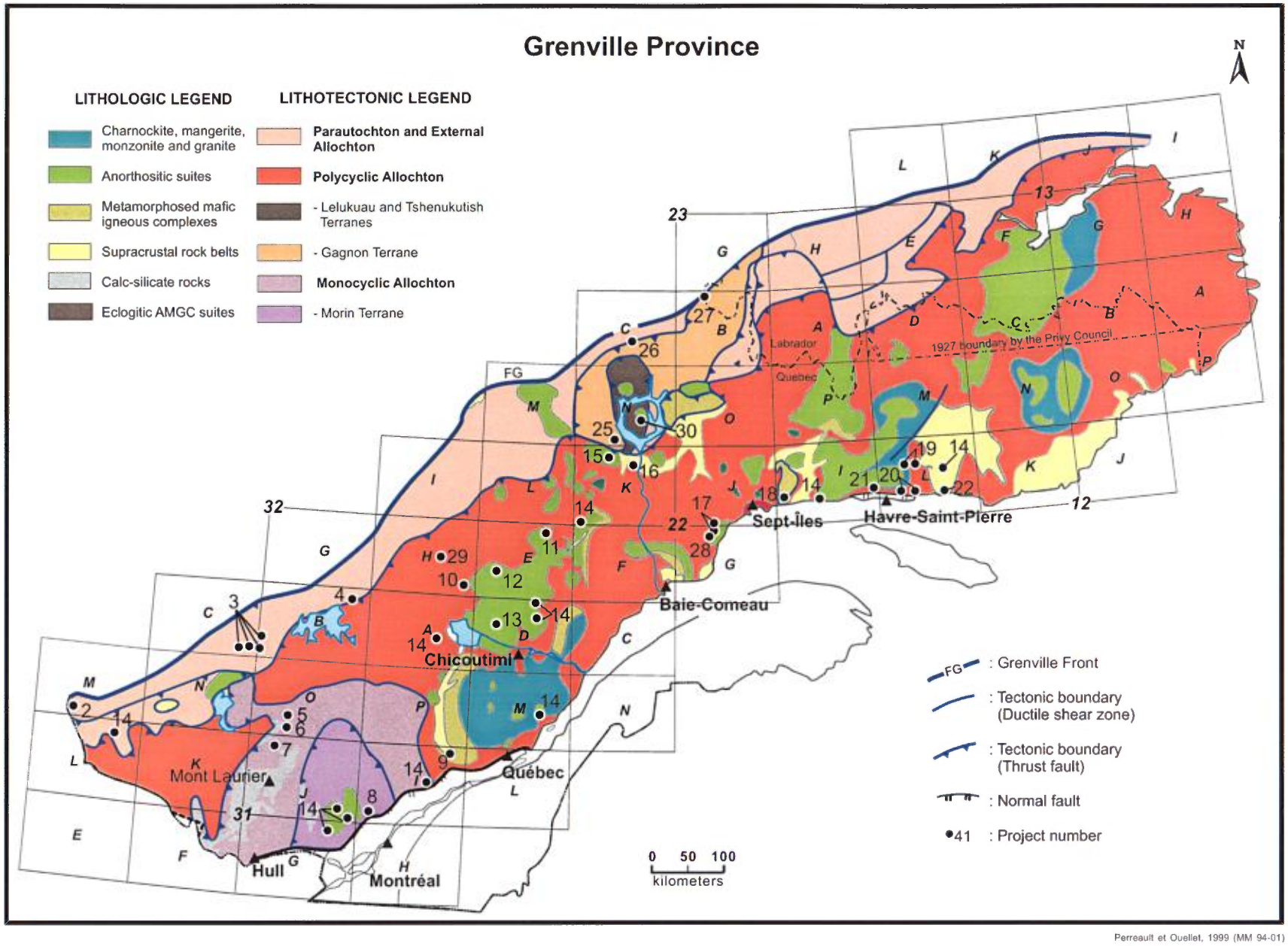

Figure 1E-1. Location of mining exploration projects in the Grenville Province for 2003.

TABLEAU 1E-1 - Exploration projects in Grenville Province for 2003 (see figure 1E-1).

NO	TOWNSHIPS	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORKS [1]
1	-	21 M, 22 D, 22 F, 22 N, 23 C, 31 O, 31 N	Virginia Gold Mines Inc. / BHP Billiton	Reconnaissance Grenville	Cu-Ni-Co-PGE	G, Pr
2	Mazenod, Fabre	31 M/03	Kinbauri Gold Corporation	Laniel	PGE, diamond	G, Pr, Gs(sl), Gs(t), Mag
3	Trévet, Foch, Crusson, Baudin, Bourgmont, Jalobert, Diaz, Vasson	32 C/01, 32 C/02, 32 B/04, 32 B/05	Tango Mineral Resources Inc.	Grenab - Laglade	Cu-Zn-Au-Ag	Pr, Gs(r), Gs(t), EM
4	Huard	32 B/16	J.-L. Tremblay	Huard	Au-Ag-Cu-Zn	Pr
5	-	31 O/06	Ressources Maxima Inc.	Boisvert / Huard	Cu-Mo	G, Pr, Mag, VLF
6	-	31 O/03	Ressources Maxima Inc.	Lachabel	Cu-W	Pr, T, Gs(sl), Mag
7	Major	31 J/13	R. Dumoulin	Major	Cu-Ni-Co-Ag	Pr, T, Gs(r)
8	Kildare	31 I/04	M. Lazarescu, M. Bercaru	Claim 7	Au	S, Pr, D(12:12), Gs(r)
9	Montauban	31 I/16	Mirabel Resources Inc.	Montauban	Au-Ag	TE
10	Latrappe	32 H/01	L. Lefebvre	LaTrappe	Cu-Ni-Co	Pr, Gs(r)
11	-	22 E/14, 15	SOQUEM INC / Virginia Gold Mines Inc.	Chute-des-Passes	Cu-Ni-Co-Ti-P	S, G, D(8:1147), Gp
12	-	22 E/05, 06	L. Lefebvre	SONIA	Cu-Ni-Co	S, Pr, D(7:40), Gp
13	*Simard*	*22 D/11*	*Mazarin Inc. / Cambior Inc.*	*Niobec (BM 663)*	*Nb*	*D*
14	Beresford, Wexford, Shawinigan, Kénogami, Garreau, Bailloquet	31 G/15, 16, 31 J/01, 02, 31 I/10, 21 M/09, 10, 22 D/06, 10, 15, 32 A/07,12 L/07, 10, 15, 22 D/06, 22 K/04	Les Ressources d'Arianne Inc.	Ti-2002	Fe-Ti-V, Cu-Ni	S, ET
15		22 K/14	Quinto Technology Inc. / SOQUEM INC.	Baie Nickel	Cu-Ni	D(32:4613), T
16		22 K/15	Quinto Technology Inc.	Lac Paradis	Cu-Ni	S, T
17	Grenier	22 G/14, 22 J/03	Ressources Appalaches Inc. / Marum Resources Ltd	B-20	Cu-Ni-Co	S, D(5:1262), EM
18	Moisie	22 I/05	Ressources Appalaches Inc. / Fancamp Exploration Ltd	Lac Méchant	Cu-Ni-Co	Grav
19	Parker, Longfellow, Vigneau	12 L/11, 12	QIT Fer & Titane Inc.	Lac Tio	Fe-Ti	Pg, S, G, AGp

TABLEAU 1E-1 - Exploration projects in Grenville Province for 2003 (see figure 1E-1).

NO	TOWNSHIPS	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORKS [1]
20	Vigneau, Puyjalon	12 L/05, 06	QIT Fer & Titane Inc.	Lac Bat-le-Diable	Fe-Ti	Pg, S, G, AGp
21	Mingan	22 I/08	Fancamp Exploration Ltd / Sheridan Platinum Group Ltd	Mingan	Fe-Ti	S, Pr, D(16:540), T, Gp, Mag
22	-	12 L/07	9117-4284 Québec Inc.	Baie-Johan-Beetz	Si	D(12:1)
23	-	Côte-Nord	Ressources Appalaches Inc.	Grassroot Côte-Nord	Cu-Ni-Co, PGE	Pr
24	-	Côte-Nord	Puma Exploration Inc	Régional Côte-Nord	Cu-Ni-Co, PGE	Pr
25	-	22 N/03	Quinto Technology Inc.	Lac Guéret	GP	S, D(10:1200), T, Gp
26	-	23 C	BHP Billiton	Eastern Grenville	Zn-Ag	FM
27	Lislois	23 B/14	Exploration Québec/Labrador	Silice du Lac Daviault	Si	D(307), T
28	Grenier	22 G/14	R. Richards	Le Corbeau	Cu-Ni-PGE	Pr
29	Crevier, Lagorce	32 H/07, 10	Cambior Inc.	Crevier	Ta-Nb	Pr, Met
30	-	22 N/07	Ressources Manicouagan Inc.	Manicouagan	Cu-Ni-PGE	D(6:2700), DPEM, Mag

1 = See abbreviation list in table 1A-1.

1E

St. Lawrence Platform and Appalachians

Serge Lachance

Introduction

The St. Lawrence Platform and Appalachians, as discussed in this section, include all parts of Québec located south of the St. Lawrence River (Figure 1F-1). The geological setting of this part of Québec, to the south of the Canadian Shield, mainly consists of Paleozoic rocks subdivided into two geological provinces: the St. Lawrence Platform, which overlies the Grenvillian basement along an erosional unconformity, and the Appalachians to the southeast. The boundary between the two provinces is marked by Logan's Line (LL). In Québec, each of these two provinces is subdivided into major tectono-stratigraphic domains. In the St. Lawrence Platform, from northwest to southeast, we find the following Cambrian to Silurian domains: the Autochthonous Domain and the Parautochthonous Domain. The Appalachian Orogen, also from northwest to southeast, is divided into four domains: the Cambrian-Ordovician Humber and Dunnage zones, separated by the Baie Verte-Brompton Line (BVBL), the Silurian-Devonian Gaspé Belt, and the Permo-Carboniferous Magdalen Basin.

The region contains two geotourist attractions, namely two properties under mining lease that are the focus of small-scale operations (mineral collecting), and that may be considered as exceptional mineralogical sites; the first hosts gem-quality quartz crystals and the second contains agate. The first site is located in the Estrie region, a few kilometres northeast of Bonsecours. Since 1990, **Mines Cristal Québec** (Sanctuaire du Cristal) extracts quartz crystals of all shapes and sizes from this site. These exceptional crystals, both in terms of quality and quantity, line the countless druses present in quartz veins intercalated in the Sutton Schists.

The second site is located near Lac Sainte-Anne, in Lemieux Township, about 10 km south of the Parc national de la Gaspésie. Since 2002, **Mine d'Agates du Mont Lyall** is the owner and operator of this mining lease where mineral collectors can "harvest" agates and geodes, also exceptional in terms of quality and quantity, from a rhyolite flow intercalated in the York River Formation (Gaspé Sandstones).

In the St. Lawrence Platform and Appalachians, a total of 16 exploration projects were brought to our attention in 2003, compared to 62 in 2002. The total number of metres drilled in 2003 stood at 6,043, compared to 3,637 m in 2002.

To provide a clearer framework in which to discuss exploration projects, the St. Lawrence Platform and Appalachians were divided into three segments: the southwestern segment including the Montréal and Chaudière-Appalaches regions (4 projects and 2,083 m drilled), the central segment comprising the Bas-Saint-Laurent region (2 projects and 570 m drilled), and the northeastern segment, which includes the Gaspésie and Îles-de-la-Madeleine regions (10 projects and 3,390 m drilled).

Exploration Projects

This chapter lists and describes exploration projects that caught our attention in 2003.

SOUTHWESTERN SEGMENT (MONTRÉAL AND CHAUDIÈRE-APPALACHES REGIONS)

Near Montréal, in the Lac-des-Deux-Montagnes seigniory, **Niocan Inc.** continued development work on its niobium mining property in the Oka carbonatite complex. The company's ultimate goal is to operate an underground mine and build a processing plant onsite to convert pyrochlore concentrate into ferroniobium. In the long term, the company also intends to market by-products associated with the niobium ore deposit, namely apatite, magnetite, mica, rare earth elements, and calcite. For the time being, only the niobium market has been taken into account and the economic viability of two ore zones, S-60 and HWM-2, has been established. The main zone, S-60, a 200 by 100-m pipe-shaped endoskarn, contains an identified mineral resource of 14.37 million tonnes at a grade of 0.66 % Nb_2O_5. Zone HWM-2, a 25-m-thick mineralized band that extends for over 600 m along strike, contains a total resource of 5.95 million tonnes grading 0.56% Nb_2O_5. Combined ore reserves for the two zones (reco-verable reserves using a cut-off grade of 0.50% Nb_2O_5) are estimated at 13.3 million tonnes at a grade of 0.63% Nb_2O_5. At the end of 2003, **Niocan Inc.** was still waiting for the Certificate of Authorization to be delivered by the Ministère de l'Environnement du Québec.

