DV 2005-02

REPORT ON MINERAL EXPLORATION ACTIVITIES IN QUEBEC

Documents complémentaires

Additional Files

Licence

License

Énergie et Ressources naturelles
Québec

Report on mineral exploration activities in Québec

2004

DV 2005-02

Québec

Report on mineral exploration activities in Québec

2004

DISCLAIMER

The data compiled in this report come from a several 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, despite the editing of the document by an external editor and a final review of the contents by Ministry personnel.

ACKNOWLEDGEMENTS

The authors would like to thank the following people who have contributed to this report:

Huguette Boucher
Maryse Dionne
Manon Dufour
Jenifer d'Anjou
Éric Grégoire
Sylvain Lacroix
Steve Ouellet
Sylvie Ouellette
Monique Perreault
Lucie Pouliot
Lina Sohier
Michelle Vézina

PUBLISHED BY "GÉOLOGIE QUÉBEC"

Director
Alain Simard

Service à la clientèle de l'exploration et du marketing
Chantal Dussault

Service géologique de Québec
Pierre Verpaelst

Page make-up
Julie Royer

Technical supervision
Charlotte Grenier

Cover pages
Graphic design: Charlotte Grenier
Front photographs: Main Image: Shaft construction at the Lapa project (Agnico-Eagle Mines Ltd)

Image on the left: Shaft collar under construction at the Casa Berardi mine project (Aurizon Mines Ltd)

Image in the center: Diamond drilling in Ungava (Canadian Royalties Inc.)

Image on the right: Shaft collar under construction at the Lapa project (Agnico-Eagle Mines Ltd)

Back Cover Photographs: Image on the left: Shaft construction at the Lapa project (Agnico-Eagle Mines Ltd)

Image in the center: Côte-Nord (Abdelali Moukhsil)

Image on the right: Shaft collar under construction at the Lapa project (Agnico-Eagle Mines Ltd)

Dépôt légal – Bibliothèque nationale du Québec
ISBN : 2-551-22674-0

Highlights

This annual report for 2004 provides an overview of mineral exploration projects in the geological provinces and major assemblages of Québec and outlines the mineral potential of Québec's landmass. In 2004, exploration and deposit appraisal expenditures are estimated at $204M. This is a 52% increase relative to 2003. This hike reflects higher expenditures for precious metals (+61% to reach $109M), base metals (+46% to reach $61M) and diamond (+48% to $27M).

For the year 2004, the "Eleonore" gold discovery by **Virginia Gold Mines Inc.** in Québec's Near North near the Opinaca reservoir, was certainly the most important event in exploration in Québec. Other promising finds include the base metal discovery on the "Lac Montbray" property west of Rouyn-Noranda, by **Noranda Inc.** and **Alexis Minerals Corporation**, and the intersection of a massive sulphide lens, dubbed "Renaissance", by **Noranda Inc.** in the Matagami area.

In Québec's Far North, **Canadian Royalties Inc.** pursued its exploration efforts on the Expo-Ungava property, located 15 km south of the Raglan mine. At the Mesamax deposit, indicated resources were increased to 1.84 Mt at 1.9% Ni, 2.3% Cu, and 5.2 g/t Pt+Pd. Near the Mesamax deposit, **Canadian Royalties Inc.** also discovered another high-grade Ni-Cu-Pt-Pd showing near surface (2.25% Ni, 5.70% Cu, and 10.01 g/t Pt+Pd over 56.6 m; drillhole MXNW-04-110). **Knight Resources Ltd.** and **Anglo American Exploration (Canada) Ltd** reported several interesting intercepts, including 24.5 m grading 1.71% Ni, 0.8% Cu, and 1.33 g/t Pt+Pd. **Goldbrook Ventures Inc.** also reported the discovery of high-grade Ni-Cu-Pt-Pd showings on its Bélanger property. One drillhole yielded average grades of 1.35% Ni, 0.61% Cu, and 2.88 g/t Pt+Pd over a 49.35-m interval.

In the search for precious and base metals, northwestern Québec remains a prime target area. Several gold projects, some of which have reached an advanced stage, were underway this past year. In September 2004, **Aurizon Mines Ltd** began preparation work to sink a shaft on the Casa Berardi project. West of Rouyn-Noranda, on the Lac Montbray property, partners **Noranda Inc.** and **Alexis Minerals Corporation** reported an impressive intercept of 5.16 m grading 5.61% Cu, 1.70% Zn, 0.34 g/t Au, and 17.6 g/t Ag, at a vertical depth of 110 m. In the Cadillac area, mining operations resumed at the Mouska gold mine (**Cambior Inc.**) in early October, following the completion of a shaft-deepening program. Accessing new ore zones has added three years to the mine life. On the Noralex property, located 10 km northwest of the Doyon and Mouska mines, **Alexis Minerals Corporation** and **Noranda Inc.** intersected gold-bearing veins grading 3.19 g/t over 15 m in drillhole. **Agnico-Eagle Mines Ltd** launched a $30M program on the Lapa property near Rouyn-Noranda, which includes shaft sinking, underground development, drilling and metallurgical testing. Reserves and resources are estimated at 4.9 Mt at a grade of 8.23 g/t Au. At the Kiena mine complex, **Wesdome Gold Mines Inc.** is conducting a drilling and drift development program. Drillholes intersected gold grades, including 3.03 g/t Au over 9 m along the extension of zone S-50. Near Malartic, **Richmont Mines Inc.** drove an exploration ramp on its East Amphi property. An underground exploration campaign involving 9,000 m of drilling is planned, and a decision concerning the start-up of commercial production at the East Amphi deposit will be taken in the summer 2005. In the Val-d'Or area, **Agnico-Eagle Mines Ltd** began work to rehabilitate mining infrastructure on the Goldex property. Some $10M will be invested to increase the level of confidence in the probable reserve estimate, which currently stands at 21.77 Mt at a grade of 2.4 g/t Au. **Century Mining Corp.** completed, in 2004, the acquisition of the Sigma-Lamaque mining complex from **McWatters Mining Inc.** Operations were suspended at the mine in October 2003. A drill program was launched in October 2004, in order to increase the level of confidence in the gold resource estimate at the open pit mine. East of Val-d'Or, a drillhole by **Alexis Minerals Corporation** testing the Hogg showing on the Cadillac Group project intersected a skarn-type mineralized zone grading 21.2 g/t Au and 0.56% Cu over 3.8 m. In the Matagami area, **Noranda Inc.** intersected in drillhole 6.9 m of massive and semi-massive sulphides at 465 m depth. The new showing is called "Renaissance". It is located just 7 km southeast of the company's existing infrastructure. In the central part of the Urban-Barry belt, located 120 km east of Lebel-sur-Quévillon, **Noront Resources Ltd** completed a drill campaign on the Windfall Lake property. Several drillholes intersected pyrite-rich zones with significant gold grades such as 8.55 g/t Au over 13.4 m. As of October 1, 2004, **Campbell Resources Inc.** had completed nearly 9,000 m of definition drilling at the Copper Rand mine, in Chibougamau. Ore extraction began in November and commercial production is slated to begin in January 2005.

The James Bay region continues to attract interest for its diamond potential. The Monts Otish area was certainly the most active. Thus, **Ashton Mining of Canada Inc.** and **SOQUEM INC.** performed drilling and bulk sampling, to extract a total of 639 tonnes of kimberlitic material from the Renard 2, 3, 4, and 65 bodies on the Foxtrot property. To date, 28 diamonds larger than 0.5 carat have been recovered, including 5 stones exceeding 1.0 carat in size. In February 2004, processing of a 3.87-tonne sample of erratic boulders from the Lynx property, adjacent to Foxtrot, yielded an estimated diamond content of 120 carats per 100 tonnes. **Majescor Resources Inc.** confirmed the discovery, on its Portage property, of several kimberlite blocks up to 50 cm in size. A total of 32 diamonds larger than 0.075 mm were recovered from a 136.65-kg sample of kimberlitic float. In the Near North region, near the Opinaca reservoir, **Virginia Gold Mines Inc.** defined, on surface and in drillhole, a high-grade gold system, which extends for roughly 300 m along strike to a depth of more than 225 m. The project is called "Eleonore", and the gold system comprises two main zones: *Roberto* (18.85 g/t Au

over 16 m; drillhole ELE-04-02) and *Roberto East* (4.05 g/t Au over 17 m; drillhole ELE-04-37). This new high-grade gold setting attracted much attention, which translated into claim acquisitions in the area. In the La Grande greenstone belt, **Virginia Gold Mines Inc.** and its partner **Noranda Inc.** announced the discovery of volcanogenic massive sulphide lenses on the Coulon property, namely in the *DOM* area (9.94% Zn, 2.12% Pb, 0.73% Cu, and 96.38 g/t Ag over 19.5 m; drillhole CN04-17) and the DOM NORD area (12.65% Zn, 1.54% Pb, 1.36% Cu, 125.31 g/t Ag, and 0.3 g/t Au over 4.7 m; drillhole CN04-23).

In the Far North region, **Virginia Gold Mines Inc.** and **BHP-Billiton** completed a $1M drill program on the Gayot project. With uranium prices on the rise, **Strathmore Minerals Corp.** acquired the mining rights of the Dieter Lake property, located about 110 km northwest of the Caniapiscau reservoir, where geological resources are estimated between 10 and 15 million metric tonnes at a grade of 0.25% U_3O_8 or 50 million metric tonnes at a grade of 0.10% U_3O_8.

In the eastern Grenville Province in the Côte-Nord region, **Quinto Technology Inc.** conducted extensive exploration work, which led to the discovery of a Ni-Cu showing at Lac Paradis, near the Daniel-Johnson dam. This showing yielded significant nickel (up to 5.26%) and copper (up to 2.2%) grades. **9083-5596 Québec Inc.** continued its drill program launched in 2002 on the Lac Desautels project, located some 70 km northwest of Girardville, in the Lac Saint-Jean region. The company has completed nearly 8,000 m of drilling to date, in order to delineate a high-tonnage low-grade nickel-copper deposit. In the Gaspésie region, **Appalaches Resources Inc.** is drill-testing deep-seated geophysical anomalies outlined during a recent geophysical survey on its Mont-de-l'Aigle property in Lemieux Township.

Architectural stone is fast becoming a coveted commodity in Québec. Québec's bedrock contains magnificent varieties of stone that adorn buildings and various architectural works throughout the world. Québec granite will namely be used to rebuild certain buildings destroyed during the September 11, 2001 attacks in New York City. Several companies are involved in this field. In 2004, **NAMCA Inc.** successfully completed development work at two deposits; a pinkish violet limestone breccia deposit in Maria and a whitish grey calcilutite deposit in Saint-Armand. **Granijem Inc.** launched the production of a mangerite-type stone reputed for its green colour, near the town of Magpie in the Côte-Nord region. To support the architectural stone industry in Québec, the **Ministère des Ressources naturelles, de la Faune et des Parcs (MRNFP)** has inserted in its website a page devoted to the exploration and extraction of these commodities.

In the field of industrial minerals, **Junex Inc.** drilled two new brine wells in Bécancour. With the start-up of production at the two wells, the company will be able to increase its daily output capacity of natural brine. In the Côte-Nord region, **Quinto Technology Inc.** and **SOQUEM INC.** continued their exploration program launched in 2002 to define the graphite potential at Lac Guéret, near the Daniel-Johnson dam. In the Labrieville area, north of Forestville, **Quinto Technology Inc.** launched an exploration program on the Lac Brûlé hemo-ilmenite deposit. Analytical results indicate an interesting titanium dioxide content, at about 35% TiO_2.

In the field of construction materials, the **MRNFP** discovered a potential cement stone deposit in the Percé area. A preliminary assessment of the limestones reveals CaO grades of about 48-50%, which would meet industry requirements. Access to several hundred million tonnes of reserves is easily feasible.

With metal prices on the rise, the year 2005 promises to be an exciting one for the exploration industry in Québec. We believe that northwestern Québec, the Monts Otish area and the Ungava Trough will remain the busiest in terms of exploration. The search for gold, diamond, copper, zinc, and nickel will attract investments in Québec, which remains largely underexplored.

M. Alain Simard, directeur
Direction de Géologie Québec
5700, 4e Avenue Ouest, suite A-208
Charlesbourg (QC) G1H 6R1
Phone: (418) 627-6274
Fax: (418) 643-2816
alain.simard@mrnfp.gouv.qc.ca

M. Pierre Verpaelst, chef de service
Service géologique de Québec
5700, 4e Avenue Ouest, suite A-210
Charlesbourg (QC) G1H 6R1
Phone: (418) 627-6276, extension 5059
Fax: (418) 643-2816
pierre.verpaelst@mrnfp.gouv.qc.ca

M. Robert Marquis, chef de service
Service géologique du Nord-Ouest
400, boul. Lamaque, suite 1.02
Val-d'Or (QC) J9P 3L4
Phone: (819) 354-4514, extension 232
Fax: (819) 354-4558
robert.marquis@mrnfp.gouv.qc.ca

Mme Chantal Dussault, chef de service
Service à la clientèle de l'exploration
et du marketing
5700, 4e Avenue Ouest, suite A-208
Charlesbourg (QC) G1H 6R1
Phone: (418) 627-6392, extension 5281
Fax: (418) 643-2816
chantal.dussault@mrnfp.gouv.qc.ca

M. Patrick Rissmann, chef de service
Service de la géoinformation
5700, 4e Avenue Ouest, suite A-214
Charlesbourg (QC) G1H 6R1
Phone: (418) 627-6269, extension 5219
Fax: (418) 643-2816
patrick.rissmann@mrnfp.gouv.qc.ca

1 - CHIBOUGAMAU
375, 3e Rue, suite 2
Chibougamau (QC) G8P 1N4
patrick.houle@mrnfp.gouv.qc.ca
M. Patrick Houle
Phone: (418) 748-2663
Fax: (418) 748-6061

2 - MONTRÉAL
Complexe FTQ
545, boul. Crémazie Est, suite 1110
Montréal (QC) H2M 2V1
serge.perreault@mrnfp.gouv.qc.ca
M. Serge Perreault
Phone: (514) 873-8814,
Extension 291
Fax: (514) 873-8983

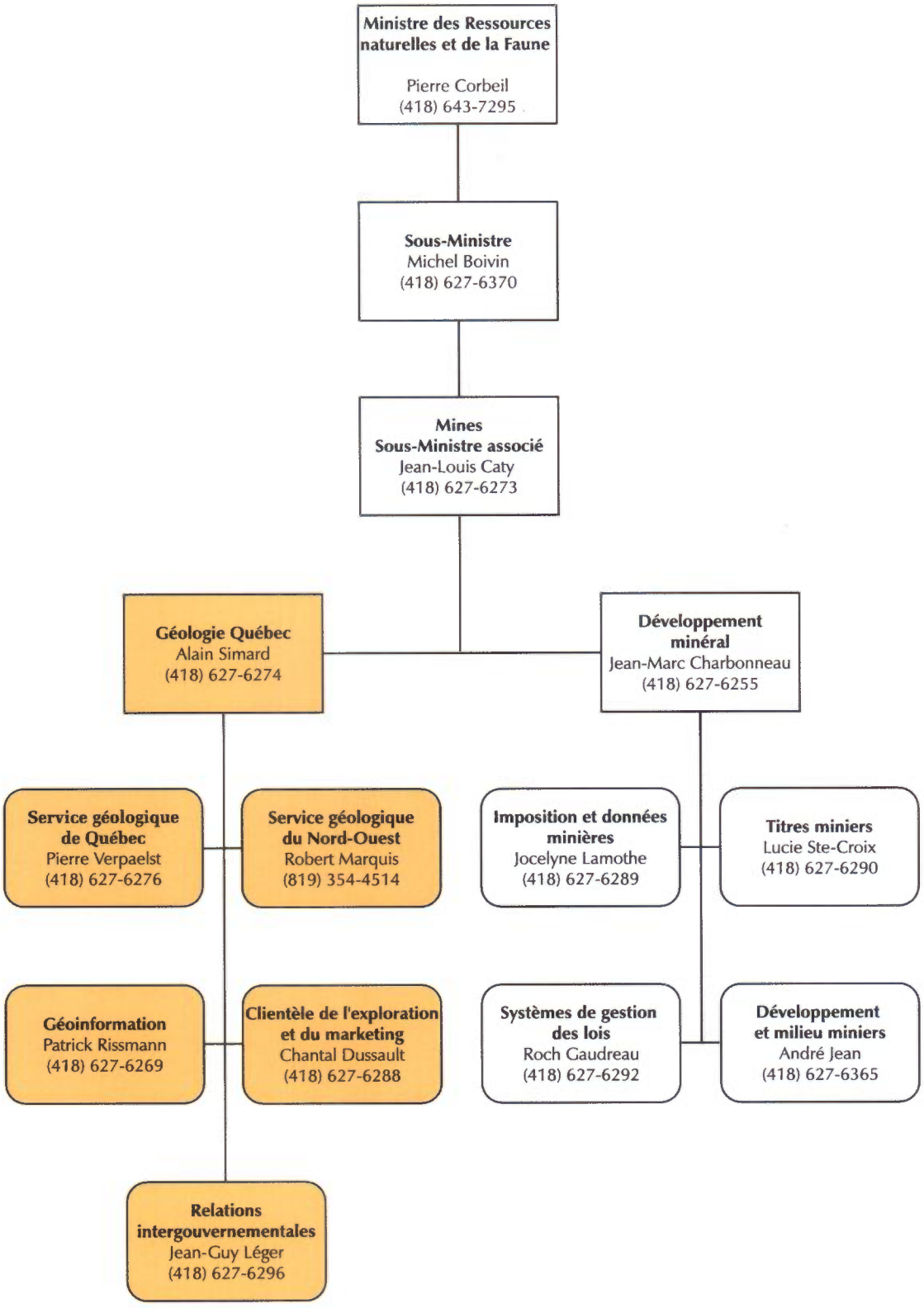
3 - ROUYN-NORANDA
82, boul. Québec
Rouyn-Noranda (QC) J9X 6R1
pierre.doucet@mrnfp.gouv.qc.ca
M. Pierre Doucet
Phone: (819) 763-3748,
Extension 300
Fax: (819) 763-3798

4 - SAINTE-ANNE-DES-MONTS
124, 1re Avenue Ouest, suite 1.07
Sainte-Anne-des-Monts (QC) G4V 1C5
serge.lachance@mrnfp.gouv.qc.ca
M. Serge Lachance
Phone: (418) 763-3622
Fax: (418) 763-2958

5 - VAL-D'OR
400, boul. Lamaque, suite 1.02
Val-d'Or (QC) J9P 3L4
james.moorhead@mrnfp.gouv.qc.ca
M. James Moorhead
Phone: (819) 354-4735,
Extension 242
Fax: (819) 354-4558

6 - SEPT-ÎLES
456, av. Arnaud, suite 1.04
Sept-Îles (QC) G4R 3B1
abdelali.moukhsil@mrnfp.gouv.qc.ca
M. Abdelali Moukhsil
Phone: (418) 964-8300
Extension 422
Fax: (418) 964-8506

Figure 1. Geological subdivisions and people to contact.


Ministre des Ressources naturelles et de la Faune
Pierre Corbeil
(418) 643-7295
Sous-Ministre
Michel Boivin
(418) 627-6370
Mines
Sous-Ministre associé
Jean-Louis Caty
(418) 627-6273
Géologie Québec
Alain Simard
(418) 627-6274
Développement minéral
Jean-Marc Charbonneau
(418) 627-6255
Service géologique de Québec
Pierre Verpaelst
(418) 627-6276
Service géologique du Nord-Ouest
Robert Marquis
(819) 354-4514
Imposition et données minières
Jocelyne Lamothe
(418) 627-6289
Titres miniers
Lucie Ste-Croix
(418) 627-6290
Géoinformation
Patrick Rissmann
(418) 627-6269
Clientèle de l'exploration et du marketing
Chantal Dussault
(418) 627-6288
Systèmes de gestion des lois
Roch Gaudreau
(418) 627-6292
Développement et milieu miniers
André Jean
(418) 627-6365
Relations intergouvernementales
Jean-Guy Léger
(418) 627-6296

march 2005

Summary

Chapter 1

Base and precious metals

1A

1A

Northern Superior Province

Serge Perreault

The Ungava region (Nunavik) covers a vast surface area of about 350,000 km^2. Although relatively under explored, this region offers a very promising mineral potential.

Since 1998, **Géologie Québec** has completed 22 geological surveys within the scope of the Far North Project. In 2004, **Géologie Québec** continued its geological synthesis of the Far North (Leclair *et al.*, 2004) and published a synthesis map of mineral occurrences for the northeastern Superior Province (Labbé and Lacoste, 2004). **Géologie Québec** was also involved in two studies: 1) phase 3 of a geochemistry and Nd isotope study of volcanic and plutonic assemblages in the Far North (Boily *et al.*, 2004) and 2) a study of polyphase glacial dispersal patterns and diamond exploration in the eastern Saindon-Cambrien corridor with the **Geological Survey of Canada** (Parent *et al.*, 2004). The **Geological Survey of Canada** also produced a map of ice flow indicators for the Lac Maricourt (24 D) and Lac Gayot (23 M) areas (Paradis and Parent, 2004).

In 2004, a total of 15 exploration projects were carried out in the northern Superior Province (Table 1A-1). The bulk of exploration expenditures were spent in the search for diamond or gold. One project was funded under the Québec Mineral Exploration Assistance Program (MEAP), to support the **Nunavik Mineral Exploration Fund**.

The following sections describe the most significant exploration projects carried out in 2004 in the eastern part of the Opatica Subprovince and in the Minto Subprovince, as well as diamond exploration projects.

Opatica Subprovince

The Opatica Subprovince comprises Archean metavolcanosedimentary sequences and plutonic suites located between the Abitibi Subprovince to the south and the Opinaca and Ashuanipi subprovinces to the north (Hocq, 1994; Lamothe *et al.*, 1998). The eastern part of the Opatica Subprovince is formed of the Brûlis Group, a basaltic to intermediate volcanic assemblage metamorphosed to the upper amphibolite facies, as well as hornblende-biotite granodiorite, hornblende monzogranite, and leucocratic biotite and locally hornblende-bearing tonalite (Lamothe *et al.*, 1988).

In the Lac Courcy area, **Géologie Québec** had previously reported the presence of gold showings (Courcy 1 and Courcy 2; Thériault *et al.*, 1998) associated with iron formations and mafic and felsic volcanic rocks of the Soucy and Soulard formations in the Brûlis Group. After signing an agreement with prospector **Jean Fortin** in 2003, **SOQUEM INC.** (project 15, Figure 1A-1) uncovered, during the summer 2004, a series of gold occurrences associated with volcanogenic massive sulphide mineralization. The best results from trench samples were obtained on the following showings: DL-02, with grades of 91 g/t Au and 7.3 g/t Ag; Courcy 2, with 3.3 g/t Au; Souche, with grades of 4.8 g/t Au, 6 g/t Ag, and 0.25% Zn; and SL-12, with 2.53 g/t Au. A channel sample from showing SL-29 yielded assays of 10.75 g/t Au over 1 m.

Diamond

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 magmatism. Several major crustal lineaments transect the Bienville, Minto, and Ashuanipi subprovinces (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 2004, diamond exploration activities consisted of reconnaissance work carried out by joint venture partners **Ashton Mining of Canada Inc.** and **SOQUEM INC.**, as well as a drilling program which yielded inconclusive results, performed by **Majescor Resources Inc.** and **Diamondex Resources Ltd** in the Lac Gayot area.

Opportunities for Exploration

In the current economic context, with gold prices reaching historical highs and mineral exploration financing as promising as ever, it is worth mentioning that several greenstone belts in the Minto Subprovince host interesting gold occurrences, namely associated with iron formations in the Far North. For example, on the Kogaluk property, **Virginia Gold Mines Inc.** and **SOQUEM INC.** reported grades up to 60 g/t Au in grab sample, 2.85 g/t Au over 4.1 m in channel sample, and 2.20 g/t Au over 27.9 m in drillhole, including high-grade zones at 9.89 g/t Au over 2.1 m and 14.25 g/t Au over 1.5 m.

In the eastern Ashuanipi Subprovince, west of Schefferville, and in the eastern Opatica Subprovince, metasedimentary bands represent interesting targets for gold exploration. Recent work by **SOQUEM INC.** in the Lac Courcy area is very promising, and opens up this area to more advanced exploration.

With the sharp rise in uranium prices, uranium exploration is thriving again, nearing levels recorded in the mid-1980s. As remnants of a former Paleoproterozoic sedimentary basin overlying the Archean basement of the Minto Subprovince,

the various outliers of the Sakami Formation are certainly interesting in this regard. These outliers are aligned along the Saindon-Cambrien structural corridor, already a target area for diamond exploration. Note that in 1980, mining company **Uranerz** estimated mineral resources at the Dieter Lake deposit, also referred to as the Lac Gayot deposit (deposit file 23 M/15-001), at 50 million metric tonnes at 0.1% U_3O_8 or between 10 and 15 Mt at 0.25% U_3O_8. This uranium deposit is a syngenetic mineralization that underwent an intermediate enrichment process (Gosselin and Simard, 2000). Recently, **Strathmore Minerals Corp.** acquired the mining rights on the Dieter Lake deposit.

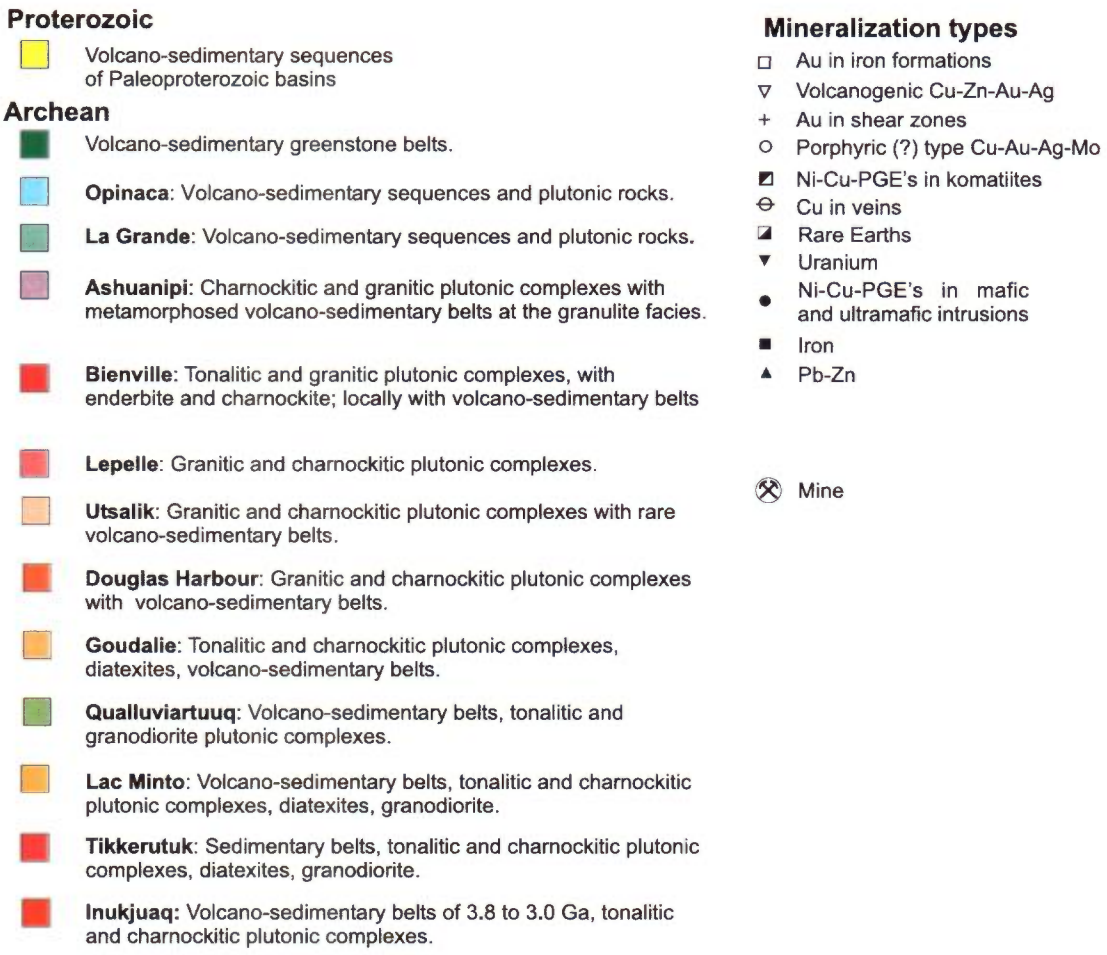


Figure 1A-1. Legend of exploration projects in the northern Superior Province for 2004.

1A

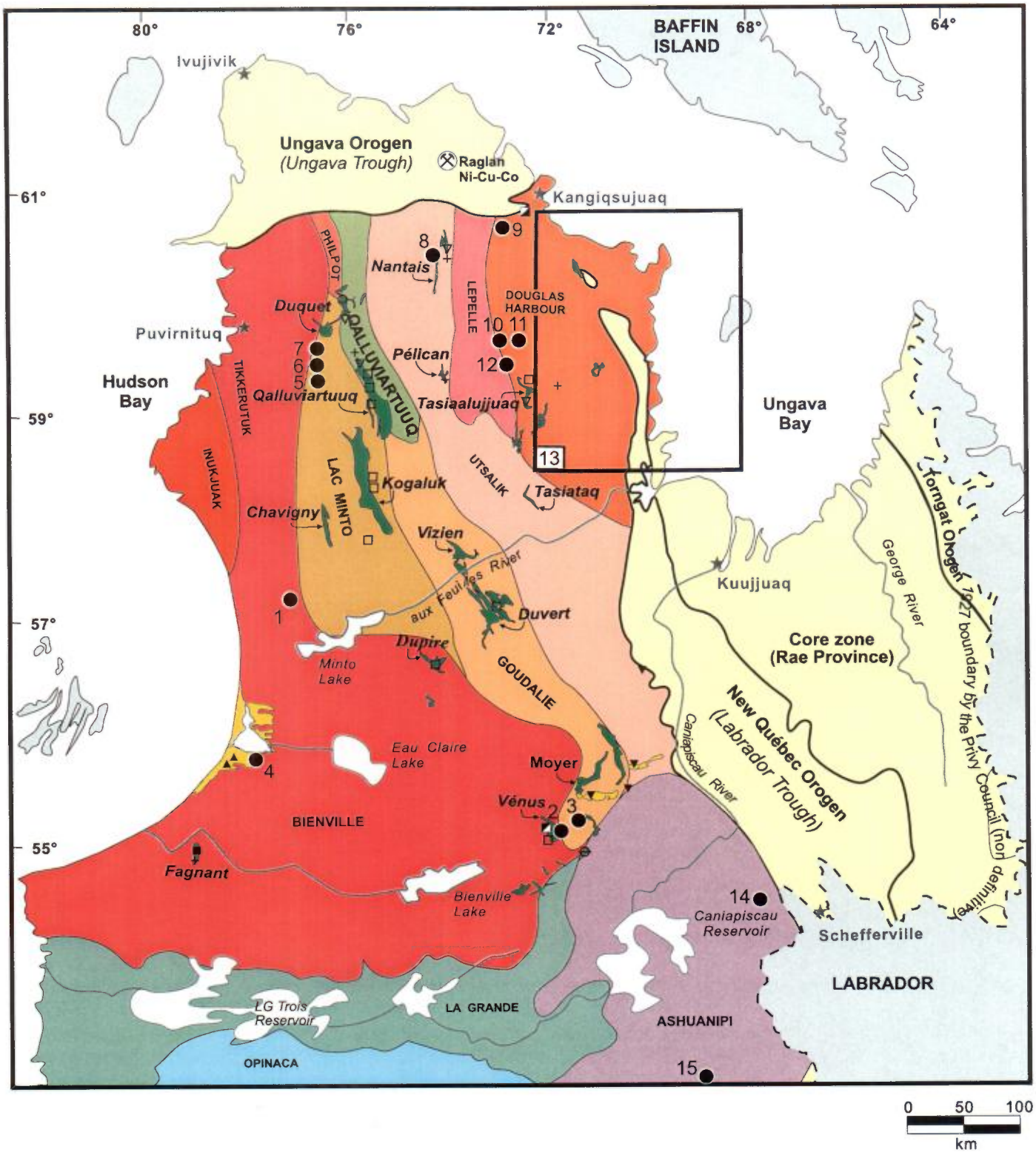


Figure 1A-1. Exploration projects in the northern Superior Province for 2004.

TABLE 1A-1 - Exploration projects in the northern Superior Province for 2004 (see figure 1A-1).

NO	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORKS [1]
1[2]	-	Ashton Mining Canada Inc. / SOQUEM INC.	Regional reconnaissance	Diamond	S
2	23 M/11	Virginia Gold Mines Inc. / BHP Billiton Diamond Inc.	Gayot	Ni-Cu-Co-PGE	D(14:2742), EM
3	23 M/06, 07, 10, 11, 15, 16	Majescor Resources Inc. / Diamondex Resources Ltd	Gayot	Diamond	D(5:213), Mag, Mag(A)
4	34 C/01, 02	Nunavik Mining Exploration Fund / SOQUEM INC.	Umiujaq	Cu-Ag	EM
5	34 O/05	Canadian Royalties Inc.	Alorutchaak	Ni-Cu-Co	Rsi
6	34 O/12	Canadian Royalties Inc.	Kogaluk	Ni-Cu-Co	Rsi
7	34 O/13	Canadian Royalties Inc.	Ferguson	Ni-Cu-Co	Rsi
8	35 A/13	Ressources Antoro Inc.	Nantais	Zn-Pb-Cu-Ag-Au	G
9	35 H/02	Ressources Antoro Inc.	Lataille	Rare earth	G, S
10	35 A/01	Ressources Antoro Inc.	Frank and Glass	Au-Ni-Cu-PGE	G
11	35 A/01	Ressources Antoro Inc.	Hamelin	Au	S
12	34 P/16	Ressources Antoro Inc.	Douglas Harbour	Cu-Ni-PGE	G, Pg
13	24 M, N, 25 C, D, E, F	SOQUEM INC.	-	Ni-Cu-Co-PGE-Au-Ag	G, Pg
14	23 J/13, 14	E. D. Black / New Stafford Industries Ltd / Grandcru Resources Corp.	Ashuanipi Gold	Au	Mag, Mag(A), Rsi, Pg
15	23 C/10	SOQUEM INC.	Courcy	Au-Ag	Pr

1 = See the legend of abbreviations in appendix II.
2 = Regional reconnaissance project.

1B

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, which are, 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-trending shear zones and are metamorphosed to the greenschist facies in the centre and to the upper amphibolite facies near their borders. These assemblages are intruded by a number of granitoids assigned to various plutonic suites (Moukhsil *et al.*, 2003).

Over the course of 2004, 43 exploration projects were reported in the Near North region (Table 1B-1), compared to 47 projects in 2003. In 2004, the main ore deposit types under investigation in the James Bay region included lode gold or iron formation-hosted gold deposits, diamond deposits associated with kimberlites, volcanogenic massive sulphide deposits, and to a minor extent, porphyry Cu-Au deposits associated with felsic intrusions.

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. 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. All 9 exploration projects reported in 2004 in this area are concentrated in the Frotet-Troilus segment.

The Frotet-Troilus segment hosts a few massive sulphide deposits, among which the Tortigny deposit (490,000 tonnes at 2.2% Cu, 6.2% Zn, 0.24% Pb, 91 g/t Ag, and 0.3 g/t Au), as well as numerous porphyry Cu-Au-Ag deposits, such as the Troilus mine (project 43, Figure 1B-1) held by **Inmet Mining Corporation**.

Following an airborne MEGATEM II survey covering 11,560 km of the Frotet-Troilus segment, **Beaufield Consolidated Resources Inc.** and **Noranda Inc.** conducted reconnaissance work on the Troilus project (project 16, Figure 1B-1), which led to the discovery of a mineralized boulder grading 15.55% Zn, 0.05% Cu, 16 g/t Ag, and 0.25 g/t Au. Along the same Frotet-Troilus segment, **Dios Exploration Inc.** announced the discovery of kimberlite indicator minerals, specifically picroilmenite, olivine, and G9 and G10 pyrope garnets, in till samples collected in the Rivière De Maurès area, on the Artaud property (project 22, Figure 1B-1).

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; Otish Mountains 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, 21 projects were reported in 2004. In the Lower and Middle Eastmain segments, exploration was focussed on lode gold or iron formation-hosted gold deposits and porphyry Cu-Au±Ag intrusions. Diamond exploration projects were largely concentrated in the granitoids and paragneisses that border the Upper Eastmain greenstone belt (Otish Mountains area).

In the Lower Eastmain area, on the Eleonore project (project 27, Figure 1B-1), **Virginia Gold Mines Inc.** delineated a major gold system on surface and in drillholes over a lateral distance of roughly 300 m and to a depth of more than 225 m. The system comprises two main zones trending N-S: *Roberto* (18.85 g/t Au over 16.0 m - drillhole ELE-04-02) and Roberto East (6.94 g/t Au over 18.0 m [*FW*]- drillhole ELE-04-39), as well as a few subsidiary zones such as the *Veine* zone (34.66 g/t Au over 6.60 m - drillhole ELE-04-34). All the gold-bearing zones, which remain open in several directions, are hosted in a sedimentary unit strongly altered to sericite, albite, epidote, tourmaline, muscovite, and chlorite, with intense potassic alteration along the contact with a diorite-tonalite intrusion. It is located along the northern margin of a vast batholithic complex, at the junction between the La Grande and Opinaca geological subprovinces. The strongly silicified country rock is cut by a stockwork of quartz veins and veinlets with finely disseminated sulphides (pyrrhotite, arsenopyrite, trace chalcopyrite). This new high-grade gold setting attracted much attention, which translated into claim acquisitions in the Lower and Middle Eastmain areas. Based on the presence of metasediments in the vicinity of syn- to late-tectonic intrusions, a weak to moderate magnetic signature, and arsenic, copper, and gold anomalies in lake sediments previously analyzed by the **Ministère des Ressources naturelles, de la Faune et des Parcs (MRNFP)**, **Azimut Exploration Inc.**, in partnership with **Everton Resources Inc.**, as well as **Sirios Resources Inc.** and its partners **Canadian**

Royalties Inc. and **Golden Valley Mines Ltd**, acquired extensive land positions in the area.

