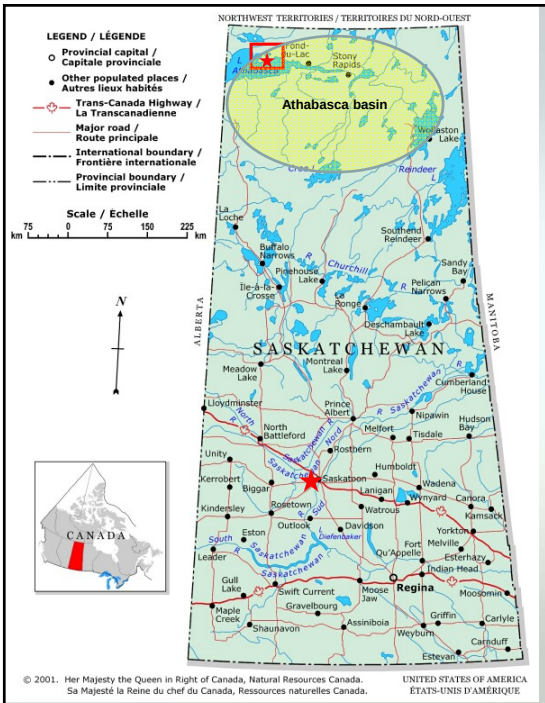
Gunnar Clean Up Progress:

Saskatchewan Research Council

June 2015



- **Athabasca basin**
- **Cracking stone Peninsula**
- **Uranium city**
- Gunnar mining site

Gunnar Site Highlights

- Uranium mines and mills operated in 1953-1964
- Total ~8.5 million tons of rock mined and processed
- Open pit developed over 100 m deep, and over 3 million m^3 volume
- Vertical shaft and mine work over 600 m deep
- Uranium mill, acid plant, other utility, structures, and buildings
- Over 5 million tons of unconfined tailings
- Mining ceased in 1964
- The pit and subsurface workings were flooded, shaft plugged with concrete, and mine site abandoned
- **All the buildings, structures, tailings, and waste rock piles were left on site "as is"**
- **The open pit and mine work were flooded by blasting a channel between the pit and Lake Athabasca**

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Project Objectives

- To eliminate or reduce public safety hazards and environmental risks at the site now and in the future;
- To develop sustainable remediation options that are technically and economically feasible;
- To establish a responsible and cost-effective environmental monitoring program; while
- Minimizing the long-term care and maintenance at the site.

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Project Endpoints

- The Site must not pose unreasonable public health or environmental risks;
- The environment surrounding the site are not significantly impacted by contaminants;
- The traditional use of resources adjacent to the site can be safely conducted; and
- To have the site managed through the Provincial Institutional Control Program (ICP).

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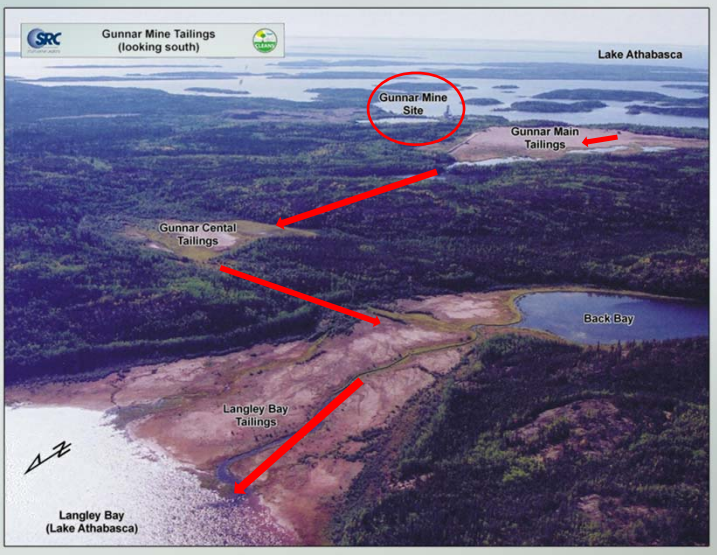
Gunnar Site Components

Gunnar Tailings Areas



A total of 4.4 million tonnes of tailings were discharged from the mill. This material is located in three main tailings deposits on the Gunnar site.

Gamma Radiation levels: ~4-10 µSv/h

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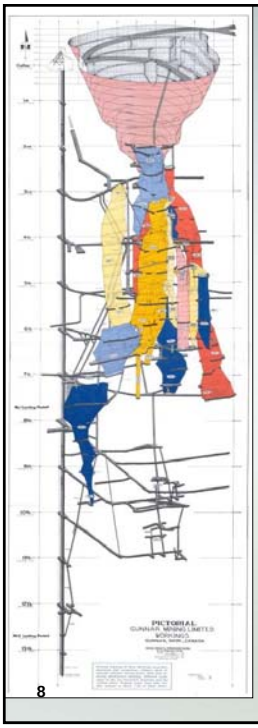

Open pit (> 100 m deep) and mine working (> 600 m deep)

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Gunnar Pit

In 1964

116 m deep

300 m diameter

~50 m from Lake Athabasca

Today

Flooded, containing elevated concentrations of uranium and decay products. Overflowing into Lake Athabasca

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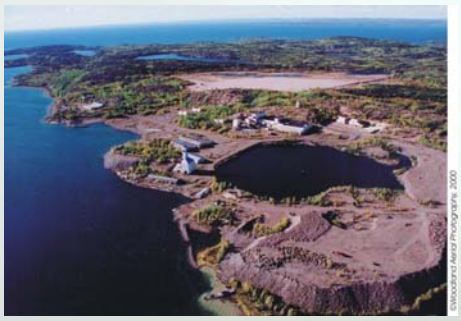
Waste Rock

- **Over 2.0 million m^3 of waste rock located adjacent to the shore of Zeemel Creek and Lake Athabasca.**
- **Gamma Radiation levels ~1-2µSv/h (up to 10µSv/h at "hot spots")**



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Buildings and Structures

Over 50 residential and industrial buildings and structures including uranium mill, acid plant, and mine head frame posed serious public hazard.

Following the CNSC Order # 10-1 of July 2010, all of the building and structures were demolished by 2012

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Summarizing the Site Conditions

Sources of hazards

- Town site, mill site, head frame (demolished)
- Waste rock piles
- Tailings deposits
- Flooded pit

Hazards and exposure

- Physical hazards,
- Asbestos containing materials
- Gamma radiation
- Contaminant discharge into Lake Athabasca.
- Contaminants in food chains

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Issues to Address

- **Public hazards**
  - Demolition waste including asbestos containing materials
  - West and South slopes of the waste rock piles
- **Gamma radiation**
  - Tailings, waste rock, mill footprint
- **Contaminant sources**
  - Mine pit, waste rock seep, tailings areas
- **Affected valued ecosystem components**
  - Tailings, Zeemel Bay, Back Bay, Langley Bay

Tasks Completed to Date

1. Public and Regulatory Engagement (2010- ongoing)
2. Demolition of buildings and structures (2011)
3. Environmental Impact Assessment (2013)
4. Phase I Waste Nuclear Substance License (WNSL) (2014)

Public Engagement

- Early communication and involvement with interested parties in order to:
  - assist with the identification and screening of important and relevant issues
  - treat public safety concerns as the first priority
  - demonstrate that SRC is incorporating regulatory and interested parties input into the Project
  - ensure that Traditional Knowledge/Traditional Land Use (TK/TLU) components are analyzed and interpreted properly, and
  - demonstrate continuous improvement of the Project design

Community Meetings

- A number of community meetings was held in:
  - Wollaston Lake
  - Fond du Lac
  - Uranium City
  - Stony Rapids
  - Camsell Portage
  - Black Lake
  - Fort Chipewyan
- The main questions discussed:
  - Public concerns about the Project
  - Potential Remediation options
  - Public suggestions and advising
  - New jobs and training due to the project

Public Expectations

- The contaminated site must be remediated to a safe and sustainable environment standard;
- When waste rock or tailings are relocated, their footprint must be remediated;
- The residual public safety hazards posed by the waste rock piles and the Gunnar pit must be mitigated;
- If Langley and Zeemel Bay cannot be remediated to the regulatory standards, barriers may be required to prevent fish from migrating in and out of these areas;
- Employment and training opportunities must be developed in the region for the surrounding communities.

Training and Job Opportunities for Local Communities

- **To the date, the following trainings have been provided to over 100 people in northern communities:**
  - WHMIS; Transportation of Dangerous Goods;
  - Respiratory Protection; Hand & Power Tools Use-Awareness
  - Confined Space Entry Awareness;
  - Hand Signals; Generators/Pumps; Personal Protection Equipment;
  - Working Around Heavy Equipment; Asbestos Abatement;
  - Radiation Safety; First Aid;
- **About 38% of the employees engaged in the demolition at Gunnar site under CNSC order are local and aboriginal people**
- **Since 2014, Gunnar Field Camp has been operated by One Sky (100% aboriginal company) that employed most of the staff from the Athabasca region.**

Environmental Impact Statement

- Environmental Impact Assessment
- An EIS is a detailed description of the site current status, risks, and possible solutions for rehabilitation and mitigation
- The Gunnar EIS document was completed in the late 2013 and approved by the Saskatchewan Ministry of Environment in August 2014. The Canadian Nuclear Safety Commission accepted the EIS in January 2015


SRC

Environmental Impact Statement
Gunnar Site Remediation Project

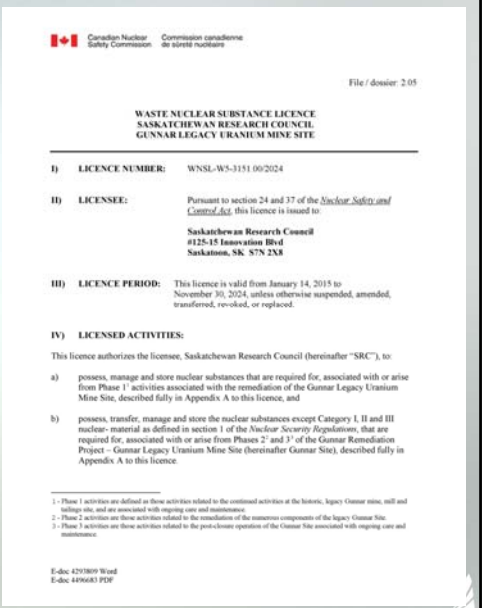
Submitted to the Saskatchewan Ministry of Environment and the Canadian Nuclear Safety Commission

November 2013

Main Document
Volume 1 - 3

Site Licensing

- It is a legal requirement to purchase a special operation License prior to start any remediation activities at the Gunnar site.
- Following the EIS approval, and a Canadian Nuclear Safety Commission (CNSC) public hearing on Nov. 7 2014, the WNSL for site operation was issued to SRC in January 2015.


