

# GM 65652

GEOLOGICAL REPORT, THE PENINSULA TITANIUM PROPERTY

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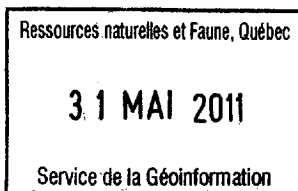
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**GEOLOGICAL REPORT**

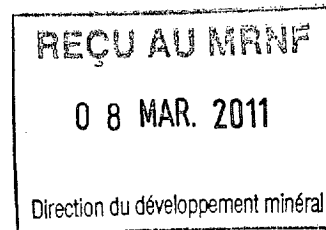
**The Peninsula Titanium Property  
Duplessis County, Puyjalon Township,  
Quebec  
NTS sheets 12L06 and 12L11**

**CANAMARA ERNERGY CORPORATION**

September 30, 2010



GM 6 5 6 5 2



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1091285

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## SUMMARY

The Peninsula titanium property is located in the St-Lawrence Lower North Shore of Quebec, 32 km NNE of the town of Havre-St-Pierre. It consists of twenty-six (26) continuous mineral claims (polygons) totaling 1412.86 hectares. The Peninsula showing is situated 6.2 km south of the Lac TiO deposit and can be reached by train along the TiO Lake mine-Havre-St-Pierre railroad or by helicopter or floatplane from Havre-St-Pierre. The Peninsula property is situated in the Havre-St-Pierre Anorthosite Suite (HSPAS) which exposes a number of deposits of ilmenite and magnetite of varying dimensions principally in the Allard and Puyjalon lakes area where the TiO Lake titanium mine is currently in operation. The Puyjalon Peninsula forms an anvil-like protrusion in Lake Puyjalon. The Peninsula showing consists of a succession of dm to meter-thick layers of leucoanorthosite and ilmenite leuconorite. These bands reveal meter-thick subconcordant layers of ilmenitite-norite and several horizons of massive ilmenitite 15 to 30 cm thick. Massive ilmenitites collected by Les Ressources d'Arianne contain between 78% to 98% oxides minerals mostly composed of hemoilmenite (76 to 92%). Chemical analyses of these rocks reveal average  $\text{TiO}_2$ ,  $\text{Fe}_2\text{O}_{3T}$  and  $\text{V}_2\text{O}_5$  contents of 33.38 wt. %, 57.09 wt.% and 0.35 wt. % respectively (n=8) very similar to those given for the TiO Lake ore. The author believes that the Peninsula property warrants more exploration work due to its proximity to the lake TiO mine and the scant attention devoted to this prospect over the years. In Phase I of an exploration program, the author recommends that the entire property be subjected to an airborne magnetic survey. The result of this survey will determine key areas of ilmenite mineralization. These areas will be subjected to a ground-based gravimetric/magnetic survey along cut lines. Grab and channel samples could also be systematically taken along the gridlines. Contingent to the results obtained during Phase I of the survey, Phase II would involve a drilling campaign along the southeastern bank of the Puyjalon Lake. A total of 21 DDH included in seven fences is proposed, bringing the total core length to 2,100 m.

## 1- PROPERTY DESCRIPTION AND LOCATION

The Peninsula titanium property is located in the St-Lawrence Lower North Shore of Quebec in the Duplessis County, Puyjalon Township, NTS map sheets 12L11 and 12L06. The property is situated 32 km NNE of the town of Havre-St-Pierre (pop. 3200) and 220 km east of the town of Sept-Iles (pop. 25,200). It consists of twenty-six (26) continuous mineral claims (polygons) bringing the total area to 1412.86 hectares or 14.12 km<sup>2</sup> (Figure 1). The claim block is centered at coordinates 63°23'17" W Long. and 50°31'17" N. Lat or UTM coordinates 472487 E and 5596671 N (NAD83; Zone 20N), with the details of the titles given below (Table 1). The Peninsula property was staked by Mr. Fayz Yacoub through the GESTIM website run by the Ministère des Richesses naturelles et de la Faune du Québec. The UTM coordinates and grid contours on the geological maps are extracted from the information given on the GESTIM website.

<b>TITLE #</b>	<b>SURFACE AREA (Ha)</b>	<b>Expiry date</b>
CDC2180693	54.77	2011/03/11
CDC2180694	54.77	2011/03/11
CDC2180695	54.76	2011/03/11
CDC2180696	54.76	2011/03/11
CDC2180697	54.76	2011/03/11
CDC2203670	54.75	2012/06/06
CDC2203671	54.75	2012/01/27
CDC2236749	54.77	2012/06/06
CDC2236750	54.76	2012/06/06
CDC2236751	54.75	2012/06/06
CDC2236752	54.74	2012/06/06
CDC2236753	54.77	2012/06/06
CDC2238440	54.74	2012/06/16
CDC2238441	54.74	2012/06/16
CDC2238442	54.74	2012/06/16
CDC2238443	54.73	2012/06/16
CDC2238444	54.73	2012/06/16
CDC2238445	54.72	2012/06/29

<b>TITLE #</b>	<b>SURFACE AREA (Ha)</b>	<b>Expiry date</b>
CDC2239450	54.73	2012/07/05
CDC2246919	54.74	2012/08/18
CDC2246920	54.73	2012/08/18
CDC2246921	54.73	2012/08/18
CDC2246922	54.72	2012/08/18
CDC2246923	54.71	2012/08/18
CDC2246924	54.85	2012/08/18
CDC2246925	44.14	2012/08/18

Table 1. Designated claims for the Peninsula property.

## **2-ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY**

The property can be reached by train from the town of Havre-St-Pierre. The company QIT Fer et Titane (Rio Tinto) has built a railroad from Havre St-Pierre to the TiO Lake open pit mine for transporting the titanium ore. The Peninsula showing is situated 6.2 km south of the TiO Lake deposit. Alternatively, a helicopter or a floatplane can be rented from Havre St-Pierre to carry personnel to the Peninsula site in less than 30 minutes. Hydro-Quebec is in the process of developing a new vast hydroelectric complex along the Romaine River. The project includes four main hydro stations (Romaine I to IV) which will be joined by a new road. This road will pass less than 8 km east from Puyjalon Lake when reaching the Romaine II station. The new road is located 32 km west of Havre-St-Pierre. It is the intention of the Company to ask permission to Hydro Quebec to travel along this road when completed. There is also a camp for lodging the Hydro-Quebec workers at the Romaine II station. The Company will also enquire about the possibility to stay at the camp. It will be then necessary to build a 8 km access road to the Peninsula property.

The Havre St-Pierre area is characterized by a maritime cold climate. Summers (early-May to mid-September) are temperate with average maxima and minima of 18°C and 10°C (July). Winter is harsh and starts in October and lasts until April, with an extensive snow cover (333 cm) from November to April. Average temperatures reach -17°C (min) and -7°C (max) in January. The cold and humid climate favours the growth of the black spruce and moss, whilst the

