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Introduction to the Giant Mine Environmental Assessment – Plain Language Summary

Giant Mine Remediation Project

This summary was prepared for INAC by SENES Consulting Ltd, for the Giant Mine Developer's Assessment Report, submitted to the Mackenzie Valley Environmental Impact Review Board in October 2010.

Giant Mine is near Yellowknife, Dettah and Ndilo in the Northwest Territories (NWT). The former gold mine started in 1948 and operated for more than 50 years. After the owner of the mine went bankrupt in 1999, Indian and Northern Affairs Canada (INAC) took over the site. INAC and the Government of the Northwest Territories (GNWT) are now responsible for site management and cleanup. Giant Mine is the second largest contaminated site in Canada that is being managed by the federal government. The total area of the mine site covers approximately 850 hectares or twice the size of downtown Yellowknife and is 700 metres deep.

Since 2000, INAC and the GNWT have been working with independent experts and the public to make a plan to clean up the site. This "Remediation Plan" is now being looked at by the Mackenzie Valley Environmental Impact Review Board (Review Board). The Review Board is the co-management group that does environmental assessments in the Mackenzie Valley.

Environmental Assessment is the process of looking at the changes a project may cause on people and the environment, before a project is allowed to take place. The Review Board will make a recommendation to the federal and territorial governments about whether the Giant Mine Remediation Plan should proceed and what rules are needed to protect people and the environment.

This summary describes some of the environmental concerns at the site right now and the plans to deal with them. It also provides a summary of the environmental assessment.

Environmental Concerns

A variety of environmental concerns left at Giant Mine need to be cleaned up and managed. The greatest challenge on the site is the 237,000 tonnes of arsenic dust stored underground. This dust needs to be managed long term to make sure the people and animals in the area are safe.

The rocks that were mined at Giant Mine included high levels of naturally occurring arsenic. Arsenic can be dangerous to both people and the environment if too much gets into the air or water.

The process used to produce gold at Giant created a dust that is made up of about 60% arsenic. From 1951 to 1999, 237,000 tonnes of this dust was put underground in storage areas at the mine site. The dust is stored in 14 chambers and stopes in the rock underground, many that are as big as the Precambrian Building in downtown Yellowknife. One of the main problems with the dust is that the type of arsenic it contains is water soluble. This means it could dissolve in any water that contacts the dust and flow into nearby water bodies such as Baker Creek or Great Slave Lake. The ground water is currently collected and treated to remove arsenic.

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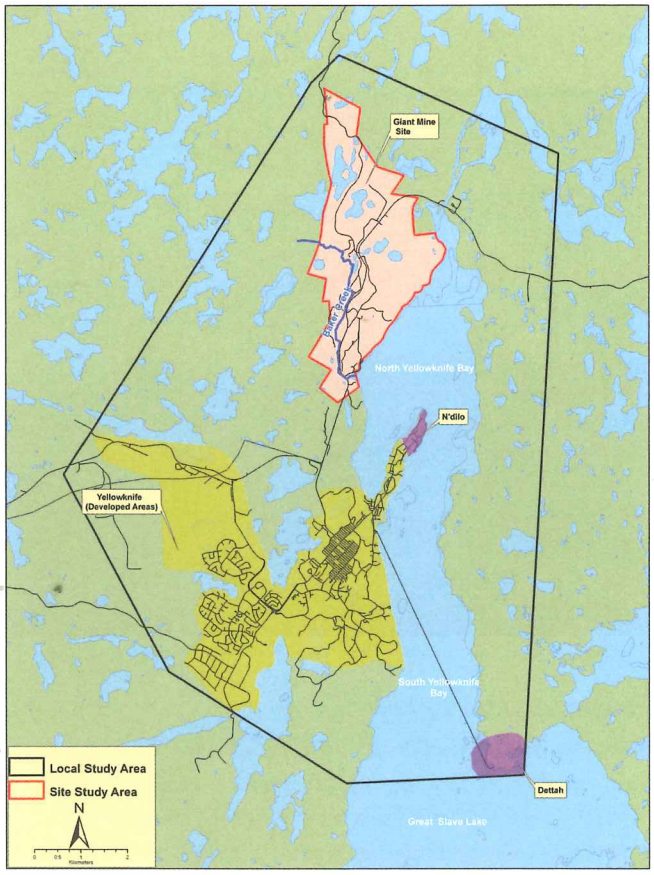
Location of Giant Mine



Other Concerns

In addition to the arsenic dust, other concerns at Giant Mine include:

- The waste material from the mine process, called tailings, also contains arsenic. Most of this arsenic is in a form that is less soluble than the dust stored underground. For this reason it is not as much of an environmental risk.
- Other areas on site were contaminated during the operation of the mine. This includes arsenic in soils and some areas where fuel has been spilled.
- There are over 100 buildings on the site. Asbestos was used in the construction of most buildings and some are also contaminated with arsenic.
- There are eight open pits and 35 openings to the mine that are safety hazards.
- Baker Creek flows through the site. The path of the creek was changed in some areas to allow for mining and construction of the highway. The water and sediment in the creek have high concentrations of arsenic.

The Remediation Plan

INAC and the GNWT have developed a "Remediation Plan" to deal with the environmental concerns at the Giant Mine site. Overall, the goal of the Plan is to protect human health, public safety and the environment. The purpose of the Remediation Plan is to:

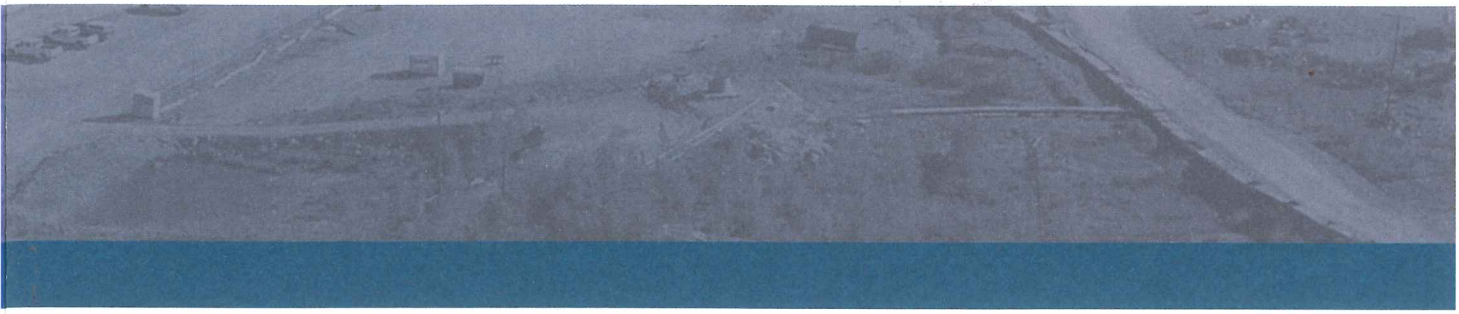
- Prevent the release of arsenic in the underground dust into the environment;
- Clean up the surface of the site to industrial guidelines set by the GNWT. Many parts of the site will be okay for other land uses. Decisions on how to use the land will be made in the future;
- Reduce risks by removing buildings, closing mine openings and getting rid of other hazards at the site;
- Keep the release of contaminants from the site as low as possible; and
- Restore Baker Creek to a more natural condition.

The Remediation Plan has two main phases. The first is "Site Remediation" and the second is "Long-term Operation and Maintenance".

Site Remediation Phase

The Site Remediation Phase will last for about ten years but the busiest time will be during the first five years. The main priority during this time will be to make sure the arsenic dust is dealt with safely. This issue has been looked at by many experts and through talking to the public. After evaluating many options, INAC and the GNWT have decided to freeze the arsenic dust underground and the rock that surrounds it. The "frozen block method" will keep water from flowing through the areas where the arsenic dust is being stored. This will reduce the release of arsenic to the environment.

There are many other steps that need to be taken to clean up the Giant Mine site. The following table shows the steps that will be taken and the expected benefits.



Site Remediation Phase - Activities and Benefits

Location/materials	Proposed Activities	Benefits
Underground arsenic dust storage areas	• Freeze in place underground through the "frozen block method"; • Maintain ground freezing system.	• Prevents release of arsenic into groundwater.
Other parts of the underground mine	• Clean up and remove waste; • Close mine openings.	• Stops safety risks to wildlife and the public.
Open pits	• Backfill B1 Pit and Brock Pit; • Use signs, fences and berms to stop access to remaining pits.	• Improved public safety by stopping access to pits.
Tailings areas	• Cover with rock and soil; • Evaluate options for plant growth.	• Better groundwater and surface water runoff quality; • Better long-term air quality (less dust); • More options for future land uses.
Tailings on the shore of Great Slave Lake	• Extend the existing tailings cover.	• Limits erosion and potential for arsenic to get into water.
Site water management	• Build a new water treatment plant and treat all contaminated water; • Release treated water to Great Slave Lake instead of Baker Creek.	• Less arsenic going into Baker Creek and Great Slave Lake.
Baker Creek	• Move portions of the creek to reduce the risk of mine flooding; • Manage contaminated sediments; • Create suitable habitat for fish and animals in the creek.	• Reduces the risk of flooding; • Improves aquatic habitat in Baker Creek; • Improves the aesthetic value of the creek.
Quarries, borrow pits, and soil/rock piles	• Reclaim areas disturbed during the mining operation.	• Reduces physical dangers; • Returns the site to more natural conditions.
Contaminated soils	• Dig out contaminated soils and place in a frozen zone or treat on surface.	• Improves quality of habitat on site; • Reduces risks to the public and animals; • More options for future land uses.
Buildings and roads	• Remove all unsafe materials and tear down buildings; • Move part of highway to allow for site cleanup.	• Improves how the site looks; • Reduces safety risks to the public and wildlife.

In addition to the benefits listed in the table, the Remediation Plan will create jobs for Aboriginal people and other Northerners. It will also help local businesses because there will be money spent on goods and services.

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Long-term Operation and Maintenance Phase

After the main cleanup activities are over, most of the area will be available for other uses. However, a small area near the middle of the mine will require long-term activity. The activities in this area will include running the ground freezing system and treatment of contaminated water. People will monitor these activities to make sure they are working and that the land and water are safe.

The Environmental Assessment

INAC and the GNWT applied for a water license to start the Remediation Plan in October 2007. The City of Yellowknife sent the Remediation Plan to an environmental assessment based on concerns about potential negative effects. The Review Board began its environmental assessment of the Remediation Plan in April 2008.

As part of the assessment, INAC and the GNWT prepared a Developer's Assessment Report. The main purpose of the report is to see if the Remediation Plan activities will have any negative effects on the environment. This is done by setting a location and a timeframe for the assessment and figuring out the most important features of the environment that need to be protected.

Study Areas

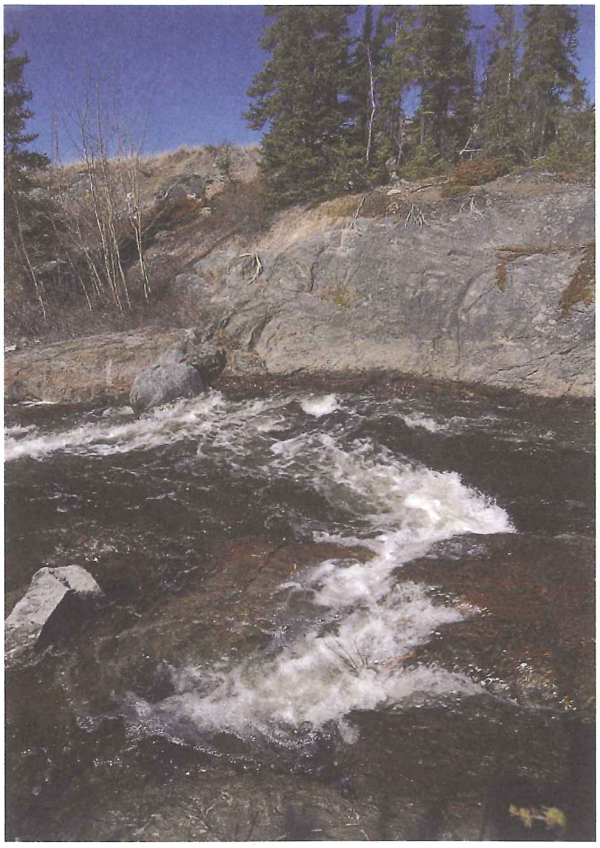
The effects of the Remediation Plan were predicted for three separate areas: the Site Study Area and Local Study Area (shown in the map on page 2), and a Regional Study Area that includes the North Slave Region of the Northwest Territories.

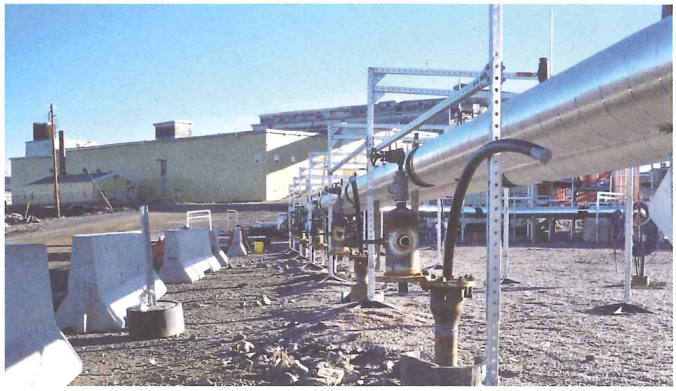
Timeframe

The Review Board requested that the Developer's Assessment Report look at any changes the project might cause over its first 25 years. This consists of two stages, one after the other:

- Fifteen years to freeze all of the underground arsenic; and
- Ten years of monitoring to show that the plan is working and the site has been properly cleaned up.

After these 25 years, monitoring and maintenance activities will make sure the site remains stable over the long-term.





Valued Components

The project was studied to see if it will have negative effects on the following parts of the environment:

- Surface water – surface water flow and quality, and sediment quality;
- Groundwater, rock and soil – groundwater quality and flow, soil quality and permafrost;
- Air – air quality and noise;
- Animal and plants and their habitat, in water and on land;
- Environmental and human health;
- Aboriginal interests – traditional land use, community well-being and heritage resources;
- Other community interests – land use, social and economic conditions, and transportation.

"Valued Components" were selected to help study how the project might cause negative effects to different parts of the environment. A few examples of the Valued Components are:

- For water: Arctic grayling in Baker Creek and northern pike in Yellowknife Bay;
- For land: moose, grouse, peregrine falcon, willow;
- For people: traditional harvesting and Aboriginal archaeological resources and employment.

Predicted Effects

Possible interactions between the project and the environment were looked at in the Developer's Assessment Report to see if negative effects might occur. If potential negative effects were identified, different ways of reducing or avoiding the effects were selected. This is called "mitigation". Any effects that could remain after mitigation are known as "residual effects".

The Report looked at interactions between the project and the environment in the following four ways:

1) Effects of the Project on the Environment

The main goal of the Remediation Plan is to improve existing conditions and protect lands, waters, wildlife and people. However, some site cleanup activities may result in negative effects that cannot be completely avoided. The residual effects that could occur include:

- Exhaust and noise from on-site equipment and vehicles;
- Dust during earth moving activities;
- Temporary loss of fish habitat and muddier water during the cleanup of Baker Creek;
- Release of existing contaminants into the air or water during cleanup;
- Loss of some permafrost;
- Surface damage that affects habitat, plants and animals;
- Erosion in areas where digging occurs; and
- Removal of heritage buildings.

Overall, the Developer's Assessment Report concluded that only minor negative effects will remain after mitigation. These changes are not significant compared to the benefits of cleaning up the site. Most of the effects will be short-lived and will only happen during the Site Remediation Phase.

Even though the Remediation Plan will clean up and protect the environment, arsenic concentrations will continue to be higher than would naturally occur. Studies looked at the effects this arsenic will have on plants, animals, and humans. The studies show that the arsenic may continue to cause some

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negative effects on bottom-feeding fish and land animals like muskrats that live in or near Baker Creek.

After the Remediation Plan is completed, there will be little risk to humans from arsenic. The total intakes of arsenic for residents living near the site will still be similar to those of most Canadians. However, there may need to be rules about how the site is used. For example, people may need to avoid eating fish from Baker Creek until monitoring shows that fish in the creek are safe to eat.

2) Effects of the Environment on the Project

The Developer's Assessment Report also looked at whether the Remediation Plan will be successful under extreme conditions. This included evaluating the effects of flooding, climate change and earthquakes. The Report concluded that the Remediation Plan will work as planned under such situations. For example, the arsenic dust will remain frozen even in a "worst case" scenario where temperatures rise in the coming years.

3) Effects of Accidents and Malfunctions

Another important part of the Report was an evaluation of accidents and malfunctions. This could include things like transportation accidents, fires and spills. The Remediation Plan has been designed to manage these situations. There will be emergency response plans in place to make sure action is taken to quickly control accidents and malfunctions. With these plans in place, negative effects on the environment or human health from accidents and malfunctions are not expected.

4) Cumulative Effects

The remaining negative effects that the Remediation Plan cannot completely stop or avoid were looked at to see if they might add to the effects of other unrelated projects and activities to produce greater combined or "cumulative" effects.

Several activities were identified that might contribute to cumulative effects. These were mainly projects or activities near the Giant Mine site, such as the garbage dump, active quarries and the possible changes to the Ingraham Trail. There are no cumulative effects predicted that would require additional environmental protection.

Public Consultation

INAC and the GNWT have focused on consulting with the public in Yellowknife, Ndilo and Dettah. These activities have included holding workshops, open houses, public meetings, and giving mine tours to members of the public who are interested in what is happening with the clean up plan. The main goals of these activities were to:

- Inform the public about conditions at the site;
- Describe the Remediation Plan, particularly how the underground arsenic will be managed; and
- Receive input on how the Remediation Plan can be improved.

The Developer's Assessment Report describes the ways to make sure the public can be included and informed of what's going on with the project. Some of the approaches include:

- Holding workshops and meetings to get community input on specific issues. For example, input is needed on the final designs for Baker Creek and what kind of plants should be planted on the tailings covers.
- Informing the Giant Mine Community Alliance, a group of interested organizations that share information about the project and relay public concerns to INAC and the GNWT.
- Posting updates on the project website and through the media.
- Updating the public registry for the project.
- Addressing public concerns brought to the attention of team members at the Giant Mine Remediation Project office and answering questions in person, by phone or e-mail.

