

# Exploration for and Evaluation of pegmatitic Lithium Deposit in Ontario, Canada

Lithium  
From Exploration to End-user

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TÜV NORD GROUP



**DMT**



The  
Geological  
Society

*servicing science & profession*

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## DMT at a Glance

DMT as part of the TÜV NORD GROUP

### TÜV NORD GROUP

Headquarters in Hannover, Germany



Industrial Service,  
Mobility, Education



Natural Resources



Aerospace



Information Technology

# 1 DMT at a Glance

## Facts & Figures

The international engineering & consulting service provider DMT serves the four markets **Mining, Infrastructure & Civil Engineering, Oil & Gas, and Plant & Process Engineering.**



We provide independent services in engineering, consulting, exploration and geotechnics, as well as measuring and research.



DMT's **roots** dating back to **1864**



About **1.000 employees** mainly with academic background



DMT comprising **13 operational consulting and engineering companies**



DMT's attitude is dedicated to **excellence, responsibility & innovation**



About **110 million € turnover**



Today **DMT** is a **core brand** of **TÜV NORD GROUP**

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## Markets & Projects

Focus Markets



# Location of the lithium mine project

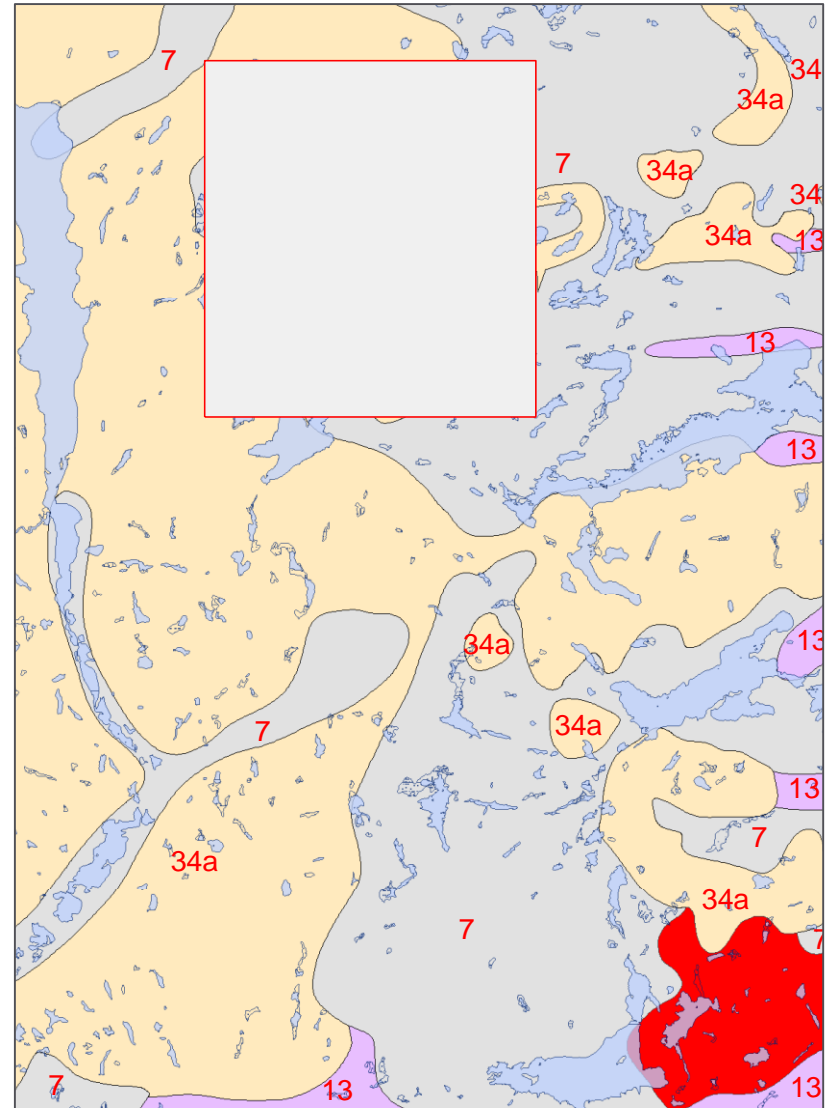
- Rock Tech Lithium Inc. ("Rock Tech") of Vancouver, British Columbia, Canada
- Georgia Lake Lithium Project
- approximately 160 km northeast of Thunder Bay



