Giant Mine
Remediation Project

SWANA Northern Lights Conference

June 15th, 2023

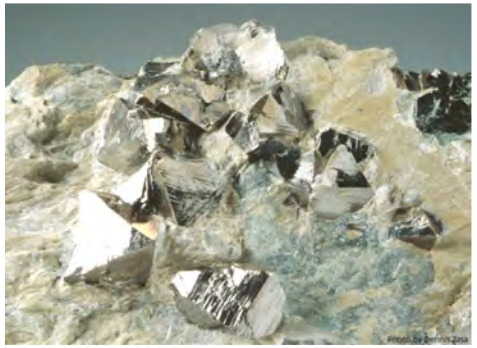
Government of Northwest Territories / Gouvernement des Territoires du Nord-Ouest

Canada



A Brief History of Giant Mine

- Gold discovered in region in 1800s
- Exploration in the 1930s led to opening of Giant Mine in 1948



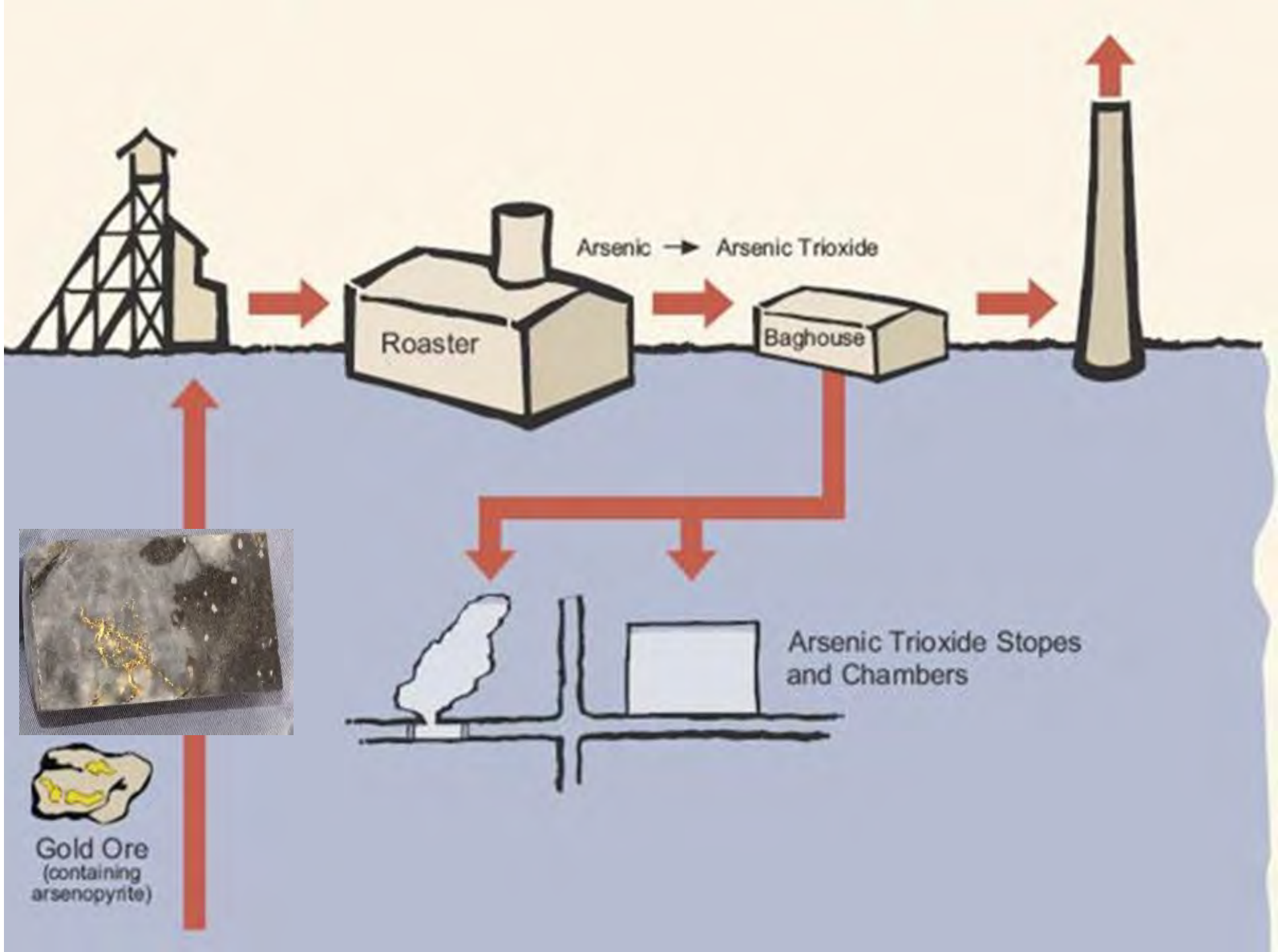
- Operated continuously until 1999, when operator went bankrupt