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Monitoring Plans

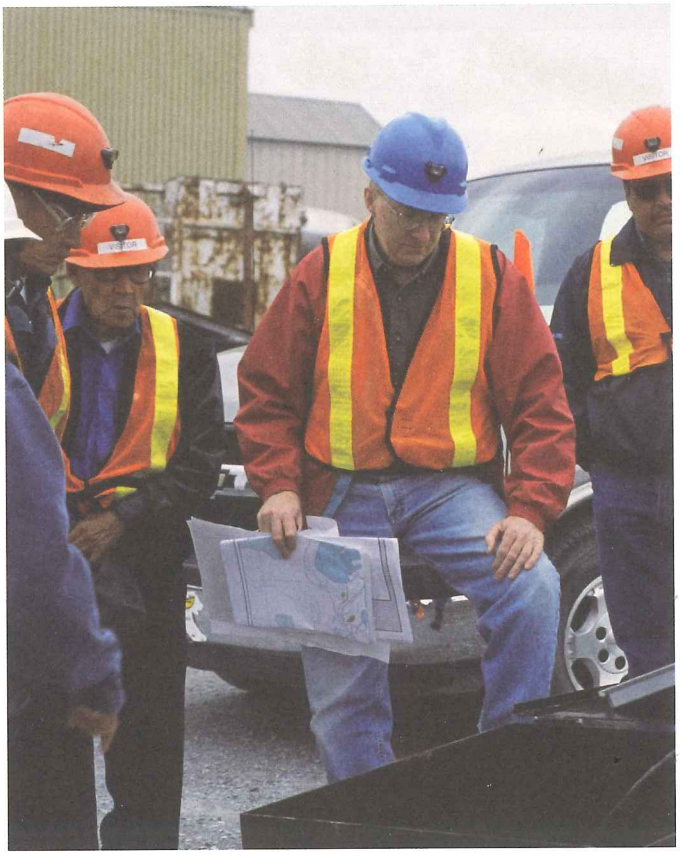
The purpose of monitoring is to help figure out if the effects of the Remediation Plan actually turn out to be as predicted. Monitoring is also used to confirm that the proposed improvements, or "mitigation" programs work. If the mitigation does not work, new actions can be used, although this is not expected to be needed.

The Remediation Plan was designed to reduce or avoid negative effects from the risks that were created when Giant Mine was operating. Some of the risks can be eliminated by the Remediation Plan. Others, such as high levels of arsenic, will remain on site for a long time. These long-term risks will always need active care. Long-term monitoring will make sure the project is protecting the environment from these risks. This will include monitoring of the frozen arsenic dust and any changes in the land, air and water over time.

The Developer's Assessment Report includes a detailed plan to do monitoring during and after the project. The monitoring plan includes:

- Monitoring of underground temperatures in and around the frozen arsenic chambers;
- Collection and study of underground water and surface water;
- Monitoring of the health of fish in Baker Creek and Yellowknife Bay;
- Air quality monitoring; and
- Wildlife and plant health studies.

Several government agencies and environmental management boards will review the monitoring reports to make sure that people, the land, water and animals are protected. This includes the Mackenzie Valley Land and Water Board, Environment Canada, Department of Fisheries and Oceans, Indian and Northern Affairs Canada, and the territorial government's Department of Environment and Natural Resources.



Conclusion

Overall, the Developer's Assessment Report concluded that only minor negative effects will remain after clean up. Most of the effects will be short-lived and will only happen during the Site Remediation Phase.

INAC and the GNWT are confident that the Giant Mine Remediation Plan will result in many positive effects by improving and protecting the environment.

Giant Mine Remediation Project Office

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Northwest Territories

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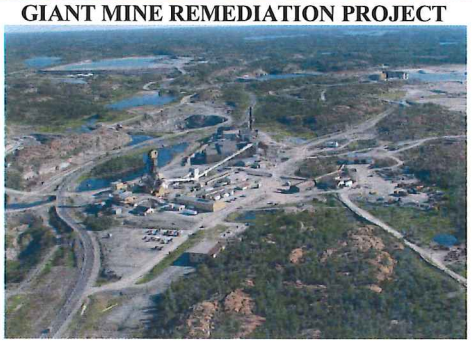
GIANT MINE REMEDIATION PROJECT



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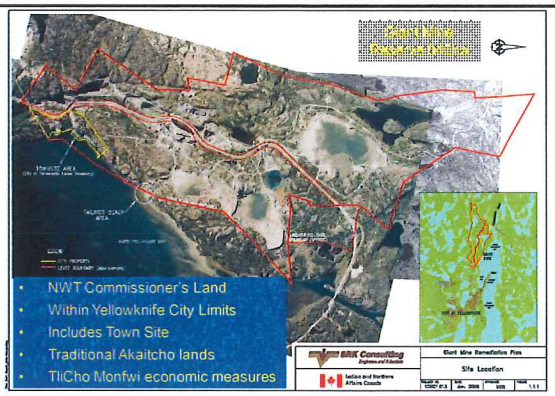

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Gold Extraction by Roasting

Rock containing gold is rich in arsenopyrite

Arsenopyrite iron arsenic sulphide (FeAsS)

As_2O_3

As 46.01%

Fe 34.3%

SO_2

S 19.96%

Common Impurities
Au, Ag, Co, Sn, Ni, Sb, B, Cu, Pb

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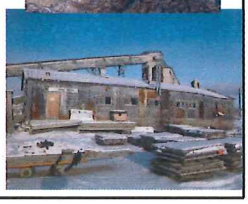
THE ISSUES



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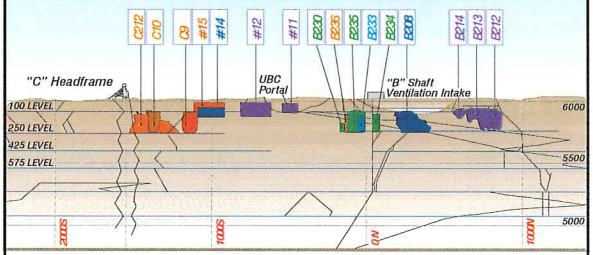
Giant Mine – Arsenic Chambers, Long Section



Arsenic trioxide dust in undergroundstorage is enclosed completely in rock – all access drifts sealed by cement bulkheads

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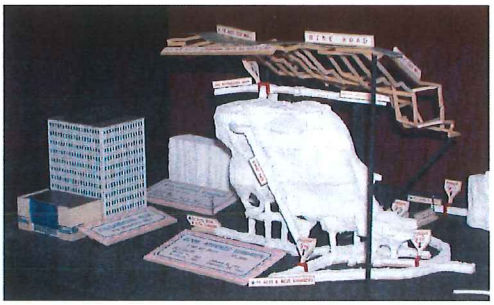
B208 CHAMBER – True Scale to Precambrian Bldg



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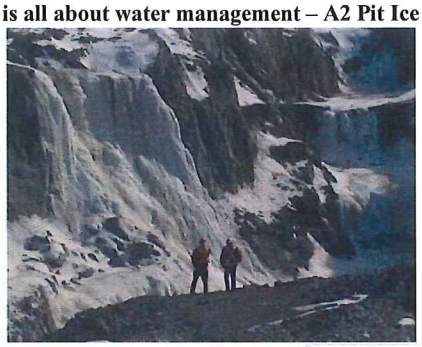
Giant is all about water management – A2 Pit Ice Wall



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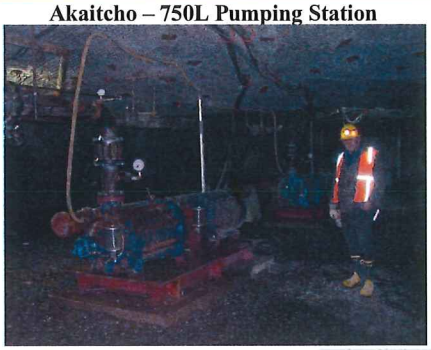
Akaitcho – 750L Pumping Station



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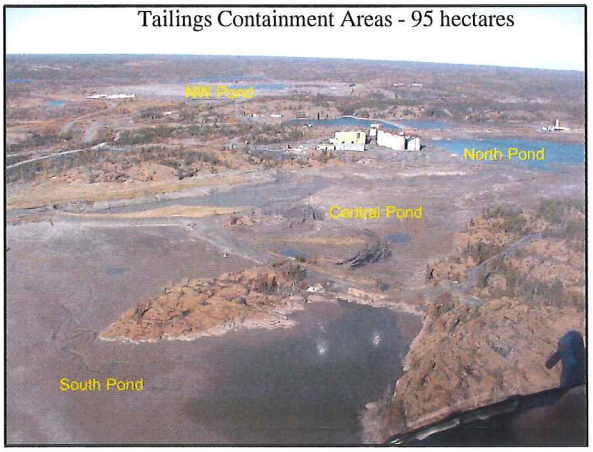
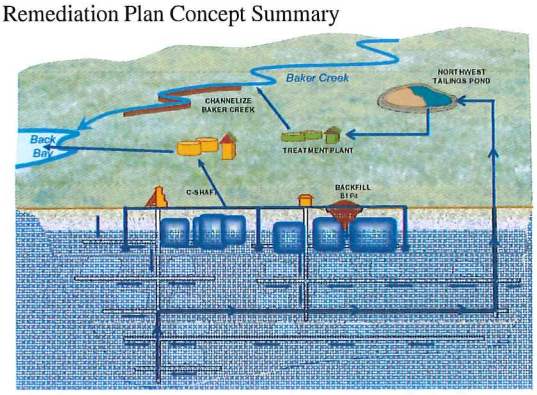
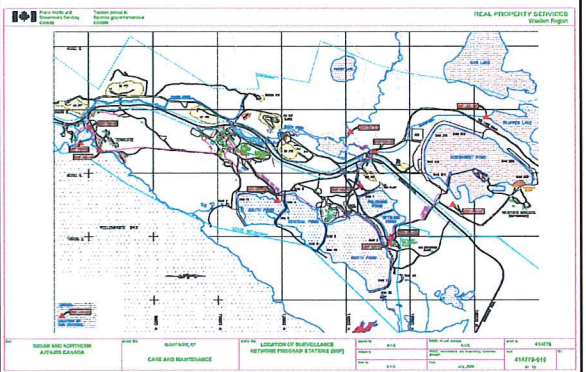
Tailings Containment Areas - 95 hectares



Remediation Plan Concept Summary



SURVEILANCE NETWORK PROGRAM (SNP) – Environmental Monitoring



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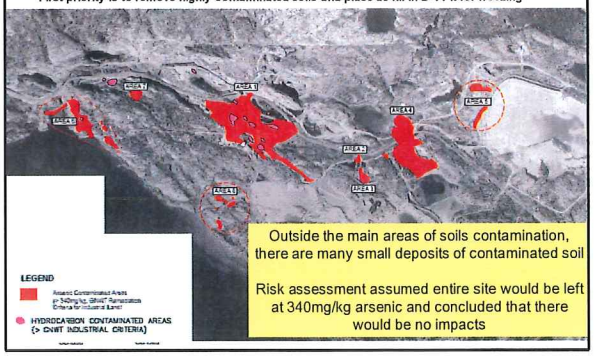
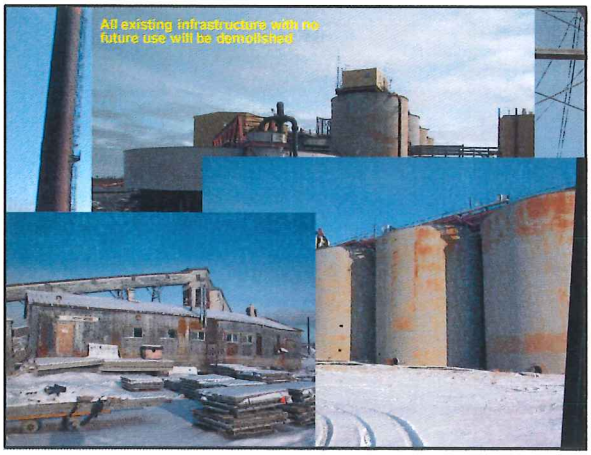
Contaminated Surface Materials

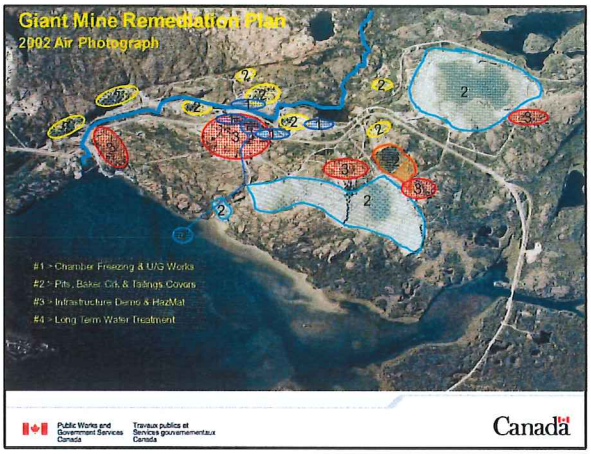
Site will be remediated to GNWT industrial standard - 340 mg/kg
Adopted industrial criterion to flag most contaminated areas
First priority is to remove highly contaminated soils and place as fill in B-1 Pit for freezing



Outside the main areas of soils contamination, there are many small deposits of contaminated soil

Risk assessment assumed entire site would be left at 340mg/kg arsenic and concluded that there would be no impacts


All existing infrastructure with no future use will be demolished


Giant Mine Remediation Plan
2002 Air Photograph
#1 = Chamber Freezing & U/G Works
#2 = Pits, Baker Crk & Tailings Covers
#3 = Infrastructure Demo & HazMat
#4 = Long Term Water Treatment
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THE SOLUTION
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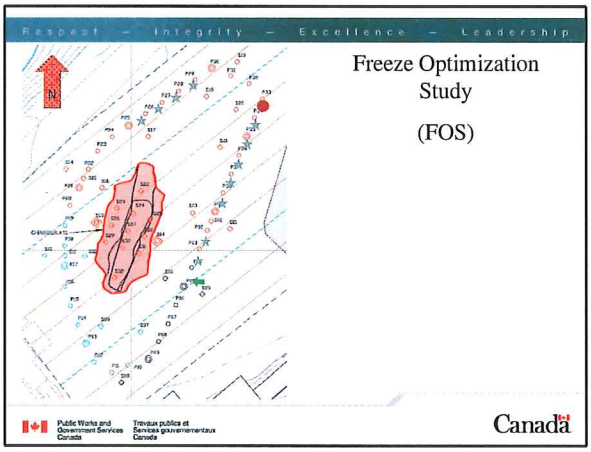
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Freeze Optimization Study
(FOS)
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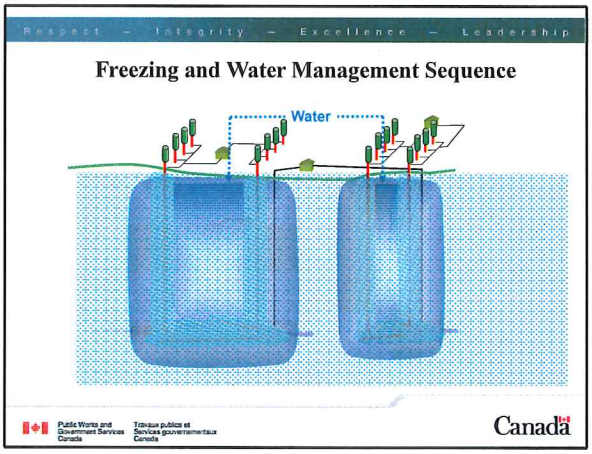
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Freezing and Water Management Sequence
Water
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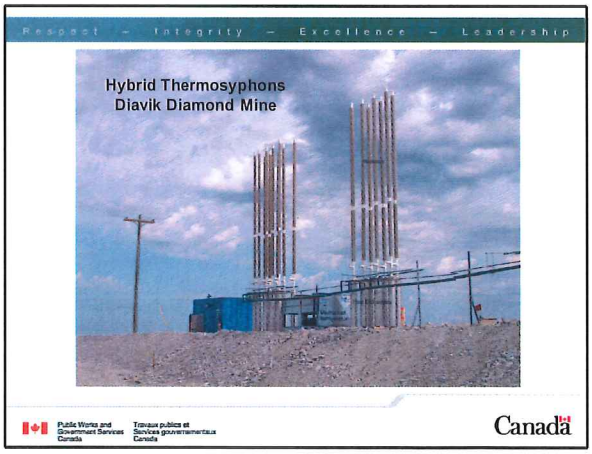
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Hybrid Thermosyphons
Diavik Diamond Mine
Public Works and Government Services Canada
Travaux publics et Services gouvernementaux Canada
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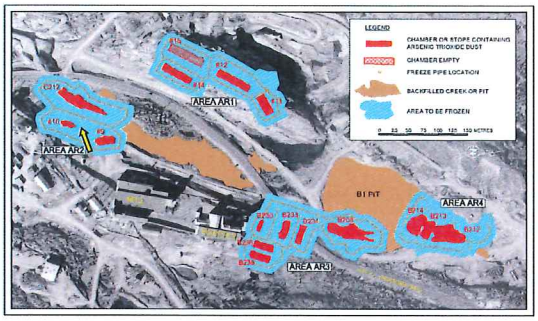
#1 > Four Separate Arsenic Trioxide Storage Areas to be Frozen



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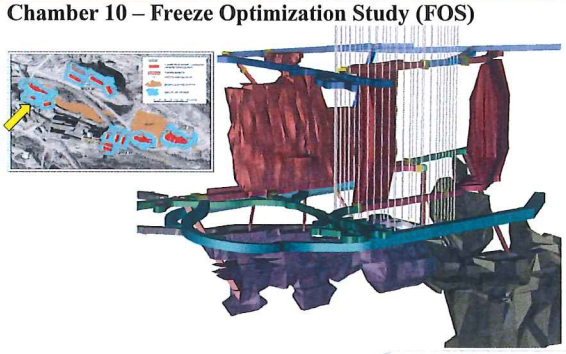
Chamber 10 – Freeze Optimization Study (FOS)



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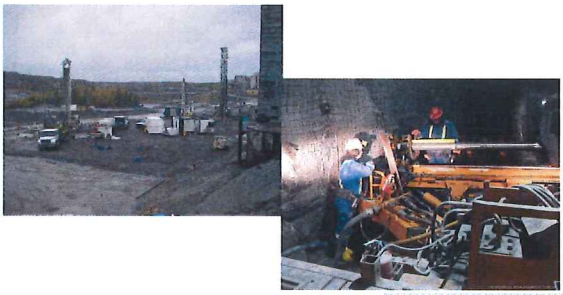
FOS - DRILLING