Canadian Nuclear Safety Commission / Commission canadienne de sûreté nucléaire

File / dossier: 2.05

WASTE NUCLEAR SUBSTANCE LICENCE
SASKATCHEWAN RESEARCH COUNCIL
GUNNAR LEGACY URANIUM MINE SITE

I) **LICENCE NUMBER:** WNSL-W5-3151.00/2024

II) **LICENSEE:** Pursuant to section 24 and 37 of the *Nuclear Safety and Control Act*, this licence is issued to:

Saskatchewan Research Council
#125-15 Innovation Blvd
Saskatoon, SK S7N 2X8

III) **LICENCE PERIOD:** This licence is valid from January 14, 2015 to November 30, 2024, unless otherwise suspended, amended, transferred, re-voked, or replaced.

IV) **LICENSED ACTIVITIES:**

This licence authorizes the licensee, Saskatchewan Research Council (hereinafter "SRC"), to:

a) possess, manage and store nuclear substances that are required for, associated with or arise from Phase 1[1] activities associated with the remediation of the Gunnar Legacy Uranium Mine Site, described fully in Appendix A to this licence, and

b) possess, transfer, manage and store the nuclear substances except Category I, II and III nuclear- material as defined in section 1 of the *Nuclear Security Regulations*, that are required for, associated with or arise from Phases 2[2] and 3[3] of the Gunnar Remediation Project – Gunnar Legacy Uranium Mine Site (hereinafter Gunnar Site), described fully in Appendix A to this licence.

1 - Phase 1 activities are defined as those activities related to the continued activities at the historic, legacy Gunnar mine, mill and tailings site, and are associated with ongoing care and maintenance.
2 - Phase 2 activities are those activities related to the remediation of the numerous components of the legacy Gunnar Site.
3 - Phase 3 activities are those activities related to the post-closure operation of the Gunnar Site associated with ongoing care and maintenance.

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Suggested approach to remediation at Gunnar:

- Cover Gunnar Main, Gunnar Central, and Langley Bay tailings with 0.5 to 1 m till layer with active drainage and vegetative cover
- Utilize acceptable waste rock as a cover component
- Re-shape remaining waste rock portion and isolate it from the incoming surface and ground water flows
- Construct an Asbestos Containing Material (ACM) waste cell within the waste rock, cover with till, and vegetate
- Monitor Gunnar Pit during the remediation of other site aspects and treat the water if required (e.g. permeable barrier or in situ treatment)
- Establish intensive monitoring at Langley Bay to see the trends and apply adaptive management if required

Decision Tree: Questions to be answered.

- How remediation of one site aspect (e.g. covering tailings) may affect the other aspects?
- How to reduce environmental footprint of remediation (e.g. less borrow)
- What is the optimal use of waste rock?
- Can the Gunnar Pit be utilized for remediation?
- What is the optimal balance between the regulatory requirements, achievable performance, and project cost

Decision Tree Drivers

- Ensure that remediation of one site aspects does not negatively affect the other aspects
- Maximize use of waste rock and non-hazardous waste as remediation resource (if environmentally safe)
- Maximize use of local workforce and locally owned businesses
- Minimize the borrow excavation footprint
- Divert or isolate water flows from contaminated materials
- Provide intensive monitoring to all the site aspects during remediation and (if necessary) correct the strategy based on the monitoring results

Phased Approach to Gunnar site Remediation

- Provide the conceptual design for remediation of all aspects of the Gunnar Site (August, 2015)
- Complete the detailed design for tailings cover (autumn 2015)
- Obtain Phase II Licence to start physical remediation (early 2016)
- Mobilization and infrastructure preparation to cover the tailings (2016)
- Finalize detailed design for all site aspects (2017)
- Complete the tailings cover and drainage (2018)
- Complete other aspects of Gunnar site remediation (2020)
- Keep intensive site monitoring (up to 2025)

We need your input

How can we maximize participation of local communities in the decision making process and remediation activities?

Thank you for your attention!

QUESTIONS?

SASKATCHEWAN RESEARCH COUNCIL

Gunnar Mine Site Remediation
Site Tour and Workshop

Conceptual Design for Tailings

Kristie Bonstrom, M.Sc., P.Geo.
Technical Coordinator

Denise Chapman, M.Sc. P.Eng.
Project Manager

O'Kane Consultants Inc.
Integrated Mine Waste Management and Closure Services
Specialists in Geochemistry and Unsaturated Zone Hydrology

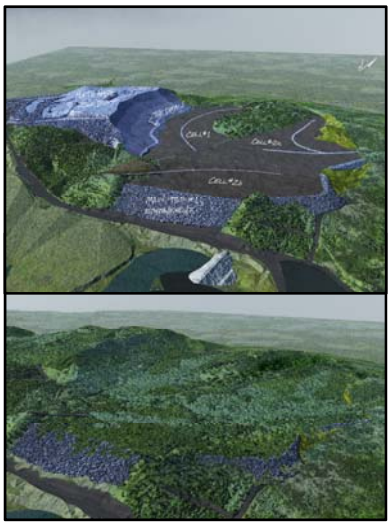
EcoMetrix INCORPORATED

Presentation Outline

1) **OKC: Who we are and what we do**
2) **OKC's role in the Gunnar Project**
3) **Remediation objectives for the exposed tailings**
4) **Overview of conceptual designs for each tailings deposit**

OKC – Who We Are

- Specialize in remediation designs for mine waste (tailings and waste rock)
- 1996-- 1 person … Mike O'Kane
- 2015-- ~60 people, 9 offices
  - Canada, USA, Australia, New Zealand
- Head Office: Saskatoon
  - Many of our entities are staffed by Saskatchewan-raised personnel
  - Saskatoon office is almost exclusively U of S graduates



OKC – Where We Work

- World Wide Presence
- Northern Experience
- Northern Cold Regions Guidance Document for of Canada (MEND)

OKC – Experience

- Cluff Lake
- Key Lake
- Rabbit Lake
- Whistle Mine

- Tundra
- Giant
- Meadowbank
- Syncrude/Suncor/ Albian Sands

OKC – Gunnar Project Personnel

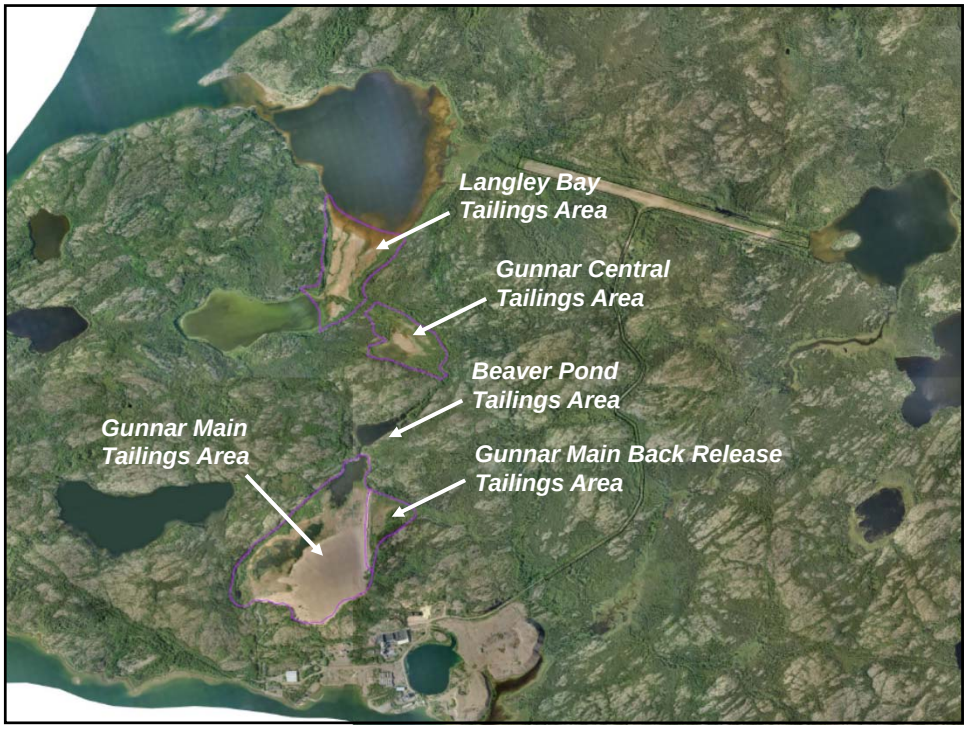
- Project Manager: Denise Chapman
- Technical Coordinator: Kristie Bonstrom
- Design Leads:
  - Brian Ayres: Landform and Surface Water Management Designs
  - Dave Christensen: Cover System Design and Material Requirements
- Technical and Field Support:
  - Bonnie Dobchuk: Stakeholder, Decision Tree and Field Investigation
  - Hal Cooper: Drafting and Field Investigation
  - Larisa Barber: Field Investigation
  - Matt McKeown Field Investigation

