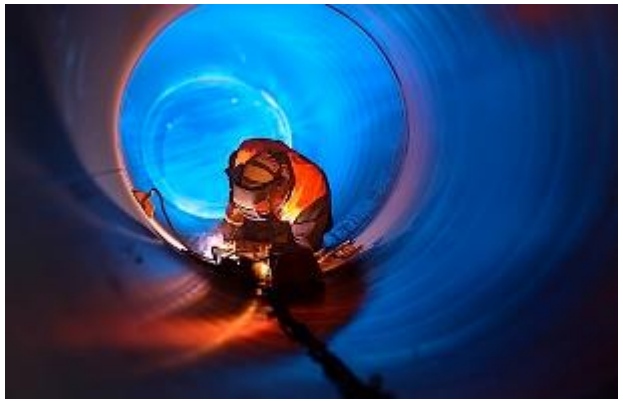
NioBay METALS

Diversified Junior Exploration Company

Crevier Project

May 2019

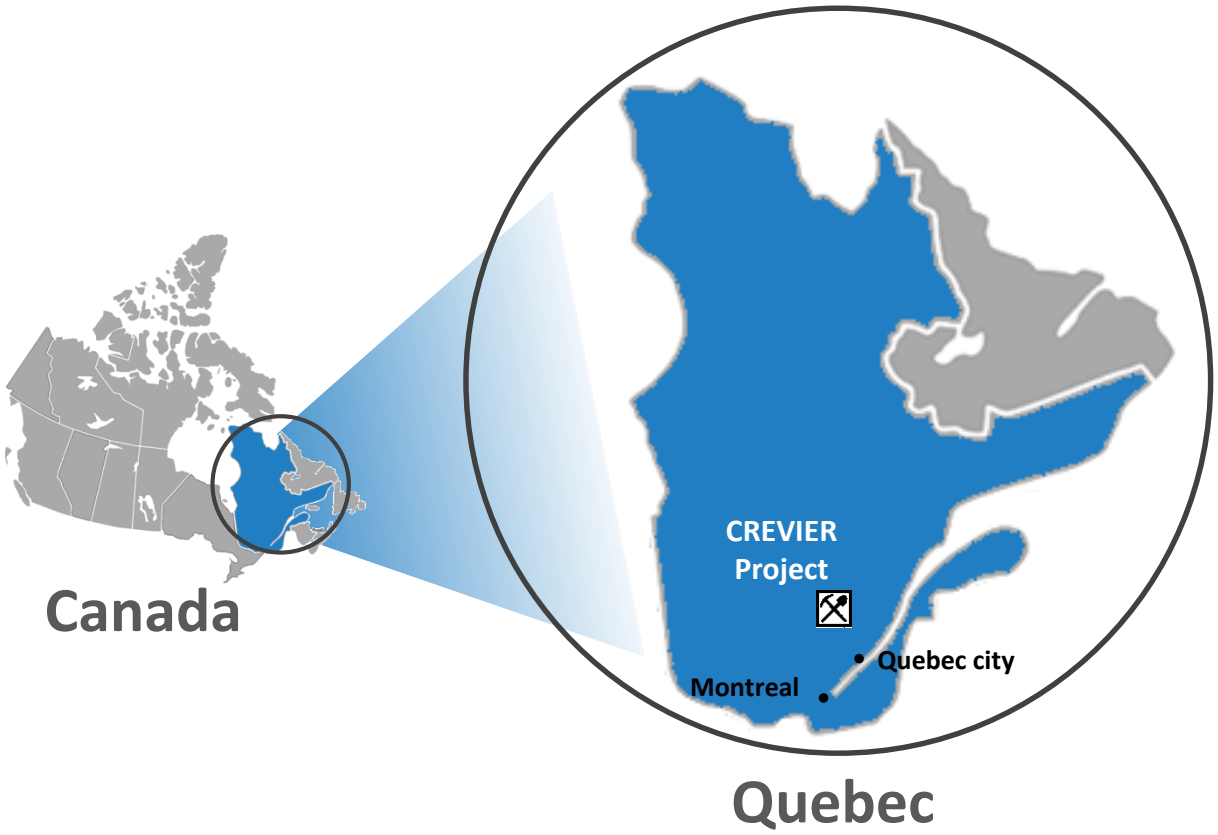




Introduction Crevier

- The Crevier Tantalum and Niobium project is located 65km north of the municipality of Girardville, Québec.
  - Two metals identified as green and critical by the United States and the EU.
  - Demand rising strongly in technological applications.
  - Crevier would become the only Niobium and Tantalum Oxide producer in North America.