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ACTIVE and HYBRID FREEZING

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Instrumentation and Monitoring

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FOS – AR2 EAST, UNDERGROUND FREEZE SYSTEM

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ENVIRONMENTAL ASSESSMENT & WATER LICENCING

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BASE CARE & MAINTENANCE

- SENIOR STAFF & SUPPORT
- SITE SECURITY
- PREVENTATIVE MAINTENANCE
- ENVIRONMENTAL MONITORING
- HEATING SYSTEMS
- ELECTRICAL INFRASTRUCTURE
- SURFACE MAINTENANCE & ROADS
- UNDERGROUND INFRASTRUCTURE
- MINE DEWATERING
- SURFACE WATER MGMT
- ETP OPERATIONS
- WATER & SEWER
- ENERGY
  - Heating Fuel
  - Electricity
  - Propane

TOTAL **~$7,000,000**

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Immediate Risks

- Baker Creek (C1 Pit Channel)
- B1 Pit Wall Stability
- Mill Conveyor
- Secure C-Shaft
- Mine Record Preservation
- Inadvertent Site Access

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Baker Creek Reach 6 – JoJo Lake Directive

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Relocation of Effluent Discharge Pipe

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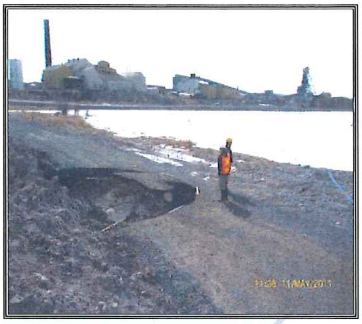
B1 Pit Subsidence



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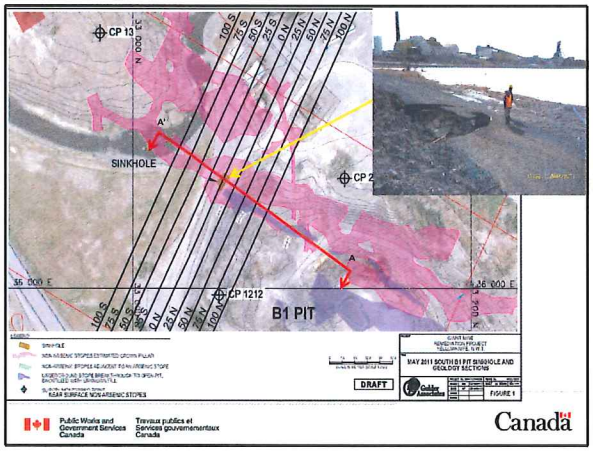

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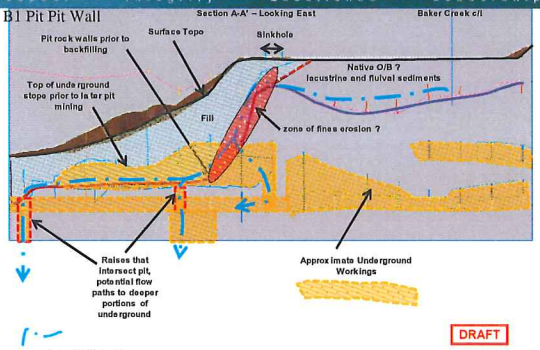
B1 Pit Pit Wall



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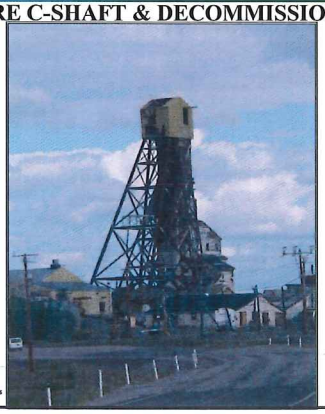
SECURE C-SHAFT & DECOMMISSION HOIST



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DEMOLITION OF CONVEYOR GALLERIES

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ADVANCED REMEDIATION

- Roaster Complex
- Underground Stabilization
- Emergency Plan for Diversion of Baker Creek

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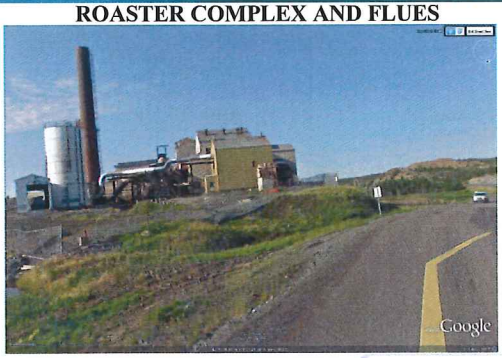
ROASTER COMPLEX AND FLUES



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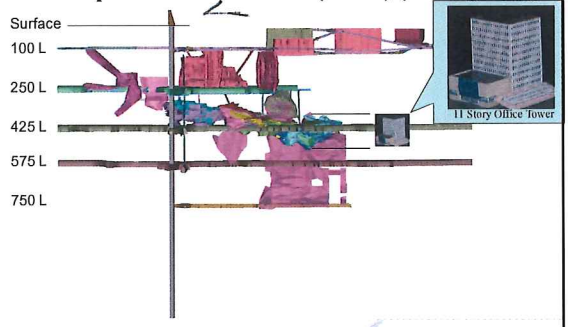
C5-09 Complex – Loss of Backfill (5M ft^3) (looking West)



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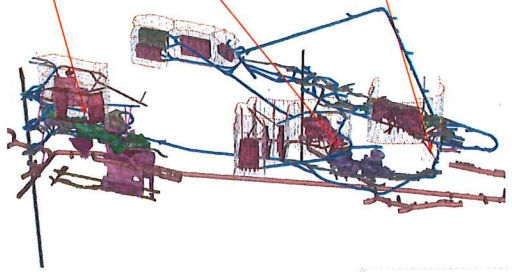
ARSENIC CHAMBER BULKHEAD STABILIZATION

C2-12 – BH#49, B2-08 – BH's #10/11/12, B212/213/214 – BH#36,



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B2 Dam – Project Aerial View (Post Reconstruction Conditions)

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B2 Dam – Looking North over B2 (UBC) Pit

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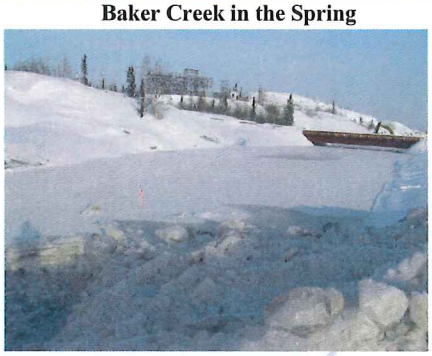
Baker Creek in the Spring



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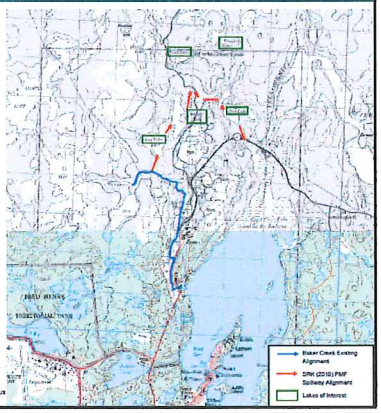
North Diversion

An Emergency Response Plan for Mitigating Uncontrolled Mine Flooding Risk



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Capital Improvements

- Electrical System Code Deficiency Upgrades
- A1 Ditch Improvements (to reduce water infiltration)
- Effluent Treatment Plant Tank Repairs

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A1 Diversion Upgrade

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ELECTRICAL SUB STATION REPAIRS

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Old Akaitcho Substation vs FOS Substation

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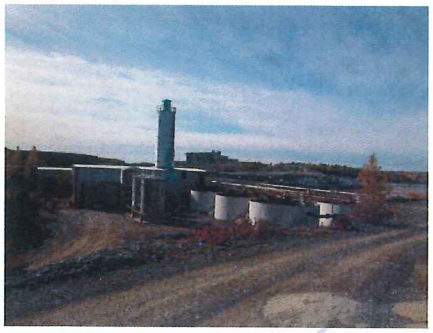
Effluent Treatment Plant



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COMPLETELY PERFORATED FLOORS IN REACTOR TANKS

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ENGINEERING

- Critical that AECOM/Golder Engineering Team continuity be maintained until full predesign, and current high risk element design and stabilization requirements are completed.
- Underground and Mine Records Preservation
  - Updates to 3D asbuilt model for stability assessments, risk evaluation, etc
  - Further detailed site investigations: drilling, cavity monitoring, surveys, etc
  - Ongoing preliminary design and detailed design to maintain scheduled mitigation of high risk elements, consistent with the remediation plan
- Water Treatment
  - Underground water quality characterization
  - Ongoing preliminary & detailed design to allow priority replacement of existing ETP
- Freeze Program
  - FOS – continuation of study through to wetting and achieving frozen block
  - Ongoing preliminary design and full detailed design optimizations using FOS results
- Baker Creek
  - Sediment Study to support fundamental design decisions
  - Complete risk review to confirm ongoing design decisions

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GIANT MINE REMEDIATION PROJECT

Thank you for your time

Questions?

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Giant Mine Remediation Project

Remediating the Giant Mine Site

Giant Mine has played a significant role in Canadian history since 1948 when the first gold brick was poured. The Yellowknife mine was one of Canada's largest producers of gold and one of the single biggest employers for Yellowknife residents until its closure.

Now, more than 50 years later, it is time to remediate the mine site in a responsible and effective manner. We welcome any questions you might have about the Remediation Plan for Giant Mine. Please contact the Giant Mine Remediation Project Office for more information.

Highlights

Giant Yellowknife Gold Mines Ltd. began production in 1948. The mine was operated continuously under different owners until 1999, when its owner at the time, Royal Oak Mines, was assigned into receivership. The mine was then transferred to the Government of Canada which immediately sold it to Miramar Giant Mine Ltd., after providing indemnification for the environmental liabilities.

Miramar Giant Mine Ltd. operated the mine until 2004, and provided care and maintenance at the mine site until 2005. Since then, Public Works and Government Services Canada has managed care and maintenance activities at the Giant Mine site, with services provided by a private sector contractor.

In 2005, the Government of Canada and the Government of the Northwest Territories (GNWT) signed a 10-year Cooperation Agreement on the management and remediation of Giant Mine. The two governments agreed to work together to address both surface and underground aspects of the mine site clean-up.

In 2007, a Remediation Plan for Giant Mine, agreed upon by both Indian and Northern Affairs Canada (INAC) and the GNWT, was submitted to the Mackenzie Valley Land and Water Board as part of a water license application.

The Remediation Plan outlines the clean-up plans for the entire mine site, including the surface remediation (demolition of buildings, tailings clean-up), and the subsurface containment of the 237,000 tonnes of arsenic trioxide dust using the Frozen Block Method.

The Remediation Plan is subject to the regulatory process under the *Mackenzie Valley Resource Management Act*. The City of Yellowknife sent the Remediation Plan to an environmental assessment based on concerns about potential negative effects. The Review Board began its environmental assessment of the Remediation Plan in April 2008.

As part of the Review Board's assessment, INAC and the GNWT prepared a Developer's Assessment Report. The main purpose of the report is to see if the Remediation Plan activities will have any negative effects on the environment.

After the Review Board completes its environmental assessment, the Mackenzie Valley Land and Water Board will review and evaluate the plan, and ultimately determine the timing of the next steps for the clean-up of the Giant Mine site. It is anticipated that remediation of the mine site could be completed within 10 years of receiving approvals.

Giant Mine Remediation Project Office

2nd Floor, Waldron Building, 5103 - 48th St., Yellowknife, NT X1A 1N5 Tel.: (867) 669-2426 Fax: (867) 669-2439 Email: giantmine@ainc-inac.gc.ca

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Northwest Territories

Canada

Affaires indiennes et du Nord Canada | Indian and Northern Affairs Canada

Projet d'assainissement de la mine Giant

L'assainissement du site de la mine Giant

La mine Giant a joué un rôle important dans l'histoire du Canada depuis 1948, année à laquelle on a coulé le premier lingot. La mine a été prise en charge par le gouvernement du Canada, qui l'a immédiatement vendue à Miramar Giant Mine Ltd., après avoir versé une indemnité relativement au passif environnemental.

Aujourd'hui, plus de 50 après, il est temps de restaurer le site minier de manière responsable et efficace. Nous répondrons aux questions que vous pourriez avoir concernant les plans d'assainissement de la mine Giant. Veuillez communiquer avec le Bureau du Projet d'assainissement de la mine Giant pour obtenir de plus amples renseignements.

Faits saillants

La société Giant Yellowknife Gold Mines Ltd. a entrepris l'exploitation de la mine en 1948. Différents propriétaires ont exploité la mine sans interruption jusqu'en 1999, lorsque le propriétaire de l'époque, Royal Oak Mines, a été mis sous séquestre. La mine a été prise en charge par le gouvernement du Canada, qui l'a immédiatement vendue à Miramar Giant Mine Ltd., après avoir versé une indemnité pour la contamination du sous-sol.

La société Miramar Giant Mine Ltd. a exploité la mine jusqu'en 2004 et s'est occupée du site jusqu'en 2005. Depuis, Travaux publics et Services gouvernementaux Canada a géré les activités d'entretien et de maintenance du site de la mine Giant, ainsi que les services fournis par un entrepreneur du secteur privé.

En 2005, le gouvernement du Canada et le gouvernement des Territoires du Nord Ouest (GTNO) ont signé un accord de collaboration décennal relativement à la gestion et à la restauration de la mine Giant. Les deux gouvernements ont convenu de travailler ensemble pour aborder le nettoyage du site, tant en surface que sous terre.

En 2007, on a présenté à l'Office des terres et des eaux de la vallée du Mackenzie, dans le cadre d'une demande de permis d'utilisation des eaux, un plan d'assainissement de la mine Giant qu'avaient accepté le ministère des Affaires indiennes et du Nord Canada (AINC) et le GTNO.

Le plan d'assainissement décrit les plans de nettoyage pour l'ensemble du site minier, notamment en ce qui concerne la surface (démolition des bâtiments, assainissement des bassins de résidus) et les ouvrages de confinement souterrain contenant 237 000 tonnes de trioxyde de diarsenic. Pour ces derniers, on utilisera la méthode de congélation des blocs.

Le plan d'assainissement est soumis au processus de réglementation, conformément à la *Loi sur la gestion des ressources de la vallée du Mackenzie*. Ainsi, la Ville de Yellowknife a soumis le plan d'assainissement à une évaluation environnementale fondée sur des préoccupations en matière d'effets néfastes possibles. L'Office d'examen a commencé son évaluation environnementale du plan d'assainissement en avril 2008.

Dans le cadre de l'évaluation de l'Office d'examen, AINC et le GTNO ont produit un rapport d'évaluation du promoteur. Le but principal du rapport est de déterminer si les activités liées au plan d'assainissement auront des répercussions négatives sur l'environnement.

Lorsque l'Office d'examen aura terminé son évaluation environnementale, l'Office des terres et des eaux de la vallée du Mackenzie étudiera et évaluera le plan, et il déterminera finalement l'échéancier des prochaines étapes relatives au nettoyage du site de la mine Giant. On prévoit que le projet d'assainissement du site de la mine pourra être achevé dans les dix années qui suivront l'obtention des approbations.

Bureau du projet d'assainissement de la mine Giant

2e étage, édifice Waldron, 5103 – rue 48e, Yellowknife, T.N.-O. X1A 1N5 Tél. : (867) 669-2426 Téléc. : (867) 669-2439 Courriel : giantmine@ainc-inac.gc.ca

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This publication is also available in English under the title: Giant Mine Remediation Project

Territoires du Nord-Ouest

Canada

Indian and Northern Affairs Canada | Affaires indiennes et du Nord Canada

Remediation Plan 101

Giant Mine Remediation Project

A Remediation Plan for Giant Mine was developed by INAC and its Technical Advisor after extensive consultation with the general public, other government departments and industry experts. The Remediation Plan was subsequently vetted by an Independent Peer Review Panel. In 2007, the Remediation Plan for Giant Mine was submitted to the regulatory process for review in support of a water license application.

What is a Remediation Plan?

The Remediation Plan is the blueprint for cleaning up the Giant Mine site to ensure that human health and safety and the environment are protected for the future.

Why do we need a Remediation Plan? What is the point?

The current state of Giant Mine is unacceptable. The site has been impacted by more than 50 years of gold mining and ore processing. Arsenic trioxide stored underground must be effectively managed to protect human health and safety and the environment. The Remediation Plan explains how this will be done, and also describes general site clean-up activities on the surface.

What does the Remediation Plan cover?

The Remediation Plan covers the clean-up of the entire mine site, including the management of the 237,000 tonnes of arsenic trioxide dust currently stored underground, remediation of tailings ponds, and the demolition of buildings and other surface structures. More details are available on our website: www.giant.gc.ca

Is there anything the Remediation Plan doesn't cover?

The Remediation Plan was thoroughly reviewed by technical advisors and subject matter experts to ensure it addressed all the issues associated with cleaning up the mine site. It covers all surface and underground aspects of the clean-up of Giant Mine. It does not address future uses of the site after the remediation is completed.

Why can't INAC just go ahead with the remediation since you already know what work has to be done?

The project is subject to the regulatory process under the *Mackenzie Valley Management Act* so we need to get approval from the Mackenzie Valley Environmental Impact Board and the Mackenzie Valley Land and Water Board for our plan before we can begin doing the work.

Remediation Plan 101

When will remediation of the site be finished?

We expect that the surface remediation and freezing of the underground arsenic trioxide chambers and surrounding areas may take approximately 10 years to complete, after the project has received approvals.

Will the remediation work remove all traces of arsenic trioxide from the area?

Most of the arsenic trioxide will stay safely sealed in the underground chambers behind concrete bulkheads and will be frozen. Any soils on the surface that are contaminated will be excavated and disposed of safely at the mine site.

Is the Remediation Plan a "safe" plan?

Yes. The Remediation Plan includes clean-up methods that have been successfully used at other contaminated sites across North America. Safety measures that were developed for other clean-up projects in North America have been adopted for the remediation of Giant Mine.

Where can I get a copy of the Remediation Plan?

The Remediation Plan is more than 200 pages long, and there are more than 40 supporting technical documents – maps, diagrams, tables, spreadsheets, illustrations – making for a pile of binders more than two feet high.