OKC – Project Scope

- **What is OKC's involvement in the Gunnar Remediation Project?**

OKC – Project Scope

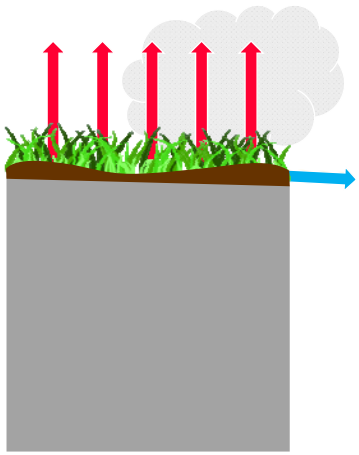
- **OKC is responsible for developing a remediation plan for the *tailings facilities*.**



OKC – Project Scope

- **Tailings Remediation Goals:**

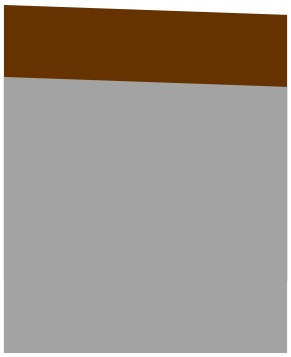
1. **Protection from gamma radiation**
2. **Reduction in dust**
3. **Improving the quality of surface water discharging from the tailings**
4. **Creation of a landform for grasses and shrubs that blends into the surrounding landscape**



OKC – Project Scope

- How can we meet these goals?

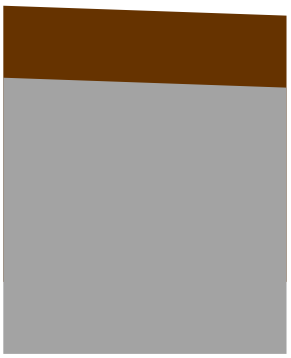
Cover System



OKC – Project Scope

- How?

Cover System



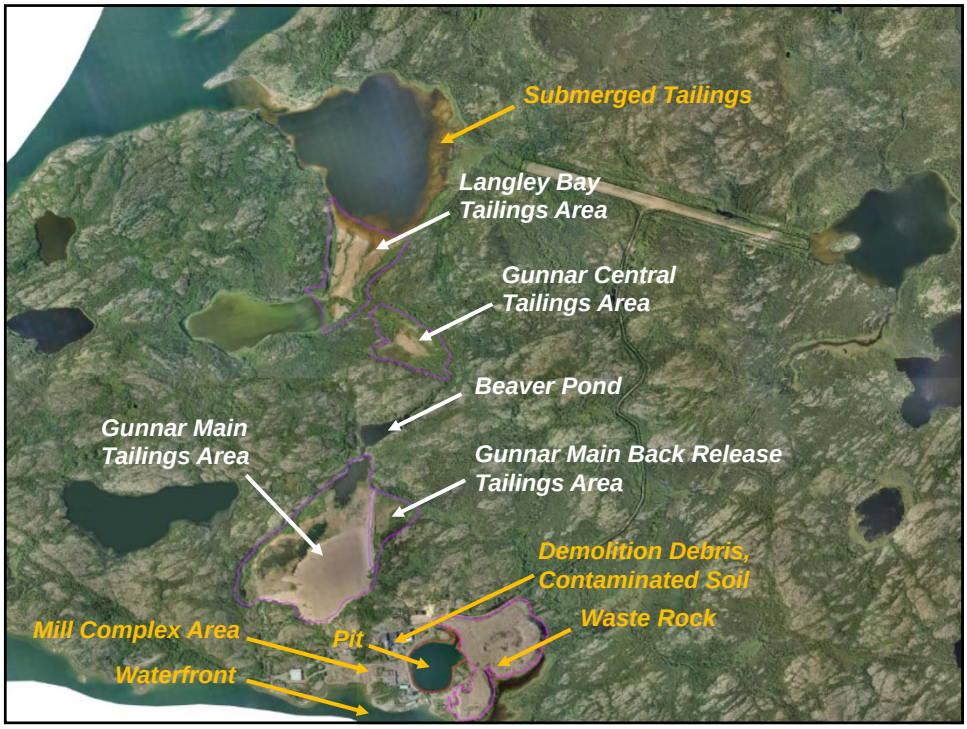
1. How thick does the cover need to be? Material type?
2. What materials are available? Is there enough?
3. Where will the material come from? How much disturbance?
4. What should the final landform look like?
5. How do we create a new landform?
    1. Fill needed? If so, what do we use?
    2. Design/construct waterways?

OKC – Project Scope

- **To answer those questions:**
  1. **Verify the basic cover design (make sure it will meet the goals)**
  2. **Develop different cover design and landform options**
  3. **Verify quantity and quality of available cover materials**
  4. **Use decision tree, multiple accounts analysis, & other methods to develop *optimum design***
  5. **Develop an engineering package for construction**

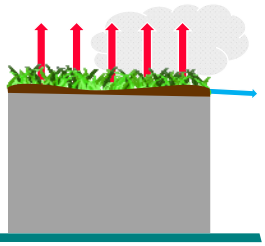
OKC – Project Scope

- **OKC is responsible for land-based tailings**
- **What OKC *isn't* responsible for:**
  1. **Remediation of the waste rock**
  2. **Remediation of the pit and pit lake**
  3. **Remediation of the demolition debris, contaminated soil, etc.**
  4. **Remediation of the mill complex area**



Cover Design Objectives

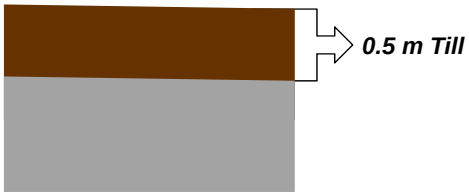
1. Protection from gamma radiation
2. Reduction in wind-blown tailings
3. Improving the quality of surface water discharging from the tailings
4. Creation of a landform for grasses and shrubs that blends into the surrounding landscape



Cover Design Objectives

1. **Protection from gamma radiation**
   - Gamma radiation is reduced to background levels by a 0.5 m soil cover (EIS, 2014).
     - Gunnar background levels are 1.14 µSv/h.
   - Soil is defined as the locally available till borrow material.

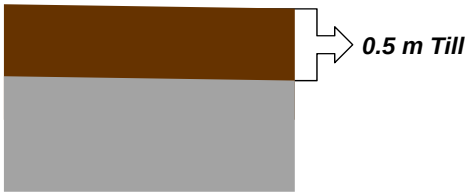
Cover System



Cover Design Objectives

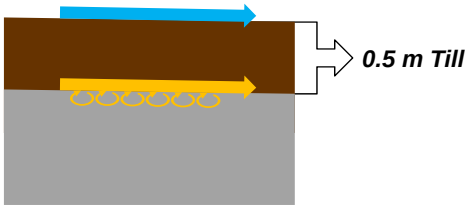
1. Protection from gamma radiation
2. **Reduction in wind-blown tailings**
   - Wind-blown tailings
     - 0.5 m of soil cover prevents wind-blown dust
   - Inhalation of radon and LLRD
     - 0.5 m of soil cover reduces radon flux 2X (EIS, 2014)

Cover System



Cover Design Objectives

1. Protection from gamma radiation
2. Reduction in dust
3. **Improving the quality of surface water discharging from the tailings**
   - **Contamination via contact with surface tailings**
     - **0.5 m of soil cover reduces contact**



Cover Design Objectives

1. Protection from gamma radiation
2. Reduction in dust
3. Improving the quality of surface water discharging from the tailings
4. **Creation of a landform for grasses and shrubs that blends into the surrounding landscape**
   - **To support vegetation, a landform requires:**
     - **Soil layer to support vegetation**
     - **Drainage to ensure soil layer not contaminated by capillary rise (water-shedding landform).**

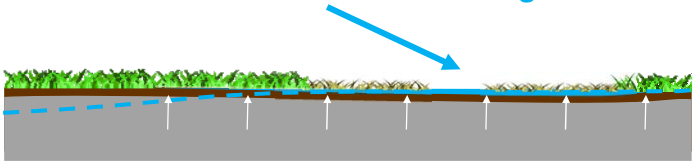
Cover Design Objectives

- Why a water-shedding landform?

Cover Design Objectives

- Place a 0.5 m thick cover on this landform:

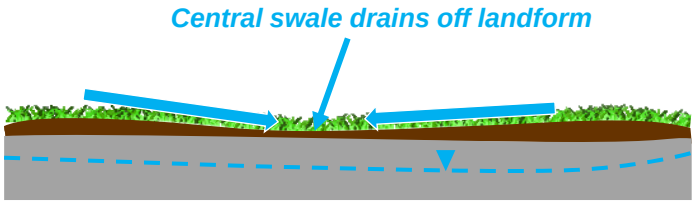
Shallow water table will lead to capillary rise of contaminants from the tailings.