# Geology of the Area

## Legend

- 35 Carbonatite-alkalic intrusive suite (1.0 to 1.2 Ga)
- 34a Logan and Nipigon sills (1109 Ma): diabase sills
- 7 Metasedimentary rocks
- 13 Muscovite-bearing granitic rock
- 15 Massive granodiorite to granite
- Area of interest



<http://www.mndm.gov.on.ca/en/mines-and-minerals>

# DMT and Rocktech Lithium Inc.

DMT is currently supporting the Canadian exploration company Rock Tech Lithium Inc. in the development of the Georgia Lake lithium project in Canada.

## Overview of the Project

The spodumene-bearing pegmatites of the Georgia Lake area, located some 145 kilometers northeast of the city of Thunder Bay, Ontario, were discovered in 1955. Subsequent to the discovery, the area was subjected to a staking rush and significant exploration work by various operators until 1958.

The principal means of access to the area is Ontario Provincial Highway No. 11. From the Provincial Highway, an extensive network of gravel and tertiary bush roads provide access to the area of interest.

Geologically, the area is underlain by metasediments and metavolcanics of Archean age, trending east-northeast to west-southwest, in steeply dipping beds along the south flank of a regional syncline. These metasediments were invaded by large masses of Algoman granitic rocks and by numerous sills and dykes of genetically related porphyry, pegmatite and aplite.

These Archean metasediments are overlain by a thin cover of Sibley sediments which were subsequently intruded by diabase dykes and sills of Proterozoic age.

The Georgia Lake pegmatites contain lithium- and rare metals-bearing spodumene at many places in the area. In addition to spodumene, historical work also identified beryl, columbite, molybdenite, amblygonite, apatite, and bityite, enhancing the lithium and rare metals potential of the area.

**In the Field on the Way to the Project Area**





# Exploration

- Between 1955 and 2017, 567 boreholes were made, 56646 meters were drilled and 150 channel samples were taken



