

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

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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)**, **Azimet Exploration Inc.**, in partnership with **Everton Resources Inc.**, as well as **Sirios Resources Inc.** and its partners **Canadian**

1B

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.** drilled 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.

1B

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 Tichégami property of **Ashton Mining of Canada Inc.** and **SOQUEMINC.** (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.

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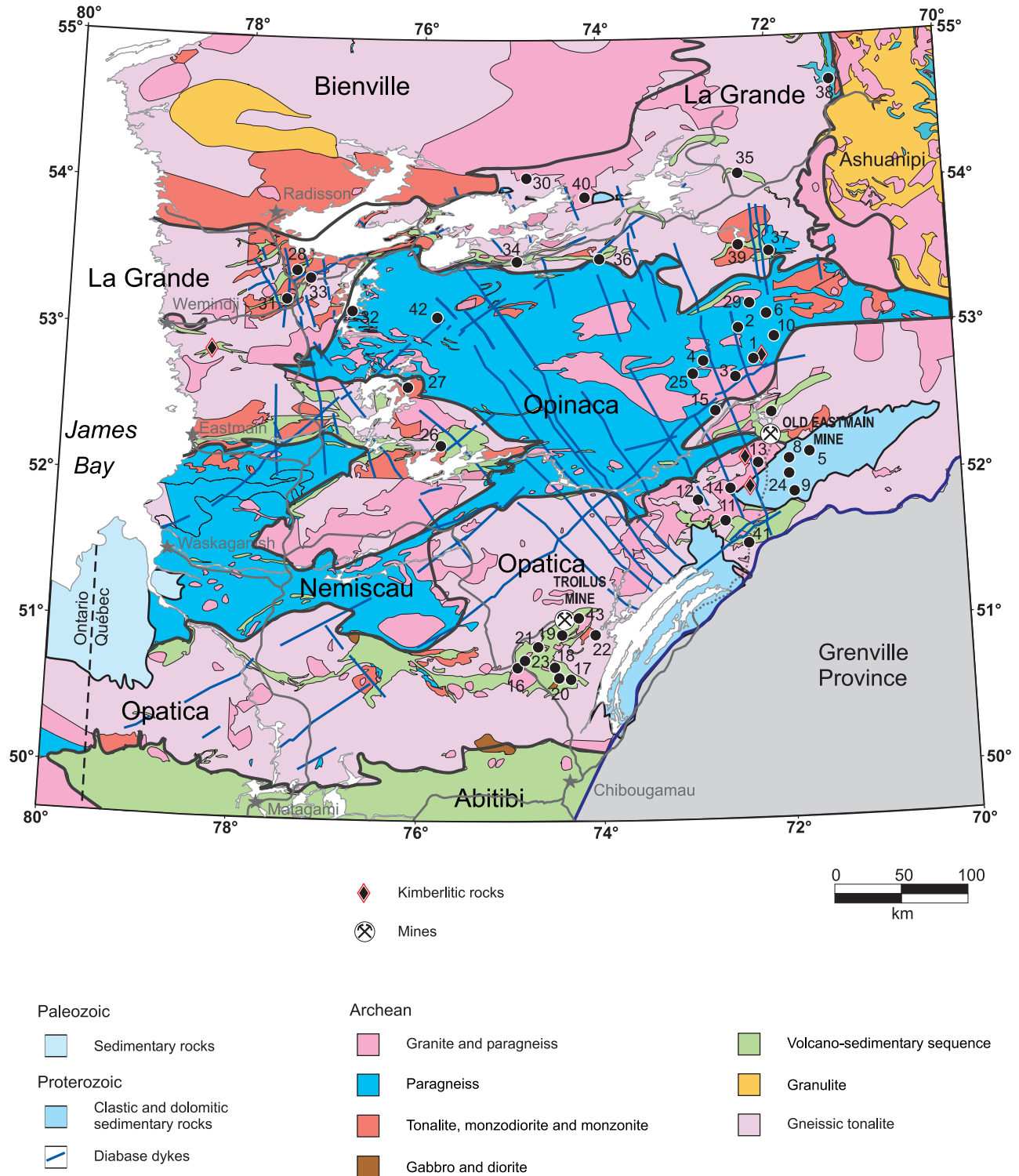


Figure 1B-1. Exploration projects in the James Bay area for 2004.

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	Cs(e), Cs(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	Cs(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, Cs(t)
26	33 B/04	Eastmain Resources Inc.	Clearwater	Au	D(14:9407), G, Cs(t), Cs(s), 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	Cs(t), Mag, Pr, Rsi(2:215)
29	23 E/04, 06, 10, 23 D/12, 33 H/01	Otish Mountain Diamond Company	Otish	Diamond	Agp, Cs
30	33 G/14, 15, 33 J/02, 03	Dios Exploration Inc.	Minti	Diamond	Cs(t), Pr
31	33 F/04	Typhoon Exploration Inc.	Wapiscan	Cu-Zn-Au-Ag-Diamond	Cs, Pr
32	33 F/02, 07	Matamec Explorations Inc.	Sakami	Au	D(13:2541), G, Cs(h), Cs(s), 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	Cs(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, Cs, 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), Cs(t)
42	33 C/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 abbreviations list in appendix II.