Capillary rise of contaminants can lead to:
- *Contamination in soil and surface water, and*
- *Vegetation uptake of contaminants.*

Cover Design Objectives

- **Water-shedding landform**

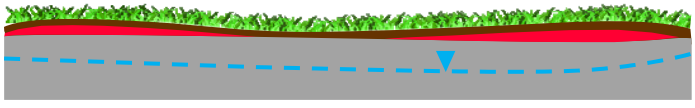


Positive drainage will:

- ***prevent ponding, lowering the water table below the depth where capillary rise can occur.***
- ***reduce net percolation through the tailings by increasing both runoff and evapotranspiration.***

Cover Design Objectives

- **Water-shedding landform**
  - **Requires FILL in many areas**

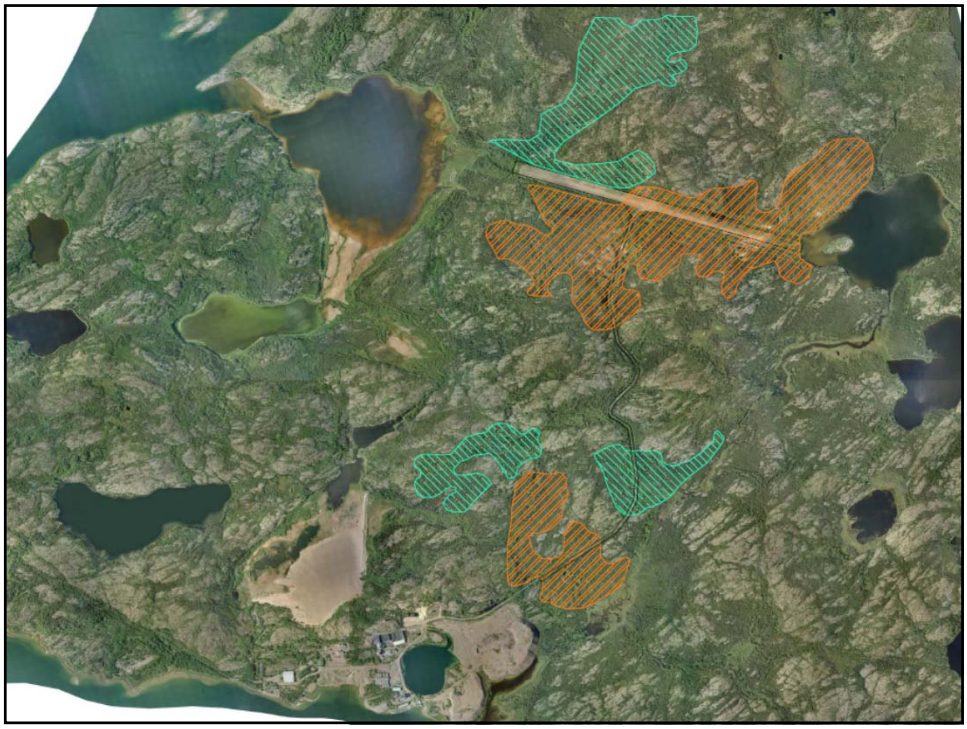


Fill Options:

- ***Till borrow material***
- ***Waste rock***

Cover Design Objectives

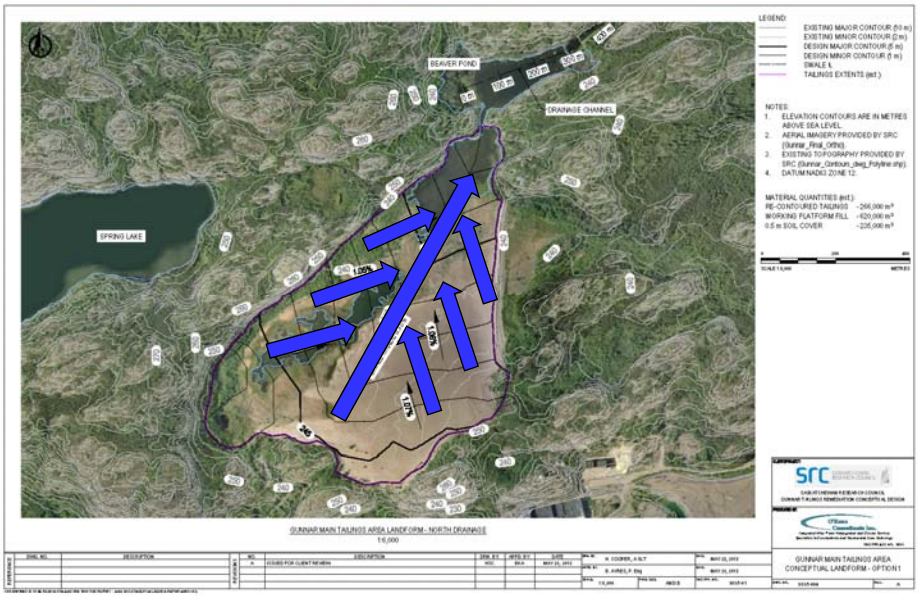
- **Till Borrow vs Waste Rock for Fill**
  - **Till Borrow Material:**
    - **PRO: Clean material.**
    - **CON: Large land disturbance.**



Cover Design Objectives

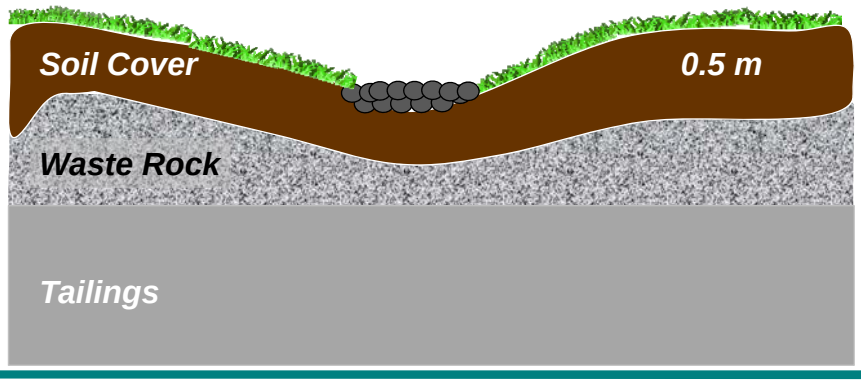
- **Till Borrow vs Waste Rock for Fill**
  - **Waste Rock Borrow Material:**
    - **PRO: Provides**
      - ***good working platform on wet tailings,***
      - ***capillary barrier beneath the cover,***
      - ***minimizes land disturbance, and***
      - ***removal of portion of contaminant source adjacent to Zeemal Bay.***
    - **CON: Similar concentrations of COPCs in Langley Bay compared to current conditions.**