On the Clearwater project (project 26, Figure 1B-1), **Eastmain Resources Inc.** continued to define the extension at depth (~ 600 m) of the main high-grade gold veins at the Eau Claire deposit (uncut indicated and inferred mineral resources estimated at 755,435 ounces of gold – April 2004). Furthermore, recent trenching revealed the presence of schist zones and gold-bearing quartz-tourmaline veins 2.5 km east of the Eau Claire deposit. Channel samples yielded grades up to 10.2 g/t Au in trench B5 and up to 8.95 g/t Au in trench B2, located about 740 m east of trench B5. These new gold-bearing zones are located along the same stratigraphic horizon and in the same rock formation as the Eau Claire deposit.

The Archean Upper Eastmain volcano-sedimentary belt, known for its gold, base metal, and PGE potential, continues to attract considerable attention in terms of diamond exploration. North of the Otish Mountains, on the Foxtrot property (project 1, Figure 1B-1), **Ashton Mining of Canada Inc.** and **SOQUEM INC.** invested $18M in exploration and deposit appraisal, including a diamond drilling and bulk sampling program to extract a total of 639 tonnes of kimberlitic material from the Renard 2, 3, 4, and 65 bodies. The first 269 tonnes of ore to be processed from this bulk sample yielded a total of 97 carats of diamonds. Furthermore, the joint venture partners considerably improved their understanding of the Lynx anomaly, located 2 km west of the Renard cluster. The Lynx anomaly contains a system of kimberlite dykes ranging from 0.5 to 4.4 m in width, delineated in 15 drillholes sites over a lateral distance of 3.7 km. In February 2004, processing of a 3.87-tonne sample of erratic boulders from the Lynx anomaly yielded an estimated diamond content of 120 carats per 100 tonnes. Finally, while collecting samples for indicator minerals, kimberlitic pebbles and cobbles were found in three different locations, 3 to 15 km away from the Renard cluster. The discovery of these new kimberlitic pebbles, combined with previous discoveries at the North and Southeastern anomalies, confirm that the discovery of additional kimberlite bodies besides the Renard cluster and the Lynx anomaly is still quite likely to occur on the Foxtrot property (project 1, Figure 1B-1). In the same area, **Majescor Resources Inc.** confirmed the discovery of several kimberlitic boulders reaching up to 50 cm in size on its Portage property (project 3, Figure 1B-1). A total of 32 diamonds larger than 0.075 mm were recovered from a 136.65-kg sample of kimberlitic float.

South of the Otish Mountains, **Dios Exploration Inc.** discovered a kimberlite boulder located several kilometres away from the glacial trains associated with three known kimberlite occurrences on the Hotish property (project 11, Figure 1B-1). In the same area, on the Tichegami property (project 41, Figure 1B-1), **Ashton Mining of Canada Inc.** and **SOQUEM INC.** drill-tested four targets and intersected kimberlite dykes in two locations, over widths of 2.35 m and 0.15 m, respectively.

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.

Part of the La Grande Subprovince, the La Grande volcano-sedimentary 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 ultra-mafic 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 2004. Exploration projects are clustered in two areas: the western and eastern La Grande segments.

In the western part of the La Grande area, **Pro-Or Mining Resources Inc.** confirmed in drillhole the stratiform nature and vertical extension of the ore zones, as well as the chrome and platinum group metal resources associated with orebodies Cr-1 and Cr-16, on the Menarik property (project 33, Figure 1B-1). During the year, **Pro-Or Mining Resources Inc.** and its partners **INRS-ETE**, **Phytronics Technologies**, and **Johnston-Vermette** completed the construction of a semi-industrial pilot plant to test newly patented processes involving chromite carbochlorination and the recovery of platinum group metals. Metallurgical tests are slated to begin in January 2005.

In the eastern part of the La Grande Subprovince, diamond drilling by **Virginia Gold Mines Inc.** and **Globestar Mining Corporation** led to the discovery of the Orfée Est zone, located 500 m east of the Orfée zone (resources of 203,483 metric tonnes at a grade of 14.5 g/t Au), on the Poste Lemoyne Extension property (project 34, Figure 1B-1). This new zone consists of a thick gold-bearing structure formed within a sequence of basalt, sandstone, and iron formation with pyrrhotite and arsenopyrite mineralization. Several intercepts, ranging from 1 to 10 m in thickness with subeconomic gold grades, such as drillhole PLE-04-76, which yielded 0.98 g/t Au over 23.0 m, including 10.53 g/t Au over 1.1 m, were obtained.

On the Aquilon property (project 35, Figure 1B-1), **Sirios Resources Inc.** and **Golden Tag Resources Ltd** tested at shallow depth the new *Red Toad* showing, where surface grab samples had yielded assays of 1,691 g/t Au and 153 g/t Au. Drill results indicate the Red Toad zone extends over at least 100 m along strike and to a depth of 36 m. Drillhole AQU-04-03 intersected 4.33 m of mineralization at an average grade of 10.03 g/t Au. This section contains many visible gold occurrences in quartz-sericite veins within a tonalitic intrusive rock.

Virginia Gold Mines Inc. drill-tested the Marco and Contact zones on the Corvet Est property (project 36, Figure 1B-1), two gold-bearing structures discovered on surface during the fall 2003. Both zones yielded a few interesting gold intercepts down to a depth of 200 m, including drillhole CE-04-23 in the Marco zone (2.10 g/t Au over 46.0 m, including 4.50 g/t Au over 10.0 m) and drillhole CE-04-14 in the Contact zone (10.29 g/t Au over 4.75 m). The Marco zone is characterized by a structure several metres wide that contains a series of finely disseminated sulphide zones (up to 10% arsenopyrite, pyrite, and pyrrhotite), associated with mm-scale to cm-scale quartz veins and veinlets, along with microcline, tourmaline, garnet, biotite, magnetite, and damourite alteration. The Marco zone is hosted in a granoblastic quartz-feldspar-biotite rock (felsic dyke), along the contact with a basalt that exhibits strong biotite alteration, which defines a magnetic anomaly traced across the property for more than 3 km along strike.

On the Coulon property (project 38, Figure 1B-1), **Virginia Gold Mines Inc.** and its partner **Noranda Inc.** announced the discovery of volcanogenic massive sulphide lenses in the *DOM* area (9.94% Zn, 2.16% Pb, 0.73% Cu, and 96.38 g/t Ag over 19.5 m – drillhole CN-04-17) and the *DOM NORD* area (12.65% Zn, 1.54% Pb, 1.36% Cu, 125.31 g/t Ag, and 0.3 g/t Au – drillhole CN-04-23). The Coulon property is located in the Coulon belt, one of eight volcano-sedimentary belts in the Gayot Complex (Thériault and Chevé, 2001). The Coulon belt is mainly composed of variably amphibolitized mafic volcanic rocks and felsic to intermediate pyroclastic rocks, with thin beds of detrital sedimentary rocks. Oxide-facies iron formation horizons are observed locally. To date, the fertile VMS-hosting volcanic sequence has been traced over more than 10 km along strike (Archer *et al.*, 2004).

Opportunities for Exploration

The Eleonore discovery in 2004 is yet another example among many others (such as the Eau Claire deposit) that confirms the potential of the James Bay region for high-grade gold deposits. It also supports analogies that may be suggested with similar ore deposits in Ontario (Hemlo and Red Lake). **Virginia Gold Mines Inc.** has, in fact, suggested that the structural style and alteration patterns at the Eleonore deposit are similar to those described in the Hemlo area.

Monzogranitic intrusions along the contact between volcano-plutonic and metasedimentary subprovinces constitute one of the most favourable geotectonic settings for rare metal occurrences (Y-Zr-Nb-Ta-Be-Li-REE). Two specific areas in the James Bay region present this type of setting, and are relatively underexplored, namely the *Granite du Vieux-Comptoir*, emplaced along the boundary between volcano-plutonic assemblages of the La Grande Subprovince and metasedimentary rocks of the Opinaca Subprovince (NTS sheets 33 C/04, 33 F/03, and 33 F/04), and *granitic bodies* near the contact between metasedimentary rocks of the Nemiscau Subprovince and sedimentary rocks of the Lower and Middle Eastmain belt (NTS sheets 33C/01 to 33C/08). Furthermore, the Frotet-Evans volcano-sedimentary belt also offers good potential for rare metal deposits (Boily and Gosselin, 2004).

Moreover, last November, **Dios Exploration Inc.** reported the discovery of kimberlite indicator minerals, specifically picroilmenite, olivine, and G9 and G10 pyrope garnets, in till samples from the Rivière De Maurès area, in the Troilus segment. This discovery may confirm the southward extension of the Mistassini-Lemoyne structural zone (MLZ), which already hosts kimberlites in the Renard cluster, the Lynx anomaly (north of the Otish Mountains), Lac Beaver, H-1 to 4, kimberlite dykes on the Hotish property held by **Dios Exploration Inc.**, and on the Tichegami property of **Ashton Mining of Canada Inc.** and **SOQUEM INC.** (south of the Monts Otish). Thus, the intersection of the southward extension of the MLZ and the boundary between the Opatica and Abitibi geological subprovinces may represent a new prospective area (NTS sheets 32 J/01 to 03) for diamond exploration in Québec's Near North.

1B

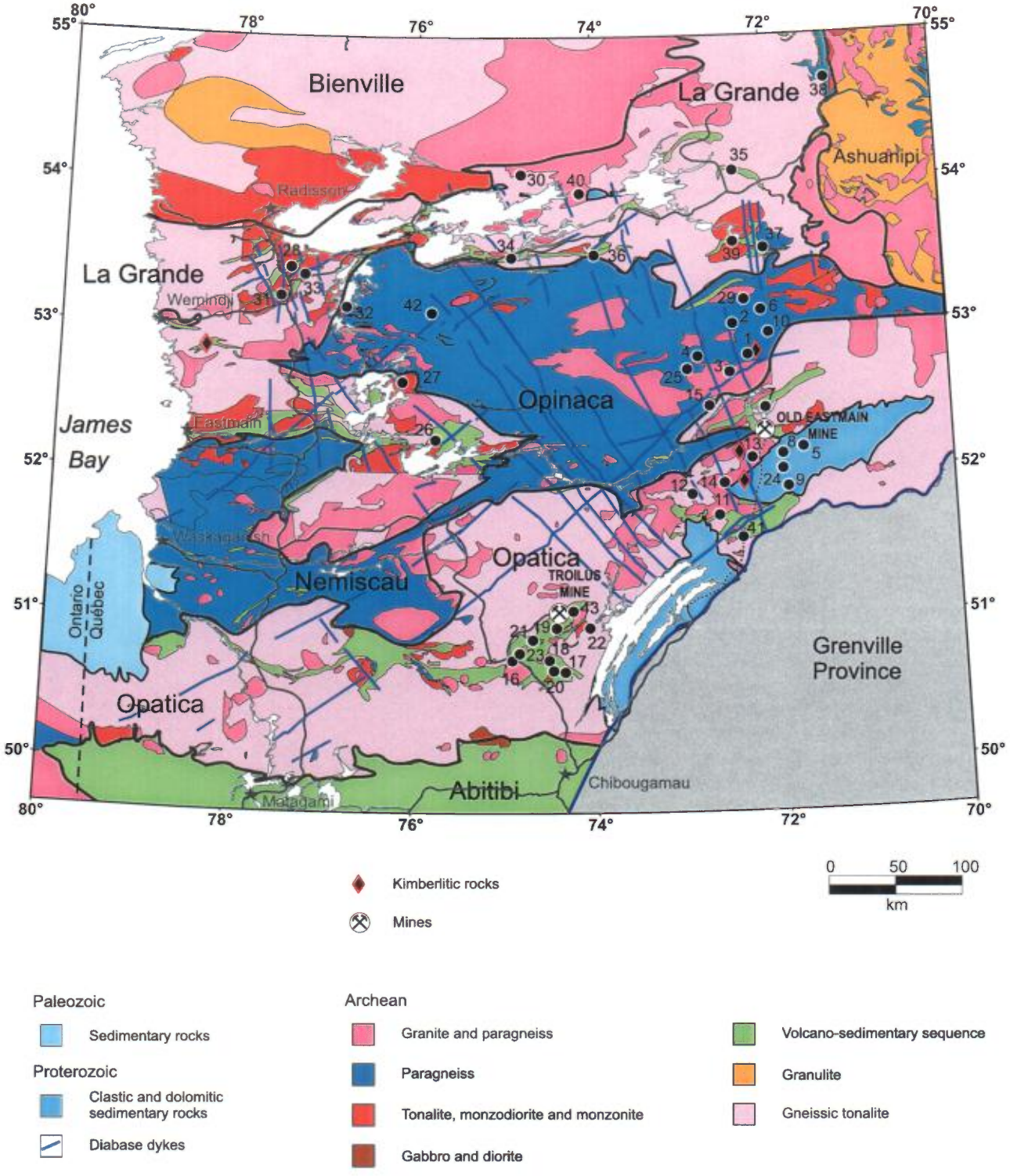


Figure 1B-1. Exploration projects in the James Bay area for 2004.

TABLE 1B-1 - Exploration projects in the James Bay area for 2004 (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	B(639:?),D(105:17378), Gs(sl), Gs(t), Mag, Rcd(23:4157), S
2	33 A/08, 09, 10, 23 D/12, 33 H/01, 02	Dios Exploration Inc. / De Beers Canada Exploration Inc.	33 Carats	Diamond	D(5:500), G, Gs(t), Mag, Pr
3	33 A/07, 08, 09, 10 15, 16, 33 H/01, 02	Majescor Resources Inc.	Portage	Diamond	Gs, Pr, S
4	33 A, 32 P, 22 M, 23 D, 23 E, 23 L/06	Diadem Resources Ltd	Otish Diamond	Diamond	Gs, Mag-EM(A), Pr
5	23 D/03	Majescor Resources Inc. / Dunsmuir Ventures Ltd	Lac Laparre	Diamond	Gs
6	23 E/03, 04	Dianor Resources Inc. / Alexis Minerals Corporation	Queotish	Diamond	Gs(sl), Gs(t), Pr
7	33 A/08	Stratabound Minerals Corporation	Marusia	Diamond-Au	Gs(s), Gs(t)
8	23 D/04	Otish Resources Inc.	Lac Laparre	Diamond	Gs
9	22 M/13, 32 P/16	Cameco Corporation / Cogema Resources Inc.	Otish South	Uranium	Mag-EM(A), Rd, Rsi
10	33 A/02, 03, 08, 10, 11, 33 A/14, 15, 23 D/13	Dios Exploration Inc.	Hotish Extension	Diamond	Gs(t)
11	32 P/10, 15, 16	Dios Exploration Inc.	Hotish	Diamond	G, Gs(t), Min, Pr
12	32 P/07, 10, 14, 15, 16	Majescor Resources Inc. / Superior Diamonds Inc.	Mistassini	Diamond	Gs
13	33 A/01	Ditem Explorations Inc.	Tichegami	Diamond	D(?:?)
14	32 P/16	Ditem Explorations Inc.	Beaver Lake South	Diamond	D(?:?)
15	33 A/03, 07	Western Troy Capital Resources Inc.	Lac MacLeod	Cu-Au-Ag-Mo	PP
16	32 J/10, 15, 16	Beaufield Consolidated Resources Inc. / Noranda Inc.	Troilus	Cu-Zn-Pb-Ag-Au	D(9:2300), MEGATEM, Pr
17	32 J/09	Normabec Mining Resources Inc. / SOQUEM INC.	Armagnac (1345)	PGE-Au-Cu	G, IP, Pr, S, T
18	32 J/10, 15, 16	Vior Mining Exploration Co Inc. / SOQUEM INC.	Domergue (1149)	Cu-Zn	AGp
19	32 J/16	Les Ressources Tectonic Inc.	Lac La Fourche	Au	G
20	32 J/09, 10	Northern Mining Exploration Ltd / SOQUEM INC.	Clairy (1171)	Cu-Zn	AGp
21	32 J/15, 16	SOQUEM INC.	Diléo-Nord (1346)	Cu-Au	IP, Mag, T

TABLE 1B-1 - Exploration projects in the James Bay area for 2004 (see Figure 1B-1).

NO	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORKS (1)
22	32 J/09, 16, 32 I/13	Dios Exploration Inc.	Artaud	Diamond	Gs(e), Gs(t)
23	32 J/10	SOQUEM INC.	Moblan (1331)	Lithium	G, Pr, S, T
24	32 P/16, 22 M/13	Pershimco Resources Inc. / Gilbert Lamothe	Kimbert	Diamond	Gs(t)
25	32 O/16, 33 A/04, 09, 10, 11, 14, 33 H, 23 O/12	Santoy Resources Ltd / Vaaldium Resources Ltd	Otish Mountain	Diamond	AGp, Gs(t)
26	33 B/04	Eastmain Resources Inc.	Clearwater	Au	D(14:9407), G, Gs(r), Gs(si), Pr, S, T
27	33 C/09	Virginia Gold Mines Inc.	Éléonore	Au	D(63:14178), G, IP, S, T
28	33 D, 33 E, 33 F	Dianor Resources Inc.	James Bay	Diamond	Gs(t), Mag, Pr, Rsi(?:215)
29	23 E/04, 06, 10, 23 D/12, 33 H/01	Otish Mountain Diamond Company	Otish	Diamond	Agp, Gs
30	33 G/14, 15, 33 J/02, 03	Dios Exploration Inc.	Minti	Diamond	Gs(t), Pr
31	33 F/04	Typhoon Exploration Inc.	Wapiscan	Cu-Zn-Au-Ag-Diamond	Gs, Pr
32	33 F/02, 07	Matamec Explorations Inc.	Sakami	Au	D(13:2541), G, Gs(h), Gs(sl), Pr, S, T
33	33 F/06	Pro-Or Mining Resources Inc.	Ménarik	Cr-Pd-Pt-Ni-Cu	B(35:?), D(31:3100), Met
34	33 G/06	Virginia Gold Mines Inc. / Globestar Mining Corporation	Poste Lemoyne Ext.	Au	D(18:3132)
35	32 I/01, 02	Sirios Resources Inc. / Golden Tag Resources Ltd	Aquilon	Au	D(11:954), G, S, T
36	33 H/05, 33 G/07, 08	Virginia Gold Mines Inc.	Corvet Est - Lac Eade	Au	D(37:5684), IP, G, Mag, S, T
37	33 H, 23 E	Virginia Gold Mines Inc.	Noella	Au	Gs(t), Pr
38	23 L/11, 12, 13, 14, 23 M/03, 04	Virginia Gold Mines Inc. / Noranda Inc.	Coulon	Cu-Zn-Pb-Ag-Au	D(25:4783), EM, G, Gs, Mag, Pr, S
39	33 H/09	Sirios Resources Inc.	Escale	Cu-Au-Mo	D(6:576)
40	33 G/16	Sirios Resources Inc.	Tilly	Cu-Au-Ag-Mo	Pr, S
41	33 A/01, 02, 32 P/01, 07, 08, 09, 10, 11, 15, 16	Ashton Mining of Canada Inc. / SOQUEM INC.	Tichegami	Diamond	D(4:394), Gs(t)
42	33 G/04	Pro-Or Mining Resources Inc.	Lac Ewart	Cr-Pd-Pt-Ni	EM, G, Mag, PP
43	32 O/01	Inmet Mining Corporation	Troilus Mine	Cu-Au-Ag	D(6:3500)

1 = See abreviations list in appendix II.

1C

Southern Superior Province (Abitibi and Pontiac Subprovinces)

Pierre Doucet
James Moorhead
Suzanne Côté

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 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 2004, we compiled 198 mineral exploration projects in the Abitibi and Pontiac subprovinces, compared to 178 in 2003. This represents an increase of 11%. The total number of metres drilled in 2004 in the Abitibi and Pontiac subprovinces reached 576,165 metres.

In 2004, several companies were involved in the search for gold deposits in the Abitibi and Pontiac subprovinces. The number of projects targeting this commodity stood at 131 (Table 1C-1), which represents an increase of 10% relative to 2003. Over the course of 2004, the number of exploration projects targeting polymetallic deposits or diamonds stood at 67 (Table 1C-2). Compared to the 59 projects reported in 2003, this represents an increase of 14%. These higher figures probably reflect the gradual rise in metal prices observed in recent years.

Figures 1C-1 to 1C-4 show the location of exploration projects in the Abitibi and Pontiac subprovinces.

Precious Metal Deposits

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

In this area, located along the northwesternmost part of the Abitibi Subprovince, we compiled 8 projects in 2004.

The Casa-Berardi project (project 44) by **Aurizon Mines Ltd** is located 130 km WSW of Matagami, in sedimentary rocks of the Taïbi Group. The former Casa Berardi East and West mines are located near the Casa Berardi fault. Gold mineralization is generally associated with fine-grained pyrite and arsenopyrite in quartz veins, quartz-carbonate stockworks, and sulphide-rich schists. In 2004, **Aurizon Mines Ltd** conducted definition drilling, deepened the development ramp to the 570-m level in zone 113 and completed preparation work to sink a shaft. A feasibility study completed in 2000 indicates that reserves at the West mine stand at 6,943,000 tonnes at a grade of 6.7 g/t Au based on measured and indicated resources, whereas an additional 1.7 million tonnes of inferred resources at a grade of 6.1 g/t Au were estimated for the new zones 118 and 120. **International Taurus Resources Inc.** and **Fairstar Explorations Inc.** have joined forces on the Fenelon project (project 68), located 70 km WNW of Matagami. This project consists of a gold deposit composed of quartz-sulphide veins hosted in strongly altered mafic rocks surrounded by argillaceous sediments. Inferred and indicated resources totalling 88,390 tonnes at 10.91 g/t Au were delineated. In 2004, a 185-m ramp was excavated to access ore zones on the 5213 level, 37 m below surface. A bulk sample of 8,300 tonnes was extracted and processed at the Camflo mill near Malartic. Control samples indicate an average grade of 10.3 g/t Au for this sample.

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

We compiled 25 gold exploration projects in this area, located in the east-central part of the Abitibi Subprovince. The Sleeping Giant mine (Au-Ag) was the only active gold producer in the area in 2004.

Held by **Cambior Inc.** and **Aurizon Mines Ltd**, the Sleeping Giant mine (project 47) 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. In December 2003, the shaft was deepened by 200 m to reach a total depth of 1,006 m, providing access to new gold zones 6, 7, 8, and 18. In 2004, a reserve

development program was completed in zones 3, 8, 16, and 30, as well as exploration drillholes in zones 30, West, 7, and 8. Dewatering is underway at the former Bachelor gold mine near Desmaraisville (project 85), where **Metanor Resources Inc.** and **Wolfden Resources Inc.** are planning to drill the upper extension of the B Zone, which contains indicated resources of 71,589 tonnes at 11.6 g/t Au and inferred resources of 65,309 tonnes at 12.1 g/t Au.

Strateco Resources Inc. conducted drill programs on its Discovery (project 32) and Cameron (project 33) projects, located 45 km north of Lebel-sur-Quévillon. On the Discovery project, drillholes testing the central part of the East lens yielded gold intercepts such as 6.28 g/t Au over 6.3 m in drillhole BD-04-77A. **GéoNova Explorations Inc.**, a subsidiary of Campbell Resources Inc., had estimated resources of 2.12 Mt at a grade of 5.11 g/t Au for the Discovery Zone. On the Desjardins property (project 126), located 35 km north of Lebel-sur-Quévillon, **Normabec Mining Resources Ltd** and **SOQUEM INC.** completed 2 drillholes, which intersected Zone III. The latter consists of 3 subparallel gold-bearing structures; best results include 9.82 g/t Au over 1 m in the Central structure.

At about 120 km east of Lebel-sur-Quévillon, in the central part of the Urban-Barry belt, **Noront Resources Ltd** intersected in drillhole on the Windfall Lake property (project 120) pyrite-rich zones with significant gold grades such as 8.55 g/t Au over 13.4 m (drillhole NOT 04-27) and 11.19 g/t Au over 8.2 m (drillhole NOT 04-32). On an adjoining property to the north (project 127), **Murgor Resources Inc.** and **Freewest Resources Canada Inc.** also discovered gold showings. A channel sample on showing IPE yielded 40.62 g/t Au over 5.9 m. Three drillholes intersected gold-bearing zones, including a 3.5-m intercept at 8.34 g/t Au (drillhole WIN-04-02). In Urban Township just 7.5 km to the southeast of the discovery made by Noront Resources Ltd, **Beaufield Consolidated Resources Inc.** intersected in drillhole on its Lac Rouleau property (project 119) a silicified breccia zone in felsic volcanic rocks. Mineralized intervals include 3.73 m grading 11.63 g/t Au (drillhole BFRL 401). In Barry Township, some 12 km southwest of the Noront discovery, **Osisko Exploration Ltd**, in partnership with **Murgor Resources Inc.** and **Freewest Resources Canada Inc.**, intersected on the Barry property (project 5) 19.62 m grading 5.31 g/t Au (drillhole BA04-136). Furthermore, two new gold-bearing zones, zone 45 and zone 48, were detected to the SSW of the Main Zone. This property hosts the Barry gold deposit, in which the near-surface Main Zone consists of a gold-bearing quartz-pyrite stockwork. Also in Barry Township, some 19 km southwest of the Noront property, **Gold Hawk Resources Inc.** intersected 6.5 m at 11.81 g/t Au (drillhole LB-04-10) on its Barry-Souart property (project 128). The mineralization consists of quartz-carbonate veins associated with silicified zones with pyrrhotite-pyrite-chalcopyrite, injected in granodiorite-tonalite-diorite intrusions.

CHIBOUGAMAU AREA (FIGURE 1C-1)

In 2004, we compiled 8 gold exploration projects in the Chibougamau area, which forms the northeastern tip of the Abitibi Subprovince. With its numerous gold projects, **SOQUEM INC.** is an important player in the area. One gold producer, the Joe Mann mine (Au-Au), was in operation in the Chibougamau area.

In 2004, **Campbell Resources Inc.** performed definition drilling and development work on its mining infrastructure at the Copper Rand mine in Chibougamau (project 129) in order to commence ore extraction in November. Commercial production is slated to begin in early 2005. The Copper Rand 5000 project contains measured and indicated resources of 1.9 Mt at 1.55% Cu and 3.33 g/t Au.

At the Joe Mann mine held by **Campbell Resources Inc.** (project 82), underground drillholes from the 2925 level delineated the easternmost extent of the high-grade West Zone. Drillhole EW-78 intersected 2.6 m (true thickness) grading 10.3 g/t Au. On the Meston property (project 81), contiguous to the Joe Mann mine, **Campbell Resources Inc.** and **SOQUEM INC.** conducted a drill program to extend zones 2800 and 3100 another 500 m to the west. Several mineralized intercepts were encountered, among which 6.34 m at 52.16 g/t Au in zone 2800 (drillhole H-04-579). On the Lac Shortt property (project 87), located 90 km west of Chapais, **Northern Mining Explorations Ltd** and **SOQUEM INC.** intersected in drillhole an altered syenite with microfractures filled with disseminated pyrite. Several gold-bearing intercepts were reported, among which a 9.0-m interval grading 1.18 g/t Au in drillhole BV 04-66.

Typhoon Exploration Inc. carried out channel sampling and drilling on its Monexco property (project 96), located about 30 km northeast of Chibougamau. At strip zone no.1, grades ranged from 1.38 g/t Au over 0.5 m to 137.5 g/t Au over 1.0 m in quartz-tourmaline-pyrite veins injected in deformed andesitic volcanic rocks along the Rivière France deformation zone. On the La Dauversière property (project 80), located 30 km south of Chibougamau, **Ressources d'Arianne Inc.** reported grades ranging from 2.26 to 176 g/t Au from grab samples collected along an ENE-trending deformation zone intruded by a quartz porphyry and injected with gold-bearing quartz veins.

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

Eight gold projects were carried out in this area, located in the west-central part of the Abitibi Subprovince. **Golden Valley Mines Ltd** performed ground geophysical surveys on three properties located 32 km south of La Sarre (projects 103, 104, and 113). On the Swanson property (project 4), located near Barraute some 65 km north of Val-d'Or, **Phoenix Matachewan Mines Inc.** performed an induced polarization survey. 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 a grade of 3.26 g/t Au, with indicated resources of 687,078 tonnes at a grade of 3.11 g/t Au.

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

A total of 37 gold exploration projects were compiled in this area, in the southwestern Abitibi Subprovince. Three mines produced gold in 2004 in the area, namely the Mouska and Doyon gold 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 the Cadillac area, mining operations resumed in October at the Mouska mine held by **Cambior Inc.** (project 29) after the internal shaft was deepened by 210 m to provide access to new ore zones and add three years to the mine life. On the contiguous Westwood property (project 27), located east of the Doyon mine, **Cambior Inc.** continued a deep drilling program to test the North Corridor and the Westwood horizon. In drillhole 1158H-04, significant results include 2.1 g/t Au over 7.2 m in the North Corridor, and 2.3 g/t Au over 19.6 m in the Westwood horizon. **Cambior Inc.** began driving a 2.6-km exploration drift from level 14 at the Doyon mine to reach the Westwood property; it should be completed at the end of 2006. On October 21, 2004, 650 m of drift had been excavated, and a first exploration station was established.

Agnico-Eagle Mines Ltd launched an extensive work program on the Lapa property (project 38), located 16 km west of Malartic, which includes sinking a 830 m deep shaft, underground development, drilling, and metallurgical testing. Shaft-sinking work commenced in October. Known as the Contact Zone, gold mineralization lies along the interface between sheared and altered mafic and ultramafic lavas of the Piché Group and sediments of the Cadillac Group, in the Cadillac Tectonic Zone. It consists of disseminated sulphides and quartz-sulphide veinlets in volcanic rocks altered to biotite and sericite. Combined reserves and resources are estimated at 4.9 Mt at a grade of 8.23 g/t Au.

Following the discovery of the Contact Zone, **Queenston Mining Inc.** intersected on the contiguous Pandora property (project 34), located west of Lapa, a gold zone (0.5 g/t Au over 10.9 m in drillhole PD-04-16) interpreted as the westward extension of the Contact Zone. **Radisson Mining Resources Inc.** drill-tested its O'Brien and Kewagama properties (project 41), located 1 km north of Cadillac, to explore the depth extensions of known ore lenses hosted in the Piché Group, within the Cadillac Tectonic Zone. In drillhole OB04-01, a 0.30-m intercept yielded 13.68 g/t Au at a vertical depth of 1,280 m.

On the Noralex property (project 123), located 10 km northwest of the Doyon and Mouska mines in a relatively little-explored area, **Alexis Minerals Corp.** and **Noranda Inc.** intersected in drillhole quartz-pyrite veins and disseminated pyrite in a sericitized and ankeritized tonalite. Grades reported for drillhole NA-04-01 include 3.19 g/t Au over 15.0 m.

Yorbeau Resources Inc. extracted a bulk sample in order to assess the viability of an open pit operation on the Astoria property, located 3 km south of Rouyn-Noranda. This property, which straddles the Cadillac Tectonic Zone, comprises the Astoria I project (project 114) to the east and the Augmitto-Astoria II project (project 10) to the west, both characterized by the presence of a carbonate alteration zone. Gold mineralization is associated with a stockwork of quartz-sulphide veins. At Astoria I, the estimated grade for a 1,858-tonne sample collected from trench no.1 stands at 2.00 g/t Au, and 2.2 g/t Au for a 695-tonne sample collected in trench no.2. In trench no.6, located at Astoria II, a 500-kg sub-sample taken from the 750-tonne bulk sample yielded a grade of 2.7 g/t Au.

On the Bazooka project (project 11), located 7 km southwest of Rouyn-Noranda, **Lake Shore Gold Corp.** obtained a 2.3-m intercept at 10.8 g/t Au (drillhole BA03-02A) on this property which straddles the Cadillac Tectonic Zone. The mineralization consists of disseminated pyrite and quartz veins in a carbonate-albite-silica alteration zone in chlorite schists and deformed greywackes.

On the Fayolle property (project 1), located 35 km northeast of Rouyn-Noranda, **Typhoon Exploration Inc.** intersected hematized and pyritized granodiorite dykes in drillhole. The best intercepts in drillhole FA-04-02 include a 6.25-m interval grading 14.56 g/t Au. Indicated resources are estimated at 221,206 tonnes at a grade of 6.86 g/t Au and inferred resources at 578,000 tonnes at a grade of 5.93 g/t Au. **Queenston Mining Inc.** and **Globex Mining Enterprises Inc.** completed 5 drillholes on the Duquesne West property (project 61), located 32 km north of Rouyn-Noranda. Three holes were drilled to test the Liz Zone, a gold-bearing shear zone in sericitized and ankeritized intermediate to mafic volcanic rocks with 5-20% pyrite. Drillhole DQ-04-22 yielded an assays of 2.4 g/t Au over 7.9 m.

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

The number of gold projects reported in 2004 in the Malartic – Senneterre – Val-d'Or area, in the southeastern part of the Abitibi Subprovince, stands at 41. The Beaufor mine (Au-Ag) was the only active gold producer in the area in 2004.

About 3 km east of Malartic, **Richmont Mines Inc.** drove an exploration ramp on its East Amphi property (project 92). As of October 27, 2004, the ramp was 770 m long and at a vertical depth of 130 m out of a total objective of 200 m. An underground exploration campaign involving 9,000 m of drilling is planned. Once a new resource estimate is calculated, a decision concerning the start-up of commercial production will be taken in the second half of 2005. On the Midway project (project 56), located 16 km west of Val-d'Or along the Cadillac Tectonic Zone,

Northern Star Mining Corp. intersected in drillhole four new gold-bearing zones in mafic and gabbroic lenses within an ultramafic unit in the Cadillac Tectonic Zone. The Midway project contains part of the former Malartic Goldfields mine, which produced more than 2 million ounces of gold to a depth of 823 m.

At the Kiena mine complex (project 55), **Wesdome Gold Mines Inc.** launched a drilling and drift development program. Drillholes intersected gold grades, including 3.03 g/t Au over 9.0 m in drillhole U-3719, along the extension of zone S-50 at the Kiena ore deposit. Total resources for the orebody are estimated at 3.01 Mt at a grade of 4.25 g/t Au, assuming a minimum mining width of 3.0 m and a cut-off grade of 2.4 g/t Au. Two exploration drifts are being excavated. The first, on the 33 level (330 m below surface) at the Kiena mine, is to provide access to the Shawkey and 388 zones. The second, on the 52 level (520 m below surface), has already reached the VC zone and will eventually provide access to the lower North zone and the Wesdome property to the north. The VC zone consists of three lenses of silicified and albitized breccia hosted in basalt flows. Drill intercepts include 8 m (true thickness) at 7.18 g/t Au for the VC2 lens (drillhole U-3735).

Agnico-Eagle Mines Ltd began work to rehabilitate mining infrastructure on the Goldex property (project 59), located in the western part of the city of Val-d'Or. This exploration and development program, at a cost of about $10M, will serve to increase the level of confidence in the reserve estimate, which currently stands at 21.77 Mt at a grade of 2.4 g/t Au. A 20,000-tonne bulk sample, extracted in 2004-2005, will be milled in January 2005. Mineralization in the Goldex Extension orebody consists of a stockwork of quartz-tourmaline-pyrite veins with albite-pyrite altered wall rocks, hosted in a quartz diorite sill locally altered to sericite and chlorite. **Metanor Resources Inc.** intersected in drillhole Zone #5, a subparallel zone to the south of the latter, and the Stabell vein on its Dubuisson property (project 58) located in the western part of the city of Val-d'Or. The best intercepts include 2.1 m grading 14.6 g/t Au (drillhole ME-04-58) for the Stabell vein, and 4.2 m grading 3.61 g/t Au (drillhole RS-208) for the subparallel zone south of Zone #5.

Century Mining Corp. completed in September the acquisition of the Sigma-Lamaque mining complex (project 16), formerly held by **McWatters Mining Inc.** Operations at the mine were suspended in October 2003. A drill program was undertaken in October 2004 to upgrade gold resources in the open pit and eventually resume mining operations in 2005. On the Lamaque property (project 17), located in the eastern part of the city of Val-d'Or, **Kalahari Resources Inc.** drill-tested the Sixteen Zone, which consists of quartz-tourmaline-pyrite veins hosted in a strongly leached granodiorite porphyry. Drillhole SX 06-04-1 intersected 0.49 m grading 17.5 g/t Au in the Sixteen Zone.

Located 8 km southeast of Val-d'Or, a drillhole by **Alexis Minerals Corp.** testing the Hogg showing on the Cadillac Group project (project 125) intersected a skarn-type mineralized zone (epidote-magnetite-sulphides) grading 21.2 g/t Au and 0.56% Cu over 3.8 m. This project contains several other showings with skarn-type alteration. On the Aurbel property (project 124), located 10 km east of Val-d'Or, **Alexis Minerals Corp.** released a mineral resource estimate for the Lac Herbin zone and Zone II of 1,072,681 tonnes at 7.26 g/t Au. Seven mineralized zones, consisting of gold-bearing quartz-pyrite veins, are hosted in shear zones cross-cutting the Bourlamaque Batholith. At the Beaufor mine (project 107), located 19 km east of Val-d'Or, **Richmont Mines Inc.** launched an underground exploration campaign totalling $1M, to test the lateral and depth extensions of zones B, C, 8, and 32.

