



Remediation of the Gunnar Uranium Mine and Mill Site

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Saskatchewan Research Council

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SRC Overview

SRC is Canada's second largest research and technology organization and has worked with industry, government and communities around the world for 75 years.

Role as a Treasury Board Crown Corporation

SRC is governed by The Research Council Act. It is overseen by an independent Board of Directors and is accountable to the Minister Responsible for SRC.

We receive a portion of our funding from government with the remainder coming from contract research and fee-for-service work.

You can learn more about SRC from our booth in the registration hall.



Project CLEANS

Cleanup of Abandoned Northern Sites

- Started in 2007
- Managed by SRC Environmental Remediation Unit
- Regulated by CNSC and SK Ministry of Environment
- Funded by:

**Province of Saskatchewan
Ministry of Energy &
Resources**

**Government of Canada
Natural Resources Canada**

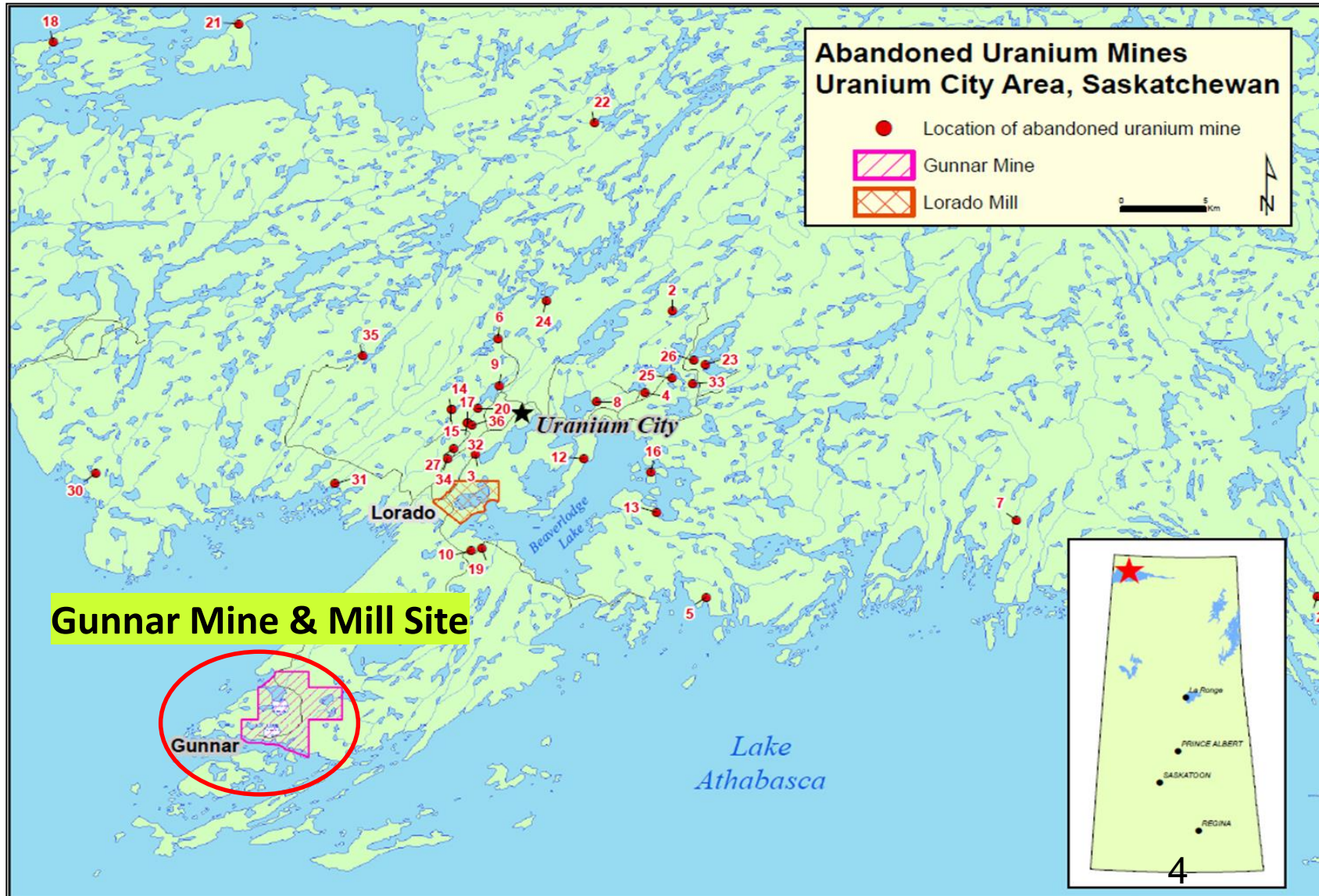
- The project includes 37 sites:
 - ✓ Gunnar Uranium Mine and Mill Site
 - ✓ Lorado Uranium Mill Site
 - ✓ 35 legacy uranium mine sites