**Channel Samples**

## Trench in glacial sediments showing the geological details



# Outcrops of the Spondumene Pegmatite



# Cleaning of the ground and taking channel samples for further analyses



channel sampling



spondumene pegmatite

## Examples of the spondumene minerals



example of a 1 meter long spondumene minerals

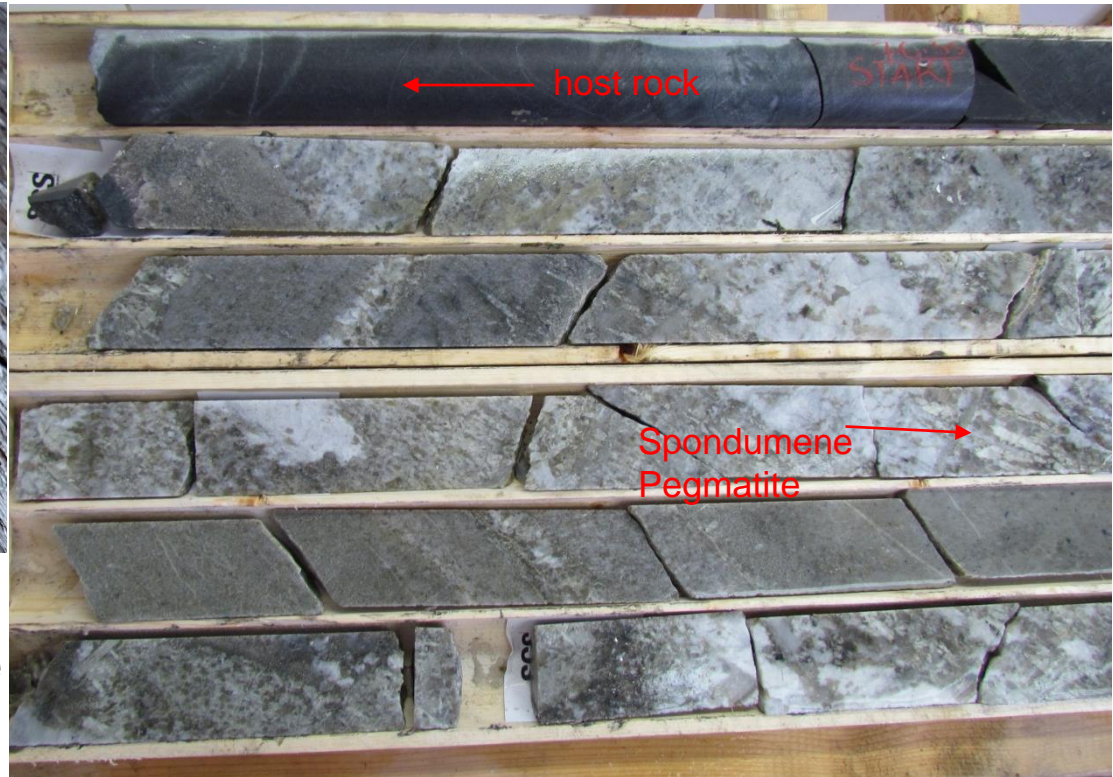


core yard with more than 20.000 m of drill cores

# Hand rock sample and core box with spondumene pegmatites and host rocks



hand rock sample with spondumene



core box showing spondumene pegmatites and host rock

## Detailed look at the spondumene pegmatite mineralization



scanned surface of drill core with the Core scanner showing green spondumene orientated minerals in quartz, feldspar and rare mica ( 180° surface 10x22 cm)

# Exploration equipment

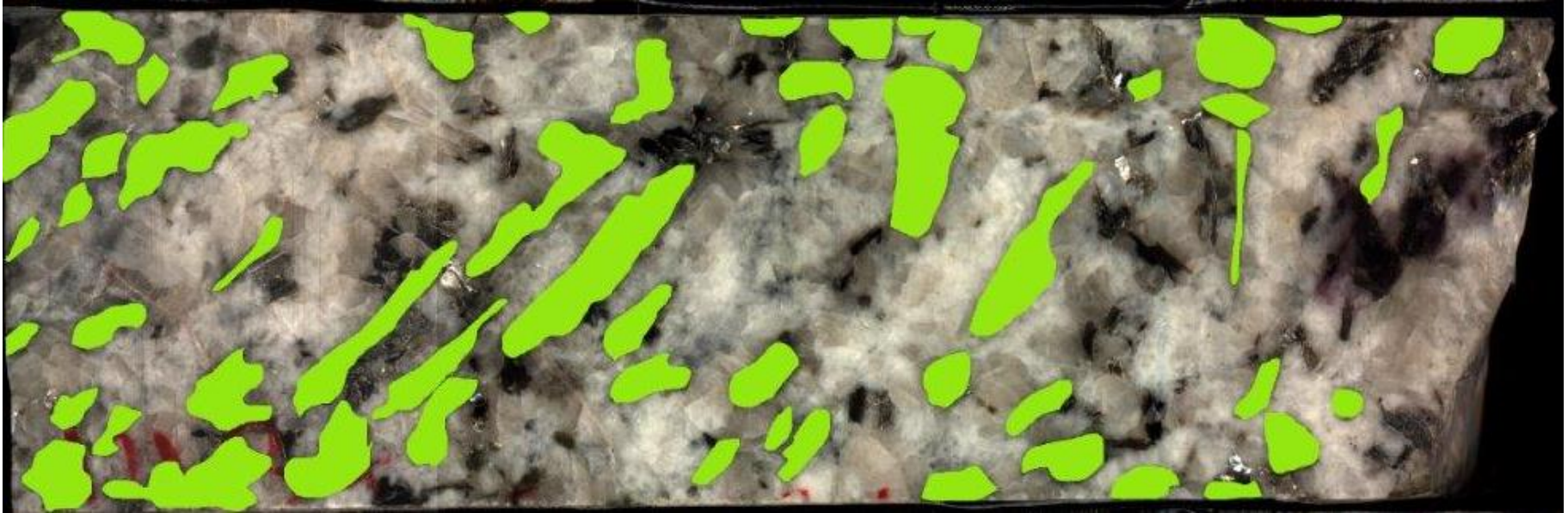
Using the core scanner for structure analysis and image investigation for the quantitative volume percentage of spondumene minerals