A Brief History of Giant Mine

- Giant Mine operator Royal Oaks Mines Inc goes into receivership in 1999
- Control of Giant Mine transferred to CIRNAC in December 1999
- Offsite processing of ore continued until 2004

- Giant Mine Remediation Project created to reduce risk and liability to Crown
- Canada and GNWT co-proponents for project in 2005
- Anticipated start to remediation 2021


Arsenic → Arsenic Trioxide
Roaster
Baghouse
Arsenic Trioxide Stopes
and Chambers
Gold Ore
(containing
arsenopyrite)

Site Overview

WHERE ARE WE IN THE PROCESS

Traditional Use

1948 - 2004
Mining

2005 - 2020
Care & Maintenance,
Site Stabilization Plan
Regulatory and Engagement

2020 August
Water License &
Land Use Permit
received

2021 – 2038
REMEDIATION

2038 and beyond

Post Closure
Perpetual Care

Waste Management at Giant Mine

Waste Management at Giant Mine

- **Waste Management at Giant Mine is permitted through Mackenzie Valley Land and Water Board:**
  - Water License
  - Land-Use Permit
- **Waste Types:**
  - Legacy Waste
  - Buildings
  - Tailings
  - Arsenic Trioxide
  - Contaminated Soils and Sediment

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Legacy Waste

- Scrap wood
- Drums
- Cables and piping
- Derelict machinery and equipment
- Vehicles

- Recycle metal if possible
- If non-hazardous: disposed at on-site Non-Hazardous Waste Landfill
- If hazardous (non-arsenic): Disposed off-site

Credit: Dave Brosha

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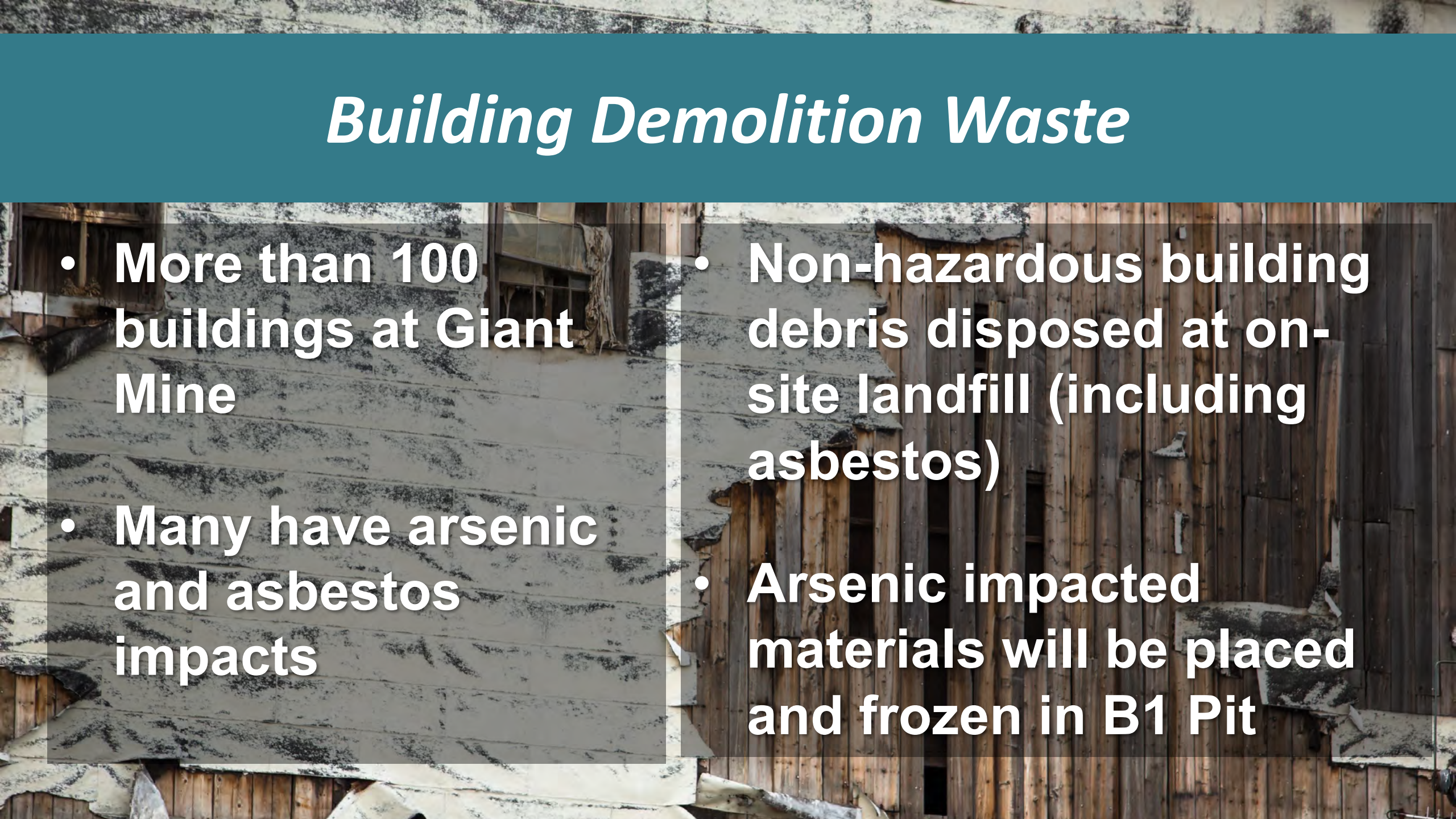
SCHOOL BUS
KOMATSU
85EX
CATERPILLAR
854