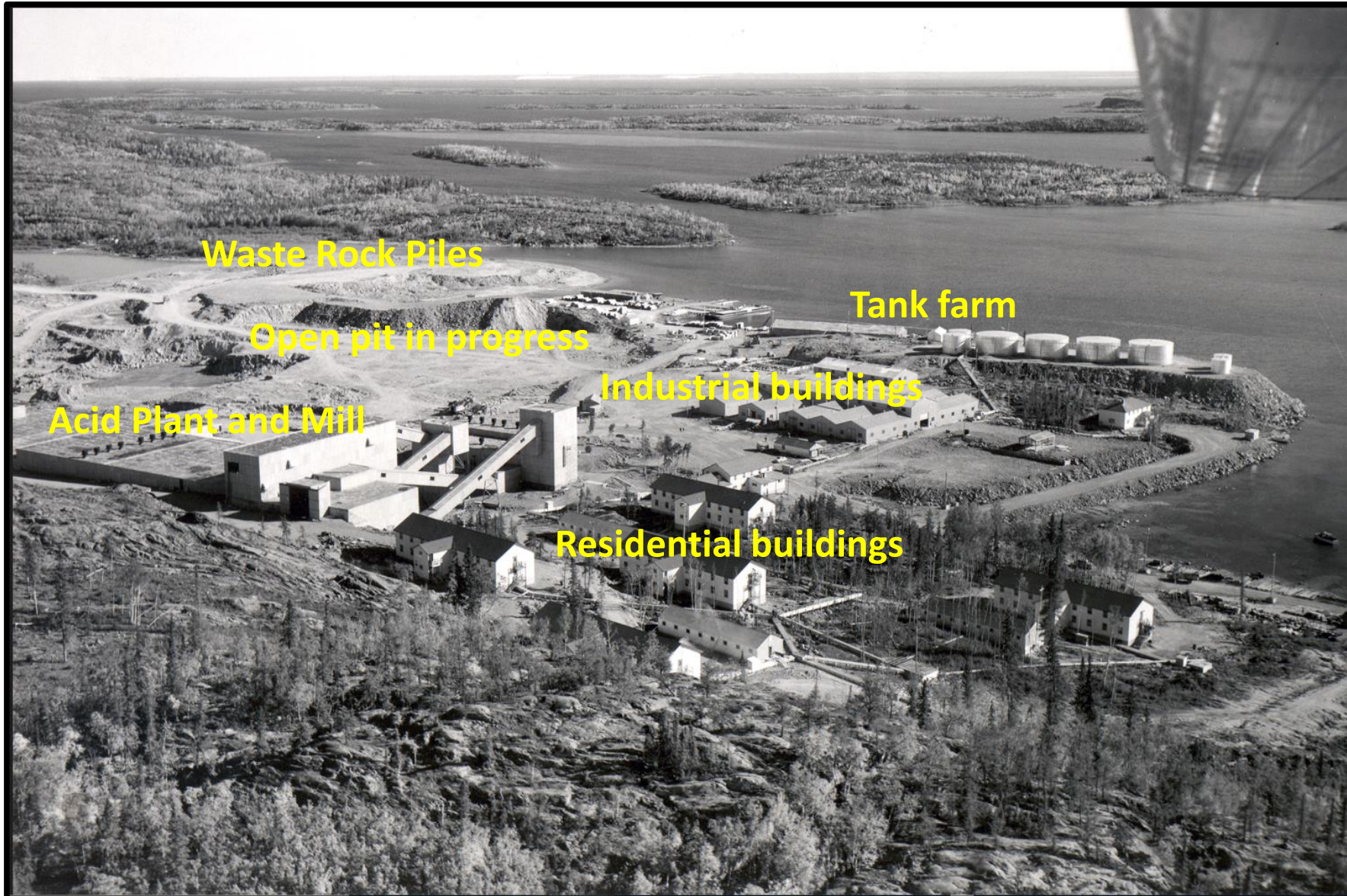
CLEANS logo:

The concept was suggested by a school student from Uranium City

CLEANS Sites



Gunnar Mine & Mill Site (1957)



Gunnar Mine & Mill Site (2008)



Gunnar Industrial Facilities (2008)

Mine headframe



Mill buildings



Acid plant with residual
elemental sulfur

Inside the Mill Buildings (2003)

Ore Storage Bins

Product Packaging Area



Residence Buildings Structurally Unsound (2008)