  - Great potential for the economic and social development of the Saguenay-Lac-St-Jean region
- Deposit discovered by SOQUEM in 1974 and taken over by Cambior (1986).
- Acquired an 50% from Iamgold in 2008 for 7.5M$
  - Reimburse Convertible Debenture (1.5M$) in 2009
  - Invested 8M$ between 2008 till 2013.
- NioBay to continue the development of the project.

Location

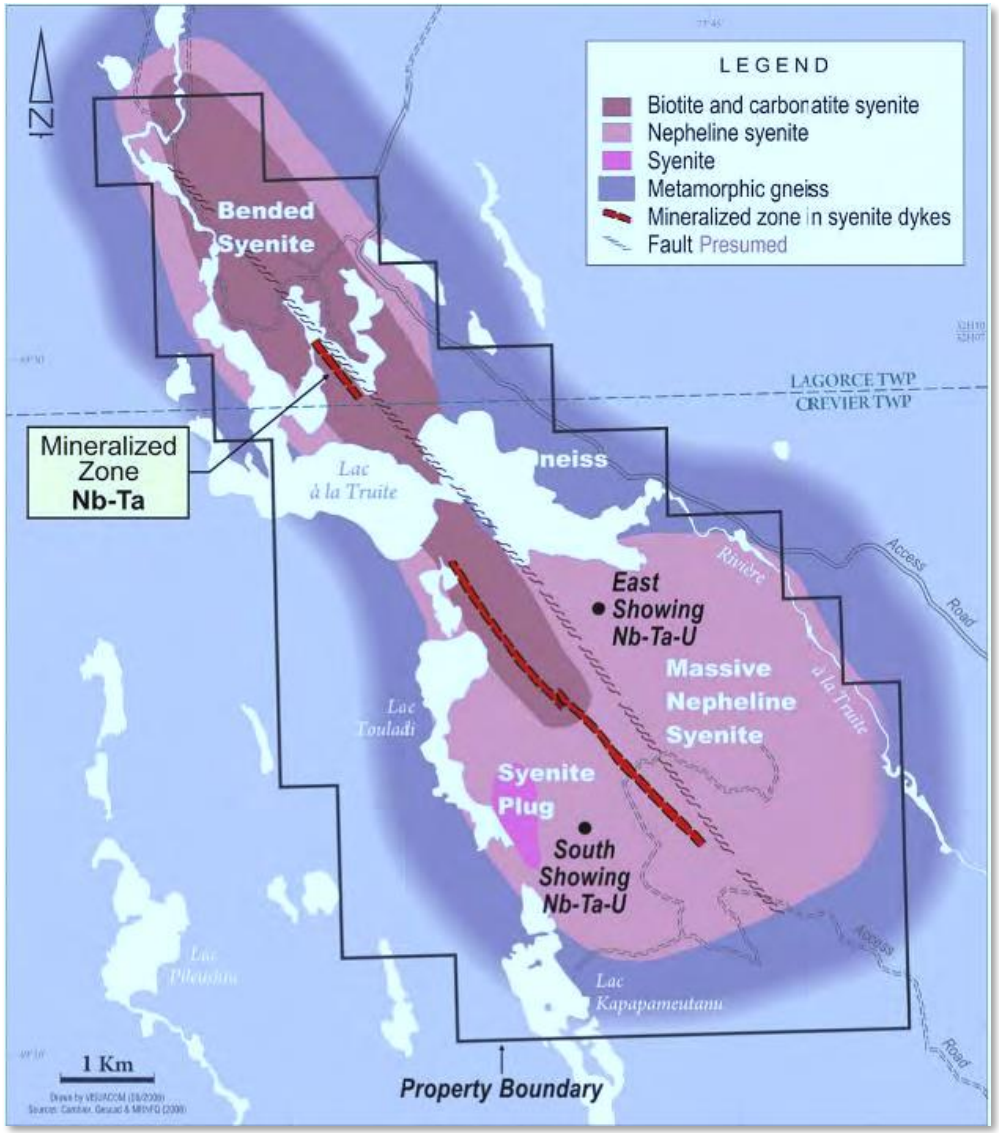
- Located in the mining friendly region of Lac St-Jean, province of Quebec, Canada.
- Supported by Quebec government's Plan Nord and local first nation group.