An Executive Summary of the Remediation Plan is available on our website: www.giant.gc.ca

Giant Mine Remediation Project Office

2nd Floor, Waldron Building, 5103 - 48th St., Yellowknife, NT X1A 1N5 Tel.: (867) 669-2426 Fax: (867) 669-2439 Email: giantmine@ainc-inac.gc.ca

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Northwest Territories

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Surface Remediation

Giant Mine Remediation Project

Background

Several years of extensive technical and scientific research, and consultation with the public (including governments and other groups concerned about the mine site), have led to the proposal of surface remediation activities to protect the safety of local residents and the environment.

Remediation activities will minimize the release of contaminants from the mine site to the surrounding environment. The surface of the site will be remediated to industrial guidelines as outlined in the *NWT Environmental Protection Act*, with recognition that portions of the mine site may eventually be suitable for other land uses with appropriate restrictions.

Contaminated Soils

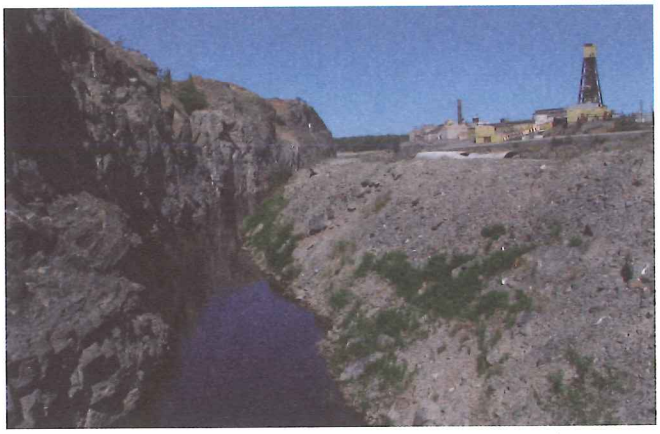
Contaminated soils will be excavated and disposed of within the frozen portion of B1 Pit, which will then be covered with non-contaminated material. Additional contaminated soils and spilled tailings will be excavated and moved into the most appropriate tailings or sludge area, and covered, along with the existing tailings and sludge.

Rehabilitation of Baker Creek

Clean-up activities include stopping the current discharge of treated water into the Baker Creek and creating a diversion channel away from the arsenic chambers. Rehabilitation of the creek channel will also encourage habitat development, and help restore Baker Creek to a condition that is as ecologically sound as possible, given the constraints of hydrology and climate.

Highway Diversion

A portion of Highway 4 will be relocated away from the arsenic chambers to avoid interference with surface facilities required for ground freezing.



Baker Creek will be diverted and rehabilitated as part of the Remediation Plan.

Water Management

A new water treatment plant will be constructed to treat contaminated water extracted from around the arsenic trioxide chambers and stopes – step-like parts of the mine where minerals are extracted – during and immediately after the ground freezing. Contaminated surface water will also be collected and treated until monitoring data clearly shows that the arsenic levels are low enough to allow direct discharge. Over the longer term, it is expected that water from the underground mine areas outside the frozen zones may continue to need treatment, and the new water treatment plant will remain in operation as long as required.

Open Pits

There are eight open pits on the mine site, five of which are substantial in size. The B1 Pit will be backfilled to facilitate installation of the ground freezing system. Contaminated soils from other areas on the mine site will be contained in the portion of the pit that will ultimately be within the frozen zone. Waste rock, quarry rock or clean demolition waste will be used to fill the remainder of the pit. The entire backfilled area will then be covered with soil and re-vegetated. The other pits will be surrounded by berms or fences to prevent inadvertent public access.

Surface Remediation

An aerial overview of the Effluent Treatment Plant, polishing and settling ponds at Giant Mine.

The Assay Office at Giant Mine is one of more than 100 buildings on site scheduled for demolition.

Tailings

The tailings and sludge areas will be covered with one layer of quarried rock and a second layer of fine-grained soil. The lower layer of quarried rock will prevent contaminants from the tailings from moving upward and inhibit the downward penetration of plant roots. It will also serve as a final protective layer in the event that the soil erodes. The upper layer of fine-grained soil will enable vegetation to grow and a variety of future uses for the site may be considered. The surface of each tailings area will be graded, and ditches and spillways constructed, to limit erosion and to allow water to run off the cover without becoming contaminated.

Removal of Mining Roads

Mining roads not required for maintenance and inspections at the site will be removed, and these areas will be planted with native vegetation to restore them as closely as possible to their natural state.

Buildings and Infrastructure

More than 100 buildings, supported by associated infrastructure and utilities, remain on the mine site. Many of these buildings pose a hazard to the public. The Remediation Plan calls for all buildings and infrastructure without an identified existing or future use to be removed and disposed of according to industry best practices. Any arsenic-contaminated materials will be removed and placed in the empty chamber 15 and frozen underground at that time.

When will this work be done?

The regulatory process could take several years. Once the environmental assessment is completed by the Mackenzie Valley Environmental Impact Review Board, the Project will need to go through regulatory approvals and licensing by the Mackenzie Valley Land and Water Board. It is anticipated that surface remediation could be completed within 10 years, as long as it receives regulatory approval.

In the meantime, regular care and maintenance activities will continue at Giant Mine to protect human health, public safety and the environment.

Giant Mine Remediation Project Office

2nd Floor, Waldron Building, 5103 - 48th St., Yellowknife, NT X1A 1N5 Tel.: (867) 669-2426 Fax: (867) 669-2439 Email: giantmine@ainc-inac.gc.ca

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Northwest Territories

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Indian and Northern Affairs Canada
Affaires indiennes et du Nord Canada

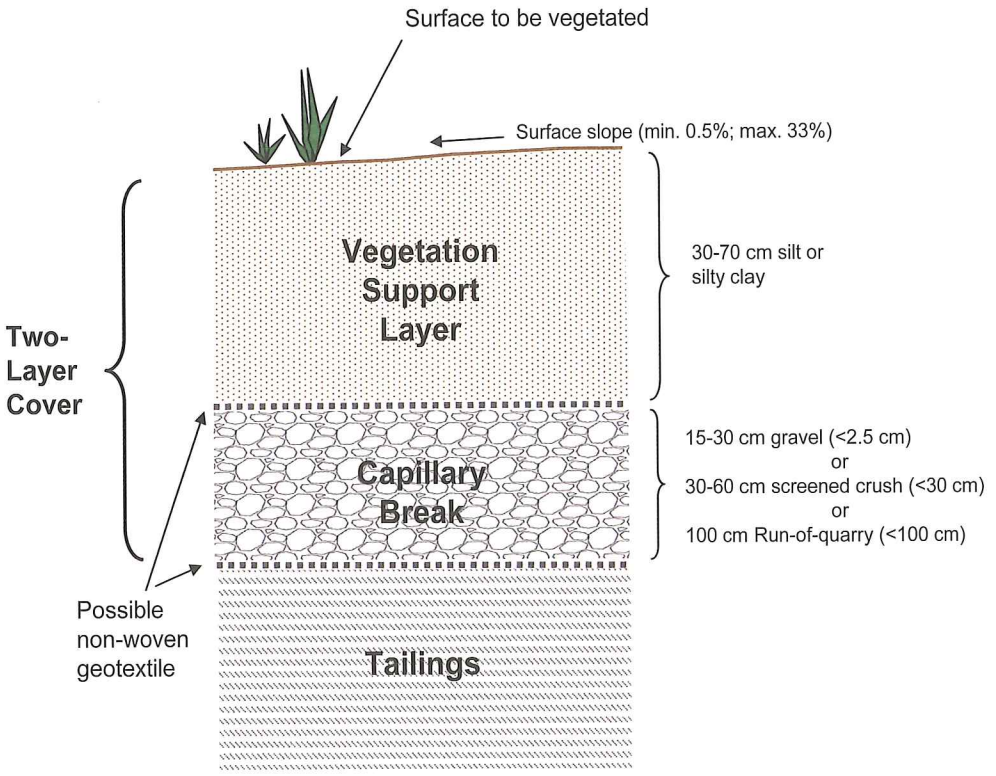
Tailings Remediation

Giant Mine Remediation Project

What are tailings?

Tailings are milled and finely crushed rock left over after the process of separating the gold from the ore bearing rock.

There are approximately 13.5 million tonnes of tailings stored in ponds constructed on the surface at the Giant Mine site. The south, central, north and northwest tailings ponds cover a total of about 95 hectares. In addition, water treatment sludge is stored in settling and polishing ponds covering an additional nine hectares. Both the tailings and the sludge 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.



History of tailings at Giant Mine

The depositing of tailings on the surface of Giant Mine started in 1948 and continued until 1999. From 1948 to early 1951, a relatively small amount of tailings was deposited at the north edge of Yellowknife Bay on Great Slave Lake. Subsequently, tailings were deposited directly into natural lakes, behind earth dikes, and in the engineered tailings impoundments (forming the current north, central, south and northwest ponds on the Giant property). Mill tailings were also placed in the underground mine as backfill in mined-out areas. Water treatment sludge has been deposited over the tailings behind Dam 1 starting in approximately 1983, and every summer since. A separation dike was constructed in the mid 1980s, resulting in the present day configuration of separate settling and polishing ponds.

How will the tailings be remediated?

The Remediation Plan calls for the tailings and sludge areas to be covered with one layer of quarried rock and a second layer of fine-grained soil. The lower layer of quarried rock will prevent the upwards migration of contaminants from the tailings, and reduce the downwards penetration of plant roots. This layer will also act as a physical and protective barrier against the removal of tailings by erosion.

The upper layer of fine-grained soil will allow for re-vegetation and possible future recreational or traditional uses of the site. The surface of each tailings area will be graded, and ditches or spillways constructed to limit erosion and allow water to run off the cover without becoming contaminated.

Tailings Remediation

Why remediate the tailings?

The Giant Mine Remediation Plan calls for the remediation of the surface of the mine site to the industrial standards set out in the *Environmental Protection Act* with a specific focus on minimizing the release of contaminants from the site to the surrounding environment. To meet this objective, the tailings and sludge pond surfaces will need to be covered.

The specially-constructed cover will create a physical barrier between the tailings/sludge and people making use of the remediated surface, prevent dust release and direct physical exposure to tailings, and prevent the inadvertent exposure of plants, animals and people to the arsenic contained in the tailings and sludge.

The cover will also prevent the contamination of clean surface water through direct contact with tailings; surface water from wicking arsenic salts upwards; and vegetation from establishing roots in the tailings and sludge.

Finally, the cover and its ditches or spillways will ensure clean surface water runoff and the establishment of self-sustaining vegetation for aesthetic purposes.

What will the tailings ponds look like post-remediation?

The covered tailings areas will be re-vegetated to fit in with the surrounding landscape; however, the ponds will still be recognizable as they will be relatively flat with gentle drainage slopes. The remediated tailings ponds may be available for various recreational uses – snowmobiling, hiking – once the vegetation has become well established.

The GNWT's Department of Municipal and Community Affairs is examining options for future land use at Giant Mine.

Will the remediated tailings ponds be safe?

Yes. The tailings and sludge covers will be inspected annually for five years or until vegetation is fully established and erosion rates are found to be consistent with those naturally-occurring in the local environment. Any run-off water from the tailings covers will be monitored to ensure that it is not contaminated.

How long will it take to remediate the tailings ponds?

The remediation of the surface of the Giant Mine site – including demolition and removal of more than 100 buildings – is expected to be completed within 10 years of the implementation of the Giant Mine Remediation Plan.

Giant Mine Remediation Project Office

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Northwest Territories

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Arsenic Trioxide Management

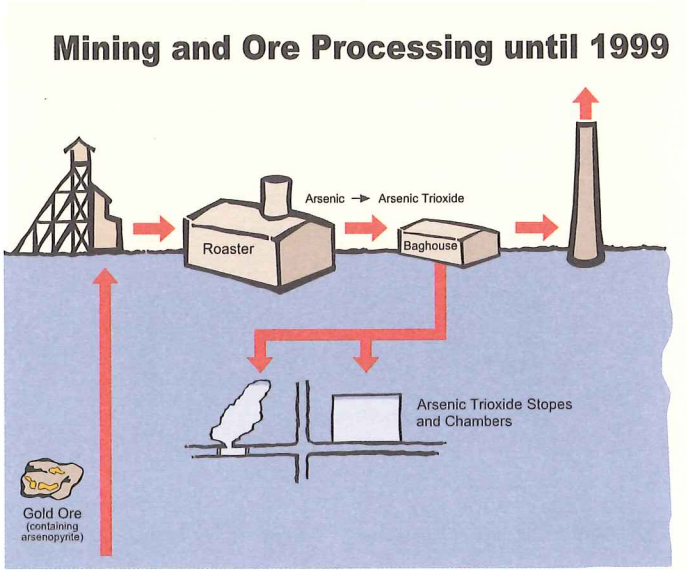
Giant Mine Remediation Project

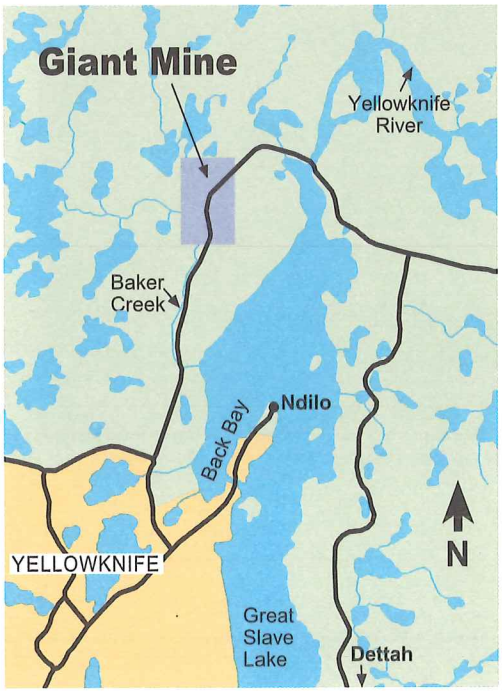
Mining and Ore Processing

Gold ore at Giant Mine was rich in arsenopyrite, a mineral locally found in the Yellowknife area with a high arsenic content. To extract gold from the ore, a roasting process was used. This process also created arsenic trioxide dust (As_2O_3), a highly toxic substance. Most of the dust was collected and pumped underground into 10 chambers and five mined-out stopes at the mine site.

Currently, there are 237,000 tonnes of arsenic trioxide dust stored underground at Giant Mine. This is equivalent to seven 11-storey office buildings.

Other sources of arsenic in the Giant Mine area include tailings, waste rock, underground mine workings and contaminated soils.





Different Types of Arsenic

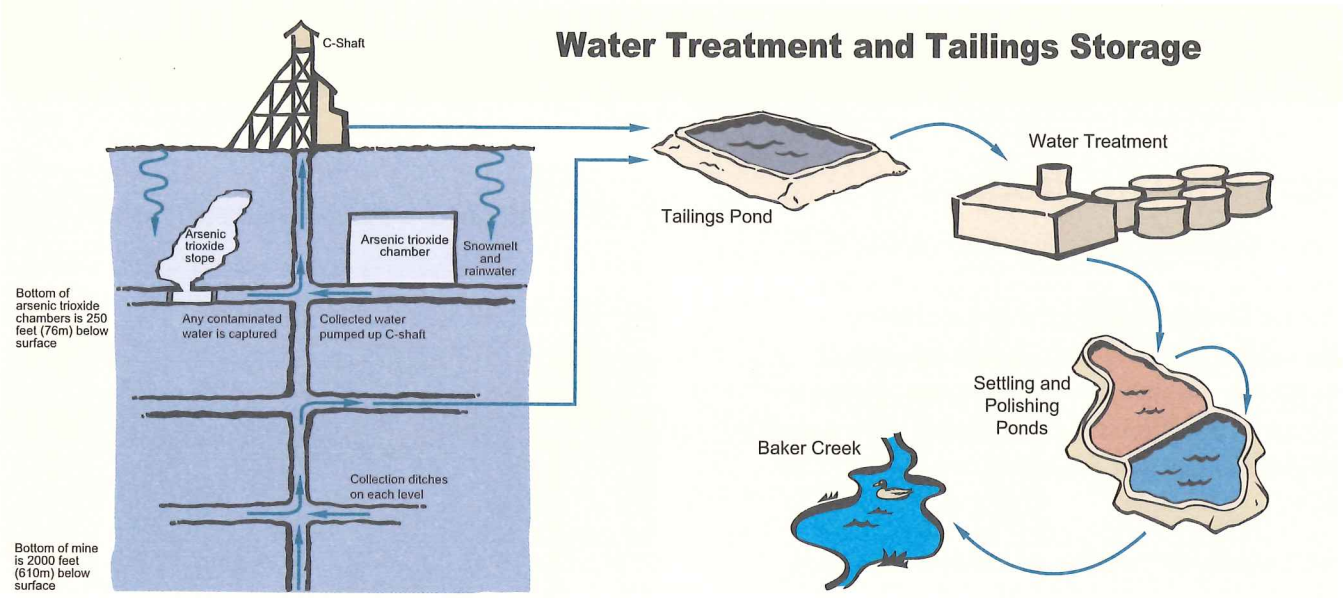
There are two different types of arsenic found at Giant Mine: Arsenopyrite and Arsenic trioxide.

Arsenopyrite is found in naturally occurring iron arsenic sulphide which is found in the host rock on the site.

Arsenic trioxide was produced as a byproduct of the gold roasting process. When gold ore is heated, the arsenic binds to oxygen and forms arsenic trioxide dust.

View of the central buildings at the Giant Mine site in Yellowknife.

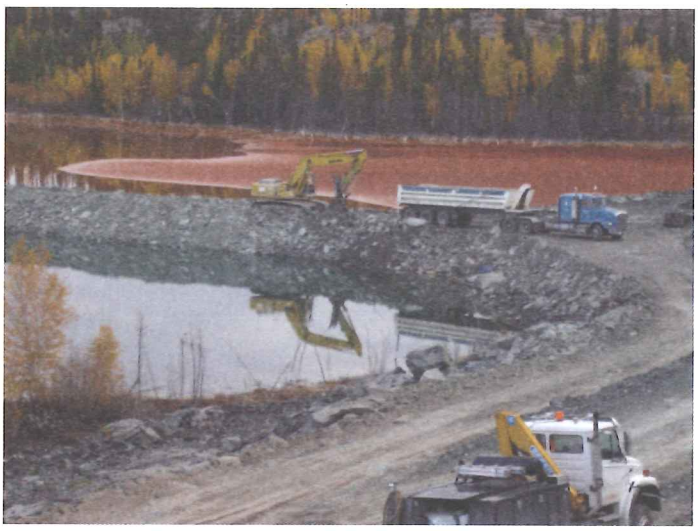
Arsenic Trioxide Management



Water Treatment and Tailings Storage

Water entering the mine is pumped out to the tailings ponds on the surface. During the summer, this water is pumped to the on-site water treatment plant to remove arsenic and other contaminants. The treated water is transferred to the settling pond where the remaining contaminants settle to the bottom of the pond. The last step is the polishing pond. When water quality in the polishing pond meets the regulatory requirements set out in the mine's water licence, it is released into Baker Creek.