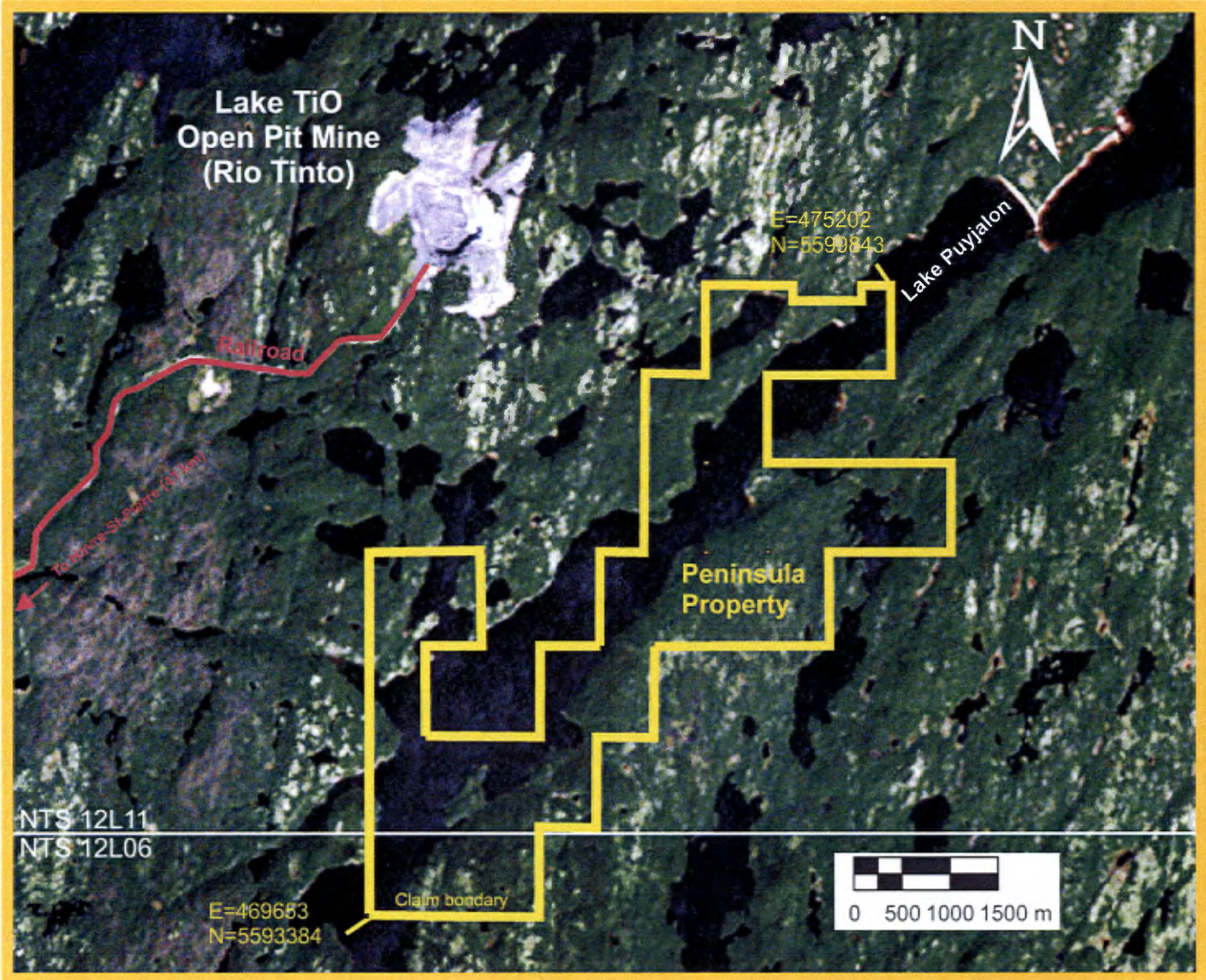


Figure 1. Localization and boundaries of the designated claims of the Peninsula property.

proximity of the shore and low relief facilitates the development of peat bogs especially at the mouth of rivers. Wildlife in the area includes caribou, moose, black bear, rabbit, beaver, muskrat, wolf and mink. The different type of fish present in the lakes, rivers and streams are: trout, pike, wananish, touladi and salmon.

From the St-Lawrence Gulf to the interior, the topography changes from a coastal plain into a dissected narrow plateau and transforms into a region dominated by high altitude plateaus (500 to 900 m). Sand and gravel delta deposits associated with peat bogs characterize the littoral plain. Numerous waterways include parallel NW-SE-oriented rivers that shed into the St-Lawrence River (ex: La Romaine, Natashquan, Petit Mécatina and Aguanish). Elongated small lakes occupy the dissected valley floors.

In the town of Havre-St-Pierre, one can find a regional airport, deep water port, lodging, food, truck rentals and hospital. Sept-Îles forms the major economic center of the Lower North Shore of Quebec. A smelting and shipping center for the iron ore extracted and transported from the mines of the Labrador Trough (i.e. Fermont, Gagnon); Sept-Îles possess modern infrastructures including airport, lodging, government offices and can provide adequate services to the mining exploration companies.

### **3- GEOLOGICAL SETTING**

#### *3.1- Regional Geological Setting*

The Peninsula property is located in the Grenville Province of the Canadian Shield (Figures 2 and 3). The Grenville Province is bordered to the north by the "Grenville Front", a zone of faulting with a sharply delineated metamorphic boundary with the Superior Province. The main crustal build-up of the Grenville Province occurred through prolonged, 1.8 to 1.24 Ga, Andean-type continental arc and intracontinental back-arc magmatism with some lateral accretion of magmatic arcs (Rivers, 1997; Hanmer et al., 2000; Gower and Krogh, 2002). The Grenville Province is subdivided into two main semi-continuous parallel stacked belts known as the parautochthonous belt and the structurally overlying allochthonous polycyclic belt, as well as into a series of supracrustal-dominated assemblages termed the allochthonous monocyclic belt.

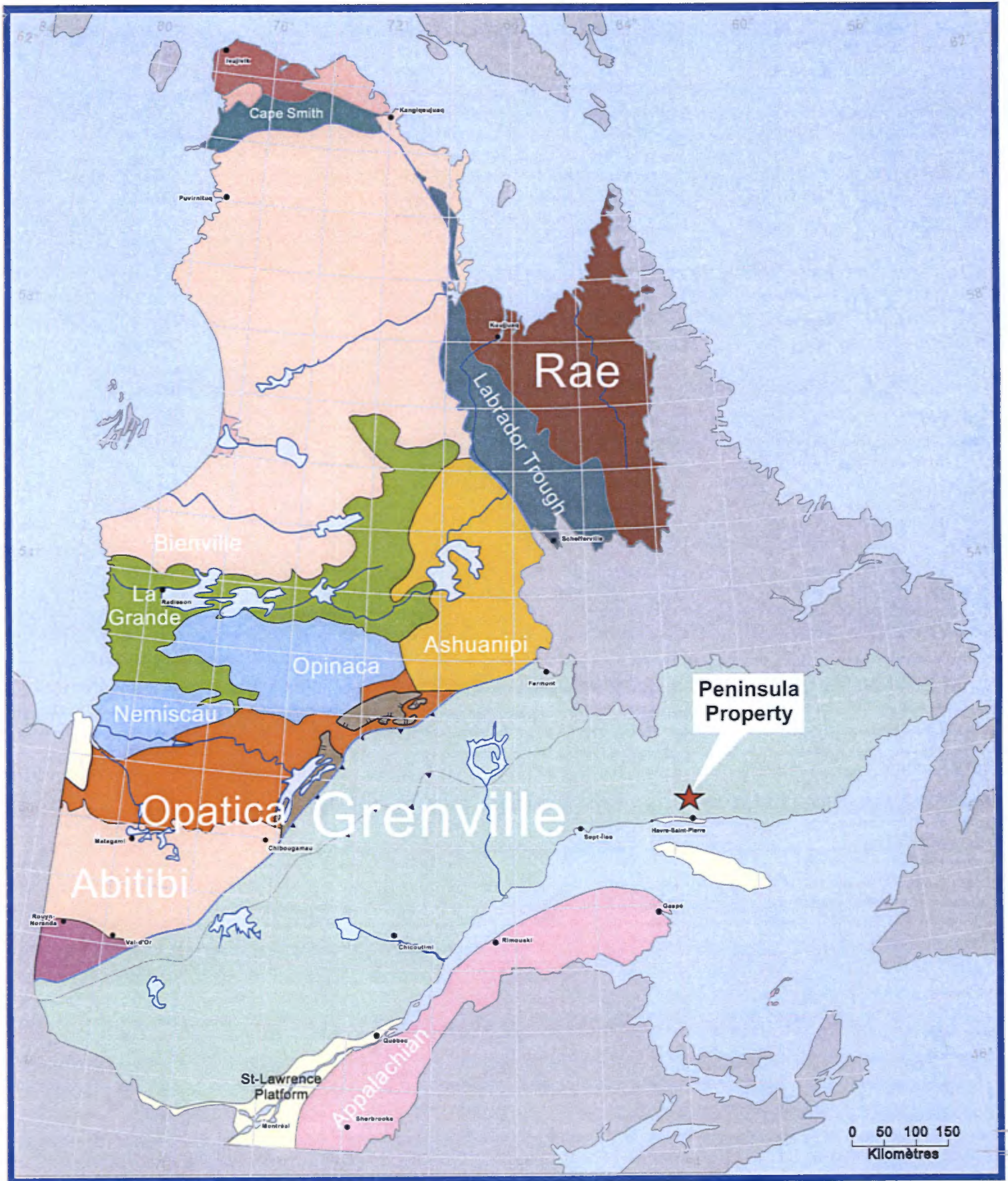


Figure 2. Geological map of the Quebec province illustrating the different geological provinces and subprovinces and the localization of the Peninsula property.