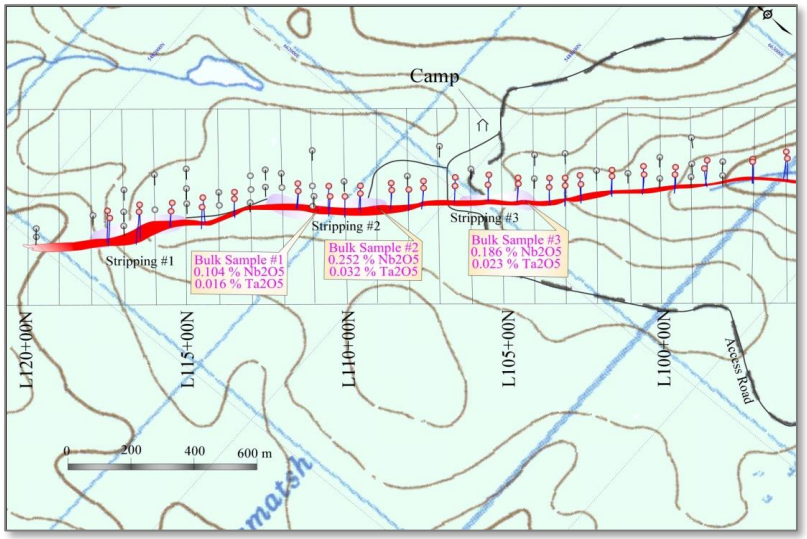


- Easy access:
  - 85 km north of Dolbeau-Mistassini.
  - Road access to site.
- Industrial region:
  - Rio Tinto Alcan smelters.
  - Deep water port.
- The project is welcomed all stakeholders.