Allican Resources Inc. devoted time and energy to the CHROMEC project. The objective of the company is to build and operate, in Québec, a plant to produce low-carbon ferrochrome from imported chromite concentrate, with an annual capacity of up to 20,000 tonnes.

In May 2003, **Osisko Exploration Ltd** signed an option agreement with **Golden Hope Mines Ltd** to acquire a 60% interest in the Bellechasse property (project 2, Figure 1F-1) located in Bellechasse and Panet townships. This property was initially explored in the 1950s, then later in 1960, 1975, and from 1986 to 1991. Today, it hosts five known gold zones (Timmins, Timmins South, 88, Ascot, Northeast), two showings (88 Extension and Colfax), and three prospects of gold-bearing erratic boulders, the source of which remains unknown. The mineralization essentially consists of auriferous quartz veins intimately associated with gabbro sills within the Ordovician Etchemin and Beauceville sedimentary formations (Magog Group).

The first phase of a delineation drill program (19 holes totalling 2,083 m) was focused on the Timmins zone. This zone, which consists of a gold-bearing stockwork hosted in an altered gabbro, is exposed over a surface area of 120 by 80 m. According to **Osisko Exploration Ltd**, the average gold content of 520 surface grab samples collected between 1960 and 1991 is 8.0 g/t Au. Furthermore, three bulk samples totalling 39.3 tonnes extracted in the 1960s from three trenches excavated in selected veins yielded an average grade of 16.9 g/t Au. In 2003, the Rico vein, the main high-grade gold structure in this zone, yielded gold grades of 66.6 g/t over 1.05 m (drillhole BD 2003-05), 25.50 g/t over 2.94 m (BD 2003-01), 17.20 g/t over 1.35 m (BD 2003-02), 20.70 g/t over 2.30 m (BD 2003-03), and 11.70 g/t over 0.45 m (BD 2003-04). A second zone (Timmins Extension), formed of a quartz-sulphide stockwork, was intersected at depth in drillhole BD 2003-01 (3.26 g/t Au over 7.00 m, including 11.00 g/t Au over 1.14 m).

On the Timrod property (project 3, Figure 1F-1) in the Saint-François seigniory, prospectors **R. Mainville** and **T. Burnham** discovered, in a trench, several quartz boulders with native gold. The trench exposes a well-developed stockwork of quartz veins and veinlets within an acidic tuff in contact with a graphitic argillite typical of the Beauceville Formation. Located directly up-ice from gold placers in Saint-Simon-les-Mines, the Timrod showing may indicate the location of one of the sources of gold placers in the area.

CENTRAL SEGMENT (BAS-SAINT-LAURENT REGION)

Puma Exploration Inc. carried out an induced polarization geophysical survey and a drill program (5 holes totalling 438 m) on the Sainte-Marguerite gold property (project 5, Figure 1F-1), in La Vérendrye and Casupscull townships.

NORTHEASTERN SEGMENT (GASPÉSIE AND ÎLES-DE-LA-MADELEINE REGIONS)

For the third year in a row, **Ressources Appalaches Inc.** was very busy on its Mont de l'Aigle property (project 12, Figure 1F-1), in Lemieux Township. A large work program was implemented in 2003, including an induced polarization geophysical survey, which detected, on two grids, seven IP anomalies that coincide with gravity and magnetic anomalies. Subsequent trenching and drilling (23 holes totalling 2,490 m) led to the discovery of mineralized veins and iron oxide-copper breccias (hematite-pyrite-chalcopyrite-quartz). Grab samples collected in trenches yielded grades of 12.3% Cu (one sample) on the Hupé showing, from 0.80 to 6.36% Cu (14 samples) on the Duchesne showing, and for the three zones on the Turcotte showing, 0.37 to 2.3% Cu over 25 m (12 samples in the central zone), 0.40 to 4.8% Cu over 45 m (15 samples in the northeast zone), and 0.40 to 4.60% Cu over 30 m (11 samples in the northwest zone).

In 2003, the **Fonds régional d'assistance à la prospection minière Gaspésie – Îles-de-la-Madeleine (FRAPMGÎM)** trained a new crop of prospectors, who led an off-claim prospecting campaign in the Gaspésie region (project 11, Figure 1F-1). This work led to the discovery of a gold occurrence in Flahault Township, in the vicinity of known gold, arsenic, and antimony stream sediment anomalies. This gold discovery was staked, and the group of prospectors continued prospecting the Flahault South Block (project 9, Figure 1F-1) and Flahault North Block (project 10, Figure 1F-1) properties on behalf of the **FRAPMGÎM**. Several samples were collected from erratic boulders consisting of breccias invaded by quartz and sulphides on the South Block. At least 15 of these samples yielded gold grades above 500 ppb, including 8 samples with grades from 2,595 to 34,043 ppb Au. These erratic boulders are inferred to be derived from a local source, within black shales of the Garin Formation (Honorat Group). In the fall of 2003, the **FRAPMGÎM** signed an agreement with **Ressources Appalaches Inc.** concerning a group of claims surrounding the two properties.

For the fourth consecutive year, **Scorpio Mining Corporation** carried out exploration on its Lac Arsenault property (project 16, Figure 1F-1), in Weir and Honorat townships. A drill program (totalling 900 m) and surface stripping were carried out in 2003, in order to pursue their assessment of the property characterized by the presence of polymetallic (Au-Ag-Pb-Zn) breccias and veins. These occurrences are hosted in greywackes and siltstones of the Arsenault Formation (Honorat Group), along the southern limb of the Grand-Pabos fault. In 1975, **Esso Resources Ltd** outlined a probable mineral resource on this property of 40,000 tonnes grading 15.43 g/t Au, 197 g/t Ag, 6.60% Pb, and 3.50% Zn. According to **Scorpio Mining Corporation**, a more recent compilation (Peter Smith, 1995) of previous data concerning four vein systems on the property increased this resource to 122,932 tonnes at a grade of 12 g/t Au, not taking into account the silver, lead, and zinc content.

Exploration Opportunities

Paleozoic sedimentary and volcanic rocks in north-central Gaspésie, particularly assemblages found between Murdochville to the east and the Lemieux Dome, located 60 km further west (NTS sheets 22 A/11 to 14, 22 B/09 and 16, 22 G/01, and 22 H/04), remain prime targets for mineral exploration in this part of the Appalachians in eastern Québec. The Murdochville area is known for the former mining operations (1959-1999) of Noranda Inc., where copper was extracted from world-class porphyry deposits (Copper Mountain), skarns (zones B and C), and marble-hosted replacement massive sulphides (mantos) (zone E). Until now, exploration in north-central Gaspésie was almost exclusively focused on the same types of deposits, associated with porphyry intrusions, as well as distal polymetallic vein-type deposits, which on a regional scale, typically show a lateral and vertical metal zoning pattern, from Fe-Cu-rich in the centre of the system to Cu±Zn±Pb±W and Zn±Pb±Ag around the periphery. However, based on the presence of prospective metallogenic settings (Lachance and Pilote, 2003; Pilote, 2002; Doyon, 1995, 1996; Bellehumeur and Valiquette, 1993;

Wares, 1988; Stevens, 1983), the north-central part of the Gaspésie region also represents a regional target for a variety of deposit types that were neglected up until now, in particular those occurring around the periphery or atop porphyry systems, and at subvolcanic to volcanic levels. Future exploration in this area may lead to the discovery of zinc-lead-silver replacement deposits (skarns and massive sulphides) in limestones, epithermal gold deposits in and around rhyolitic volcanic centres (particularly the Mont Lyall and Mont Tuzo rhyolites peripheral to the Lemieux Dome), SEDEX-type lead-zinc-silver-barite deposits associated with manganese-enriched zones in calca-reous shales with bentonite beds indicating volcanism coeval with sedimentation in the Upper Gaspé Limestones, zinc-lead-copper volcanogenic massive sulphides (VMS) or Besshi-type copper-zinc deposits, and disseminated lead-zinc in sandstones of the York River Formation around the margins of the Lemieux Dome.

Recent exploration conducted by **Ressources Appalaches Inc.** and geoscience studies performed by the MRNFP in the Lac Sainte-Anne area (NTS 22 B/16-0200-0102) confirm, particularly in the northern part of the Lemieux Dome, the presence of hematite-magnetite-pyrite-chalcopyrite-quartz breccias and veins. The latter cross-cut epithermal veins and constitute a later mineralizing event, with which certain monzonitic intrusions are associated (Pilote, 2003). Given their characteristics and their alteration paragenesis, these occurrences correspond to iron oxide-copper-gold deposits (IOCG), although the gold component remains very poorly developed to date. Iron oxide occurrences cross-cut and displace neutral epithermal occurrences. These observations explain the complex nature of certain showings found in the northern part of this area, where fragments of amethyst veins occur adjacent to or directly within quartz-hematite-pyrite breccias.

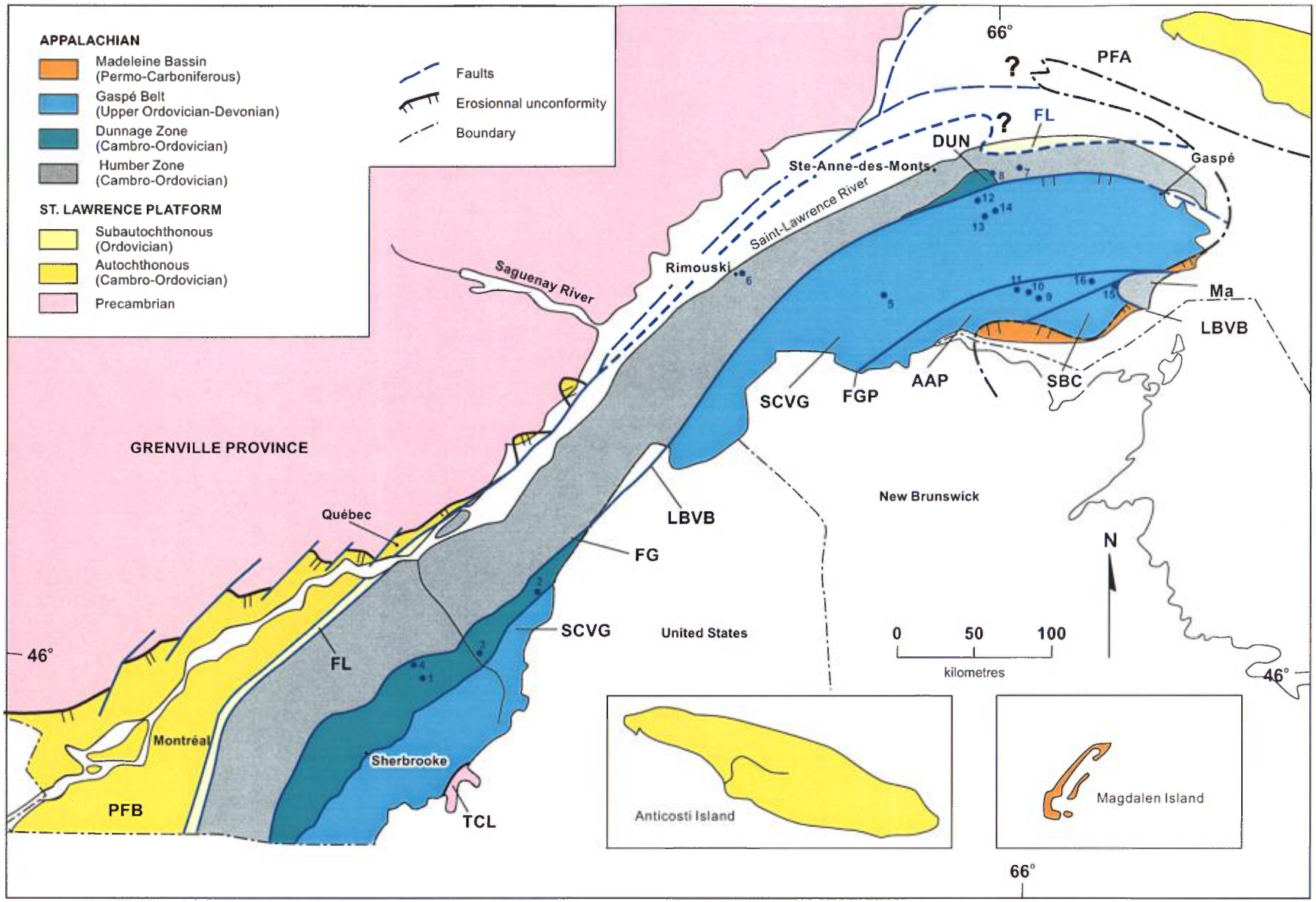

Figure 1F-1. Location of exploration work in 2003, total of 16 projects (no 1 to 16)
Abbreviations: **AAP**: Aroostook-Percé anticlinorium; **DUN**: Dunnage zone; **FGP**: Grand Pabos fault; **FL**: Logan fault; **FG**: Guadeloupe fault; LBVB: Baie Verte-Brompton line; **Ma**: Maquereau-Mictaw window; **PFA**: Anticosti platform; **PFB**: St.Lawrence Lowlands platform; **SBC**: Baie des Chaleurs synclinorium; **SCVG**: Connecticut Valley-Gaspé synclinorium; **TCL**: Chain Lakes terrane.

