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Giant Mine Remediation Project *Moving Forward Together*

The Giant Story



GIANT MINE REMEDIATION PROJECT

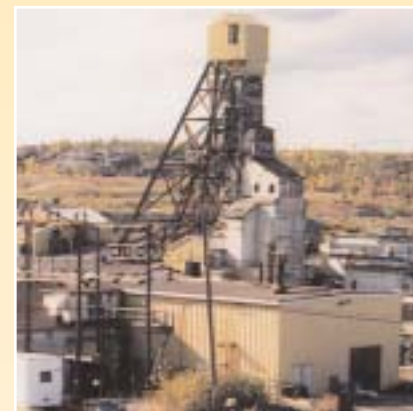
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L'histoire de la mine Giant



*Giant Mine has a long and
impressive history as one of
Canada's earliest and richest
gold mines.*

Giant Mine has a long and impressive history as one of Canada's earliest and richest gold mines. Since the first gold brick was poured in 1948, the mine has played a significant role as a major employer and economic engine for Canada's North. Now, more than 50 years later, the mine is entering its final chapter. A plan is being written to close the site in a responsible and effective manner, offering the best protection possible to local residents and the environment.

The greatest challenge associated with Giant Mine is the 237,000 tonnes of highly toxic arsenic trioxide dust stored underground. Effective, long-term management of that material is DIAND's top priority regarding this site.

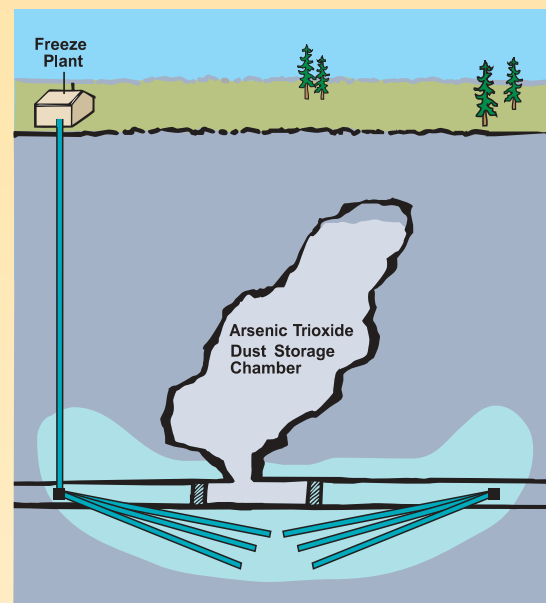
After consulting with the community, the project's technical advisor and a panel of independent experts, DIAND's Giant Mine Remediation Project team is working on a plan to freeze the toxic material and surrounding rock underground. The solid, impenetrable frozen blocks will contain the arsenic trioxide and isolate it from the environment. After investigating a long list of alternatives, it was decided that this method is the best choice to protect Northerners and the environment.

How does the Frozen Block method work?

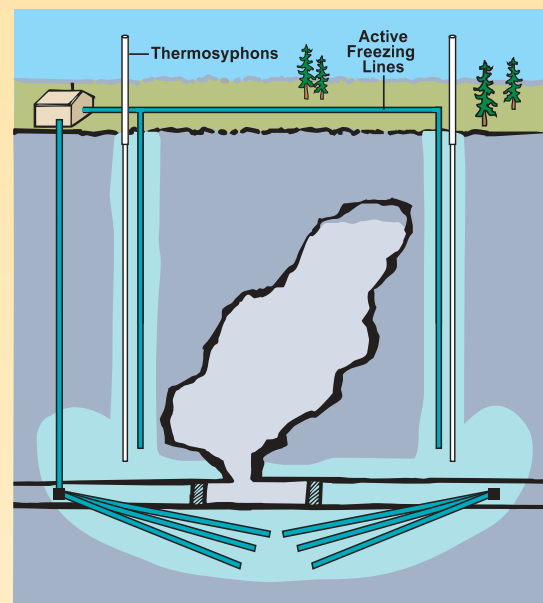
The 15 underground chambers and stopes containing the arsenic trioxide dust will be carefully frozen using an active freezing system, a system that is very similar to what is used to freeze the ice in indoor rinks. A super-cooled liquid will be circulated through a series of underground pipes to freeze the designated areas around and within each of the chambers and stopes. (Please refer to included diagrams.) The freezing would