On the Croinor property (project 109), located 70 km east of Val-d'Or, **South-Malartic Exploration Inc.** reported the recovery of 1,981 ounces of gold from a 20,000-tonne bulk sample extracted from the open pit at the Croinor deposit, between November 2003 and January 2004. The average head grade at the Camflo mill near Malartic was 3.10 g/t Au. Measured and indicated resources at the Croinor deposit are estimated at 501,402 tonnes at a grade of 3.46 g/t Au. The mineralization is hosted in a diorite sill; gold occurs in quartz veins and altered pyritized wall rocks. On the Lac Bug showing, located 700 m northeast of the Croinor deposit, drillholes intersected mineralized intervals; best results include 11.34 g/t Au over 4 m (drillhole CR-04-289).

On the Courville property (project 51), located 15 km west of Senneterre, **Pershimco Resources Inc.** carried out surface stripping and drilling on the Thibodeau intrusive, composed of sericitized leucotonalite with disseminated pyrite cut by a stockwork of subhorizontal anastomosing quartz-sulphide veins. Best results include 145 g/t Au and 455 g/t Ag over 0.54 m for channel samples, and 166 g/t Au and 230 g/t Ag over 0.37 m for drillholes. A bulk sample of 12,700 tonnes was collected from a surface stripping on the Thibodeau intrusive and shipped to the Camflo mill near Malartic. A total of 775 ounces of gold and 621 ounces of silver were recovered. The ore grade is estimated at 2 g/t Au.

TÉMISCAMINGUE REGION (FIGURE 1C-1)

In the Témiscamingue region, underlain by rocks of the Pontiac Subprovince south of the Abitibi Subprovince, 4 gold exploration projects were reported in 2004.

Vantex Resources Ltd carried out extensive stripping, sampling, and drilling on its Guillet project (project 76), located 5 km east of Belleterre. One drillhole intersected a grade of 40.75 g/t Au over 13.3 m (drillhole LE04-70), collared near the D zone. Joint venture partners **Fieldex Exploration Inc.** and **Aurora Platinum Corp.** announced the discovery of gold showings (project 2), where grab samples yielded grades ranging from 16.05 to 59.8 g/t Au.

1C

Polymetallic Deposits and Diamonds

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

In 2004, a total of 19 exploration projects were reported in the northwestern part of the Abitibi Subprovince. Operations were suspended in January 2004 by **Billiton Metals Canada Inc.** at the Selbaie mine, located 95 km west of Matagami, whereas the Bell-Allard mine, property of **Noranda Inc.** in Matagami, ceased operations in October.

Noranda Inc. discovered a new showing, dubbed "Renaissance", on the McLeod property (project P24), located just 7 km southeast of the company's mining infrastructure in Matagami. The mineralized zone, intersected in drillhole MC-04-07 at a vertical depth of 465 m, consists of about 6.9 m (true thickness) of massive and semi-massive sulphides. A section of exhalite and stringer sulphides nearly 14 m wide underlies the massive and semi-massive sulphide zone. On the Du Dome-Matagami property (project P11), **SOQUEM INC.** and **Metco Resources Inc.** intersected in drillhole 1288-04-09 a mineralized exhalite, which yielded 2.65% Zn, 0.13% Cu, and 6.05 g/t Ag over 3.3 m.

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

In the Lebel-sur-Quévillon – Desmaraisville area, 9 exploration projects for polymetallic deposits were compiled in 2004.

East of Lebel-sur-Quévillon, **Breakwater Resources Ltd** carried out re-development work at the Langlois mine (project P46), closed since November 2000. According to the company, production is expected to resume in early 2006, and the projected mine life is eight years.

CHIBOUGAMAU AREA (FIGURE 1C-2)

In the Chibougamau mining camp, 8 exploration projects were carried out in 2004.

MSV Resources Inc. performed delineation drilling at the Corner Bay deposit (project P32) located in the southern part of the Lac Doré Complex. Elsewhere in the area, **Woodruff Capital Management Inc.**, in partnership with **Inmet Mining Corp.**, completed several drillholes and geophysical surveys on the Lemoine property (project P31).

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

The number of exploration projects targeting polymetallic deposits in the west-central part of the Abitibi Subprovince stood at 8 in 2004.

Globex Mining Enterprises released the results of a drillhole collared on the Lyndhurst property (project P16), which yielded 1.41% Cu and 26.5 g/t Ag over 7.38 m (in a 17.17-m interval grading 0.825% Cu and 16.42 g/t Ag) at a vertical depth of 35 m. Additional work is planned to assess the tonnage and grade of this silica and sulphide-rich deposit amenable to open pit mining; the ore may be used as flux by base metal processing plants.

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

In 2004, 11 exploration projects were compiled in the Rouyn-Noranda – Cadillac area. One producer, the Bouchard-Hébert mine, was in operation in the area in 2004.

On the MegaTEM-VMS project (project P44), **Noranda Inc.** and **Alexis Minerals Corp.** reported an impressive intercept of 5.16 m at 5.61% Cu, 1.70% Zn, 0.34 g/t Au, and 17.6 g/t Ag (drillhole MON-04-09) at a vertical depth of 110 m, in the Lac Montbray area 25 km west of Rouyn-Noranda. A drillhole collared 50 m east of the discovery hole was underway at the end of the year. On the Fabie Bay – Magusi River property (project P27), **Globex Mining Enterprises** intersected 3.7 m grading 3.44% Cu and 8.1 g/t Ag in drillhole H04-01, drilled to define the easternmost extent of the known mineralized zone.

On the LaRonde II project (project P9), **Agnico-Eagle Mines Ltd** continued its exploration drilling program at depth and to the west in Zone 20 North at the LaRonde mine. According to the company, the results suggest the presence of a higher-grade gold core at depth. They also suggest that Zone 20 North may expand at depth and toward the south and west.

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

In 2004, the number of exploration projects targeting polymetallic deposits in this area stood at 8. One producer, the Louvicourt mine, was in operation in the Val-d'Or area in 2004.

On the Simkar property (project P38), located 20 km east of Val-d'Or, **Megastar Development Corp.** completed three drillholes testing an IP anomaly and the extension of the A-B and East zones. According to the company, anomalous Au-Cu values and the presence of alteration zones suggest the setting is favourable for volcanogenic mineralization. A drill program completed in the western part of the Abcourt-Barvue orebody (project P1) by **Abcourt Mines Inc.** yielded good results, such as 12.68 m at 141.58 g/t Ag and 2.77% Zn in drillhole AB04-22. The company plans to extract an 80,000-tonne bulk sample in this area in 2005.

TÉMISCAMINGUE REGION (FIGURE 1C-2)

In the Pontiac Subprovince, 4 exploration projects for polymetallic deposits were compiled.

Near Notre-Dame-du-Nord (project P59), **Tres-Or Resources Ltd** discovered in early 2004 a kimberlite pipe as well as a series of four kimberlite dykes respectively located 6 km northeast and 2 km southwest of the Guigues pipe. No diamonds were recovered from the newfound pipe.

Opportunities for Exploration

BASE METALS

Significant base metal (Cu-Zn) discoveries were made in the fall 2004 by **Noranda Inc.** in the Matagami area and by partners **Noranda Inc.** and **Alexis Minerals Corp.** west of Rouyn-Noranda. These suggest the mineral potential in established mining camps remains quite high, despite several decades of intense exploration. The discovery of massive and semi-massive sulphides, exhalites, and stringer sulphides at a depth of about 465 m at the "Renaissance" showing, located just 7 km from Noranda's mining infrastructure in Matagami, is yet another example of the tremendous potential of the volcanic sequence along the South Flank of the Galinée anticline, which hosts a series of volcanogenic massive sulphide deposits that were mined in the past.

The intersection of massive sulphides, followed by mineralized breccias and a stringer zone, at a shallow depth of 110 m in the Lac Montbray area, some 25 km west of Rouyn-Noranda, emphasizes the potential of the western Blake River Group. This vast area, which extends from the Ontario border eastward to the Flavrian synvolcanic pluton, is not as well known as the Noranda central camp, where the vast majority of known massive sulphide deposits are located. **Géologie Québec** is currently conducting a regional geological survey in the western Blake River Group (Lafrance *et al.*, 2004a, 2004b), in order to better define stratigraphic horizons likely to host VMS deposits and structures associated with epigenetic gold mineralization.

East of Rouyn-Noranda, in Joannès Township, mapping by **Géologie Québec** in 2004 identified a stratigraphic horizon with VMS potential in the Lac Dupuis Formation (Lafrance *et al.*, 2004a, 2004b). In the vicinity of the Joannès-Chouinard property, located 3 km southeast of Lac Marillac, a single drillhole intersected this horizon that contains a large pyrrhotite-pyrite stringer zone with weakly anomalous Cu-Zn values. This horizon has seen little or no exploration, particularly along its regional extensions. The work of **Géologie Québec** shows this horizon may be traced over a lateral distance of nearly 12 km, namely from the Rivière Kinojévis in the west, eastward to an area southeast of the Joannès-Orion Au-Cu-Zn deposit. The results obtained in these three areas highlight the mineral potential of these regions, and as such, generate high expectations for exploration in the western part of the Abitibi Subprovince.

PRECIOUS METALS

In 2004, exploration campaigns yielded positive results in many parts of the Abitibi and Pontiac subprovinces.

In the central part of the Urban-Barry belt, located 120 km east of Lebel-sur-Quévillon, **Noront Resources Ltd** completed a drill program on the Windfall property in Urban Township (NTS 34 G/04), targeting the lateral extensions of known gold-bearing zones in felsic volcanic rocks. Several drillholes intersected semi-massive pyrite zones with high gold grades. On the adjoining property to the north, **Murgor Resources Inc.** and **Freewest Resources Canada Inc.** also discovered new surface gold showings. These mineralized zones are hosted in the Windfall Member of the Macho Formation, recently outlined in the entire Urban-Barry belt by **MRNFP** mapping (Bandyayera *et al.*, 2001, 2002, 2003). Eastward, in map sheet 32 G/03, several other felsic units were recognized in the Fecteau and Chanceux formations, as well as in the Freeman Member of the Urban Formation (Bandyayera *et al.*, 2003). These units host gold and zinc-copper showings as well as sericite and chlorite alteration zones. Given the fact that logging roads were only very recently developed in the area, these km-scale felsic units have not been intensely explored. The Urban-Barry belt, and particularly the eastern part of the belt, represents a relatively underexplored area with significant economic potential.

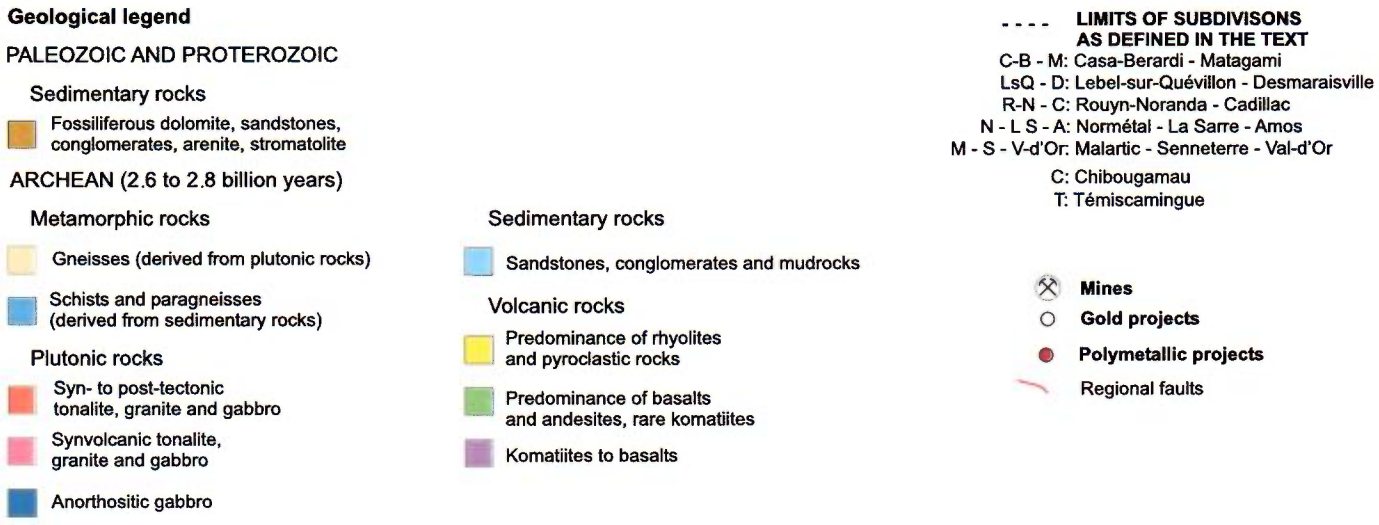


Figure 1C-1. Geological legend of maps of the Abitibi and Pontiac Subprovinces (Figures 1C-1 and 1C-2).

1C

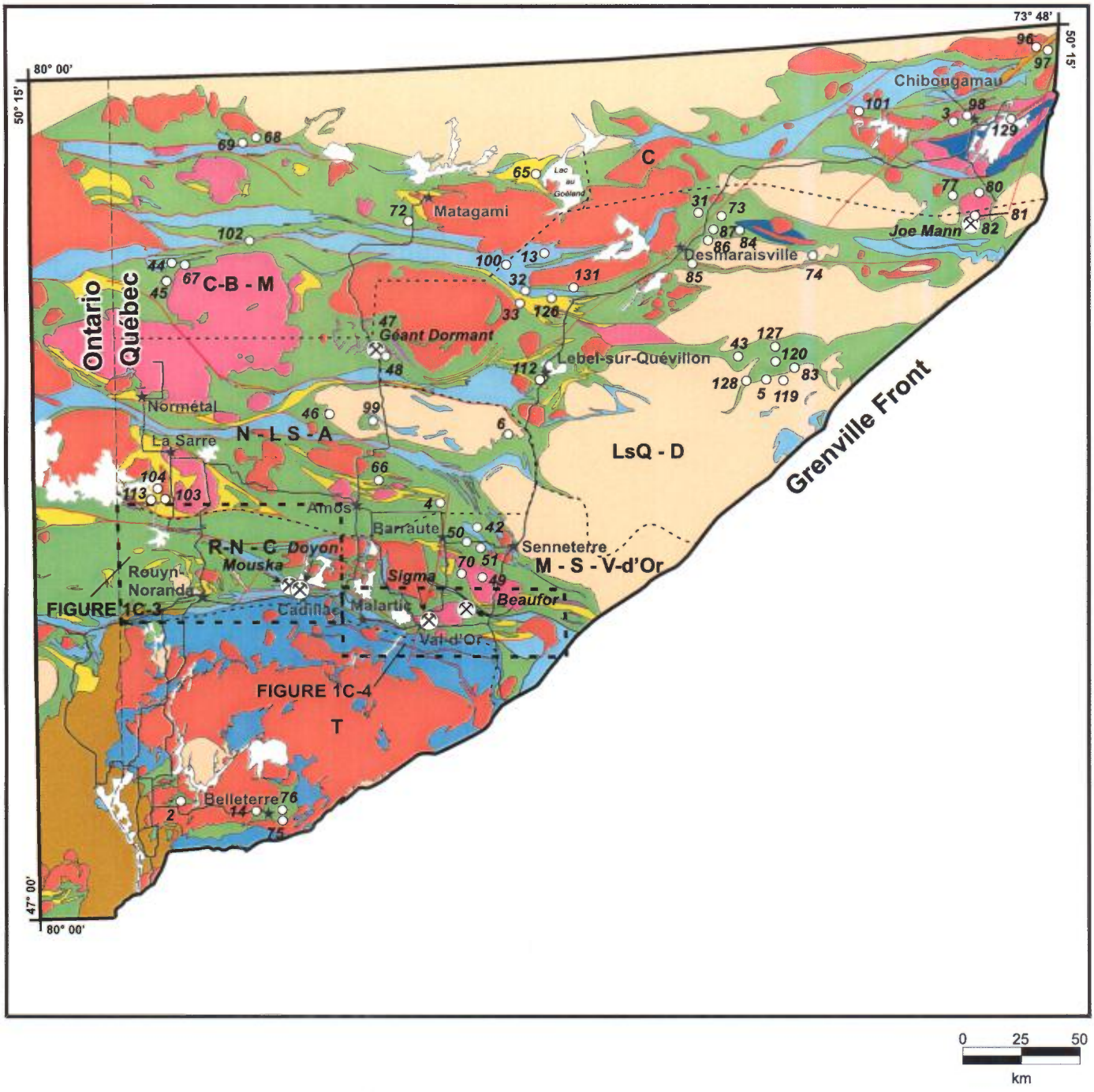


Figure 1C-1. Exploration projects for gold in the Abitibi and Pontiac subprovinces for 2004. Modified from Hocq and Verpaelst (1994).

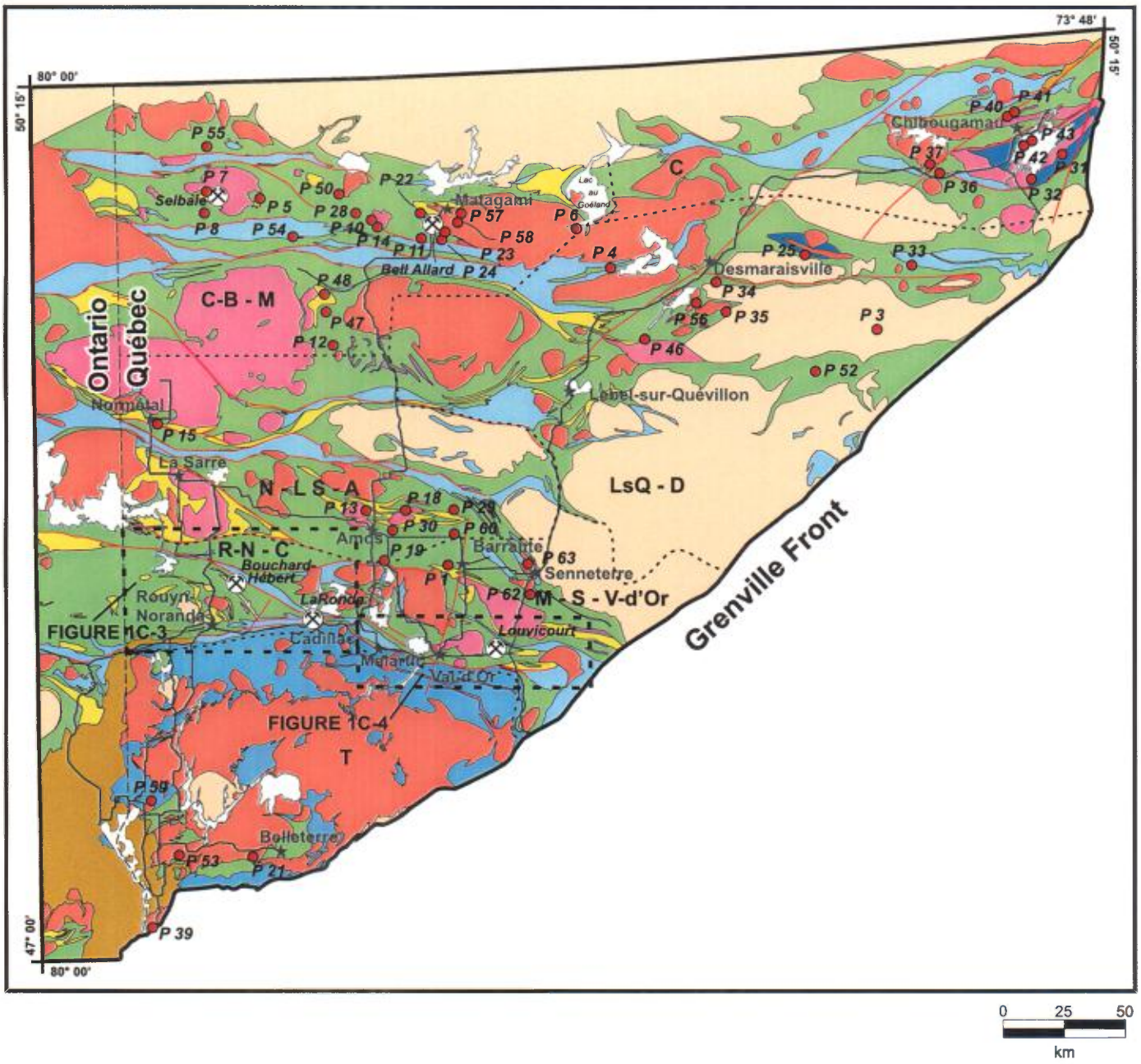
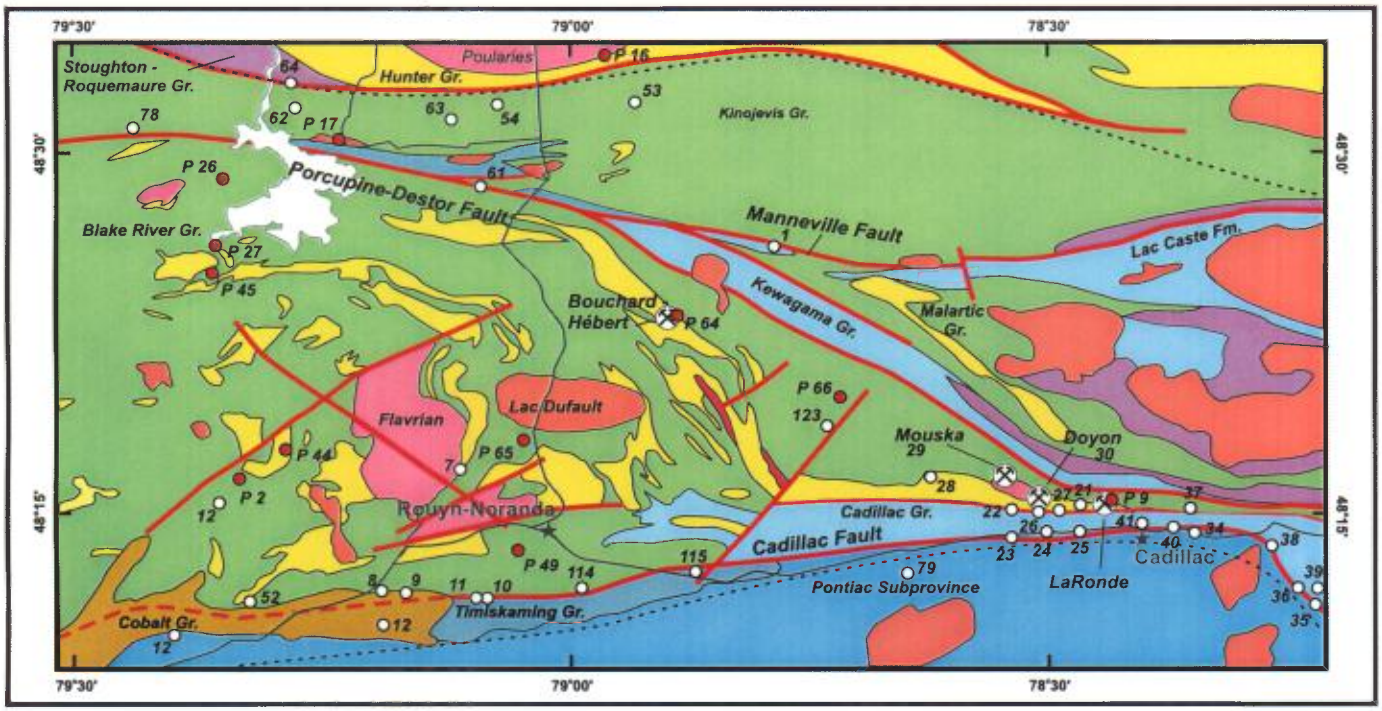


Figure 1C-2. Exploration projects for base metals in the Abitibi and Pontiac subprovinces for 2004. Modified from Hocq and Verpaelst (1994).

1C



Geological legend

PROTEROZOIC

Sedimentary rocks

- Sandstones, conglomerates, arenites, stromatolite

ARCHEAN

Plutonic rocks

- Syn- to post-tectonic tonalite, granite and gabbro
- Synvolcanic tonalite, granite and gabbro

Sedimentary rocks

- Cadillac type
- Pontiac type
- Timiskaming type

Volcanic rocks

- Rhyolites
- Basalts
- Komatiites to basalts

LIMITS OF SUBDIVISIONS AS DEFINED IN THE TEXT

Mines

Projects

- Gold
- Polymetallic

Faults

Figure 1C-3. Exploration projects and mines in the Rouyn-Noranda – Cadillac area for 2004. Modified from Avramtchev and Lebel-Drolet (1981) and Couture (1991).

1C

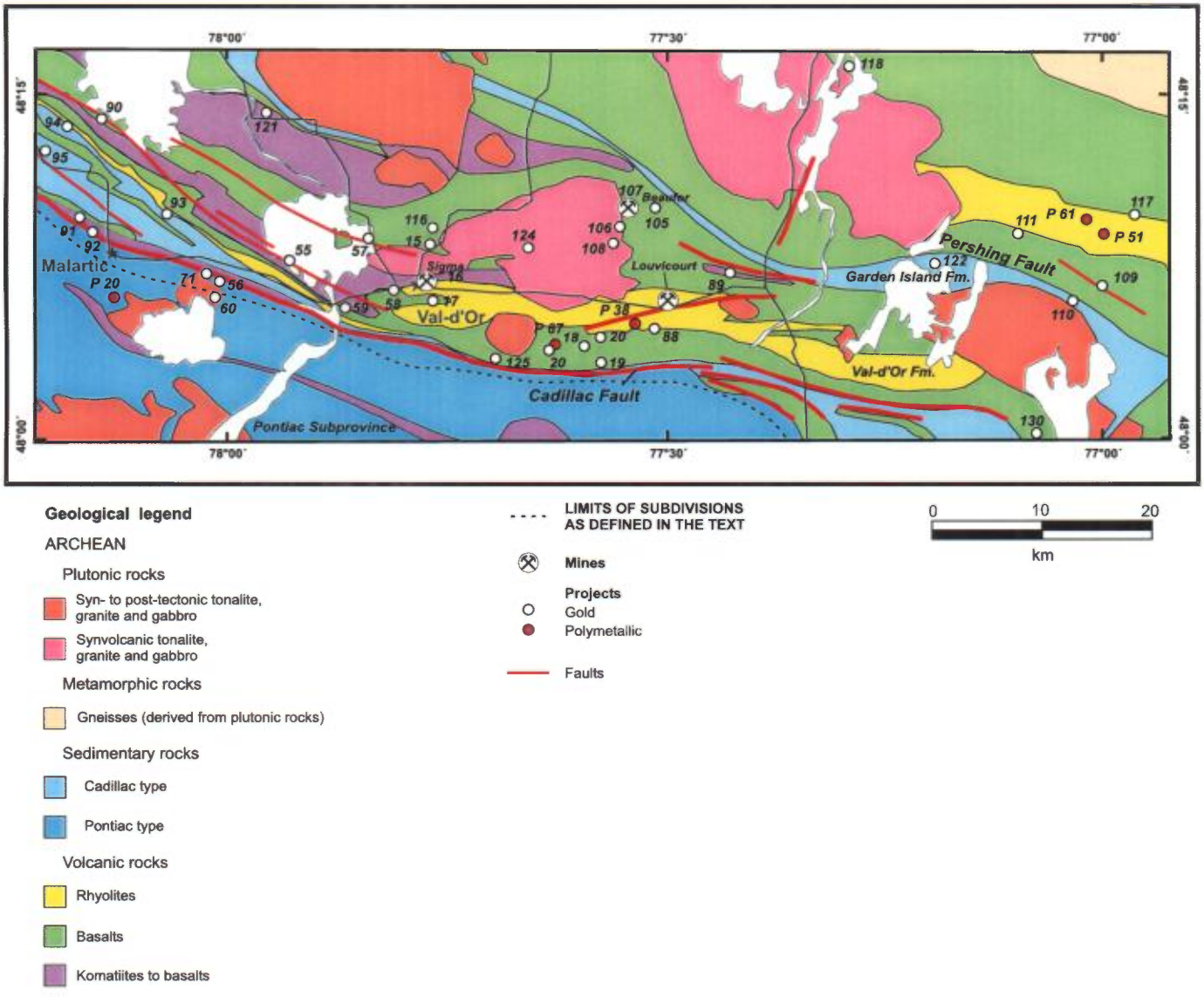


Figure 1C-4. Exploration projects and mines in the Malartic – Val d'Or area for 2004. Modified from Avramtchev and Lebel-Drolet (1981) and Couture (1991).

TABLE 1C-1 - Exploration projects for gold in the Abitibi and Pontiac subprovinces for 2004.

NO	TOWNSHIPS	Fig.	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORKS [1]
1	Aiguebelle	1C-3	32 D/07	Typhoon Exploration Inc.	Fayolle	Au	D(14:3271), Gs(r), TE
2	Baby	1C-1	31 M/06	Fieldex Exploration Inc. / Aurora Platinum Corp.	Témiscamingue	Au, Cu, Zn, Pt	Mag-EM(A), Pg, S, T
3	Barlow	1C-1	32 G/16	Alexandria Minerals Corporation	Gwillin	Au, Cu	G, Mag
4	Barraute, Carpentier	1C-1	32 C/12	Phoenix Matachewan Mines Inc.	Swanson	Au, Cu	G, IP
5	Barry	1C-1	32 B/13	Osisko Exploration Ltd / Murgor Resources Inc. / Freewest Resources Canada Inc.	Barry	Au	D(?:1846)
6	Bartouille	1C-1	32 C/14	Cambior Inc.	Bartouille	Au, Zn, Cu, Ag	D(5:844)
7	Beauchastel	1C-3	32 D/03	Abcourt Mines Inc.	Mine Elder	Au	TE
8	Beauchastel	1C-3	32 D/03	Richmont Mines Inc.	Wasamac	Au	D(5:3839)
9	Beauchastel	1C-3	32 D/03	Globex Mining Entreprises Inc.	Arntfield Goldfields	Au	D(3:?)
10	Beauchastel	1C-3	32 D/03	Yorbeau Resources Inc.	Augmito - Astoria II	Au	S, T
11	Beauchastel	1C-3	32 D/03	Lake Shore Gold Corp.	Bazooka	Au	D(7:2047)
12	Beauchastel, Dasserat, Rouyn	1C-3	32 D/03	Cadillac West Explorations Inc.	Several	Au	Gs(r), Mag-EM(A), Pr, Rsi
13	Berthiaume	1C-1	32 F/07, 10	Géonava Exploration Ldt / SOQUEM INC. / Freewest Resources Cananda Inc.	Berthiaume	Au	S, T
14	Blondeau	1C-1	31 M/07	Searchgold Resources Inc.	Lac Crevier	Au	Pr, S, T
15	Bourlamaque	1C-4	32 C/04	Société Minière Rivière Harricana Inc. / Aur Resources Inc.	Aubel	Au	Mag
16	**Bourlamaque**	**1C-4**	**32 C/04**	**Century Mining Corp.**	**Sigma-Lamaque**	**Au**	**D(375:18 677), Env**
17	Bourlamaque	1C-4	32 C/04	Kalahari Resources Inc.	Lamaque	Au	D(56:11 122), Gs(h)
18	Bourlamaque, Louvicourt	1C-4	32 C/03, 04	South-Malartic Exploration Inc. / Cambior Inc.	Tex-Sol	Au	D(2:496), IP, Mag, Pr
19	Bourlamaque, Louvicourt	1C-4	32 C/03, 04	Cambior Inc.	Akasaba - Bloc Sud	Au	D(4:2148), DPEM
20	Bourlamaque, Louvicourt	1C-4	32 C/03, 04	Cambior Inc. / Aur Resources Inc.	Valdora-Annamaque	Au	D(14:4310), IP, Mag
21	Bousquet	1C-3	32 D/02, 07	Agnico-Eagle Mines Ltd	Ellison (PN-121)	Au, Ag, Zn, Cu	D(2:1340)
22	Bousquet	1C-3	32 D/02, 07	Agnico-Eagle Mines Ltd	Norbar (PN-127)	Au, Ag, Zn, Cu	D(1:1238)
23	Bousquet	1C-3	32 D/02	Agnico-Eagle Mines Ltd	Norgold (PN-120)	Au, Ag, Zn, Cu	D(4:2144)

TABLE 1C-1 - Exploration projects for gold in the Abitibi and Pontiac subprovinces for 2004.

NO	TOWNSHIPS	Fig.	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORKS [1]
24	Bousquet	1C-3	32 D/01	Agnico-Eagle Mines Ltd	Normand Lake (PN-114)	Au, Ag, Zn, Cu	D(5:948)
25	Bousquet	1C-3	32 D/01	Agnico-Eagle Mines Ltd	Terrex (PN-125)	Au	D(6:1924)
26	Bousquet	1C-3	32 D/02	Cambior Inc.	Doyon	Au	D(1:1161), DPEM, Gs(r), TE
27	Bousquet	1C-3	32 D/02	Cambior Inc.	Westwood-Warrenmac	Au	D(4:4233), DPEM, Gs(r)
28	Bousquet	1C-3	32 D/02	Cambior Inc. / Breakwater Resources Ltd	Bousquet-Ferris	Au, Cu	D(3:811)
29	Bousquet	1C-3	32 D/02	Cambior Inc.	Mine Mouska	Au	D(?:6809)
30	*Bousquet*	*1C-3*	*33 D/02*	*Cambior Inc.*	*Mine Doyon*	*Au*	*D(188:38 350)*
31	Boyvinet	1C-1	32 F/09, 32 G/12	NioGold Mining Corp.	Lake Shortt	Au	S, T
32	Bruneau, Desjardins	1C-1	32 F/06	Strateco Resources Inc. / Géonava Exploration Ldt	Discovery	Au	D(11:4500), Mag, TE
33	Bruneau, Desjardins	1C-1	33 F/06	Strateco Resources Inc. / Géonava Exploration Ldt	Cameron	Au	D(7:2411), Pr
34	Cadillac	1C-3	32 D/02	Queenston Mining Inc.	Pandora	Au	D(5:4358)
35	Cadillac	1C-3	32 D/01	Agnico-Eagle Mines Ltd	Chibex South (PN-124)	Au	D(13:5330)
36	Cadillac	1C-3	32 D/01	Agnico-Eagle Mines Ltd	Chibex North (PN-123)	Au	D(12:4334)
37	Cadillac	1C-3	32 D/01	Agnico-Eagle Mines Ltd	Bruce (PN-108)	Au, Ag, Zn, Cu	D(3:2477)
38	Cadillac	1C-3	32 D/01	Agnico-Eagle Mines Ltd	Lapa (PN-118)	Au	D(47:28 847)
39	Cadillac	1C-3	32 D/01	Golden Valley Mines Ltd	Cadillac High	Au	D(3:260), EM, IP, Mag
40	Cadillac	1C-3	32 D/01	Globex Mining Entreprises Inc. / Queenston Mining Inc.	Wood	Au	D(1:1050)
41	Cadillac	1C-3	32 D/01	Radisson Mining Resources Inc.	O'Brian-Kéwagama	Au	D(6:6000)
42	Carpentier	1C-1	32 C/05	Abitex Resources Inc. / Placements J.E. Jolin	Jolin	Au	Mag-Em(A), Rsi, T
43	Carpiquet	1C-1	32 G/04	Les Ressources Tectonic Inc.	Panache	Au	Pr
44	**Casa-Berardi, Dieppe, Estrées, Puiseaux**	**1C-1**	**32 E/10, 11**	**Aurizon Mines Ltd**	**Casa Berardi**	**Au**	**D(?:21 400), Grav**
45	Casa-Bérardi, Laberge	1C-1	32 E/06, 11	Cambior Inc. / Cancor Mines Inc.	Gémini-Turgeon	Au, Cu, Zn	D(17:7192), IP, Mag
46	Céleron	1C-1	32 E/01	Denis Cyr	Céleron	Au	Pr
47	*Chaste*	*1C-1*	*32 F/04*	*Cambior Inc. / Aurizon Mines Ltd*	*Mine Géant Dormant*	*Au, Ag*	*D(276:51 276)*
48	Chaste, Glandelet	1C-1	32 E/01, 32 F/04	Cambior Inc. / Aurizon Mines Ltd	Dormex	Au	D(6:2325), IP, Mag

TABLE 1C-1 - Exploration projects for gold in the Abitibi and Pontiac subprovinces for 2004.