TABLE 1F-1 - Exploration work over the St.Lawrence Platform and the Appalachians in 2003 (see figure 1F-1).

NO	TOWNSHIPS (SEIGNIORIES)	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORKS[1]
Southwestern Segment (Montréal et Chaudière-Appalaches regions)						
1	Adstock	21 L/03	Mengold Resources Inc. / A. Blackmore	Adstock-Blackmore-Juby Option	Cr-PGE	Gs
2	Bellechasse, Panet	21 L/09	Osisko Exploration Ltd / Golden Hope Mines Ltd	Bellechasse	Au	D(19:2083)
3	(Saint-François)	21 L/02	R. Mainville / T. Burnham	Timrod	Au	T
4	Thetford	21 L/03	Mengold Resources Inc. / A. Blackmore	Thetford-Blackmore-Juby Option	Cr-PGE	Gs
Central Segment (Bas-Saint-Laurent region)						
5	La Vérendrye, Casupscull	22 B/07, 06	Puma Exploration Inc.	Sainte-Marguerite	Au	D(5:438), IP
6	(Lessard-Rimouski)	22 C/08	H. Rioux	Saint-Anaclet	Cu-Pb-Zn-Ag	D(4:132)
Northeastern Segment (Gaspésie et Iles de la Madeleine regions)						
7	Boisbuisson	22 H/04	Ressources Appalaches Inc.	Boisbuisson	Au	S, Pr, Gs(r)
8	Boisbuisson, La Potardière	22 G/01, 22 B/16	SOQUEM INC.	La Potardière	Cu	Pr, IP
9	Flahault	22 A/05	FRAPMGÎM / Ressources Appalaches Inc.	Flahault Bloc Sud	Au	S, Pr, Gs(r)
10	Flahault	22 A/05	FRAPMGÎM / Ressources Appalaches Inc.	Flahault Bloc Nord	Au	S, Pr, Gs(r)
11	Gaspésie, Bas-Saint-Laurent	22 A, 22 B	FRAPMGÎM / Développement économique Canada / Ressources Appalaches Inc.	Prospection minière en Gaspésie (MACPQ)	Au-Ag-Pt	S, Pr, Gs(r)
12	Lemieux	22 B/16	Ressources Appalaches Inc.	Mont de l'Aigle	Cu-Au	S, G, Pr, D(23:2490), T, Gs(r), Gs(sl), IP
13	Lemieux	22 B/16	V. Arsenaut / G. Gasse / Y. Gasse	Fédéral	Cu-Pb-Zn-Au-Ag	S, G, Pr, T, Gs(r)
14	Lemieux	22 B/16	V. Côté	Mine d'Agates du Mont Lyall	Agate	T, Gs(r), M
15	Weir	22 A/06	Antoro Resources Inc.	Serpenphior	Au-Ni-Cu-Cr-PGE	S, Pr, T, Gs(r)

TABLE 1F-1 - Exploration work over the St.Lawrence Platform and the Appalachians in 2003 (see figure 1F-1).

NO	TOWNSHIPS (SEIGNIORIES)	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORKS[1]
16	Weir, Honorat	22 A/06	Scorpio Mining Corporation	Lac Arsenault	Au-Ag-Cu-Zn-Pb	S, G, D(n.d.:900), T, Gs(r)

1 = See abbreviation list in table 1A-1.

Chapter 2

Architectural Stone and Industrials Minerals

2

This chapter describes the results of mineral exploration and mining activities conducted in Québec in 2003 in the field of architectural stone and industrial minerals.

Architectural Stone

Yves Bellemare

Production

Figure II shows the location of architectural stone quarries in operation in Québec in 2003. Table II in appendix provides a brief description of each operation.

In the field of architectural stone, 97 active quarries were compiled. Architectural stone varieties include rocks from anorthositic, charnockitic, and granitic suites, which account for most of the dimension stone production; steatite and soapstone (for sculptures and refractory plates); slate (roofing tiles and slabs); as well as limestone, dolomite, sandstone, siltstone, marble, quartzite, schist, and gneiss (dimension stone, ashlar, and landscaping stone).

With sixteen quarries in operation, the Rivière-à-Pierre area (NTS 31 I/16 and 31 P/01) remains the most important mining camp in the field of dimension stone. Three other areas are also very active with five quarries each, namely the Saint-Nazaire (NTS 22 D/12), Stanstead (NTS 31 H/01), and Saint-Alexis-des-Monts – Saint-Didace (NTS 31 I/06) areas.

During the year, two new quarries began production operations. In Chilton Township, near Notre-Dame-de-la-Merci, **A. Lacroix et Fils Granit Ltée** completed its extensive development program undertaken in 2002. A new quarry face was opened to mine a bluish grey, iridescent, granoclastic anorthosite (project 11, Appendix 1). The stone will be marketed under the name Orion. At the Saint-Sébastien facility, the company integrated a stone resin unit into its production line, which will provide a new outlet for old and new varieties of stone. **Granitslab International Inc.** continued its investigations in Gendron Township, north of La Tuque, and began extracting a black, fine-grained gabbro, which will be used to produce funeral monuments (project 41, Appendix 1).

Exploration

Figure 2.1 shows the location of 56 exploration projects reported in 2003. Project descriptions are listed in Table 2.1.

The year 2003 was another very busy year for the **Polycor Group**. The company obtained a contract to supply the stone to be used in renovations of the Citadel in Québec City. To meet this objective, the company implemented an exploration program to find potential sites to quarry greenish grey sandstone of the Tourelle Formation, which will be used to replace Sillery Group sandstone. The company's search was focused on four target areas in the Bas-Saint-Laurent and Gaspésie regions. A site was finally selected, and sandstone extraction began in the Matane area (project 49). However, the company is still searching for new sources. The **Polycor Group** also conducted sampling and polishing tests on a brown mangerite located in Fournel Township near Magpie (project 33). The rock is riddled with randomly oriented, mm- to cm-scale, orange-pink, discontinuous veins. Test results led the company to apply for a mining lease (BEX 419). The **Polycor Group** also acquired the mining rights of the **Georgia Marble** Company, which operates quarries and a plant in Georgia, in the United States. This acquisition will also allow the group to market the products of this American company.

SOQUEM INC. and **Polycor Inc.** formed a new company, **NAMCA Inc.**, with the objective of developing the dimension stone potential of limestone, marble, and iridescent anorthosite deposits in Québec. The company carried out development work in the Gaspésie, Montérégie, and Lac-Saint-Jean regions. In Gaspésie, an exploration program was launched on properties in Port-Daniel (two areas), Clemville, and Maria (projects 52 to 55). These properties are underlain by limetones of the West Point, La Vieille, and Bonaventure formations; the limestones show a wide range of colours and textures. Following a market study, the company zeroed in on the Maria area, where a grey clastic limestone with reddish fragments of the Bonaventure Formation is exposed. In the Montérégie region, the company conducted exploration and development work in the Saint-Armand area (project 35), north of the former quarries of the **Missisquoi Stone & Marble Co.** Their work focused on calcilutites of the Strites Pond Formation and was successful in finding lithological equivalents to the Mottled, Regina, and Grey Green varieties produced in the former quarries. In 2004, the company expects to finish developing a quarry face in order to begin extraction of commercial blocks. In the Lac-Saint-Jean region, north of Saint-David-de-Falardeau, the company continued an exploration program launched in 2002 to develop a bluish or copper-toned, iridescent anorthosite belonging to the Lac-Saint-Jean Anorthositic Suite (project 24). Five areas of interest were delineated, two of which are considered as priority targets. In 2004, a drill program will help determine if these target areas contain a sufficient volume of marketable stone.

A. Lacroix et Fils Granit Ltée continued its extensive exploration and development program launched in 2002 in the Notre-Dame-de-la-Merci area (project 3). The company opened a quarry face to sample and polish a bluish grey, iridescent, granoclastic anorthosite assigned to the Morin AMCG Suite. Conclusive results led to the start-up of operations to extract

this stone, identified as a member of the Orion variety. In Bois Township, in the Rivière-à-Pierre area, the company continued a sampling program on a pinkish brown, porphyritic farsundite, in two target areas within its Deer Brown II project (project 11). Polishing test results are encouraging, and this work will continue in 2004. In the Lac Stein area, the company also sampled a black, migmatitic gneiss and a pink, fine-grained farsundite located along the margin of the Rivière-à-Pierre Suite, near the boundary with the La Bostonnais Complex (project 10).

Granicor Inc. carried out geological mapping, surface stripping, and sampling on three properties in the Saguenay – Lac-Saint-Jean region. The first property corresponds to a former quarry operated in the 1990s by **Les Carrières du Parc** (project 18). The stone consists of a greenish black quartz mangerite with bluish quartz, similar to the Laurentide Green variety. A mining lease (BEX 421) was obtained during the year. The second property is located in Caron Township (project 20), and a mining lease (BEX 422) now covers the mining rights. The stone, identified under the name Betchouan Sonata, is an orange-pink, porphyritic farsundite. The third property, located east of Alma in Labarre Township (project 22), contains a greyish black, fine-grained anorthosite. A mining lease (BEX 420) was also obtained in this case to protect the mining rights.

2329-1677 Québec Inc. (Granitslab International Inc.) continued its sampling program in a black gabbro in Gendron Township, north of La Tuque (project 15). Following the 2002 work program, a second working face was developed in a favourable part of the property, and tests indicated the stone in this location is much more massive. Development work has given way to extraction operations on this fine-grained stone, which will be used to produce funeral monuments. **Granit Design** performed development work on a green and brown, medium-grained mangerite in the Magpie area (project 34). The results were conclusive and an application for a mining lease will be filed in order to begin quarrying the stone, to be marketed under the name Anticosti Verde, in 2004. The company is looking into the market for kitchen and bathroom counters.

In the last two years, **Granit Yoguy Inc.** performed sampling work north of Rivière-à-Pierre on a greenish grey farsundite assigned to the Rivière-à-Pierre Suite. The company continued development work and extracted a few blocks of this stone, named Rustic Green (project 12). The sampled stone has a much stronger greenish tinge than the initial stone. It resembles the Atlantic Green variety, mined at the Deer Brown quarry; it is darker, however, and contains less quartz. **Granite D.R.C. Inc.** began drilling, surface stripping, and sampling on a greyish green, medium-grained mangerite or quartz jotunite in an area north of Perthuis (project 6). Similar to the Prairie Green variety, this stone is very beautiful once polished; it is known as Timberland Green. The property was sold to **Gestrock**, a subsidiary of **Stone Vogue International**. In Saint-Marc-des-Carrières, **Graymont (Portneuf)** carried out geological work and drilling to determine the potential for architectural and industrial stone in an area located along the extension of brownish grey limestone units of the Deschambault Formation (project 4). The results are promising and will secure a reliable supply of this stone, known as Saint-Marc Limestone, for many years to come.