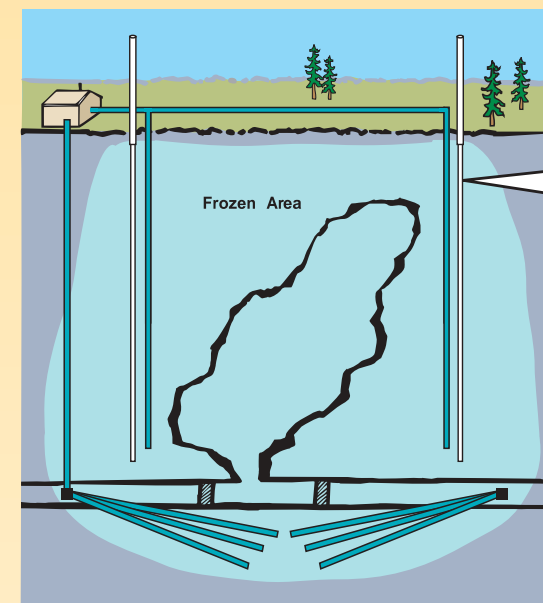
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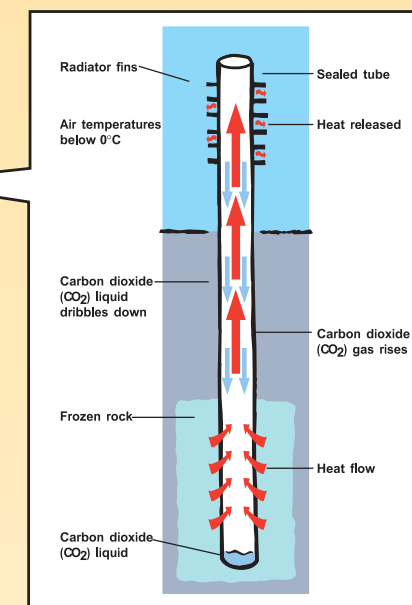
1) Freeze under chamber



2) Freeze surrounding the chamber



3) Chamber frozen in solid block



How thermosyphons work

- Passive system with pressurized carbon dioxide (CO₂)
- Takes heat out of the ground and releases it into cold air during the winter
- Continuous cycle: vaporizing CO₂ into a gas, rises to top, heat released through radiator fins, CO₂ cools and condenses into liquid, dribbles back down
- Commonly used successfully in the North

Why Frozen Block?

- The Frozen Block method presents the lowest short-term and long-term risks, as well as low worker health and safety risks.
- Freezing the arsenic trioxide chambers and stopes, and the rock surrounding them, will provide an impenetrable barrier so that water cannot get in and arsenic cannot get out.
- Managing the dust where it is will avoid the worker health and safety risks associated with any option that requires moving the toxic material. It will also avoid the risk of accidental spills or releases during the handling, transport and re-processing.
- It would be impossible to remove all of the arsenic trioxide from the underground storage chambers because of the nature of the rock surrounding the waste, thus leaving an ongoing environmental concern.
- Once the blocks are frozen, there will be absolutely no possibility of sudden failure. In the unlikely event of a problem with the freezing system, the sheer mass of the blocks will keep them frozen for decades. There will be ample time to fix any problems and there is no possibility of a sudden arsenic release.
- Ground freezing technology has been used successfully throughout the world in the mining industry and in underground construction. Examples include several potash and uranium mines in Saskatchewan, the Alaska pipeline, and the Boston and Tokyo subway systems.

occur in stages over 20 years to ensure that the blocks are completely frozen. DIAND will ensure that the site is safely managed throughout the entire process.

The blocks will be kept frozen over the long term by using thermosyphons, which are tall, metal tubular devices that draw and expel heat from the ground. Thermosyphons are self-sustaining, meaning they do not require an external source of power. They are commonly used in the North to keep ground frozen. For example, they are used in the parking lot at the NWT Legislative Assembly to prevent thawing of the natural permafrost.