NO	TOWNSHIPS	Fig.	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORKS [1]
49	Courville	1C-1	32 C/06	South-Malartic Exploration Inc.	Courville	Au	Mag
50	Courville	1C-1	32 C/06	South-Malartic Exploration Inc.	Belcourt	Au	IP, Mag
51	Courville	1C-1	32 C/06	Pershimco Resources Inc.	Courville	Au, Ag	B(13 000:?), D(?:500), Gs, T
52	Dasserat	1C-3	32 D/03	Searchgold Resources Inc	Lac Fortune Ouest	Au	Pr, S, T
53	Destor	1C-3	32 D/10	Golden Valley Mines Ltd	Sea Serpent	Au	IP, EM, Mag
54	Destor	1C-3	32 D/11	Golden Valley Mines Ltd	Double Trouble	Au	IP, EM, Mag
55	**Dubuisson**	**1C-4**	**32 C/04**	**Wesdome Gold Mines Inc.**	**Kiena**	**Au**	**D(20:5000)**
56	Dubuisson	1C-4	32 C/04	Northern Star Mining Corp.	Midway	Au	D(39:11 539), G, Gs(r), Mag
57	Dubuisson	1C-4	32 C/04	Alexandria Minerals Corporation	Siscoe East	Au	G, Mag
58	Dubuisson	1C-4	32 C/04	Metanor Resources Inc.	Dubuisson	Au	D(?:6000), Gp
59	**Dubuisson**	**1C-4**	**32 C/04**	**Agnico-Eagle Mines Ltd**	**Goldex**	**Au**	**D(?:?),B(20 000:?)**
60	Dubuisson	1C-4	32 D/01, 32 C/04	Golden Valley Mines Ltd	Dubuisson	Au	D(4:544), EM, IP, Mag
61	Duparquet	1C-3	32 D/06	Queenston Mining Inc. / Globex Mining Entreprises Inc.	Duquesne West	Au	D(9:5943)
62	Duparquet	1C-3	32 D/11	Golden Valley Mines Ltd	Ruisseau Déguisé	Au	EM, IP, Mag
63	Duparquet	1C-3	32 D/11	Golden Valley Mines Ltd	Golden Jet	Au	EM, IP, Mag
64	Duparquet, Palmarolle	1C-3	32 D/11	Cambior Inc. / SOQUEM INC.	Hunter-Duparquet	Au	D(2:305), IP
65	Dussieux	1C-1	32 F/14, 15	Sirios Resources Inc.	Dussieux	Au	D(4:588)
66	Duvernay	1C-1	32 C/12	Globex Mining Entreprises Inc.	Duvay	Au	IP
67	Estrées	1C-1	32 F/10	Cambior Inc. / Canley Development Inc.	Estrées-Caribou	Au, Cu, Zn	D(6:2269), IP, Mag
68	**Fénelon**	**1C-1**	**32 E/15**	**International Taurus Resources Inc. / Fairstar Explorations Inc.**	**Fénelon Gold**	**Au**	**Met**
69	Fénelon, Gaudet	1C-1	32 E/15	J. Figon, G. Robert, L. Martel / Pro-veinor Resources Inc.	Fénelon-Gaudet	Au, Base metals	D(6:1400), S
70	Fiedmont, Courville	1C-1	32 C/05	Wesdome Gold Mines Inc.	McKenzie Break	Au	D(37:4550)
71	Fournière	1C-4	32 D/01	Cambior Inc.	Piché	Au	IP, Mag, Pr
72	Galinée	1C-1	32 F/12	Cambior Inc.	Galinée-Newmont	Au, Base metals	ET, Gs, IP, Mag

TABLE 1C-1 - Exploration projects for gold in the Abitibi and Pontiac subprovinces for 2004.

NO	TOWNSHIPS	Fig.	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORKS [1]
73	Gand	1C-1	32 G/12	SOQUEM INC. / Itamineraque Resources Inc.	Gandex (1232)	Au	D(2:1015)
74	Gradis, Drouet, Druillettes	1C-1	32 G/06, 11	Lake Shore Gold Corp.	Drouet	Au	Gs(r), Gs(sl), Gs(t)
75	Guillet	1C-1	31 M/07	J. Viger	Platior	Au, Pt	EM, Gs(s), Pr, S
76	Guillet	1C-1	31 M/07	Vantex Resources Ltd	Guillet	Au	D(26:?), G, Pr, S, T
77	Hauy	1C-1	32 G/09, 10	Les Ressources Tectonic Inc.	Hygrade	Au	G
78	Hébécourt	1C-3	32 D/11	Cambior Inc.	Porcupine	Au	D(5:2706)
79	Joannes	1C-3	32 D/02	Alexandria Minerals Corporation	Joannes	Au	G, Mag, Pr
80	La Dauversière	1C-1	32 G/09	Ressources D'Arianne Inc.	La Dauversière	Au	S, T
81	La Dauversière	1C-1	32 G/08, 09	Campbell Resources Inc. / SOQUEM INC.	Joe Mann	Au (Ag-Cu)	D(31:8465), EM, Gs, IP, Pr
82	*La Dauversière*	*1C-1*	*32 G/08, 09*	*Campbell Resources Inc. / SOQUEM INC.*	*Mine Joe Mann*	*Au (Ag-Cu)*	*D(?:?)*
83	Lacroix	1C-1	32 G/03	Jean Descarreaux et Ass. Ltée	Lacroix	Au	G, Gs(r), S, T
84	Lespérance	1C-1	32 G/12	Matamec Explorations Inc.	Lespérance	Au	ET, Gs(t), IP
85	Lesueur	1C-1	32 F/08	Wolfden Resources Inc. / Metanor Resources Inc.	Bachelor Lake Gold Mine	Au	ET
86	Lesueur, Lespérance	1C-1	32 G/12	SOQUEM INC. / Northern Mining Eplorations Ltd	Lespérance (1194)	Au	Mag-Em(A)
87	Lesueur, Lespérance, Gand, Boyvinet	1C-1	32 G/12	SOQUEM INC. / Northern Mining Eplorations Ltd	Lac Shortt (1123)	Au	D(7:2873), Mag-EM(A), S
88	Louvicourt	1C-4	32 C/03	Megastar Development Corp.	Simkar	Au, Cu	D(3:900)
89	Louvicourt	1C-4	32 C/03	Louvem Mines Inc. / SOQUEM INC.	Monique	Au	D(7:3865)
90	Malartic	1C-4	32 D/01	South-Malartic Exploration Inc. / Prospectors	Héva-Malartic	Au	D(5:800), IP, Mag
91	Malartic	1C-4	32 D/01	Ressources D'Arianne Inc.	Rivière Héva	Au	IP, G
92	**Malartic**	**1C-4**	**32 D/01**	**Richmont Mines Inc.**	**East Amphi**	**Au**	**D(66:14 022)**
93	Malartic	1C-4	32 D/01	Richmont Mines Inc. / SOQUEM INC.	Camflo NO	Au	D(1:453)
94	Malartic	1C-4	32 D/01	Golden Valley Mines Ltd	Héva-Minor	Au	D(4:400), EM, IP, Mag
95	Malartic	1C-4	32 D/01	Golden Valley Mines Ltd	Rivière Héva	Au	D(2:166), EM, IP, Mag
96	McCorkill	1C-1	32 G/16, 32 J/01	Typhoon Exploration Inc.	Monexco	Au	D(7:320), G, Gs(r), S
97	McCorkill	1C-1	32 H/13, 32 I/04	Typhoon Exploration Inc.	McCorkill	Au	G, Gs(r), S
98	McKenzie	1C-1	32 G/16	SOQUEM INC. / Itamineraque Resources Inc.	Brosman (1230)	Au	D(12:2358), G, IP, Mag, Pr

TABLE 1C-1 - Exploration projects for gold in the Abitibi and Pontiac subprovinces for 2004.

NO	TOWNSHIPS	Fig.	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORKS [1]
99	Miniac	1C-1	32 D/16	Globex Mining Entreprises Inc.	Miniac	Au, Zn	G, Pr
100	Noyelles	1C-1	32 F/06, 11	GéoNova Exploration Inc. / SOQUEM INC. / Freewest Resources Cananda Inc.	Noyelles	Au	EM, IP, S, T
101	Opémisca	1C-1	32 G/14, 15	SOQUEM INC. / Nimsken Corporation Inc.	Michwacho (1340)	Au, Cu, PGE	EM, IP, Mag, Mag-EM(A)
102	Orvilliers, Montgolfier	1C-1	32 E/10	J-Pacific Gold Inc.	Montgolfier	Au	ET, Pr
103	Palmarolle	1C-1	32 D/11	Golden Valley Mines Ltd	Palmarolle	Au	EM, IP, Mag
104	Palmarolle	1C-1	32 D/11	Golden Valley Mines Ltd	Witch Hunt	Au	EM, IP, Mag
105	Pascalis	1C-4	32 C/04	South-Malartic Exploration Inc.	Pascalis	Au	D(4:850), Mag
106	Pascalis	1C-4	32 C/04	Richmont Mines Inc.	Beaufor	Au	D(1:300)
107	*Pascalis*	*1C-4*	*32 C/04*	*Richmont Mines Inc.*	*Mine Beaufor*	*Au*	*D(?:13 396)*
108	Pascalis, Louvicourt	1C-4	32 C/04	Richmont Mines Inc. / Louvem Mines Inc.	Colombière	Au	D(2:801)
109	**Pershing**	**1C-4**	**32 C/03**	**Exploration Malartic-Sud Inc.**	**Croinor**	**Au**	**D(56:9729), IP, Mag, T**
110	Pershing	1C-4	32 C/03	South-Malartic Exploration Inc.	Pershing	Au	D(4:800), Mag
111	Pershing, Tiblemeont	1C-4	32 C/03	South-Malartic Exploration Inc.	Bel-Rive	Au	D(7:1300), IP, Mag
112	Quévillon	1C-1	32 F/03	Alexandria Minerals Corporation	Quévillon	Au	G, Mag, Pr
113	Roquemaure	1C-1	32 D/11	Golden Valley Mines Ltd	Playa Dolce	Au	EM, IP, Mag
114	Rouyn	1C-3	32 D/03	Yorbeau Resources Inc.	Astoria I	Au	S, T
115	Rouyn, Joannes	1C-3	32 D/02	Cambior Inc.	Rouyn-Merger	Au	ET, IP
116	Senneville, Vassan	1C-4	32 C/04	JCML Resources Inc.	Val d'Or	Au, Cu	D(1:250)
117	Tavernier	1C-4	32 C/03	South-Malartic Exploration Inc.	Lac Tavernier	Au	IP, Mag
118	Tiblemont	1C-4	32 C/06	South-Malartic Exploration Inc.	Robinson	Au	EM, IP
119	Urban	1C-1	32 B/13, 32 G/04	Beaufield Consolidated Resources Inc.	Lac Rouleau	Au	D(11:860), Gs(sl), Mag
120	Urban	1C-1	32 G/04	Noront Resources Ltd	Windfall Lake	Au	D(15:5645), DPEM, S, T
121	Vassan	1C-4	32 C/04	Golden Valley Mines Ltd	Vassan	Au	D(2:200), EM, IP, Mag
122	Vauquelin	1C-4	32 C/03	South-Malartic Exploration Inc. / C2C INC.	Bruell	Au	G
123	Cléricy	1C-3	32 D/07	Alexis Minerals Corporation	Noralex - Au	Au	D(16:4044), Gs(r), IP, Mag, TE

TABLE 1C-1 - Exploration projects for gold in the Abitibi and Pontiac subprovinces for 2004.

NO	TOWNSHIPS	Fig.	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORKS [1]
124	Bourlamaque	1C-4	32 C/03, 04	Alexis Minerals Corporation	Aurbel	Au	D(51:17 601), Gs(r), Mag, TE
125	Bourlamaque, Louvicourt	1C-4	32 C/03, 04	Alexis Minerals Corporation	Cadillac Option	Au, Ag, Cu, Zn	D(71:15 000), DPEM, Gs(r), IP, Mag, TE
126	Desjardins	1C-1	32 F/07	Normabec Mining Ressources Ltd / SOQUEM INC.	Desjardins	Au	D(2:?)
127	Urban	1C-1	32 G/04	Murgor Resources Inc. / Freewest Resources Canada Inc.	Windfall	Au	D(11:2038), IP, Pg, S, T
128	Barry, Souart	1C-1	32 B/13	Gold Hawk Resources Inc.	Barry-Souart	Au	D(12:2000), IP, Mag
129	**Roy**	**1C-1**	**32 G/16**	**Campbell Resources Inc.**	**Copper Rand**	**Au, Cu**	**D(59:28 340)**
130	Denain	1C-4	31 N/14	Mirabel Resources Inc.	Denain	Au	B, D(?:?), S
131	Currie	1C-1	32 F/07	Mirabel Resources Inc.	Lac Rose	Au	D(?:?), S

1 = See abbreviation list in appendix II.

TABLE 1C-2 - Exploration projects for base metals in the Abitibi and Pontiac subprovinces for 2004.

No	TOWNSHIPS	Fig.	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORKS [1]
P1	Barraute	1C-2	32 C/12	Abcourt Mines Inc.	Abcourt-Barvue	Zn-Ag	D(?:1700), TE
P2	Beauchastel	1C-3	32 D/03, 06	SOQUEM INC.	Lac Arnoux (1162)	Zn-Cu	EM
P3	Belmont	1C-2	32 G/03	Abitex Resources Inc. / Clearview Minerals	St-Cyr	Ni-Cu-Co-PGE	Pr, T, Mag, G
P4	Bergère	1C-2	32 F/07, 10	Explorateurs Innovateurs de Québec Inc. / Freewest Resources Canada Inc.	Suite Syndicat Ex-66	Cu-Zn-Au	T, Gs(r)
P5	Beschefer	1C-2	32 E/15	SOQUEM INC.	Beschefer (11722)	Zn-Cu	Pr
P6	Bourbeaux	1C-2	32 F/10	Explorateurs Innovateurs de Québec Inc.	Goéland Ex-63	Ni-Cu-Co-PGE	T, Gs(r)
P7	Brouillan	1C-2	32 E/14	SOQUEM INC.	Wagosic (1338)	Zn-Cu	Mag, EM
P8	Brouillan, Carheil	1C-2	32 E/14	Woodruff Capital Management Inc. / Inmet Mining Corp	Selbaie West	Cu-Zn-Au-Ag	EM
P9	Cadillac	1C-3	32 D/08	Agnico-Eagle Mines Ltd	Mine LaRonde	Cu-Zn-Au-Ag	D(275:48610)
P10	Cavelier	1C-2	32 F/12	Noranda Inc. / Phelps Dodge Corporation	PD-2	Zn-Cu-Ag-Au	D(4:1292), DPEM
P11	Cavelier, Galinée	1C-2	32 F/12	SOQUEM INC. / Metco Resources Inc.	Du Dôme-Matagami (1288)	Zn-Cu	D(5:1628), EM, Mag, Gs(r)
P12	Dalet	1C-2	32 E/01	M. Morin	Dalet	Cu-Zn-Au	Pr
P13	Dalquier	1C-2	32 D/09	D. Cyr	Dalquier	Cu-Zn-Au-Ag	Pr, T
P14	Desmazures	1C-2	32 E/09	SOQUEM INC.	B6-20 Mc Ivor (1214)	Zn-Cu	D(2:583), EM, DPEM, Gs(r)
P15	Des Méloïzes, Perron, Clermont, Rousseau	1C-2	32 D/14	SOQUEM INC.	Lac Des Méloïzes (1356)	Zn-Cu	Pr
P16	Destor, Poularies	1C-3	32 D/10	Globex Mining Enterprises Inc.	Lyndhurst	Cu-Zn	D(1:?)
P17	Duparquet, Hébécourt, Destor	1C-3	32 D/11	SOQUEM INC.	Ruisseau Deguisier (1357)	Zn-Cu	EM
P18	Duverny	1C-2	32 C/12	Globex Mining Enterprises Inc.	DW	Cu-Ni	Pr, E
P19	Figuery	1C-2	32 D/08	SOQUEM INC.	Wathish (1353)	Ni-Cu-PGE	EM, Mag
P20	Fournière	1C-4	32 D/01	170364 Canada Inc. / C2C Inc.	Fournière	Cu	D(4:710), Mag, IP
P21	Gaboury	1C-2	31 M/06	Hinterland Metals Inc.	Lorraine	Ni-Cu-PGE-Au	D(4:1604), DPEM
P22	Galinée	1C-2	32 F/13	Beaufield Consolidated Resources Inc.	Matagami	Cu-Zn-Au-Ag	D(4:380), Mag
P23	Galinée	1C-2	32 F/12	Noranda Inc.	Bracemac	Zn-Cu-Ag-Au	D(4:2176), DPEM

TABLE 1C-2 - Exploration projects for base metals in the Abitibi and Pontiac subprovinces for 2004.

No	TOWNSHIPS	Fig.	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORKS [1]
P24	Galinée	1C-2	32 F/12	Noranda Inc.	McLeod (Renaissance)	Zn-Cu-Ag-Au	D(14:8715), DPEM, Gs(h)
P25	Guercheville, La Ronde, Du Guesclin	1C-2	32 G/05, 06	SOQUEM INC.	Wachigabau (1324)	PGE	Pr
P26	Hébécourt	1C-3	32 D/06	Alexandria Minerals Corporation	Hébécourt	Cu-Zn-Au-Ag	Mag
P27	Hébécourt	1C-3	32 D/06	Globex Mining Enterprises Inc.	Baie Fabie - Rivière Magusi	Cu-Zn-Ag	D(1:?)
P28	La Gauchetière, Desmazures	1C-2	32 E/09, 16	SOQUEM INC. / Metco Resources Inc.	Caber (1309)	Zn-Cu	EM
P29	La Morandière	1C-2	32 C/12	Explor Resources Inc.	La Morandière	Cu-Zn-Ag	D(5:1500), Mag, DPEM
P30	Landrienne	1C-2	32 C/05	Woodruff Capital Management Inc. / Inmet Mining Corp	Landrienne	Cu-Zn-Au-Ag	D(3:744), EM
P31	Lemoine	1C-2	32 G/16	Woodruff Capital Management Inc. / Inmet Mining Corp	Lemoine	Cu-Zn-Au-Ag	D(11:8871), DPEM
P32	Lemoine	1C-2	32 G/09	Ressources MSV Inc.	Corner Bay	Cu	D(85:14420)
P33	L'Espinay	1C-2	32 G/03	Antoro Resources Inc.	St-Urbain	Cu-Zn-Au	Pr
P34	Lesueur, Le Tac	1C-2	32 F/08	SOQUEM INC. / Explorations minières du Nord	Le Tac (40412)	Cu-Zn-Au-Ag	Mag, EM
P35	Le Tac	1C-2	32 F/08	Antoro Resources Inc.	McLennan	Diamant-Au	Gs(t)
P36	Lévy	1C-2	32 G/15	2736-1179 Québec Inc.	Mine Cooke	Cu-Au-Zn-Pb-Ag	D(7:2620)
P37	Lévy	1C-2	32 G/15	Explorateurs Innovateurs de Québec Inc.	Opemisca Ex-07C	Cu-Au	Mag, T, Gs(r)
P38	Louvicourt	1C-4	32 C/03	Megastar Development Corporation	Simkar	Cu-Zn-Au-Ag	D(3:?)
P39	Mazenod, Fabre	1C-2	31 M/03	Kinbauri Gold Corporation	Laniel	PGE-Diamant	Mag, Gs(t), Pr
P40	McKenzie	1C-2	32 G/16	SOQUEM INC. / Itamineraque Resources Inc.	Mop II (1206)	Cu-Au	D(17:4897), Pr
P41	McKenzie	1C-2	32 G/16	SOQUEM INC. / Itamineraque Resources Inc.	Radar (1287)	Cu-Au	D(7:1514)
P42	McKenzie	1C-2	32 G/16	Ressources Meston Inc. / SOQUEM INC.	CM 437	Cu-Au	DPEM
P43	McKenzie, Roy	1C-2	32 G/16	MSV Resources Inc.	Baie du Commencement	Cu-Au	D(6:1660), Mag, EM, IP
P44	-	1C-3	-	Alexis Mineral Corporation / Noranda Inc. / Falconbridge Ltd	MégaTEM-VMS	Cu-Zn	D(18:6607), Mag, DPEM, Gs(r)
P45	Montbray	1C-3	32 D/06	SOQUEM INC.	New Insco (1361)	Zn-Cu	Mag, EM

TABLE 1C-2 - Exploration projects for base metals in the Abitibi and Pontiac subprovinces for 2004.

No	TOWNSHIPS	Fig.	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORKS [1]
P46	Mountain, Grevet	1C-2	32 F/02	Breakwater Resources Ltd	Mine Langlois	Zn-Cu-Ag-Au	TE
P47	Poirier	1C-2	32 E/08	Globex Mining Enterprises Inc. / Noranda Inc.	Poirier Sud	Cu-Zn	Pr, S
P48	Poirier, Joutel	1C-2	32 E/08	SOQUEM INC. / Orient Resources Inc.	Joutel West (1290)	Zn-Cu	EM
P49	Rouyn, Beauchastel	1C-3	32 D/03	SOQUEM INC. / Thundermin Resources Inc. / Itamineraque Resources Inc.	Lac Pelletier (1298)	Ni-Cu-PGE	D(6:1749), Gs(r)
P50	Ste-Hélène, La Gauchetière, Bapst	1C-2	32 E/16	SOQUEM INC.	Samson (1091)	Zn-Cu	Mag, EM
P51	Tavernier, Pershing	1C-4	32 C/02, 03	SOQUEM INC.	Matchi-Manitou (1352)	Zn-Cu	Mag, EM
P52	Urban	1C-2	32 G/04	Urbana Corporation	Urban Township	Cu-Au	Mag, EM
P53	-	1C-2	31 M/06, 07	Aurora Platinum Corporation / Fieldex Exploration Inc.	Temiscamingue	Cu-Ni-Pt-Pd-Au	D(2:450), Mag, EM, Pr, T
P54	-	1C-2	-	SOQUEM INC.	RÉA-MB-Abitibi (2161)	Zn-Cu	Gs(r)
P55	-	1C-2	32 E/15, 32 L/02	Majescor Resources Inc.	Nothaway	Diamant-Au	Rcd(7:305)
P56	-	1C-2	32 F/08	Ressources Broadback Inc. / Sirios Resources Inc.	Val-d'Or nickel	Cu-Ni-PGE	D(3:830)
P57	-	1C-2	-	Noranda Inc.	Matagami 3D	Zn-Cu-Ag-Au	TE
P58	-	1C-2	-	Noranda Inc.	Matagami AEM	Zn-Cu-Ag-Au	D(4:1019), DPEM, EM, Mag
P59	Nédelec, Guérin, Guigues, Baby	1C-2	31 M/11	Tres-Or Resources Ltd	Temiscamingue	Diamant	D(?:?), Gp, Gs(t)
P60	Barraute	1C-2	32 C/05	Gestion Aline Leclerc Inc.	Barraute-Centre	Cu-Zn-Au-Ag	Pr, Gs(r)
P61	Tavernier	1C-4	32 C/06	Gestion Aline Leclerc Inc.	Tavernier A	Cu-Zn-Au-Ag	Pr, Gs(r)
P62	Senneterre	1C-2	32 C/06	Gestion Aline Leclerc Inc.	Senneterre A	Cu-Zn-Au-Ag	Pr
P63	Carpentier	1C-2	32 C/06	Gestion Aline Leclerc Inc.	Carpentier A	Cu-Zn-Au-Ag	Pr, Gs(r)
P64	Dufresnoy	1C-3	32 D/07	Breakwater Resources Ltd	Mine Bouchard-Hébert	Cu-Zn-Ag-Au	D(39:20040), DPEM
P65	Rouyn, Beauchastel, Duprat, Dufresnoy	1C-3	32 D/02, 03, 06, 07	Alexis Minerals Corporation / Noranda Inc. / Falconbridge Ltd	GOCAD-Camp central	Cu-Zn	D(12:10875), DPEM, Gs(r)
P66	Cléricy	1C-3	32 D/07	Alexis Minerals Corporation / Noranda Inc. / Falconbridge Ltd	Noralex-VMS	Cu-Zn	D(2:830), Mag, DPEM, Gs(r)
P67	Bourlamaque, Louvicourt	1C-4	32 C/03, 04	Alexis Minerals Corporation / Aur Resources Inc.	VMS Option	Cu-Zn	D(9:5731), DPEM, Gs(r)

1 = See abbreviation list in appendix II.

1D

New Québec and Torngat Orogens, Southeastern Churchill Province (core zone), and Ungava Orogen

Abdelali Moukhsil

Introduction

Composed mainly of Paleoproterozoic rocks, the New Québec (Labrador Trough), Torngat, and Ungava (Cape Smith Belt) orogens cover a significant proportion of northern Québec (figures 1D-1 and 1D-2). The Southeastern Churchill Province includes the New Québec and Torngat orogens and their hinterland (core zone, composed largely of Archean rocks and sometimes 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 and the core zone in 2004 were copper, nickel, platinum group elements (PGE), zinc, and cobalt. The search for diamonds generated some interest in the Torngat Orogen (Figure 1D-1). The Ungava Orogen (Ungava Trough or Cape Smith Belt) once again attracted several exploration companies in the search for nickel, copper, and PGE. All exploration projects reported in 2004 by exploration companies and individual prospectors within the study area are listed in Table 1D-1.

New Québec Orogen

GEOLOGICAL OVERVIEW

Also referred to as the Labrador Trough in Québec, or simply "the Trough", the New Québec Orogen, with rocks dated from 2.17 to 1.79 Ga, forms a fold and thrust belt along the margin of the Superior Province (Clark and Wares, 2004). The Trough is composed of rocks comprising two volcano-sedimentary cycles and a third cycle of metasedimentary rocks (Clark and Wares, 2004).

MAGMATIC CU-NI (± PGE) DEPOSITS

Azimut Exploration Inc. carried out prospecting and sampling on the Retty and Lac Gillet properties (projects 1 and 2, Figure 1D-1). The two properties are associated with strong Ni-Cu-Co lake sediment geochemistry anomalies. **Golden Valley Mines Ltd** reported the results of their 2003 exploration program on the Marymac project (project 3, Figure 1D-1), including assays up to 2.01% Ni, 4.80% Cu, and up to 15.88 g/t PGE from seven historical drillholes in the Island Zone (drillhole AUL-220 yielded grades of 1.41% Ni, 3.07% Cu, and 1.89 g/t PGE over 1.5 m). Assays up to 0.42% Ni, 3.07% Cu, and 0.95 g/t PGE were obtained from two drillholes in the Redcliff Zone (drillhole AUL-200 yielded 0.42% Ni, 2.23% Cu, and 0.95 g/t PGE over 0.9 m).

ZN-CU-AU-AG±PB DEPOSITS

Several Zn-Cu-Au-Ag sulphide deposits are known in the sandy-pelitic sequences of the second cycle in the Baby and Howse zones (Clark and Wares, 2004). In these areas, black shales and iron formations are commonly encountered, and namely host the Kan deposit. Showings are also reported in carbonate sequences of the Abner Formation. Overall, these showings may be related to Besshi-type deposits, a variation on the VMS theme, where the proportion of sedimentary rocks is greater than that of volcanic rocks. Following encouraging results from a soil geochemistry survey performed in 2003 on the Lac La Touche property (project 6, Figure 1D-1) NNE of Schefferville, **Metco Resources Inc.** conducted prospecting, sampling, and surface stripping on mineral occurrences essentially composed of pyrrhotite, in thin beds or conformable laminations of massive sulphides in exhalite, black shale, mudstone, mudslate, and dolomitic sandstone.

Torngat Orogen and Core Zone

GEOLOGICAL OVERVIEW

The Paleoproterozoic Torngat Orogen is bounded to the east by Archean rocks of the Nain Province and to the west by Archean and Paleoproterozoic rocks of the core zone (Figure 1D-1). This orogen is divided into lithotectonic domains and complexes separated by ductile shear zones (*e.g.*, the Abloviak deformation zone, Figure 1D-1).

Located in the Southeastern Churchill Province, the Trough hinterland and the Torngat foreland were called the "core zone" by James *et al.* (1996). The core zone is composed largely of Archean gneisses with bands of Paleoproterozoic supracrustal rocks. These rocks were subsequently deformed and metamorphosed during the Paleoproterozoic. The core zone is divided into a series of lithotectonic domains separated by wide deformation zones (Figure 1D-1; Wardle *et al.*, 2002).

DIAMONDS

In September 2004, **Diamond Discoveries International Corp.** announced a kimberlite discovery in the first drillhole completed on the St. Pierre dyke on the Torngat project (project 11, Figure 1D-1). The drillhole intersected kimberlite material over a 6.85-m interval, which corresponds to a true dyke thickness of 5.42 m. Indicator minerals such as garnet (pyrope), picroilmenite, and olivine (forsterite) were observed in core samples. In October, the company released the results of caustic fusion analyses from 19 samples (5.1 to 72.95 kg) of various kimberlites and lamprophyre dykes. A sample from the K-25 dyke (#90943, 21.50 kg) yielded a clear microdiamond, weighing 0.026 mg and with dimensions of 0.38 x 0.30 x 0.1 mm. The K-25 dyke, 3 to 5 m

wide on average, was traced on surface over more than 5 km. According to the company, it is the fourth dyke known to contain macro or microdiamonds. The other three diamond-bearing dykes are the A dyke, the B dyke, and the F dyke. The A dyke also contains pink corundum (ruby).

Ungava Orogen

GEOLOGICAL OVERVIEW

The Paleoproterozoic Ungava Orogen (Ungava Trough or Cape Smith Belt) consists of a volcano-sedimentary belt that stretches over some 370 km along an ENE-WSW axis (St-Onge and Lucas, 1990; Figure 1D-2). The area may be divided into four main tectonic units: a) the autochthonous Archean basement of the Superior Province, b) the allochthonous accretionary belt or Ungava Trough *s.s.*, c) the Paleoproterozoic Narsajuaq Terrane, and d) the parautochthonous Archean basement (Lamothe, 1994). The Ungava Orogen comprises seven tectonostratigraphic units that form the Southern and Northern lithotectonic domains, separated by the Bergeron fault. The Southern Domain is composed of three groups: a) the Lamarche Group (sedimentary assemblage intruded by gabbro sills), b) the Povungnituk Group (tholeiitic basalts intercalated with detrital sediments), and c) the Chukotat Group (komatiitic to tholeiitic basalts) thrust onto the Povungnituk. The Northern Domain consists of the Chassé Formation (detrital unit) and of four groups: a) the Watts Group (sedimentary and metavolcanic rocks), b) the Parent Group (tholeiitic basalts and tuffs), c) the Spartan Group (psammites, pelites, semipelites, sandstones, felsic tuffs, and mudstones), and d) the Perrault Group (wackes, conglomerates, sandstones, and mudstones).

MAGMATIC NI-CU-CO-PGE DEPOSITS

Since 1998, the **Société minière Raglan du Québec**, a wholly-owned subsidiary of **Falconbridge Ltd**, operates an underground and open pit mine, extracting ore from several Ni-Cu-PGE deposits in the Raglan mining camp (project 12, Figure 1D-2). The ore deposit consists of a series of 19 massive sulphide lenses (including the Katinniq deposit). **Falconbridge Ltd** remains very active in the area, exploring to discover and delineate new lenses (project 13, Figure 1D-2; Table 1D-1).

On the Delta-Kenty property (project 14, Figure 1D-2), located 50 km west of the Raglan mine, **Melkior Resources Inc.**, in partnership with **Falconbridge Ltd**, detected four electromagnetic anomalies, two of which coincide with weakly mineralized ultramafic rocks separated by a weakly mineralized gabbro unit. The Delta-Kenty property is known for its historical geological reserves estimated at 817,000 tonnes at a grade of 3.05% Ni, 1.26% Cu, and 2.65 g/t PGE, in addition to another 205,800 tonnes of resources at 2.63% Ni, 1.15% Cu and 2.46 g/t PGE.

A few kilometres away on the Raglan Project property (project 15, Figure 1D-2), **Novawest Resources Inc.** and **Cascadia International Resources Inc.** reported interesting assays up to 2.89% Ni, 3.99% Cu, and 12.49 g/t PGE over a 15-m interval of massive to disseminated sulphides in drillhole NW04-15.

Since 2001, **Canadian Royalties Inc.** and **Ungava Minerals Corp.** have completed several drill programs on their properties (Expo-Ungava and Phoenix) located about 15 km south of the Raglan mine. In 2004, **Canadian Royalties Inc.** released a revised estimate for the Mesamax deposit (project 16, Figure 1D-2), where indicated resources were increased to 1.84 Mt at a grade of 1.9% Ni, 2.3% Cu, 0.08% Co, 0.3 g/t Au, 0.9 g/t Pt, and 4.3 g/t Pd. At the Mequillon deposit, located about 15 km west of the Expo deposit (project 17, Figure 1D-2), **Canadian Royalties Inc.** also released an inferred resource estimate of 1.4 Mt at a grade of 0.7% Ni, 0.9% Cu, 0.03% Co, 0.2 g/t Au, 0.6 g/t Pt, and 2.1 g/t Pd. On the Expo NE project (project 18, Figure 1D-2), **Canadian Royalties Inc.** confirmed the presence of 24.55 m of massive to disseminated sulphides (drillhole EX-04-71) at an average grade of 1.2% Ni, 1% Cu, 0.06% Co, 0.38 g/t Pt, and 1.23 g/t Pd, including a 5-m interval of massive sulphides grading 3.5% Ni, 3.3% Cu, 0.15% Co, 0.75 g/t Pt, and 2.7 g/t Pd. Another drillhole (EX-04-73) intersected 11 m grading 2.60% Ni, 2.88% Cu, 0.10% Co, 1.81 g/t Pt, and 6.64 g/t Pd. **Golden Valley Mines Ltd**, in partnership with **Little Mountain Resources Ltd**, reported drilling results from the India and Alpha zones (projects 19 and 20, Figure 1D-2) on the West Shoot Out project. Grades of 1.1% Ni, 0.74% Cu, and 3.33 g/t PGE over 12.25 m were reported from a deep drillhole on the Alpha zone. In 2003, the best results from several prospecting samples on the India zone were as follows: 1.72% Ni, 1.12% Cu, and 2.66 g/t Pt+Pd+Au.

In 2004, joint venture partners **Anglo American Exploration (Canada) Ltd** and **Knight Resources Ltd** announced the discovery of two new Ni-Cu-PGE zones: the Red Zone and Zone 111 (projects 21 and 22, Figure 1D-2). Assays from the Red Zone went up to 5.75% Ni, 1.35% Cu, 0.21% Co, 0.46 g/t Pt, and 2.97 g/t Pd over 0.55 m (drillhole WR-04-33). Two grab samples from Zone 111 yielded grades of 0.58 to 0.84% Ni, 0.38 to 1.36% Cu, 0.04 to 0.06% Co, and 0.39 to 1.11 g/t PGE. An interesting intercept of 24.5 m grading 1.71% Ni, 0.80% Cu, and 1.33 g/t Pt+Pd was encountered in drillhole WR-04-74 on the Frontier South showing.

Goldbrook Ventures Inc. focussed its efforts on the Bélanger property, and obtained its best results on the Getty zone (project 23, Figure 1D-2). In drillhole BLE 04-21, a 39.35-m interval yielded an average grade of 1.35% Ni, 0.61% Cu, and 2.88 g/t PGE, including 15.90 m of massive sulphides grading 3.27% Ni, 0.99% Cu, and 5.90 g/t PGE. Grab samples from the Sylvie zone, discovered by prospecting, yielded assays up to 0.28% Ni, 0.41% Cu, and 1.45 g/t Pt+Pd (project 24, Figure 1D-2).

Opportunities for Exploration

Clark and Wares (2004) compiled over 336 mineral occurrences in the New Québec Orogen. We refer the reader to this comprehensive synthesis, which describes the main types of ore deposits in the New Québec Orogen. Among these, we will mention those related to the second cycle, associated with mafic volcanism and mafic to ultramafic sills, which host magmatic Cu-Ni-PGE mineralization. According to these authors, picritic flows and sills hold promising economic potential for this type of mineralization. The Lac Retty and Lac Gerido areas are known for their massive and disseminated sulphide deposits hosted in mafic to ultramafic sills (Clark, 1994). Although known Cu-Ni occurrences in these areas are low-grade, other lenses may be discovered through additional exploration. These areas therefore represent excellent targets to discover new magmatic Cu-Ni-PGE deposits. The Lac Bleu area may also host this type of magmatic copper-nickel mineralization. Here, at the base of the Willbob Formation, a differentiated sill composed of peridotite and gabbro hosts massive sulphide lenses (Clark and Wares, 2004).

In the Cape Smith Belt, results reported in 2004 by **Canadian Royalties Inc.** and **Goldbrook Ventures Inc.** confirm the excellent potential to discover new Ni-Cu-PGE showings. As is the case at the Raglan mine, this potential is associated with ultramafic sills cogenetic with the Chukotat Group (Raglan trend) and injected in the Povungnituk Group. Until now, exploration has mainly focussed on the Southern Domain of the belt. Various parts of the Northern Domain warrant further exploration and remain very interesting for their Ni, Cu, Co, and PGE potential associated with volcaniclastic rocks of the Parent Group. Mineralization encountered in this formation occurs as stratiform massive sulphide lenses (pyrrhotite-pyrite-chalcopyrite), or is hosted in gabbro sills emplaced in the volcaniclastic rocks (Moorhead, 1996).

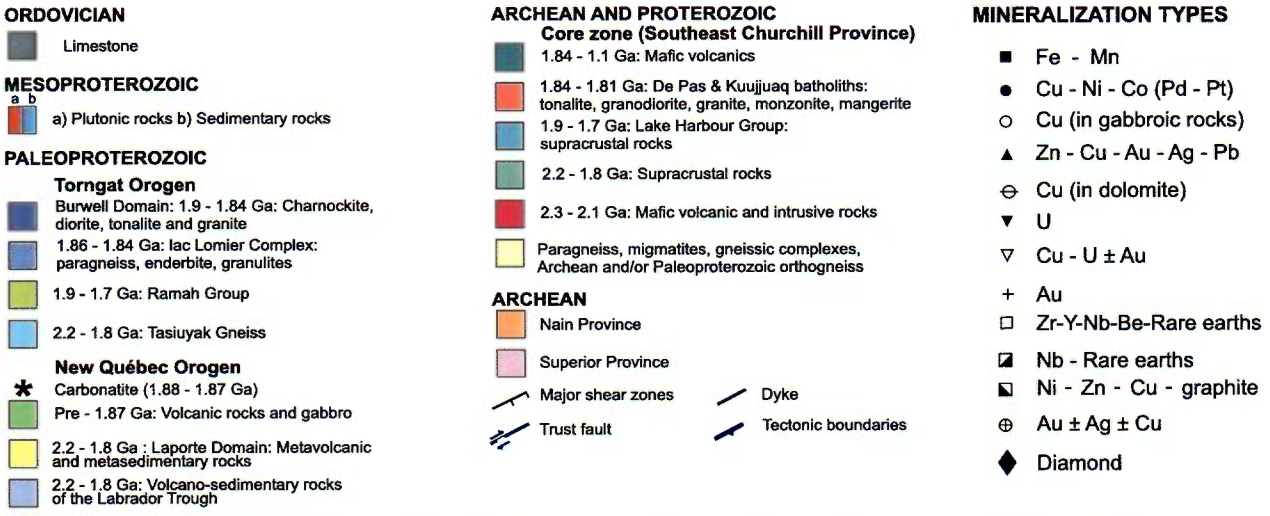


Figure 1D-1. Legend of the mineral exploration projects in the New Québec and Torngat orogens, the core zone and the Ungava Orogen for 2004.