During the year, demand sharply increased for brightly coloured sandstone for landscaping purposes. This resulted in the search for alternate sources of sandstone varieties produced in the United States, Nova Scotia, and Ontario. Exploration projects were concentrated in the Saint-Mathieu area (project 46), located in the Bas-Saint-Laurent region. Prospecting, geological mapping, sampling, and cutting tests were performed to determine the potential of quartz arenites in the Robitaille Formation. Four different varieties of coloured sandstones were identified, namely red (Basque variety), pink and buff (Neigette variety), orange, and white and pink.

Opportunities

Geological mapping conducted in NTS sheets 31 J/15 (Nantel and Pintson, 2001) and 31 O/02 (Nantel, 2003) in the northern part of the Central Metasedimentary Belt identified a white dolomitic marble that may be used as a source of dimension stone.

Industrial Minerals

Henri-Louis Jacob

Production

Figure II shows the location of active industrial mineral quarries and mines in Québec in 2003. Table III in appendix provides a brief description of each operation.

Industrial minerals produced in Québec include: chrysotile asbestos, extracted in three mines in the Estrie region; ilmenite and titanium slag, extracted at the Tio mine north of Havre-Saint-Pierre; graphite flakes from the Stratmin mine in Lac-des-Îles south of Mont-Laurier; mica from the Bédard mine in Suzor Township in the Haute-Mauricie region; rock salt produced at the Seleine mine in the Îles-de-la-Madeleine; brines obtained from two wells operated by **Junex** in the Bécancour area; silica derived from quartzite (three quarries); sandstone (three quarries); natural sand (two operations); sulphur recovered as sulphuric acid in non-ferrous metal smelters; high-purity limestone from the Estrie region and the St. Lawrence Lowlands (six quarries in total); and high-purity dolomite extracted from a quarry in Portage-du-Fort.

Compared to 2002, the year 2003 witnessed a drop of about 10% in the value of shipments, according to preliminary data released by the Service de traitement des données minières. This situation is largely attributable to sharp declines in asbestos and titanium slag shipments, two substances that account for more than 75% of all industrial mineral shipments in Québec. Asbestos shipments, for example, dropped by nearly 30%. The Jeffrey mine in Asbestos resumed mining operations for a few weeks only, mainly to process stockpiled ore, whereas in the Thetford-Mines area, the Black Lake and Bell mines were operated alternately due to weak demand.

As for the remaining substances, ilmenite and mica shipments experienced significant increases. Shipments of other substances remained stable or declined slightly.

In the limestone industry, **Graymont (Qc) Inc.** opened its quarry no. 6, located on the Rang des Canadiens, 4 km from Saint-Adolphe-de-Dudswell. Limestone extracted from this new quarry will be used along with limestone from quarry no.5 to produce industrial lime. **Graymont (Qc) Inc.** produces a very-high-purity lime product designed to meet the pulp and paper industry's need for precipitated calcium carbonate.

Timcal Graphite ended mining operations in its first pit, initially opened in 1989; last summer, the company began operations in a second open pit located to the northwest of the first. The new orebody, delineated in drillholes, contains sufficient reserves to supply the plant for at least five years.

Junex began producing brine from a second well in Sainte-Angèle-de-Laval, located 13 km from the Bécancour well. Brine extracted from the Sainte-Angèle well contains 32 to 35% dissolved salt, whereas Bécancour brine contains 27 to 29% dissolved salt. Brines produced by **Junex** are used in summer for dust abatement and in winter for de-icing.

Exploration

Twenty-three mineral exploration projects targeting a dozen commodities (rocks or minerals) were compiled in 2003 (Figure 2.1 and Table 2.2). This is a sharp drop compared to the 37 projects reported in 2002. The loss of the Mineral Exploration Assistance Program, through which most industrial mineral projects were funded in previous years, partly explains this situation.

One of the most important exploration projects in 2003 is the Lac Guéret North graphite project headed by **Quinto Technology Inc.** (project 73) in partnership with **SOQUEM INC**. The 2003 exploration program included excavation of over 30 trenches and a total of 10 diamond drillholes. To date, two graphite zones have been sampled and partially delineated. The Graphite Road zone (GR) extends for 1 km over widths of 110 to 160 m; high-grade zones contain 10 to 20% graphite over 10 to 50 m in thickness. Moreover, the Graphite Cliff zone (GC) outcrops over more than 900 m and is open in both directions; high-grade zones contain 15 to 30% graphite over widths of 10 to 15 m.

Sheridan Platinum Group Ltd offered **Fancamp Exploration Ltd** an option on its Mingan property located in the western part of the Havre-Saint-Pierre anorthositic massif (project 76). Work by **Fancamp Exploration Ltd** included trenches, which exposed massive hemo-ilmenite, and diamond drillholes (10 holes totalling 540 m), which yielded massive hemo-ilmenite sections from a few metres to over 37 m thick. Assays yielded grades ranging from 33.0 to 35.7 % TiO_2, 54.9 to 60 % Fe_2O_3, and 1.9 to 2.4% MgO.

Québec/Labrador Exploration continued its investigations on the Lac Daviault property near Fermont (project 78), where very high-purity, glassy, white quartzites were discovered in 2002. These quartzites belong to the Wapussakatoo Formation of the Proterozoic Gagnon Group. The company extracted a bulk sample of a few thousand tonnes, in order to test the quartzite as a potential source of white granules for the manufacturing of artificial stone.

Les Ressources d'Arianne inc. (project 62) heads one of the most advanced exploration projects. Its ultimate goal is to use calcitic marble from the **Les Calcites du Nord inc.** quarry in Dolbeau as a source of ground calcium carbonate (GCC). The marble in question has a very high brightness index and could be used as filler for the paper industry. Crushing tests were conducted in 2003, and pilot tests were undertaken at the Centre spécialisé en pâtes et papier in Trois-Rivières. Industrial tests are scheduled for 2004 at Québec paper industry.

In the Outaouais region, north of Buckingham, the American company **Ceramco Inc.** conducted exploration in two former feldspar mines (projects 68 and 69). **Ceramco Inc.** manufactures dental porcelain and prostheses, and uses very pure K-feldspar as raw material. Pegmatites in the Buckingham area host pure K-feldspar zones that are suitable for dental applications and that may be selectively mined. The company's objective is to secure a reliable supply for years to come.

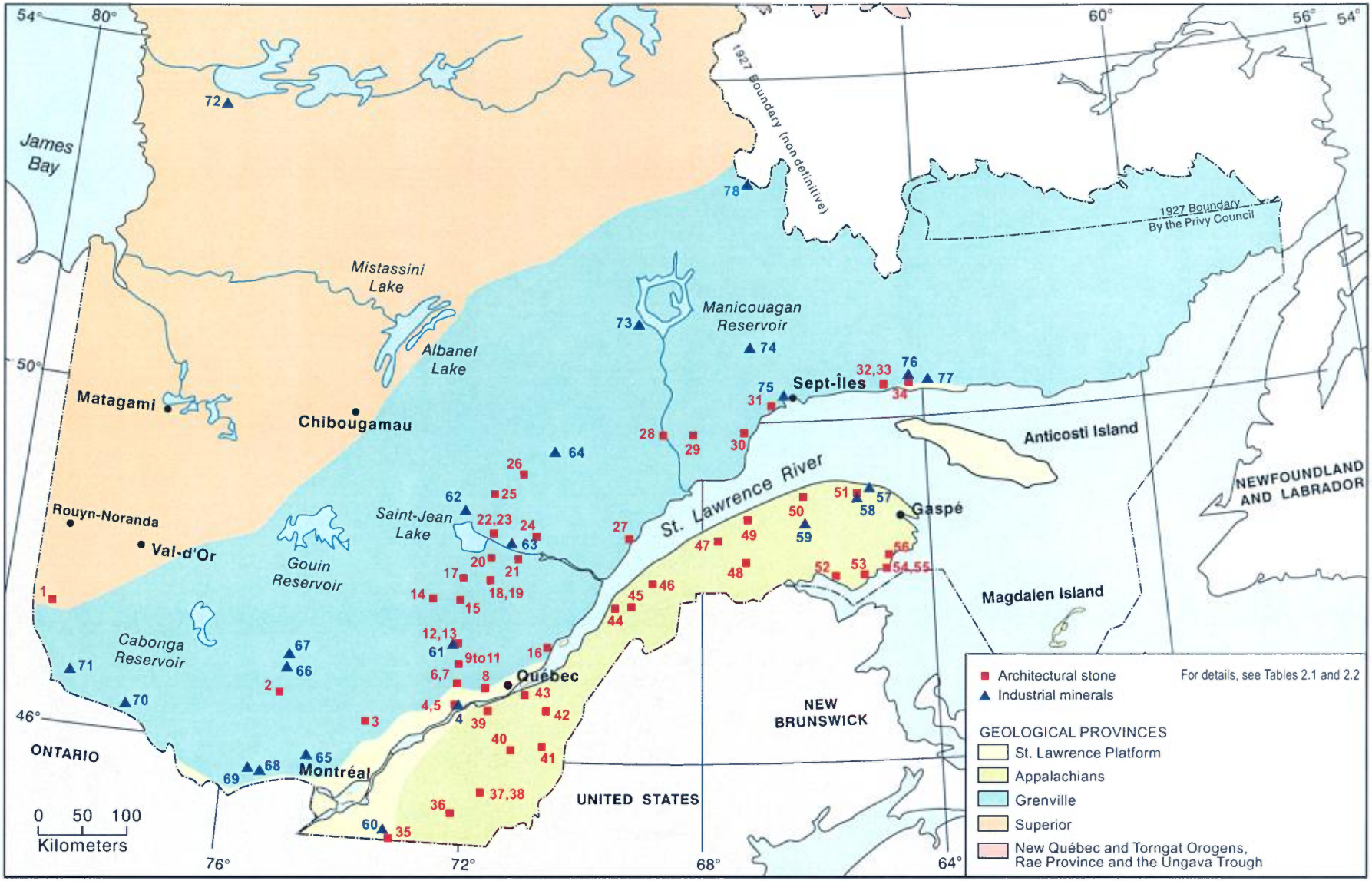

Figure 2.1 - Location of exploration projects in Québec in 2003. Architectural stone and industrial minerals.

TABLE 2.1 - Exploration work in Quebec for architectural stone in 2003 (see figure 2.1)

NO	NTS	MINING TITLE	COMPANIES / PROSPECTORS	USE*	WORKS (1)	DETAILS
1	31 M/06	-	L. Guimond	PD	G	Saint-Bruno-de-Guigues project, sandy dolomitic limestone, Farr Formation
2	31 J/11	-	Carrara Marble	PD	Pr , D	Val-Barrette project, white dolomitic marble
3	**31 I/05**	**BEX 255**	**A. Lacroix et Fils Granit Ltée**	**PD**	**B, Pt, T**	**Orion project, granoclastic anorthosite, iridescent, bluish grey**
4**	31 I/09	-	Graymont (Portneuf)	PD	G, D	Limestone, Deschambault Formation
5	31 I/09	-	F. Bédard	PD	Pr	Limestone, Deschambault Formation
6	31 I/16	CDC 1116738 à 1116746, 1100122 à 1100129, 1102068 à 1102077	Granite D. R. C. Inc. / R. Bélanger / Gesrock	PD	B, Pr, Pt, D, T	Vert Timberland project, quartz mangerite or quartz jotunite, porphyritic, greyish green, medium-grained
7	31 I/16	-	S. Lamarre	PD	Pr	Saint-Ubalde project, leucogranite
8	21 L/13	CDC 1193 à 1198	A. Lacroix et Fils Granit Ltée	PD	S	Rainbow project, red gneiss
9	31 P/01	CDC 1101020 à 1101023	J. Cauchon	PD	B, Pr, Pt	Farsundite, porphyritic, brownish to greenish grey, coarse-grained
10	31 P/01	CDC 1118360 à 1118368	A. Lacroix et Fils Granit Ltée	PD	S, Pr, Pt, T	Lac Stein project, migmatized gneiss, black and pink farsundite, fine-grained
11	31 P/01	BEX 366, 367	A. Lacroix et Fils Granit Ltée	PD	B, Pr, Pt, T	Deer Brown II project, farsundite, porphyritic, pinkish
12	31 P/08	CDC 1019356 à 1019364	Granit Yoguy Inc.	PD	B, Pt, D, T	Vert Rustique project, quartz mangerite, greenish grey
13	31 P/08	CDC 1101571 à 1101578, 1100799 à 1100808	D. Borgia	PD	D	Lasalle township, Beaudet sector, granite
14	31 P/15	CDC 980, 1126523	B. Vigneault	PD	S, Pr, Pt	Lac de la Bouteille project, white marble, fine-grained
15	**31 P/16**	**BNEP 649, BEX 405**	**Granitslab International Inc. (2329-1677 Québec Inc.)**	**PD**	**B, Pt, T**	**Gendron project, black gabbro, fine-grained**
16	21 M/07	CDC 1116565 à 1116568	Prodier Ltée	PD	S, Pr, Pt	Sainte-Tite-des-Caps project, farsundite, salmon brown, foliated
17	32 A/01	CDC 1121972 à 1121978	F. Gobeil	PD	S, D, Pt	Lac Mirage project, farsundite, dark brown to pale beige, coarse-grained
18	22 D/04	CDC 4860, 1123377 à 1123379, BEX 421	Granicor Inc.	PD	B, G, Pt	Vert Laurentide project, quartz mangerite, greenish black, with blue quartz, acquired BEX 421