How did we get to this point?

In 1999, Giant Mine's owner, Royal Oak Mines, went bankrupt and the court assigned the site to DIAND. The mine was then sold to Miramar Giant Mining Ltd., which also owns Yellowknife's Con Mine. The deal meant that limited mining operations could continue at Giant Mine, and Miramar would provide ongoing care and maintenance of the site. These activities resulted in 50 employees retaining their jobs. The federal government became the caretaker for the site's pre-existing environmental conditions, including the arsenic trioxide stored underground.

The arsenic trioxide was created during the production of more than seven million ounces of gold between 1948 and 1999. The rock mined at Giant is rich in gold and arsenopyrite, a mineral that has a high arsenic content. When the rock was roasted to release the gold, the arsenic was also released in the form of arsenic trioxide. The arsenic trioxide dust is a toxic, grey powder and ingesting a small amount of it can cause illness or death.

Almost all of the arsenic trioxide at Giant Mine today is stored in underground chambers and stopes (irregular, mined-out cavities), surrounded by rock. Each of the 15 chambers and stopes are cut into solid rock. Cement bulkheads, which act as plugs, were used to seal the openings. When this storage method was originally designed, it relied on the area's

permafrost, which worked naturally as a frozen barrier. However, ongoing mining activity caused the permafrost in this area to thaw. That resulted in water seeping in and out of some of the underground storage areas. All contaminated water from the mine is currently being collected and pumped to a water treatment facility above ground on site.

Time to make a choice

While Giant Mine is currently being safely managed, including the pumping and treating of arsenic-contaminated water, this is not a long-term solution. It is time to put in place a long-term remediation plan that addresses the risks associated with such a large amount of toxic material.

DIAND's Giant Mine team started working on a plan in 1999, and invested significant resources to find the best strategy. After an international competition, DIAND contracted SRK Consulting Inc., a well-respected, experienced firm in mine closures, to work as the lead technical advisor on this project. The advisor examined 56 management alternatives for the arsenic trioxide and then narrowed the list down to 12 of the most viable options.

The advisor recommended the two best alternatives: one "take-it-out" option and one "leave-it-in" option. The first involves removing as much of the arsenic trioxide dust as possible from the underground storage chambers, mixing it with cement and creating a secure, above-ground landfill site. The leave-it-in alternative involves leaving the waste where it is, and actively freezing all of the storage stopes and chambers.

To further assess the work done by the technical advisor, DIAND created the Independent Peer Review Panel, which consists of nine experts in fields of special importance to this project. In their report, the panel provided valuable insight into the project and agreed with the advisor's conclusions.

Since DIAND took on the Giant Mine project in 1999, DIAND has held many public workshops and information sessions to keep the public informed. In February, 2003, DIAND

created the Giant Mine Community Alliance, a group of 10 representatives from the public, which advises the federal team on community concerns. From January 20 to May 31, 2003, the team participated in 20 information sessions and workshops to explain the options and seek out a preference. Most of the local residents who expressed a preference preferred the "leave-it-in" option. The majority also said they wanted the project to keep moving forward.

Taking into account the views of local residents, the recommendation of its technical advisor and independent experts, DIAND's Giant Mine Remediation Project team decided to move forward with the "leave-it-in" alternative, known as the Frozen Block method.

What happens next?

The team is working on a plan to implement the Frozen Block method. This plan, referred to as the Project Description, will be submitted to the Mackenzie Valley Land and Water Board for review. That Project Description will be one chapter in the mine's overall Abandonment and Restoration (A&R) Plan, which will address the cleanup of the entire site, including buildings and other surface facilities. Details in the A&R Plan will help determine future uses of the Giant Mine site. The Board expects to receive the Project Description by Fall, 2004. The Board's review process will also involve more opportunities for public input. If the A&R Plan is approved, implementation of the Frozen Block method at Giant Mine could begin as soon as 2006.

For more information, contact:

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