NBY LISTED ON TMX

Deposit

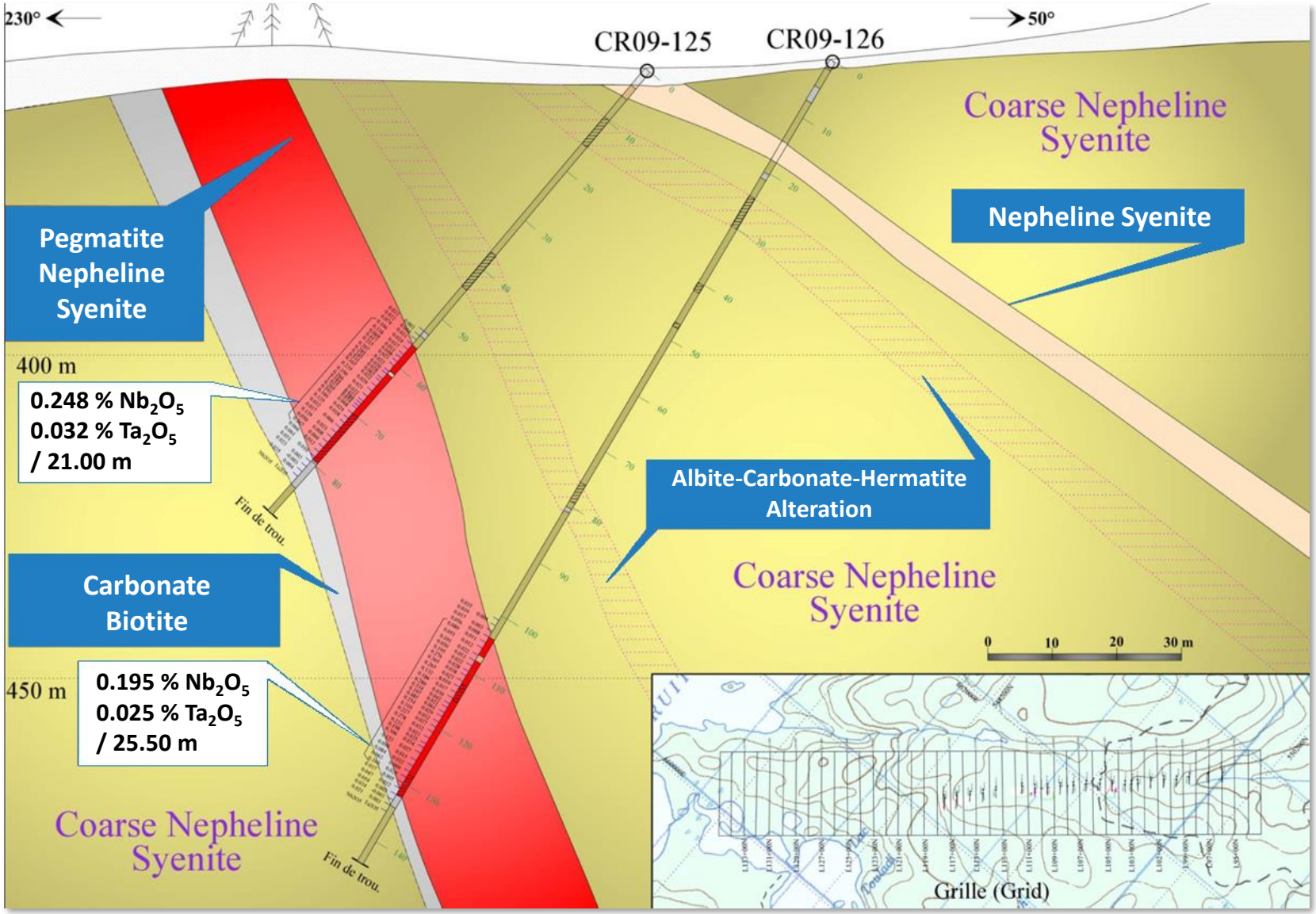

LEGEND
Biotite and carbonatite syenite
Nepheline syenite
Syenite
Metamorphic gneiss
Mineralized zone in syenite dykes
Fault Presumed
Bended Syenite
Mineralized Zone Nb-Ta
LAGORCE TWP
CREVIER TWP
Lac à la Truite
East Showing Nb-Ta-U
Massive Nepheline Syenite
Lac Touladi
Syenite Plug
South Showing Nb-Ta-U
Lac Kapapameutanu
Access Road
1 Km
Property Boundary


Camp
Stripping #1
Stripping #2
Stripping #3
Bulk Sample #1
0.104 % Nb2O5
0.016 % Ta2O5
Bulk Sample #2
0.252 % Nb2O5
0.032 % Ta2O5
Bulk Sample #3
0.186 % Nb2O5
0.023 % Ta2O5
L120+00N
L115+00N
L110+00N
L105+00N
L100+00N
Access Road
0
200
400
600 m

Mineralization

- The pegmatite nepheline syenite dyke is mainly composed by albite and nepheline with very large crystals.
- The other minerals are biotite, zircon, pyrochlore, magnetite, pyrrhotite and less frequently sodalite and cancrinite.
- Pyrochlore grains are disseminated between the Porphyric Nephiline crytals and are observed within sodalite in visible percentage.
- An ore petrography study indicate that niobium and tantalum are both contained in pyrochlore only, and apparently not partitioned into other accessory minerals.