TABLE 2.1 - Exploration work in Quebec for architectural stone in 2003 (see figure 2.1)

NO	NTS	MINING TITLE	COMPANIES / PROSPECTORS	USE*	WORKS (1)	DETAILS
19	22 D/04	CDC 3038 à 3040	P. Godin / R. Cloutier / Polycor Inc.	PD	E, Ep, Pr	Norite with bronzite, black, coarse-grained
20 BEX 422	22 D/05	CDC 1123380 à 1123381,	Granicor Inc.	PD	Ev, Ep, G, T	Betchouan Sonata project, farsundite, porphyritic, orange pink, acquired BEX 422
21	22 D/06	CDC 1991 à 1997, 7905, 1118961 à 1118969	R. Gagnon	PD	E, Ep, Pr	Lac Kénogami project, green dunite
22	22 D/12 BEX 420	CDC 1123382 à 1123384,	Granicor Inc.	PD	Ev, Ep, T	Labarre project, greyish black anorthosite, fine-grained, acquired BEX 420
23	22 D/12	-	Granitslab International Inc.	PD	Ev, Ep, T	Black anorthosite, Taillon Black-type
24	22 D/10, 22 D/11	CDC 1029921 à 1029927, 1099194 à 1099229, 1099270 à 1099276, 1099723 à 1099725, 1099834, 1101306 à 1101342, 1102225 à 1102248	NAMCA Inc.	PD	E, G, Ep, T	5 explored targets, anorthosite with bluish or coppery iridescence
25	22 E/04	CDC 1102432 à 1102437	L. Lefebvre	PD	E, Ep, Pr	Farsundite, porphyritic, reddish orange, coarse-grained
26	22 E/06	PRS 2530 à 2535	R. Goulet	PD	Ev, Ep	Pekin project, brown monzogabbro
27	22 C/11	CDC 1118708, 1122217 à 1122218	Prodier Ltée	PD	E, Ep, Pr	Granitic gneiss, Saint-Paul-du-Nord Formation
28	22 F/15	CDC 1037983 à 1037992	C. Rouleau / D. Bérubé	PD, PA	Ev, Ep	Gneiss Manic 3 project, migmatized gneiss, pinkish grey
29	22 F/16	CDC 1053689, 1053690, 1053692, 1053693, 1097681, 1099722	M. Bourque / G. Bourque	PA	E, Ep, T, EF	Marbre Manicouagan project, fault gouge, epidotized, chloritized, hematitized
30	22 G/14	CDC 1071786, 1098417	C. Pelletier / M. Morissette	PD	E, Ep	Lac-Paul-Côté project, grey gneiss, migmatized and banded
31	22 J/02	CDC 5100	E. Picard Landry / S. Landry	PD	E, Ep, Pr	Monzonite, orange brown, with blue quartz
32	22 I/07	CDC 1127493 à 1127559, 1128836 à 1128839	B. Beaudin / W. Comolli / V. Smith	PD	E, Ep,m Pr	Rivière-au-Tonnerre project, anorthosite with labradorite
33	22 I/07	BEX 419	Polycor Inc.	PD	Ev, Ep	Picasso project, brown mangerite, acquired BEX 419
34	**22 I/08**	**BNEP 714**	**Granit Design**	**PD**	**Ev, Ep**	**Verde Anticosti project, green and brown mangerite, medium-grained**
35	**31 H/03**	-	**NAMCA Inc.**	**PD, PA**	**Ev, Ep, G, T**	**Phillipsburg project, calcilutite, Strites Pond Formation**

TABLE 2.1 - Exploration work in Quebec for architectural stone in 2003 (see figure 2.1)

NO	NTS	MINING TITLE	COMPANIES / PROSPECTORS	USE *	WORKS (1)	DETAILS
36	31 H/08	CDC 1099961 à 1099964	J. Longpré / J.-G. R. Lacourse	PA	D	Saint-Élie project, listwaenite, reddish and whitish green, black peridotite, granite
37	21 E/12	No	Les Pierres de l'Estrie	PB	S, Pr	Dudswell project, calcilutite, Ayer's Cliff Formation
38	21 E/12, 21 E/13	CDC 1081913	C. Vachon / M. Bilodeau	PB	D	Mel-Ship project, slate, Saint-Daniel melange
39	21 L/12	-	Stone Vogue International	PD	S, Pr	Saint-Nicolas project, sandstone, Saint-Nicolas Formation
40	21 L/03	-	Les Pierres Stéatites	PD	B, Pt	Carrière du 9 project, serpentinite
41	21 L/02	CDC 1103785 à 11003787	M. Vallée	PD	D	Saint-Philibert project, slate, Saint-Francis Group
42	21 L/10	CDC 9736 ?	M. Bilodeau	PD	S, Pr, Pt	Buckland project, metasomatic rock with actinolite
43	21 L/14	-	Stone Vogue International	PD	S, Pr	Lévis project, sandstone, Saint-Nicolas Formation
44	21 N/13	-	Polycor Inc.	PB, PD	S, G, Pr, Pt	Greenish grey sandstone, Tourelle Formation
45	21 N/14	-	Granite Aurélien Tremblay	PD	Pr	Saint-Modeste project, sandstone, Tourelle Formation
46	22 C/02, 22 C/03	CDC 1127256 à 1127263, 1127481 à 1127484	R. Paquette	PB	S, Pr, Pt	Grès Basques project, sandstone, Robitaille Formation
47	22 B/12	-	Polycor Inc.	PB, PD	S, G, Pr, Pt	Greenish grey sandstone, Tourelle Formation
48	22 B/06	-	Cantin et Cantin	PD, PB	Pr	Brownish red sandstone, Lake Branch Formation
49	**22 B/14**	-	**Polycor Inc.**	**PB, PD**	**B, G, Pr, Pt**	**Grès Matanais project, greenish grey sandstone, Tourelle Formation**
50	22 G/01	-	Polycor Inc.	PB, PD	S, G, Pr, Pt	Greenish grey sandstone, Tourelle Formation
51	22 H/03	CDC ?	Poly-Vein Exploration	PD	S, Pt	Lac Jumeau project, limestone, West Point Formation
52	**22 A/04**	-	**NAMCA Inc.**	**PD, PA**	**B, G, Pr, Pt, FM**	**Maria project, marble limestone, pinkish grey, Bonaventure Formation**
53	22 A/03	CDC 1039222 à 1039227	NAMCA Inc.	PD, PA	B, G, Pr, Pt, FM	Clemville project, limestone, La Vieille Formation
54	22 A/02	CDC 1122634, 1123067 à 1123069	NAMCA Inc.	PD, PA	B, G, Pr, Pt, FM	Port-Daniel ouest project, limestone, West Point Formation

TABLE 2.1 - Exploration work in Quebec for architectural stone in 2003 (see figure 2.1)

NO	NTS	MINING TITLE	COMPANIES / PROSPECTORS	USE *	WORKS [1]	DETAILS
55	22 A/02	-	NAMCA Inc.	PD, PA	B, G, Pr, Pt, FM	Port-Daniel est project, limestone, West Point Formation
56	22 A/07	-	Prodier Ltée	PD, PA	Pr	Dark grey limestone with calcite veins, Pabos Formation

* PA: decorative stone; PB: building stone or landscaping; PD: dimension stone.
** Project disigned for exploration of architectural stone or industrial stone.

1 = See abbreviation list in table 1A-1.

TABLE 2.2 - Exploration work in Quebec for Industrial minerals in 2003 (see figure 2.1).

SITES	TOWNSHIPS (SEIGNIORIES)	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORKS [1]
4	Lachevrotière	31 I/09	Graymont (Portneuf)	St-Marc-des-Carrières	Limestone	D
57	Denoue	22 H/03	Poly-Vein Exploration Inc.	Alumine	Shale	TE
58	Lefrançois	22 H/03	Conseil de Developpement Economique de Murdochville	Rivière Madeleine	Limestone	FM
59	Richard et Lemieux	22 B/16	Exploration Tom Inc.	Tuzo	Perlite, bentonite	Pg, S
60	Beauharnois	31 H/04	Antoro Resources Inc.	Sainte-Clotilde	Silica	D, TE
61	Charest	31 P/08	C. Bronsard / C. Ricard	Lac Crapaud	quartz (silica)	T
62	Pelletier	32 A/16	Les Ressources d'Arianne inc.	Calcite du Nord	Calcic marble	TE, Met
63	Bourget	22 D/11	Micrex Development Corp.	St. Charles	Magnetite, ilmenite,	Gp, G, Ct
64		22 E/10, 22 E/15	Les Ressources d'Arianne inc.	Lac-à-Paul	Ilmenite	S, Min
65	Amherst	31 G/15	Société minière Gerdin	Saint-Rémi d'Amherst	Silica and kaolin	B, T
66	Leman	31 J/14	M. Bélisle	sillimanite	Sillimanite	G, Min
67	Chopin	31 O/03	M. Bélisle	Marbre dolomitique	Dolomite	TE
68	Portland-ouest-Derry	31 G/13	Ceramco Inc.	Othmer	Feldspar	Pg, S
69	Portland-ouest	31 G/13	Ceramco Inc.	McLaurin	Feldspar	Pg
70	Edwards	31 L/08	D. Cyr	Sillim	Sillimanite	Pg
71	Gendreau, Campeau, Raisenne, LeCaron	31 L/10	G. Houle	Beauchesne	Muscovite	Ct
72		33 F/06	Ressources Minières Pro-Or inc.	Ménarik	Chromite	Met
73	1548	22 N/03	Quinto Technology Inc.	Lac Guéret	Graphite	S, G, T
74		22 J/04	SOQUEM INC.	Grand Lac du Nord	Sillimanite	Ct
75	Arnaud	22 J/02	SOQUEM INC.	Sept-Îles	Apatite, ilmenite	FM
76		22 I/08	Sheridan Platinum Group Ltd / Fancamp Exploration Ltd	Mingan	Ilmenite	G, D, T, Grav, Mag
77	Cugnet	12 L/05	D. Scherrer / M. Picard	Ilménite	Ilmenite	S, T
78	Lislois	23 B/14	Quebec/Labrador Exploration	Lac Daviault	Silica	B, T, Ct

1 = See abbreviation list in table 1A-1.