# The Grenville Province

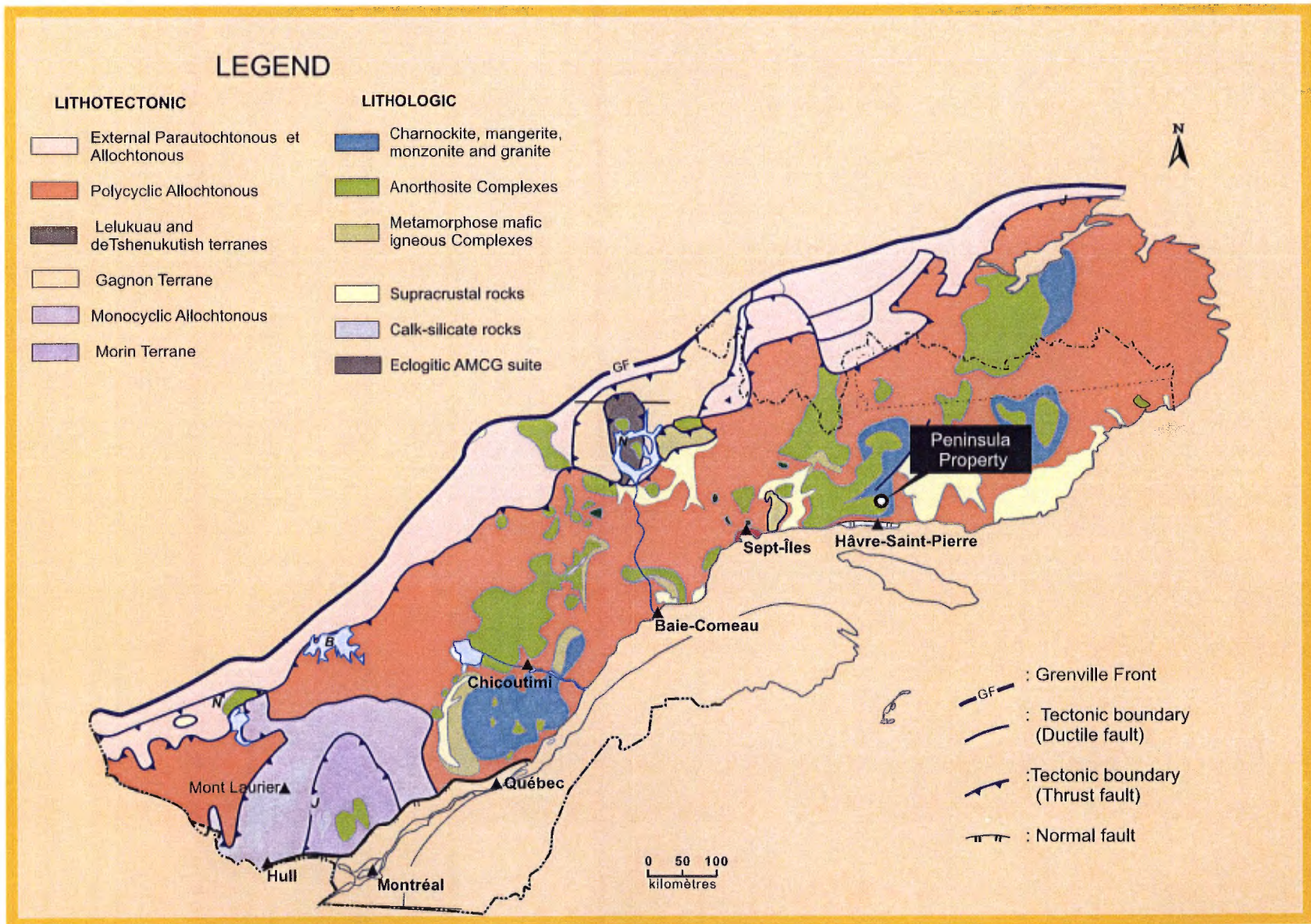


Figure 3. Geology of the Grenville Province of Québec showing the location of the Peninsula property.

The area north of Havre-St-Pierre belongs to the Polycyclic Allochthonous Belt and is locally overlain by Paleozoic carbonates of the St-Lawrence Platform. The Precambrian rocks were deformed and amalgamated during the Pinawarian (1530-1540 Ma) and Grenvillian (1190-980 Ma) orogenies. The Lower North Shore region is subdivided into three lithotectonic domains: Lac-à-L'Aigle, St-Jean and Natashquan (Figure 4). The domains are limited by large shear zones (ex: Romaine and Abbé-Huard) that are also prevalent within each domain. The Natashquan domain is composed of several lithostratigraphic and lithodemic units (Gobeil et al., 2003). The central segment is occupied by the Wakeham Group (1.63-1.50 Ga); a large sedimentary basin (8100 km<sup>2</sup>) containing metamorphosed sandstones, with a small proportion (~10%) of metapelite, and mafic to felsic metavolcanic or hypabyssal layers. It is surrounded by metamorphic complexes: (Aguanish, Boulain and Buit). The Buit Complex forms an assemblage of orthogneiss, foliated granitoids, tonalite gneiss and amphibolites. The Complex also displays massifs of alkali feldspar granite, syenite, pegmatite and also cm- to km-long enclaves and rafts of paragneiss and quartzite commonly migmatized. Near the contact with the St-Jean domain, the Buit Complex exhibit mangerite and charnockite rocks which were tectonically emplaced from the Havre-St-Pierre Anorthosite Complex during a late deformation phase

### *3.2-The Lac St-Jean Domain*

The Lac St-Jean domain is constituted of five rock assemblages: the Manitou Complex, the Magpie Complex, the Matamec Complex, the anorthosite intrusive suites (de Tortue Anorthosite, Thorn Anorthosite and the Havre St-Pierre Anorthosite Suite) and the late mafic to felsic intrusions (Figure 4).

The Manitou Complex incorporates a metamorphosed and deformed assemblage of gneissic rocks and ultramafic to felsic intrusive rocks. Quartzofeldspathic gneiss, orthopyroxene +clinopyroxene+hornblende gneiss and granitic gneiss composed the majority of the rock assemblages. They are accompanied by sillimanite gneiss, quartzite, marble, calc-silicate rock, grenatite, metabasite and by pyroxene amphibolite. The intrusive rocks are moderately to strongly deformed, syn- to post-cinematic, and represented by gabbro, pyroxene amphibolite,

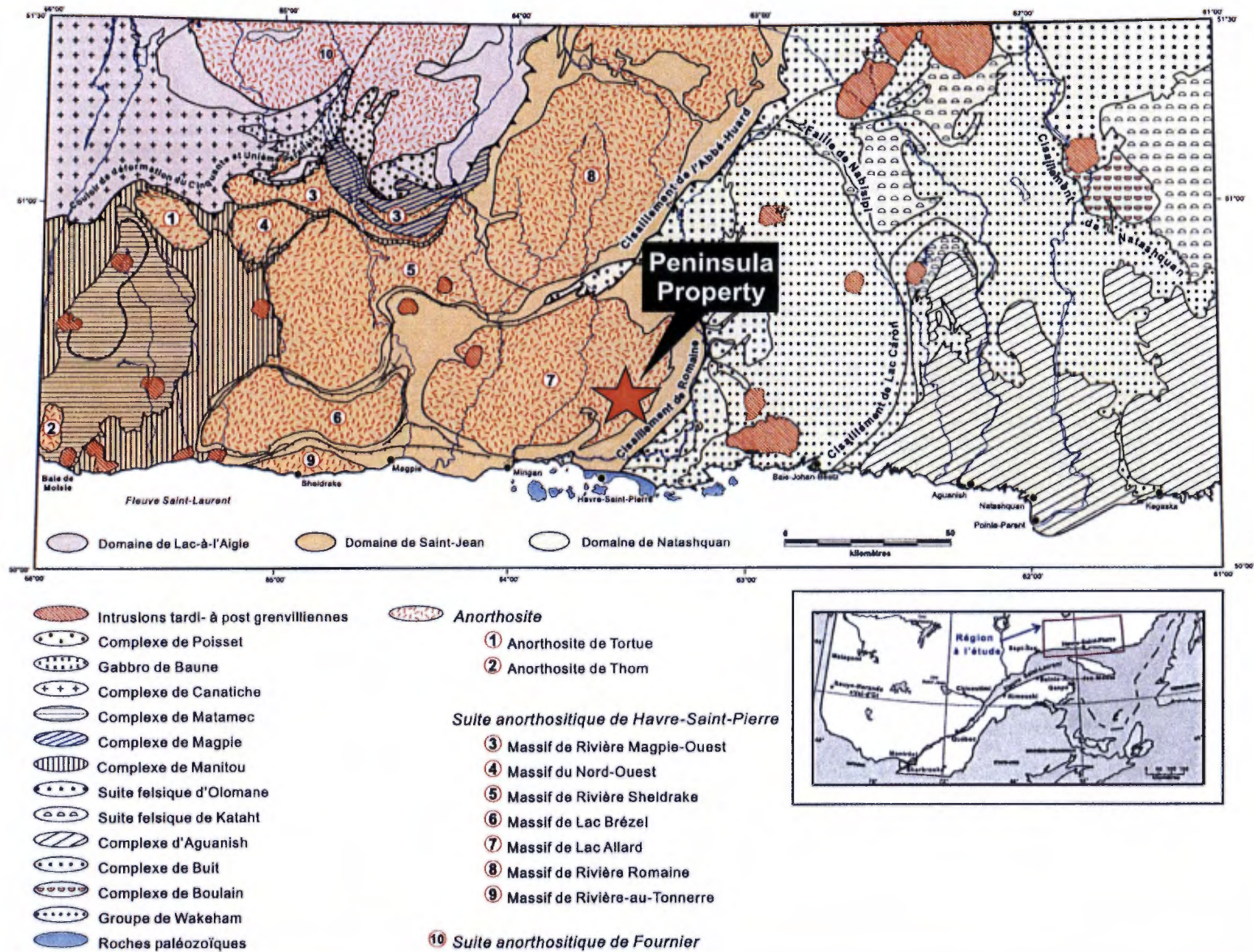


Figure 4. Simplified geological map of lithotectonic domains, stratigraphic units, principal structural elements and anorthositic massifs of the Lower North Shore area. (From Gobeil et al., 2003).

mangerite, leucogranite, foliated-gneissic granite and syenite. The Magpie Complex defines a crescent shape assemblage of feldspathic and quartzofeldspathic gneiss with rusty paragneiss intercalations. The Complex includes granitic to tonalitic orthogneiss, gabbro, gneissic to foliated amphibolite and a massif of foliated granite (Gobeil et al., 2003). The Matamec Complex is dominated by a large gabbro-norite intrusion invaded by mangerite, monzonite and granite. The felsic intrusions are intimately associated with the gabbro-norite forming irregular kilometric-long masses and layers. The Matamec Complex is characterized by numerous evidences related to magma mixing of gabbro-noritic, monzonitic and granitic components. The Complex is delimited by a ductile shear zone and was thrust on the Manitou Complex.