Geology Section



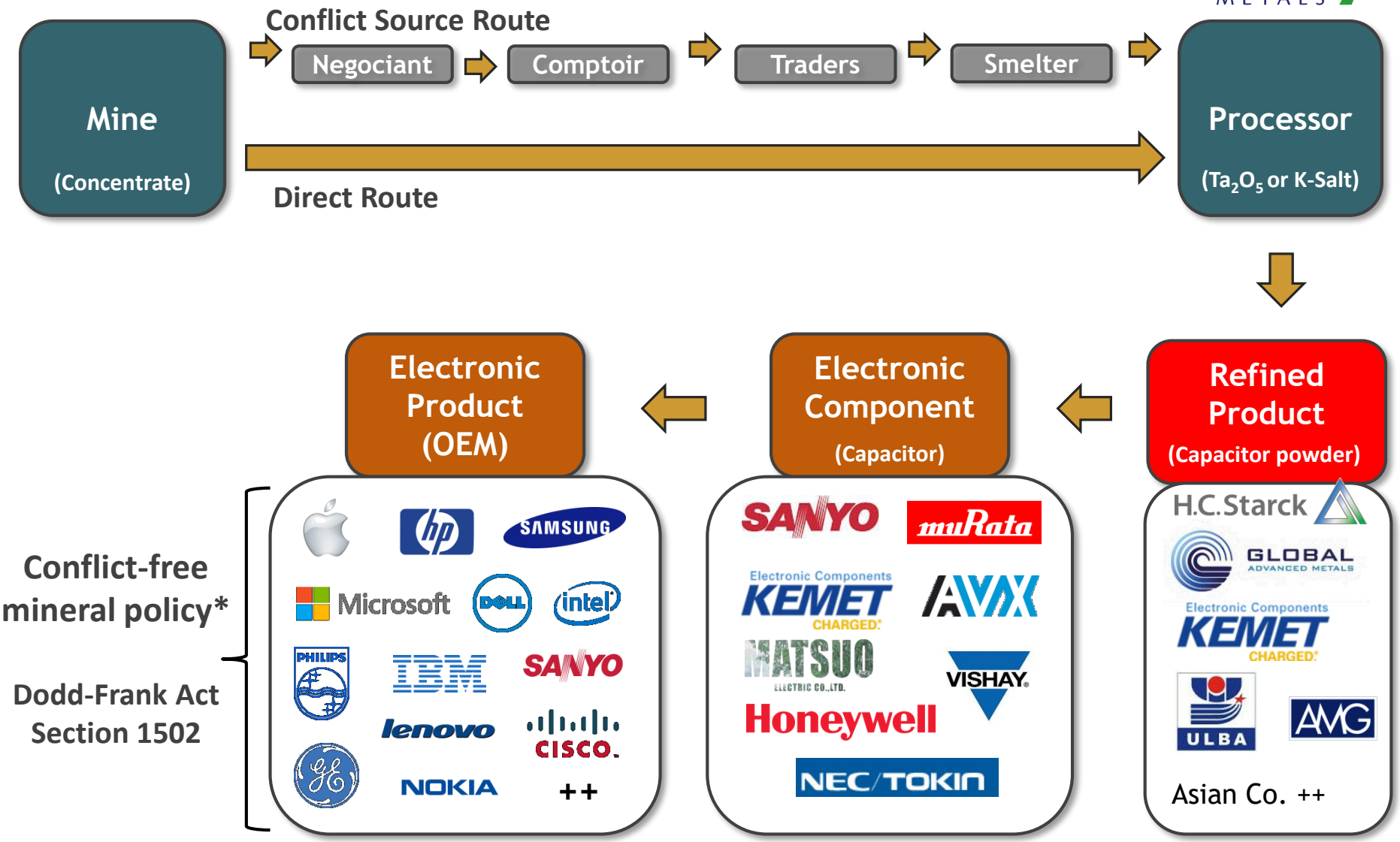
Resources (NI 43-101)

- World class Niobium and Tantalum resource:
  - Comparable grades to actual producing mines and developing projects.
  - 25+ years of mine life at 1 million tons per year throughput.
  - Exploration works are to extend the resource southeast.

