What's Happening at Giant Mine?

Remediation Project

This is a **clean-up** the surface project.

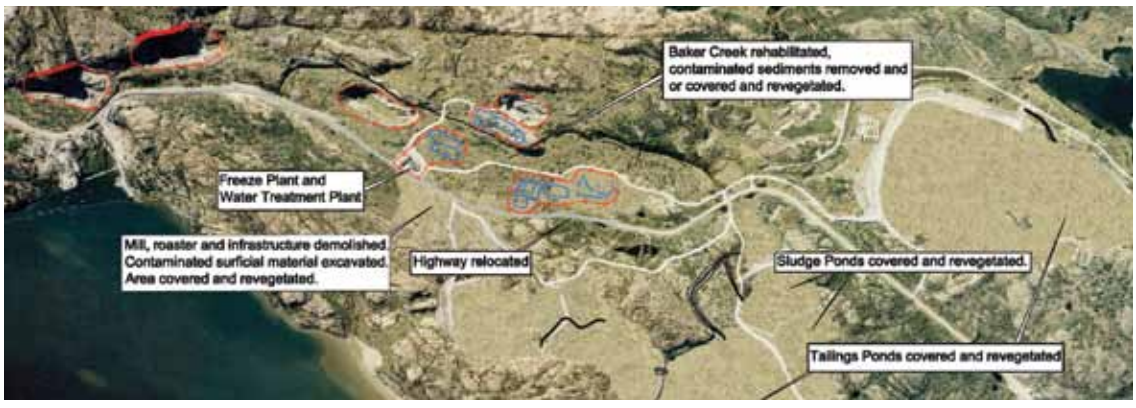
This is a **stabilize** and secure the underground project.

This is a **maintain** & **monitor** for health & safety project.

While we can't turn it back to pre-existing conditions, and….
parts of the site will always have to be under institutional control, many of the….
Giant Mine site will be better than industrial standards.

…So there are a host of opportunities for the future use of the remediated site.
It will be for the communities and people to decide.

◀ Giant Mine site, former goldmine. Giant Mine is currently under health & safety maintenance co-managed by INAC and GNWT. The remediation and cleanup plan for the Giant Mine site is undergoing an environmental assessment by the Mackenzie Valley Environmental Impact Review Board.



▼ This is a rendition of a satellite image to demonstrate what the Giant Mine site will look like after the clean up.

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Canada

This project is co-managed by INAC & GNWT

Why is it taking so long to see anything happen at Giant?

In order to prepare the Giant Mine Remediation Plan, INAC and GNWT have incorporated eight years of research and engineering work into the plan. The plan has evolved and been improved through-out this time by a multitude of input sessions from community, public and stakeholders. The plan has also been rigorously reviewed and adapted by international experts in the fields of engineering, mine remediation, geology and health sciences. The plan was also reviewed by other government departments.

What is the remediation plan?

There are three main categories in the remediation plan:

1) CLEANUP the Surface

Surface cleanup includes: cleaning up the contaminated areas, demolishing all decaying mine buildings, placing two layers of cover material over the tailings ponds.

2) STABILIZE to Secure the Underground

The arsenic trioxide dust will be frozen solid in its sealed 15 underground chambers to create a "frozen block" barrier to prevent any seepage of arsenic from the chambers.

3) MAINTAIN & MONITOR

The Giant Mine site will have to be monitored indefinitely to ensure health and safety, even once the remediation plan is complete. Long term water treatment will require the construction of a new water treatment plant.

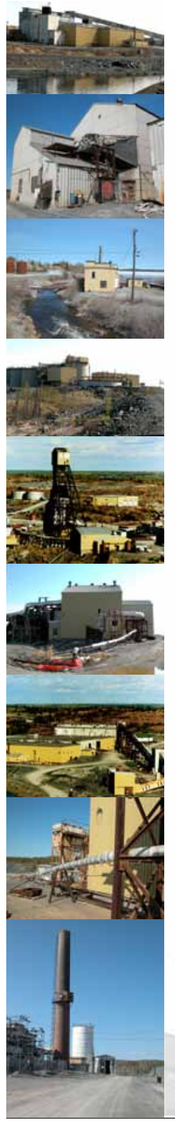
Why can't INAC and GNWT start the cleanup now?

INAC and GNWT applied for the water license to begin the remediation project in October 2007. In March 2008 the project was referred to an environmental assessment (EA) by the City of Yellowknife. The Mackenzie Valley Environmental Impact Review Board (MVEIRB) co-ordinates this process which will include various hearings and other activities associated with an EA. More information about the EA process and timelines related to the Giant Mine remediation is available on the MVEIRB's website: www.mveirb.nt.ca.

The EA process may take several years and no remediation work at the Giant Mine site may begin until the regulatory process is completed.

What are INAC's and GNWT's jobs during the environmental assessment?