2

Appendix 1

Location of producing mines and architectural stone quarries in Québec

APPENDIX 1

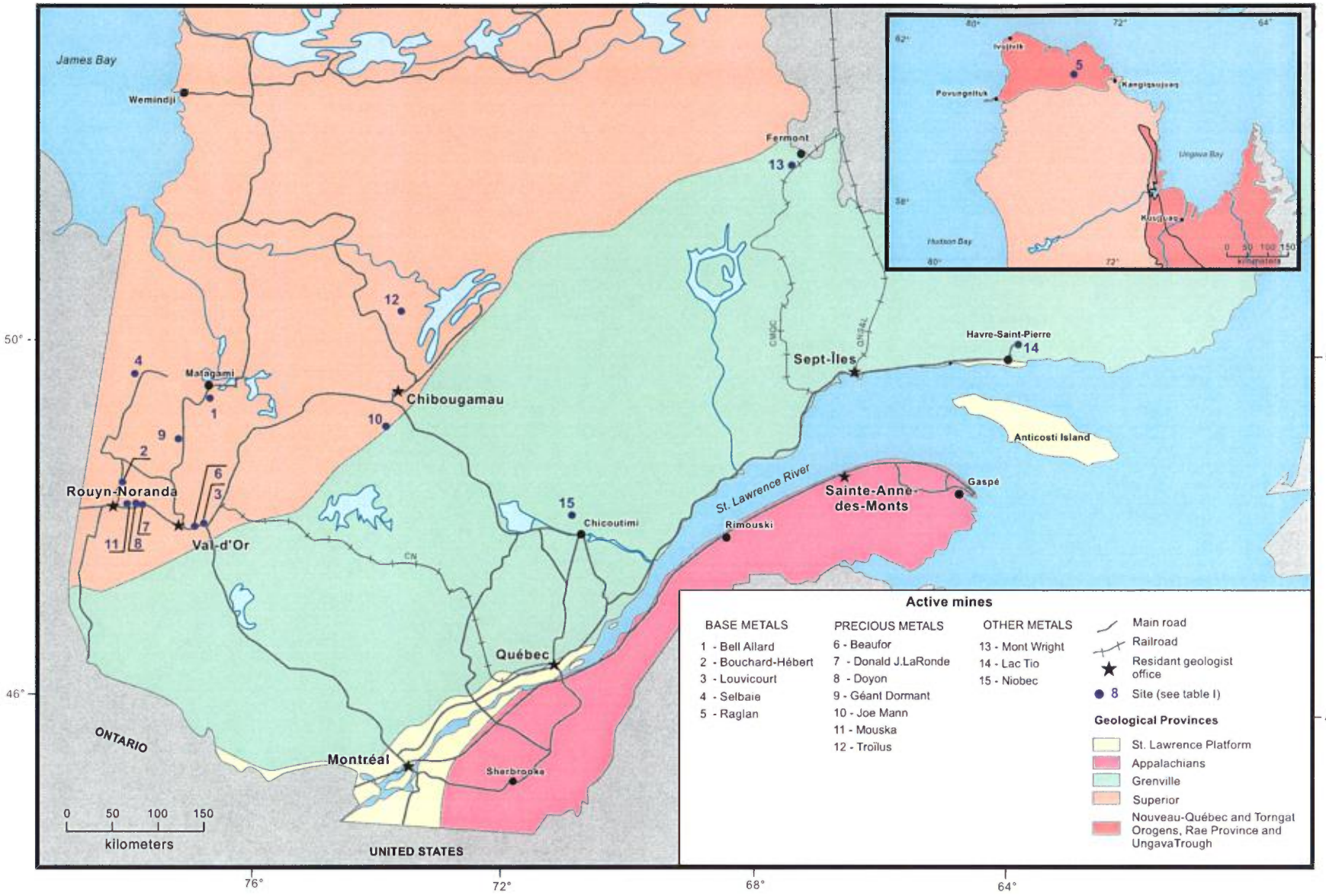

Figure I. Active mines in Québec for 2003 (metallic substances).

Table I - Production of metallic substances in Québec (see figure I).

Base metals : Cu and Zn (Au and Ag)

Site	Mine	Companies	Summary description of the deposit	Ore process in 2003	Metal production in 2003	Ore processing in 2003	Proven mineral reserves (at January 1st 2004)	Probable mineral reserves (at January 1st 2004)	Employees in 2003	Cumulative production	Number of years of production	Township / NTS / Administrative area/ Mining district
1	Bell Allard	Noranda Inc.	SMV-type	781 227 t at 1,21% Cu 15,14% Zn 0,68 g/t Au 42,61 g/t Ag 0,12% Pb	7 907,96 t Cu 110 769,40 t Zn 231,33 Kg Au 13 551,97 Kg Ag	Matagami Mine	***689 000 t at 1,1% Cu 15,3% Zn 0,42 g/t Au 38,2 g/t Ag 0,1% Pb	–	243	2 710 049 t at 1,28% Cu 13,46% Zn 0,70 g/t Au 41,48 g/t Ag	2000-20.. (4)	Galinée 32 F/12 / 10/ **Val-d'Or**
2	Bouchard-Hébert	Breakwater Resources Ltd	Massive sulfides (PY-SP-CP) subvertical lenses in rhyolites and pyroclastics	1 082 833 t at 0,43% Cu 5,56% Zn 1,17 g/t Au 36,00 g/t Ag	1 082 833 t at 0,43% Cu 5,56% Zn 1,17 g/t Au 36,00 g/t Ag	Bouchard-Hébert Mine	***1 123 300 t at 0,37% Cu 6,09% Zn 0,89 g/t Au 26,62 g/t Ag	–	139	8 522 824 t at 0,82% Cu 4,76% Zn 1,48 g/t Au 45,01 g/t Ag	1995-20.. (9)	Dufresnoy / 32 D/07 / 08 / **Rouyn-Noranda**
3	Louvicourt	Aur Resources Inc.	VMS-type associated with Val d'Or Formation, dominated by lapilli ash tuffs and exhalative chert	1 260 334 t at 3,21 % Cu 1,69% Zn 0,68 g/t Au 26,33 g/t Ag	37 783,29 t Cu 15 196,84 t Zn 520,97 Kg Au 17 074,6 Kg Ag	Louvicourt Mine	***1 629 000 t at 2,76% Cu 1,96% Zn 0,85 g/t Au 23,80 g/t Ag	***12 000 t at 0,16% Cu 9,42% Zn 0,99 g/t Au 48,34g/t Ag	240	13 865 841 t at 3,52% Cu 1,53% Zn 0,92 g/t Au 25,88 g/t Ag	1994-20.. (10)	Louvicourt / 32 C/04 / 08/ **Val-d'Or**
4	Selbaie	Billiton Metals Canada Inc.	Disseminated SP-PY-CP associated with network veins in a rhyodacite breccia and dacitic welded tuff	3 776 569 t at 0,25% Cu 1,14% Zn 0,22 g/t Au 26 g/t Ag	7 142 t Cu 32 198 t Zn 485,2 Kg Au 45 112 Kg Ag	Selbaie Mines	**350 000 t at 0,30% Cu 1,27% Zn 0,28 g/t Au 29 g/t Ag (Mining reserves)	–	146	52 876 364 t at 0,96% Cu 1,90% Zn 0,58 g/t Au 40,83 g/t Ag	1981-20.. (23)	Brouillan / 32 E/15 / 10/ **Rouyn-Noranda**
5	Raglan	Québec Mining Raglan Society Ltd	Magmatic massive sulfides lenses at the base of ultramafic flows	833 947 t at 3,47% Ni 0,99% Cu 0,26 g/t Au 2,87g/t Ag 0,06% Co	25 946 t Ni 7 161 t Cu 188 Kg Au 1 699 Kg Ag 465 t Co	Concentrator - Raglan / smelter - Sudbury / refinery - Norvège	**(2002)** 6 691 000 t at 3,04% Ni 0,81% Cu 0,05% Co	**(2002)** 11 418 000 t at 2,78% Ni 0,78% Cu 0,05% Co	**(2002)** 454	N.a.	1998-20... (6)	1998-20... (6)

Table I - Production of metallic substances in Québec (see figure I).

Precious metals : Au and Ag

Site	Mine	Companies	Summary description of the deposit	Ore process in 2003	Metal production in 2003	Ore processing in 2003	Proven mineral reserves (at January 1st 2004)	Probable mineral reserves (at January 1st 2004)	Employees in 2003	Cumulative production	Number of years of production	Township / NTS / Administrative area/ Mining district
6	Beaufor	Richmont Mines Inc.	Gold-bearing veins located inside of E-W shear zones at the margin of the Bourlamaque batholith	252 6011 t at 6,76 g/t Au	1 704 Kg Au	Camflo Mill	***923 680 t at 7,81 g/t Au	***767 338 t at 6,75 g/t Au	118	1 219 636 t at 7,96 g/t Au	1996-20.. (8)	Pascalis / 32 C/04 / 08 / **Val-d'Or**
7	Donald J.LaRonde	Agnico-Eagle Mines Ltd	Massive and semi-massive pyrite lenses in sericitized felsic volcanics and metamorphosed in andalusite and kyanite-bearing schists.	2 185 963 t at 3,63 g/t Au 75,2 g/t Ag 0,56% Cu 3,16% Zn	7 356,8 Kg Au 122 938,3 Kg Ag 9 739,16 t Cu 53 783,92 t Zn	Concentrator Division LaRonde, Preissac	**5 046 334 t at 2,27 g/t Au 107,3 g/t Ag 0,33% Cu 5,73% Zn	**30 590 467 t at 3,45 g/t Au 63,2 g/t Ag 0,37% Cu 2,93% Zn	520	14 191 516 t at 5,74 g/t Au 41,90 g/t Ag 0,42% Cu	1988-20.. (16)	Bousquet / 32 D/08 / 08 / **Rouyn-Noranda**
8	Doyon	Cambior Inc.	Veinlets and disseminated pyrite in sericite schists, in intermediate felsic volcanics and in Mooshla pluton.	1 169 637 t at 4,47 g/t Au 2,21 g/t Ag	4 979,8 Kg Au 2 331,8 Kg Ag	Doyon Mine	***3 005 600 t at 4,89 g/t Au	***3 458 800 t at 5,78 g/t Au	441	26 885 396 t at 5,82 g/t Au	1980-20.. (24)	Bousquet / 32 D/07 / 08 / **Rouyn-Noranda**
9	Géant Dormant	Cambior Inc. and Aurizon Mines Ltd	Gold-bearing quartz and sulfides veins at contact between dacitic intrusions and lava flows	176 500 t at 12,1 g/t Au 17,7 g/t Ag	2 071,3 Kg Au 3 126 Kg Ag	Sleeping Giant Mine	***150 000 t at 11,2 g/t Au 16,5 g/t Ag	***268 00 t at 12,1 g/t Au 17,5 g/t Ag	200	2 325 055 t at 10,09 g/t Au	1987-1991 1992-20.. (18)	Chaste / 32 F/04 / 10 / **Val-d'Or**
10	Joe Mann	Campbell Resources Inc.	Sulfides-bearing quartz veins in gabbro and sheared rhyolite	165 771 t at 7,84 g/t Au 4,73 g/t Ag 0,23% Cu	1 465 Kg Au 672 Kg Ag 365,5 t Cu	Campbell Mill (Merrill Island)	***173 328 t at 8,27 g/t Au 4,67 g/t Ag 0,25% Cu	***323 436 t at 9,17 g/t Au 4,67 g/t Ag 0,25% Cu	175	4 598 873 t at 7,59 g/t Au 0,23% Cu	1956-1959 1974-1975 1987-20.. (21)	Rohault / 32 G/08 / 10 / **Chibougamau**
11	Mouska	Mouska	Quartz veins in the Mooshla diorite close to the northern sheared contact.	108 677 t at 17,37 g/t Au	1 773,9 Kg Au	Doyon Mine	**129 000 t at 15,6 g/t Au	**163 000 t at 15,0 g/t Au	123	N.a.	1991-20.. (13)	Bousquet / 32 D/07 / 08 / **Rouyn-Noranda**
12	Troilus	Inmet Mining Corporation	Au-Cu porphyry in diorite	5 923 205 t at 1,048 g/t Au 0,109% Cu	5 103,5 Kg Au 6 236,1 Kg Ag 5 791 t Cu	Troilus Mine	***4 875 496 t at 0,58 g/t Au 0,07% Cu	***31 659 304 t at 0,945 g/t Au 0,08% Cu	308	35 668 531 t at 1,15 g/t Au 0,11% Cu	1997-20.. (7)	32 O/01/ 10/ **Chibougamau**

Table I - Production of metallic substances in Québec (see figure I).