Preferred Designs – Gunnar Main



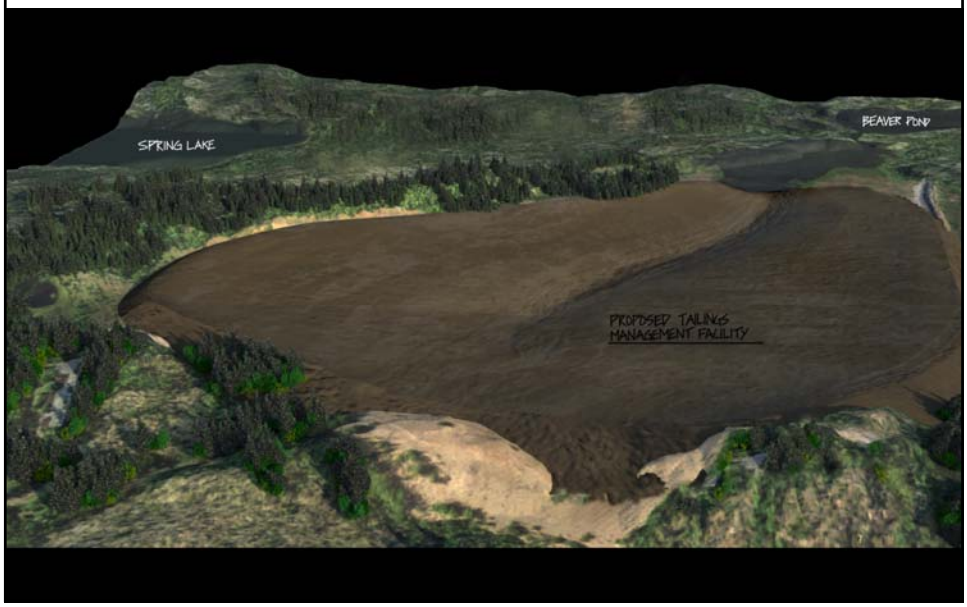
Preferred Designs – Gunnar Main

- **Single Outlet to Beaver Pond**

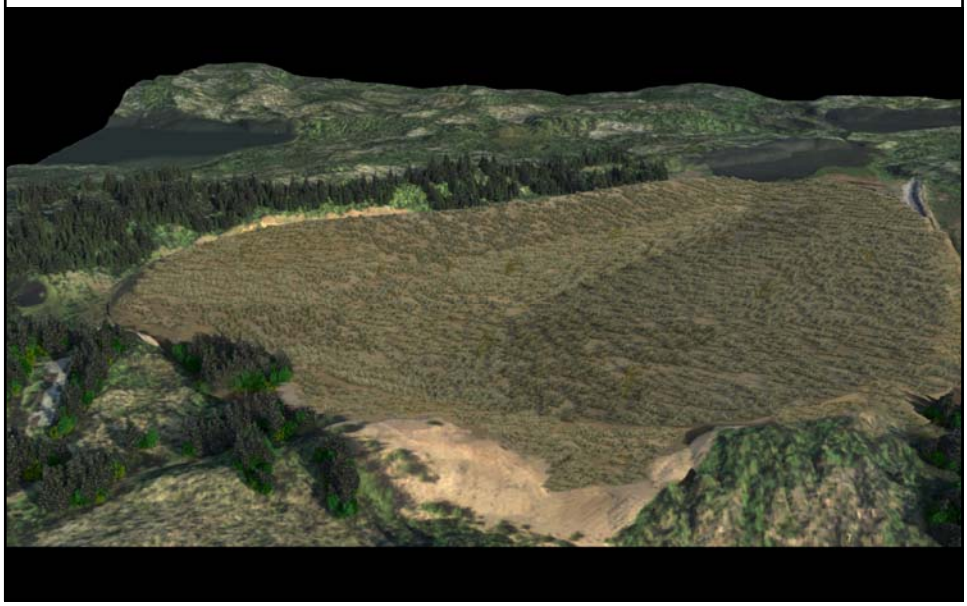


Gunnar Main Existing Landform

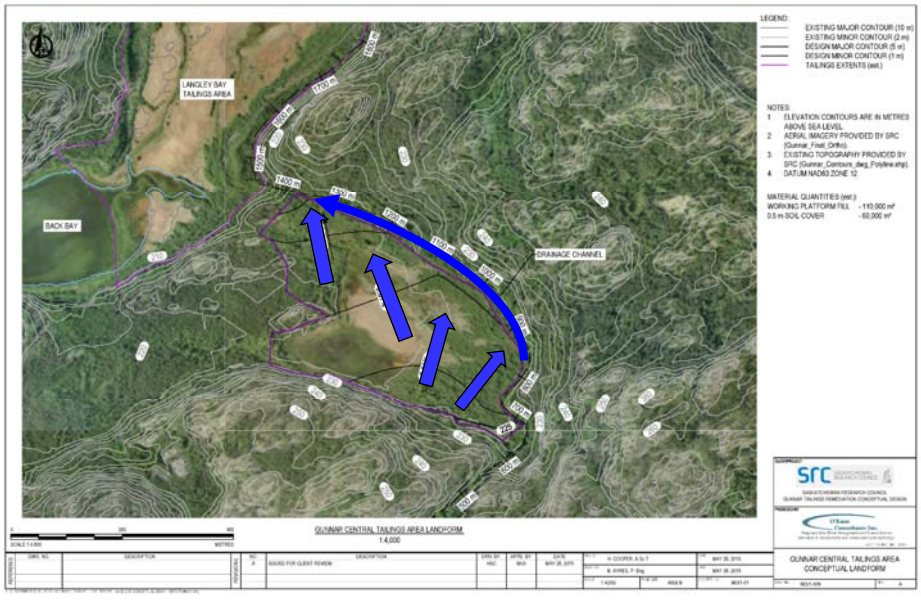
Gunnar Main Proposed Landform



Gunnar Main Proposed Landform

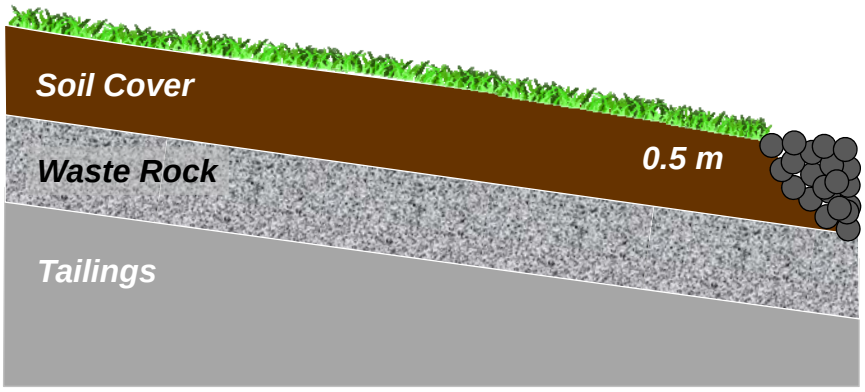


Preferred Designs – Central

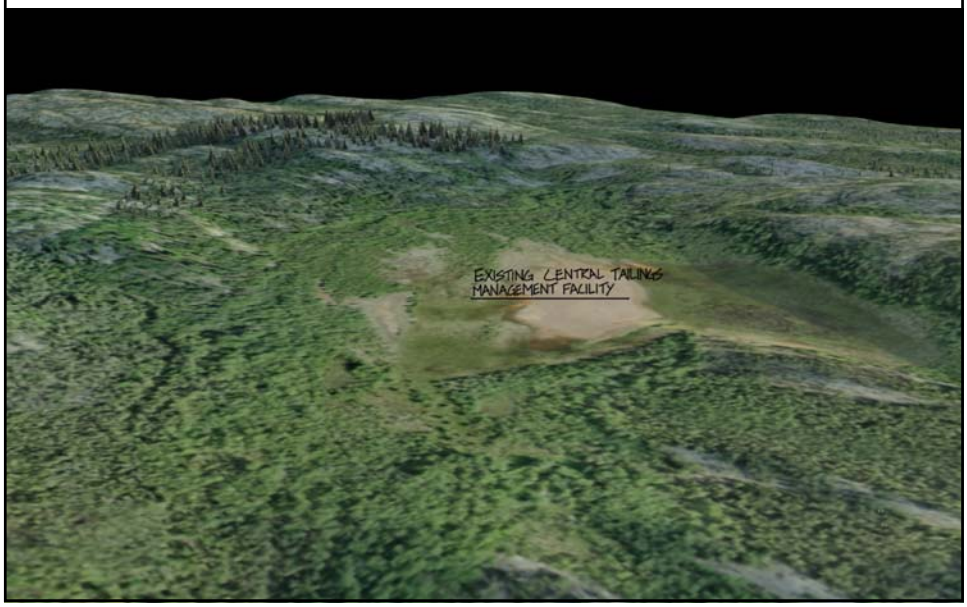


Preferred Designs – Central

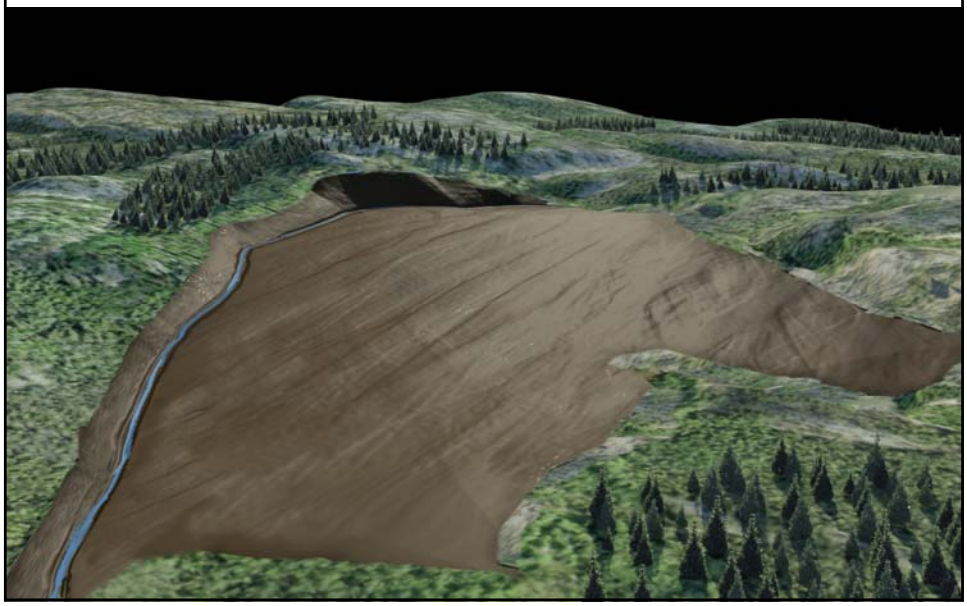
- Cover tailings in place with soil cover



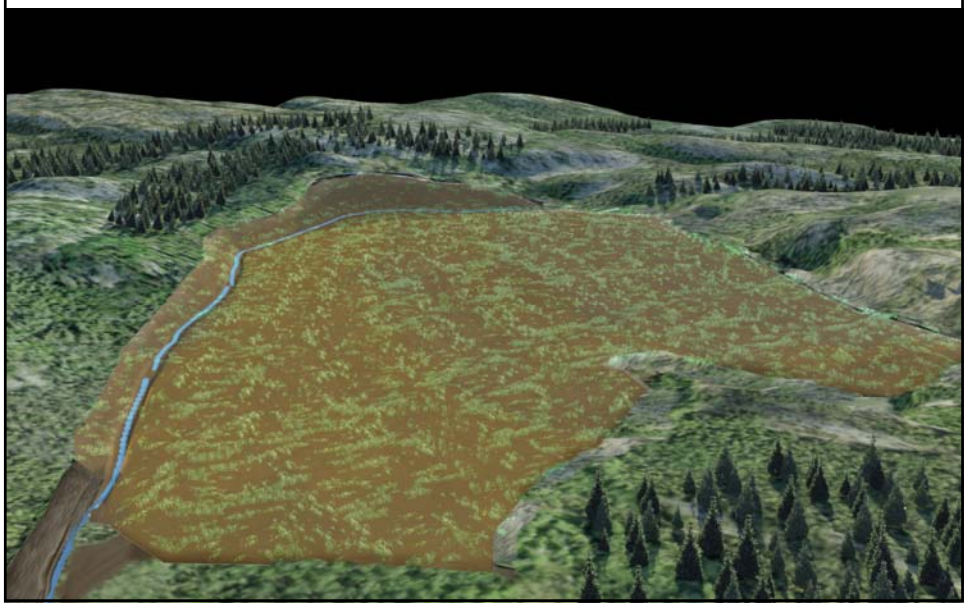
Central Existing Landform
(looking SE)