- 360° core image
- Structure analysis and presentation
- Derivation of geotechnical parameters (RQD)
- For further details : [www.corescan.de](http://www.corescan.de)





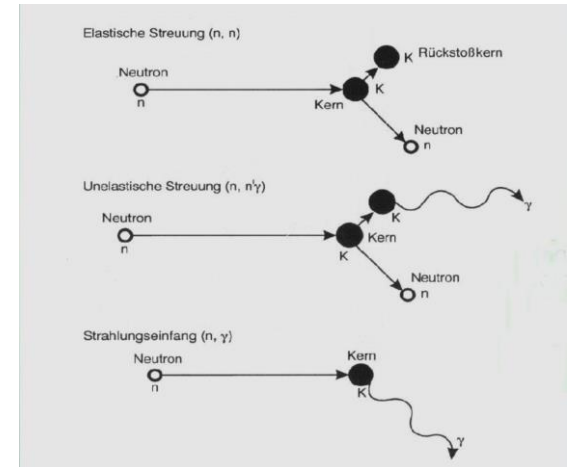
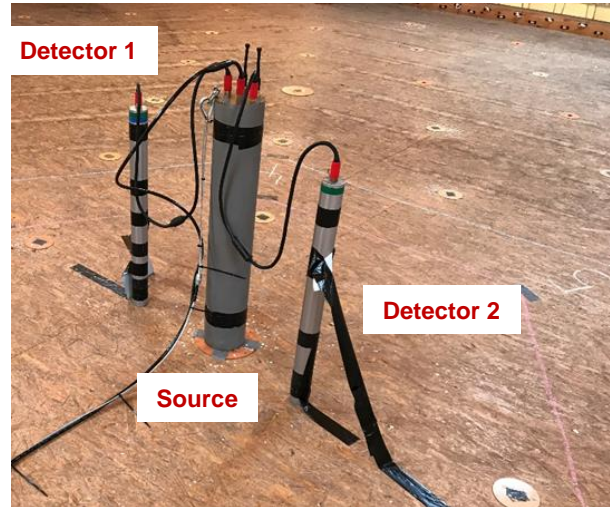
## Using image analyzing in order to define the volume of spondumene minerals