Site	Mine	Companies	Summary description of the deposit	Total production in 2003	Total shipment in 2003	Shipment of iron pellets and concentrate in 2003	Reserves (at January 1st 2004)	Employees in 2003	Cumulative production	Years of production	Township / NTS / Administrative area/ Mining district
13	Mont Wright	Québec Cartier Mining Company	Specular hematite in metamorphosed iron formation of the Gagnon Group	13 329 955 t	13 619 241 t	8 874 718 t (pellets) 4 744 523 t (concentrate)	N.a.	1859 (Mt-Wright + Port -Cartier)	N.a.	1976-20.. (27)	Normanville / 23 B/14, 23 B/11 et 23 B/09 / 09 / **Sept-Îles**
14	Lac Tio	QIT Fer et Titane Inc.	Massive hemo-ilmenite in anorthosite associated with the Havre-Saint-Pierre intrusive suite.	N.a.	N.a.	N.a.	N.a.	N.a.	N.a.	1950-20.. (54)	Parker/ 12 L/09 et L/11 / 09 / **Sept-Îles**
15	Niobec	Cambior Inc. and SEQUOIA Minerals Inc.	Pyrochlore in the St-Honoré carbonatite	N.a.	N.a.	Niobec Mine (ferroniobium an aluminothermic converter)	**(2002)** Proven 8 910 000 t at 0,637 Nb_2O_5	N.a.	N.a.	1976-20.. (28)	Simard / 22 D/11 / 02 / **Montréal-Estrie-Laurentides**

Abbreviation List:

Au: Gold
Ag: Silver
Cu: Copper
BO: Biotite
CP: Chalcopyrite
PO: Pyrrhotite
PY: Pyrite
Ni: Niobium
SP: Sphalerite
Zn: Zinc
VMS: Volcanogenic massive sulfides
Ni: Nickel
N.a.: Non available
t: Metric ton

NOTE:

The data compiled in this table are preliminary and have been collected from mining companies before they published their financial statements.

The difference between proven mineral reserves and probable mineral reserves is defined according to the CIM standards.

The reserves compiled in this table take into consideration: * Ore losses
** Ore dilution
*** Ore losses and ore dilution
**** none of those factors

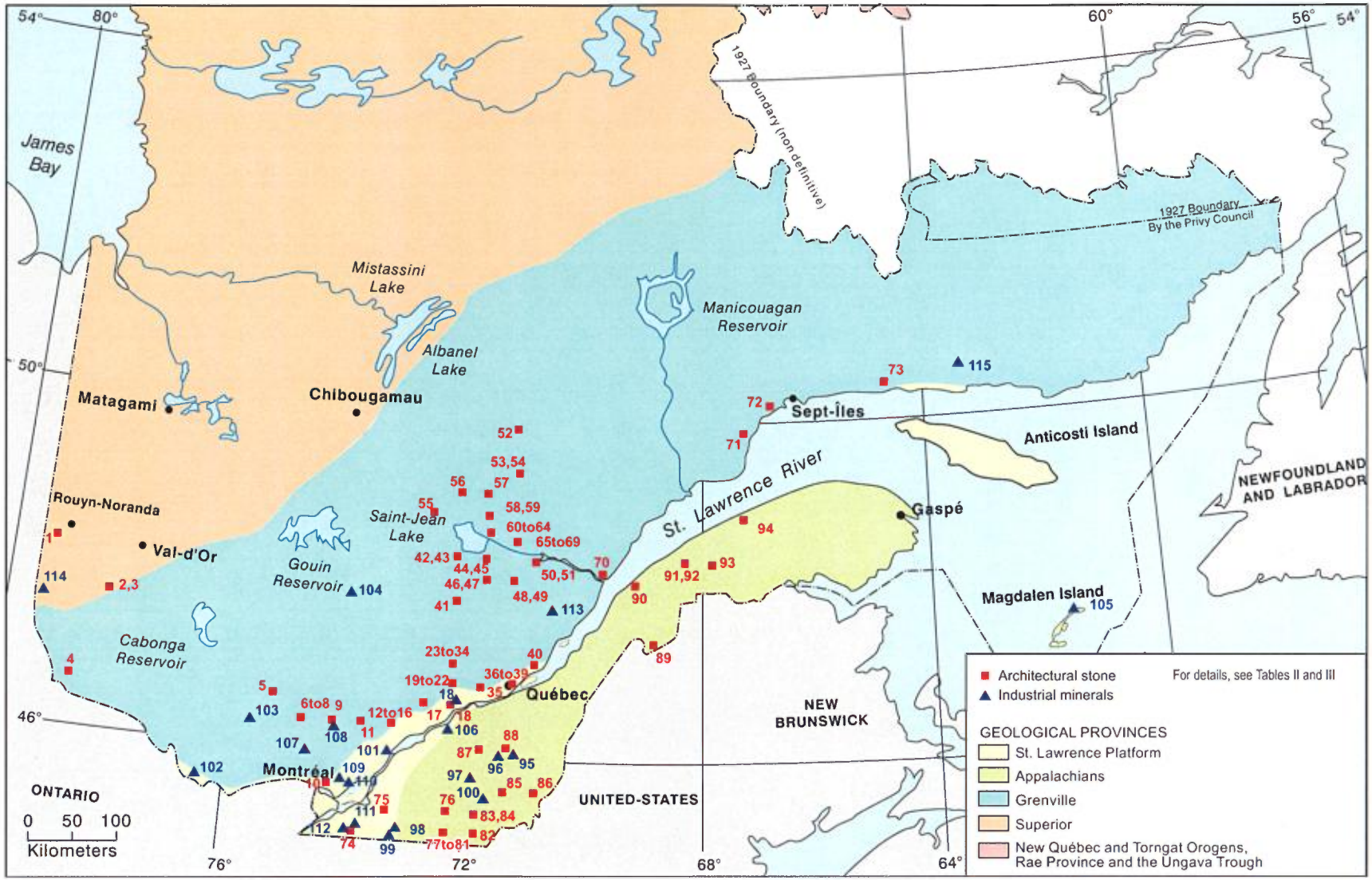

Figure II. Mining activities in Québec in 2003. Architectural stone and industrial minerals.

TABLE II – Architectural stone quarries exploited in Quebec in 2003 (see figure II).

SITE	LOCATION	COMPANIES	ROCK TYPE / PRODUCTS*	COMMERCIAL NAME	NTS / ADMINIS-TRATIVE REGION	TITLE
1	Beaudry	Les Pierres du Nord	Biotite schist - 3	Schiste Nordic	32 D/03 - 08	BEX 086
2	Winneway	Polycor Inc.	Granite - 1	Winneway	31 M/09 - 08	BEX 167
3	Winneway	Polycor Inc.	Granite - 1	Winneway	31 M/09 - 08	BEX 323
4	Téminscaming	Les Pierres du Nord	Muscovite quartzite - 3	Aventurine	31 L/10 - 08	BEX 355
5	Guénette	Rock of Ages du Canada	Monzogranite - 1, 2	Laurentian Pink, Autumn Pink	31 J/11- 15	CM 079
6	Labelle	R. Durand	Paragneiss - 3	–	31 J/07 - 15	BEX 076
7	Labelle	Les Pierres Mitchell	Paragneiss - 3	–	31 J/07 - 15	BEX 330
8	Labelle	Les Pierres Mitchell	Paragneiss - 3	–	31 J/07 - 15	BEX 337
9	Saint-Donat-de-Montcalm	Les Carrières F. L. Inc.	Gneiss - 3	–	31 J/08 - 14	BEX 140
10	Mirabel	Les Pierres Saint-Canut	Sandstone - 3	Saint-Canut Sandstone	31 G/09 - 15	No
11	Notre-Dame-de-la-Merci	A. Lacroix et Fils Granit Ltée	Anorthosite - 1	Orion	31 I/05 - 14	BEX 255
12	Saint-Didace	A. Lacroix et Fils Granit Ltée	Quartz mangerite - 1	Nordix Red	31 I/06 - 14	No
13	Saint-Alexis-des-Monts	Firstake Capital Corporation	Quartz mangerite - 1	Diamond Brown	31 I/06 - 04	BEX 174
14	Saint-Alexis-des-Monts	Firstake Capital Corporation	Quartz mangerite - 1	Diamond Brown, Auburn	31 I/06 - 04	No
15	Saint-Alexis-des-Monts	Granicor Inc.	Quartz mangerite - 1, 4	Autumn Brown	31 I/06 - 04	No
16	Saint-Alexis-des-Monts	Polycor Inc.	Quartz mangerite - 1	Newton Brown	31 I/06 - 04	No
17	Shawinigan	Les Entreprises Élie Grenier	Gneiss - 3	–	31 I/10 - 04	No
18**	Saint-Marc-des-Carrières	Graymont (Portneuf)	Limestone - 1	Saint-Marc Limestone	31 I/09 - 03	No
19	Rousseau Mills	Polycor Inc.	Farsundite - 1	Greyish Pink	31 I/16 - 03	No
20	Rivière-à-Pierre	Polycor Inc.	Quartz mangerite - 1	Boreal Green	31 I/16 - 03	BEX 333
21	Rivière-à-Pierre	Polycor Inc.	Farsundite - 1	Riviera	31 I/16 - 03	BEX 114
22	Rivière-à-Pierre	Granicor Inc.	Farsundite - 1, 4	New New	31 I/16 - 03	No
23	Rivière-à-Pierre	A. Lacroix et Fils Granit Ltée	Gneiss - 1	Silver Mist	31 P/01 - 03	BEX 378
24	Rivière-à-Pierre	A. Lacroix et Fils Granit Ltée	Quartz mangerite - 1	Atlantic Blue	31 P/01 - 03	BEX 178, 372
25	Rivière-à-Pierre	A. Lacroix et Fils Granit Ltée	Farsundite - 1 Deer Brown D.D.	Deer Brown, Atlantic Green,	31 P/01 - 03	BM 723, 746, BEX 366, 367

TABLE II – Architectural stone quarries exploited in Quebec in 2003 (see figure II).

SITE	LOCATION	COMPANIES	ROCK TYPE / PRODUCTS*	COMMERCIAL NAME	NTS / ADMINIS-TRATIVE REGION	TITLE
26	Rivière-à-Pierre	A. Lacroix et Fils Granit Ltée	Farsundite, quartz mangerite - 1	Forest Green, Atlantic Green, Atlantic Blue	31 P/01 - 03	CM 488
27	Rivière-à-Pierre	A. Lacroix et Fils Granit Ltée	Quartz mangerite - 1	Forest Green	31 P/01 - 03	BEX 349
28	Rivière-à-Pierre	Granicor Inc.	Quartz mangerite, farsundite - 1, 4	Nara	31 P/01 - 03	BEX 231
29	Rivière-à-Pierre	Granicor Inc.	Farsundite - 1, 4	Abbey Rose	31 P/01 - 03	No
30	Rivière-à-Pierre	Granicor Inc.	Quartz mangerite, quartz jotunite - 1, 2, 4	Prairie Green	31 P/01 - 03	BEX 164, 165
31	Rivière-à-Pierre	Granite D. R. C. Inc. / Stone Vogue International	Farsundite - 1, 3, 4	Canadian Caledonia	31 P/01 - 03	No
32	Rivière-à-Pierre	Polycor Inc.	Quartz mangerite - 1	Galaxy	31 P/01 - 03	BEX 401
33	Rivière-à-Pierre	Polycor Inc.	Farsundite - 1, 4	Caledonia	31 P/01 - 03	BEX 033
34	Rivière-à-Pierre	Polycor Inc.	Farsundite - 1, 4	Caledonia	31 P/01 - 03	No
35	Saint-Raymond	A. Lacroix et Fils Granit Ltée	Gneiss - 1	Rainbow	21 L/13 - 03	No
36	Sainte-Foy	Agrégats Ste-Foy	Gneiss - 3	–	21 L/14 - 03	No
37	Québec	Carrière Union	Limestone - 3	–	21 L/14 - 03	No
38	Charlesbourg	Construction B. M. L.	Limestone - 3	–	21 L/14 - 03	No
39	Château-Richer	Carrière Laplante	Limestone - 3	–	21 L/14 - 03	No
40	Saint-Joachim	Ladufo Inc.	Limestone - 3	–	21 M/02 - 03	No
41	La Tuque	Granitslab International Inc.	Gabbro - 1	Heritage Black	31 P/16 - 04	BEX 405
42	Saint-François-de-Sales	Granite Aurélien Tremblay	Quartz mangerite - 1	Spring Green	32 A/08 - 02	BEX 203
43	Chambord	Granite Aurélien Tremblay	Limestone - 1	Chambord Limestone	32 A/08 - 02	No
44	Métabetchouan	Polycor Inc.	Farsundite - 1	Canadian Violetta	22 D/05 - 02	No
45	Saint-André-du-Lac-Saint-Jean	J.-G. Simard	Limestone - 1	Saint-André Green	22 D/05- 02	BEX 080
46	Mont-Apica	Polycor Inc.	Quartz jotunite - 1, 2	Laurentian Green	22 D/04 - 02	BEX 210, 228
47	Parc des Laurentides	Granicor Inc.	Quartz mangerite - 1, 4	Laurentian Green	22 D/04 - 02	BEX 421
48	Parc des Laurentides	Granite Aurélien Tremblay	Farsundite - 1	Autumn Harmony	22 D/03 - 02	BEX 225

TABLE II – Architectural stone quarries exploited in Quebec in 2003 (see figure II).