The role of INAC, Contaminants and Remediation Directorate (CARD), and the GNWT, Environment and Natural Resources (ENR), Environment Division, during the analytical and hearings phase of MVEIRB's work plan is that of co-proponent, not intervener. INAC's role in the EA process will be to make presentations and answer questions about the remediation plan. MVEIRB is independent of government and solely responsible for the management of the EA process.



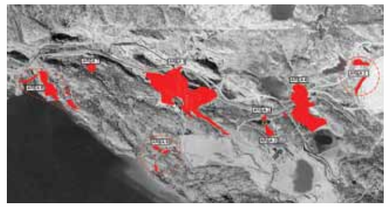
Giant Mine Remediation Project.

This is a **clean-up** the surface project.

The landscape will change dramatically.

Arsenic Contaminated Areas

- The main area of surface contamination is around the roaster.
- Contaminated soils in the roaster and mill area will be removed.
- The site will be cleaned up to at least GNWT industrial standard (340 mg/kg) and at that level, the risk assessment concluded that there would be no impacts.
- Other areas are already cleaned or will be cleaned up better than that and could eventually be used for recreation.

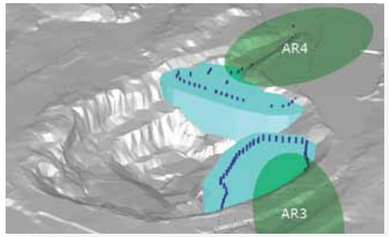


The red indicates the areas on the Giant Mine site which have arsenic soil contamination.

Pits A-1, A-2 and C-1

- There is no extra rock on the mine site to fill the pits. INAC and GNWT want to limit the impact of the clean up project. Digging other holes or quarrying to get rock to fill the pits would further impact the surrounding environment. So pit numbers A-1, A-2 and C-1 will be fenced off for safety reasons.

All three pits will remain open – bermed/fenced.



Since the B-1 pit sits on top of two of the chambers that contain the arsenic trioxide, it will need to be filled and a drill platform will be constructed to put the freezing pipes in around the chambers.

B-1 Pit

- Contaminated material that is found on the surface will be placed in B-1 pit and will be frozen along with the arsenic chambers
- The B-1 pit will also be filled with waste rock, quarry rock or clean demolition debris

First priority is to remove highly contaminated soils and place as fill in B-1 Pit for freezing

All buildings that have no continued function will be removed.

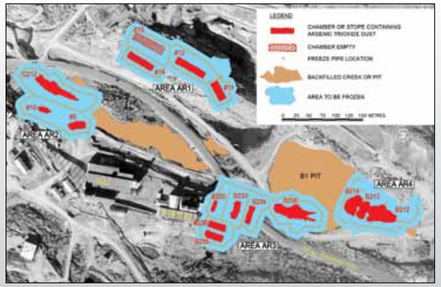
Giant Mine Remediation Project.

This is a **stabilize** to secure the underground project.

INAC and GNWT should choose the safest way to manage the arsenic dust. Are the governments leaving the dust in the ground because it is the cheapest option?

No. The least expensive way to manage the arsenic trioxide dust would be to pump out the contaminated ground water and treat it through a water treatment plant, much like what we are doing now.

The safest way to manage the arsenic trioxide dust is to freeze it where it is. Contain it. Keep it where it can't contaminate the underground water because the ground will be frozen solid. Taking the dust out and bringing it to surface is too risky - it is too risky for the workers who would do it – too risky because it would have to be stored on surface creating another area of contamination and - it is too risky for the nearby communities.



Four Separate Arsenic Trioxide Storage Areas to be Frozen

Frozen Block Method

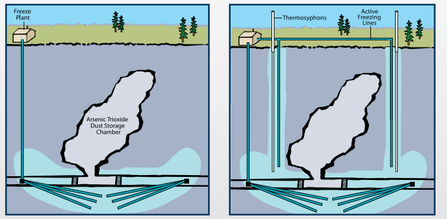
Once the blocks are effectively frozen solid (will take about eight years), the chambers will remain frozen with the aid of thermosyphons which do not required an energy source.

Step One

Freeze under the chamber with a super-cooled liquid in pipes that go from a freeze plant on surface, down and under the chamber.

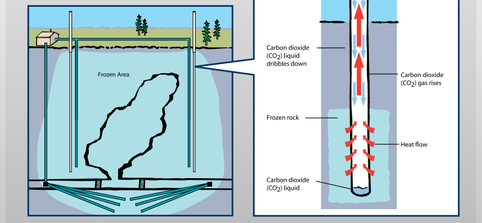
Step Two

Freeze the ground surrounding the chamber with super-cooled liquid in pipes that go around the chamber, like frozen walls. Step 1 & 2 will create a 'frozen cup' around the chamber.