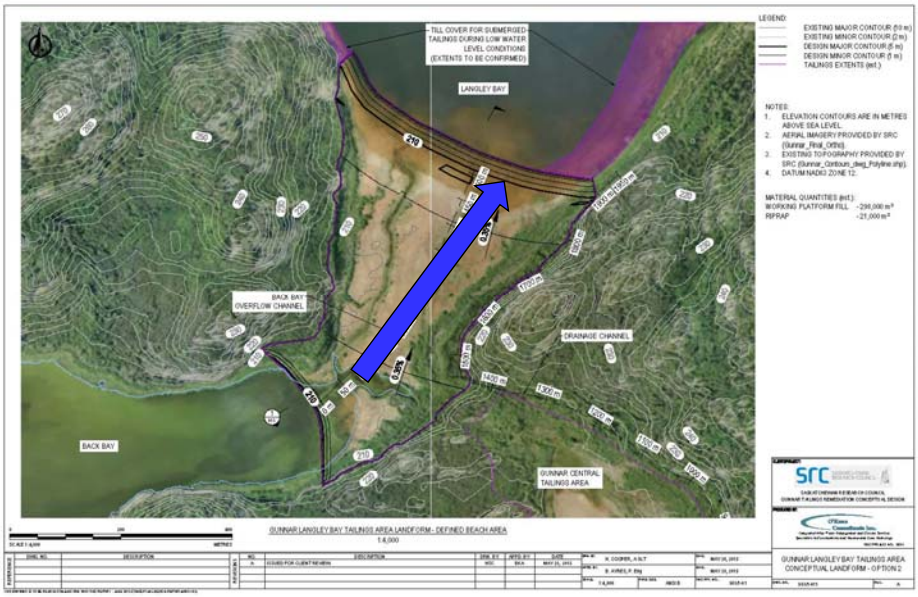
Central Proposed Landform
(looking SE)



Central Proposed Landform
(looking SE)



Preferred Designs – Langley Bay

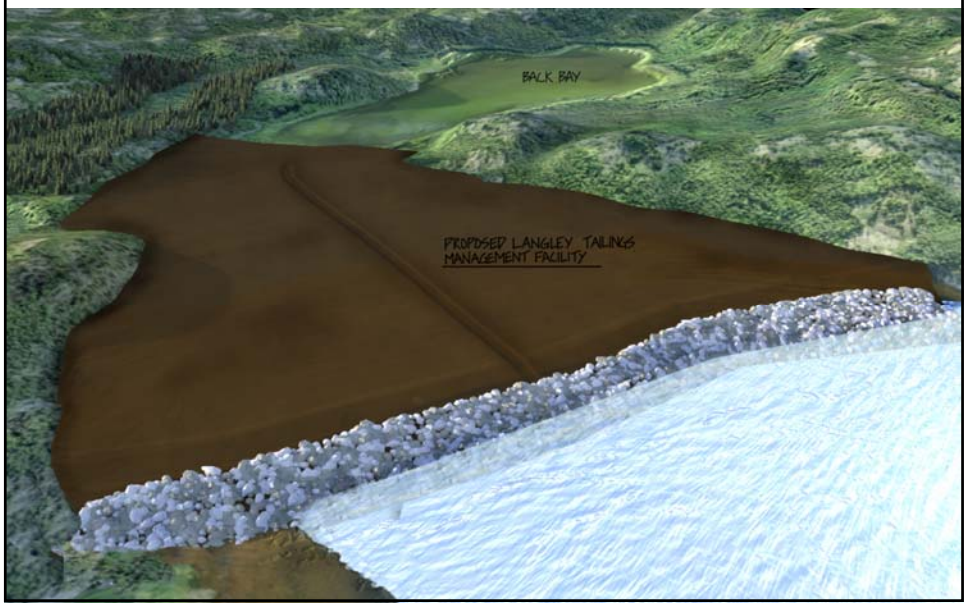


Preferred Designs – Langley Bay

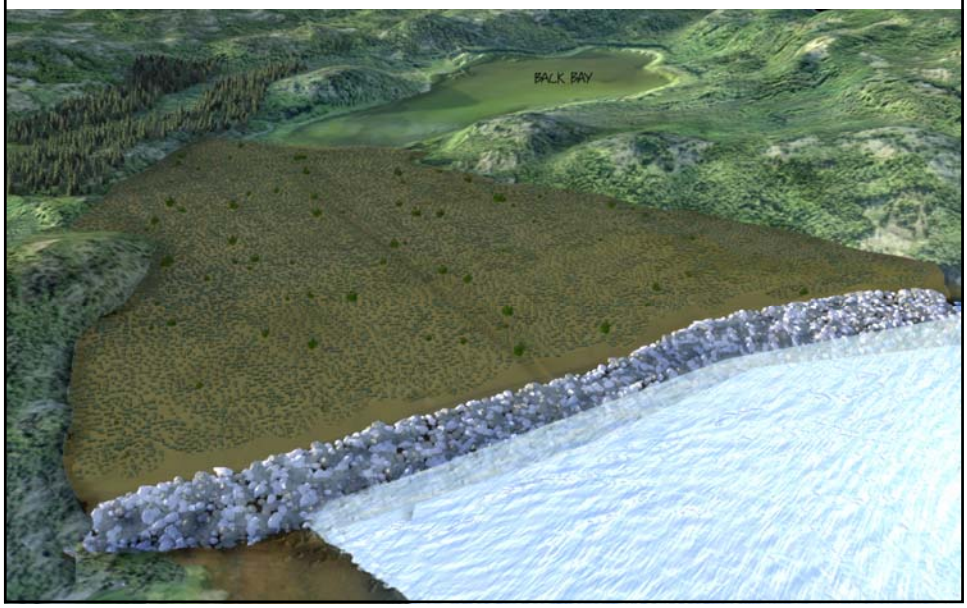
- **Cover tailings in place with soil cover**

Langley Bay Existing Landform

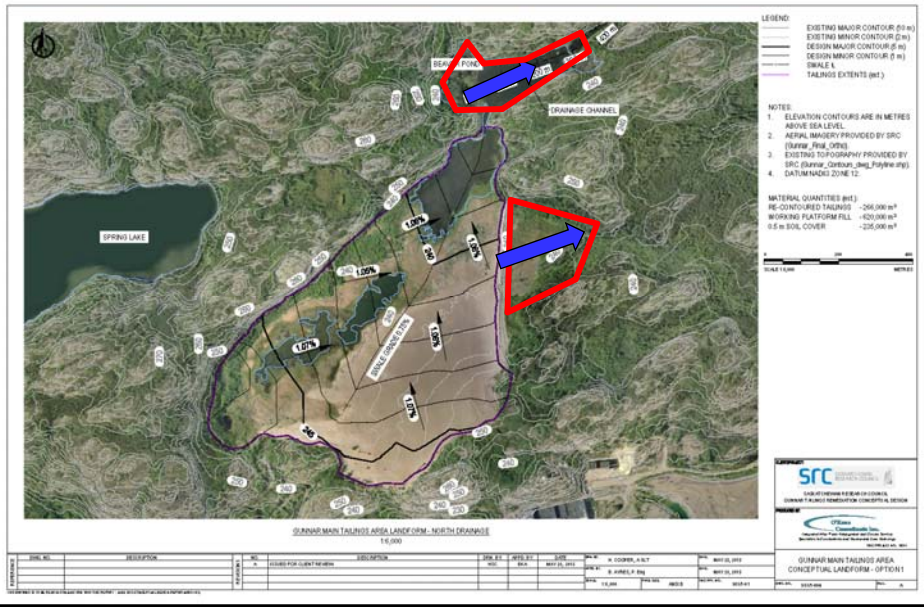
Langley Bay Proposed Landform



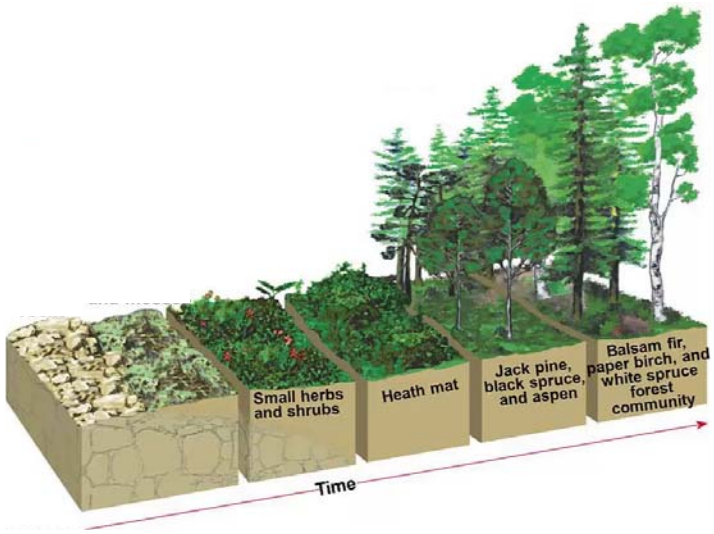
Langley Bay Proposed Landform



Preferred Designs – Misc.



Trajectory - Succession



Trajectory – Year 0

Trajectory – Year 2

Trajectory – Year 4

Trajectory – Year 5

Trajectory – Year 7

Trajectory – Year 9

Trajectory – Year 10

Alternate Trajectory – Year 1

Alternate Trajectory – Year 2

Alternate Trajectory – Year 3

Alternate Trajectory – Year 4

Alternate Trajectory – Year 5

Borrow Material Investigation

- **OKC Personnel on site for 3 weeks**
  - **Test pits up to 6 m deep**
  - **Material types logged and sampled**
  - **Survey of borrow extents**
- **Key Goals:**
  - **Volumes**
  - **Proximity**
  - **Characteristics**
  - **Variability**