All water released into the natural environment from Giant Mine exceeds water quality standards set out in its water licence.



Working on the split dyke between the settling and polishing ponds at Giant Mine.

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Frozen Block Method

Giant Mine Remediation Project

The Frozen Block Method was selected for the management of the arsenic trioxide dust at the Giant Mine after extensive research and peer review with industry experts, and in consultation with local residents. The Frozen Block Method uses proven technology and is a safe method of dealing with the long-term storage and containment of the arsenic trioxide dust.

It will take approximately 10 years to fully implement the Frozen Block Method at Giant Mine. Global warming and climate change were taken into effect in the decision to use the Frozen Block Method, and detailed thermal analysis concludes that this method will continue to work, even with an increase of several degrees in regional mean temperature.

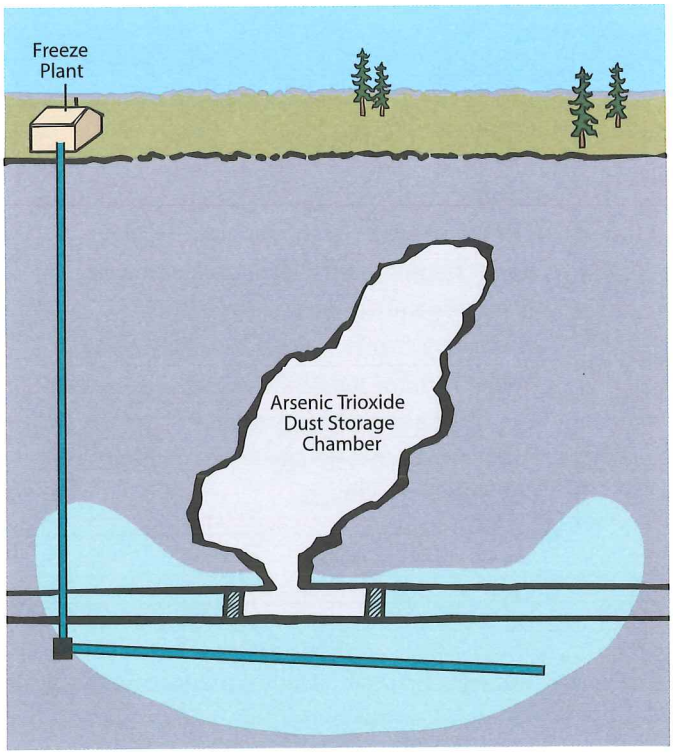
These diagrams represent the basic steps involved with the Frozen Block Method for long-term management of the arsenic trioxide dust stored underground at Giant Mine.

Step One

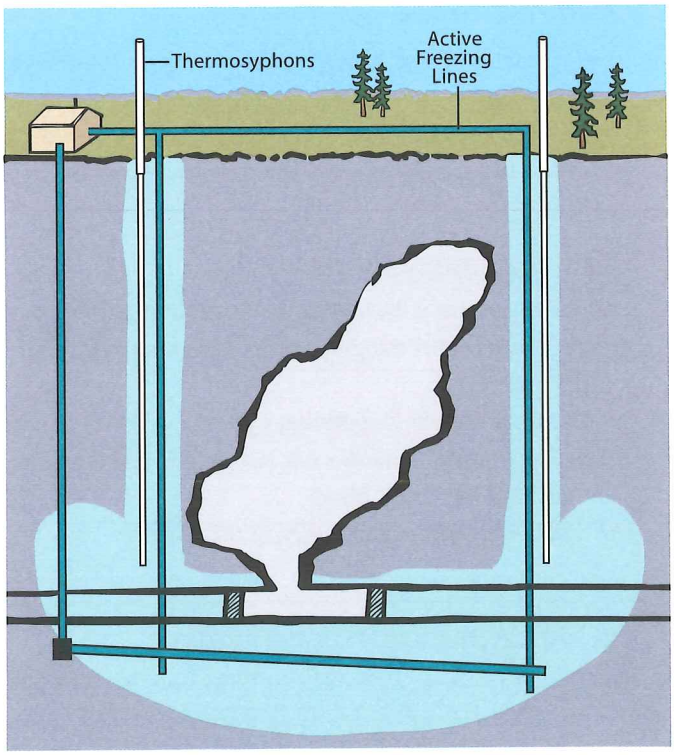
- Drill holes in the rock and under the stopes and chambers.
- Install pipes into the holes.
- Connect the pipes to a freezing plant on the surface.
- Circulate a super-cooled liquid through the pipes to freeze the rock and any nearby water under the chambers and stopes.

Step Two

- Drill vertical holes alongside the chambers and stopes, and insert pipes into the holes.
- Circulate super-cooled liquid from the freezing plant through the pipes to freeze walls around the stopes and chambers.
- Steps One and Two will form a secure cup-like shape of frozen rock around the arsenic chambers, which will prevent water circulation.
- Install thermosyphons to aid in the freezing process and maintain the frozen area.



1) Freeze under chamber

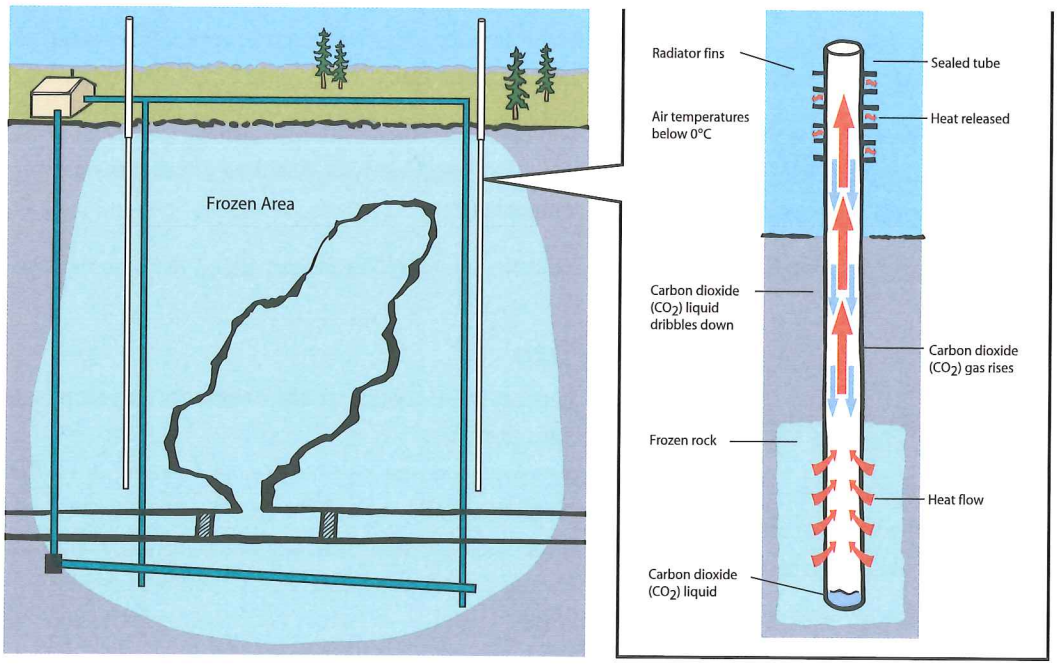


2) Freeze surrounding the chamber

Frozen Block Method

Step Three

- Water is added to slowly fill the cup-like shape.
- The freeze plant will continue to operate until the entire contents of the "cup" are frozen, including the arsenic chambers.
- This will prevent any water from entering or exiting the chambers.



3) Chamber frozen in solid block

How the freeze plant works

- Active system that is similar to systems used to make ice in hockey rinks
- Coolant is cooled in the freeze plant using a heat exchanger, then circulated through pipes in the ground surrounding the arsenic chambers

How thermosyphons work

- Passive system with pressurized carbon dioxide (Co_2)
- Takes heat out of the ground and releases it into cold air during the winter
- Continuous cycle: vaporizing Co_2 into gas, rises to top, heat released through radiator fins, Co_2 cools and condenses into liquid, dribbles back down
- Commonly used successfully in the North

Other Details

Estimated Cost: Approximately $200 million
Time Involved: Approximately 10 years
Long-Term Operation: Once the arsenic chambers and surrounding rocks are effectively frozen solid, they will remain frozen with the aid of thermosyphons, which do not require an energy source (see diagram). Water from other on-site mine workings will still require treatment.

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Care and Maintenance Activities

Giant Mine Remediation Project

INAC continues to ensure that the Giant Mine site is safely managed to protect health and safety of local residents and the environment.

Care and maintenance activities at Giant Mine will continue while the Remediation Plan is going through the regulatory process. All activities at the mine site, whether "emergency," risk management, or regular care and maintenance activities, are conducted to protect the health and safety of on-site workers, the public and the environment.

A contractor is hired to be in charge of care and maintenance at the site. The contractor must ensure the mine remains in compliance with relevant environmental regulations, maintaining site security and public safety, facilities maintenance, management of mine water, treatment of effluent and effective site monitoring.

Maximizing Employment on Site

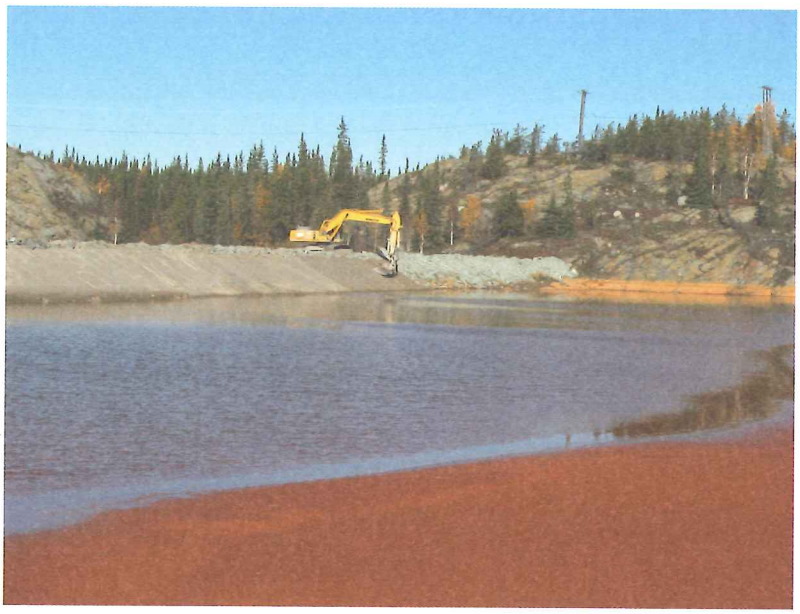
The care and maintenance contractor is required to maximize Aboriginal employment, sub-contracting and on-the-job training opportunities, and involve local, regional and Aboriginal citizens and businesses in its proposals. The care and maintenance contractor employs up to 30 people to work at the mine.

Contracts for care and maintenance are for two years but can sometimes be extended for an additional year. The most recent contract was awarded to Deton'Cho/Nuna Joint Venture in 2008. A new care and maintenance contract will be open to tender and awarded in 2011.

Specific Care & Maintenance Activities

Care and maintenance contracts are multi-year care arrangements to provide for the supply of all labour, equipment and materials necessary for the continued care and maintenance at the Giant Mine site. Work includes maintaining the mine in a dewatered and environmentally-compliant state, operating the effluent treatment plant, performing risk mitigation work/services, protecting the public, and securing the property.

Surface Remediation



Examples of recent and upcoming care and maintenance activities include:

- underground ground support (screening, bolting);
- pump maintenance;
- bulkhead stabilization;
- annual mine water treatment; and
- electrical system maintenance.

These and other care and maintenance activities reduce the potential for emergency measures and mitigate ongoing issues. However, only full remediation of the site can deal with the issues generated by the mine. INAC is confident that the proposed Remediation Plan is the safest and best option at this time, and will meet or exceed the standards of any additional review process. Remediation is anticipated to take approximately 10 years to complete, leaving a better legacy that Northerners can be proud of for years to come.

While the Remediation Plan undergoes the environmental assessment process, INAC continues to work to mitigate the risks related to the condition of the mine site and its aging infrastructure.

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Independent Peer Review Panel

Giant Mine Remediation Project

Independent Peer Review Panel experts answer questions at a public information session in Yellowknife.

Background

After conducting extensive research and preparing its reports, INAC needed to know that the recommendations of its Technical Advisor – SRK Consulting Inc. – were sound.

Therefore, in 2006, INAC brought together an Independent Peer Review Panel of nine recognized experts whose qualifications and experience collectively cover the fields relevant to the Remediation Plan – namely geotechnology, mining, mineral processing and environmental engineering, toxicology, hydrogeology, risk assessment, and public health.

The Independent Peer Review Panel reviewed both the *Report on Arsenic Trioxide Management Alternatives* and *the Remediation Plan for Giant Mine* and provided expert feedback to INAC.

Who is on the Independent Peer Review Panel?

The membership of the Independent Peer Review Panel was based partly on suggestions from stakeholder communities and the local public, who recommended individuals able to provide independent expert technical review. The names, credentials and professional resumes of the nine experts are available in the Independent Peer Review Panel's reports.

What did the Independent Peer Review Panel conclude about the Remediation Plan for Giant Mine?

The Panel unanimously supported the approach described in the Remediation Plan, and encouraged INAC to proceed with its application for a water license.

Where can I get a copy of the Independent Peer Review Panel reports?

Both reports – *Report on Arsenic Trioxide Management Alternatives and Report on the Remediation Plan for Giant Mine* – are available through the Public Registry. (www.giant.gc.ca)

What did the Independent Peer Review Panel say about the Frozen Block Method?

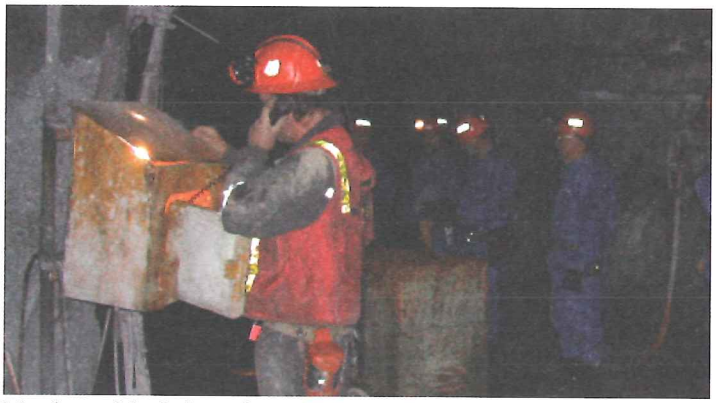
"Artificial freezing has been used for several decades and on various projects to provide efficient impervious barriers to water flows (McArthur River Mine, large shaft drilling, etc). Furthermore, detailed thermal analyses given in *Supporting Document J1* provide strong support to the proposed remedial plan and to its feasibility to achieve the desired objectives. The Independent Peer Review Panel reviewed these analyses and agrees with the conclusions presented in *Supporting Document J1*. Finally, it is worth stressing that the proposed remedial plan also includes an exhaustive and

comprehensive monitoring program during and after freezing is complete, together with a series of contingency measures. These measures can be readily implemented in case of poor performance, either during initial freezing or in the long term. They include replacement of defective components, installation of additional freeze pipes, extension of active and/or hybrid freezing."

What did the Independent Peer Review Panel say INAC did well?

"The Independent Peer Review Panel commends INAC on important recent activities undertaken for purposes of the Remediation Plan, such as dam safety inspections; a comprehensive dam safety review; tailings and sludge water balance; tailings and sludge properties; and of course, cover design, construction and long term reclamation maintenance."

"The executive summary and main text of the Final Draft Report are effective in communicating the current environmental conditions that are important to the Remediation Plan. The documents provide a clear and concise description of the key surface and subsurface hydrological, hydrogeological and geochemical aspects of the Remediation Plan for Giant Mine."



Members of the Independent Peer Review Panel participate in an underground tour of Giant Mine.

What were the Independent Peer Review Panel official conclusions?

1. Based on the Panel's review of the Final Draft Report, the Panel unanimously supports the approach described in the Remediation Plan and encourages INAC to proceed with the plan into the regulatory approvals process.
2. The work produced by INAC and their Technical Advisor is of high quality using state of the art methodology and has adequately defined existing conditions at the Giant Mine site for purposes of developing the remediation plan at this stage. The Independent Peer Review Panel understands that a detailed engineering phase will commence once the project is approved.
3. The Remediation Plan as described will, in the long term, provide protection of human and ecosystem health.
4. Stability concerns within the mine may compromise the Remediation Plan if not dealt with in a timely fashion e.g., arsenic Chamber 208.
5. A number of recommendations on specific items have been included within the text but they do not alter the basic conclusions regarding the viability of the Plan from a technical perspective.
6. The objective of integrating the original sub-surface and surface remediation plans for the Giant Mine has been adequately achieved for present purposes of the proposed integrated Remediation Plan.

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Communications Activities

Giant Mine Remediation Project

Public participation in the Giant Mine Remediation Project has been a consistent aspect of work at the site since INAC became custodian of the mine in 1999. The public's input was essential when the Remediation Plan was being developed and when selecting the best way to deal with the arsenic trioxide dust stored underground. Now during the environmental assessment stage, input from the public continues to be essential to ensure the site is remediated in a way that reflects the needs and wants of residents when remediation is complete and well into the future.

Past Communications Activities

Over the years, INAC held numerous public information sessions and workshops and led a large number of tours at Giant Mine. The input received from the public contributed to the development of the Remediation Plan.

Between 2001 and 2003, while the Project Team, Technical Advisor and Independent Peer Review Panel were trying to determine the best solution for dealing with the arsenic trioxide dust, over 40 public consultations were conducted including three major public workshops to discuss the options. After consultations and further technical research was completed, the Frozen Block Method was chosen from the three options which were narrowed down from the original 56 methods.

During this time, INAC distributed information through newspaper public notices, householder newsletters, and public displays to keep the public informed of the progress of the Remediation Plan.