	Tonnage (Million tons)	Grade	
		Nb_2O_5 (%)	Ta_2O_5 (ppm)
Measured	12.5	0.20	234
Indicated	12.9	0.19	234
Total (M+I)	**25.4**	**0.20**	**234**
Inferred	15.4	0.17	252

NI 43-101 Resources update on Crevier property, July 2010.
Mineral resource within the geological deposit, 0.1% Nb2O5 cutoff grade.
Niobium: High grades cut to 0.5% Nb2O5.
Tantalum: High grades cut to 550 ppm Ta2O5.

Tantalum - Electronics Supply Chain



- *OEMs spend millions of dollars to ensure their products contains conflict-free minerals.

Niobium - Superalloys Supply Chain

NioBay METALS

Crevier Mine/Processor
(Concentrate) ➡ (Nb_2O_5)

Crevier (?) Alloys manufacturer
(Masteralloys) ➡ (Superalloys)

H.C.Starck
SPECIAL METALS A PCC Company
HAYNES International
AMG
GfE
CARPENTER Specialty Alloys
ATI

Jet Engine Component

GE Aviation
WYMAN GORDON A PCC Company
TURBOCAM INTERNATIONAL
Firth Rixson
GKN AEROSPACE
BTI
Precision Components International

Jet Engine Manufacturer

GE Aviation
cfm
Pratt & Whitney A United Technologies Company
Rolls-Royce
IAE International Aero Engines
Honeywell | Aerospace
SAFRAN Snecma
НПО САТУРН

Aircraft Manufacturer

BOEING
AIRBUS
MHI
BOMBARDIER
LOCKHEED MARTIN
DASSAULT AVIATION
EMBRAER

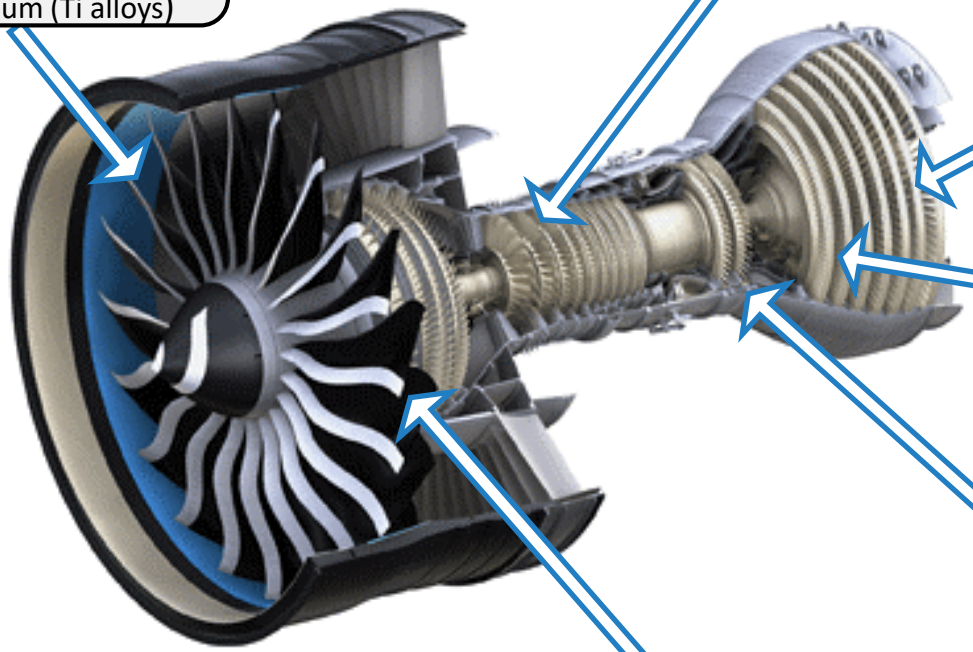
NBY LISTED ON TMX

Superalloys: Jet Engine Main Components

FAN BLADES
Cobalt, Chromium
Niobium
Tantalum
Titanium, Tungsten
Vanadium (Ti alloys)

HP COMPRESSOR DISCS
Cobalt, Chromium, Hafnium
Tantalum
Titanium, Tungsten
Vanadium (Ti alloys)

LP TURBINE BLADES
Cobalt, Chromium
Niobium
Tantalum
Tungsten



HP TURBINE DISCS
Cobalt
Chromium
Tantalum
Tungsten

HP TURBINE BLADES
Cobalt, Chromium
Hafnium, Platinum
Rhenium, Rare Earths
Tantalum
Tungsten

ANCILLARIES & CONTROL SYSTEMS
Cobalt
Rare Earths
Tantalum

LP COMPRESSOR DISCS
Cobalt, Chromium
Niobium
Tantalum
Tungsten

- Source: Adapted from AMG
- Other Nb and Ta products includes fasteners, bolts, shafts, etc.