Borrow Material Investigation

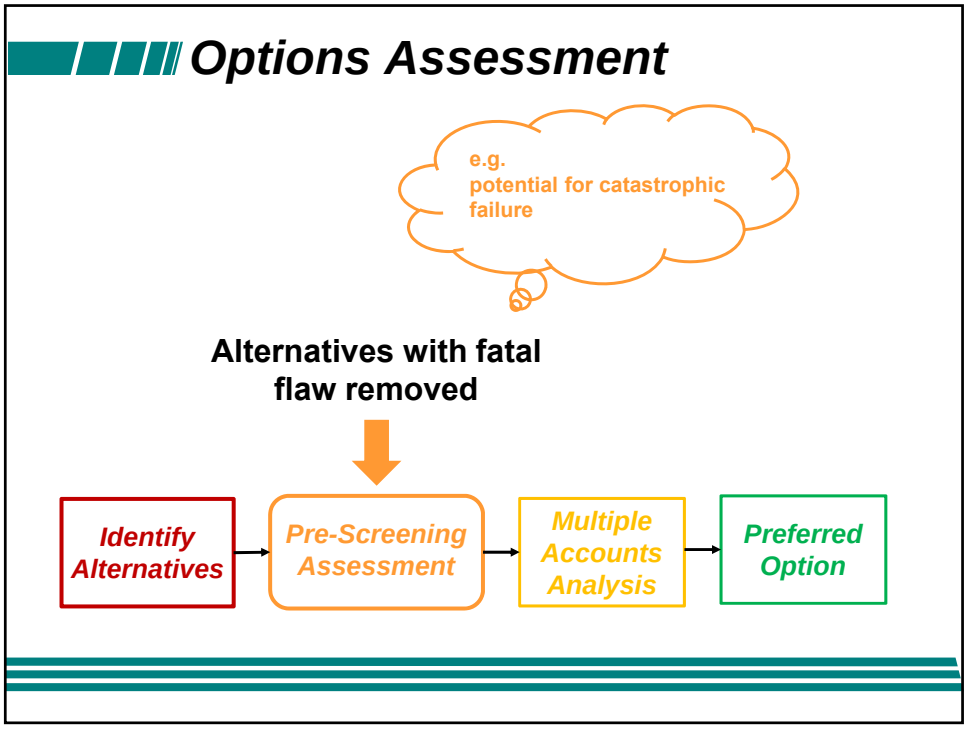
- Test Pitting
  - Test pit excavated to bottom of till (6 m max) or water table
  - Material types logged and sampled (bag and pail samples)
- Disturbance:
  - LFH layer will be stockpiled
  - Material will be replaced upon pit completion
  - LFH layer will be placed over top and smoothed

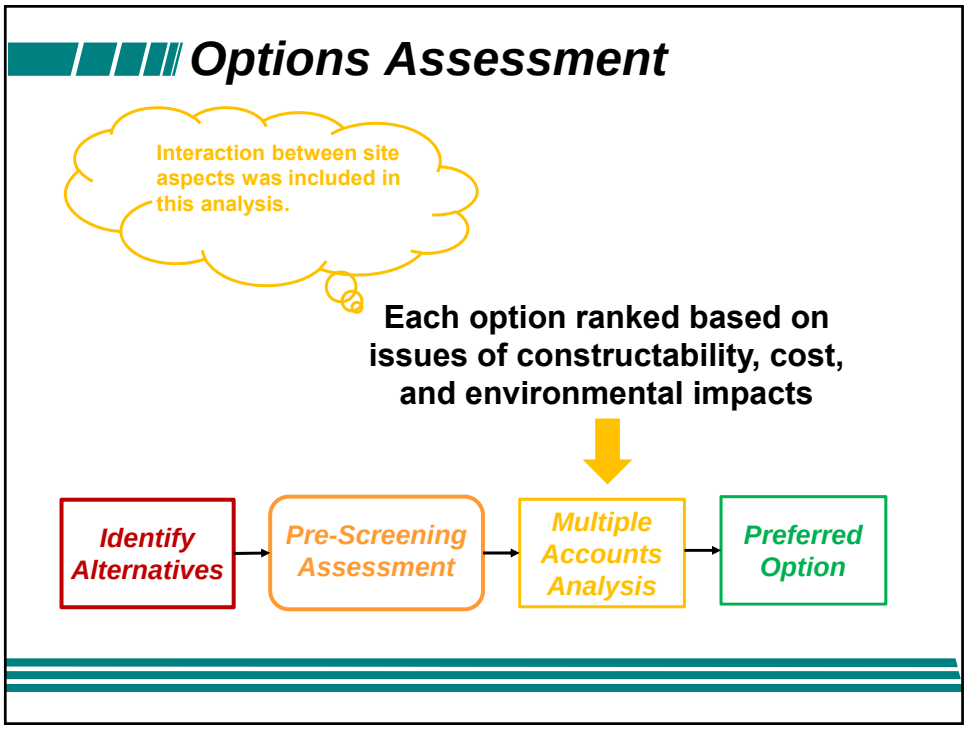
Options Assessment

Results of previous investigations were used so that only feasible alternatives were identified

Come up with all possible landform and cover configurations

Identify Alternatives → Pre-Screening Assessment → Multiple Accounts Analysis → Preferred Option


Options Assessment
e.g.
potential for catastrophic failure
Alternatives with fatal flaw removed
Identify Alternatives
Pre-Screening Assessment
Multiple Accounts Analysis
Preferred Option

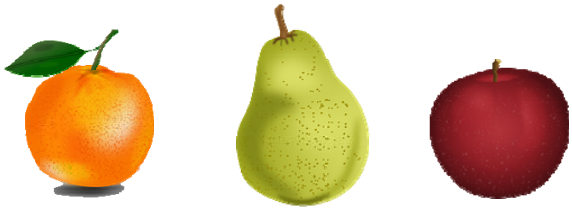

Options Assessment
Interaction between site aspects was included in this analysis.
Each option ranked based on issues of constructability, cost, and environmental impacts
Identify Alternatives
Pre-Screening Assessment
Multiple Accounts Analysis
Preferred Option

Options Assessment

Preferred option from MAA then compared to Decision Tree prior to finalizing

Identify Alternatives → Pre-Screening Assessment → Multiple Accounts Analysis → Preferred Option

Multiple Accounts Analysis



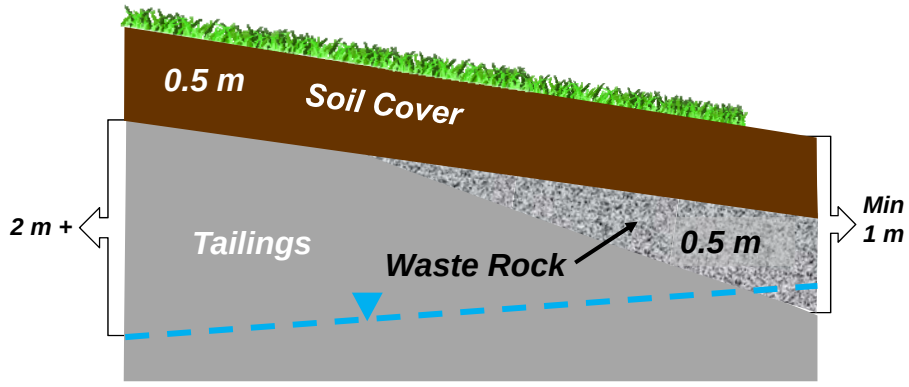
Accounts			
Cost	1	2	3
Size	1	3	2
Preference	3	2	1
	5	7	6

Multiple Accounts Analysis

Accounts			
Cost x 3	1 x 3 = 3	2 x 3 = 6	3 x 3 = 9
Size	1	3	2
Preference	3	2	1
	7	11	12

Cover Design Details

- Cover thickness depends on water table depth.



Gunnar Community Engagement Site Tour and Workshop

June 3 to June 5, 2015

Attendees:

George Bihun – Environmental Project Officer, Environmental Protection Branch (Prince Albert)
Joseph Tsannie – Vice Chief, Prince Albert Grand Council
Jim Tsannie – Prince Albert Grand Council
Louis Mercredi – Fond du Lac Denesuline First Nation
Emily Jones – Interpreter and Fond du Lac Band Member
Lloyd Gould – Representing ACFN/Jack Flett from Fort McMurray
Allen Joseyounen – Hatchet Lake Denesuline First Nation
Peter Piochion - Metis Nation Saskatchewan/Stony Rapids
Denise Chapman – Sr. Geoenvironmental Engineer, O'Kane Consultants Inc. (OKC)
Kristie Bonstrom – Senior Geoscientist, O'Kane Consultants Inc. (OKC)
Trevor Podaima – Senior Consultant, SRK
Mark Liskowich – Principal Consultant,SRK
Chris Reid – Project Manager, Gunnar Site, SRC
Mark Calette – Senior Advisor, Community and Aboriginal Engagement, SRC
Vanessa Crawford – Administrative Assistant, SRC
Eric Thiessen - Interactive Communications Specialist, SRC

Regrets:

John McDonald – Stony Rapids
Curtis Fiss – Metis Nation, Saskatchewan/Stony Rapids
Terry-Lynne Beavereye – Black Lake Denesuline First Nation
Archie Robillard – Black Lake Denesuline First Nation
Jackie Robillard – Black Lake Denesuline First Nation
Margaret Powder – Uranium City
Ovide Sha'Ouelle – Hatchet Lake Denesuline First Nation

Agenda:

- Site Tour of Gunnar
- Opening Prayer
- SRC Presentation and Discussion – Gunnar Cleanup Progress
    - Project Objectives
    - Project Endpoints
    - Summary of Site Conditions
    - Issues to Address
    - Public Engagement
    - Training and job opportunities for Local Communities
- O'Kane Presentation and Discussion
    - Conceptual Design for Tailings cover
- Closing Prayers

Discussion regarding tailings cover:

Q: What about sand and dirt contaminant effects? Once we start to get big trucks working in the area we will need to start air monitoring.
A: An Air monitoring program was completed in the past and may need to start it again. The tailings cover will help with the sand and dirt getting into the air.
A: Air monitoring was conducted at the Lorado mine site. The monitoring showed most of the dust they found was from the roads, not the tailings.

Q. When you were designing the tailings cover did you take erosion into account? What will you do if something goes wrong?
A. They plan to make the drainage angle low enough to move water effectively, handle settling and mitigate erosion. They don't anticipate this as being a problem. The fill is also important to help with settling and erosion or ponding.

