



Frozen Block Method

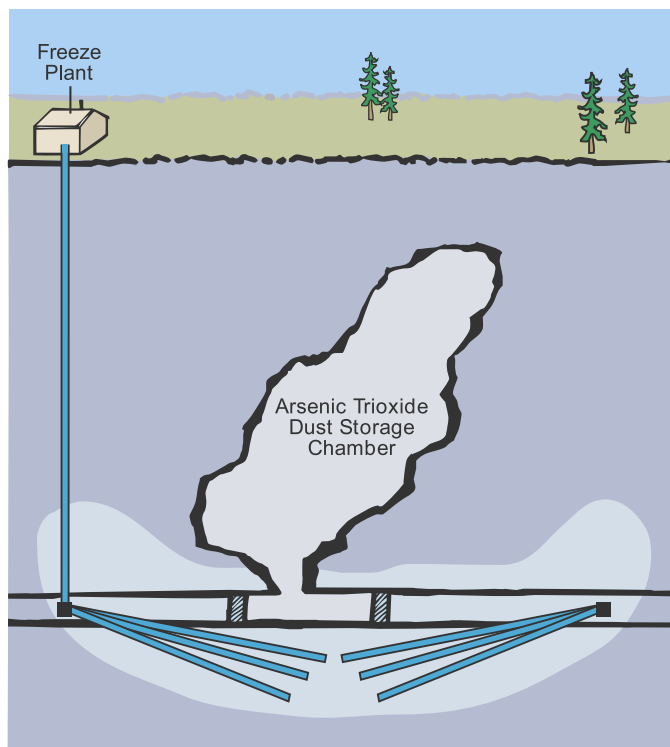
Giant Mine Remediation Project

The Frozen Block Method was selected for the long-term management of the arsenic trioxide dust at Giant Mine after extensive research and peer review with industry experts, and in consultation with local residents.

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

Step One

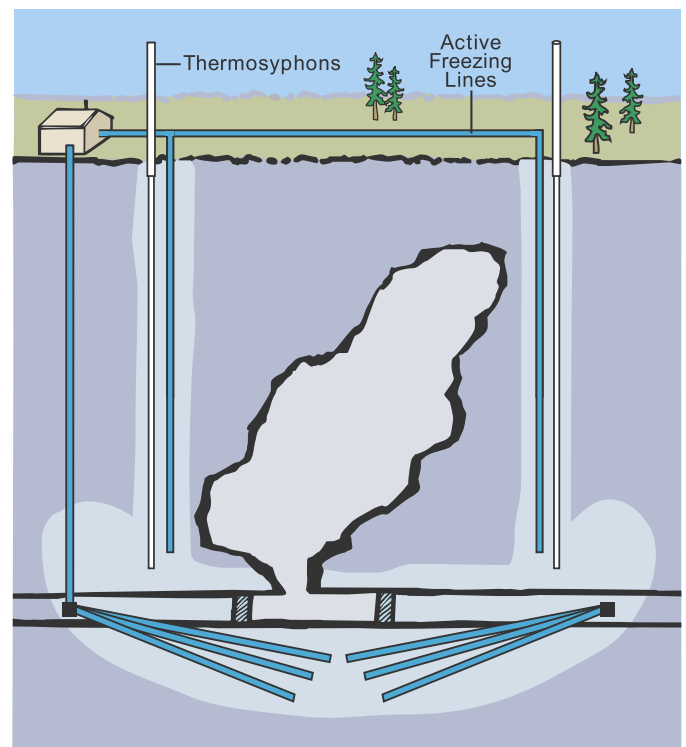
Drill holes in the rock and under the stopes and chambers. Install pipes into the holes. Connect the pipes to a freezing plant on the surface. Circulate a super-cooled liquid through the pipes, which freezes the rock and any nearby water under the chambers and stopes.



1) Freeze under chamber

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 form a secure cup-like shape of frozen rock around the arsenic chambers, which prevent water circulation. Install thermosyphons to aid in the freezing process and maintain the frozen area.

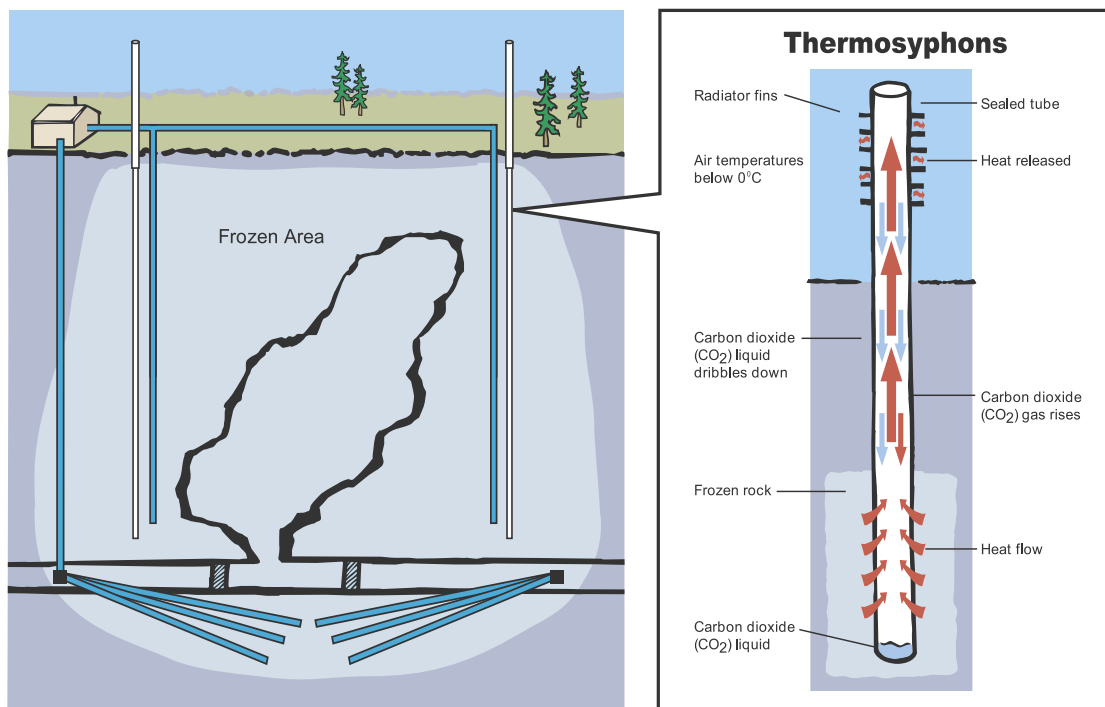


2) Freeze surrounding the chamber

Frozen Block Method

Step Three

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



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 gas, rises to top, heat released through radiator fins, CO₂ 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 block is effectively frozen solid, it will remain frozen with the air of thermosyphons which do not require an energy source. Long term monitoring and maintenance will continue indefinitely.

Giant Mine Remediation Joint 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
QS-Y289-003-EE-A1 Cette publication est aussi disponible en français sous le titre :
La méthode des blocs congelés