The anorthosite assemblages are constituted of three units: the Tortue Anorthosite, the Thom Anorthosite and the Havre-St-Pierre Anorthosite suite which covers over 2/3 of the Lac St-Jean Domain (Figure 4). These units are characterized by a spectrum of anorthosite-leuconorite-leucogabbro-mangerite rocks. The anorthositic plutons present magmatic primary layering and sub-concordant injections. Norite, gabbro and troctolite constitute minor facies in these plagioclase-rich rocks. The Tortue Anorthosite forms an ovoid massif (250 km<sup>2</sup>) containing three assemblages: 1) anorthosite and leuconorite with subordinate norite and gabbro; 2) leuconorite with minor anorthosite, norite, gabbro and pyroxenite and 3), a foliated, augen-type monzonite. The Thom Anorthosite unit forms an ovoid massif (100 km<sup>2</sup>) composed of anorthosite with subordinate leuconorite, gabbro and norite. The unit was affected by cataclasis and granoblastic recrystallization and contains gneissic enclaves.

### *3.3-The Havre St-Pierre Anorthosite Suite (HSPAS)*

Madore et al. (1999) and Gobeil et al. (2003) have included the anorthositic massifs and mangerite-charnockite-granite envelope located north of an EW-line joining the village of Sheldrake and the town of Havre-St-Pierre, into the Havre St-Pierre Anorthosite Suite (HSPAS). The HSPAS contains the spectrum of anorthosite-leuconorite-norite-leucogabbro-mangerite rocks. Gabbro, troctolite, monzonite and mangerite constitute minor lithofacies within these plagioclase-rich rocks. Pyroxenites are commonly observed at the border of anorthosite massifs

and are spatially associated with Cu-Ni mineralization. The HSPAS contains important ilmenite and magnetite mineralization, notably near Puyjalon, Allard and TiO lakes (Figure 5).

Anorthosite represents the common rock facies. The rock ranges in color from white-grey to blue-grey, green or black. The anorthosite is coarse- to very coarse-grained, locally pegmatitic, equigranular or porphyroid. The plagioclase crystals, white, grey or blue-grey, can reach decimeter length in several massifs. The leucocratic anorthosite contains andesine ( $An_{38-44}$ ) with some occurrences of leuconorite-norite. We also find labrador plagioclase ( $An_{50-65}$ ). The plagioclase is antiperthitic and ilmenite occurs in recrystallized crystals near triple point junctions. Apatite is rare and green hornblende and biotite of metamorphic origin are often present. Large crystals of orthopyroxene and clinopyroxene fill the interstices between the plagioclases. Pyroxene commonly possesses an interstitial poecilitic texture.

The HSPAS was strongly deformed (Sharma and Franconi, 1975). The least deformed anorthosite is protoclastic, with a film of fine-grained plagioclase neocrystals surrounding the plagioclase phenocrysts. At a more advanced recrystallization stage, the anorthosite is porphyroclastic with angular centimetric plagioclases surrounded by a plagioclase-rich matrix presenting granoblastic, granular and interlobate textures. Although some of the plagioclase recrystallization may be syn-magmatic in origin, Gobeil et al. (2003) suggest that most of the recrystallization took place during a regional deformation event associated with tectonic transport during the collisional Grenvillian Orogeny.

In the eastern area of the Allard anorthosite massif, layers or lenses of norite appear and contain apatite and ilmenite/magnetite mineralization, typical of that encountered at the Peninsula property. The anorthosites are surrounded by a band of mangeritic rocks 1 to 10 km in width (Hocq, 1982). This band is composed of jotunite, mangerite, quartz mangerite (farsundite), charnockite, granite and monzonite. Jotunite commonly occurs at the contact with the anorthosite with variable thicknesses exposed (10-500 m).

The anorthosite massifs and associated mangerite rocks are affected by an N-S (NNW-SSE to NNE-SSW) jointing with minor E-W-oriented joints.

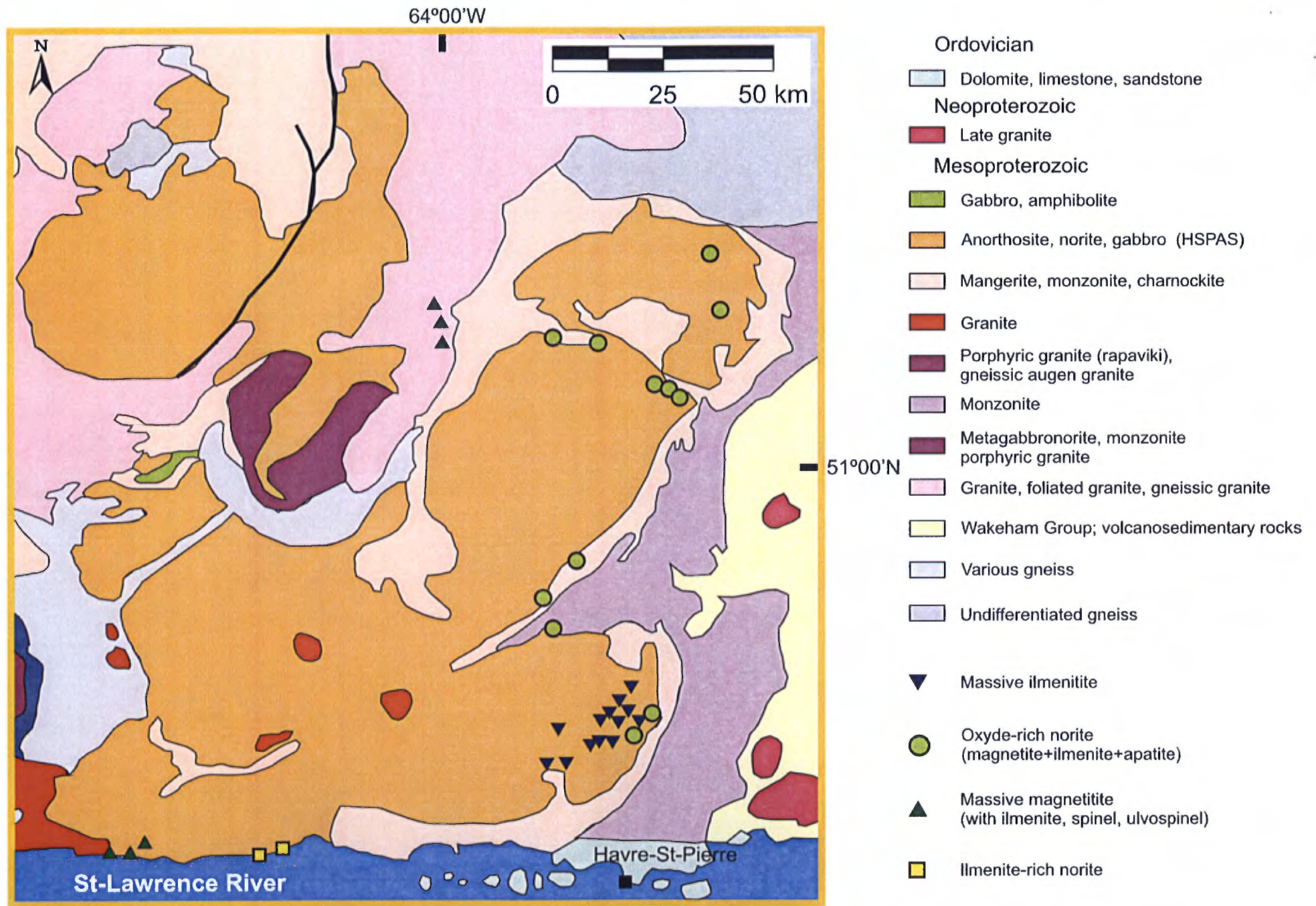


Figure 5. Geology of the Havre-St-Pierre area illustrating the widespread occurrence of anorthositic rocks of the HSPAS. The localization of Fe-Ti mine, prospects and showings are presented and subdivided according to the four types recognized by Perreault et al. (2003). Modified from Perreault et al. (2003).