1D

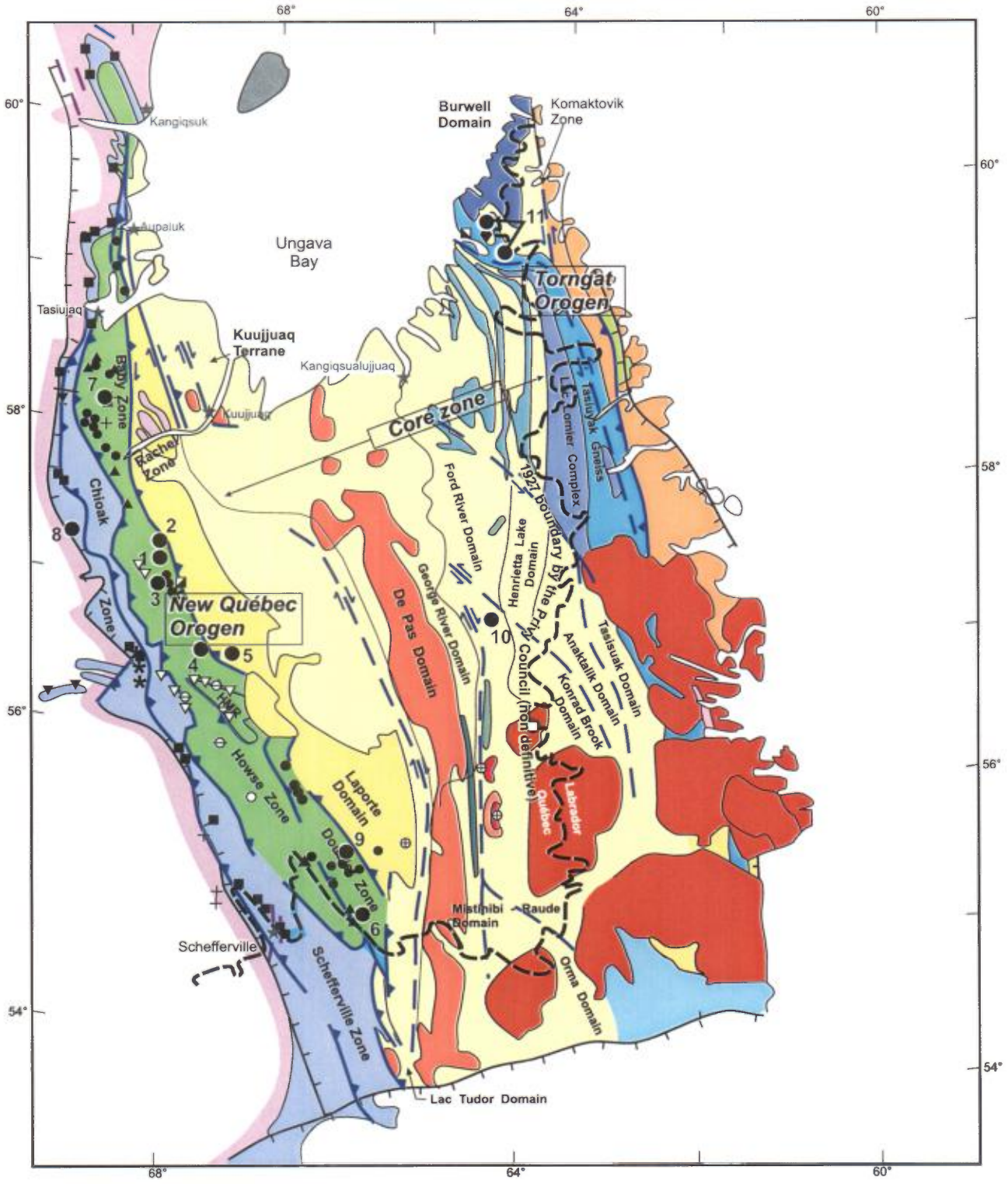
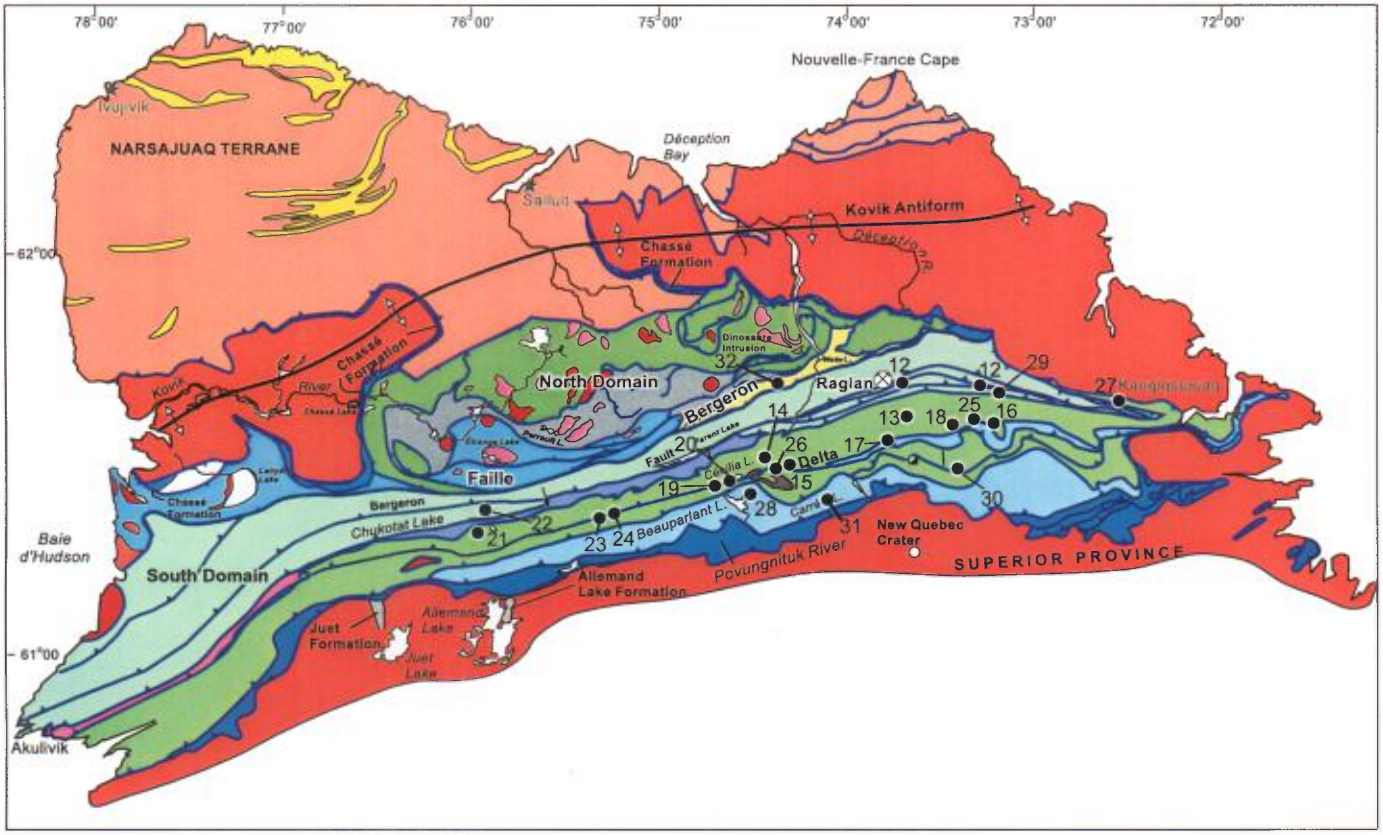


Figure 1D-1. Mineral exploration projects in New Québec and the Torngat orogen, the core zone and the Ungava Orogen for 2004. Modified from Wardle *et al.*, 1990 and 2000.

1D



NORTH DOMAIN

Perrault Group
Wacke, conglomerate, sandstone, mudstone

Spartan Group
Psammites, pelites, felsic tuff, dolomite

Parent Group
Pyroclastites, basalt, rhyodacite, rhyolite

Watts Group
Peridotite, pyroxenite, gabbro, basalt

Chassé Formation
Quartzite, psammites

Intrusive rocks
Granite, granodiorite, monzodiorite

Gabbro, tonalite, diorite, peridotite, pyroxenite

UNGAVA OROGEN

SOUTH DOMAIN

CHUKOTAT GROUP

Basalt

POVUNGNITUK GROUP

Nuvilic Formation
Psammites, carbonates, pyroclastites, basalt

Cecilia Formation
Basanite, phonolite

Beauparlant Formation
Basalt, rhyolite

Dumas Formation
Psammites, pelites, basalt

LAMARCHE GROUP
Psammites, dolomite, iron formation, pelites

INTRUSIVE ROCKS

Granite, granodiorite, monzodiorite

Gabbro, peridotite, pyroxenite

NARSAJUAQ TERRANE

INTRUSIVE ROCKS
Tonalite, quartz diorite, granite, monzonite, syenogranite

SUGLUK GROUP

Semipelite, quartzite

ARCHEAN BASEMENT
Granodiorite, granite, quartz diorite, tonalite, psammites, iron formation, pyroclastites, basalt

0 25 50
km

Lithological contact

Trust fault

Mines

Figure 1D-2. Exploration projects in the Ungava Orogen for 2004. Modified from Lamothe (1996).

TABLEAU 1D-1 - Mineral exploration projects in New Québec and Torngat Orogens, core zone and Ungava Orogen for 2004.

NO	FIG.	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORK [1]
New Quebec Orogen						
1	1D-1	24 F/02, 07	Azimut Exploration Inc.	Retty	Cu-Ni-PGE	Pr, S
2	1D-1	24 F/02, 07	Azimut Exploration Inc.	Lac Gillet	Cu-Ni-PGE	Pr, S
3	1D-2	24 F/02, 24 C/15,16	Golden Valley Mines Ltd	Marymac (Island, Redcliff projects)	Ni-Cu-PGE	AEROTEM, Pr, S
4	1D-1	24 C/09	Inco Ltd	Cordier	Ni	Pr
5	1D-1	24 B/05, 12	Inco Ltd	Graham	Ni	Pr
6	1D-1	23 I/13	Metco Resources Inc.	Lac La Touche	Zn-Cu-Au-Ag	G, Gp, Gs(sl), S, T,
7	1D-1	24 K/04	Azimut Exploration Inc.	De Romer	Cu-Ni-PGE	Pr, S
8	1D-1	24 F/04, 05	Uranor Inc.	Labrador-Torngat	U	Pr
9	1D-2	23 O/01, 08	E. D. Black \ Pacific North West Capital Corp.	Retty Lake	Cu-Ni-Pt	Pr, S
Core zone and Torngat Orogen						
10	1D-1	24 A/15	Inco Ltd	Terriault	Ni	Pr
11	1D-1	24 P/07, 11	Diamond Discoveries International Corp / Tandem Resources Ltd	Monts Torngat	Diamond	B, D(1:43), S
Ungava Orogen						
12	1D-2	35 H/11, 12	Société Minière Raglan du Québec / Falconbridge Ltd	Raglan	Cu-Ni-Co-PGE	D(238:6400), G, Mag-EM(A), Pr, S
13	1D-2	35 F, G, H	Falconbridge Ltd	Ungava Regional	Ni-Cu-PGE	D(16:2600), G, Gp, Gs(sl),Mag, Mag-EM(A), Pr
14	1D-2	35 G/07, 08	Falconbridges Ltd / Melkior Resources Inc.	Delta-Kenty	Cu-Ni-Co-PGE	D(2:450), DPEM, EM, S
15	1D-2	35 G/08	Novawest Resources Inc. / Cascadia International Resources Inc.	Raglan (Bravo)	Ni-Cu-Co-PGE	D(9:1305), DPEM, G, Gp, Pr,
16	1D-2	35 H/11	Canadian Royalties Inc.	Mesamax	Ni-Cu-PGE	D(?:?), Re
17	1D-2	35 H/11, 12	Canadian Royalties Inc. / Ungava Minerals Corporation	Mequillon	Ni-Cu-PGE	D(75:?), G, Mag, Pr, Re, S, TDEM
18	1D-2	35 H/11	Canadian Royalties Inc.	Expo NE	Ni-Cu-PGE	E, D(?:?), G, Pr
19	1D-2	35 G/07, 08	Golden Valley Mines Ltd / Little Mountain Resources Ltd	West Shoot out (India)	Ni-Cu-Au-PGE	D(30:4299), Mag, Pr, S, TDEM
20	1D-2	35 G/07, 08	Golden Valley Mines Ltd / Little Mountain Resources Ltd	West Shoot out (Alpha)	Ni-Cu-Au-PGE	D(30:4299), Mag, Pr, S, TDEM

TABLEAU 1D-1 - Mineral exploration projects in New Québec, Torngat Orogens, core zone and Ungava Orogen for 2004.

NO	FIG.	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORK [1]
Ungava Orogen						
21	1D-2	35 G/05, 05, 35 F/08	Anglo American Exploration (Canada) Ltd / Knight Resources Ltd	West Raglan (Red Zone)	Ni-Cu-PGE	AEROTEM, D(60:7241), DPEM, EM, G, Gs, Mag, Pr, S
22	1D-2	35 G/05, 05, 35 F/08	Anglo American Exploration (Canada) Ltd / Knight Resources Ltd	West Raglan (Zone 111)	Ni-Cu-PGE	AEROTEM, D(60:7241), DPEM, EM, G, Gs, Mag, Pr, S
23	1D-2	35 G/06	Goldbrook Ventures Inc.	Bélanger (Getty zone)	Ni-Cu-PGE	D(15:?), EM, Pr, S
24	1D-2	35 G/06	Goldbrook Ventures Inc.	Bélanger (Sylvie zone)	Ni-Cu-PGE	D(4:?), EM, Pr, S
25	1D-2	35 H/11, 12	Canadian Royalties Inc. / Ungava Minerals Corporation	Tk Area	Ni-Cu-PGE	D, Pr, S
26	1D-2	35 G/08	Novawest Resources Ltd / Cascadia International Resources Inc.	Raglan (Echo)	Cu-Ni-Co-PGE	D(6:1247), Pr
27	1D-2	35 H/10	Goldbrook Ventures Inc. / Inlet Resources Ltd	Wakeham	Ni-Cu-PGE	D(?:?), G, Pr, S
28	1D-2	35 G/07, 08	Golden Valley Mines Ltd / Resolve Ventures Inc.	Shoot out East	Ni-Cu-Au-PGE	Pr, S
29	1D-2	35 H/11	Boulder Mining Corporation / Canadian Royalties Inc.	Colts	Cu-Ni-PGE	AEROTEM, D(?:?) EM, Pr, S
30	1D-2	35 H/06	Boulder Mining Corporation / Canadian Royalties Inc.	Breakaway	Cu-Ni-PGE	AEROTEM, D(?:?) Mag-EM, Pr, S
31	1D-2	35 G/08	Montoro Resources Inc. / Canadian Royalties Inc.	South Trend Prospect	Cu-Ni-PGE	G, Gp, Pr, S
32	1D-2	35 G/09	Novawest Resources Ltd / Cascadia International Resources Inc. / Minera Capital Corp.	True North	Cu-Ni-PGE	G, Pr, S

1 = See abbreviation list in appendix II.

Grenville Province

Serge Perreault
Abdelali Moukhsil

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 2004 will be described according to the type of ore 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 Côte-Nord region).

Western Grenville Province

In 2004, **Géologie Québec** carried out a new geological survey at 1:50,000 scale in the western part of the Grenville Province, in the Lac Pine and Lac Adonis area (NTS sheets 31 O/02 and 31 O/06), northeast of Mont-Laurier (Nantel *et al.*, 2004). This mapping program was conducted within the scope of a mineral potential assessment of prospective areas for SEDEX-type copper and zinc deposits, industrial minerals, and dimension stone. **Géologie Québec** continued its geological, metamorphic, and metallogenic synthesis of the Grenville Front in the Chibougamau area, with a mapping survey along the Grenville Front in the Lac Lagacé (32 B/14) and Lac Mitshisso (32 H/13) areas (Cadéron *et al.*, 2004). This synthesis is performed in conjunction with a project to develop a 3D geological model along the Grenville Front, in partnership with the **Université du Québec en Abitibi-Témiscamingue** (URSTM), **Université du Québec à Montréal** and **Université Laval** (Rabeau *et al.*, 2004). **Géologie Québec** also conducted an assessment of the sillimanite and muscovite potential in the Mont-Laurier area (Togola *et al.*, 2004) and took part, along with the **Université Laval**, in a study of Ni-Cu-PGE showings in the Portneuf-Mauricie belt (Sappin *et al.*, 2004).

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. The most 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 also associated with peridotite bodies intruding small anorthositic complexes, or with mineralized pyroxenite dykes injected in peridotitic stocks or late-tectonic mafic and ultramafic intrusions that cut metamorphosed supracrustal sequences (Hébert, 1997; Clark and Hébert, 1998a and 1998b).

In 2004, **Matamec Explorations Inc.** (project 2, Figure 1E-1) delineated several EM anomalies, the largest measuring 700 m long by 100 m wide, on the Vulcain property, which hosts the Renzy deposit. Inferred mineral resources for the latter were recently estimated at 259,000 tonnes at 0.72% Ni and 0.94% Cu. The Renzy deposit, which was mined by open pit from 1969 to 1972, is hosted in tabular ultramafic intrusions injected in a metasedimentary sequence possibly associated with the Central Metasedimentary Belt.

In La Trappe Township, near Lac Yénévac, company **9141-6883 Québec Inc.** (project 10, Figure 1E-1) and prospector **Lionel Lefebvre** (project 11, Figure 1E-1) uncovered a copper-nickel showing associated with a norite facies in the Lac-Saint-Jean anorthositic Suite. Surface stripping exposed a massive sulphide lens of 100 m long by about 4 to 5 m wide, with grades up to 1% Cu and 1% Ni.

Eastern Grenville Province

In 2004, exploration was focussed on the search for copper, nickel, and platinum group elements (PGE) as well as industrial minerals (graphite and titanium). The Manicouagan MRC was once again the focus of intense exploration by many junior

companies and individual prospectors. Following through on its Grenville Project, **Géologie Québec** prepared a geological mapping survey at 1:50,000 scale in NTS sheet 22 F/10.

MAGMATIC NI-CU (CO-PGE) DEPOSITS

About 20 km NNE of Daniel-Johnson dam (Manic-V), **Quinto Technology Inc.** actively explored the Lac Paradis showing (project 15, Figure 1E-1), and reported grades ranging from 0.27 to 4.75% Ni and from 0.04 to 2.4% Cu. **Géologie Québec** assayed a massive sulphide sample from this showing, and obtained grades of 5.26% Ni and 0.03% Cu with low PGE concentrations.

Manicouagan Minerals Inc. reported grades ranging from 0.01 to 0.13% Ni and from 0.11 to 1.11% Cu, with trace amounts of Pt, Pd, and Au, from drillholes testing two gossans and some electromagnetic anomalies on the Baie du Nord project (project 16, Figure 1E-1). The company is exploring within the confines of the Manicouagan meteorite impact crater, hoping to discover Sudbury-type Ni-Cu deposits.

IRON FORMATIONS

The Fermont area is characterized by the presence of abundant iron ore deposits, mined since the 1950s by the **Québec Cartier Mining Company** in Québec, and by **IOC** and **Wabush Mines** in Labrador. These ore deposits are part of the Gagnon Group and represent the Grenvillian metamorphic equivalents of iron formations in the Labrador Trough. Extracted minerals include hematite and specular hematite. Renewed interest in iron ore prompted several companies to acquire options on known magnetite-rich deposits.

MAGMATIC MASSIVE ILMENITE DEPOSITS

QIT-Fer et Titane Inc., a wholly-owned subsidiary of the Anglo-Australian **Rio Tinto** Group, operates, since 1950, an open pit mine to extract ilmenite at Lac Tio (Figure 1E-1) near Havre-Saint-Pierre, as well as 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 Mt at an average grade of 86.9% combined iron and titanium oxide (34.2% TiO_2, 27.5% FeO, 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, 0.41% V_2O_5). In 2004, **QIT-Fer et Titane Inc.** and **Rio Tinto Fer et Titane Inc.** carried out extensive work including geophysical surveys, in order to define drilling targets in the Havre-Saint-Pierre anorthositic Suite (projects 17, 18, and 19, Figure 1E-1).

In partnership with **Sheridan Platinum Group Ltd**, **Fancamp Exploration Ltd** discovered new hemo-ilmenite outcrops on the Mingan Titanium Option property (project 20, Figure 1E-1).

Quinto Technology Inc. (project 21, Figure 1E-1) intersected 24.69 m of massive hemo-ilmenite in drillhole on the Lac Brûlé property in the Labrieville anorthositic Suite, about 100 km northwest of Forestville. Analyses of two surface grab samples yielded the following results: 34.80-34.30% TiO_2, 60.70-60.20% Fe_2O_3, 1.36-1.46% Al_2O_3, 1.78-1.38% MgO, 0.13% MnO, 0.22-0.29% CaO, 0.08-0.07% Cr, 0.07-0.30% P_2O_5, and 0.19% V. The objectives of the 2004 drill program were to delineate reserves in this deposit, where an estimated 6.5 Mt of indicated resources and 3.5 Mt of inferred resources were delineated in the 1950s by **Bersimis Mining Corp.** for two of the three massive hemo-ilmenite lenses (A, B, and C).

Opportunities for Exploration

With uranium prices on the rise over the past two years, certain parts of the Grenville Province have attracted the attention of companies engaged in uranium exploration. Based on airborne gamma ray spectrometry compilation maps released by the Geological Survey of Canada (GSC Open File 4460), three strongly anomalous areas are outlined: the Mont-Laurier area, an area northwest of Gatineau, and the Lac Litchfield area. While the uranium potential of the Gatineau and Litchfield areas is associated with granitic and syenitic intrusions, the potential of the Mont-Laurier area appears to be associated with the formation of the Mont-Laurier sedimentary basin in the Central Metasedimentary Belt, or with the tectonometamorphic remobilization of uranium during Grenvillian metamorphism. Other areas such as the Wakeham sedimentary basin and the granitic Lac Turgeon pluton in the Moyenne Côte-Nord region are also targets to be considered.

Recent mapping by the **Géologie Québec** in the Lac Varin area (NTS 22 F/10; Gobeil *et al.*, 2004) outlined the great mineral potential of this area. Several types of mineral occurrences (magnetite and ilmenite, apatite, and sulphides) and potential architectural stone varieties were identified during this geological mapping survey. This area is certainly worth a second look in terms of its exploration potential associated with an anorthositic suite composed of anorthosite, leuconorite, troctolite, gabbronorite, and mangerite. The Moyenne-Côte-Nord region, and especially the Lac Caron area (NTS 12 L/07, L/08 and L/09), constitutes a prospective area to rediscover, with Mesoproterozoic rocks of the Wakeham Terrane. Several Cu-Au-Ag (*e.g.* BJB, Lac Véronique) and Ni-Cu (*e.g.* Nord de la crête White; Clark, 1995) showings and occurrences are known and documented from previous prospecting campaigns, field studies and geological mapping. The Lac Caron area contains the km-wide Lac Caron shear zone, which extends for about 75 km along strike. It is a brittle-ductile deformation zone characterized by the emplacement of a series of pegmatite sills and quartz veins (Nadeau *et al.*, 2004). These sills and veins may have acted as discharge zones and constitute an interesting ore guide for gold deposits. The shear zone is hosted in metagabbros of the Robe-Noire Suite, which should be the focus of a very detailed sampling program for PGE analyses.

1E

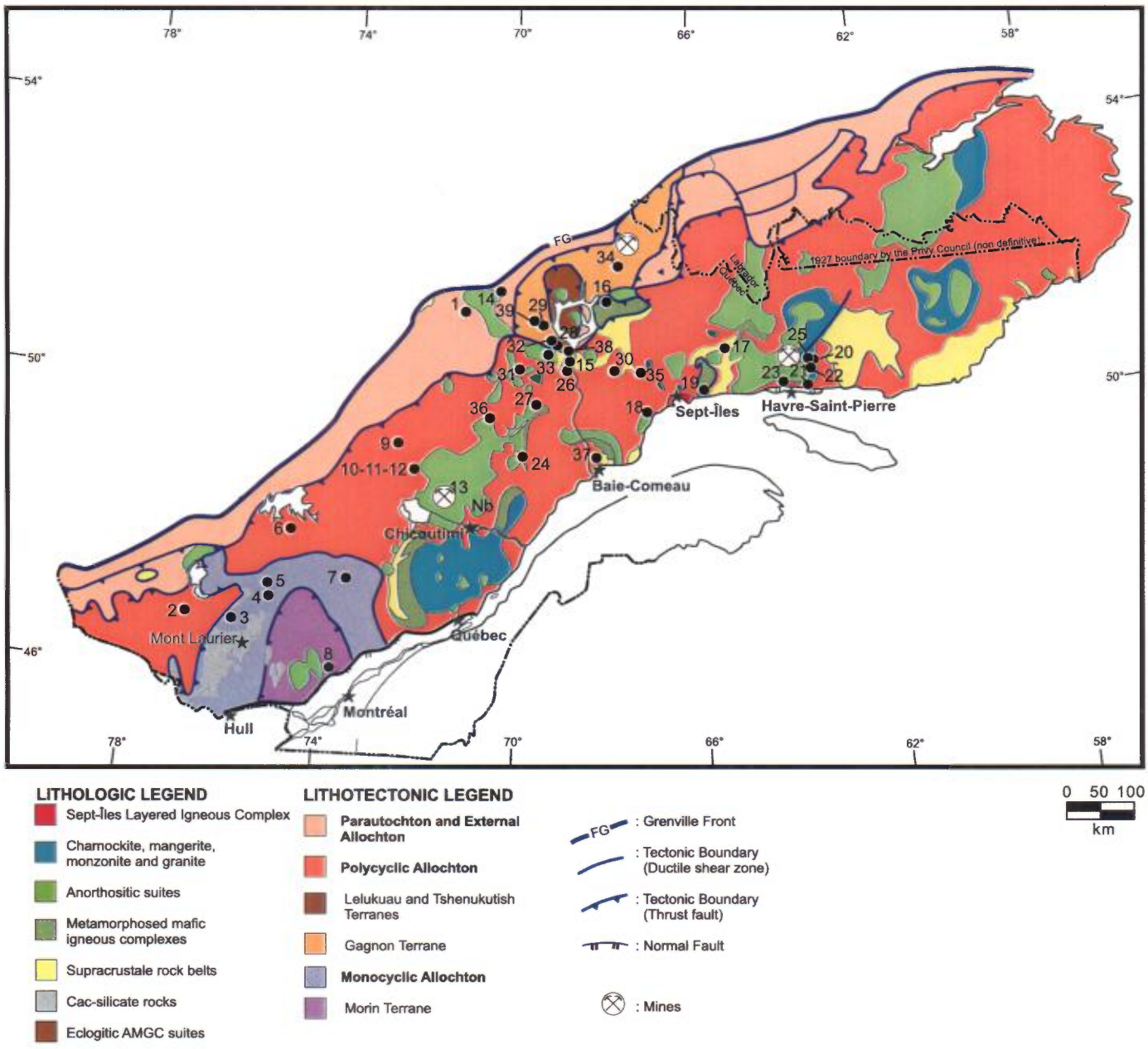


Figure 1E-1. Exploration projects in the Grenville Province for 2004.

TABLEAU 1E-1 - Exploration projects in the Grenville Province for 2004 (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	Hainaut	31 K/15	Matamec Explorations Inc.	Vulcain	Ni-Cu	AEROTEM, Re
3	Major	31 J/12, 13	Exploration Esbec Inc.	Cran Bornite	Cu-Au-Ag	Gs(r), Pg, T
4	-	31 O/03	Ressources Maxima Inc.	Montagne d'argent	Cu-Au	Gs(r), Pg
5	-	31 O/06	Ressources Maxima Inc.	Le Sueur	Cu	Pg
6	Tassé, Bazin	31 O/15, 32 B/02	Prospection Minordbec	Abeille	Cu-Ni-PGE	G, T
7	-	31 P/06, 11, 12, 13	G. Gingras	-	-	S, T
8	Kildare	31 I/04	M. Lazarescu / M. Bercaru	-	Au-Cu-Ag	D(1:20), S
9	Desautels	32 H/06	9083-5596 Québec Inc.	Lac Desautels	Ni-Cu-Co	D(12:8000)
10	La Trappe	32 H/01	9141-6883 Québec Inc.	Lac Yenevac	Ni-Cu	T
11	La Trappe	32 H/01	L. Lefebvre	Lac Yenevac	Ni-Cu-Co	T
12	Melançon	32 H/01	J.-L. Tremblay / L. Lefebvre	Stanislas	Ni-Cu-Co	D(3:1), S, T
13	Simard	22 D/11	Cambior Inc.	Niobec	Nb	D(?:9211)
14	-	22 M/15	Bitterroot Resources Ltd	Mistassini	Ni-Cu-PGE	D(8:1714), EM, G, S
15	-	22 K/15	Quinto Technology Inc. / SOQUEM INC.	Lac Paradis	Cu-Ni	G, Gp, Pr, S
16	Quertier, Brien	22 N/09	Manicouagan Minerals Inc.	Baie du Nord	Cu-Ni-Co-PGE	D(4:400), EM, S
17	-	22 I/14	Cuesta Geoscience Inc. / Pacific North West Capital Corp.	Lac Manitou PGM	Ni-Cu-PGE	G, S
18	Grenier	22 G/14, 22 J/03	Ressources Appalaches Inc. / Marum Resources Ltd	B-20	Cu-Ni-Co	EM, G, Mag, Pr
19	Moisie	22 I/05	Ressources Appalaches Inc. / Fancamp Exploration Ltd	Lac Méchant	Cu-Ni-Co	Grav
20	Parker	12 L/11	QIT-Fer & Titane Inc.	Grader South	Fe-Ti	Gg(A), Grav, S
21	Cugnet	12 L/05	QIT-Fer & Titane Inc.	Scherrer-Picard	Fe-Ti	EM, TDEM
22	Vigneau	12 L/05	Rio Tinto Fer & Titane Inc.	Big Island	Fe-Ti	Gg(A), S
23	Mingan	22 I/08	Fancamp Exploration Ltd / Sheridan Platinum Group Ltd	Mingan	Fe-Ti	G, S, T
24	-	22 F/05	Quinto Technology Inc.	Lac Brûlé	Fe-Ti	B(10:?), D(12:?), Pr
25	Parker	12 L/11, 12	QIT Fer & Titane Inc.	Grader West	Fe-Ti	Gg(A), Grav, S

TABLEAU 1E-1 - Exploration projects in the Grenville Province for 2004 (see figure 1E-1).

NO	TOWNSHIPS	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORKS [1]
26	-	22 K/10, 15	Fancamp Exploration Ltd	Manicouagan	Cu-Ni-Co	G, Pr, S
27	-	22 K/03, 04, 05, 06	Gowest Amalgamated Resources Ltd	Quebec Nickel	Cu-Ni-Co	AEROTEM, Mag
28	-	22 N/03	Ressources Appalaches Inc.	Lamentshiu	Cu-Ni-Co	G, Pr
29	-	22 N/06	Ressources Appalaches Inc.	Manic-Ouest	Cu-Ni-Co	Pr
30	-	22 J/12	Puma Exploration Inc.	Aimé	Rare Earths	Pr
31	-	22 K/12	Puma Exploration Inc.	Lac à l'Argent	Cu-Ni-Co	Pr
32	-	22 N/03	Quinto Technology Inc. / SOQUEM INC.	Lac Guéret	GP	G, S, T
33	-	22 N/03	Quinto Technology Inc. / SOQUEM INC.	Lac Guéret sud	Ni-Cu-PGE-GP	G, S, T
34		23 B/05	E. D. Black / Quinto Technology Inc.	Peppler Lake	Fe	Pr, S
35	-	22 J/10	Exploration Esbec Inc.	Ste-Marguerite	Cu-Ni-Co-PGE	D(3:250), Gs(sl), Mag, Pr
36	-	22 F/13	Exploration Esbec Inc.	B-100	Cu-Ni	Pr, S
37	-	22 G/05, 22 F/08	Exploration Minière Manicouagan	Manicouagan Area	Ni-Au	EM, Mag, Pr, S
38	-	22 N/03	Exploration Minière Manicouagan	Manicouagan Area	Ni-Cu	EM, Mag, Pr, S
39	-	22 N/05	Exploration Minière Manicouagan	Manicouagan Area	Ni-Cu-Au	EM, Mag, Pr, S

1 = See abbreviation list in appendix II.

St. Lawrence Platform and Appalachians

Serge Lachance

Introduction

The St. Lawrence Platform and Appalachians 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.

This area hosts two mineral collecting operations on outstanding mineralogical sites. Located a few kilometres northeast of Bonsecours in the Estrie region, **Mines Cristal Québec** extracts, since 1990, quartz crystals of all sizes from numerous druses occurring in quartz veins intercalated in the Sutton Schists. In Lemieux Township south of the Parc national de la Gaspésie, **Mine d'Agates du Mont Lyall** manages a site where collectors can find exceptional agates and geodes, in a rhyolite flow intercalated in the York River Formation (Gaspé Sandstones).

In terms of exploration activities in the St. Lawrence Platform and Appalachians, 18 exploration projects were brought to our attention in 2004, compared to 16 projects in 2003. The total number of metres drilled in 2004 amounted to 6,700 m compared to 6,043 m in 2003.

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, which includes the Montréal and Chaudière-Appalaches regions (4 projects and 1,950 m drilled), the central segment comprising the Bas-Saint-Laurent region (2 projects), and the northeastern segment, which includes the Gaspésie and Îles-de-la-Madeleine regions (12 projects and 4,750 m drilled).

Exploration Projects

SOUTHWESTERN SEGMENT (MONTRÉAL AND CHAUDIÈRE-APPALACHES REGIONS)

At the end of 2004, **Niocan Inc.** was still waiting for the *Ministère de l'Environnement du Québec* (MENV) to issue the Certificate of Authorization required to continue development work on its niobium deposit, where proven and probable reserves for the two ore zones S-60 and HWM-2 are estimated at 13.3 Mt at a grade of 0.63% Nb_2O_5. This ore deposit is hosted in the Oka carbonatite Complex (project 3, Figure 1F-1), near Montréal in the Lac-des-Deux-Montagnes seigniory. Before the certificate is issued, **Niocan Inc.** will take part in a study led by the *Bureau d'audiences publiques sur l'Environnement* (BAPE) in order to provide, before the end of March 2005, further details on water-related issues on the minesite.

For the second consecutive year, **Osisko Exploration Ltd** explored its Bellechasse property (project 2, Figure 1F-1) in Bellechasse and Panet townships. This property was subject to an option agreement signed in May 2003 with **Golden Hope Mines Ltd**, but the latter announced in a press release dated July 30, 2004, the termination of its agreement with **Osisko Exploration Ltd**. The property contains five known gold-bearing zones (Timmins, Timmins South, 88, Ascot, Northeast), two showings (88 Extension and Colfax) and three prospects of gold-bearing boulders of unknown origin. The gold mineralization is essentially hosted in quartz veins intimately associated with gabbro sills in Ordovician sedimentary rocks of the Etchemin and Beauceville formations (Magog Group). The results of a drill program conducted in the spring 2004 to test this gold stockwork were not released.

In 2003, the discovery of several quartz boulders with native gold prompted prospectors **R. Mainville** and **T. Burnham** to pursue their investigations on the Timrod property (project 4, Figure 1F-1) in the Saint-François seigniory. Thus, in 2004, a new trench was excavated to assess the potential of a well-developed stockwork of quartz veins and veinlets hosted in 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 gold showing may represent one of the sources of these placer deposits.

CENTRAL SEGMENT (BAS-SAINT-LAURENT REGION)

In 2004, **Ressources Appalaches Inc.** conducted two exploration projects in the Bas-Saint-Laurent region. On the Catalogne project (project 5, Figure 1F-1) in Catalogne Township, the company tested magnetic anomalies which may be related to the presence of copper mineralization. On its Dunière project (project 6, Figure 1F-1) in La Vérendrye Township, it looked for gold-bearing veins along the eastern extension of the Sainte-Florence fault.

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

For the fourth year in a row, **Ressources Appalaches Inc.** was very active in the Gaspésie region with six exploration projects, especially on its flagship Mont de l'Aigle property (project 11, Figure 1F-1) in Lemieux Township. Work conducted on this property in 2004 was successful in demonstrating the presence of an iron oxide-copper-gold (IOCG)-type deposit. Three trenches excavated over near-surface magnetic anomalies revealed the presence of disseminated chalcopyrite, pyrite, magnetite, and hematite mineralization, with grades ranging from 0.5 to 4.5% Cu, whereas drillholes intersected quartz-sulphide-oxide veins and stockworks over intervals of 10 to 57 m. Five other projects managed by **Ressources Appalaches Inc.** were aimed at assessing the gold potential on the remaining properties.