Metallurgy

- SGS Pilot plant testing in 2012.
  - Using approximately 250 tonnes of mineralization collected from a near-surface location grading 0.02% Ta2O5 and 0.21% Nb2O5, similar to the resource average
- SGS Hydromet testing in 2012.
  - Confirmed the amenability of the Crevier pre-concentrate to HF/H2SO4-SX refining
- COREM Pilot plant testing in 2013.
  - Using 50 tons of material at an average of 0.24% Nb2O5 & 0.03% Ta2O5 in the feed.
- The pilot plant achieved higher Ta & Nb recoveries than the associated laboratory tests, but lower grade (due to the higher CaO in the concentrate).

- From the reviewed methods, H_2SO_4 based route seems to be the most promising. Combination with other concept(s) may also be needed to achieve the target performances .
- Assess the opportunity of HF regeneration.

Environment

- According to the Department of Natural Resources and Wildlife (MRNF) and the Ministry of Sustainable Development, Environment and Parks (MDDEP),
  - No mention of plants threatened, vulnerable or likely to be so designated is reported for the area covered by the Project.
  - No exceptional forest ecosystem is listed in the study area.
  - No wildlife habitats, mapped according to the regulations, is currently protected except for the fish habitat that consists of all the lakes, marshes, swamps, floodplains or streams where there are fish.
- Still need to identify any environments incompatible with development and the need for an impact statement for the BAPE.

Crevier Project: Planning

- 2010 ▪ Preliminary Economic Assessment.
- 2010 ▪ Resources update (NI 43-101).
- 2012 ▪ Pilot plant SGS.
- 2013 ▪ Pilot Plant COREM.

Done

- 1975: Discovery by SOQUEM
- 1986: Transfer to Cambior
- 2006: Iamgold buy Cambior
- 2008: Crevier Minerals Inc. (CMI) acquire the property from Iamgold in exchange of a 50% stake in CMI
- 2009: increase its equity in CMI to 72.5%
- 2023: Production