### *3.4-The Allard-Puyjalon Lake Area*

The HSPAS contains a number of deposits of ilmenite and magnetite of varying dimensions principally exposed in the Allard and Puyjalon lakes area (Figure 6). The magnetite and ilmenite occurs either as dissemination or as segregation into bands, patches or large elongated masses.

Magnetite norite, norite ilmenitite, ilmenitite-norite and ilmenitite are non-magnetite and form dark bands, lenses or dykes in hololeucocrate in leucoanorthosite. These rocks form important zones of mineralization at Puyjalon, Allard, TiO, Manitou and Magpie lakes. Norite-ilmenitite is rare and occurs exclusively at the border of certain ilmenite bands (massive ilmenitite).

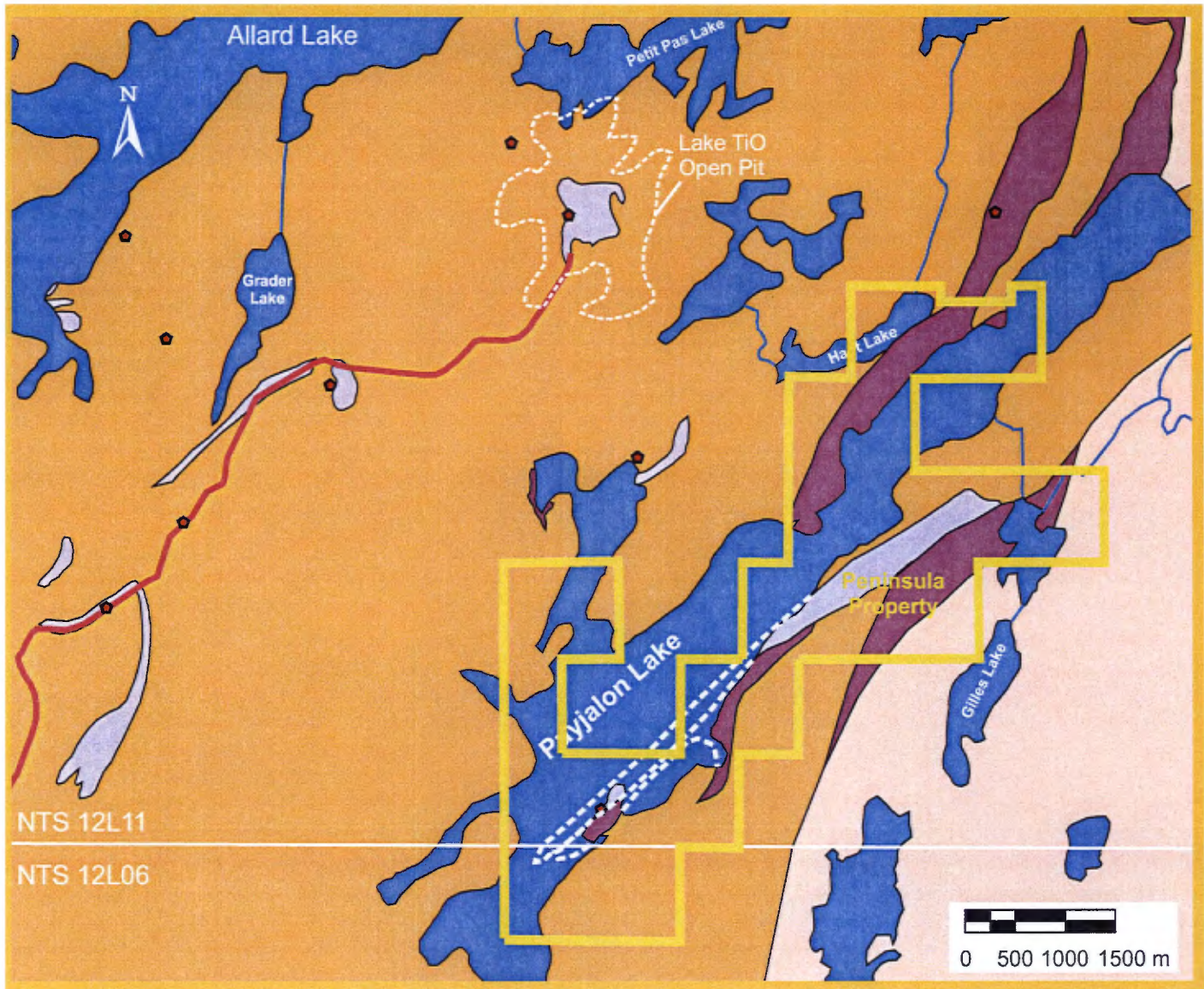
Pyroxenite is associated exclusively with the magnetite-norite and ilmenitite-norite bands where they constitute thin plagioclase-poor layers. The magnetite-norites are located generally east of Lake Allard. These are dense and dark rocks containing between 5 to 25% magnetite.

Lenses, bands and layers of ilmenitite constitute the titanium ore of all the deposits, prospects and showings located in the vicinity of the Allard and Puyjalon lakes. They are found in leucocrate anorthosite, rarely in leuconorite or norite. Most bands and layers of ilmenitite show variable thickness (5 cm to 100 m), tend to lay parallel to the anorthosite layering and possess shallow dips (10° to 35°). The ilmenitite rock presents a black lustrous massive and homogeneous or finely laminated texture. Ilmenitite can also form dykes in anorthosite. In certain areas, evidence of sedimentation by gravity has been observed, principally in layers and lenses of ilmenite leuconorite, ilmenite norite and ilmenitite-norite (Hocq, 1982).

## **4- THE PENINSULA TITANIUM PROPSECT**

### *4.1-Introduction*

The first occurrence of ilmenite mineralization associated with anorthosite was recognized by Low (1895). In 1941, Retty from the Quebec Department of Mines described the findings of ilmenite outcrops within anorthosites on the shores of Puyjalon, Allard, Petit-Pas and Bat-le-



Grenville Province  
(Lac St-Jean Domain)

Havre-St-Pierre Anorthosite Suite  
(HSPAS)

- Jotunite, magnetic
- Massive to finely laminated ilmenitite, noritic ilmenitite
- Mangerite, magnetic, minor charnockite, jotunite, monzonite and quartz monzonite
- Leucocratic anorthosite, partially or totally recrystallized, minor leuconorite, norite, gabbro, olivine gabbro and troctolite



Titanium showing, prospect or mine



Havre-St-Pierre Lake TIO Railway (Rio Tinto)

Figure 6. Geology of the Allard and Puyjalon lakes area. The principal titanium mine, prospects and showings are presented. Modified from Hocq (1982).

Diable lakes (see Retty, 1944). Chemical assay results for the Bat-le-Diable and Allard lakes mineralized zones produced average contents of 35 wt.% TiO<sub>2</sub> and 55 wt.% FeO. Late in 1942, claims were staked and later optioned by Kenneco Explorations and by the New Jersey Zinc Company. In 1946, Kenneco geologists discovered eight ilmenite deposits in the area, among which the TiO Lake. The Quebec Iron and Titanium Corporation (QIT) was formed to develop this new property. A loading dock was built at Havre-St-Pierre and a 41 km railroad was completed to the site of TiO Lake where an open pit was established. The ore was then shipped from Havre St-Pierre to Sorel where an electric smelting plant was constructed. In 1947, the QIT Corporation conducted an aeromagnetic survey over a large area to discover that the main deposit was associated with a strong negative magnetic anomaly.

#### *4.2-History of the Peninsula Property*

There is scant information concerning the exploration of the Peninsula property. The Ministère des Richesses naturelles du Québec files indicate a that a magnetic geophysical survey was run in 1949 on part of the peninsula jutting into lake Puyjalon Peninsula (Lees, 1949; GM11512-C). In 1951, Dubuisson Mines sunk three DDH totaling 196 m (see Table 2 below). Core assays produced results of 19.23 wt.% TiO<sub>2</sub>/6.1 m and 23.2 wt.% TiO<sub>2</sub>/12.2 m. In 1967, Gulf Titanium Ltd. completed three holes totaling 175 m (Hart, 1967: GM22125). Best intersection in one hole cut 50 m with a grade of 17.2 wt.% TiO<sub>2</sub>. However, no trace of this drilling campaign was found in the Ministère des Richesses naturelles du Québec files.

# DDH	Azimuth (°)	Plunge (°)	Depth (m)
P-1 (GM01770B)	340	70	64,0
P-2	330	70	69,6
P-3	330	70	52,0

Table 2. Diamond drill holes sunk by Dubuisson Mines on the Peninsula property.