SITE	LOCATION	COMPANIES	ROCK TYPE / PRODUCTS*	COMMERCIAL NAME	NTS / ADMINISTRATIVE REGION	TITLE
49	Laterrière	Firstake Capital Corporation	Stromatolite dolostone block - 3	Pikauba Stone	22 D/03 - 02	BEX 343
50	La Baie	Polycor Inc.	Farsundite - 1	Polychrome	22 D/07 - 02	No
51	La Baie	Granicor Inc.	Farsundite - 1, 4	Polychrome	22 D/07 - 02	No
52	Chute-des-Passes	A. Lacroix et Fils Granit Ltée	Gneiss - 1	New Rainbow	22 E/14 - 02	BEX 377
53	Chute-des-Passes	Polycor Inc.	Gabbroic anorthosite - 1	Noir Kodiac	22 E/06 - 02	BEX 402
54	Chute-des-Passes	Granite Péribonka	Monzodiorite - 1	Grizzly	22 E/06 - 02	BEX 353
55	Saint-Thomas-Didyme	Granicor Inc.	Quartz mangerite - 1, 4	Acajou	32 A/15 - 02	No
56	Mistassini	A. Lacroix et Fils Granit Ltée	Monzogabbro, charnockite - 1	–	32 H/01 - 02	BEX 351, 352
57	Chute-des-Passes	Polycor Inc.	Farsundite - 1	Astra	22 E/04 - 02	BEX 001
58	Chute-du-Diable	Granicor Inc.	Anorthosite - 1, 2, 4	Peribonka	22 D/13 - 02	No
59	Chute-du-Diable	Granicor Inc.	Anorthosite - 1, 2, 4	Peribonka	22 D/13 - 02	No
60	Saint-Henri-de-Taillon	Granite Aurélien Tremblay	Anorthosite - 1, 2, 4	Peribonka Northern Black	22 D/12 - 02	No
61	Saint-Nazaire	Granicor Inc.	Leucogabbronorite - 1, 2, 4	Cambrien	22 D/12 - 02	BEX 332
62	Saint-Nazaire	Polycor Inc.	Leucogabbronorite - 1, 2	Cambrien Black	22 D/12 - 02	BM 705 (2 quarries)
63	Saint-Nazaire	A. Lacroix et Fils Granit Ltée	Leucogabbronorite - 1	Atlantic Black, Nordix Green	22 D/12 - 02	BEX 148
64	Saint-Nazaire	A. Lacroix et Fils Granit Ltée	Leucogabbronorite - 1	Nordix Green, Atlantic Black, Forest Black	22 D/12 - 02	No (2 quarries)
65	Bégin	A. Lacroix et Fils Granit Ltée	Quartz mangerite - 1	Atlantic Pink	22 D/11 - 02	No
66	Bégin	Granite Aurélien Tremblay	Quartz mangerite - 1	Wild Pink	22 D/11 - 02	No
67	Bégin	Granicor Inc.	Quartz mangerite - 1, 4	Granville	22 D/11 - 02	No
68	Saint-Honoré	Les Pierres Naturelles Tremblay	Limestone - 3	–	22 D/11 - 02	No
69	Chicoutimi	Carrière 500	Limestone - 3	–	22 D/06 - 02	No
70	Grandes-Bergeronnes	Granicor Inc.	Gneiss - 1, 4	Tadoussac	22 C/04 - 09	No
71	Rivière-Pentecôte	Polycor Inc.	Anorthosite - 1	Nordic Black	22 G/14 - 09	BEX 155
72	Gallix	Polycor Inc.	Gneiss - 1	Gallix	22 J/02 - 09	BEX 262

TABLE II – Architectural stone quarries exploited in Quebec in 2003 (see figure II).

SITE	LOCATION	COMPANIES	ROCK TYPE / PRODUCTS*	COMMERCIAL NAME	NTS / ADMINIS-TRATIVE REGION	TITLE
73	Magpie	Polycor Inc.	Mangerite -1	Picasso	22 I/07 - 09	BEX 419, BNEP 695
74	Havelock	Les Carrières Ducharme	Sandstone - 3	Ducharme	31 H/04 - 16	No
75	Saint-Jean-sur-Richelieu	P. Baillargeon	Limestone - 3	–	31 H/06 - 16	No
76	Stukely-Sud	Consultants R. L. Jomphe	Marble - 1	–	31 H/08 - 05	No
77	Stanstead	Granit Marlington	Granodiorite - 3	Bofalec Grey	31 H/01 - 05	No
78	Stanstead	Polycor Inc.	Granodiorite - 1, 2	Stanstead Grey	31 H/01 - 05	No
79	Stanstead	Granit Export	Granodiorite - 1	–	31 H/01 - 05	No
80	Stanstead	Rock of Ages du Canada	Granodiorite - 1, 2	Stanstead Gray	31 H/01 - 05	No
81	Stanstead	Centre du Granite Beebe	Granodiorite - 1, 3	Stanstead Light	31 H/01 - 05	No
82	Stanhope	Granicor Inc.	Granodiorite - 1, 2, 4	Snow White	21 E/04 - 05	No
83	Bromptonville	Carrière Ardoise 55	Slate - 3	–	21 E/05 - 05	No
84	Bromptonville	Carrière Ardobec	Slate - 3	–	21 E/05 - 05	No
85	Saint-Gérard	Granite Aurélien Tremblay	Granite - 1	Birch White, Frosty Green	21 E/11 - 05	CM 170, CM 308, CM 336, CM 400, CM 521
86	Saint-Sébastien	Polycor Inc.	Granite - 1	San Sebastian Grey	21 E/10 - 05	No
87	Saint-Ferdinand	A. Langlois et Fils Ltée	Sandstone - 3	–	21 L/04 - 17	No
88	East Broughton	Les Pierres Stéatites	Steatite, talc-carbonate rock - 6	–	21 L/03 - 12	No
89	Saint-Marc-du-Lac-Long	Carrière Glendyne	Slate - 3, 5	La Canadienne	21 N/07 - 01	No
90	Saint-Mathieu	J.-C. Ouellette	Sandstone - 3	–	22 C/03 - 01	No
91	Mont-Lebel	Les Pierres Naturelles du Québec	Siltstone - 3	–	22 C/08 - 01	No
92	Mont-Lebel	A. Jean	Siltstone - 3	–	22 C/08 - 01	No
93	Saint-Cléophas	Carrière Bernier	Siltstone - 3	–	22 B/05 - 01	No (2 quarries)
94	Sainte-Félicité	Polycor Inc.	Sandstone - 1	Matanais Sandstone	22 B/14 - 01	No

* 1 – Dimension stone; 2- Tombstone; 3- Building stone, landscaping, flagstone, paving stone; 4- Curbstones; 5- Roofing tiles: 6- Blocks for sculpture, refractory plates.
** Quarry exploited for architectural stone and for the industrial stone.

TABLE III - Industrial minerals quarries in production in Quebec in 2002 (see figure II).

SITE	QUARRY	COMPANIES	DESCRIPTION OF DEPOSIT	PRODUCTS	COUNTY / NTS ADM. AREA
Asbestos (chrysotile)					
95	Bell	LAB Chrysotile	Vein system (stockwork) in serpentinized ultramafic rocks	Chrysotile asbestos fibre	Thetford / 21 L/03 / 12
96	Black Lake	LAB Chrysotile	Veins system (stockwork) in serpentinized ultramafic rocks	Chrysotile asbestos fibre	Ireland / 21 L/03 / 12
97	Jeffrey	JM Asbestos	Vein system (stockwork) in serpentinized ultramafic rocks	Chrysotile asbestos fibre	Shipton / 21 E/13 / 12
High purity limestone					
18	Calco	Graymont (Portneuf)	Deschambault Formation limestone	Crushed stone, crushed limestone products for industrial use	Seigneurie de Grondines/ 31 I/09 / 03
98	Bedford	Graybec (Bedford division)	Corey Formation limestone	Lime, crushed limestone products for industrial use, crushed stone	Stanbridge / 31 H/03 / 16
99	Saint-Armand Ouest	Omya St.-Armand	Strites Pond Formation marble	Pulverized limestone for mineral	Seigneurie de Saint-Armand / 31 H/03 / 16
100	Domlim #5 et Domlim #6	Graybec (Marbleton division)	Lac Aylmer Group limestone	Lime, crushed limestone products for industrial use, crushed stone	Dudswell / 21 E/12 / 12
101	Joliette	Graybec (Joliette division)	Deschambault Formation limestone	Lime, crushed limestone products for industrial use, crushed stone	Lavaltrie / 31 I/03 / 14
High purity dolomite and dolomitic marble					
102	Portage-du-Fort	Dolomex	Precambrian dolomitic marble	Agricultural lime, fine powders for industrial use, decorative crushed stone	Litchfield / 31 F/10 / 07
Graphite					
103	Lac-des-Îles	Timcal Canada	Disseminated graphite flakes in crystalline limestone (± quartzite)	Graphite concentrate for refractory materials, foundry moulds, lubricants, brake linings	Bouthillier / 31 J/05 / 15

TABLE III - Industrial minerals quarries in production in Quebec in 2002 (see figure II).

SITE	QUARRY	COMPANIES	DESCRIPTION OF DEPOSIT	PRODUCTS	COUNTY / NTS ADM. AREA
Mica					
104	Letondal	Les Produits Mica Suzorite	Lenticular alkaline intrusion with 80-85% phlogopite (suzorite variety)	Crushed mica mineral filler (plastic, joint cement, drilling mud)	Suzor / 31 O/16 / 04
Salt					
105	Seleine	La Société canadienne de sel (division Mine Seleine)	Carboniferous salt dome	De-icing salt	Îles-de-la-Madeleine / 11 N/12 / 11
106	Puits Bécancour et Saint-Angèle	Junex	Brines	De-icing products and dust reducers	Bécancour / 31 G/08 /17
Silica					
107	Saint-Rémi d'Amherst	Société minière Gerdin	Precambrian quartzite	Silica sand for cements	Amhurst / 31 G/15 /15
108	Saint-Donat	Unimin Canada (Saint-Donat division)	Precambrian quartzite	Silica sand	Lussier / 31 J/08 / 14
109	Saint-Canut	Unimin Canada (Saint-Canut division)	Postdam Group sandstone	Silica sand for glasswork, sand-blasting, filtration, siliceous bricks	Lac-des-Deux-Montagnes-3 / 31 G/09 / 15
110	Saint-Joseph-du-Lac	La Cie Bon Sable	Natural sand	Washed sand for masonry and sandblasting	Lac-des-Deux-Montagnes-1 / 31 H/12 / 15
111	Sainte-Clotilde	Les Sables Silco	Postdam Group sandstone	Siliceous crushed stone for cements and ferro-silicon	Beauharnois-1 / 31 H/04 / 16
112	Ormstown	La Cie Bon Sable (Ormstown division)	Natural sand	Washed sand for sandblasting, foundry, mixtures for ceramic glue	Beauharnois-2 / 31 H/04 / 16
113	Petit lac Malbaie	Sitec inc.	Quartzite	Silicon pieces for metal and silica sand for silicon carbide	Charlevoix / 21 M/15 / 03
114	Saint-Bruno-de-Guigues	Temisca Silice	Ordovician sandstone	Sand for filtration, foundry, hydraulic fracturing	Guigues / 31 M/06 / 08

TABLE III - Industrial minerals quarries in production in Quebec in 2002 (see figure II).

SITE	QUARRY	COMPANIES	DESCRIPTION OF DEPOSIT	PRODUCTS	COUNTY / NTS ADM. AREA
Titanium					
115	Lac Tio	QIT Fer et Titane Inc.	Massive hemo-ilmenite in Havre-Saint-Pierre anorthosite complex	Titanium slags for pigment production, cast iron and crushed ilmenite (Sorel flux)	Parker / 12 L/11 / 09

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References

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