After the submission of the Remediation Plan to the Mackenzie Valley Land and Water Board, the Project Team began to work towards the detailed design of the project. In the period between 2007 and 2010, information was shared with Aboriginal groups and the public on the direction the detailed design was heading. This was done by offering guided public tours of the site, hosting engagements with Aboriginal leaders and other interested parties, and public meetings. Feedback received was taken into consideration to ultimately form the design of the project. The Project Team also held technical briefings for media to help reporters understand the project better.

Communications Activities

When the Remediation Plan was referred to environmental assessment in 2008 by the City of Yellowknife, the Mackenzie Valley Environmental Impact Review Board (Review Board) issued its *Terms of Reference* for the assessment which included directions for conducting public engagement. The Remediation Team has responded to the directions in the *Terms of Reference* with a renewed commitment and focus on public engagement. These commitments have been detailed in the Developer's Assessment Report submitted to the Review Board in October 2010.

Upcoming Communications Activities

Now that the project is in environmental assessment, public consultation and communications on the Giant Mine Remediation Project is as critical as ever. The Project Team is seeking public input on the detailed design, particularly on surface remediation.

As in the past, the Project Team will continue to offer the public several ways to participate. Open houses and community meetings have proved to be an effective means of staying in touch. The Project Team will use workshops with a particular focus on remediation options to inform and ask for feedback. Models and displays that have been used in the past will continue to be used to help explain concepts, proposals and options.

To update the public on news about the project, newsletters will be distributed to households and public notices will be published in local newspapers. Events and opportunities for participation in the Giant Mine Remediation Project will be advertised through the local media.

For more information on communications activities past, present and future, visit www.giant.gc.ca. To review the Consultation and Engagement section of the Developer's Assessment Report submitted to the Review Board, please visit the Giant Mine section of the Review Board's website at www.reviewboard.ca.

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Key Stakeholders

Giant Mine Remediation Project

As a member of the general public, YOU have an important role to play in terms of the long-term remediation of Giant Mine. Your input at public hearings into the management alternatives for dealing with the arsenic trioxide helped Indian and Northern Affairs Canada (INAC) to narrow its focus to two options for further expert review and then to finally select the Frozen Block Method.

Meaningful consultation with local residents continues to remain a priority throughout this next phase of the project. We have prepared this brief overview of significant stakeholders and their roles in the remediation of Giant Mine for your understanding.

Indian and Northern Affairs Canada

Indian and Northern Affairs Canada (INAC) was assigned a caretaker role for the pre-existing condition of the site – including the underground arsenic trioxide dust – when Royal Oaks Mine went into receivership in 1999.

INAC is the lead federal government department for the remediation of Giant Mine and will be overseeing the remediation of the site to industrial standards.

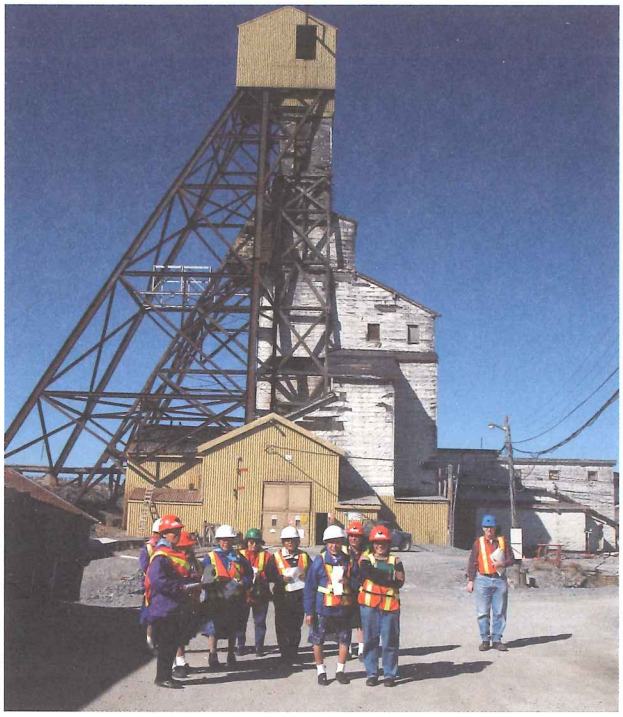
Other Federal Government Departments

Environment Canada, Health Canada, and the Department of Fisheries and Oceans have all played a role in providing expert advice and assessment to INAC.

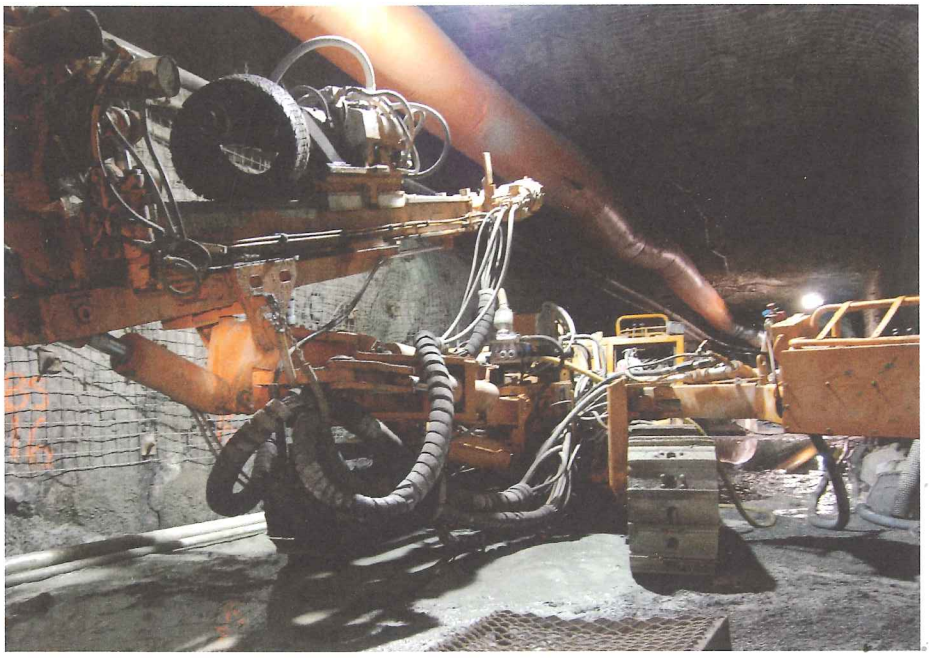
Public Works and Government Services Canada handles all contracting and procurement related to the care and maintenance contracts at Giant Mine.

Government of the Northwest Territories

The Giant Mine site is on Commissioner's Land and its administration falls to the Government of the Northwest Territories (GNWT). The GNWT will be engaged in the long-term development of the site after the remediation is complete, specifically the Department of Environment and Natural Resources, the Department of Transportation, and the Department of Municipal and Community Affairs.



Key Stakeholders



Giant Mine Oversight Committee

Given that the Giant Mine site is subject to the jurisdictional authority of both the territorial and federal governments, and that certain responsibilities rest with a specific party, it was recognized that an official agreement would be required in order to advance the Remediation Project. The federal and territorial governments entered into a Cooperation Agreement regarding the Project on March 15, 2005. The Cooperation Agreement established that both parties would implement a care and maintenance plan for the site that protects human health, public safety and the environment. The Cooperation Agreement also established an Oversight Committee to provide direction and guidance on the following:

a. Finalizing an integrated (surface and underground) remediation plan;

b. Formulation of a single intergovernmental application for approval by regulators;

c. Ensuring that care and maintenance activities are undertaken;

d. Monitoring remediation activities at the site;

e. Preparing emergency response activities; and

f. Addressing any other matter that may arise in carrying out the terms of the Cooperation Agreement.

The Regional Director General of INAC NWT Region and the Deputy Minister of Environment, Natural Resources (GNWT) provide strategic direction and guidance to the project through the Oversight Committee.

City of Yellowknife

Giant Mine is within the city limits of Yellowknife. The Municipality of Yellowknife was granted a lease by the GNWT for the former Giant Mine townsite.

The City of Yellowknife also maintains a boat dock adjacent to Giant Mine, and plans to establish a NWT Mine Heritage museum on the former Giant Mine townsite.

Yellowknives Dene First Nation

The area surrounding Giant Mine is in the traditional territory of the Yellowknives Dene First Nation. The Yellowknives Dene First Nation is in the process of negotiating a land, resource and governance agreement with the Government of the Northwest Territories and the Government of Canada – known as the Akaitcho Process – which may deal with the loss of their traditional hunting and fishing grounds.

Giant Mine Community Alliance

The GMCA was established in 2003 to assist the public by sharing information about the project and relaying public concerns and issues about the remediation of Giant Mine. Its members include the mayor of Yellowknife, a representative from the Yellowknife Chamber of Commerce, the NWT Mine Heritage Society, the Northern Territories Federation of Labour, the North Slave Metis Alliance, a health representative, and the general public. The Yellowknives Dene First Nation also participates in GMCA meetings as observers.

SRK Consulting Engineers and Scientists Inc.

In 2000, SRK Consulting Inc. won an international competition to become lead technical advisor to INAC on the management of the arsenic trioxide dust. SRK Consulting is an independent, international consulting practice that employs leading specialists in science and engineering. SRK's reports were subject to an Independent Peer Review Panel.

Key Stakeholders

Independent Peer Review Panel

An Independent Peer Review Panel consisting of nine recognized experts in the fields relevant to the remediation of Giant Mine was initially appointed in 2002 to provide technical review of the Arsenic Trioxide Management Alternatives Report and subsequently to provide technical review of the Remediation Plan for Giant Mine.

The Independent Peer Review members considered every aspect of the Remediation Plan, and provided concrete advice and analysis that was taken into advisement by INAC and incorporated into subsequent versions of the Remediation Plan for Giant Mine.

Mackenzie Valley Environmental Impact Review Board

The Review Board was created in 1998 under the *Mackenzie Valley Resource Management Act*. The Review Board ensures that potential environmental impacts of proposed developments receive careful consideration before any actions take place. The Review Board is currently conducting the environmental assessment of the Giant Mine Remediation Project.

Mackenzie Valley Land and Water Board

The Mackenzie Valley Land and Water Board (MVLWB) was created in 1998 under the *Mackenzie Valley Resource Management Act*. It regulates the use of land and waters, and the deposit of waste to provide for the conservation, development and utilization of land and water resources.

The MVLWB issues land use permits and water licences throughout the Mackenzie Valley under the *NWT Waters Act*, and has a key role to play in the regulatory process for the Giant Mine Remediation Plan.

Non-Governmental Organizations – Environment

Local environmental organizations such as Ecology North, the Canadian Arctic Resources Committee (CARC), and the Canadian Parks and Wilderness Society (CPAWS) have an important role to play to ensure that the government's process remains open and transparent.

With their focus on the environment, these Non-Governmental Organizations ask pertinent questions and ensure that all aspects of environmental impact have been carefully considered in the planning process.

Giant Mine Remediation Project Office

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Cette publication est aussi disponible en français sous le titre : Feuillet d'information – Intervenants clés

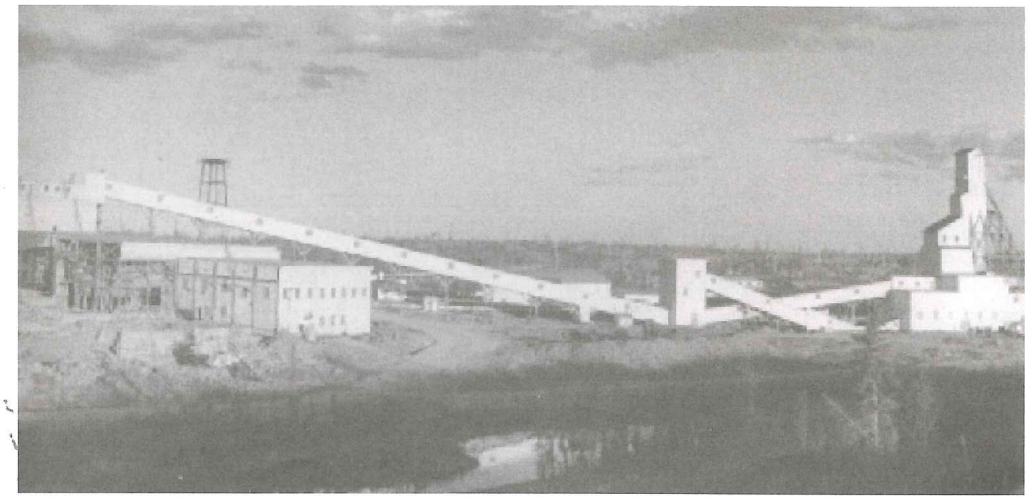
Northwest Territories

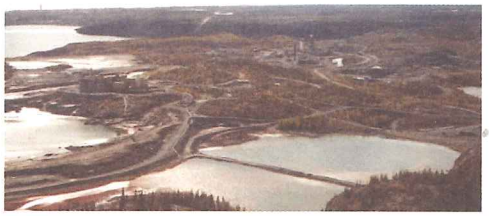
Canada

Indian and Northern Affairs Canada
Affaires indiennes et du Nord Canada

Historical Timeline

Giant Mine Remediation Project





1935

- Burwash Yellowknife Mines Ltd. stakes 21 claims, including the future Giant Mine

1937

- Yellowknife Gold Mines Ltd. acquires Burwash's assets, which become part of a subsidiary – Giant Yellowknife Gold Mines Ltd. (GYGML)

1948

- June 3: first gold brick is poured
- Tailings deposited into Back Bay

1949-1951

- Airborne arsenic emissions estimated at 7,500 kg/day

1950

- GYGML initiates first studies into arsenic in surrounding environment, leading to revised operations

1951

- Cold Cottrell Electrostatic Precipitator (ESP) installed to remove arsenic trioxide from roaster gases
- Arsenic emissions drop to 5,500 kg/day
- Arsenic trioxide dust pumped into mined-out storage chambers 80-250 feet below surface in permafrost

1952

- Mill processes 400 to 700 tonnes of ore per day

1953

- Tailings dam construction marks beginning of engineered tailings disposal

1955

- Hot Cottrell ESP installed to capture gold-bearing arsenic dust

Historical Timeline

1957
- Tailings dam #2 is built
- Arsenic removal from tailings effluent commences

1958
- Mill processing rate increases to 1,000 tons per day
- Dracco baghouse facility constructed to collect arsenic trioxide dust

1959
- Airborne arsenic emissions drop to 200 – 300 kg/day

1962
- Arsenic trioxide storage moves to mined-out stopes located in permafrost zone

1967
- Improved tailings effluent treatment circuit commissioned

1970
- Commissioner's Lands Act proclaims surface land transfers to the Government of the Northwest Territories (GNWT), including Giant Mine site

1974
- Open pit mining begins

1981
- New tailings effluent treatment plant commences operation

1981-1986
- Koppers Corp. of Georgia, U.S.A. purchases 6,700 tonnes of arsenic trioxide dust from Giant Mine until the price drops ending Koppers Corp's purchases
- Regular inspection of storage chambers begins

1987
- Northwest Tailings Pond built to accommodate re-processed tailings

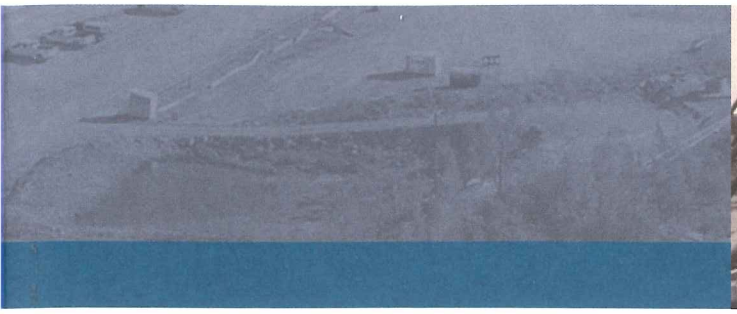
1990
- Royal Oak Resources Ltd. gains control of Giant Yellowknife Gold Mines Ltd.