For the second year in a row, the ***Fonds régional d'assistance à la prospection minière Gaspésie–Îles-de-la-Madeleine*** **(FRAPMGÎM)** trained new prospectors to search for epithermal vein-type and Carlin-type gold deposits in black organic shales, and for copper deposits in sedimentary and volcanic red beds. These prospectors led an off-claim prospecting campaign in areas from Nouvelle to Port-Daniel and near Mont Alexandre (project 10, Figure 1F-1), as well as on **FRAPMGÎM** claims, namely on the Rivière Angers property (project 7, Figure 1F-1) in Angers and Carleton townships. These two projects led to the discovery, in outcrop or in erratic boulders, of weakly auriferous (<300 ppb Au) quartz-carbonate-pyrite-stibnite-arsenopyrite veins and breccias, of pyritic felsic volcanic breccias (<125 ppb Au), of altered pyrite-rich dacitic dykes, of altered gold-bearing feldspar porphyry boulders (<500 ppb Au), of chlorite-pyrite stockworks, of weakly auriferous pyritic shales (<50 ppb Au), and of locally altered and pyritic chert and felsic ash tuff horizons.

Mines Cascapédia Inc. (project 13, Figure 1F-1) explored the northern and southern extensions of the historical New Richmond 1 (Cap Brûlé) showing discovered in 1917. The quartz-antimony-gold-silver veins in this showing, associated with a 2 to 8-m-wide fault zone trending N340°/90° across a polymictic conglomerate of the Honorat Group, were previously traced over a distance of 30 m and a width of 4 to 5 m.

Prospectors **R. Lelièvre** and **M. Boudreau** (project 14, Figure 1F-1) observed sedimentary redbed-type copper occurrences (chalcocite, malachite) associated with two structures trending N60° from Grande-Rivière Ouest to Sainte-Thérèse-de-Gaspé, and trending N340° along the "Brèche à Manon" creek. A few samples were collected, yielding assays up to 0.82% Cu and g/t Ag.

The goal of **Junex Inc.** on the Mictaw project (project 15, Figure 1F-1) in Port-Daniel Township is to assess the potential for Kupferschiefer-type copper deposits and other deposit types associated with sediments enriched in organic matter. Certain black shale units in the Mictaw syntectonic melange host disseminated and nodular sulphides and up to 10% organic matter; these locally contain anomalous gold (18 ppb), molybdenum (61 ppm), and palladium (20 ppb).

Prospectors **J.-B. Beaudin** and **L. Leblanc** pursued their investigations on a Cu-Ag showing (1.0 to 7.2% Cu and 1.2 to 28.6 g/t Ag) consisting of disseminated chalcopyrite and bornite in volcanic conglomerates with quartz veining, discovered in 2001 on the Grand Pabos Nord property (project 16, Figure 1F-1) in Randin Township.

Opportunities for Exploration

BASE METALS AND PRECIOUS METALS

Over the past two decades, exploration carried out by mining companies has shown the mineral potential of sedimentary environments in the Appalachians, namely for copper in red beds and for Carlin-type gold in limestones. **Ressources Appalaches Inc.** and **SOQUEM INC.** explored the Paleozoic sedimentary basin in the Bas-Saint-Laurent region, more specifically in NTS sheets 22 C/02 and 21 N/15. Their work on the Transfiguration and Squatec properties, southwest of Rimouski, uncovered stratiform Cu-Au±Pb±Zn occurrences typical of sedimentary redbed-type copper deposits. The copper mineralization is disseminated and essentially consists of chalcopyrite and minor chalcocite, with grades ranging from 0.1 to 15% Cu. On a regional scale, it occurs in reduced facies composed of grey and green conglomerates and grey quartzitic sandstones overlying the base of the Silurian Robitaille Formation in the Connecticut Valley-Gaspé Synclinorium.

In north-central Gaspésie, and more specifically in Boisbuisson Township west of the Devonian McGerrigle granitic Pluton (NTS 22 G/01 and 22 H/04), the **FRAPMGÎM** performed exploration work on its property, which includes the minesite of former copper producer **Les Mines Madeleine Ltée.** They confirmed the presence of copper-silver mineralization also related to sedimentary redbed-type copper deposits. The mineralization, reaching grades of 4.8% Cu and 31 g/t Ag, is disseminated in green sandstones overlying mafic volcanic and volcaniclastic rocks at the top of the Cambrian volcano-sedimentary sequence of the Des Pics Unit in the Québec Supergroup. In this area in 1981, **Les Mines Madeleine Ltée** had estimated, based on drill results, mineral resources at 400,000 tonnes at a grade of 0.25% Cu.

DIVEX, a group of earth scientists united in a research network to diversify mineral exploration in Québec, is taking a closer look at known gold showings in sedimentary environments near the Grand Pabos-Ristigouche fault in the southern Gaspésie region. The efforts of **DIVEX** to better characterize the geological setting of occurrences and particularly the Saint-André-de-Restigouche gold-stibnite showing in Ristigouche Township (NTS 22 B/02) show that several features typical of Carlin-type gold deposits are present.

The results of this study outline the potential for Carlin-type gold deposits in Ordovician and Silurian limestones of the Matapédia Group.

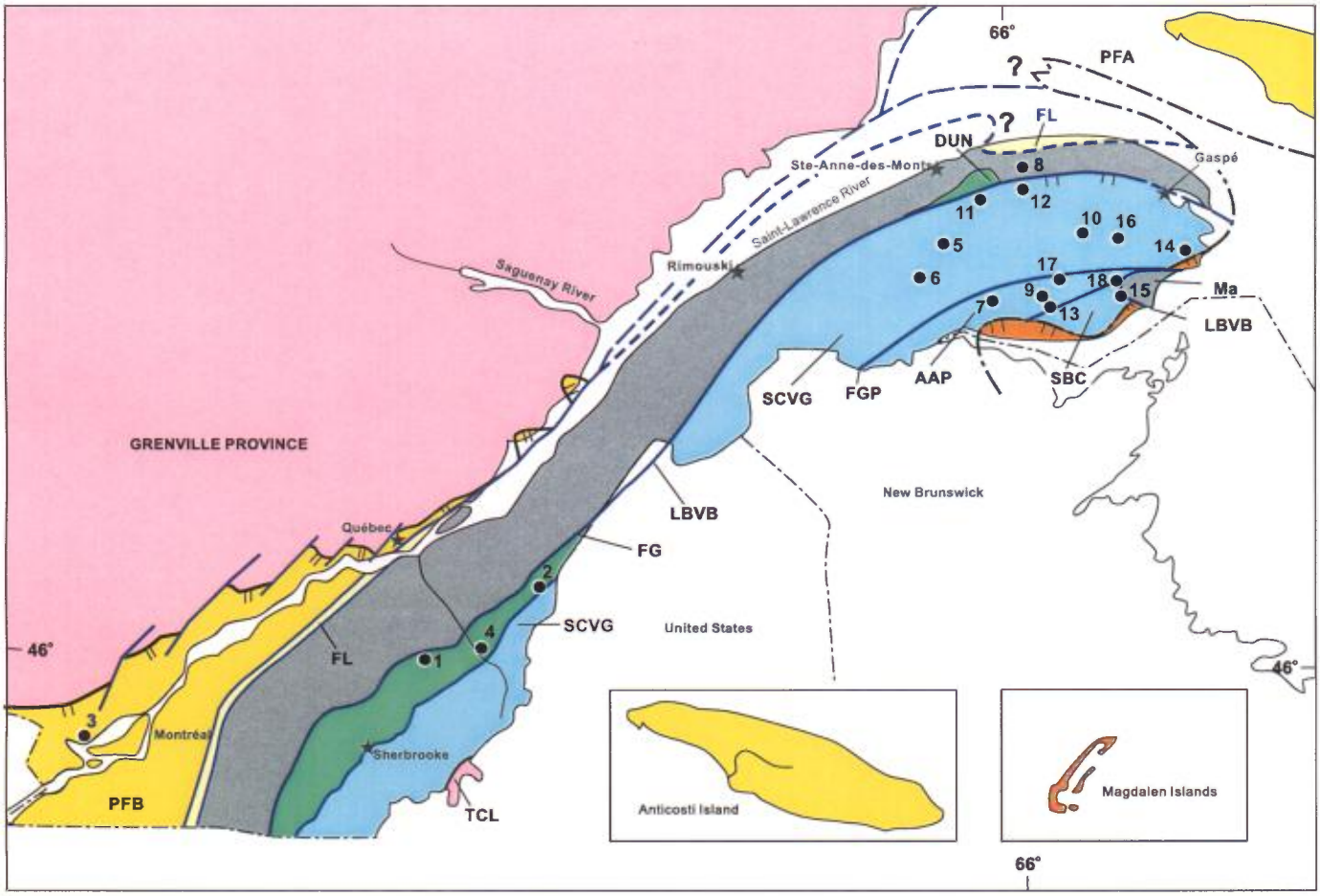
In eastern Gaspésie, more specifically in York, Fortin, Baillargeon, and Galt townships (NTS 22 A/09, A/10 and A/15), the **FRAPMGÎM** conducted a study on hydrocarbons and Pb-Zn±Ag occurrences in cherty and dolomitic limestone, dolomite and dolomitic breccia zones along the Troisième Lac fault. The study confirms that lead-zinc occurrences are related to Mississipi Valley-type (MVT) deposits, and that, in this area, lower Devonian carbonate rocks in the Indian Cove Formation of the Upper Gaspé Limestones and in the York Lake Formation of the overlying Gaspé Sandstones offer a strong potential for this type of ore deposit.

To date, Paleozoic sedimentary and volcanic assemblages in north-central Gaspésie (NTS sheets 22 A/11 to 14, B/09, B/16, G/01 and H/04) were explored to find copper deposits similar to those at the former **Gaspé Copper mine** (a division of **Noranda Inc.**) in Murdochville, namely: porphyry-type deposits (Copper Mountain), skarns (zones B and C), marble-hosted replacement massive sulphides (mantos) (zone E), as well as distal polymetallic vein-type deposits.

However, based on the presence of favourable metallogenic environments (Lachance and Pilote, 2003; Pilote, 2002; Doyon, 1995, 1996; Bellehumeur and Valiquette, 1993; Wares, 1988; Stevens, 1983), the north-central Gaspésie region also represents a first-order regional target in the search for zinc-lead-silver replacement deposits (skarns and massive sulphides) in limestones, epithermal gold deposits in and around rhyolitic volcanic centres (particularly in Mont Lyall and Mont Tuzo rhyolites peripheral to the Lemieux dome), SEDEX-type lead-zinc-silver-barite deposits associated with manganese-enriched zones in calcareous shales with bentonite beds indicating volcanism coeval with sedimentation in the Upper Gaspé Limestones, volcanogenic massive sulphide (VMS)-type zinc-lead-copper deposits or Besshi-type copper-zinc deposits, and along the southern edge of the Lemieux dome, disseminated lead-zinc deposits in quartzofeldspathic sandstones of the lower Devonian York River Formation.

Recent exploration campaigns conducted by **Ressources Appalaches Inc.** on its Mont de l'Aigle property and geoscience studies conducted by the ***Ministère des Ressources naturelles, de la Faune et des Parcs*** **(MRNFP)** in the Lac Saint-Anne area (NTS 22 B/16-0200-0102) confirm the presence of hematite-magnetite-chalcopyrite-quartz-dolomite veins and hydrothermal breccias, particularly in the northern part of the Lemieux dome. These Paleozoic Appalachian occurrences correspond to iron oxide-copper-gold (IOCG)-type deposits, with a gold component that for the moment remains poorly developed.

1F



APPALACHIAN

- Magdalen Bassin (Permo-Carboniferous)
- Gaspé belt (Upper Ordovician-Devonian)
- Dunnage Zone (Cambro-Ordovician)
- Humber Zone (Cambro-Ordovician)

ST. LAWRENCE PLATFORM

- Subautochtonous (Ordovician)
- Autochtonous (Cambro-Ordovician)
- Precambrian

- Fault
- Erosionnal unconformity
- Boundary

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.

0 50 100
km

FIGURE 1F-1. Exploration projects over the St.Lawrence Platform and the Appalachians for 2004.

TABLE 1F-1 - Exploration projects over the St.Lawrence Platform and the Appalachians for 2004 (see figure 1F-1).

NO	TOWNSHIPS (SEIGNIORIES)	NTS	COMPANIES / PROSPECTORS	PROJECTS	SUBSTANCES	WORKS[1]
Southwestern Segment (Montréal and Chaudière-Appalaches regions)						
1	Adstock	21 L/03	Ressources Mengold Inc.	Thetford Option	Cr-PGE	Gs, Pr, S
2	Bellechasse, Panet	21 L/09	Osisko Exploration Ltd / Golden Hope Mines Ltd	Bellechasse	Au	D(12:1950), Mag(A)
3	**(Lac-des-Deux-Montagnes)**	**31 G/09**	**Niocan Inc.**	**Niobium/Oka**	**Nb**	**Env**
4	(Saint-François)	21 L/02	R. Mainville / T. Burnham	Timrod	Au	T
Central Segment (Bas-Saint-Laurent region)						
5	Catalogne	22 B/10	Ressources Appalaches Inc.	Catalogne	Cu	Gs(r), Pr, S
6	La Vérendrye	22 B/07	Ressources Appalaches Inc.	Dunière	Au	Gs(r), Pr, S
Northeastern Segment (Gaspésie et Îles-de-la-Madeleine regions)						
7	Angers, Carleton	22 B/08, 01	FRAPMGÎM	Propriété Rivière Angers	Au-Cu-Ag-Pb-Zn-Ni	Gs(r), Pr, S
8	Boisbuisson	22 H/04	Ressources Appalaches Inc.	Boisbuisson	Au	D(4:250), T
9	Flahault	22 A/05	Ressources Appalaches Inc.	Harriman	Au	Gs(sl), Pr, T
10	Gaspésie	22 A, B	FRAPMGÎM	Prospection de cibles 2004	Au-Cu-Pb-Zn	Gs(r), Pr, S
11	Lemieux	22 B/16	Ressources Appalaches Inc.	Mont de l'Aigle	Cu-Au	D(17:4500), T, Titan 24
12	Lesseps	22 A/13	Ressources Appalaches Inc. / SOQUEM INC. / Major Drilling Group International Inc.	Lesseps Est	Au	Gs(sl)
13	New Richmond	22 A/04, 05	Mines Cascapédia Inc.	Gîte New Richmond I	Sb-Au-Ag	Gs(r), Pr, S, T,
14	Percé	22 A/08	R. Lelièvre / M. Boudreau	Lits rouges cuprifères de Grande-Rivière	Cu-Ag-Co-Au-Ni-PGE	Gs(r) Pr, S
15	Port-Daniel	22 A/02, 03	Junex Inc.	Mictaw	Au-Cu-Ni	Gs(r), Pr, S
16	Randin	22 A/11	J.-B. Beaudin / L. Leblanc	Grand Pabos Nord	Cu-Ag	G, Gs(r), Pr, S, T
17	Robidoux	22 A/06, 05	Ressources Appalaches Inc.	Robidoux	Au-Cu	Pg, Titan 24
18	Weir	22 A/06	Ressources Appalaches Inc.	Irlande	Au	Gs(r), Pr, S

1 = See abbreviation list in appendix II.

Chapter 2

Architectural Stone, Industrial Minerals, Industrial Stone and Peat

2

2

This chapter describes the results of mineral exploration and mining activities conducted in Québec in 2004 in the field of architectural stone, industrial minerals, industrial stone, and in the peat industry.

Architectural Stone

Yves Bellemare

Production

In the field of architectural stone, a total of 106 active quarries were compiled in 65 different locations (see Figure II for the location of architectural stone quarries in operation in Québec in 2004 and table II in Appendix 1 for a brief description of each operation). Architectural stone varieties include:

- rocks from anorthositic, charnockitic, and granitic suites, which account for most of the dimension stone production;
- steatite, soapstone and serpentinite (blocks for sculptures and refractory plates);
- slate (roofing tiles and slabs);
- limestone, dolomite, sandstone, siltstone, marble, quartzite, schist, and gneiss (dimension stone, ashlar, and landscaping stone).

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

Over the course of the year, companies active in Québec launched mining operations with five new quarries, to produce nine new commercial varieties. The most significant work was accomplished in the Montérégie, Gaspésie, and Côte-Nord regions. In the Saint-Armand Seigniory, **NAMCA Inc.**, a subsidiary of Polycor Inc. and SOQUEM INC., completed an important development program undertaken in 2003. A new quarry face was opened to mine calcilutites of the Strites Pond Formation, a whitish grey to medium grey stone with an occasional greenish tinge (project 51, Appendix 1). Northeast of Maria, **NAMCA Inc.** also completed development work on a deposit of grey-violet limestone breccia with reddish fragments of the Bonaventure Formation (project 65, Appendix 1). In the Magpie area, **Granijem Inc.** began quarrying a brownish green hypersthene syenite with a bluish tinge from the Havre-Saint-Pierre Anorthositic Suite (project 49, Appendix 1). Near the Manic-3 hydroelectric dam, **Granijem Inc.**, in conjunction with **Granit C. Rouleau Inc.**, also mined a variety of pinkish grey migmatized straight gneiss (project 45, Appendix 1). Finally, **Polycor Inc.** acquired the assets and mining rights of the Colorado Yule Marble property in the United States. It subsequently created a new subsidiary, the **Colorado Stone Quarries Inc.**

Exploration

In addition to completing development work on the two properties described in the section entitled "Production", **NAMCA Inc.** launched or continued exploration work on nine other mining properties, in the search for limestone, slate, and anorthosite deposits (see figure 2.1 for the location of 53 projects where exploration and development work took place in 2004. Project descriptions are listed in Table 2.1). In the Gaspésie region, the company continued to explore the various facies of marble limestone in the West Point and La Vieille formations (projects 49 to 53). In most cases, the work is preliminary, but was successful in targeting areas of interest. In 2005, the company plans to launch an extensive work program on the Clemville, Port-Daniel, Lac Madeleine or Marin-Lavoie projects, depending on the needs of its clientele. **NAMCA Inc.** also launched an exploration program targeting slate deposits in the Témiscouata, Matapédia, and Gaspésie regions (projects 44 to 47). Mudslates of the Témiscouata Formation and the Fortin Group are specifically targeted. In the Lanaudière region, the company searched for outcrops of bluish iridescent anorthosite of the Morin AMCG Suite within a vast property near Saint-Côme. However, preliminary results were disappointing (project 7).

In the Chute-des-Passes area, **Polycor Inc.** continued an extensive exploration and development program undertaken in previous years. Dark brown gabbroic anorthosite was mined from a quarry face initially opened in 2003. The 2004 campaign was spoiled by problems associated with the extraction of this highly prized variety on the stone market. Due to a higher than anticipated rate of fracturation in the lower levels of the quarry, the company carried out surface stripping in nearby areas (project 16). Near Cacouna (project 40), the company continued its assessment of green sandstones of the Saint-Roch Group, similar to those of the Sillery Group quarried in the early 20th century in the Québec City area. Block sampling is slated for 2005 or 2006.

A. Lacroix et Fils Granit Ltée continued its extensive exploration and development program undertaken in 2002 in the Notre-Dame-de-la-Merci area. Positive results from drillholes completed in an unexplored part of the property proved useful to orient subsequent work to sample blocks of dimension stone (project 8). Note that in this area, anorthosite of the Morin AMCG Suite have a bluish tinge. In Lidice Township near Chute-des-Passes (project 15), prospecting and drilling revealed more massive outcrops with a better potential than outcrops previously identified in 2001. In Saint-Alexis-des-Monts, the company also

began preliminary work to develop a dark brown porphyritic quartz mangerite assigned to the Saint-Didace Massif (project 9).

In addition to completing exploration and development work on the two properties described in the section entitled "Production", **Granijem Inc.** conducted exploration on three other properties to the east and north of Baie-Comeau (projects 28, 29, and 32). The most important program took place in the Lac Poulin area, where a brownish beige granodiorite has been targeted to produce decorative furniture items or exterior cladding for buildings. In 2005, an important sampling program is planned, to extract blocks of dimension stone. North of Baie-Comeau, **Gemme Manicouagan Inc.** continued development work, namely sampling blocks from a new working face and polishing tests, on a hematized, chloritized, and epidotized fault gouge similar to unakite (project 31). In Saint-Thomas-Didyme, northwest of Lac Saint-Jean (project 14), **Granicor Inc.** performed work north of the original quarry. Polished samples of a mangerite variety with a deeper red colour than the *Acajou* variety were distributed to the company's clients, and the response was positive.

Glendyne Inc. pursued its investigations launched in the Saint-Marc-du-Lac-Long area in the mid-1990s to determine the slate potential of the Témiscouata Formation. This year, the company continued its drilling program to delineate reserves near the quarry on the Normand property (project 42). It also performed reconnaissance drilling and conducted an interpretation study of remote sensing images as well as a seismic survey on the Botsford South property (project 41), in order to advance to a detailed exploration program in 2005.

Brightly coloured sandstone, used to produce masonry stone and landscaping stone, was once again in high demand in 2004. The search is on to find alternate sources to sandstone varieties produced in the United States, Scotland, Nova Scotia, and Ontario. The most important exploration project was carried out by **Les Pierres Saint-Mathieu Inc.** in the Saint-Mathieu-de-Rioux area (project 43), where the potential of quartz arenites of the Robitaille Formation was investigated. Of the four different varieties of coloured sandstone discovered last year, the red variety (*Basques*) was selected for advanced work. Test results were conclusive, and the company will apply for a mining lease over the course of the coming year. Additional work is also planned for 2005.

More detailed information on exploration and extraction of architectural stone is available at the following address:

http://www.mrnfp.gouv.qc.ca/english/mines/architectural/index.jsp

2

Industrial Minerals, Industrial Stone, and Peat

N'golo Togola,
Charles Gosselin
and Pierre Buteau

Production

Industrial minerals and stones produced in Québec in 2004 include: chrysotile asbestos, ilmenite and titanium slag, graphite, phlogopite, rock salt and brine, clay minerals, peat, silica, as well as limestone, dolomite, and marble (see Figure III for the location of active quarries and mines of industrial minerals and stone, as well as producing peatlands in Québec. Table III in Appendix 1 provides a brief description of each operation).

Chrysotile asbestos is extracted from three mines in the Estrie region. Ilmenite comes from the Lac Tio mine, north of Havre-Saint-Pierre, and is used to manufacture titanium slag at the QIT plant near Sorel in the Montérégie region. Flaky graphite is extracted at the Stratmin mine in Lac-des-Îles, south of Mont-Laurier, and phlogopite at the Bédard mine in Suzor Township in the Mauricie region. Rock salt is extracted at the Seleine mine in the Îles-de-la-Madeleine, whereas brines are produced from four wells in the Bécancour area. Clay minerals are mined from a shale unit in the Montréal area and are used to manufacture bricks. The main sources of silica are: quartzite (five quarries), sandstone (four quarries), and natural sand (two operations). Limestone, dolomite, and marble are mined for industrial purposes in more than fifteen quarries. Depending on their chemical or physical characteristics, they are used to produce quick lime (three operations), various aggregate products (amendments, mineral fillers, granules), or cement (three producers).

When comparing 2003 figures with preliminary data from the *Service de l'imposition* and production figures for 2004, we note a slight increase of 2.4% in the value of mineral shipments for industrial minerals (peat and silica included). Sharp increases are recorded for peat (26%), silica (28%), and graphite (32%). The value of asbestos and ilmenite shipments however is down by about 14%, whereas shipments for the remaining commodities remain relatively stable.

In 2004, **Junex Inc.** started production at two new brine wells in Bécancour: Junex Bécancour no.2 and no.3. These brines are used as dust control agents in the summer and as de-icing products in the winter.

In the carbonate industry, the **Coopérative des producteurs de chaux du Bas-Saint-Laurent Inc.** began producing magnesian lime from dolomitic limestone in the La Rédemption area.

The Coop is also considering the possibility of mining another dolomite deposit located a few kilometres southeast of its current quarry. In the Centre-du-Québec region, **Les Carrières St-Ferdinand Inc.** started up operations at a second quarry near the town of Trottier, to produce magnesian and dolomitic agricultural lime. In the Outaouais region, the dolomitic marble quarry in Portage-du-Fort, operated by **Sequoia Minerals (Dolomex division)**, ceased operations in October. The new owner of the quarry, **Cambior Inc.**, is currently planning its rehabilitation.

Exploration Québec/Labrador Inc. began mining a quartzite deposit in the Fermont area. This very high-purity silica deposit is currently used to produce quartz granules to manufacture artificial stone, but it may also be suitable for a number of other industrial purposes that require a very high SiO_2 content.

In 2004, 16 peat producers were active in Québec, in 35 peatlands mainly located in the Bas-Saint-Laurent, Côte-Nord, and Saguenay–Lac-Saint-Jean regions. Preliminary data for 2004 indicate total shipments of 9.9 million bags of 170 dm^3, for an aggregate value of about $62.4M. For the third year in a row, the peat harvesting season started exceptionally late. The first harvesting operations were only recorded in mid-July, and in mid-August, most producers still had not reached 30% of their production objectives. Subsequently, weather conditions prevailing until the end of September enabled many operations to reach about 65% of their annual target.

Exploration

Eight mineral exploration projects targeting six different commodities (rocks or minerals) were compiled in 2004 (Figure 2.1 and Table 2.2). The Lac Guéret graphite project by **Quinto Technology Inc.**, in partnership with **SOQUEM INC.** (project 54), constitutes one of the most interesting projects in 2004. The lateral extensions of the Graphite Cliff (GC) zone were delineated. Enclosed in paragneisses and quartzites, the GC zone includes a high-grade sub-zone that contains more than 20% graphite.

The Mingan property (project 55), explored by **Sheridan Platinum Group Ltd** and **Fancamp Exploration Ltd**, contains massive hemo-ilmenite occurrences hosted in anorthositic and gabbroic rocks of the Havre-Saint-Pierre anorthositic Suite. In Bourget Township in the Saguenay–Lac-Saint-Jean region, **Micrex Development Corp.** continued work on a magnetite-ilmenite deposit (project 56) hosted in rocks of the Lac-Saint-Jean anorthositic Suite. In the Labrieville area, interesting titanium dioxide values (35% TiO_2) were reported by **Quinto Technology Inc.** from the Lac Brûlé hemo-ilmenite deposit (project 57).

Ressources Maxima Inc. continued work on its property, which contains an important sillimanite deposit, near Sainte-Anne-du-Lac (project 58). The deposit is hosted in a sillimanite-muscovite-biotite-garnet-graphite paragneiss. **Junex Inc.** started drilling new wells in the Bécancour area in the search for brine (project 59). **Baskatong Quartz Inc.** completed drillholes in a former silica operation northeast of Lac Bouchette, south of Lac Saint-Jean (project 60), to determine if the site still contains reserves. **Sitec Inc.** collected a bulk sample of quartzite in the Petit Lac Malbaie area (project 61), where the company already produces high-purity silica from another important quartzite deposit.

Opportunities for Exploration

Geological mapping conducted by the **Ministère des Ressources naturelles, de la Faune et des Parcs (MRNFP)** revealed several geological settings with good potential for architectural stone, industrial stone, and industrial minerals.

Mapping conducted in NTS sheet 31 O/02 (Nantel, 2004), in the northern part of the Lac Pine area, identified pegmatite outcrops which may represent a source of architectural stone. The pegmatite contains pink coarse feldspar crystals set in a white quartz-feldspar groundmass.

In the Mont-Laurier area, geological mapping in NTS sheets 31 J/14 (Nantel, 2000), 31 J/15 (Nantel and Pintson, 2001), 31 O/02 (Nantel, 2003, in print), 31 O/02 and 31 O/07 (Nantel, 2004, in print) outlined the sillimanite potential in paragneiss bands of the Central Metasedimentary Belt.

During the summer 2004, inventory work led to the discovery of a potential cement stone deposit in the Percé area. A preliminary assessment of the limestones indicate CaO (48-50%), Na_2O+K_2O (<0.6%), MgO (<2.5%), S (<0.2%), and Cl (<30 ppm) contents which would meet industry requirements. Furthermore, this potential deposit contains an easily accessible mineral resource, which could likely reach several hundred million tonnes.

2

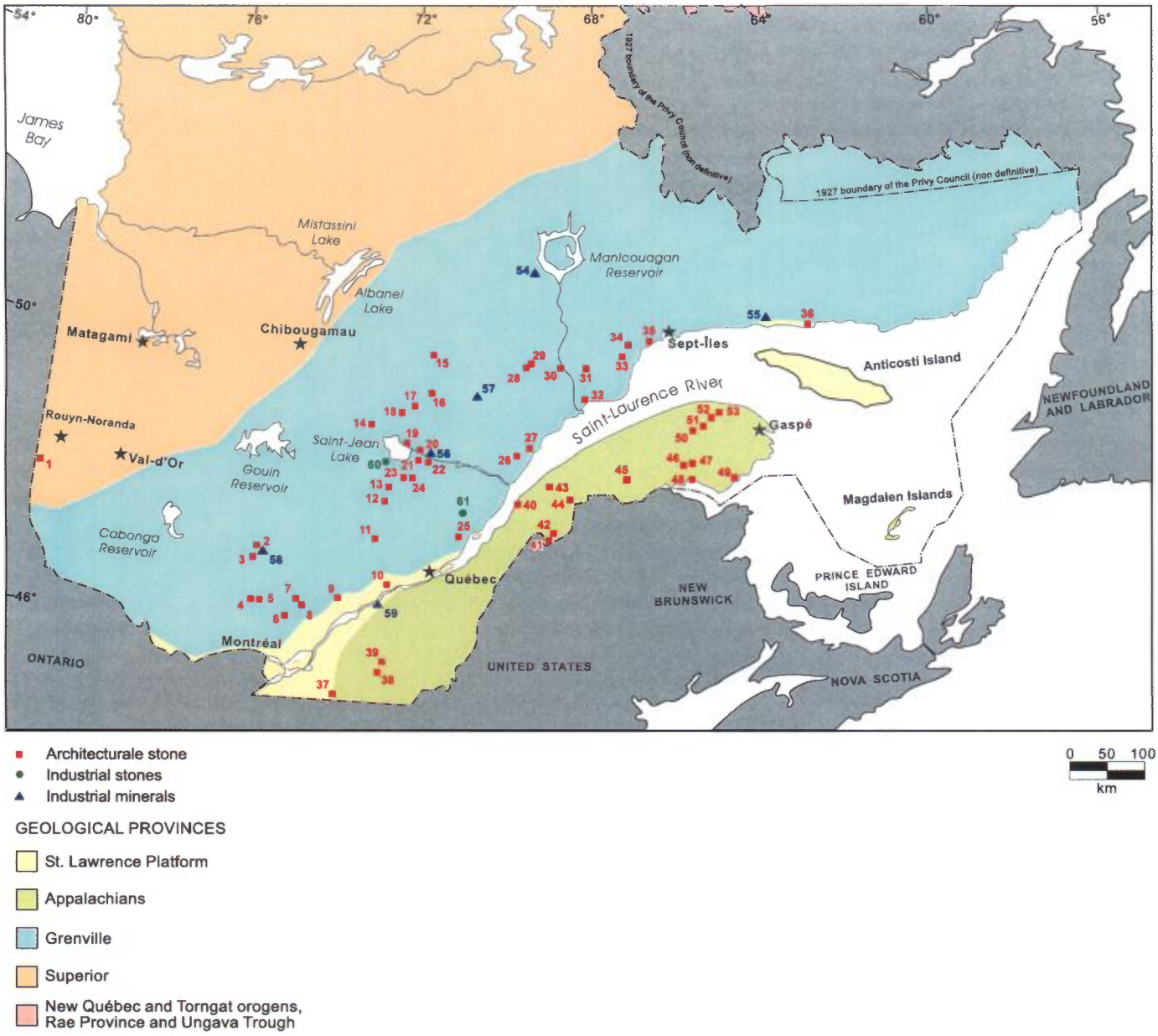


Figure 2.1. Exploration work for architectural stone, industrial minerals and stone in Québec in 2004.

TABLE 2.1 - Exploration work in Quebec for architectural stone for 2004 (see figure 2.1)

PROJECTS	NTS	MINING TITLES	HOLDERS	USE (1)	WORKS(1)	DETAILS
1	31 M/14	CDC 9505 to 9507	Granitslab International Inc. (2329-1677 Québec Inc.)	DS	Bs, Pt, T	Cheminis project, grey granite, fine grain
2	31 O/02	CDC 15066 to 15069, 15466, 47877 to 47889	A. Lacroix et Fils Granit Ltée	DS	Pr	White dolomitic marble
3	31 J/15	CDC 15064 to 15065, 25394 to 25400, 32711 to 32722	A. Lacroix et Fils Granit Ltée	DS	Pr	White dolomitic marble
4	*31 J/07*	*BEX 337*	*Les Pierres Mitchell Inc.*	*BS*	*D*	*Labelle ouest project, paragneiss*
5	*31 J/07*	*BEX 330*	*Les Pierres Mitchell Inc.*	*BS*	*D*	*Labelle est project, paragneiss*
6	31 J/01	CDC 7219 to 7220	A. Lacroix et Fils Granit Ltée	DS	Pr	Sainte-Lucie project, brown anorthosite, irridescent, bluish gray
7	31 I/04, 31 I/05, 31 J/08	87 mining titles (CDC)	NAMCA Inc.	DS	Pg	Saint-Come project, anortho-site, irridescent, bluish gray
8	*31 I/05*	*BEX 255*	*A. Lacroix et Fils Granit Ltée*	*DS*	*D*	*Orion project, anorthosite, irridescent, bluish gray*
9	31 I/06	BNEP 922	A. Lacroix et Fils Granit Ltée	DS	S, T	Saint-Alexis-des-Monts pro-ject, quartz mangerite, brown
10	31 I/09	CDC 34600 to 34603	F. Bédard	DS	Pr	Limestone, Deschambault Formation
11	31 P/08	CDC 1019356 to 1019364	Granit Yoguy Inc.	DS	Bs, Pt, T	Vert Rustique project, quartz mangerite, greenish grey
12	**31 P/16**	**BNEP 880, CDC 1104234**	**Granitslab International inc. (2329-1677 Québec Inc.)**	**DS**	**Bs, Pt, T**	**Gendron project, black gabbro, fine to medium grain**
13	32 A/01	CDC 1121972 to 1121978	F. Gobeil	DS	Bs, T	Lac Mirage project, farsundite, dark brown to pale beige, coarse grain
14	**32 A/15**	**CDC 1123388**	**Granicor Inc.**	**DS**	**Bs, G, Pt, T**	**Acajou 2 project, quartz mangerite, porphyritic, reddish brown**
15	22 E/14	CDC 14613 to 14624	A. Lacroix et Fils Granit Ltée	DS	D, Pr, S	New Rainbow project, migma-tized and banded gneiss, reddish pink, medium grain
16	*22 E/06*	*CDC 1014112 to 1014115, BEX 402*	*Polycor Inc.*	*DS*	*S, T*	*Kodiak project, gabbroic anorthosite, brownish black*

TABLE 2.1 - Exploration work in Quebec for architectural stone for 2004 (see figure 2.1)

PROJECTS	NTS	MINING TITLES	HOLDERS	USE (1)	WORKS[1]	DETAILS
17	22 E/04	CDC 7023-7024	Prospection Olivier Perron Enr.	DS	D, T	Reflet d'amazonite project, anorthosite mauve and green
18	22 E/04, 32 H/01	CDC 1105863, 1105867 to 1105868	F. Gobeil	DS	S, Pr	Anorthosite brown or blue
19	22 D/12	CDC 1119729 to 1119731	Prospection minière Dan	DS	S, Pt	Powell project, black anorthosite, fine grain
20	22 D/12	CDC 1168	A. Lacroix et Fils Granit Ltée	DS	D, S, T	Noir Atlantique ouest project, metagabbronorite, greyish black, fine to medium grain
21	22 D/05	No	M. Tremblay	DS	Pr, S	Marine blue iridescent anorthosite
22	22 D/06	CDC 23905-23906	M. Tremblay	DS	Pr, S	Black anorthosite
23	22 D/04	CDC 50252, 50264	P. and R. Cloutier	DS	Pr, S	Aigle Rouge project, hypersthene syenogranite, porphyritic, orangey pink
24	22 D/04	CDC 3038 to 3040, 4854	Polycor Inc. / P. and R. Cloutier	DS	S, Pr, T	Nuit Étoilée project, bronzite norite, black, coarse grain
25	21 M/07	CDC 1116565 to 1116568	Prodier Ltée	DS	Pr	Sainte-Tite-des-Caps project, far-undite, salmon brown, foliated
26	22 C/12	CDC 1005203	E. Hurtubise	DS	G	Granite Sault-au-Mouton project, pink granite
27	22 C/11	CDC 1118708, 1122217 to 1122218	Prodier Ltée	DS	Pr	Rosey red granitic gneiss, Saint-Paul-du-Nord Formation
28	22 F/14	CDC 1099143-1099144	Granijem Inc.	DS	Bs, Pt, T	Lac Poulin project, granodio-rite, brownish beige
29	22 F/14	CDC 1099146	Granijem Inc.	DS	Bs, Pt, T	Yeux du Nord project, augen mangerite, rosy beige
30	**22 F/15**	**BNEP 865**	**Granijem Inc. / Granit C. Rouleau Inc.**	**DS**	**Bs, Pt**	**Rose de Manic project, straight gneiss, migmatized, rosy grey**
31	**22 F/16**	**BNEP 863**	**Gemme Manicouagan Inc.**	**DS, DeS**	**G, T**	**Marbre Manicouagan project, fault gouge, epidotized, chloritized and hematized**
32	22 F/08	CDC 12427 to 12432, 17586	Granijem Inc.	DS	Pr, T	Anse Saint-Pancrase project, granitic gneiss, reddish pink

TABLE 2.1 - Exploration work in Quebec for architectural stone for 2004 (see figure 2.1)

PROJECTS	NTS	MINING TITLES	HOLDERS	USE (1)	WORKS(1)	DETAILS
33	22 G/14	CDC 42700, 46563 to 46567	R. Landry / J.-C. Rochette	DS	Pr, T	Lac Riverin project, migmatized paragneiss, whitish grey
34	22 J/03	CDC 1009857 to 1009862	Exploration Flair Inc.	DS	G, Pt, S, T	Rose Walker project, foliated granite, pink, coarse grain
35	22 J/02	CDC 1125126 to 1125153	R. Landry / M. Richard	DS	Pr	Quartz bleu project, monzonite, porphyritic, grey, with blue quartz
36	12 L/03, 12 L/06	CDC 14748 to 14751, 15838, 16420 to 16431,	C. and G. Jomphe	DS	Pr, Pt, S	Dolomite, Romaine Formation and limestone, Mingan Formation, 5 explored targets
37	**31 H/03**	**No**	**NAMCA Inc.**	**DeS, DS**	**D, Bs, Pt**	**Saint-Armand project, calcilutite, Strites Pond Formation**
38	31 H/08	CDC 1099961 to 1099964	Les Produits d'Ardoise Québec Inc.	DS	Bs, Pt, T	Saint-Élie project, agglomerate with granitic rock fragments, reddish grey in olive green matrix
39	31 H/09	No	M. Houle	BS	S, T	Melbourne project, green slate, Mélange de Saint-Daniel
40	21 N/13	No	Polycor Inc.	DS	G	Cacouna project, greenish grey sandstone, Saint-Roch Group
41	21 N/07	CDC 1082536, 1082541, 1082701 to 1082703	Glendyne Inc.	DS, RT	D, Gp, Rsi	Botsford sud project, bluish black slate, Témiscouta Formation
42	*21 N/07*	*CDC 1082540 to 1082541, 1082701 to 1082703*	*Glendyne Inc.*	*DS, RT*	*D*	*Normand project, bluish black slate, Témiscouta Formation*
43	**22 C/02, 22 C/03**	**BNEP 896, CDC 1127256 to 1127263, 1127481 to 1127484**	**Les Pierres Saint-Mathieu Inc.**	**BS, DS**	**Bs, Pr, T**	**Grès Basques project, red sandstone, Robitaille Formation**
44	21 N/15, 21 N/16	CDC 34058 to 34099	NAMCA Inc.	DS	Pg	Témiscouata project, mudslate (slate), Témiscouata Formation
45	22 B/03, 22 B/06	CDC 34398 to 34421	NAMCA Inc.	DS	Pg	Matapédia project, mudslate (slate), Fortin Group
46	22 B/08	CDC 34362 to 34370	NAMCA Inc.	DS	Pg	Transgaspésienne ouest project, mudslate (slate), Fortin Group
47	22 A/05	CDC 34371 to 34380	NAMCA Inc.	DS	Pg	Transgaspésienne est project, mudslate (slate), Fortin Group
48	**22 A/04**	**No**	**NAMCA Inc.**	**DeS, DS**	**Bs, D, Pt**	**Cascapédia project, marble limestone (breccia), reddish purple, Bonaventure Formation**

TABLE 2.1 - Exploration work in Quebec for architectural stone for 2004 (see figure 2.1)

PROJECTS	NTS	MINING TITLES	HOLDERS	USE (1)	WORKS(1)	DETAILS
49	22 A/03	CDC 1039222 to 1039227	NAMCA Inc.	DeS, DS	Bs, D, Pt	Clemville project, limestone, La Vieille Formation
50	22 A/13	CL 5250372 to 5250383	NAMCA Inc.	DS	Pg	Lac Madeleine project, metamorphized limestone, West Point Formation
51	22 A/13	CDC 28021 to 28027	NAMCA Inc. / J. Fortin	DS	Pg	Rivière Madeleine project, whitish grey limestone, West Point Formation
52	22 H/03	CDC 11698 to 11702	NAMCA Inc.	DS	Pg, Pt, S	Marin-Lavoie project, limy conglomerate, West Point Formation
53	22 H/03	CDC 1006393 to 1006402	Conseil de développement économique de Murdochville	DS	Pt	Calcaire Madeleine project, limestone, West Point Formation

1 = See abbreviation list in appendix II.