Step Three

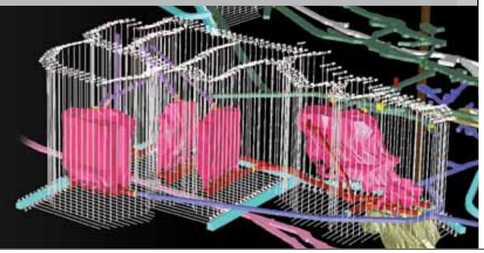
Freeze the entire chamber into a frozen block by slowing adding water into the cup and freezing it. This will stop any ground water from entering or exiting the chamber. Theromsyphons will be installed to help keep the area frozen indefinitely.



What about climate change?

Impacts of climate change were considered in the decision. Thermal analysis concludes that this method will continue to work even with a temperature increase of several degrees. The site will also be continuously monitored and adjustments would be made if necessary.

The red areas represent the arsenic chambers. The white lines under and around the chambers represent where the pipes of super-cooled liquid will create a 'frozen cup'.



Giant Mine Remediation Project.

This is a **maintain** & **monitor** for health & safety project.

Monitoring

The Giant Mine site will have to be monitored indefinitely. Once the remediation work is complete, the site will still require regular inspections, maintenance and monitoring to ensure health and safety.

INAC and the GNWT will ensure the following kinds of monitoring programs will be in place to verify project results:

- Surface Water monitoring
- Treated Water monitoring
- Minewater monitoring
- Groundwater monitoring
- Frozen ground monitoring
- Environmental Effects Monitoring under Metal Mining Effluent Regulations

* Air quality will be monitored during the remediation work

Independent Audits

INAC and the GNWT are open to considering various audit options, such as:

- Status of Environment Reports (Uranium Industry example)
- Independent monitoring audits every 5 years of project and enforcement/regulatory agencies (Alaska example)
- Independent Environmental Monitoring Agency (NWT Example)

Long Term Water Treatment

Once the remediation plan is approved, a new Best Available Technology (BAT) water treatment plant will be constructed and located near the C-Shaft. The design includes a holding pond which will be monitored before discharge. The operation of the new treatment plant will be changed from seasonal to year round discharge.

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Cleaning up the Tailings

The tailings contain moderate amounts of arsenic. They are subject to wind erosion when dry, and could also be directly taken up by animals looking for salt. The remediation plan calls for the tailings and sludge areas to be covered with one layer of quarried rock and a second (top layer) of fine-grained soil.

Top layer of locally available silt and silty clay will:

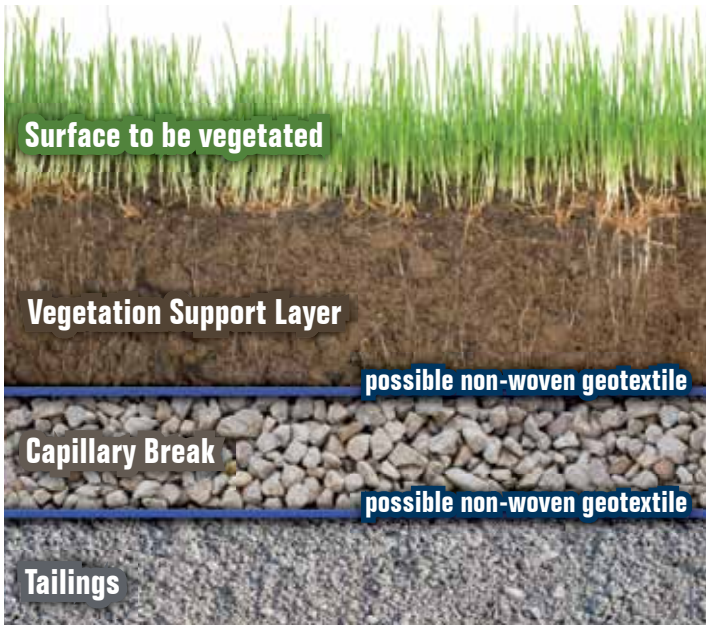
1. Act as clean surface to shed runoff
2. Allow vegetation to establish
3. Reduce water infiltration
4. Allow for future recreational and/or traditional use
5. Eliminate airborne tailings fines on windy days

Lower layer of broken rock has four functions:

1. Physical Barrier to prevent contact with the tailings by humans or animals
2. Prevents erosion, ie: from ATV's, Dirt Bikes,etc
3. Prevent upward wicking of arsenic salts through to cover
4. Helps prevent roots from penetrating tailings

Conceptual Tailings Cover

Surface slope (min. 0.5%; max. 33%)
Vegetation Support Layer: 30-70 cm silt or silty clay
Capillary Break: 15-30 cm gravel, or 30-60 cm crush or 100 cm run-off-quarry



There are approximately 13.5 million tonnes of tailings stored in ponds constructed on the surface at the Giant Mine site (about 95 hectares).

INAC and GNWT are testing materials to determine the best/optimum tailings cover design. Shown here are test plots for different sizes of crushed rock to be used in the first and lower layer on the tailings cover. Geotechnical fabric is also being tested.

What are tailings? Tailings are milled and finely crushed rock leftover after the process of separating the gold from the ore-bearing rock.

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