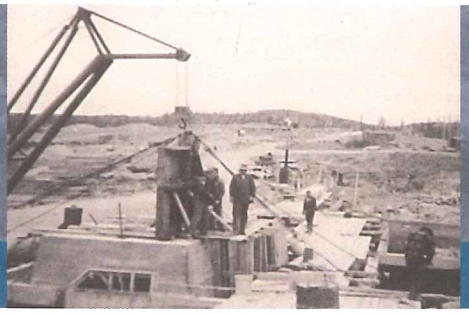
1991
- Royal Oak Mines Inc. formed

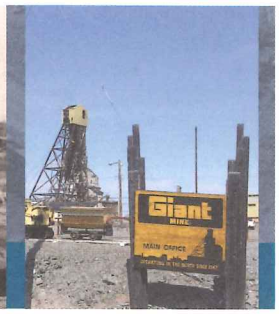
1992
- Explosion during labour strike results in deaths of nine miners

1997
- Indian and Northern Affairs Canada (INAC) along with Royal Oak Mines, Environment Canada, the GNWT and the City of Yellowknife, co-host a technical workshop to discuss management of arsenic trioxide at Giant Mine

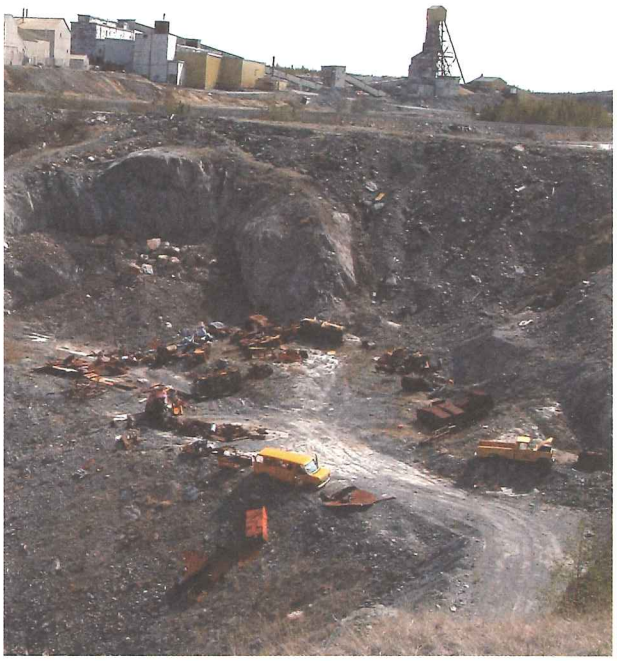
1999
- Royal Oak Mines goes into receivership and Giant Mine is transferred to INAC
- INAC starts work on action plan to manage arsenic trioxide dust stored underground
- INAC sells Giant Mine assets to Miramar Giant Mine Ltd., a division of Miramar Mining Corporation. INAC takes on role of caretaker for pre-existing environmental liabilities on the property, including arsenic trioxide dust stored underground







Black & white photos courtesy of the Prince of Wales Northern Heritage Centre



2000

- SRK Consulting wins international competition to become lead technical advisor to INAC on the management of arsenic trioxide dust

2001

- Technical advisor completes report "Study of Management Alternatives – Giant Mine Arsenic Trioxide Dust"
- Public technical workshop held to review report
- Remediation work completed on former Back Bay tailings beach
- Miramar Giant Mine Ltd. submits an abandonment and restoration plan to the Mackenzie Valley Land and Water Board

2002

- INAC and community stakeholders appoint Independent Peer Review Panel to assess options for long-term management of arsenic trioxide dust
- Tier 2 human health and ecological risk assessments conducted to assess risks of current arsenic releases from the mine site, as well as potential future releases under various arsenic trioxide management alternatives
- Field testing initiated of deep thermosyphons

2003

- Independent Peer Review Panel tables its review of technical advisor's final report
- Technical advisor tables its final report "Arsenic Trioxide Management Alternatives – Giant Mine" at a public workshop in January
- INAC initiates extensive public communications campaign regarding management alternatives for Giant Mine
- Giant Mine Community Alliance is established and holds its first meeting
- The Giant Mine Remediation Project team hosts a workshop in May
- INAC seeks approval to proceed with project description

2004

- INAC announces decision to proceed with the Frozen Block Method as the preferred long-term management alternative for storage of arsenic trioxide dust

Historical Timeline

2005

- INAC and the GNWT sign a Cooperation Agreement to work together on surface and subsurface remediation of Giant Mine
- Miramar terminates its obligations under the Reclamation Security Agreement. Giant Mine becomes an abandoned mine site
- Deton' Cho/Nuna Joint Venture wins a contract to assume responsibility for interim care and maintenance of Giant Mine

2006

- A Remediation Plan for the immediate and long-term cleanup of the mine is developed by INAC's technical advisors and reviewed by independent experts

2007

- INAC submits the Remediation Plan along with a water license application to the Mackenzie Valley Land and Water Board
- Deton'Cho/Nuna Joint Venture is awarded a multi-year contract for care and maintenance at Giant Mine
- INAC begins to work on the detailed design of the project, which continues for three years

2008

- The Remediation Plan is referred to an environmental assessment by the City of Yellowknife
- The Mackenzie Valley Environmental Impact Review Board begins its environmental assessment

2009

- The Mackenzie Valley Environmental Impact Review Board issues its Terms of Reference for the environmental assessment and the production of a Developer's Assessment Report
- INAC and PWGSC begin preparation of the Developer's Assessment Report
- Approximately 500 people are taken on tours of the mine site as part of the City of Yellowknife's 75th anniversary celebrations

2010

- The Developer's Assessment Report is submitted to the Mackenzie Valley Environmental Impact Review Board in October

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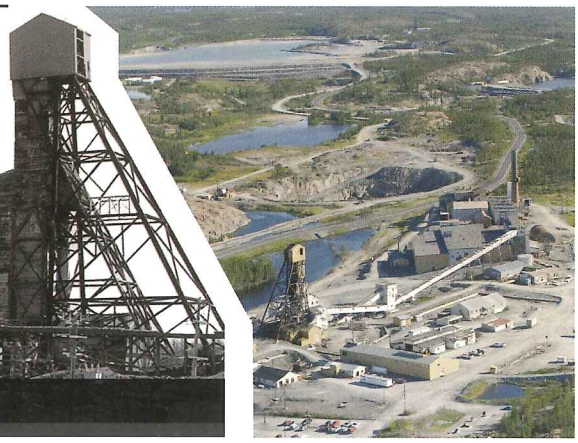
The Giant Update

Giant Mine Remediation Project



Giant Mine has played a significant role in Canadian history since 1948 when the first gold brick was poured. The Yellowknife mine was one of Canada's largest producers of gold, and one of the single biggest employers for Yellowknife residents until its closure. Now, more than 50 years later, it is time to remediate the mine site in a responsible and effective manner.

Giant Mine Community Alliance site tour

Water sampling of ponds during winter

In 2005, the Government of Canada and the Government of the Northwest Territories signed a 10-year Cooperation Agreement on the management and remediation of Giant Mine. Subsequently a remediation plan for Giant Mine was developed by INAC and its Technical Advisor after extensive consultation with the general public, other government departments and industry experts.

Remediation Plan

In 2007, the Remediation Plan for Giant Mine was submitted to the Mackenzie Valley Land and Water Board as part of a water license application. The Remediation Plan outlines the clean-up plans for the entire mine site, including surface remediation (demolition of buildings, tailings clean-up), and subsurface containment of the 237,000 tonnes of arsenic trioxide dust using the Frozen Block Method.

Implementation of the Remediation Plan will begin once the regulatory process is complete and the project receives final approval. It is anticipated that the site remediation, including the freezing of the underground chambers, could be finished within 10 years. Monitoring of the freeze plant and mine site will continue post-remediation.

The Remediation Plan and its supporting documents form a stack of binders nearly two feet high!

Surface Remediation

Raising the filter dyke between the settling and finishing ponds

Existing conditions at Giant Mine are described in the Remediation Plan. Issues such as the demolition of buildings, removal of contaminated soils, rehabilitation of Baker Creek, re-alignment of the highway, and tailing covers are addressed in the Remediation Plan. Remediation activities for the surface will ensure the site is usable by future generations for industrial purposes, while recognizing that portions of the site may be suitable for other land uses with appropriate restrictions, including traditional and recreational use.

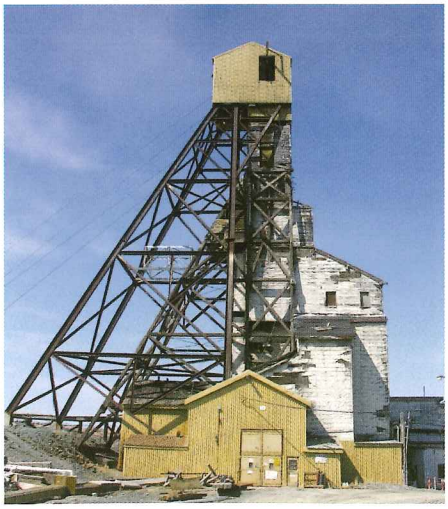
Some portions of the surface will require on-going land use restrictions – for example, hazardous waste areas.

Some parts of certain pits will also be fenced off, and there will be no public access to the freeze pipe areas.

The majority of surface remediation activities will take place over approximately a five-year period after the project is approved, followed by additional maintenance work and verification testing.

The mill conveyer is one of more than 100 buildings scheduled to be demolished at Giant Mine

Diversion of Baker Creek around C1 Pit



The C-shaft headframe is a familiar part of the Yellowknife landscape

Rehabilitation of Baker Creek

Throughout the active operating life of the mine, Baker Creek was diverted in several places to allow for the excavation of open pits for mining and the construction of tailings holding areas. During the early years of operation, sediments in Baker Creek were contaminated by the uncontained discharge of tailings, as well as by release of mining waste products prior to the construction of the water treatment plant.

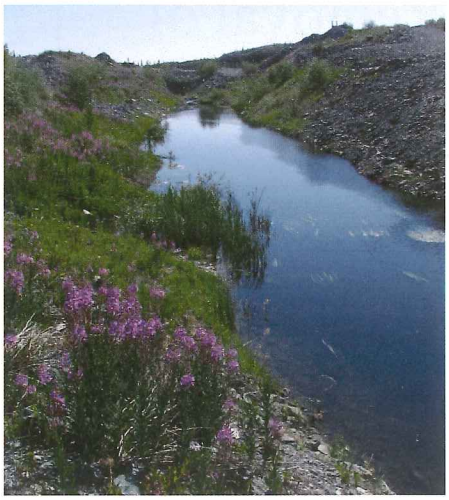
The Remediation Plan identifies activities that will help restore Baker Creek as much as possible to an ecologically sound habitat. Water quality in the creek will improve once a new water treatment plant has been constructed and treated water is no longer discharged into the creek.

Because Baker Creek flows directly over the C-212 arsenic storage chamber, a diversion of the creek away from this chamber is required to allow construction of the freeze pipes. This section of the creek was a concern because of potential flooding of the mine due to increased water flow through a rock dam into the north end of the C-1 Pit, and into the underground mine.

As a result, INAC decided to proceed with the diversion of a small portion of Baker Creek as part of regular care and maintenance activities to mitigate the risk of flooding. The diversion was completed in the summer of 2006. INAC worked closely with the Department of Fisheries and Oceans to develop the design for the diversion and the new fish habitat in this section of Baker Creek. This work included removal of the low-level concrete dam to allow the upstream water to return to its natural level.

Construction of the Baker Creek diversion


Placing bitumen liner in the new creek bed


Baker Creek in the summer

Additional changes to Baker Creek, including the development of lakes in some of the pits, may be possible in the future if water quality allows.

Buildings and Infrastructure

All of the buildings on the Giant Mine site that have no continuing function will be demolished. Several buildings on the site, such as the roaster complex, contain hazardous materials that could pose risks to site workers and the environment during the demolition stage. For this reason, strict safe work procedures based on industry-best practices for ensuring the safety of site workers, the public and the environment, will be followed. Hazardous materials and potential contaminants will be removed from the buildings prior to demolition, when this is safe and practical. The materials removed from the buildings before demolition, or recovered from the demolition debris, will be handled and disposed of according to industry-best standards.

The roaster complex is one of more than 100 buildings scheduled for demolition at Giant Mine

Removal of Mining Roads

Mining roads not required for maintenance and inspections at the site will be removed, and these areas will be planted with native vegetation to restore them as closely as possible to their natural state.

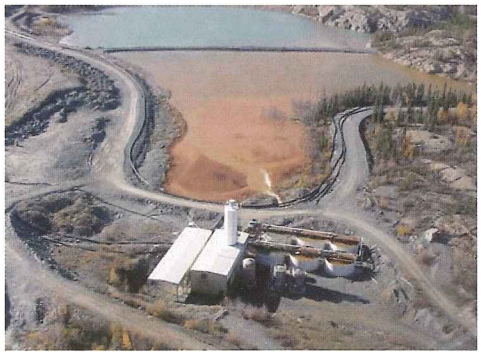
Open Pits

The B1 Open Pit will be backfilled and covered

There are eight open pits on the mine site, five of which are substantial in size. The B1 Pit will be backfilled to facilitate installation of the ground freezing system. Contaminated soils from other areas on the mine site will be contained in the portion of this pit that will ultimately be within the frozen zone.

Waste rock, quarry rock or clean demolition waste will be used to fill the remainder of the pit. The entire backfilled area will then be covered with soil and re-vegetated. The other pits will be surrounded by berms or fences to prevent inadvertent public access.

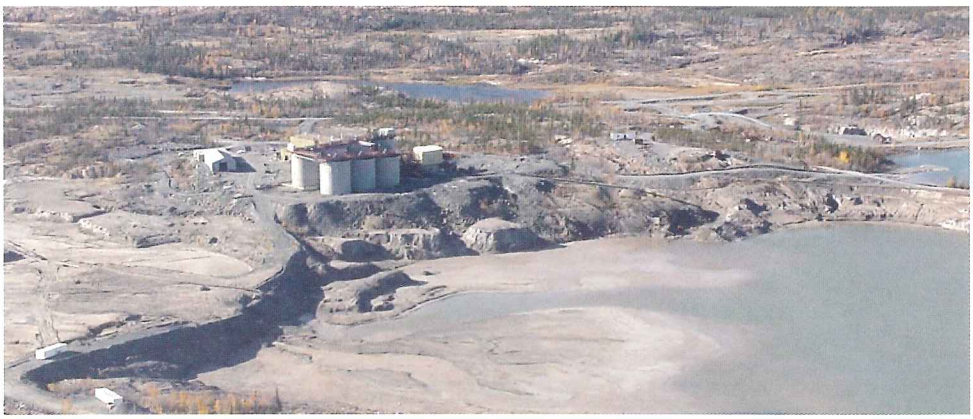
Water Management



The water treatment plant and ponds

A new water treatment plant will be constructed to treat contaminated water extracted from around the arsenic trioxide chambers and stopes. Contaminated surface water will also be collected and treated until monitoring data clearly shows that the arsenic levels are low enough to allow direct discharge. Over the longer term, it is expected that water from the underground mine areas outside the frozen zones may continue to need treatment, and the new water treatment plant will remain in operation as long as required.

Tailings



The north tailings pond and tailings reprocessing plant will be remediated

The tailings and sludge areas will be covered with one layer of quarried rock and a second layer of fine-grained soil. The lower layer of quarried rock will prevent contaminants from the tailings from moving upward and inhibit the downward penetration of plant roots. It will also serve as a final protective layer in the event that the soil erodes. The upper layer of fine-grained soil will allow revegetation and a variety of future uses for the site may be considered. The surface of each tailings area will be graded, and ditches and spillways constructed, to limit erosion and to allow water to run off the cover without becoming contaminated.

Tailings consist of finely ground rock (similar in size to sand particles), that are left over after gold has been removed from the ore.

Remediation Plan Objectives

- To manage the underground arsenic trioxide dust in a manner that will prevent the release of arsenic to the surrounding environment, minimize public and worker health and safety risks during implementation, and be cost-effective and robust over the long term
- To remediate the surface of the mine site to industrial standards under the *NWT Environmental Protection Act*, recognizing that portions of the site will be suitable for other land uses with appropriate restrictions
- To minimize public safety risks associated with contaminated buildings, mine openings and other physical hazards at the site
- To minimize the release of contaminants from the mine site to the surrounding environment
- To restore Baker Creek to a natural channel that is as ecologically sound as possible, given the natural constraints of hydrology and climate

Contaminated Soils

Throughout its 50 years of active mining operations, more than seven million ounces of gold were recovered from Giant Mine. The arsenic trioxide dust is a by-product of the gold production process when the mined ore was roasted to release the gold.

The majority of surface areas with a high level of arsenic contamination will be excavated, and where feasible, the highly-contaminated materials will be placed into the frozen zone that will be created by freezing the arsenic storage chambers and underlying stopes. Any remaining contaminated soils will be covered with clean material after excavation to a depth of two metres.

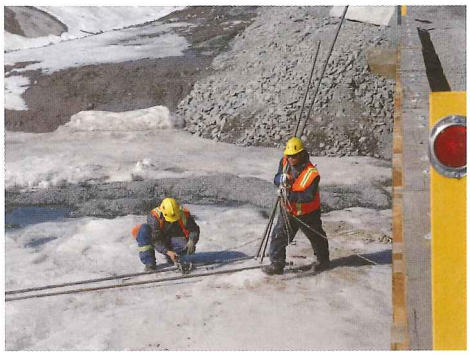
Removal of contaminated soil on the surface will commence after the demolition of the arsenic-contaminated roaster and associated buildings.

Stopes are large open cavities or voids left behind after miners have extracted the rock (ore).

Contamination by diesel fuel and/or fuel oil occurred in areas where fuel handling took place, with the highest concentrations located where bulk fuel storage tanks were situated. Many of the hydrocarbon contaminated areas co-exist with areas of arsenic contaminated soils and will be cleaned up at the same time.

Hazardous materials stored in overpacks

One of many on-site dumps at the Giant Mine

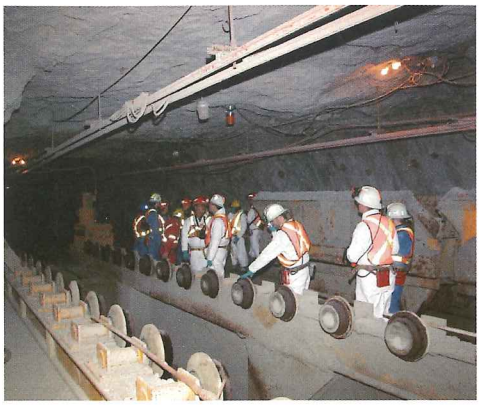


Deton'Cho Nuna Joint Venture workers on-site

Who is taking care of the Giant Mine site?

The Government of Canada has contracted Deton'Cho Nuna Joint Venture to provide the continued care and maintenance of the Giant Mine site. This northern-based, Aboriginal company is responsible for maintaining the mine in a partially de-watered and environmentally-compliant state. They are also responsible for operating the effluent treatment plant, performing risk mitigation work and services, protecting the public and performing site security.

Underground Remediation



An underground tour of the dump station at the 1500m level

Freezing of the arsenic trioxide chambers and stopes, and the rock surrounding them, is known as the Frozen Block Method. This method is fully described in the Remediation Plan, including the long-term monitoring of the chambers, stopes and rock.

The Frozen Block Method presents the lowest short-term and long-term risks, as well as low worker health and safety risks. Managing the arsenic trioxide dust where it is currently stored will avoid the potential worker health and safety risks associated with having to move or handle the toxic material.

The Remediation Plan also includes additional activities to deal with the removal of other underground contaminants such as lubricating oils, transformers, batteries and explosives.

Frozen Block Method

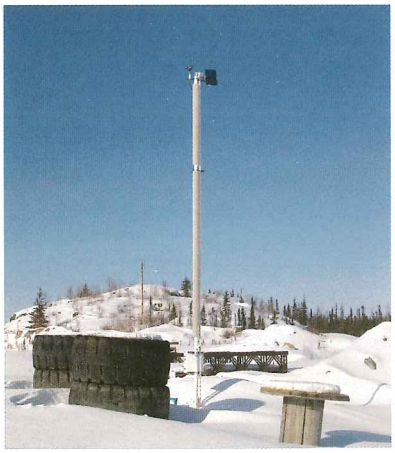
After community consultations, and based on recommendations of both the project's technical advisor and a panel of independent peer review experts, it was determined that the best option for dealing with the arsenic trioxide dust that is currently stored underground is to freeze it and the surrounding rock using the Frozen Block Method. This will result in the re-introduction of pre-existing permafrost conditions.

The Frozen Block Method involves freezing the ground under and around the arsenic trioxide dust stopes and chambers, creating a frozen rock barrier. This will keep any water from seeping into the arsenic storage areas and prevent any subsequent release of arsenic or arsenic-contaminated water. The interior of the frozen stopes and chambers will then be flooded and frozen to increase the thermal mass of frozen material. The blocks will be kept frozen over the long-term by using a freeze plant and thermosyphons which extract heat from the ground.