TABLE 2.2 - Exploration work in Quebec for Industrial minerals and stones for 2004 (see figure 2.1)

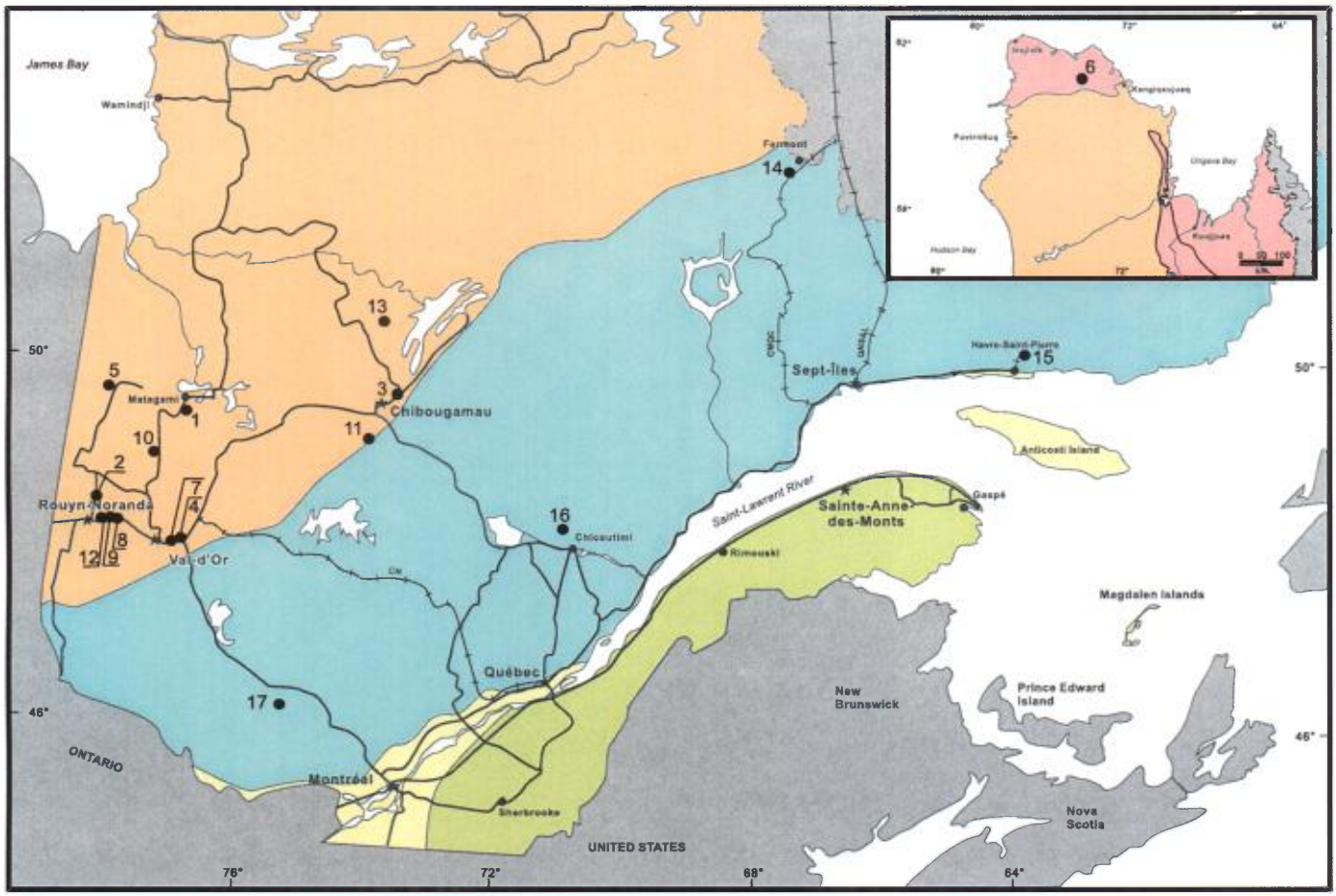
SITE	TOWNSHIPS (SEIGNIORIES)	NTS	COMPANIES \ PROSPECTORS	PROJECTS	SUBSTANCES	WORKS[1]
54	1548	22 N/03	Quinto Technology Inc. / SOQUEM INC.	Lac Guéret	Graphite	G, S, T
55	Mingan	22 I/08	Sheridan Platinum Group Ltd / Fancamp Exploration Ltd	Mingan	Ilmenite	G, S, T
56	Bourget	22 D/11	Micrex Development Corp.	St. Charles	Magnetite, ilmenite, apatite	Met, S, TE
57	0344	22 F/05	Quinto Technology Inc.	Lac Brûlé	Hemo-ilmenite	B(10:?), D(12:?), Pr
58	Leman	31 J/14, 31 O/03	Ressources Maxima Inc.	Sainte-Anne-du-Lac	Sillimanite	Pr, S
59	Bécancour	31 I/08	Junex Inc.	Bécancour	Natural brine	D
60	Dequen	32 A/08	Baskatong quartz Inc.	Lac Bouchette	Silica	D (?:350)
61	Charlevoix	21 M/15	Sitec Inc.	Petit lac Malbaie	Silica	Ev

1 = See abbreviation list in appendix II.

Appendix I

Location of producing mines and architectural stone quarries in Québec

APPENDIX I



Active mines

BASE METALS
1 - Bell Allard
2 - Bouchard-Hébert
3 - Copper Rand
4 - Louvicourt
5 - Selbaie
6 - Raglan

PRECIOUS METALS
7 - Beaufor
8 - Donald J.LaRonde
9 - Doyon
10 - Géant Dormant
11 - Joe Mann
12 - Mouska
13 - Troïlus

OTHER METALS
14 - Mont Wright
15 - Lac Tio
16 - Niobec
17 - Lac-des-Îles

GEOLOGICAL PROVINCES

- St. Lawrence Platform
- Appalachians
- Grenville
- Superior
- New Québec and Torngat orogens, Rae Province and Ungava Trough

- Main road
- Railroad
- ★ Resident geologist office
- ● 8 Site

Figure I. Active mines in Québec for 2004 (metallic substances).

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

Site	Mine	Company	Summary description of the deposit	Ore processed in 2004	Metal production in 2004	Ore processing in 2004	Proven mineral reserves (on January 1st 2005)	Probable mineral reserves (on January 1st 2005)	Employees in 2004	Cumulative production	Number of years of production	Township / NTS / Administrative area / Mining district
Base metals : Cu and Zn (Au and Ag)												
1	Bell Allard	Noranda Inc.	SMV-type	660 126 t at 1.19% Cu 15.92% Zn 0.57 g/t Au 45.87 g/t Ag 0.11% Pb	6 681.99 t Cu 98 107.18 t Zn 161.86 Kg Au 12 683.71 Kg Ag	Matagami Mine	_	_	175	3 370 175 t at 1.26% Cu 13.94% Zn 0.67 g/t Au 42.34 g/t Ag	2000-2004 (5) End of production October 17, 2004	Galinée 32F/12 / 10 / **Val-d'Or**
2	Bouchard-Hébert	Breakwater Resources Ltd	Massive sulfides, (PY-SP-CP) subvertical lenses in rhyolites and pyroclastics	968 835 t at 0.48% Cu 6.11% Zn 0.98 g/t Au 29.38 g/t Ag	3 914 t Cu 54 823 t Zn 537.59 Kg Au 9 639.60 Kg Ag	Bouchard-Hébert Mine	98 451 t at 0.67% Cu 4.87% Zn 0.74 g/t Au 25.71 g/t Ag	_	131	9 491 659 t at 0.79% Cu 4.90% Zn 1.43 g/t Au 43.41 g/t Ag	1995-20.. (10)	Dufresnoy / 32D/07 / 08 / **Rouyn-Noranda**
3	Copper Rand	Campbell Resources Inc.	Cu-Au porphyry type. Semi-massive lens of PY-CP-PO	17 216 t at 1.37 g/t Au 5.83 g/t Ag 1.87% Cu	20.09 kg Au 68.86 Kg Ag 315.7 t Cu	Copper Rand Mine	N.a.	N.a.	95	14 083 389 t at 3.02 g/t Au 1.80% Cu	1959-1997 2004-20.. (39)	McKenzie / 32G/16 / 10 / **Chibougamau**
4	Louvicourt	Aur Resources Inc.	VMS-type associated with Val-d'Or Formation, dominated by lapilli ash tuffs and exhalative chert	1 227 575 t at 2.80% Cu 2.00% Zn 0.86 g/t Au 26.30 g/t Ag	31 570.6 t Cu 17 523.7 t Zn 666.2 Kg Au 16 012.4 Kg Ag	Louvicourt Mine	*** 543 500 t at 2.49% Cu 1.77% Zn 0.90 g/t Au 25.42 g/t Ag	*** 13 500 t at 0.04% Cu 8.78% Zn 0.86 g/t Au 42.67 g/t Ag	215	15 093 416 t at 3.46% Cu 1.57% Zn 0.91 g/t Au 25.91 g/t Ag	1994-20.. (10.5)	Louvicourt / 32C/04 / 08/ **Val-d'Or**
5	Selbaie	Billiton Metals Canada Inc.	Disseminated SP-PY-CP associated with network veins in a rhyodacite breccia and dacitic welded tuff	346 097 t at 0.3% Cu 1.16% Zn 0.27 g/t Au 26.7 g/t Ag	781 t Cu 2925 t Zn 45.30 Kg Au 5 034 Kg Ag	Selbaie Mines	_	_	N.a.	53 222 461 t at 0.96% Cu 1.90% Zn 0.58 g/t Au 40.74 g/t Ag	1981-2004 (23) End of production January 21, 2004	Brouillan / 32E/15 / 10/ **Rouyn-Noranda**
6	Raglan	Québec Mining Raglan Society Ltd	Magmatic massive sulfide lenses at the base of ultramafic flows	935 000 t at 0.94% Cu 3.31% Ni 0.06% Co	7 421 t Cu 27 444 t Ni 200 Kg Au (estimated)	Concentrator - Raglan / smelter - Sudbury / refinery - Norway	*** 6 270 000 t at 0.74% Cu 2.63% Ni 0.05% Co	*** 9 380 000 t at 0.81% Cu 2,95% Ni 0.05% Co	N.a.	N.a.	1998-20 (7)	35C/09, 35H/11 et 35H/12 / 10 / **Sept-Îles**

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

Site	Mine	Company	Summary description of the deposit	Ore processed in 2004	Metal production in 2004	Ore processing in 2004	Proven mineral reserves (on January 1st 2005)	Probable mineral reserves (on January 1st 2005)	Employees in 2004	Cumulative production	Number of years of production	Township / NTS / Administrative area / Mining district
7	Beaufor	Richmont Mines Inc.	Gold-bearing veins located inside of E-W shear zones at the margin of the Bourlamaque batholith	263 896 t at 6.14g/t Au	1620.59 Kg Au	Camflo Mill	164 661 t at 6.98 g/t Au	499 543 t at 8.66 g/t Au	135	1 483 532 t at 7.64 g/t Au	1933-1951 1996-20.. (27)	Pascalis / 32C/04 / 08 / **Val-d'or**
8	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	2 700 650 t at 3.4 g/t Au 86.1 g/t Ag 0.54% Cu 4.03% Zn	8 427.32 Kg Au 201 292.41 Kg Ag 9 150.87 t Cu 90 726.42 t Zn	Concentrator Division LaRonde, Preissac	** 3 506 315 t at 3.0 g/t Au 84.9 g/t Ag 0.33% Cu 4.40% Zn	** 31 528 694 t at 4.3 g/t Au 80.5 g/t Ag 0.31% Cu 2.32% Zn	560	16 892 166 t at 5.37 g/t Au 48.97 g/t Ag 0.44% Cu	1988-20.. (17)	Bousquet / 32D/08 / 08 / **Rouyn-Noranda**
9	Doyon	Cambior Inc.	Veinlets and disseminated pyrite in sericite schists, in intermediate felsic volcanics and in Mooshla pluton.	1 145 695 t at 3.86 g/t Au 1.75 g/t Ag	4 231.96 Kg Au 1 803.58 Kg Ag	Doyon Mine	*** 1 941 100 t at 5.17 g/t Au	*** 2 281 500 t at 5.52 g/t Au	380	28 031 091 t at 5.74 g/t Au	1980-20.. (25)	Bousquet / 32D/07 / 08 / **Rouyn-Noranda**
10	Sleeping Giant	Cambior Inc. and Aurizon Mines Ltd	Gold-bearing quartz and sulfides veins at contact between dacitic intrusions and lava flows	192 950 t at 11.1 g/t Au 15.5 g/t Ag	2 083.7 Kg Au 2 956.24 Kg Ag	Sleeping Giant Mine	*** 195 000 t at 11.6 g/t Au 16.2 g/t Ag	*** 293 000 t at 11.7 g/t Au 16.4 g/t Ag	210	2 518 005 t at 10.17 g/t Au	1987-1991 1992-20.. (18)	Chaste / 32F/04 / 10 / **Val-d'Or**
11	Joe Mann	Campbell Resources Inc.	Sulfides-bearing quartz veins in gabbro and sheared rhyolite	168 275 t at 7.88 g/t Au 5.79 g/t Ag 0.23% Cu	1218.34 Kg Au 719 Kg Ag 362.88 tm Cu	Campbell Mill (Merrill Island)	N.a.	N.a.	175	4 481 364 t at 8.33 g/t Au	1956-1959 1974-1975 1987-20.. (23)	Rohault / 32G/08 / 10 / **Chibougamau**
12	Mouska	Cambior Inc.	Quartz veins in the Mooshla diorite close to the northern sheared contact.	26 351 t at 13.05 g/t Au	325.26 Kg Au	Doyon Mine	*** 134 600 t at 16.3 g/t Au 0.6% Cu	*** 142 800 t at 15.4 g/t Au 0.4% Cu	116	N.a.	1991-20.. (14)	Bousquet / 32D/07 / 08 / **Rouyn-Noranda**
13	Troilus	Inmet Mining Corporation	Au-Cu porphyry in diorite	6 048 675 t at 0.950 g/t Au 0.092% Cu	4 634.74 Kg Au 4 656.88 Kg Ag 4814 tm Cu	Troilus Mine	*** 4 875 496 t at 0.58 g/t Au 0.07% Cu	*** 25 610 629 t at 0.945 g/t Au 0.082% Cu	297	42 286 020 t at 1.124 g/t Au 0.118 %Cu	1997-20.. (8)	32O/ 01/ 10/ **Chibougamau**

Table I - Iron, ilmenite, niobium and graphite production in Québec (see figure I).

Site	Mine	Company	Summary description of the deposit	Total production in 2004	Total shipments in 2004	Shipment of first transformation products in 2004	Reserves (on January 1st 2005)	Employees in 2004	Cumulative production	Years of production	Township / NTS / Administrative area / Mining district
14	Mont Wright	Québec Cartier Mining Company	Specular hematite in metamorphosed iron formation of the Gagnon Group	11 945 276 cubic meters of iron mineral extract	13 233 150 t	9 097 067 t (pellets) 4 136 083 t (concentrate)	N.a.	1 800 (Mt-Wright + Port-Cartier)	N.a	1976-20.. (28)	Normanville / 23B/14, 23B/11 et 23B/09 / 09 / **Sept-Îles**
15	Lac Tio	Iron and Titanium QIT 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 / 12L/09 et L/11 / 09 / **Sept-Îles**
16	Niobec	Cambior inc.	Pyrochlore in the St-Honoré carbonatite	1 334 000 t at 0.71% Nb_2O_5	N.a	Niobec Mine (ferroniobium an aluminothermic converter)	16 067 854 t at 0.64% Nb_2O_5 (proven) 8 187 694 t à 0.71% Nb_2O_5 (probable)	230	N.a.	1976-20.. (28)	Simard / 22D/11 / 05 / **Montréal-Estrie-Laurentides**
17	Lac-des-Îles	Timcal Canada Inc.	Disseminated graphite flakes in crystalline limestone with quartzite horizons	12 500 t graphite	N.a.	Do not apply	Confidential data	47	N.a.	1989-20.. (16)	Bouthillier / 31J/05/ 15 / **Montréal-Estrie-Laurentides**

Abbreviation List

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

NOTE:

The data compiled in this table are preliminary and have been collected from mining companies before they published their official 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**

APPENDIX I

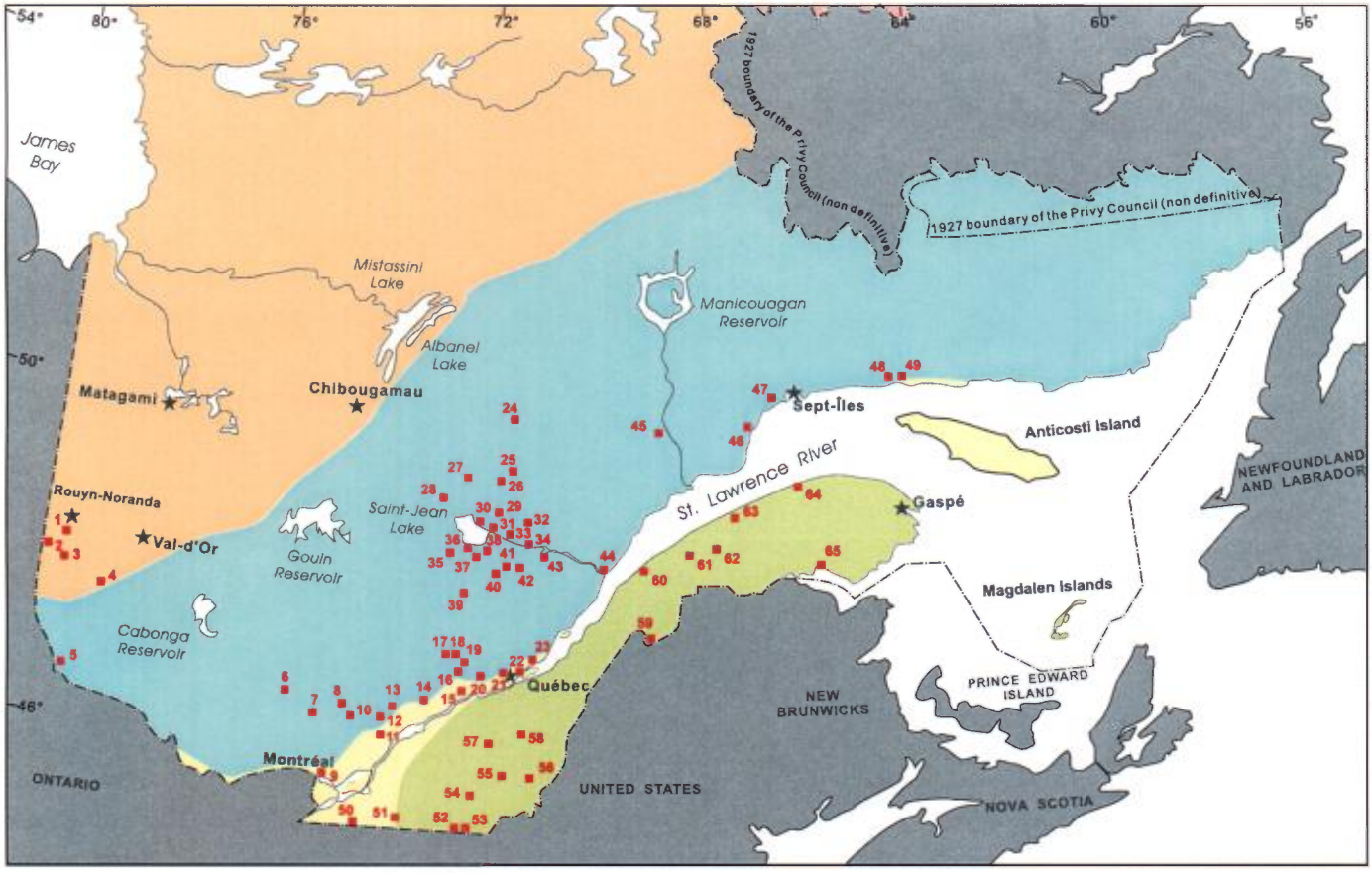


Figure II. Architectural stone quarries exploited in Québec for 2004 (for details, see table II).

APPENDIX I

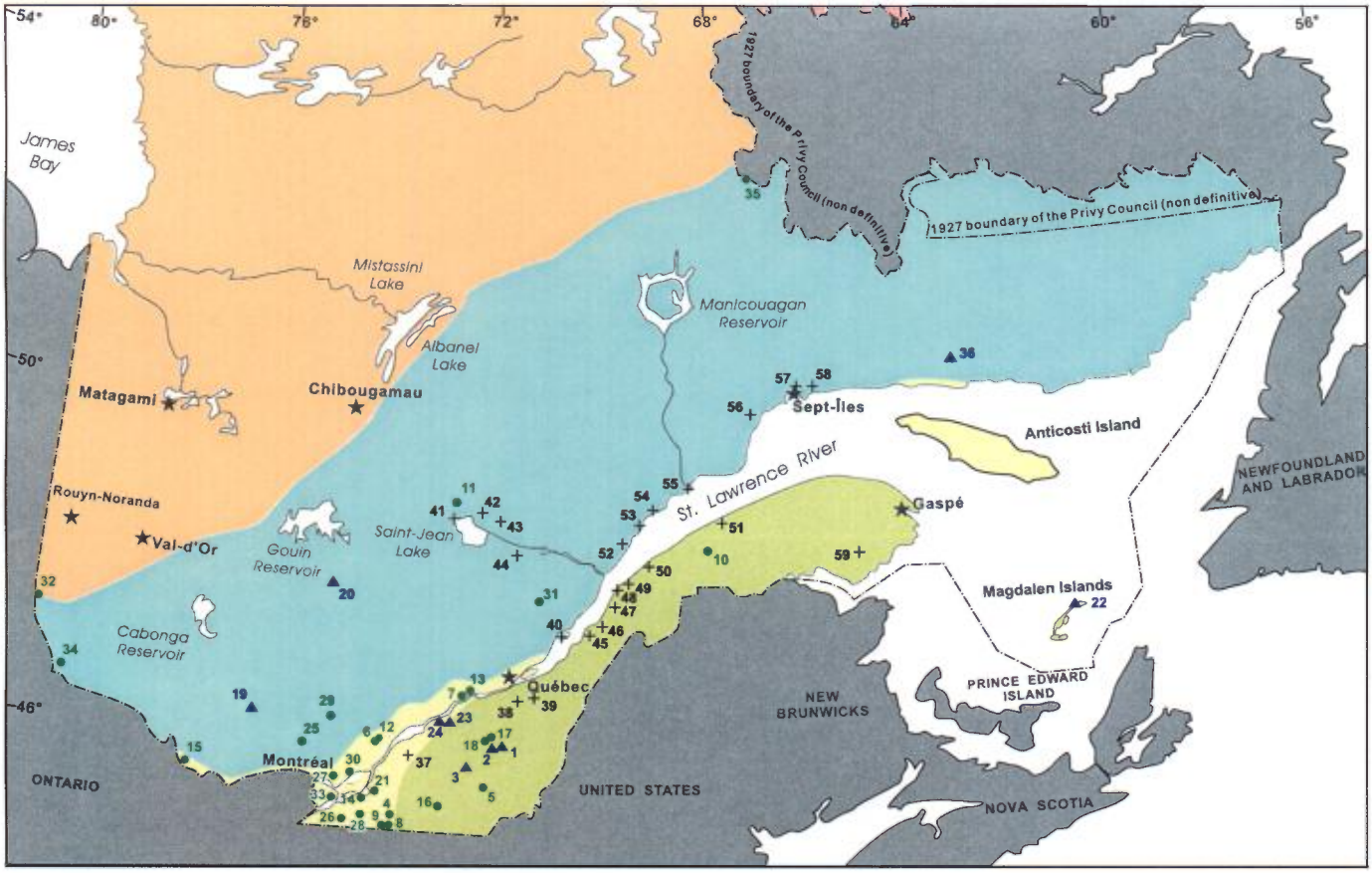


Figure III. Peat deposits, industrial minerals and stone quarries in production in Québec during 2004 (for details, see table III).

TABLE II – Architectural stone quarries exploited in Québec during 2004 (see figure II).

SITE	LOCATION	COMPANIES	ROCK TYPE – PRODUCTS (1)	COMMERCIAL NAME	NTS – ADMINISTRATIVE REGION	TITLE
1	Beaudry	Les Pierres du Nord	Biotite schist - BS	Nordic Schist	32 D/03 - 08	BEX 086
2	Dasserat	Granitslab International Inc.	Granite - DS, MO	Cheminis Grey	31 M/14 - 08	BEX 175
3	Rémigny	Granitslab International Inc.	Granite - DS, MO	Sable Pink	31 M/14 - 08	BEX 171
4	Winneway	Polycor Inc.	Granite - DS	Winneway	31 M/09 - 08	BEX 167
4	Winneway	Polycor Inc.	Granite - DS	Winneway	31 M/09 - 08	BEX 323
5	Téminscaming	Les Pierres du Nord	Muscovite quartzite - BS	Aventurine	31 L/10 - 08	BEX 355
6	Guénette	Rock of Ages Canada Ltd	Monzogranite - DS, MO	Laurentian Pink, Autumn Pink	31 J/11 - 15	CM 079
7	Labelle	Les Pierres Mitchell Inc.	Paragneiss - BS	-	31 J/07 - 15	BEX 330
7	Labelle	Les Pierres Mitchell Inc.	Paragneiss - BS	-	31 J/07 - 15	BEX 337
7	Labelle	Les Pierres Naturelles Durand Enr.	Paragneiss - BS	-	31 J/07 - 15	BEX 076
8	Saint-Donat-de-Montcalm	Carrières F. L. Inc.	Gneiss - BS	-	31 J/08 - 14	BEX 140
9	Mirabel	Les Pierres Saint-Canut Ltée	Sandstone - BS	Saint-Canut Sandstone	31 G/09 - 15	No
10	Notre-Dame-de-la-Merci	A. Lacroix et Fils Granit Ltée	Anorthosite - DS	Orion	31 I/05 - 14	BEX 255
11	Joliette	Firstake Capital Corporation	Limestone - BS	Joliette Gris, Joliette Jaune	31 I/03 - 14	No
12	Saint-Didace	A. Lacroix et Fils Granit Ltée	Quartz mangerite - DS	Nordix Red	31 I/06 - 14	No
13	Saint-Alexis-des-Monts	Firstake Capital Corporation	Quartz mangerite - DS	Diamond Brown, Auburn	31 I/06 - 04	BEX 174
13	Saint-Alexis-des-Monts	Granicor Inc.	Quartz mangerite - DS, CS	Autumn Brown	31 I/06 - 04	No
13	Saint-Alexis-des-Monts	Les Carrières Diamond	Quartz mangerite - DS	Diamond Brown, Auburn	31 I/06 - 04	No (2 quarries)
13	Saint-Alexis-des-Monts	Polycor Inc.	Quartz mangerite - DS	Newton Brown	31 I/06 - 04	No
14	Shawinigan	Les Entreprises Élie Grenier Inc.	Gneiss - BS	-	31 I/10 - 04	No
15	Saint-Marc-des-Carrières	Graymont (Portneuf) Inc.	Limestone - DS	Saint-Marc Limestone	31 I/09 - 03	No
15	Saint-Marc-des-Carrières	Les Pierres de Rocaille du Québec	Limestone - BS	-	31 I/09 - 03	No
16	Rivière-à-Pierre	Granicor Inc.	Farsundite - DS, CS	New New	31 I/16 - 03	No
16	Rivière-à-Pierre	Polycor Inc.	Quartz mangerite - DS	Boreal Green	31 I/16 - 03	BEX 333
16	Rivière-à-Pierre	Polycor Inc.	Farsundite - DS	Riviera	31 I/16 - 03	BEX 114
16	Rivière-à-Pierre	Polycor Inc.	Farsundite - DS	Blue Grey	31 I/16 - 03	No

TABLE II – Architectural stone quarries exploited in Québec during 2004 (see figure II).

SITE	LOCATION	COMPANIES	ROCK TYPE – PRODUCTS (1)	COMMERCIAL NAME	NTS – ADMINISTRATIVE REGION	TITLE
17	Rivière-à-Pierre	A. Lacroix et Fils Granit Ltée	Gneiss - DS	Silver Mist	31 P/01 - 03	BEX 378
18	Rivière-à-Pierre	A. Lacroix et Fils Granit Ltée	Quartz mangerite - DS	Atlantic Blue	31 P/01 - 03	BEX 178, 372
18	Rivière-à-Pierre	Polycor Inc.	Quartz mangerite - DS	Galaxy Blue	31 P/01 - 03	BEX 401
19	Rivière-à-Pierre	A. Lacroix et Fils Granit Ltée	Farsundite - DS	Deer Brown, Atlantic Green, Deer Brown D.D.	31 P/01 - 03	BM 723, 746
19	Rivière-à-Pierre	A. Lacroix et Fils Granit Ltée	Farsundite, quartz mangerite - DS	Forest Green, Atlantic Green, Atlantic Blue	31 P/01 - 03	CM 488
19	Rivière-à-Pierre	A. Lacroix et Fils Granit Ltée	Quartz mangerite - DS	Forest Green	31 P/01 - 03	BEX 349
19	Rivière-à-Pierre	Granicor Inc.	Quartz mangerite, farsundite - DS, CS	Nara	31 P/01 - 03	BEX 231
19	Rivière-à-Pierre	Granicor Inc.	Farsundite - DS, CS	Abbey Rose	31 P/01 - 03	No
19	Rivière-à-Pierre	Granicor Inc.	Quartz mangerite, quartz jotunite - DS, MO, CS	Prairie Green	31 P/01 - 03	BEX 164, 165
19	Rivière-à-Pierre	Granite D R C Inc. / Gesrock	Farsundite - DS, BS, CS	Canadian Caledonia, Boca Dark	31 P/01 - 03	No
19	Rivière-à-Pierre	Polycor Inc.	Farsundite - DS, CS	Caledonia Dark	31 P/01 - 03	BEX 033
19	Rivière-à-Pierre	Polycor Inc.	Farsundite - DS, CS	Caledonia Light, Caledonia Dark	31 P/01 - 03	No
20	Saint-Raymond	A. Lacroix et Fils Granit Ltée	Gneiss - DS	Rainbow	21 L/13 - 03	No
21	Charlesbourg	Construction B. M. L.	Limestone - BS	-	21 L/14 - 03	No
21	Québec	Pierre S.D.	Limestone - BS	-	21 L/14 - 03	No
21	Sainte-Foy	Agrégats Ste-Foy Inc.	Gneiss - BS	-	21 L/14 - 03	No
22	Château-Richer	Carrière Laplante Enr.	Limestone - BS	-	21 L/14 - 03	No
23	Saint-Joachim	Ladufo Inc.	Limestone - BS	-	21 M/02 - 03	No
24	Chute-des-Passes	A. Lacroix et Fils Granit Ltée	Gneiss - DS	New Rainbow	22 E/14 - 02	BEX 377
25	Chute-des-Passes	Polycor Inc.	Gabbroic anorthosite - DS	Kodiac	22 E/06 - 02	BEX 402
26	Chute-des-Passes	Polycor Inc.	Farsundite - DS	Astra	22 E/04 - 02	BEX 001
27	Mistassini	A. Lacroix et Fils Granit Ltée	Monzogabbro - DS	Quincy	32 H/01 - 02	BEX 351, 352

TABLE II – Architectural stone quarries exploited in Québec during 2004 (see figure II).

SITE	LOCATION	COMPANIES	ROCK TYPE – PRODUCTS (1)	COMMERCIAL NAME	NTS – ADMINISTRATIVE REGION	TITLE
28	Saint-Thomas-Didyme	Granicor Inc.	Quartz mangerite - DS, CS	Acajou	32 A/15 - 02	No
29	Chute-du-Diable	Granicor Inc.	Anorthosite - DS, MO, CS	Peribonka	22 D/13 - 02	No
29	Chute-du-Diable	Granicor Inc.	Anorthosite - DS, MO, CS	Peribonka	22 D/13 - 02	No
30	Saint-Henri-de-Taillon	Granit Aurélien Tremblay Inc.	Anorthosite - DS, MO, CS	Northern Black	22 D/12 - 02	No
31	Saint-Nazaire	A. Lacroix et Fils Granit Ltée	Leucogabbronorite - DS	Atlantic Black, Nordix Green	22 D/12 - 02	BEX 148
31	Saint-Nazaire	A. Lacroix et Fils Granit Ltée	Leucogabbronorite - DS	Nordix Green, Atlantic Black, Forest Black	22 D/12 - 02	No (2 quarries)
31	Saint-Nazaire	Granicor Inc.	Leucogabbronorite - DS, MO, CS	Cambrian	22 D/12 - 02	BEX 332
31	Saint-Nazaire	Polycor Inc.	Leucogabbronorite - DS, MO	Cambrian Black	22 D/12 - 02	BM 705 (2 quarries)
32	Saint-Honoré	Les Pierres Naturelles Tremblay	Limestone - BS	-	22 D/11 - 02	No
33	Bégin	A. Lacroix et Fils Granit Ltée	Quartz mangerite - DS	Atlantic Pink	22 D/11 - 02	No
33	Bégin	Granicor Inc.	Quartz mangerite - DS, CS	Granville	22 D/11 - 02	No
33	Bégin	Granit Aurélien Tremblay Inc.	Quartz mangerite - DS	Wild Pink	22 D/11 - 02	No
34	Tremblay	Carrière 500	Limestone - BS	-	22 D/06 - 02	No
35	Saint-François-de-Sales	Granit Aurélien Tremblay Inc.	Quartz mangerite - DS	Spring Green	32 A/08 - 02	BEX 203
36	Chambord	Granit Aurélien Tremblay Inc.	Limestone - DS	Chambord Limestone	32 A/08 - 02	No
37	Saint-André-du-Lac-Saint-Jean	Jean-Guy Simard et Fils	Quartz mangerite - DS	Saint-André Green	22 D/05 - 02	BEX 080
38	Métabetchouan	Polycor Inc.	Farsundite - DS	Canadian Violetta	22 D/05 - 02	No
39	La Tuque	Granitslab International Inc.	Gabbro - DS	Heritage Black	31 P/16 - 04	BEX 405, BNEP 880
40	Réserve faunique des Laurentides	Granicor Inc.	Quartz mangerite - DS, CS	Laurentian Green	22 D/04 - 02	BEX 421
40	Réserve faunique des Laurentides	Polycor Inc.	Quartz jotunite - DS, MO	Laurentian Green	22 D/04 - 02	BEX 210, 228
41	Réserve faunique des Laurentides	Granit Aurélien Tremblay Inc.	Farsundite - DS	Autumn Harmony	22 D/03 - 02	BEX 225
42	Laterrière	Firstake Capital Corporation	Stromatolite dolostone block-BS	Pikauba	22 D/03 - 02	BEX 343

TABLE II – Architectural stone quarries exploited in Québec during 2004 (see figure II).