In this core 21% of the minerals are spondumene

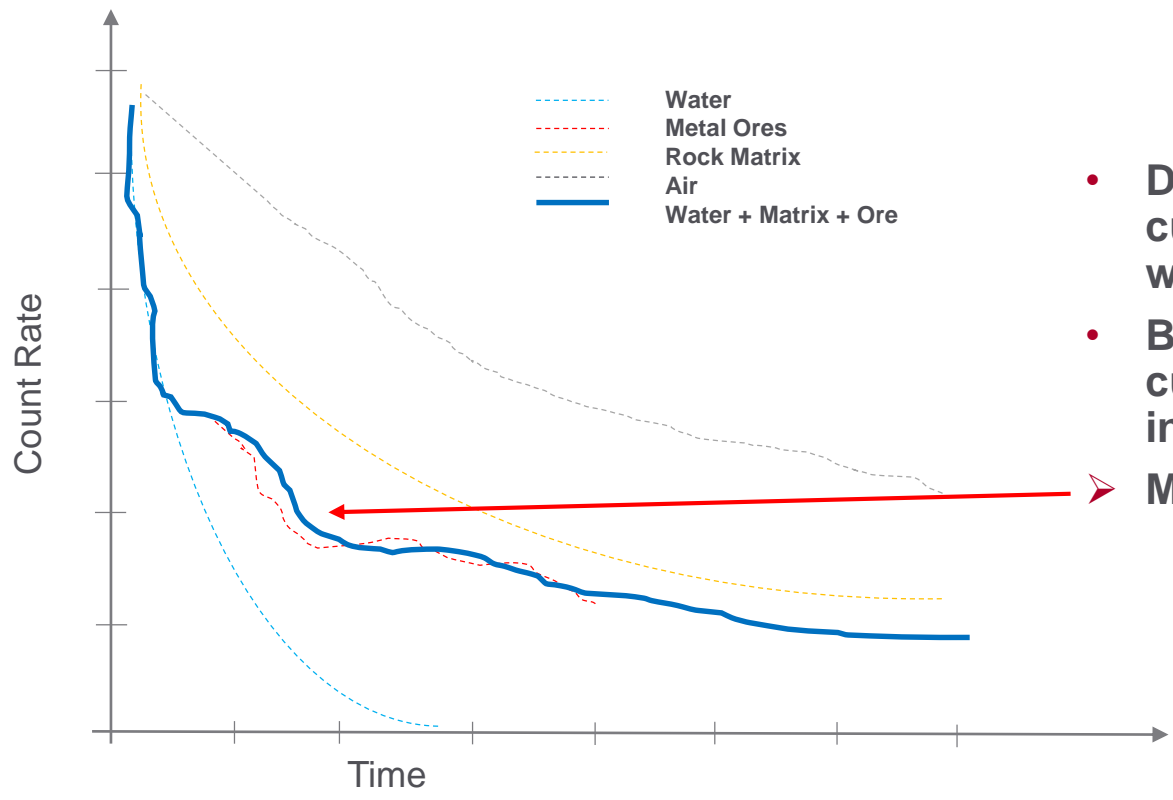
# Planned further Exploration for spondumene pegmatite with the Pulsed Neutron Neutron system

Chemical element	$\sigma_a$ , barn	$\bar{\sigma}_s$ , barn
$^1_1\text{H}$	$0,328 \pm 0,002$	$38 \pm 4$ (gas)
$^3_2\text{He}$	0	$0,8 \pm 0,2$
$^6_3\text{Li}$	$70,4 \pm 0,4$	$1,4 \pm 0,3$
$^9_4\text{Be}$	$0,010 \pm 0,001$	$7 \pm 1$
$^{10}_5\text{B}$	$758 \pm 4$	$4 \pm 1$
$^{12}_6\text{C}$	$(3,73 \pm 0,07) 10^{-3}$	$4,8 \pm 0,2$
$^{14}_7\text{N}$	$1,88 \pm 0,05$	$10 \pm 1$
$^{16}_8\text{O}$	$< 1 10^{-4}$	$4,2 \pm 0,3$
$^{19}_9\text{F}$	$< 1 10^{-2}$	$3,9 \pm 0,2$
$^{20}_{10}\text{Ne}$	$0,032 \pm 0,009$	$2,4 \pm 0,3$
$^{23}_{11}\text{Na}$	$0,531 \pm 0,008$	$4,0 \pm 0,5$
$^{24}_{12}\text{Mg}$	$0,063 \pm 0,003$	$3,6 \pm 0,4$
$^{27}_{13}\text{Al}$	$0,241 \pm 0,003$	$1,4 \pm 0,1$
$^{28}_{14}\text{Si}$	$0,16 \pm 0,02$	$1,7 \pm 0,3$
$^{31}_{15}\text{P}$	$0,20 \pm 0,02$	$5 \pm 1$
$^{32}_{16}\text{S}$	$0,52 \pm 0,02$	$1,1 \pm 0,2$
$^{35}_{17}\text{Cl}$	$33,8 \pm 1,1$	$16 \pm 1$