#### *4.3- Geology and Ti-Mineralization*

There is a large band of ilmenite mineralization that extends discontinuously along the southern shore of Puyjalon Lake. The width of this band, oriented  $40^{\circ}$ - $50^{\circ}$ / $35^{\circ}$ - $45^{\circ}$  varies from several tens of meters on the Puyjalon Peninsula to 250-350 m to the north near Aline Lake (Hocq, 1982). The Puyjalon Peninsula forms an anvil-like protrusion in Lake Puyjalon. The Peninsula showing consists of a succession of dm to meter-thick layers of leucoanorthosite and ilmenite leuconorite. On several instances, these bands reveal meter-thick subconcordant layers of ilmenitite-norite and several horizons of massive ilmenitite 15 to 30 cm thick. The entire sequence is 25 to 50 m in thickness and is overlain by 50 m of anorthosite and leuconorite containing lenses of ilmenite aggregates (Figure 7). The sequence reappears along the Puyjalon lake shore 1 km to the northeast. The outcrops reveal more bands of ilmenitite-norite and norite-ilmenitite interlayered with massive fine to medium-grained ilmenitite (30-80 cm), The strong negative magnetic anomaly found on the MERQ magnetic map of the area indicates a gradual thickening of the mineralized sequence to the north reaching 1200 m near Aline Lake. A section of the small hill located 1 km south of this lake is presented in Figure 8. At the base of the valley floor, a laminated leucocrate anorthosite is succeeded by 35 to 40 m of layered ilmenitite alternating with bands of norite-ilmenitite and ilmenitite-norite. The ilmenitites (20-50 cm thick) are finely laminated. Progressing upward, we observe 5 to 6 m of saccaroide anorthosite with 5-10% blue plagioclase porphyroclasts. 30 meters further up the hill slope, another 30 m-thick mineralized zone contains ilmenite-norite or norite-ilmenitite altered layers. A 15 to 20 m-thick zone of rusty magnetite/ilmenite melanorite is found above and is capped by a jotunite zone.

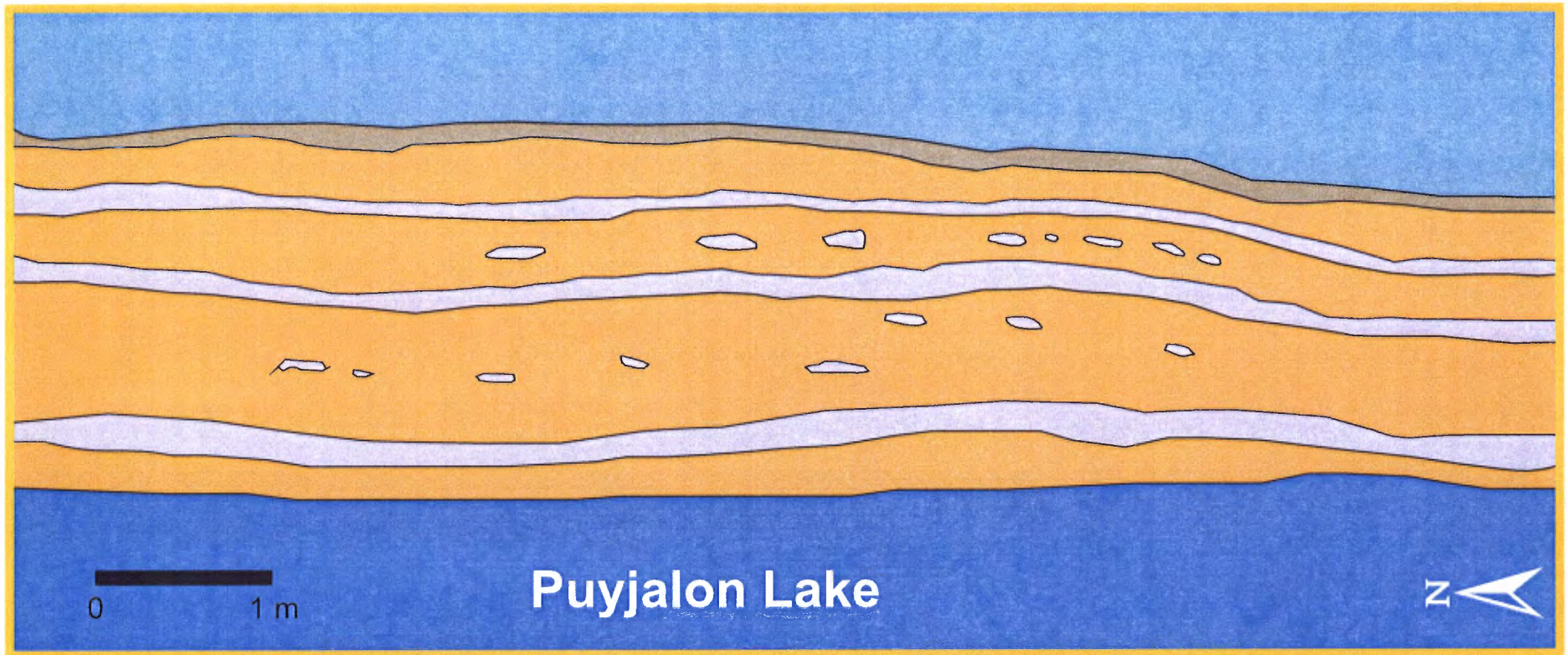
In 2002, Les Ressources d'Arianne conducted a series of geochemical, mineralogical and mineragraphic analyses on Fe, Ti and V-mineralized rock samples collected from their properties located in the Grenville Province and associated with anorthosite complexes (Boulianne, 2003; GM60442). Their geochemical and mineralogical survey included the Peninsula Property from which the company collected several mineralized samples (Table 3). Ten samples represent massive ilmenitites which contain between 78% to 98% oxides minerals mostly composed of hemoilmenite (76 to 92%) showing fine lamellae of hematite (20-30%). These massive rocks contain little magnetite (1-2 %) and sulphides (1-2%), mainly pyrite, chalcopyrite and pyrrhotite. Other accessory minerals are pyroxene, biotite, chlorite and carbonate. The texture is principally

**Table 3.** Chemical and mineral compositions of ilmenite and leucoanorthosite samples collected by Les Ressources d'Arianne from the Peninsula prospect. (From Boulianne, 2003)

Sample	Rock Type	TiO <sub>2</sub> (wt. %)	P <sub>2</sub> O <sub>5</sub>	SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	Fe <sub>2</sub> O <sub>3T</sub>	MnO	MgO	CaO	Na <sub>2</sub> O	K <sub>2</sub> O	V	V <sub>2</sub> O <sub>5</sub>
02PUY001	Ilmenite	36.50	0.01	0.25	1.02	61.20	0.10	2.45	0.09	0.00	0.03		
02PUY002	Leucoanorthosite (7-8% Ox.)	9.63	0.06	41.00	19.30	16.60	0.04	1.97	4.59	3.62	1.75		
02PUY003A	Ilmenite	36.00	0.02	0.11	1.01	61.20	0.11	2.57	0.06	0.01	0.03	0.20	0.36
02PUY003B	Leucoanorthosite (1% Ox.)	22.30	0.02	22.00	10.40	37.90	0.07	1.59	3.56	2.03	0.36		
02PUY004A	Ilmenite	36.30	0.01	0.76	1.11	59.90	0.11	2.57	0.08	0.01	0.03	0.20	0.36
02PUY004B	Leucoanorthosite (25% Ox.)												
02PUY005	Ilmenite	20.40	0.02	24.50	11.00	35.90	0.10	1.89	3.92	0.65	0.35		
02PUY006	Ilmenite	34.60	0.02	3.35	2.15	58.70	0.10	2.21	0.53	0.22	0.08	0.19	0.34
02PUY007	Ilmenite	31.30	0.01	6.32	2.93	55.60	0.11	3.03	0.80	0.34	0.08		
02PUY008	Ilmenite	36.20	0.01	0.60	0.64	61.50	0.12	1.69	0.09	0.01	0.02	0.20	0.36
02PUY009	Ilmenite	35.80	0.04	0.73	0.58	62.70	0.13	1.24	0.11	0.01	0.03		

Sample	Oxyde (%)	Sulphide	Silicate	Total	Rutile (%)	Hemoilmenite	Hematite	Ilmenite	Magnetite	Hercynite	Pyrite	Chalcopyrite	Pyrrhotite
02PUY001	96	1.0	3	100		92	30	70	1.0	2.0	0.7	0.1	0.1
02PUY002	15	0.1	84	99.1	2.0	9	22	78	5.0	0.0	0.1	0.1	
02PUY003A	98	0.1	2	100.1		94	20	80	2.0	2.0	0.1	0.0	
02PUY003B	60	0.5	40	100.5		57	25	75	0.1	1.5	0.1	0.1	
02PUY004A	98	1.5	2	101.5	0.1	92			2.0	2.0	0.5	0.1	
02PUY004B	23	0.1	77	100.1		0					0.0	0.0	
02PUY005	78	0.1	22	100.1		76					0.1	0.1	
02PUY006													
02PUY007													
02PUY008													
02PUY009													

Sample	Plagioclase (%)	Pyroxene	Biotite	Chlorite	Carbonate	Epidote	Total
02PUY001		0.1	1.0	0.1	3.0		100.2
02PUY002	82.0			2.0		0.1	100.4
02PUY003A	0.8	0.8	0.5			0.1	100.4
02PUY003B	38.0		2.0	0.1			99.0
02PUY004A							97.0
02PUY004B							
02PUY005							78.3
02PUY006							
02PUY007							
02PUY008							
02PUY009							





-  Massive to finely laminated ilmenitite
-  Leucocratic anorthosite

Figure 7. Representative cross-section of the Pennisula prospect along the shore of the Puyjalon lake. Modified from Hocq (1982).