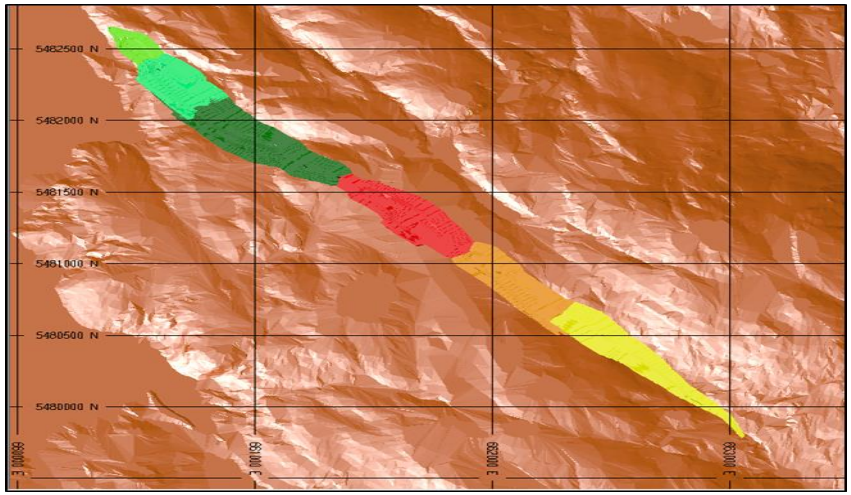
To do

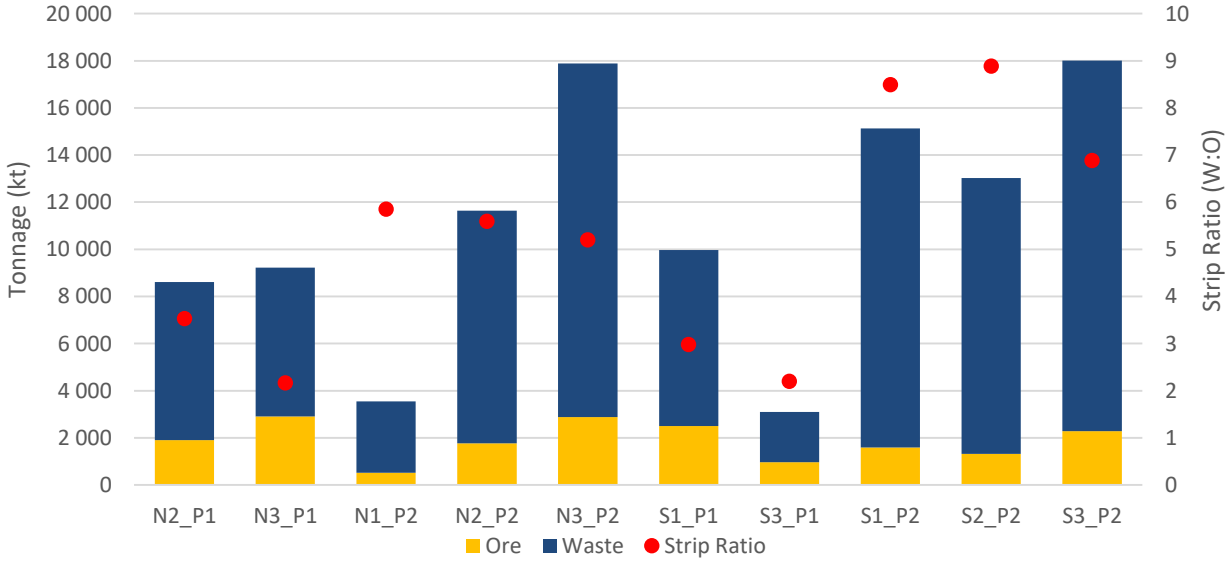
- Update PEA of 2010 (underway, G Mining).
- Complete metallurgical works (H2 2019).
- Complete Feasibility Study
  - Improve metallurgy
  - Permitting
  - Environmental studies
  - Engineering
- Financing and construction

Update Prefeasibility 2019

- Open Pit Optimization vs 2010
  - 6 smaller pits vs 1
  - Reduction strip ratio first years
  - 75% of waste disposed in pits
- Reduction of the strip ratio (<24%) mainly first years.

- CAPEX & OPEX
  - Reduction expected vs 2010.
    - Power
    - Reagents





Strategy

- NBY intend to create a Niobium and Tantalum mine-to-smelter industry in North-America.

Crevier Mine in Quebec

- **Tantalum oxide / K-salt: Offtake. TBC**
- **Niobium oxide: Alloys manufacture by Crevier?**

Local Financial Partners

- Discussion over construction of a Demonstration plant.

Ta

- **Offtakes** agreements with actual processors.
  - Focus toward Ta processors.

Nb

- Create a J.V. to build a **new Alloys manufacturing** facility in Quebec.
  - Focus toward Nb alloys & metal (Ta may be included).
  - Masteralloys end-users.
  - Speciality metals producers.
  - Price and supply stability.

- **Aerospace:**
  - Superalloys, NiNb, VG/HP FeNb
- **Superconductors:**
  - Nb & Ta Metal

Conclusion

- The Crevier deposit hosts a world-class resource of Niobium & Tantalum.
- Only Niobium & Tantalum project in North America.
- Demand growth fundamentals are strong.
- Consolidation trend in the supply chains in order to secure supply.
  - Well developed end-market in North America.
- Solid economic study results.
- Opportunities;
  - Reduction CAPEX (powerline & contract mining).
  - Pre-concentration (reduction of reagents consumption, fastest payback).