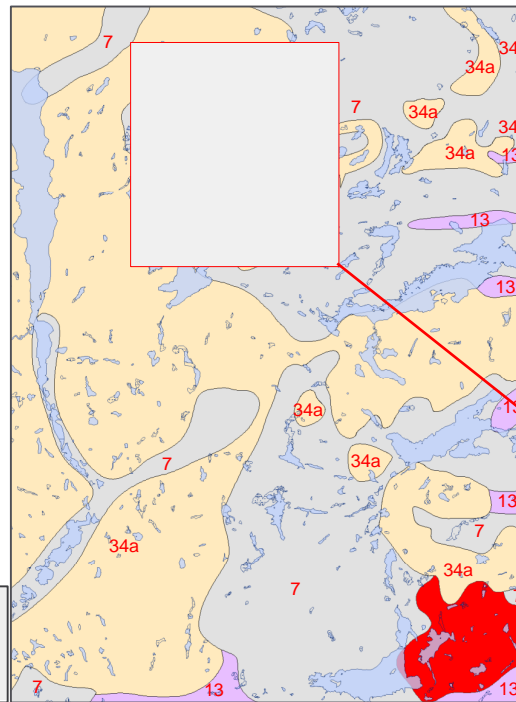
- Pulsed Neutron Source – release of  $10^6$  neutrons
- Neutron Energy = 14 MeV
- Slow Down of neutrons by elastic and inelastic scattering
- Thermic Neutrons – radiation capture
- Lithium – large capture cross section
- neutron incorporation

# Planned further Exploration for spondumene pegmatite with the Pulsed Neutron Neutron system



- Dashed curves – typical decay curves for different materials which often occur in rocks
- Blue curve – combined decay curve of all materials occurring in a rock sample
- Metal ore indicator