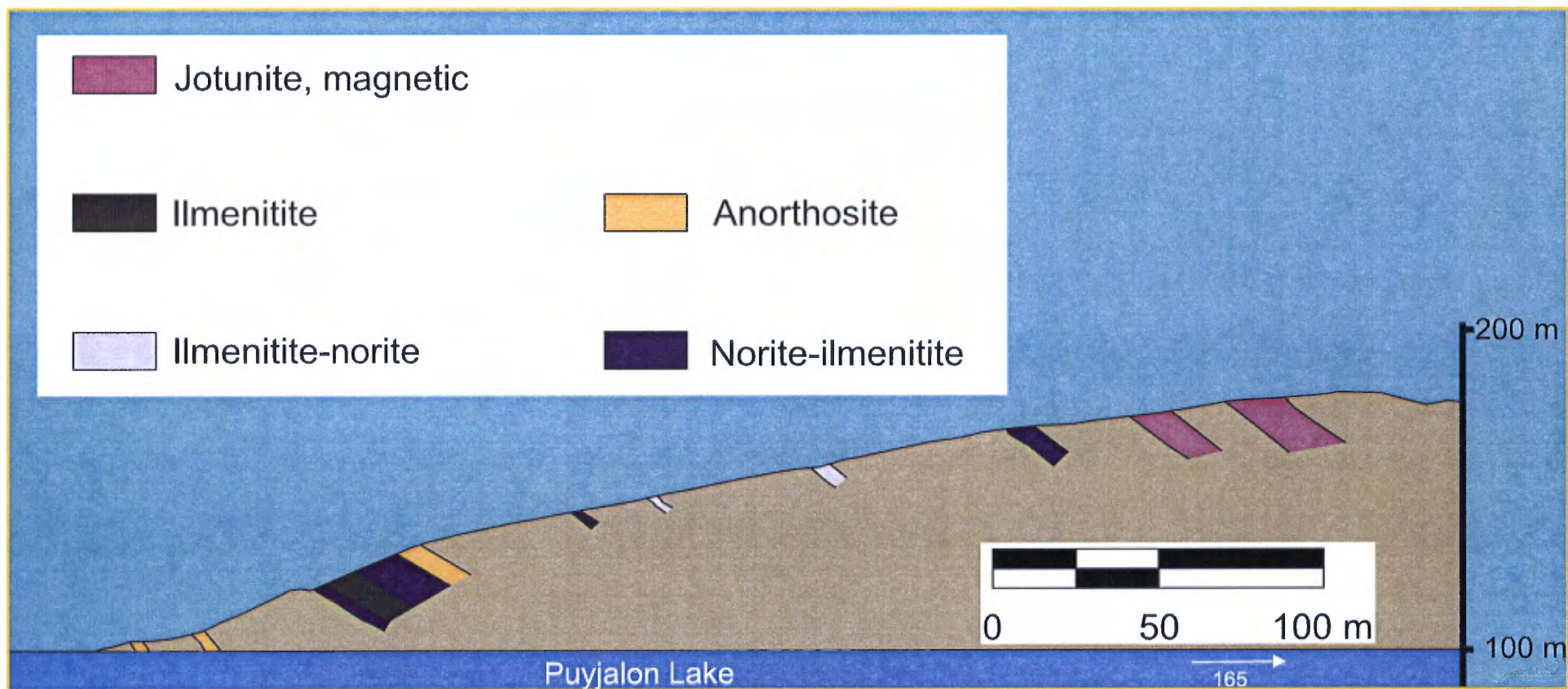


Figure 8. Cross-section of the mineralized band localized on a small along the southern bank of Puyjalon Lake near Aline Lake. Modified from (Hocq, 1982).

granoblastique and the granulometry of the oxides vary from 0.4 to 4 mm. Chemical analyses of these rocks reveal average  $\text{TiO}_2$ ,  $\text{Fe}_2\text{O}_3\text{T}$  and  $\text{V}_2\text{O}_5$  contents of 33.38 wt. %, 57.09 wt.% and 0.35 wt. % respectively, with low average contents of  $\text{SiO}_2$  (4.58 wt. %),  $\text{Al}_2\text{O}_3$  (2.56 wt.%),  $\text{MgO}$  (2.21 wt. %) and  $\text{CaO}$  (0.71 wt.%). These results are very similar to those given for the TiO Lake ore; i.e. 34 wt.%  $\text{TiO}_2$ , 55.76 wt.%  $\text{Fe}_2\text{O}_3$ , 0.41 wt.%  $\text{V}_2\text{O}_5$ , 3.5 wt. %  $\text{SiO}_2$ , 3.5%  $\text{Al}_2\text{O}_3$ , 0.9 wt.%  $\text{CaO}$  and 3.1 wt.%  $\text{MgO}$  (Perreault et al., 2003). The other collected samples are anorthosite or leuconorite including 15-60% oxide minerals expressed as hemoilmenite.

## **5- DEPOSIT TYPE**

The numerous deposits of titaniferous magnetite, magnetite-ilmenite-apatite and massive ferroan-ilmenite in the Grenville Province of Quebec have been known since the 1850's. In general, the deposits occur as tabular intrusions, stocks, sills or dykes in anorthosite massifs. Locally, they consist of stratiform mineralization in layered segment of anorthosite massifs or in layered mafic intrusions (Corriveau and Perreault, 1999).

Most of the Fe-Ti showings, prospects and mines exposed on the Lower North Shore of Quebec are associated with the Havre- Saint-Pierre Anorthosite Suite or the Fournier anorthosite massif. Perreault et al. (2003) have classified these mineral occurrences in four types: 1) Massive ilmenite dykes and veins related to andesine anorthosite; 2) Ilmenite-magnetite-apatite-rich jotunite (or ferrodiorite) dykes or intrusions emplaced at the contact of mangerite-anorthosite rocks; 3) Magnetite-ilmenite norite dykes and layers accompanied by ilmenite veins injected in labradorite anorthosite and 4), Layers, pods and dykes of massive Ti-rich magnetite intruded at the edges of labradorite anorthosite or jotunite massifs (Figure 5). The Peninsula prospect belongs to Type 1 mineralization as portrayed by Perreault et al. (2003).

## **6-GENESIS OF Fe-Ti DEPOSIT ASSOCIATED WITH ANORTHOSITE COMPLEXES**

Several mechanisms have been suggested for the genesis of magnetite-ilmenite deposits associated with massif-type anorthosites. Immiscibility of Fe-Ti-P-rich melts is one process argued by Philpotts (1967) and Kolker and Lindsley (1989). However, experimental studies do

not favor immiscibility (Lindsley, 2003), and unrealistically high temperatures are needed for ilmenite–apatite melts (~1400 °C). It ensued that the only plausible mechanism for the formation of magnetite-ilmenite deposits is fractional crystallization of a jotunite, ferrodiorite or high-Al gabbro that commonly occur in spatial association with anorthosites. Both the Fe-rich dykes and anorthosite are linked to each other by a Fe- enrichment fractionation trend typical of tholeiitic melts/liquids. In layered bodies such as Tellnes (SW Norway), the mineralization is best explained by fractional crystallization with accumulation and enrichment in Fe-Ti oxide minerals often in monomineralic layers in a magma chamber (Duschesne, 1999).

The Peninsula prospect is different, because it occurs as layers and veins in barren anorthosite not as layers in mafic-ultramafic cumulate rocks. Duschesne (1999) has shown that all Fe-Ti deposits within massif-type anorthosites display various degrees of deformation. As in the case at Peninsula, this deformation could play a role in separating the Fe-Ti oxides from other minerals and from other layered rocks generated in transient magma chamber to concentrate them in pods and veins into the enclosing barren anorthosite. Because crystallization and deformation of anorthosite massifs are probably synchronous, filter press mechanisms could have expelled the oxide ore from more rigid crystal matrixes. It is also possible that the Peninsula ilmenite mineralization originated as cumulates, with or without associated silicate minerals, in a transient magma chamber, which subsequently has been deformed along with its enclosing anorthosite at high temperature during the emplacement of the Havre St-Pierre Anorthosite Suite. Due to its ability to recrystallize and its wetting properties, ilmenite/magnetite could have separated from the silicate minerals and migrated in the solid state during deformation to form veins. One possible mechanism responsible for the ilmenite/magnetite enrichment in transient magma chambers is removal of plagioclase through segregation by flotation. Plagioclase has a lower density (2.61-2.65 g/cm<sup>3</sup>) than ferrodioritic/jotunitic melts from which it crystallizes (ca. 2.75 g/cm<sup>3</sup>). Direct evidences for plagioclase buoyancy are found in the Tellnes and TiO Lake deposits where anorthositic rocky outcrop close to Fe-Ti deposits and commonly at a higher stratigraphic level.