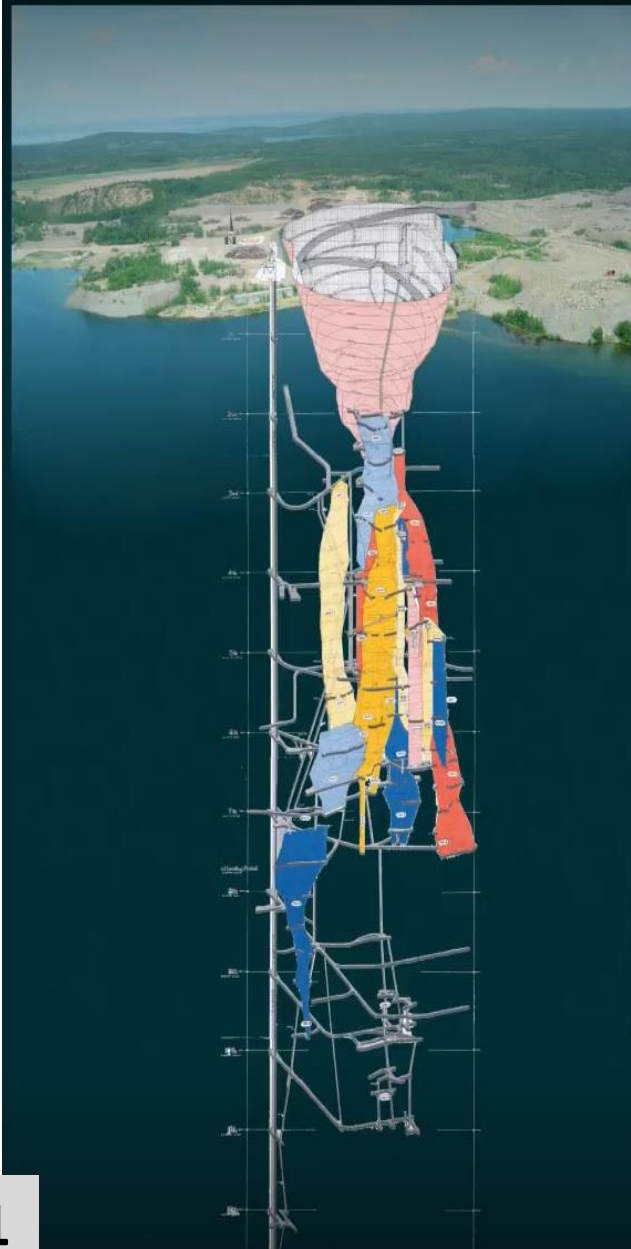
Asbestos

Asbestos wall and pipe insulation (friable)



Asbestos siding
(non-friable)

