Geology and Cu-Ni-PGE Mineralization of Legris Lake Complex

Neil Pettigrew and Keiko Hattori

Contents

• Regional geology
• Recent exploration History
• Geology of the Legris Lake Complex
• Characteristics of the Cu-Ni-PGE mineralization
• Comparison to other Cu-Ni-PGE deposits
Regional Geology

Proterozoic Cover
Archean
Felsic Intrusive Rocks
Ultramafic-Mafic Intrusive Rocks
Alkaline Intrusive Rocks
Metasediments
Mafic and Felsic Volcanic Rocks
Major Fault
Subprovince Boundary
Highway

Garden-Obonga Aeromagnetic Map

Tib Lake Gabbro
Dog River Intrusion
Lac des Iles Complex
Lac des Iles Mine
Legris Lake Complex
Legris Lake Property
Demars Lake Intrusion
Wakino Lake Intrusion
Recent Exploration History

• 154 km of line cut
• 136 km of ground based magnetometer surveys
• 88 km of I.P. surveys
• 97 km of grid mapping
• 945 prospecting samples collected
• 1500 m of diamond drilling
• Currently conducting 3<sup>rd</sup> phase of trenching
Geology of the Legris Lake Complex

• Divided into four zones:
  ➢ Central Zone
  ➢ Eastern Border Zone
  ➢ Southwestern Border Zone
  ➢ Northwestern Border Zone

Central Zone

• Well exposed
• Consists almost entirely of massive, homogenous 5ab leucogabbro
• Magnetic and I.P. surveys, however suggest much more complexity at depth
5ab Leucogabbro
Eastern Border Zone

- Poorly exposed
- Comprises most leucogabbros, but also meso to melanogabbros and pyroxenites with minor breccia
- Contains large hanging wall metasediments tongues, extending up to 600 metres into the complex
- In contact with metasandstone and iron formation
Southwestern Border Zone

- Lacks abundant breccia
- Hosts the largest 5a* leucogabbro (main showing subtype) body yet discovered
- Hosts a zoned ultramafic dyke-like body with a dunite core containing semi-massive magnetite
Northwestern Border Zone

- Poorly exposed
- Experienced many phases of dioritic to pyroxenitic intrusions and multiple brecciations
- Consists mostly of heterolithic breccia
- Developed igneous layering in several phases
- Hosts all currently known Cu-Ni-PGE mineralization and the majority of the 5a* leucogabbro (main showing subtype)
Diabase (Proterozoic)
Granitic
Dioritic
Igneous Breccia
Heterolithic Breccia
Clinopyroxenite Breccia
Gabbroic
Leucogabbro
Main Showing Subtype 5a*
Biotite-rich Subtype 5ab
Mesogabbro 5b
Melanogabbro 5c
Ultramafic
Clinopyroxenite 3a
Wehrlite, Dunite 3b 3c
Metasedimentary Rocks
Iron Formation
Metavolcanic Rocks
Iron Formation
Grid Map of Western Portion of the Legris Lake Complex
Heterolithic Breccia

Clinopyroxenite Breccia
Igneous Layering in the Legris Lake Complex

Cu-Ni-PGE Mineralization

- Occurrence and distribution
- Mineralogy
- Metal concentrations
- Mineralization models
- Comparison to other deposits
LEGRIS LAKE HIGHLIGHTS

- 0.86 g/t 12.00 m
- 1.62 g/t 10.70 m
- 1.21 g/t 4.92 m
- 1.11 g/t 0.77 m
- 3.16 g/t 9.95 m

- Legris Lake Complex
- diabase, granite, gneiss
- magnetic high
- Avalon 2000 drill hole Pd+Pt+Au core length

5a* Leucogabbro (Main Showing Subtype)
Cross Section of The Northwestern Border Zone

Main Showing, 5a* Leucogabbro

10m of 3.16g/t PGEs
0.42% Cu, 0.13% Ni

0.77m of 0.53g/t Rh
0.91g/t Pd 0.19g/t Pt
0.01% Cu, 0.07% Ni

LEGEND
- database (Pristeriza)
- gabbroic
- diorite
- gneiss breccia
- metagabbro breccia
- 5 gabroic
- Leucogabbro
- Main showing subtype 5a*
- Bittert rich subtype 5ab
- Highly altered gabbro subtype 5ac
- Monogabbro 5b
- Metagabbro 5c
- 3 gabroic
- 4 Clinopyroxenite
- Wehrlite 3b and Dante 3c
- Metasedimentary rocks
- 2 metavolcanic rocks
- 1 metavolcanic rocks

Overburrten
Cu-Ni-PGE Mineralised
Diamond Drill Hole
Photomicrograph of Cu-Ni-PGE Mineralization

Millerite

PdS

Cpy

Epd

alt. plag
High Rh, Low Cu, Leucogabbro

Metal Concentrations

Pt/Pd ratio >100 ppb PGEs

Cu vs Ni

Cu/Ni ratio >1 g/t PGEs

Total PGEs vs Cu+Ni

Pd vs Cu

Au vs Pt+Pd

Total PGEs vs Cu+Ni

Pt+Pd (ppb)

Au (ppb)

Cu (ppm)

Cu+Ni (ppm)

PGEs (ppb)

Frequency

Pt/Pd ratio

Pt/Pd ratio

Cu/Ni

Cu/Ni

Cu (ppm)

Cu (ppm)

Cu+Ni (ppm)

Cu+Ni (ppm)
PGE Concentration in a Fractionating Silicate Melt

Comparison to other Cu-Ni-PGE Deposits

- Very similar style of mineralization and geology to the Powder Hill and Vande Zones southwest of Legris Lake Complex

- Similarities to Lac des Iles and River Valley mafic-ultramafic complexes include:
  - Rock Types
  - Abundant igneous Breccias
  - Cu-Pd-rich Cu-Ni-PGE mineralization
Lac des Iles Mine
145 million tones
1.86 g/t PGEs

Stinger Zone 7.74 g/t PGEs

Vande Zone 2.23 g/t PGEs

Polar Zone 3.92 g/t PGEs

Stocker Zone 2.80 g/t PGEs

Powder Hill Zone 2.83 g/t PGEs

Lac des Iles Mine
145 million tones
1.86 g/t PGEs

Powder Hill Zone
Mineralized Leucogabbro
Summary 1

• The Legris Lake Complex is comprised mostly of 5ab leucogabbro and appears to be at a shallow level of erosion

• The northwestern border zone is characterized by numerous gabbroic intrusive and brecciation events

• The system, however, remained stable enough between brecciations to allow crystal fractionation to occur producing igneous layering in several phases
The Legris Lake mineralization is Cu and Pd-rich and occurs in coarse grained 5a* leucogabbro bodies with melanogabbro to clinopyroxenite bases.

A second style of Rh-rich and Cu-poor mineralization occurs.

The Cu-Ni-PGE mineralization is very similar to the Vande and Powder Hill zones to the southwest.

The geology of the Legris Lake Complex also bears similarities to the Lac des Iles and River Valley mafic-ultramafic complexes.