Implementation of the ground freezing is expected to take up to 10 years. During this time, accessible bulkheads of the arsenic storage vaults will be inspected on a regular basis. Ultimately all bulkheads will be included in the frozen zone.

Bulkheads are concrete plugs that will seal the passageway to the stopes after the workers have inserted the arsenic trioxide dust.

Thermosyphons



Thermosyphons are heat pipes used throughout the North to prevent ice-rich permafrost from melting below buildings and other infrastructures. Underground heat is released through the pipes to the surface.

Other Important Remediation Work

The Remediation Plan also includes the following activities at Giant Mine:

- Constructing a new water treatment facility using the best available technology for year-round treatment of contaminated mine water
- Constructing a water treatment sludge disposal facility (landfill) that will incorporate monitoring and collection systems to prevent discharge of contaminants from sludge
- Covering tailings to create a physical barrier over the tailings and to improve the quality of run-off water in order to eventually allow direct discharge to the environment
- Relocating the existing highway to allow for installation of freeze pipes and thermosyphons for ground freezing
- Removing mine roads that are no longer required and re-vegetating these areas to their natural state as much as possible
- Permanently sealing underground mine openings
- Backfilling the B-1 open pit to allow for freezing of chambers. Eventually some pits may also be flooded, or partially backfilled and flooded to form shallow pit lakes or wetlands

Air quality monitoring

Giant Mine Community Alliance tour

What Happens Next?

The regulatory process could take several years to complete. Once regulatory approvals are received, the Remediation Plan can begin to be implemented.

During this interim period while the project is under regulatory review, regular care and maintenance activities will continue at Giant Mine to protect public health and safety, and the environment.

Regular care and maintenance activities include:

- Engineering and scientific studies to assess tailings cover designs
- Monitoring of air quality and groundwater conditions
- On-going consultation and community information sessions in N'dilo, Dettah and Yellowknife on the progress of activities at Giant Mine

Care and maintenance, and environmental protection activities include:

- Backfilling of an open stope underneath the B208 arsenic chamber to provide stability to the bulkheads
- Pumping water from the underground mine to the surface storage ponds prior to water treatment
- Operating the water treatment system and discharging treated water during the open water season
- Monitoring and maintaining the tailings dams

Giant Mine Remediation Joint Project Office

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QS-Y289-005-EE-A1 Cette publication est aussi disponible en français sous le titre :
Mis-a-jour Giant

Northwest Territories

Canada

(Engineering Mine Grid)

Mine North

4000 E

6000 E

8000 E

10000 N

12000 N

14000 N

16000 N

18000 N

20000 N

A1 Pit

A2 Pit

C1 Pit

Brock Pit

B2 Pit

B1 Pit

B4 Pit

B3 Pit

BAKER CREEK

LEASE BOUNDARY

UNSURVEYED LEASE BOUNDARY

City of Yellowknife Lease Boundary

TOWNSITE

MINESITE

POCKET LAKE

GAR LAKE

TRAPPER LAKE

Ruttledge Trapper

VEE LAKE ROAD

NORTHWEST POND

B3 VENT PLANT

GARBAGE DUMP

SUPERCREST Vent Shaft

SOUTH POND

CENTRAL POND

TRP

POLISHING POND

SETTLING POND

TAILINGS PIPELINES

NORTH POND

ETP

DAM 3D

Scale

0 500 1,000 Feet

Indian and Northern Affairs Canada / Affaires Indiennes et du Nord Canada

Giant Mine Remediation Project

MINESITE SURFACE PLAN

SCALE: NTS	Revision: July 14, 2008
DATE: Sep. 10, 2003	Revision: Jan. 27, 2010
DRAWN BY: MSL	Revision:
UPDATED: Mar. 28, 2011	Revision:

File: S:\GMRP..\Surface\Surfmap_2011_(E).dwg

(Grille technique de la concession de la mine)

Mine nord

Fosse A1

Fosse A2

LOTISSEMENT URBAIN

Limite de la concession par rapport à Yellowknife

Limite concession

Fosse C1

Fosse Brock

Fosse B2

Lac Pocket

Lac Gar

LAC TRAPPER

ROUTE DU LAC VEE

Ruisseau Trapper

INSTALLATION DE VENTILATION

Fosse B1

Ruisseau Baker

Fosse B4

LAGUNE NORD-OUEST

SITE DE LA MINE

PIPELINE DE TRANSPORT DES RÉSIDUS MINIERS

Fosse B3

PISTE INGRAHAM

INSTALLATION DE VENTILATION B3

TERRAIN DE DÉCHARGE

Puits de ventilation SUPERCREST

BAIE DE YELLOWKNIFE
Grand lac des Esclaves

LAGUNE SUD

LAGUNE CENTRALE

LAGUNE TERTIAIRE

LAGUNE DE DÉCANTATION

PIPELINE DE TRANSPORT DES RÉSIDUS MINIERS

Limite concession

LAGUNE NORD

BÂTIMENT D'ENTREPOSAGE DES EXPLOSIFS

LIMITE NON ARPENTÉE DE LA CONCESSION

18000 N

20000 N

Echelle
0 500 1000 pieds

Indian and Northern Affairs Canada / Affaires Indiennes et du Nord Canada

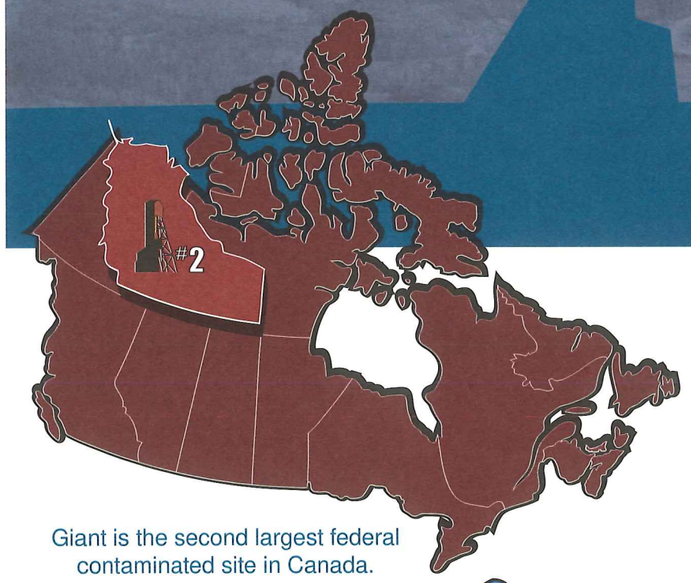
Projet de restauration de la mine Giant

PLAN DE SURFACE DU SITE DE LA MINE

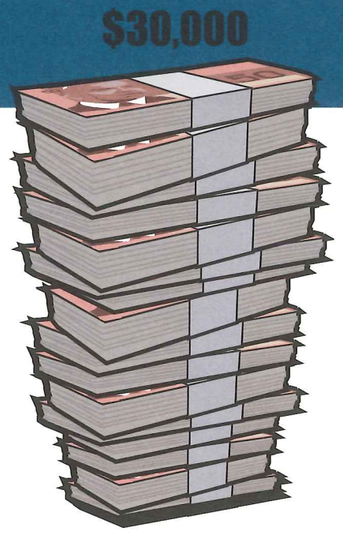
Échelle:	Révision:
DATE: 10 Septembre 2003	Révision:
Carte établie par: MSL	Révision:
Mis à jour le: 28 Mars 2011	
Dossier: S: \GMRP..\Surface\Surfmap_2011_(F).dwg	

Indian and Northern Affairs Canada | Affaires indiennes et du Nord Canada

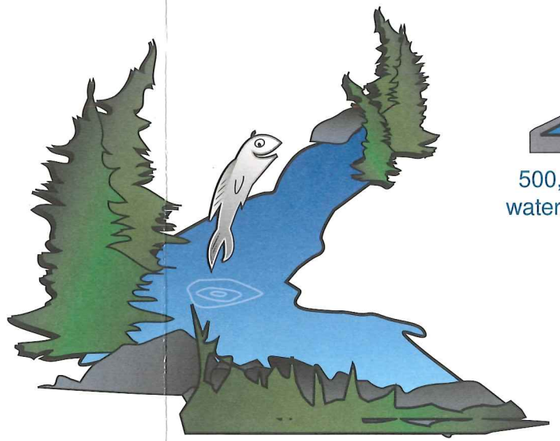
Did You Know?



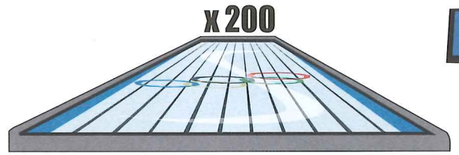
Giant is the second largest federal contaminated site in Canada.



It costs $30,000 a day to maintain the mine site in regulatory compliance.

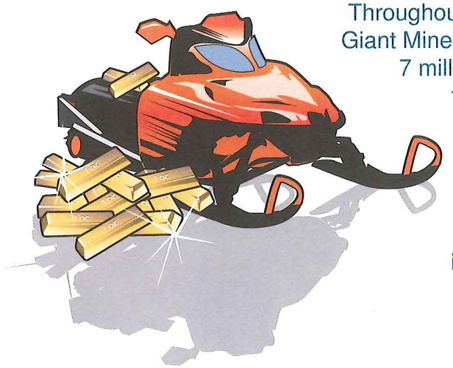


Recent studies have shown that grayling, pike, whitefish and suckers have returned to spawn in Baker Creek. The remediation plan proposes to restore Baker Creek to a condition that is as ecologically sound as possible.

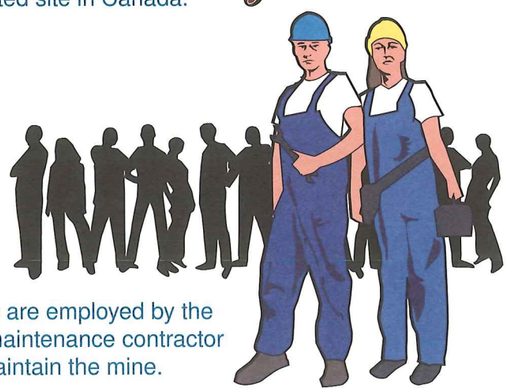


500,000 cubic metres of arsenic contaminated water is treated each season (200 Olympic sized swimming pools).

The Remediation Plan is contained in a stack of binders that is almost two feet high.

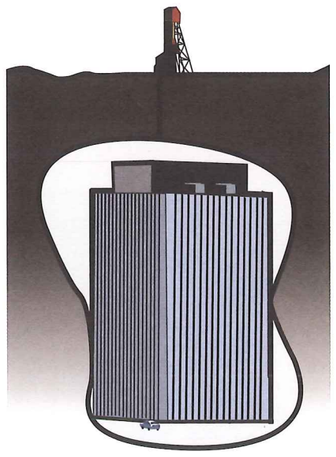


Throughout its operational life, Giant Mine produced more than 7 million ounces of gold, the equivalent to the weight of 800 averaged-sized snow machines! The gold would be worth about $3.5 billion in today's dollars.

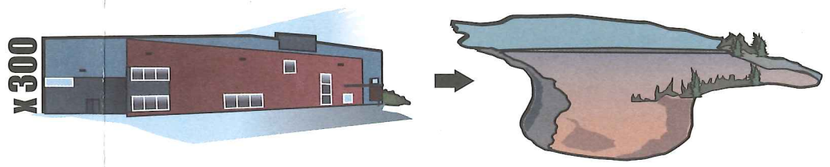


30 people are employed by the care and maintenance contractor to maintain the mine.

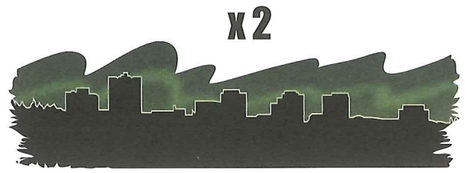
The Developer's Assessment Report is more than 1,000 pages long – not including the additional pages of appendixes, references, and supporting documents.



237,000 tonnes of arsenic is stored in chambers and stopes underground. The arsenic could fill the equivalent of 7 and half Precambrian buildings, which is located in downtown Yellowknife. 16 subsurface chambers were created underground to store arsenic trioxide, but one is empty.



There are 95 hectares of tailings ponds on the site. You could fit 300 of the new Yellowknife soccer Fieldhouses in this area.



The site covers approximately 850 hectares (twice the size of downtown Yellowknife) by 700 metres deep.

Giant Mine Remediation Project Office
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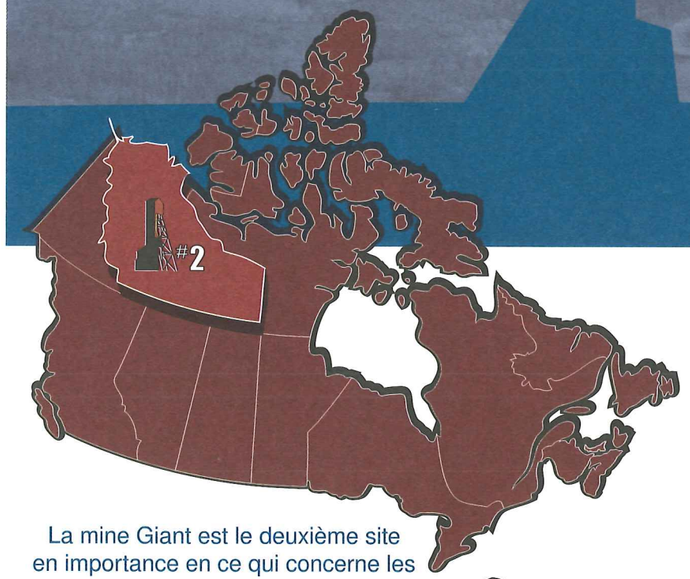
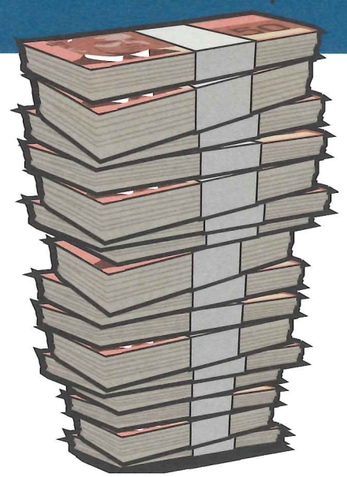
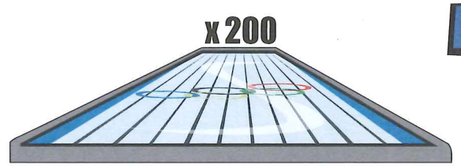


La mine Giant est le deuxième site en importance en ce qui concerne les sites contaminés fédéraux au Canada.

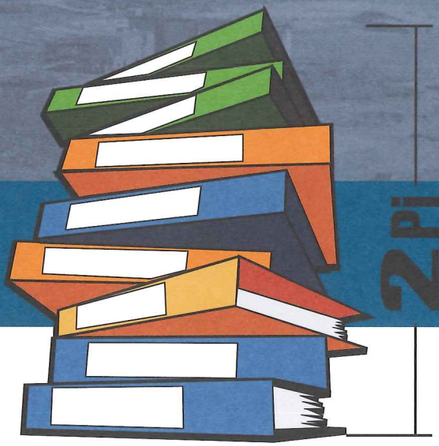


Il en coûte 30 000 dollars par jour pour maintenir le site minier en conformité avec la réglementation.

Des études récentes révèlent que l'ombre commun, le brochet, le corégone et les meuniers sont revenus frayer dans le ruisseau Baker. L'assainissement du lit du ruisseau y favorisera le développement d'un habitat et l'établissement de conditions écologiques les plus saines possibles.



Chaque saison, 500 000 mètres cubes d'eau contaminée à l'arsenic sont traités (soit l'équivalent de 200 piscines olympiques).

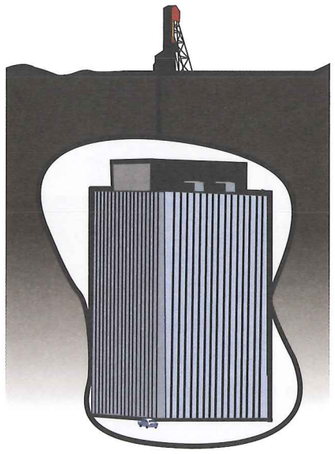


Le plan d'assainissement est contenu dans des reliures à anneaux qui, empilées les unes sur les autres, forment une colonne de près de deux pieds.

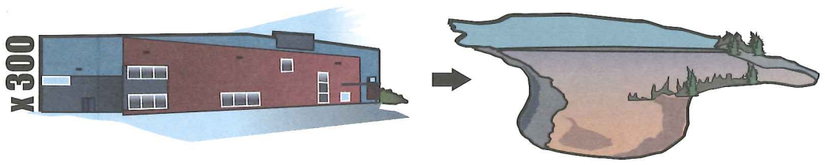
Pendant son exploitation, la mine Giant a produit plus de sept millions d'onces d'or, soit l'équivalent du poids de 800 motoneiges de taille moyenne! Cet or aurait une valeur approximative de 3,5 milliards de dollars aujourd'hui!

L'entrepreneur responsable de l'entretien et de la maintenance emploie 30 personnes pour assurer la maintenance de la mine.

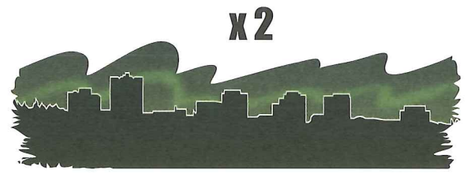
Le rapport d'évaluation du promoteur compte plus de 1000 pages, sans compter les pages supplémentaires des annexes, des références et des documents d'appui.



Il y a 237 000 tonnes d'arsenic entreposées dans les chambres et gradins souterrains. La poussière stockée dans ces chambres et ces gradins pourrait remplir sept immeubles de bureaux et demi, similaires à l'édifice Precambrian du centre-ville de Yellowknife. Seize chambres souterraines ont été créées sous la surface pour entreposer le trioxide de diarsenic, mais une chambre est vide.



Les bassins de résidus du site couvrent une superficie de 95 hectares. Cela correspond à 300 fois la superficie du nouveau complexe de terrains de soccer de Yellowknife.



Le site a une superficie approximative de 850 hectares (soit deux fois la taille du centre-ville de Yellowknife) et une profondeur d'environ 700 mètres.

Bureau du projet d'assainissement de la mine Giant

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