Soissons Ni-Cu-Co Project
Soissons Project - Location

Ni-Cu-Co prospect located in the Core Zone of Northern Quebec – Poorly known and mostly unexplored Amphibolite-Granulite grade Paleoproterozoic 1.8 Ga and Archean rocks, and newly recognized 1.3 Ga mafic intrusions, host to Ni-Cu-Co mineralization (Soissons Suite) → Post tectonic and undeformed suite!

Soissons NMEF project (50% MD, 50% NMEF)

Soissons Ni-Cu-Co project 100% MD

Voisey’s Bay Ni-Cu-Co Mine

NMEF: Nunavik Mineral Exploration Fund (native Inuit organization)
Voisey’s Bay Mine

136.7 Mt @ 1.59% Ni, 0.85% Cu

Geology of the Voisey’s Bay Deposit

Dykes and sills of troctolite, olivine gabbro, leucotroctolite, 1.33 Ga
Part of 1.3 Ga Nain plutonic suite → Post-tectonic, undeformed and unmetamorphosed → very attractive from an exploration standpoint

THE NEXT MAJOR DISCOVERER IN QUEBEC
Voisey’s Bay is located in an older Paleoproterozoic transcrustal shear zone (Abloviak shear zone) at the boundary between two Archean cratons (Nain and Core zone) critical to channel mafic-ultramafic magmas.
Soissons Intrusive Suite

- **Soissons Suite**, identified by Qc government mapping 2013-2016 (recent!):
  - Series of undeformed, post-tectonic mafic intrusions;
  - Troctolites, olivine gabbro-norite, monzonites, minor peridotites;
  - Dated at 1,311.1±1.1 Ma (*Papavoine intrusion*, Corrigan et al., in preparation), in >1.8 Ga high-grade metamorphic host rocks (granites, paragneisses with Gp-Sulf);
  - Series of km-scale intrusions found scattered over about 150 kilometers length;
  - Additional intrusions found by the QC government during 250K scale mapping, **many more to be discovered**.

- Nain plutonic suite: 1,330 Ma – 1,290 Ma.

- Voisey’s Bay: 1,332.7±1 Ma (Amelin et al., 1999).

- **The Soissons suite (and Papavoine intrusion) is similar in age to the Nain plutonic suite.**
Mesoproterozoic 1.3 Ga Mafic Intrusions in Quebec

Many other 1.3 Ga post-tectonic mafic intrusions (probably many more are undiscovered as mapping was at 250K scale)

These 1.3 Ga mafic intrusions were not known in the Core zone before 2017 (date geochron was released). Same age as the Nain plutonic suite and Voisey’s Bay

Voisey’s Bay Ni-Cu-Co Mine

Soissons Project 1.3 Ga mafic intrusions (Papavoine)
At Voisey’s Bay, the Abloviak crustal shear zone (older) channeled magmas from the Nain plutonic suite. The Lake Tudor crustal-scale shear zone appears to have played the same role on our side, with most of the Soissons suite intrusions aligned along it. A corridor of E-W fractures have provided an additional control at Voisey’s Bay (dykes at VB are E-W). These extend to the west toward Papavoine. On the Quebec side, 2 series of ~1.3 Ga dykes are dated that support that interpretation: E-W, and NW-SE.
The Core zone has been very little explored.
Soissons: Historical Work WMC

- Model: look for the dykes that would be the root of the Labrador Through gabbros in more metamorphosed rocks.
- Found several nickel showings in previously unmapped mafic intrusions.
- Large mag and EM surveys.
- Limited prospection.
- Soil geochemistry.
- 9 DDH 2001, 3,056 m.
Soissons Geology and Historical Ni-Cu-Co Showings

Papavoine West
0.57% Ni, 0.29% Cu, 0.03% Co / 1.0m (DDH)

Papavoine
1.22% Ni, 0.5% Cu, 0.06% Co; 1.03% Ni, 0.47% Cu, 0.05% Co (grab samples)
1.07% Ni, 0.23% Cu, 0.09% Co / 0.75m; 0.55% Ni, 0.43% Cu, 0.03% Co / 1.7m (DDH)

A17-1
0.30% Ni, 0.29% Cu, 0.03% Co (grab sample)

A14-1E
0.67% Ni, 0.43% Cu, 0.05% Co (grab sample)

The Papavoine intrusion is part of the Soissons Suite. All claims held by Midland