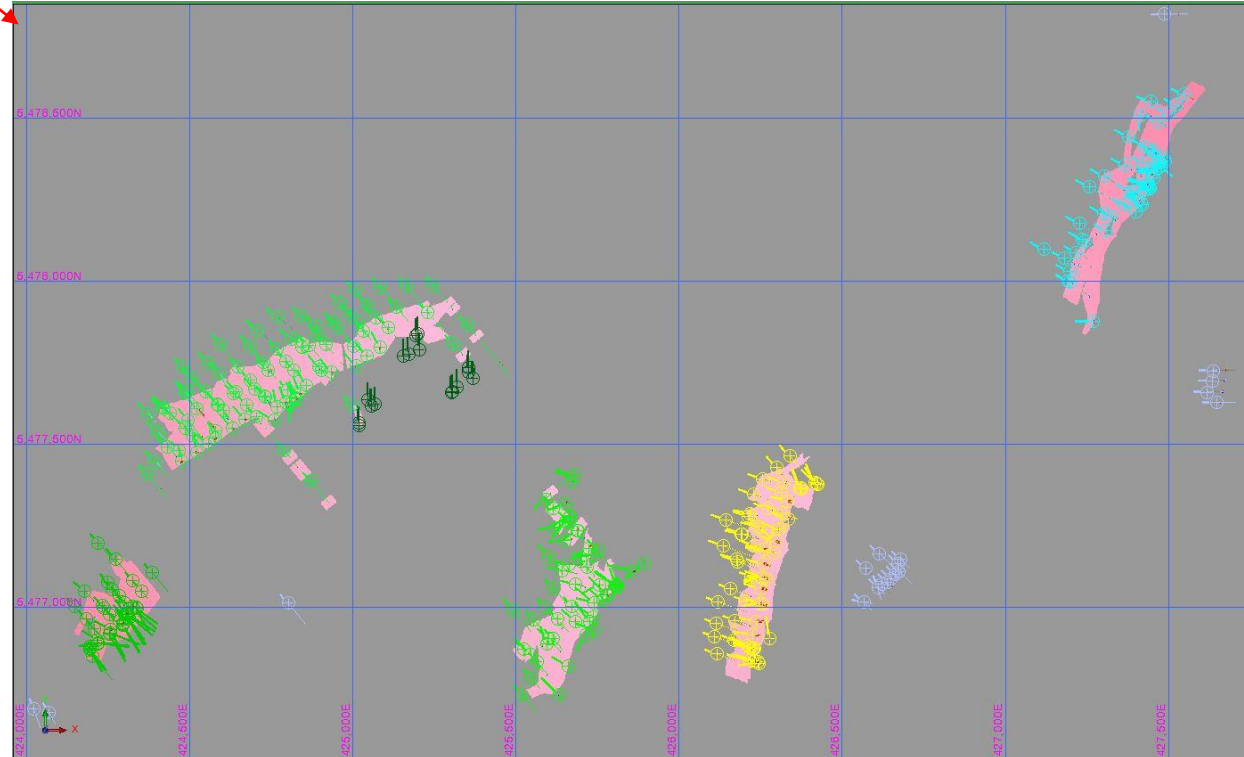
# Resource evaluation of the lithium mine project



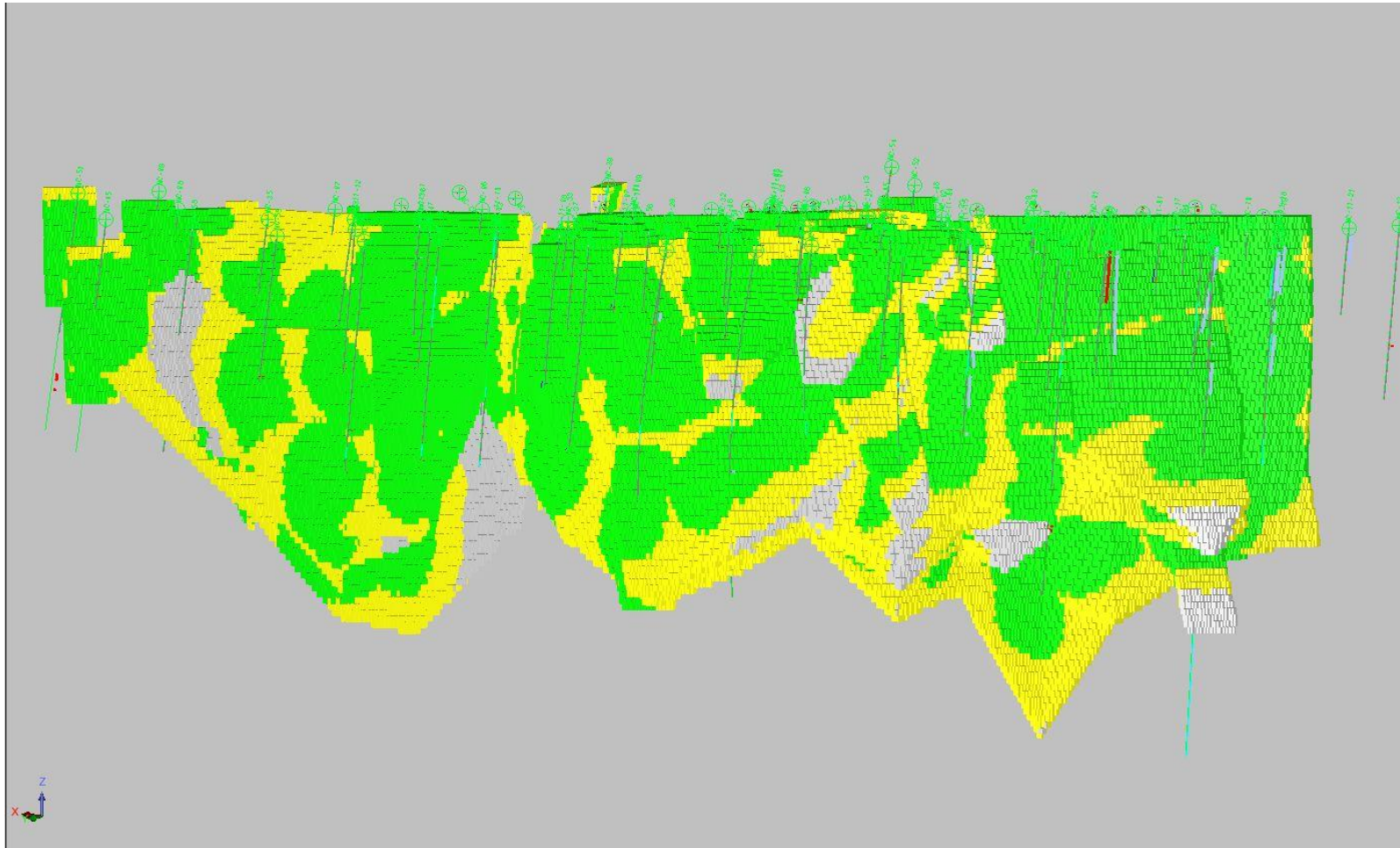
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**5 pegmatites were modeled in 3D with the creation of a block model**