## **7-THE LAKE TiO ILMENITE DEPOSIT**

The TiO Lake mine is defined by a tabular sub-horizontal intrusion divided in three zones separated by normal faults (Bergeron, 1986). The main deposit is inclined 10°W and occupies an area roughly 1 x 1.1 km with a thickness of 110 m. The “Northwest” deposit forms a 7 to 60 m thick band of massive ilmenite within decimetric to decametric anorthosite layers. The Cliff deposit has an elliptic shape and forms a small hill overlooking the Lake Tio pit. The massive ilmenite zones is 328 x 225 m with a mean thickness of 60 m. The ore consists of a coarse-grained black aggregate of hemo-ilmenite with accessory plagioclase, spinel and sulphide (chalcopyrite and pyrite).

The main deposit is subdivided into three parts: the upper zone, composed of massive ilmenite with occasional ilmenitic norite, an intermediate zone made of an alternance of massive ilmenite and ilmenite anorthosite and a lower zone of massive ilmenite. Inclusions of anorthosite, as well as horizons of ilmenite-rich anorthosite, are found throughout the orebody. The main body is covered by a low-grade cap composed of alternating bands of ilmenite and anorthosite. These bands have a shallow dip (10°E). Megascopically, the lake TiO deposit consists of crystal aggregates of thick, tabular ilmenite, with parallel-oriented ilmenite grains. Gangue minerals occur in interstices and include plagioclase, biotite, pyrite, phyrrotite and chalcopyrite. Microscopically, the ilmenite grains contain elongated and parallel lamellae of hematite. The lake TiO mineral mixture consists of 75% ilmenite and 25% hematite. The Main deposit contains at least of 125 Mt of ore with a mean composition of 34.2 wt. % TiO<sub>2</sub> and 56.1 wt.% Fe<sub>2</sub>O<sub>3T</sub> (Rose, 1969).

## **8-CONCLUSIONS AND RECOMMENDATIONS**

The Peninsula titanium property is located in the St-Lawrence North Shore of Quebec in NTS map sheets 12L11 and 12L06. The property is situated 32 km NNE of the town of Havre-St-Pierre and consists of twenty-six (26) continuous mineral claims (polygons) totaling 1412.86 hectares. The Peninsula showing is situated 6.2 km south of the TiO Lake deposit and can be reached by train along the TiO Lake mine-Havre-St-Pierre railroad or by helicopter or floatplane from Havre-St-Pierre. A new road located 32 km west from Havre-St-Pierre is currently established by Hydro-Quebec to reach the four main dams related to the Romaine River

Complex. The road will pass less than 8 km east of the Peninsula property when completed. It is the intention of the Company to ask permission to Hydro Quebec to travel along this road.

The Peninsula property is situated in the Havre-St-Pierre Anorthosite Suite (HSPAS) which exposes a number of deposits of ilmenite and magnetite of varying dimensions principally in the Allard and Puyjalon lakes area where the TiO Lake titanium mine is currently in operation. The Puyjalon Peninsula forms an anvil-like protrusion in Lake Puyjalon. The Peninsula showing consists of a succession of dm to meter-thick layers of leucoanorthosite and ilmenite leuconorite. On several instances, these bands reveal meter-thick subconcordant layers of ilmenite-norite and several horizons of massive ilmenite 15 to 30 cm thick. The entire sequence is 25 to 50 m in thickness and is overlain by 50 m of anorthosite and leuconorite containing lenses of ilmenite aggregates.

Les Ressources d'Arianne have collected samples of massive ilmenites from the Peninsula property site. The ilmenites contain between 78% to 98% oxides minerals mostly composed of hemoilmenite (76 to 92%) showing fine lamellae of hematite (20-30%). Chemical analyses of these rocks reveal average  $\text{TiO}_2$ ,  $\text{Fe}_2\text{O}_3\text{T}$  and  $\text{V}_2\text{O}_5$  contents of 33.38 wt. %, 57.09 wt.% and 0.35 wt. % respectively. These results are very similar to those given for the TiO Lake ore; i.e. 34 wt. %  $\text{TiO}_2$ , 55.76 wt. %  $\text{Fe}_2\text{O}_3$  and 0.41 wt. %  $\text{V}_2\text{O}_5$ .

After carefully examining the geological and metallogenic characteristics of the Peninsula prospect, the author believes that the Peninsula property warrants more exploration work due to its proximity to the lake TiO mine and the scant attention devoted to this prospect over the years. In Phase I of an exploration campaign, the author recommends that the entire property be subjected to an airborne magnetic survey. The result of this survey will determine key areas of ilmenite mineralization. These areas will be subjected to a ground-based gravimetric/magnetic survey along cut lines to estimate the mineralogical composition (i.e. ilmenite or magnetite) and tonnage of the buried Fe-Ti mineralization. It would be preferable that the survey be conducted during the winter months to take advantage of frozen lake surfaces. Grab and channel samples could also be systematically taken along the gridlines.

Contingent to the results obtained during Phase I of the survey, Phase II would involve a drilling campaign along the southeastern bank of the Puyjalon Lake. The drilling will be conducted in a fence pattern; i.e. each hole along the same azimuth covering in part the region investigated by the precedent. Each fence will be separated by a 400 m interval. This seemingly large interval is necessary in view of unearthing a large Ti deposit. The information gathered from the geological map of Hocq (1982) reveals a mineralized zone at the Puyjalon Peninsula covering an area of 500 x 300 m, whilst to the northeast along the lake shore there is another potential mineralized zoned 3 km long by 300 m wide. Each fence will carry a azimuth of 330°, with drillholes separated by 100 m maintaining a -45° plunge and a length of 140 m; thus allowing for a true vertical depth of 100 m. Assuming a drilling campaign only for the exposed mineralized zone, a total of 21 DDH included in seven fences are proposed, bringing the total core length to 2,100 m.

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## ITEM 24 DATE AND SIGNATURE

### CERTIFICATE OF QUALIFICATIONS

I, Michel Boily, Ph.D., P. Geo. HEREBY CERTIFY THAT:

I am a Canadian citizen residing at 2121 de Romagne, Laval, Québec, Canada.

I am a consultant geologist for the company **GÉON Ltée**.

I obtained a PhD. in geology from the Université de Montréal in 1988.

I am a registered Professional Geologist in good standing with l'Ordre des Géologues du Québec (OGQ; permit # 1097).

I had the following work experience:

From 1986 to 1987: Research Associate in Cosmochemistry at the **University of Chicago**, Chicago, Illinois, USA.

From 1988 to 1992: Researcher at **IREM-MERI/McGill University**, Montréal, Québec as a coordinator and scientific investigator in the high technology metals project undertaken in the Abitibi greenstone belt and Labrador.

From 1992 to present: Geology consultant with **Geon Ltée**, Montréal, Québec. Consultant for several mining companies. I participated, as a geochemist, in two of the most important geological and metallogenic studies accomplished by the Ministère des Richesses naturelles du Québec (MRNQ) in the James Bay area and the Far North of Québec (1998-2005). I am a specialist of granitoid-hosted precious and rare metal deposits and of the stratigraphy and geochemistry of Archean greenstone belts.

I have gathered field experience in the following regions : James Bay, Quebec; Strange Lake, Labrador/Quebec; Val d'Or and Rouyn-Noranda, Quebec; Grenville (Saguenay and Gatineau area); Cadillac, Quebec; Otish Mountains, Quebec, Lower North Shore, Quebec and Sinaloa Province, Mexico.

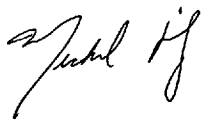
I am the author of the Geological Report entitled: "The Peninsula Titanium Property, Duplessis County, Puyjalon Township, Quebec, NTS sheets 12L06 and 12L11 written on June, 2010 for ONTRACK EXPLORATION LTD..

As of the date of the certificate, to the best of my knowledge, information and belief, this report contains all scientific and technical information that is required to be disclosed to make the report not misleading.

The Qualified Person, Michel Boily, has written this report in its entirety and is responsible for its content.

I am an independent qualified person, QP, according to NI 43-101. I have no relation to Ontrack Exploration Ltd. according to section 1.4 of NI 43-101. I am not aware of any relevant fact which would interfere with my judgment regarding the preparation of this technical report.

I have not had prior involvement with the Peninsula property that is the subject of this report.



Michel Boily, PhD., P. Geo.  
Dated at Montréal, Qc  
September 30, 2010