Geology by Quebec Govnment

Soissons Suite: Troctolite, Olivine Gabbro, Norite, Monzonite

Ni > Cu

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Soissons vs Voisey’s Bay

SAME SCALES

Outline of the Voisey’s Bay troctolite intrusion

Outline of the Soissons troctolite to olivine-gabbronorite intrusions

Voisey’s Bay Geology

Papavoine Geology

From Lightfoot, 2016

THE NEXT MAJOR DISCOVERER IN QUEBEC
Papavoine Intrusion Area

New 2018 Channels
0.61 % Ni, 0.31 % Cu, 0.04 % Co / 6.6 m, incl.
0.93 % Ni, 0.4 % Cu, 0.06 % Co / 2.8 m
0.63 % Ni, 0.45 % Cu, 0.04 % Co over 4.2 m, incl.
1.0 % Ni, 0.61 % Cu, 0.06 % Co / 1.4 m

Ni > Cu
Papavoine: Median Ni and Cu values recalculated to 100% (“tenors”):

- **3.6 % Ni** (range: **2.3 % - 4.4 %**)
- **2.1 % Cu** (range: **1.2 % - 4.3 %**) –

All the 2018 Papavoine channel samples (for S > 2 %; n = 34).

*Naldrett and Li, 2007*
Gossan in troctolite
Not previously channelled
2018 Channel: 0.35% Ni, 0.24% Cu, 0.03% Co / 4.9m
Figure 26: Example of massive mineralization encountered in Papavoine channels. Massive pyrrhotite with clusters of chalcopyrite inside (sample X915634 from PPV-18-04).
Papavoine Intrusion – Historical DDH

Only a total of 9 historical DDH (total 3,040 m; 2 DDH outside this figure); done by WMC in 2001

Section next slide
The magmatic breccia / variably textured rocks thicken to the west, with large Ni-anomalous intervals → vector to a feeder zone? Untested off-hole EM anomaly to the west. **DRILL-READY**

**Very shallow dipping intrusion**

**THE NEXT MAJOR DISCOVERER IN QUEBEC**
Voisey’s Bay – Basal Magmatic Breccia

- At Voisey’s Bay, the basal magmatic breccia is thickening toward the feeder zones.
- Massive sulfide lenses occur in the breccia close to the junction between the feeder zone and the main sill.
- "BrècheMagmatic breccia: highly dynamic system → upgrading of Ni-Cu tenors by continuous influx of new mafic magma. Present at Papavoine!"

*Naldrett and Li, 2007*
Voisey’s Bay – VTT Thickness

The thickness of the variable textured troctolite point to the outflow zone and massive sulfides.
Papavoine – Footwall Contact

**Off-hole to the west untested, from hole #7**

**Approximate isodepths of the sill-footwall contact (meters under surface):**
-400, -300, -200, -100

**Target area**

**The shallow dipping contact of the intrusion forms a large target area easily testable by drilling**

**200m radius range of borehole EM detection**

THE NEXT MAJOR DISCOVERER IN QUEBEC
Soissons Project: Highlights

✓ Covers a series of Ni-Cu-Co showings associated with two distinct troctolite to olivine-bearing gabbronorites intrusions (Soissons intrusive suite). Same as the Nain plutonic suite, host to the Voisey’s Bay world-class deposit.

✓ Previous exploration in 2001-2002 revealed the following Ni-Cu-Co grades in DDH:
  ✓ 1.07% Ni, 0.23% Cu, 0.09% Co / 0.75m; 0.55% Ni, 0.43% Cu, 0.03% Co / 1.7m (Papavoine);
  ✓ 0.57% Ni, 0.29% Cu, 0.03% Co / 1.0m (Papavoine West);
  ✓ Large intervals (tens of meters) of disseminated sulfides with nickel values between 0.1% and 0.2%.

✓ Channels 2018 by Midland (Papavoine):
  ✓ 0.61 % Ni, 0.31 % Cu, 0.04 % Co / 6.6 m, incl. 0.93 % Ni, 0.4 % Cu, 0.06 % Co / 2.8 m;
  ✓ 0.63 % Ni, 0.45 % Cu, 0.04% Co over 4.2 m, incl. 1.0 % Ni, 0.61 % Cu, 0.06 % Co / 1.4 m.

✓ Ni-Cu values at 100% sulfides about 3.6 % Ni and 2.1 % Cu (2018 channels) \(\rightarrow\) similar to Voisey’s Bay.

✓ Unexplained and untested off-hole borehole electromagnetic anomalies have been identified from previous exploration, laterally from the zones of disseminated sulfides.

✓ Large intervals of magmatic breccias at the bottom of historical drillhole indicate a dynamic magmatic environment, very favorable for Ni-Cu-Co deposits, similar to that is observed at Voisey’s Bay.