Q. How many years do you anticipate it will take to get the vegetation back to its original state?
A. It could take up to 100 years. It is dependent on various factors; the weather, which direction it is facing (North/South)

Q. Why don't you use a HDPE (High Density Polyethylene) liner? It would stop 100% of the water from going through into the ground water
A. Using a HDPE plastic liner would cause the water to accumulate and saturate the ground
A. We don't recommend using HDPE liners, they don't last forever. When the liner breaks down or disintegrates, how do you replace it?

Comment: Fill options: Till borrow material (from natural areas)
Waste rock
Using the airstrip is an option. It is already disturbed material; it would be a better option than clearing land

Q. If there was no vegetation on the tailings cover, would we have more erosion? Based on previous experience there is concern over the use of vegetation as an erosion control. Based on this experience the cover needs to be intrinsically resistant to erosion in the event of a forest fire or loss of vegetation.
A. The gradients/slopes aren't very steep, so they don't anticipate a lot of erosion. O'Kane has instrumentation that will monitor the cover systems– they are data loggers: weather, temperature, moisture, snow depth, and freeze/thaw cycles. The data loggers record every 6 hours.

Action: To come up with a good answer for the communities. When we do these sessions and talk about 90 % contamination, versus the little bit that will flow out of the ground water 10%. Mark can see it always getting brought up. We need to have a good answers for people. This is one of our uncertainties that will make people uncomfortable. Have daily impacts or possible impacts. Accumulative effects

Discussion regarding Asbestos

Q. What kind of Asbestos is found at Gunnar?
A. Friable and non-friable asbestos was located at the Gunnar site.
They are re-covering one of the non-friable asbestos piles this summer with a large tarp. The friable asbestos have been bagged and contained in a large building that is locked. It will eventually be moved and buried within the waste rock or some other location on site, covered with till and re-vegetated.

Definition of Friable and non-Friable Asbestos: An ACM (Asbestos Containing Material) is considered **friable** if it can be crumbled, pulverized, or reduced to powder by hand pressure. If it can't, it's considered **non-friable** ACM.

Discussion regarding the Monitoring of Gunnar Flooded Open Pit

Comment: Suggests a MOU (Memorandum of Understanding) be put into place with the Athabasca communities for consultation and make sure they are in agreement with the ICP's (Institutional Control plan). He would like to come to an agreement regarding how the monitoring is done. The communities need to be consulted.

Q. Have there been any cameras sent down to the pit to see what exactly is anything in there?
A. One of their communities has an underwater rover
A. SRC will check into it

Q. Do you have plans to plug up the openings in the pit?
A. We have no plan right now. The pit is stable, you may risk making it unstable by draining it.
A. It isn't as simple as setting up a water treatment plant. There are stability issues. It is very difficult to put men in there to put caps or bulk heads to seal them off.
A. If it looks like the concentrations of COPCs in the pit are getting worse, we may look into setting up a water treatment plant.
A. SRC has to provide all options in the Remediation of Gunnar. The costs are weighed against the risks, then a decision would be made regarding a water treatment plant.

Q. What are the levels of ground water seepage from the Gunnar Pit?
A. An intensive monitoring program could be established determine this and monitor into the future.
A. When the tailings pond was flooded, the water level ended up being higher than Lake Athabasca. To this date, the water is still higher, so it is a good indication there isn't much seepage. Rock in the pit is very tight, that is another indicator there isn't much seepage. Physical barriers have also been put into place to keep fish from entering the pond and becoming contaminated.

Q. Are there any raises in the pit?
A. Yes, there are 3 raises to the underground in addition to the Main shaft and pit.

Discussions regarding monitoring of Langley Bay & Zeemel Bay

Q: Do you know if there is seepage into the Bays. The fish feed in the bays. Why hasn't SERM become involved? They could give us money to help clean the area up.
A: Studies have been conducted regarding this. We can only manage the risks. The smaller fish have been impacted, but the smaller fish aren't eaten by people. The bigger fish do eat the smaller fish, but the risk is lower by that point. Studies are ongoing regarding this.

A. They are trying to eliminate and reduce the amount of containments that go into the food chain. Samples collected as part of the provincial EARMP (Eastern Athabasca Regional Monitoring Program) study have shown that country foods including berries, fish, moose and caribou are safe to eat.

Comment: He says SRC will definitely be asked these questions at public discussions. He says we need to do our research and know what we are talking about. Maybe the volume of water coming in, is faster than the volume going out? Maybe that is why the level is still higher than Lake Athabasca.

Q. Can you put carbon in Langley Bay as a natural filtration system?
A. He doesn't think it will pick up the uranium. Carbon would pick up other minerals, but not uranium. He can't think of anything that would pick up uranium, except barium chloride.

Comment: Would like to have a map of the water flows.

Q: Water levels are declining. What about when the water dries up, do contaminates stay there and what do you do about it?
A: There is an adaptive management plan. This has been taken into account. You design for the highest water levels that becomes an uncertainty

Q:. Have there been any studies conducted on leaving the submerged tailings in Langley Bay?
A: Langley Bay is getting water from all the tailings areas, once we have the tailings covers, which will help with the contaminants into the Langley. Once that is done, we can continue to monitor for any changes.

Comment: We want to attack the problems we understand to date. Let's address the main source we know now and then assess the Bay. When we understand, we will start work.

Comment: We are learning from past experiences. Ex: Beaverlodge; They dredged the area, which stirred up the bay and made things worse.

Q: Is there an option to divert Zeemel Bay? If we do, clean water won't come into the contaminated area and become contaminated.
A: That is one of our options. We are currently investigating.

General discussion items regarding employment:

Q: Will there be any training for future employment with mine remediation?
A: Training is always on going. We are currently working on training ideas that might have some relevance down the road for not only remediation work, but in other areas. Working on real needs training programs. We are also working with PAGC to establish an environmental monitoring program. To date, the following trainings have been provided to the Northern Communities

- WHMIS; Transportation of Dangerous Goods
- Respiratory Protection; Hand & Power Tools Use-awareness
- Confined Space Entry Awareness
- Hand Signals; Generator/Pumps; Personal Protection Equipment
- Working around Heavy Equipment; Asbestos Abatement
- Radiation Safety; First Aid

Comment: Suggested we have a community relations coordinator. Have someone in the community that can represents both parties

Comment: When people came from the Athabasca region to work at Lorado, they weren't treated with respect and fairly by the contractors. Communication was not very good. By the end of the season things improved, once SRC intervened and worked with the contractors.

Comment: SRC values their relationship with the communities and will help in any way to facilitate between the contractors and the employees of the Athabasca Region

Comment: This would be another reason why it would be great to have a local community relations coordinator/Community liaison). People need to feel comfortable and we aware of what is going on.

Q: Have you started projecting potential work in the next few years?
A: Ian and I are starting to work on that.

Comment: Gunnar camp provider "One Sky" (100% Aboriginal Company) is committed to hiring aboriginal employees from the Athabasca region

Q: What were the challenges and concerns regarding the contractors and expectations? How can we make it better?
A: People not having a Northern driver's license was a barrier. The contractor addressed this in 2015 by helping get the training needed into the communities to help alleviate this barrier. Another challenge is the need for the contractor's to be have a tighter integration with the communities. The contractors need to spend more time communicating with communities about the project and any opportunities or issues that come up.

SRC provided Lorado stats for employment last year. There were rewards and penalties if the contractors didn't follow the guidelines? We make these targets achievable. We don't want to set contractors up for failure.
Person hours: Target 50% - Actual 54% Athabasca region aboriginal workers
Heavy Equipment: Target 55% - Actual 65.1% Excavators, Haul trucks, Dozers, Graders, Loaders, Packers, etc.)
Dollars Spent: Target 32% - Actual 38% in the Athabasca region (Accommodations, Local and Regional equipment, sub-contractors, flights, supplies, mobilization and demobilization, freight handling, misc items

General discussion items:

Q: Are there any burial sites around the Gunnar area? Is there Traditional knowledge and traditional land use?
A: PAGC have been contacted when we have questions. A Traditional Knowledge study created by PAGC for the area is used as a guide.
A: Rare species, plants and heritage surveys are also being done. If anything is found, the area is sectioned off and protected from any work being conducted.

Q: Are there any plans of taking down the Power Lines in the area?
A: Gunnar did not having any lines coming into it, they had no connection to Uranium City. The other lines that were referred to are Uranium Cities and are owned by Sask Power. Sask Power has been approached to remove them, but they have no plans at the moment to decommission them.

Q: How much has the Gunnar Remediation cost so far? How much is left to spend? They want to make sure contractors and government don't walk away before work is complete.
A: $200 million has been estimated to do the work on the sites.
A: Demolition costs were $51 million. To date we are $60 million (demolition and assessments).

Q: Are you worried we won't have enough money to complete the whole project?
A: We will have enough. We are already moving onto the design phase of the project.

Q: Does Gunnar Mine have to help with the cleaning up? How much are they responsible for?
A: Gunnar Mine no longer exists. They just walked away when they completed their work. It is up to the government to pay for the cleanup.

Interventions: Written submissions are open to individuals, not for profit organizations, aboriginal communities. It is not open to municipalities.

All the meetings we are having are leading to the commission meeting in October

Comment: We have 1000's of dumps, mines and oils. We cannot take them anywhere, where do you move them? We have to contain them and monitor them. People have to accept there may be industrial dumps we have to monitor and maintain for years.

Closing comments about the trip:

Comment: Being involved and having SRC video, is great. We are making history; his kids & grandkids will see all the work we have done.

- He would also like to look at getting some compensation for the community members living in the Athabasca region, once the remediation is done. Someone needs to be accountable.
- He also wants to see people in his community working at these sites during the remediation process.

Comment: He is very thankful to have this opportunity to meet with us.

Comment: Has learnt a great deal by coming to the tour and workshop

Next meeting – Possibly Fond Du Lac at the end of July.