# Estimation of geological resources with different distances to the outcrops and boreholes in a 3D block model



# Lithium recourses

- Additional inferred resource from all drilling and trenching on current claims and dispositions; a 0.6 % Li<sub>2</sub>O cut-off grade was applied.

## Resource Estimate

In October 2012, the Company released an updated NI 43-101 compliant resource estimate that included the following:

- Indicated resource: 3.19 million tons grading 1.10% Li<sub>2</sub>O
- Inferred resource: 6.31 million tons grading 1.00% Li<sub>2</sub>O

Metallurgical tests show:

- Concentration of high-grade spodumene from high and low grade mineralized material;
- Recovery rate of 75.5% utilizing heavy liquid separation; and
- Recovery rate of 81.1% utilizing floatation.

Hydrometallurgical tests show:

- Production of Li<sub>2</sub>CO<sub>3</sub> with a purity of 99.96% without any process optimization; and
- Production of Li<sub>2</sub>CO<sub>3</sub> with a purity of 99.98% with bicarbonate scrubbing.

## Outlook of further work

- **A new resource statement is under development based on new drilling and sampling results. The validation of the model and underlying data is in progress and new surface data are implemented.**
- **The next steps will be the Preliminary Economic Assessment (PEA) study**
- **Ongoing good communication and integration of the First Nation in the workflow will be further realized**

# Thank you for your attention.

## I look forward to your questions, wishes and suggestions.

Σας ευχαριστώ για την προσοχή σας.

**Gracias por su atención.**

**Vielen Dank für Ihre Aufmerksamkeit.**

आपका ध्यान के लिए धन्यवाद.

**İlginiz için teşekkür ederiz.**

ご清聴ありがとうございました

Dank u voor uw aandacht.

感謝您的關注

Obrigado pela vossa atenção.

Спасибо за внимание.

ขอบคุณสำหรับความสนใจของคุณ

**Thank you for your attention.**

당신의주의를 당신을 감사하십시오

**Dziękuję za uwagę.**

**Tack för er uppmärksamhet.**

شكرا لكم على اهتمامكم

Tak for din opmærksomhed.