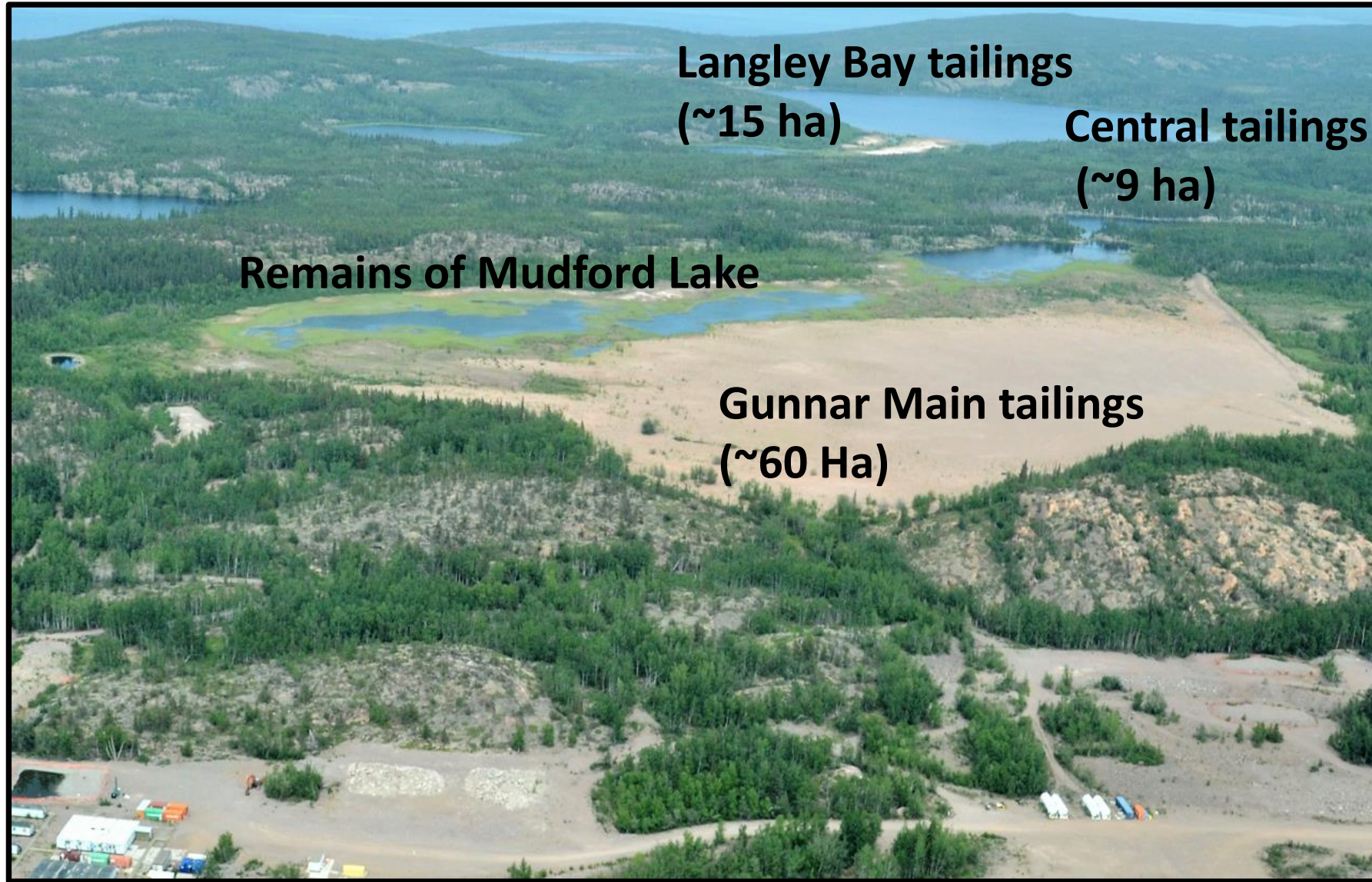
Gunnar Open Pit and Mineworking



The pit & mineworking were flooded deliberately for safety reasons in 1964



Gunnar Tailings Deposits (2013)



Remains of Mudford Lake at Gunnar Main Tailings



Waste Rock deposits (2013)



Summary of the Site Hazards

- **Radiation**
 - Tailings Areas (up to 20 $\mu\text{Sv/h}$)
 - Waste Rock Piles (up to 10 $\mu\text{Sv/h}$)
 - General site (Up to 5 $\mu\text{Sv/h}$)
- **Asbestos containing materials**
- **PHC and uranium/trace metals**
 - Soil
 - Surface and ground water
- **Physical**
 - Remaining infrastructure
 - Mine headframe/openings
 - Waste rock piles
 - Mining and mill debris



Challenges

- **Remote location – the only access is by plane, barge or via 100 km ice road**
- **Lack of reliable historical information**
- **Unspecified endpoint criteria**
- **Various levels of regulatory and government involvement (federal and provincial)**
- **Building relationships with local communities**
 - ✓ Public risk assessment (discussion on criteria and scenarios)
 - ✓ Community high expectations and concerns
 - ✓ Differing opinions on remediation options

Urgent Demolition (2011)



Remediation Approach

Multiple consultations with project stakeholders and affected communities for all the parties understand and agree with the project goals and remediation approach, as follows:

- Build 2 on-site “dry tomb” landfills for the demolition debris and legacy waste including asbestos, radioactive waste, and hydrocarbon contaminated soil
- Profile the tailings and create an engineered cover of 0.5 m of clean till for radiation shielding $<1.14 \mu\text{Sv/h}$, and then re-vegetate
- Grade waste rock piles to $<1:4$, cover with 0.5 m of clean till or clean rock, and then re-vegetate
- Restore historical channel between the waste rock piles to reduce contaminant mobilization and transport to the lake.
- Install stainless steel caps over 3 mine openings
- Identify and remove “hot spots” with elevated in the Townsite footprint
- Establish long-term monitoring network in all the areas

Landfill A (ACM, metal, concrete, wood)



Landfill B (PHC & pH impacted, radioactive waste)



Capping Mine Openings



Waste Rock Profiling and Covering

October 2022



Tailings Cover Construction completed



2017

2022



Gunnar Tailings: Before and Now

1955



2013



2022 June



2022 October



Remaining Tailings



Gunnar Remediation Timeline

▪ Gap analysis and initial EA field effort -	2009	
▪ Building & structure demolition by CNSC Order	2011	
▪ Baseline surveys and EA completed	2013	
▪ EIS approved	2014	
▪ Remediation design	2016-2017	
▪ Tailings remediation started	2018	Completed
▪ Other site aspect remediation started	2019	
▪ Remediation of dry tailings completed	2021	
▪ Cover construction over Langley Bay tailings	2023	
▪ Completion of physical remediation phase	2024	In progress
▪ Final clean up, revegetation, and As Built report	2024	
▪ Post-construction transitional monitoring	2024-34	
▪ Transition to ICP	2035	To be done



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QUESTIONS?





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