SITE	LOCATION	COMPANIES	ROCK TYPE – PRODUCTS (1)	COMMERCIAL NAME	NTS – ADMINISTRATIVE REGION	TITLE
43	La Baie	Granicor Inc.	Farsundite - DS, CS	Polychrome	22 D/07 - 02	No
43	La Baie	Polycor Inc.	Farsundite - DS	Polychrome	22 D/07 - 02	No
44	Grandes-Bergeronnes	Granicor Inc.	Gneiss - DS, CS	Tadoussac	22 C/04 - 09	No
45	Manic 3	Granijem Inc. / Granit C. Rouleau Inc.	Gneiss - DS	Manic Pink	22 F/15 - 09	BNEP 865
46	Rivière-Pentecôte	Polycor Inc.	Anorthosite - DS	Nordic Black	22 G/14 - 09	BEX 155
47	Gallix	Polycor Inc.	Gneiss - DS	Gallix	22 J/02 - 09	BEX 262
48	Magpie	Polycor Inc.	Hypersthene syenite - DS	Picasso	22 I/07 - 09	BEX 419,
49	Magpie	Granijem Inc.	Hypersthene syenite - DS	Verde Anticosti	22 I/08 - 09	BEX 436
50	Havelock	Carrières Ducharme Inc.	Sandstone - BS	Ducharme	31 H/04 - 16	No (2 quarries)
51	Saint-Armand	NAMCA Inc.	Marbled limestone - DS	Fiore de Aqua, Sea Green	31 H/03 - 16	No
52	Stanstead	Centre du Granite Beebe Inc.	Granodiorite - DS, BS	Beverly Grey	31 H/01 - 05	No
52	Stanstead	Granit Marlington Granite Inc.	Granodiorite - DS, BS	Stanstead Grey	31 H/01 - 05	No
52	Stanstead	Granit Expert Enr.	Granodiorite - DS	Diamond Grey	31 H/01 - 05	No
52	Stanstead	Polycor Inc.	Granodiorite - DS, MO	Stanstead Grey	31 H/01 - 05	No
52	Stanstead	Rock of Ages du Canada Ltd	Granodiorite - DS, MO	Stanstead Grey	31 H/01 - 05	No
53	Stanhope	Granicor Inc.	Granodiorite - DS, MO, CS	Snow White	21 E/04 - 05	No
54	Bromptonville	Ardobec Inc.	Slate - BS	-	21 E/05 - 05	No
54	Bromptonville	Ardoise 55 Inc.	Slate - DS, BS	-	21 E/05 - 05	No
55	Saint-Gérard	Granit Aurélien Tremblay Inc.	Granite - DS	Birch White, Frosty Green	21 E/11 - 05	CM 170, CM 308, CM 336, CM 400, CM 521
56	Saint-Sébastien	Polycor Inc.	Granite - DS	San Sebastian Grey	21 E/10 - 05	No
57	Saint-Ferdinand	Les Carrières St-Ferdinand Inc.	Sandstone, dolomite - BS	-	21 L/04 -17	No
58	East Broughton	Les Pierres Stéatites Inc.	Steatite, talc-carbonate rock, serpentinite - RS	-	21 L/03 -12	No
59	Saint-Marc-du-Lac-Long	Glendyne Inc.	Slate - BS, UT	La Canadienne, La Québécoise	21 N/07 - 01	No
60	Saint-Mathieu	J.-C. Ouellette	Sandstone - BS	-	22 C/03 - 01	No

TABLE II – Architectural stone quarries exploited in Québec during 2004 (see figure II).

SITE	LOCATION	COMPANIES	ROCK TYPE – PRODUCTS (1)	COMMERCIAL NAME	NTS – ADMINISTRATIVE REGION	TITLE
61	Mont-Lebel	Entreprises Antoine Jean Inc.	Siltstone - BS	-	22 C/08 - 01	No
61	Mont-Lebel	Les Pierres Naturelles du Québec	Siltstone - BS	-	22 C/08 - 01	No
62	Saint-Cléophas	Carrière Bernier	Siltstone - BS	-	22 B/05 - 01	No (2 quarries)
63	Sainte-Félicité	Polycor Inc.	Sandstone - DS	Matanais Sandstone	22 B/14 - 01	No
64	Petite-Tourelle	Polycor Inc.	Sandstone - DS	Citadelle Sandstone	22 G/01 - 11	No
65	Maria	NAMCA Inc.	Limestone breccia - DS	Cascapedia	22 A/04 - 11	No

1 = See abbreviation list in appendix II.

TABLE III - Peat, industrial minerals and stone quarries in production in Quebec during 2004 (see figure III).

SITE	QUARRY, PEAT DEPOSIT	COMPANIES	DESCRIPTION OF DEPOSIT	PRODUCTS	TOWNSHIPS / NTS / ADM. AREA
Asbestos (chrysotile)					
1	Bell	LAB Chrysotile Inc.	Vein system (stockwork) in serpentinized ultramafic rocks	Chrysotile asbestos fibre	Thetford / 21 L/03 / 12
2	Black Lake	LAB Chrysotile Inc.	Vein system (stockwork) in serpentinized ultramafic rocks	Chrysotile asbestos fibre	Ireland / 21 L/03 / 12
3	Jeffrey	JM Asbestos Inc.	Vein system (stockwork) in serpentinized ultramafic rocks	Chrysotile asbestos fibre	Shipton / 21 E/13 / 12
Limestone, dolomite and marble					
4	Bedford	Graymont (Qc) Inc. (Bedford division)	Corey Formation limestone	Lime, crushed limestone products for industrial use, crushed stone	Stanbridge / 31 H/03 / 16
5	Domlim #5 et #6	Graymont (Qc) Inc. (Marbleton division)	Lac Aylmer Formation limestone	Lime, crushed limestone products for industrial use, crushed stone	Dudswell / 21 E/12 / 12
6	Jolichaux	Graymont (Qc) Inc. (Joliette division)	Deschambault Formation limestone	Lime, crushed limestone products for industrial use, crushed stone	Lavaltrie / 31 I/03 / 14
7	Calco	Graymont (Portneuf) Inc.	Deschambault Formation limestone products	Crushed stone, crushed limestone for industrial use	Seigniory of Grondines / 31 I/09 / 03
8	Saint-Armand West	Omya St-Armand Ltd	Strites Pond Formation limestone	Pulverized limestone for mineral filler	Seigniory of Saint-Armand / 31 H/03 / 16
9	Saint-Armand	Carrière St.-Armand Ltd	Strites Pond Formation limestone	Pulverized limestone for mineral filler, white terrazzo granules	Seigniory of Saint-Armand / 31 H/03 / 16
10	La Rédemption	Coopératives des producteurs de Chaux du Bas-Saint Laurent	Formation Sayabec dolomitic limestone	Magnesium soil improvement	Awantjish / 22 B/05 / 01
11	Pères Trapistes	Les Calcites du Nord Inc.	Calcitic marble	White granules for artificial stone, sand for masonry, soil improvement	Pelletier / 32 A/16 / 02
12	Ciment Indépendant	Ciment St-Laurent (indépendant) Inc.	Trenton Group limestone and Black River Group limestone	Cement production	Lanoraye / 31 I/03 / 14
13	Saint-Basile-sud	Ciment Québec Inc.	Trenton Group limestone and Black River Group limestone	Cement production	Auteuil / 21 L/12 / 03
14	Ciment Lafarge	Lafarge Canada Inc.	Trenton Group limestone and Black River Group limestone	Cement production	Sault-Saint-Louis / 31 H/05 / 16
15	Portage-du-Fort (Closed in october 2004)	Les Minéraux Séquoia Inc. (Dolomex Division)	Dolomitic marble	White aggregates, granules products (agriculture, horticulture), powders	Litchfield / 31 F/10 / 07

TABLE III - Peat, industrial minerals and stone quarries in production in Quebec during 2004 (see figure III).

SITE	QUARRY, PEAT DEPOSIT	COMPANIES	DESCRIPTION OF DEPOSIT	PRODUCTS	TOWNSHIPS / NTS / ADM. AREA
16	Soca	Agrégats Waterloo Inc.	Stukely-south Fault dolomitic marble	High grade magnesium soil improvement, terrazzo granules, decorative crushed stone	Stukely / 31 H/08 / 05
17	Saint-Ferdinand	Les Carrières Saint-Ferdinand Inc.	Oak Hill Group dolomite	High grade magnesium soil improvement	Halifax / 21 L/04 / 17
18	Trottier Mills	Les Carrières Saint-Ferdinand Inc.	Oak Hill Group dolomite	High grade magnesium soil improvement	Chester / 21L04 / 17
Graphite					
19	Lac-des-Îles	Timcal Canada Inc.	Disseminated graphite flakes in crystalline limestone (± quartzite)	Graphite concentrate for refractory materials, foundry moulds, lubricants, brake linings	Bouthillier / 31 J/05 / 15
Phlogopite					
20	Letondal	Les Produits Mica Suzorite Inc.	Lenticular alkaline intrusion with 80-85 % phlogopite (suzorite variety)	Crushed mica mineral filler (plastic, joint cement, drilling mud)	Suzor / 31 O/16 / 04
Mineral clay					
21	Briqueterie Saint-Laurent	Les Briques Hanson Ltée	Formation Nicolet Shale	Door face brick	La Prairie / 31 H06 / 06
Salt					
22	Seleine	La Société canadienne de sel (Mine Seleine division)	Carboniferous salt dome	De-icing salt	Îles-de-la-Madeleine / 11 N/12 /11
23	Puits Bécancour 1,2, and 3	Junex Inc. (Junex Solnat division)	Brines	De-icing products and dust reducers	Becancour / 31 I/08 / 17
24	Puit Saint-Angèle-de-Laval	Junex Inc. (Junex Solnat division)	Brines	De-icing products and dust reducers	Bruyere / 31 I/08 / 17
Silica					
25	Saint-Rémi d'Amherst	Société minière Gerdin Inc.	Quartzite	Silica sand for cement works	Amhurst / 31 G/15 / 15
26	Ormstown	La Compagnie Bon Sable Ltée (Ormstown division)	Natural sand	Washed sand for sandblasting, foundry, mixtures for ceramic glue	Beauharnois-2 / 31 H/04 / 16
27	Saint-Canut	Unimin Canada Ltd (Saint-Canut division)	Postdam Group sandstone	Silica sand for glasswork, sandblasting, filter, ceramic	Lac-des-Deux-Montagnes- 3 / 31 G/09 / 15
28	Sainte-Clotilde	Les Sables Silco Inc.	Postdam Group sandstone	Siliceous crushed stone for cement works and ferro-silicon	Beauharnois-1 / 31 H/04 / 16

TABLE III - Peat, industrial minerals and stone quarries in production in Quebec during 2004 (see figure III).

SITE	QUARRY, PEAT DEPOSIT	COMPANIES	DESCRIPTION OF DEPOSIT	PRODUCTS	TOWNSHIPS / NTS / ADM. AREA
29	Saint-Donat	Unimin Canada Ltd (Saint-Donat division)	Quartzite	Silica sand	Lussier / 31 J/08 / 14
30	Saint-Joseph-du-Lac	La Compagnie Bon Sable Ltée (Ormstown division)	Natural sand	Washed sand for masonry and sandblasting	Lac-des-Deux-Montagnes-1 / 31 H/12 / 15
31	Petit lac Malbaie	Sitec Inc.	Quartzite	Silica pieces for silicon metal and silica sand for silicon carbide	Charlevoix / 21 M/15 / 03
32	Saint-Bruno-de-Guigues	Temisca Inc.	Ordovician sandstone	Sand for filtration, foundry, hydraulic fracturing	Guigues / 31 M/05 / 08
33	Chromasco	Richard Capuano Inc.	Postdam Group sandstone	Siliceous crushed stone for construction, cement works and ferro-silicon	Beauharnois / 31 H/05 / 16
34	Lac Beauchêne	Les Pierres du Nord Inc.	Kipawa Formation muscovite quartzite	Quartz granules for artificial stone	Campeau / 31 L/10 / 08
35	Lac Daviault	Exploration Quebec / Labrador Inc.	Wishart Formation quartzite, Gagnon Group	Quartz granules for artificial stone	Lislois / 23 B/14 / 09
Ilmenite					
36	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
Peat					
37	Saint-Bonaventure	Fafard et Frères (Saint-Bonaventure branch)	Peat	Sphagnum peat moss, growing media, composts, biofilters	Upton / 31 H/15 / 04
38	Saint-Henri-de-Lévis	Premier Horticulture (Saint-Henri branch)	Peat	Sphagnum peat moss	Seigniory of Lauzon / 21 L/11 / 12
39	Saint-Charles	Les tourbes M.L. (Saint-Charles branch)	Peat	Sphagnum peat moss, growing media	Seigniory of Lauzon and La Martinière fief (Beauchamp) / 21 L/10 / 12
40	Île-aux-Coudres	Tourbières Pearl	Peat	Sphagnum peat moss	Seigniory of Île-aux-Coudres / 21 M/08 / 03
41	Sainte-Marguerite	Fafard et Frères (Sainte-Marguerite branch)	Peat	Sphagnum peat moss	Racine / 32 A/16 / 02
42	L'Ascension Ouest	Tourbières Lambert (L'Ascension branch)	Peat	Sphagnum peat moss	Garnier / 22 D/13 / 02
43	Saint-Ludger-de-Milot SW	Fafard et Frères (Milot branch)	Peat	Sphagnum peat moss	Milot / 22 D/13 / 02

TABLE III - Peat, industrial minerals and stone quarries in production in Quebec during 2004 (see figure III).

SITE	QUARRY, PEAT DEPOSIT	COMPANIES	DESCRIPTION OF DEPOSIT	PRODUCTS	TOWNSHIPS / NTS / ADM. AREA
44	La Baie	Gagnon Savard Saguenay Inc.	Peat	Sphagnum peat blocks and sphagnum peat moss	Bagot / 22 D/07 / 02
45	Rivière Ouelle	Tourbières Lambert (Rivière-Ouelle branch)	Peat	Sphagnum peat moss, growing media, bulk sphagnum moss fibers	Seigniory of Rivière-Ouelle / 21 N/05 / 01
46	Saint-Alexandre	Tourbière Berger Inc. (Saint-Alexandre branch)	Peat	Sphagnum peat moss	Seigniories of Islets-du-Portage and Lachenaie / 21 N/12 / 01
47	Notre-Dame-du-Portage	Premier Horticulture (Tardif branch)	Peat	Sphagnum peat moss	Seigniory of Terrebois / 21 N/12 / 01
48	Rivière-du-Loup	Premier Horticulture (Premier branch)	Peat	Sphagnum peat moss, growing media, composts, mycorrhizes, biofilters	Seigniories of Rivière-du-Loup and Cacouna / 21 N/13-14 / 01
48	Rivière-du-Loup	Premier Horticulture (Verbois branch)	Peat	Sphagnum peat moss	Seigniories of Rivière-du-Loup and Cacouna / 21 N/13-14 / 01
48	Rivière-du-Loup	Premier Horticulture (Saint-Laurent branch)	Peat	Sphagnum peat moss	Seigniories of Rivière-du-Loup and Cacouna / 21 N/13-14 / 01
48	Rivière-du-Loup	Tourbière Michaud Ltée	Peat	Sphagnum peat moss	Seigniories of Rivière-du-Loup and Cacouna / 21 N/13-14 / 01
48	Rivière-du-Loup	Les tourbes M.L. (Rivière-du-Loup branch)	Peat	Sphagnum peat moss	Seigniories of Rivière-du-Loup and Cacouna / 21 N/13-14 / 01
48	Rivière-du-Loup	Tourbière Berger Inc.	Peat	Sphagnum peat moss, growing media, peat pellets	Seigniories of Rivière-du-Loup and Cacouna / 21 N/13-14 / 01
48	Rivière-du-Loup	Tourbière Henri Théberge et associés	Peat	Sphagnum peat moss	Seigniories of Rivière-du-Loup and Cacouna / 21 N/13-14 / 01
48	Rivière-du-Loup	Tourbière Omer Bélanger	Peat	Sphagnum peat moss	Seigniories of Rivière-du-Loup and Cacouna / 21 N/13-14 / 01
49	Isle-Verte, Est	Tourbière Réal Michaud et fils	Peat	Sphagnum peat moss	Seigniory of Isle-Verte / 22 C/03/ 01
50	Saint-Eugène-de-Ladrière	La tourbière Yvon Bélanger	Peat	Sphagnum peat moss	Seigniory of Nicolas-Rioux 03 / 22 C/07 / 01
50	Saint-Fabien-sur-Mer	La tourière Rio-Val	Peat	Sphagnum peat moss	Seigniory of Nicolas-Rioux 03 / 22 C/07 / 01
50	Saint-Fabien	Tourbière du Port-Pic	Peat	Sphagnum peat moss	Seigniory of Nicolas-Rioux 03 / 22 C/07 / 01
50	Saint-Fabien	Tourbière Berger Inc. (Saint-Fabien branch)	Peat	Sphagnum peat moss	Seigniory of Nicolas-Rioux 03 / 22 C/07 / 01

TABLE III - Peat, industrial minerals and stone quarries in production in Quebec during 2004 (see figure III).

SITE	QUARRY, PEAT DEPOSIT	COMPANIES	DESCRIPTION OF DEPOSIT	PRODUCTS	TOWNSHIPS / NTS / ADM. AREA
51	Rivière-Blanche	Permier Horticulture (Saint-Ulric branch)	Peat	Sphagnum peat moss	Matane / 22 B/13 / 01
51	Saint-Ulric	Les tourbes M.L. (Saint-Urlric branch)	Peat	Sphagnum peat moss	Matane / 22 B/13 / 01
52	Les Escoumins	Tourbières Lambert (Anse-aux-Basques branch)	Peat	Sphagnum peat moss	Bergeronnes / 22 C/06 / 09
53	La Petite Romaine	Tourbières Lambert (Saint-Paul-du-Nord branch)	Peat	Sphagnum peat moss	Ibervile / 22 C/06 / 09
54	Sainte-Thérèse Colombier	Tourbière Omer Bélanger (Ste-Thérèse branch)	Peat	Sphagnum peat moss	Betsiamites / 22 C/15
55	Pointe-Lebel	Pemier Horticulture (Sogevex branch)	Peat	Sphagnum peat moss	Manicouagan / 22 F/01 / 09
56	Port-Cartier Ouest	Les tourbes M.L. (Port-Cartier branch)	Peat	Sphagnum peat moss, sphagnum peat blocks	Babel / 22 J/02 / 09
56	Port-Cartier Ouest	Exportations Daniel Sage Inc.	Peat	Sphagnum peat moss	Babel / 22 J/02 / 09
57	Ville de Sept-Îles	Les tourbes M.L. (Sept-Îles peat branch)	Peat	Sphagnum peat moss	Letelier / 22 I/05 / 09
58	Rivière Moisie	Premier Horticulture (Sept-Îles branch)	Peat	Sphagnum peat moss	Moisie / 22 I/05 / 09
59	Saint-Jacques	Shigawake Organics Ltd	Peat	Sphagnum peat moss	Hope / 22 A/03 / 11

Appendix II

Legend of abbreviations

APPENDIX II

Legend of abbreviations used in the tables. They are related to the types of exploration works, the products and uses of architectural stones.

Prospecting and geological study

B (mt:g/t) or (mt: % Xx)	Bulk sampling including tonnage and grade (metric tons:grams per ton) or (metric tons: % Xx)
Bs	Block sampling for dimension stones
Ct	Characterization tests and analysis (peat)
D (#h:m)	Diamond drilling (number of holes:total meters)
G	Geological mapping
Min	Mineralogical studies
Pg	Unspecified prospecting and geological study
Pr	Prospection
Pt	Polishing test
Rcd (#h:m)	Reversed circulation drilling (number of holes:total meters)
Rsi	Remote sensing interpretation
S	Sampling
T	Trenching and stripping

Geochemical surveys

Gs	Unspecified geochemical surveys
Gs(e)	Esker geochemical survey
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

AEROTEM	Airborne AEROTEM survey
AGp	Unspecified airborne geophysical survey
DPEM	Drill hole pulse electromagnetic survey (borehole)
EM	Electromagnetic survey
Gg(A)	Gradiometric airborne survey
Gp	Unspecified geophysical survey
Grav	Gravimetric survey
Grav(A)	Airborne gravimetry survey
Grav(b)	Borehole gravimetric
IP	Induced polarization survey
IP(b)	Borehole induced polarization survey
Mag	Magnetic survey
Mag-EM(A)	Airborne magnetic and electromagnetic survey
MEGATEM	MEGATEM airborne survey
MIF	Field intensity magnetometric survey
Rd	Radiometric survey
Rd(A)	Airborne radiometric survey
TDEM	Temporal domain electromagnetic survey
Titan 24	Magnetotelluric survey combined with D.C. resistivity and Induced Polarization.
VLF	Very low frequency electromagnetic survey

Other types of studies

Env	Environmental studies
FM	Feasability and/or market studies
M	Mining site rehabilitation
Met	Metallurgical test
Re	Reserve evaluation
TE	Technical evaluation

Products and uses of architectural stones

BS	Building stone and landscaping
CS	Curbstone
DeS	Decorative stone
DS	Dimension stone
MO	Monument stone
RS	Refractory stone
RT	Roofing tiles

Italic	*Exploration work done on mine properties*
Bold	**Advanced exploration project**

Appendix III

References

APPENDIX III

References

ARCHER, P. – CHAPDELAINE, M. – HUOT, F., 2004 – Découverte de sulfures massifs volcanogènes de haut grade de métamorphique dans la Ceinture de Coulon, Baie-James. Dans : Québec Exploration 2004, Résumés des conférences et des photoprésentations. Ministère des Ressources naturelles, de la Faune et des Parcs, Québec et Association de l'exploration minière du Québec; page 13.

AVRAMTCHEV, L. – LÉBEL-DROLET, S., 1981 – Catalogue des gîtes minéraux du Québec : Région de l'Abitibi. Ministère de l'Énergie et des Ressources, Québec; DPV-744, 98 pages.

BANDYAYERA, D. – DAIGNEAULT, R. – SHARMA, K. N. M., 2003 – Géologie de la région du lac de la Ligne (32F/01). Ministère des Ressources naturelles, Québec; RG 2002-12, 33 pages.

BANDYAYERA, D. – RHÉAUME, P. – DOYON, J. – SHARMA, K.N.M., 2004 – Géologie de la région du lac Hébert (32G/03). Ministère des Ressources naturelles, Québec; RG 2003-07, 57 pages.

BANDYAYERA, D. – THÉBERGE, L. – FALLARA, F., 2002 – Géologie de la région des lacs Piquet et Mesplet (32G/04 et 32B/13). Ministère des Ressources naturelles, Québec; RG 2001-14, 48 pages.

BOILY, M. – Gosselin, C., 2004 – Les principaux types de minéralisations en métaux rares (Y-Zr-Nb-Ta-Be-Li-ETR) du Québec. Ministère des Ressources naturelles, de la Faune et des Parcs, Québec; ET 2004-01, 44 pages.

BOILY, M., – LECLAIR, A. – MAURICE, C. – BERCLAZ, A. – DAVID, J., 2004 – Étude géochimique et isotopique du Nd sur les assemblages volcaniques et plutoniques du Grand Nord (Phase III). Dans : Québec Exploration 2004, Résumé des conférences et des photoprésentations. Ministère des Ressources naturelles, de la Faune et des Parcs, Québec et Association de l'exploration minière du Québec; page 48.

BELLEHUMEUR, C. – VALIQUETTE, G., 1993 – Synthèse métallogénique du centre nord de la Gaspésie. Ministère de l'Énergie et des Ressources, Québec; ET 92-03, 73 pages.

CLARK, T., 1994 – Géologie et gîtes de l'Orogène du Nouveau-Québec et de son arrière-pays. Dans : Géologie du Québec. Ministère des Ressources naturelles du Québec; MM 94-01, pages 47-65.

CLARK, T., 1995 – Étude préliminaire de minéralisations à l'est de Baie-Johan-Beetz, Moyenne-Côte-Nord. Ministère des Ressources naturelles, Québec. MB 95-54, 36 pages.

CLARK, T. – HÉBERT, C., 1998a – Guide d'exploration pour l'apatite, le nickel et le cuivre dans la région de lac à Paul (Saguenay – Lac-Saint-Jean). Ministère des Ressources naturelles, Québec; PRO 98-05, 9 pages.

CLARK, T. – HÉBERT, C., 1998b – Étude du gîte de Cu-Ni-Co de McNickel, suite anorthositique du Lac-Saint-Jean. Ministère des Ressources naturelles, Québec; ET 98-02, 8 pages.

CLARK, T. – WARES, R., 2004 – Synthèse lithotectonique et métallogénique de l'Orogène du Nouveau-Québec (Fosse du Labrador). Ministère des Ressources naturelles, de la Faune et des Parcs, Québec; MM 2004-01, 180 pages accompagnées d'une carte à l'échelle de 1 : 750 000.

COUTURE, J.-F., 1991 – Carte géologique des gîtes métallifères des districts de Rouyn-Noranda et de Val-d'Or (partie sud des feuillets SNRC 32C et 32D ouest). Ministère de l'Énergie et des Ressources, Québec; DV 90-11.

DOYON, M., 1995 – Exploration des gîtes minéraux associés aux intrusions porphyriques de la Gaspésie : nouvelles avenues. Ministère des Ressources naturelles, Québec; PRO 95-09, 6 pages.

DOYON, M., 1996 – Exploration for porphyry-related mineral deposits in the Gaspé Peninsula: new perspectives. Ministère des Ressources naturelles, Québec; PRO 96-01, 6 pages.

GOBEIL, A. – SIMARD, M. – CLARK, T. – LECLAIR, A. – HÉBERT, C., 2004 – Géologie de la région du lac Varin (22 F/10), Côte-Nord. Dans : Québec Exploration 2004, Résumé des conférences et des photoprésentations. Ministère des Ressources naturelles, de la Faune et des Parcs, Québec et Association de l'exploration minière du Québec; DV 2004-06, page 46.

GOSSELIN, C. – SIMARD, M., 2000 – Géologie de la région du lac Gayot (SNRC 23M). Ministère des Ressources naturelles, Québec; RG 99-06, 29 pages.

HÉBERT, C., 1997 – Roches mafiques-ultramafiques : nouvelles cibles dans la région du Saguenay – Lac-Saint-Jean. Ministère des Ressources naturelles, Québec; PRO 97-05, 4 pages.

HOCQ, M., 1994 – La province du Supérieur. Dans : Géologie du Québec. Ministère des Ressources naturelles, Québec; MM 94-01, pages 7-20.

APPENDIX III

HOCQ, M., 1994 – La Province de Grenville. Dans : Géologie du Québec. Ministère des Ressources naturelles, Québec; MM 94-01, pages 75-94.

HOCQ, M. – VERPAELST, P., 1994 – Géologie du Québec – Les sous-provinces de l'Abitibi et du Pontiac. Ministère des Ressources naturelles, Québec; MM 94-01, pages 21-37.

JAMES, D. T. – CONNELLY, J. N. – WASTENEYS, H. A. – KILFOIL, G. J., 1996 – Paleoproterozoic lithotectonic division of the southeastern Churchill Province, Western Labrador. Canadian Journal of Earth Sciences; volume 33, pages 216-230.

LABBÉ, J.-Y., 2000 – Linéaments cristaux et potentiel de découverte de kimberlites dans l'ouest du Nouveau-Québec. Ministère des Ressources naturelles, Québec; PRO 2001-01, 8 pages.

LABBÉ, J.-Y. – LACOSTE, P., 2004 – Carte gîtologique du nord-est de la Province du Supérieur, projet Grand Nord. Dans : Québec Exploration 2004, Résumé des conférences et des photoprésentations. Ministère des Ressources naturelles, de la Faune et des Parcs, Québec et Association de l'exploration minière du Québec; DV 2004-06, page 49.

LABBÉ, J.-Y. – Lamothe, D., 2001 – Évaluation du potentiel de découverte de kimberlites dans le Grand Nord. Dans : L'exploration minérale au Québec, de brillantes perspectives, Programmes et résumés 2001; Résumés des conférences. Ministère des Ressources naturelles, Québec; DV 2001-08, page 24.

LACHANCE, S. – PILOTE, P., 2003 – Géologie de la région du lac Sainte-Anne (SNRC 22B/16-200-0102). Ministère des Ressources naturelles, de la Faune et des Parcs, Québec; DV 2003-08, échelle 1 : 20 000.

LAFRANCE, B. – DION, C. – RHÉAUME, P. – LEGAULT, M., 2004a – Levés géologiques et métallogénie au sein du Groupe de Blake River et des unités adjacentes. Résumé d'une photoprésentation, Ministère des Ressources naturelles, de la Faune et des Parcs, Québec. Résumés des conférences et des photoprésentations, Congrès Québec Exploration 2004; DV 2004-06, page 44.

LAFRANCE, B. – DION, C. – RHÉAUME, P. – LEGAULT, M., 2004b – Les nouvelles connaissances du Groupe de Blake River. Résumé d'un atelier, Ministère des Ressources naturelles, de la Faune et des Parcs, Québec. Résumés des conférences et des photoprésentations, Congrès Québec Exploration 2004; DV 2004-06, page 50.

LAMOTHE, D., 1994 – Géologie de la Fosse de l'Ungava, Nouveau-Québec. Dans : Géologie du Québec. Ministère des Ressources naturelles, Québec; MM 94-01, pages 67-74.

LAMOTHE, D., 1996 – Carte géologique de la Fosse de l'Ungava. Ministère des Ressources naturelles, Québec; PRO 96-04, pages 67-74.

LECLAIR, A. – BERCLAZ, A. – DAVID, J. – ÉQUIPE GRAND NORD, 2004 – Synthèse géologique du nord-est de la Province du Supérieur (NEPS). Dans : Québec Exploration 2004, Résumé des conférences et des photoprésentations. Ministère des Ressources naturelles, de la Faune et des Parcs, Québec et Association de l'exploration minière du Québec; DV 2004-06, page 49.

MOORHEAD, J., 1996 – Géologie de la région du lac Hubert (Fosse de l'Ungava). Ministère des Ressources naturelles, Québec; ET 91-06, 111 pages.

MOORHEAD, J. – PERREAULT, S. – BERCLAZ, A. – SHARMA, K. N. M. – BEAUMIER, M. CADIEUX, A. M., 2000 – Kimberlites et diamants dans le Nord du Québec. Ministère des Ressources naturelles, Québec; PRO 2000-05, 10 pages.

MOUKHSIL, A. – LEGAULT, M. - BOILY, M. - DOYON, J. - SAWYER, E. - DAVIS, D. W., 2003 – Synthèse géologique et métallogénique de la ceinture de roches vertes de la Moyenne et de la Basse Eastmain (Baie-James). Ministère des Ressources naturelles, de la Faune et des Parcs, Québec; ET 2002-06, 55 pages.

NADEAU, L. - PARSONS, S. - BROUILLETTE, P., 2004 – Géologie de la Minganie et du Groupe de Wakeham : la coupe Havre-Saint-Pierre – Natashquan. Dans : Québec Exploration 2004, Résumé des conférences et des photoprésentations. Ministère des Ressources naturelles, de la Faune et des Parcs du Québec et Association de l'exploration minière du Québec; DV 2004-06, page 40.

NANTEL, S., 2000 – Géologie de la région de Sainte-Anne-du-Lac (SRNC 31J/14). Ministère des Ressources naturelles, Québec; RG 2000-06, 43 pages.

NANTEL, S. – GIGUÈRE, E. – LACOSTE, P. – BERCLAZ, A., 2004 – Cartographie de la région du lac Pine et du lac Adonis : partie nord de la Ceinture centrale des métasédiments, Province de Grenville. Dans : Québec Exploration 2004, Résumés des conférences et des photoprésentations. Ministère des Ressources naturelles, de la Faune et des Parcs, Québec et Association de l'exploration minière du Québec; DV 2004-06, page 45.

NANTEL, S. – PINTSON, H., 2001 – Géologie de la région du lac de la Maison de Pierre. Ministère des Ressources naturelles, Québec; RG 2001-12, 36 pages.

PARADIS, S. – PARENT, M., 2004 – Carte des indicateurs glaciaires pour le secteur des lacs Maricourt (24D) et Gayot (23M) dans le centre-nord québécois. Dans : Québec

APPENDIX III

Exploration 2004, Résumé des conférences et des photoprésentations. Ministère des Ressources naturelles, de la Faune et des Parcs, Québec et Association de l'exploration minière du Québec; DV 2004-06, page 39.

PARENT, M. – BEAUMIER, M. – PARADIS, S., 2004 – Dispersion glaciaire polyphasée et exploration diamantifère dans l'est du corridor Saindon-Cambrien (nord du Québec). Dans : Québec Exploration 2004, Résumé des conférences et des photoprésentations. Ministère des Ressources naturelles, de la Faune et des Parcs du Québec et Association de l'exploration minière du Québec; DV 2004-06, page 39.

PILOTE, P., 2002 – Activité magmatique et minéralisations en Gaspésie : les systèmes « épithermaux neutres » de la région du dôme de Lemieux. Ministère des Ressources naturelles, Québec. L'exploration minérale au Québec; DV 2002-10, 60 pages.

RABEAU, O. – GOULET, N. – HOCQ, M.– FALLARA, F. – CHENG, L. Z. – BANDYAYERA, D. – ROY, P. – CADÉRON, S. – RHÉAUME, P. – GOUTIER, J. – BÉDARD, K., 2004 – Développement d'un modèle 3D géo-intégré le long du Front de Grenville. Dans : Québec Exploration 2004, Résumé des conférences et des photoprésentations. Ministère des Ressources naturelles, de la Faune et des Parcs du Québec et Association de l'exploration minière du Québec; DV 2004-06, page 43.

RIVERS, T. – MARTIGNOLE, J. – GOWER, C. F. – DAVIDSON, T., 1989 – New tectonic divisions of the Grenville Province, Southeast Canadian Shield. Tectonics; volume 8, pages 63-84.

SAPPIN, A.-A. – CONSTANTIN, M. – CLARK, T., 2004 – Nouvelles données géologiques préliminaires à propos des indices de Ni-Cu-EGP de la ceinture de Portneuf-Mauricie. Dans : Québec Exploration 2004, Résumé des conférences et des photoprésentations. Ministère des Ressources naturelles, de la Faune et des Parcs du Québec et Association de l'exploration minière du Québec; DV 2004-06, page 43.

STEVENS, K., 1983 – Métallogénie du dôme de Lemieux. Ministère de l'Énergie et des Ressources, Québec; DP 83-28 (Carte échelle 1 : 20 000) avec notes marginales.

ST-ONGE, M. R. – LUCAS, S. B., 1990 – Evolution of the Cape Smith Belt : Early Proterozoic continental underthrusting, ophiolite obduction and thick-skinned folding. In The Early Proterozoic Trans-Hudson Orogen of North America (J. F Lewry et M. R. Stauffer, éditeurs). Geological Association of Canada Special Paper 37, pages 313-351.

THÉRIAULT, R.- CHEVÉ, S., 2001 – Géologie de la région du lac Hurault (SNRC 23/L). Ministère des Ressources naturelles, Québec. RG 2000-11, 49 pages.

THÉRIAULT, R. – LAMOTHE, D. – CHOINIÈRE, J. 1998 – Nouvelles zones minéralisées dans la partie est des sous-provinces de La Grande et d'Opinaca (SNRC 23E). Ministère des Ressources naturelles, Québec; PRO 98-07, 8 pages.

TOGOLA, N. - NANTEL, S. – SHARMA, K. N. M., 2004 – Évaluation du potentiel en sillimanite et en muscovite de la région de Mont-Laurier. Dans : Québec Exploration 2004, Résumé des conférences et des photoprésentations. Ministère des Ressources naturelles, de la Faune et des Parcs du Québec et Association de l'exploration minière du Québec; DV 2004-06, page 41.

WARDLE, R. J. – JAMES, B. – SCOTT, D. J. – HALL, J., 2002 – The Southeastern Churchill Province : synthesis of a Paleoproterozoic transpressional orogen. Canadian Journal of Earth Sciences; Volume 39, No 5, pages 639-663.

WARDLE, R. J. – RYAN, B. – ERMANOVICS, I., 1990 – The Eastern Churchill Province, Torngat and New Quebec Orogens. In Geoscience Canada; Volume 17, pages 217-222.

WARES, R. P., 1988 – Géologie et métallogénie de la région du gîte Sullipek (Gaspésie). Ministère de l'Énergie et des Ressources, Québec; ET 86-08, 94 pages.

Ressources naturelles, Faune et Parcs
Québec