Building Demolition Waste



- More than 100 buildings at Giant Mine
- Many have arsenic and asbestos impacts
- Non-hazardous building debris disposed at on-site landfill (including asbestos)
- Arsenic impacted materials will be placed and frozen in B1 Pit

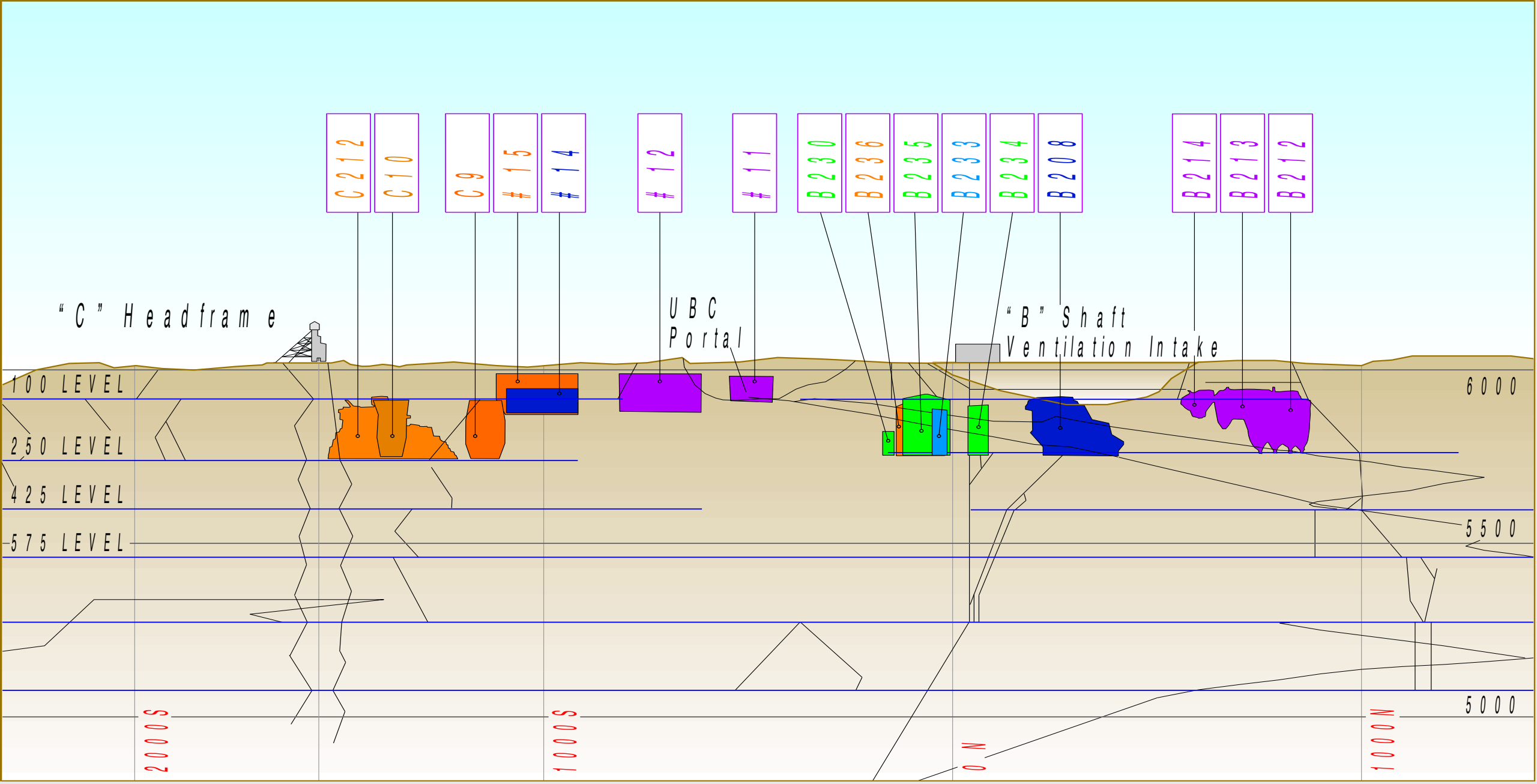
- Four tailings containment areas (TCAs)
- Three will be permanently covered and used for contaminated soils disposal
- One will be excavated, remediated and revegetated

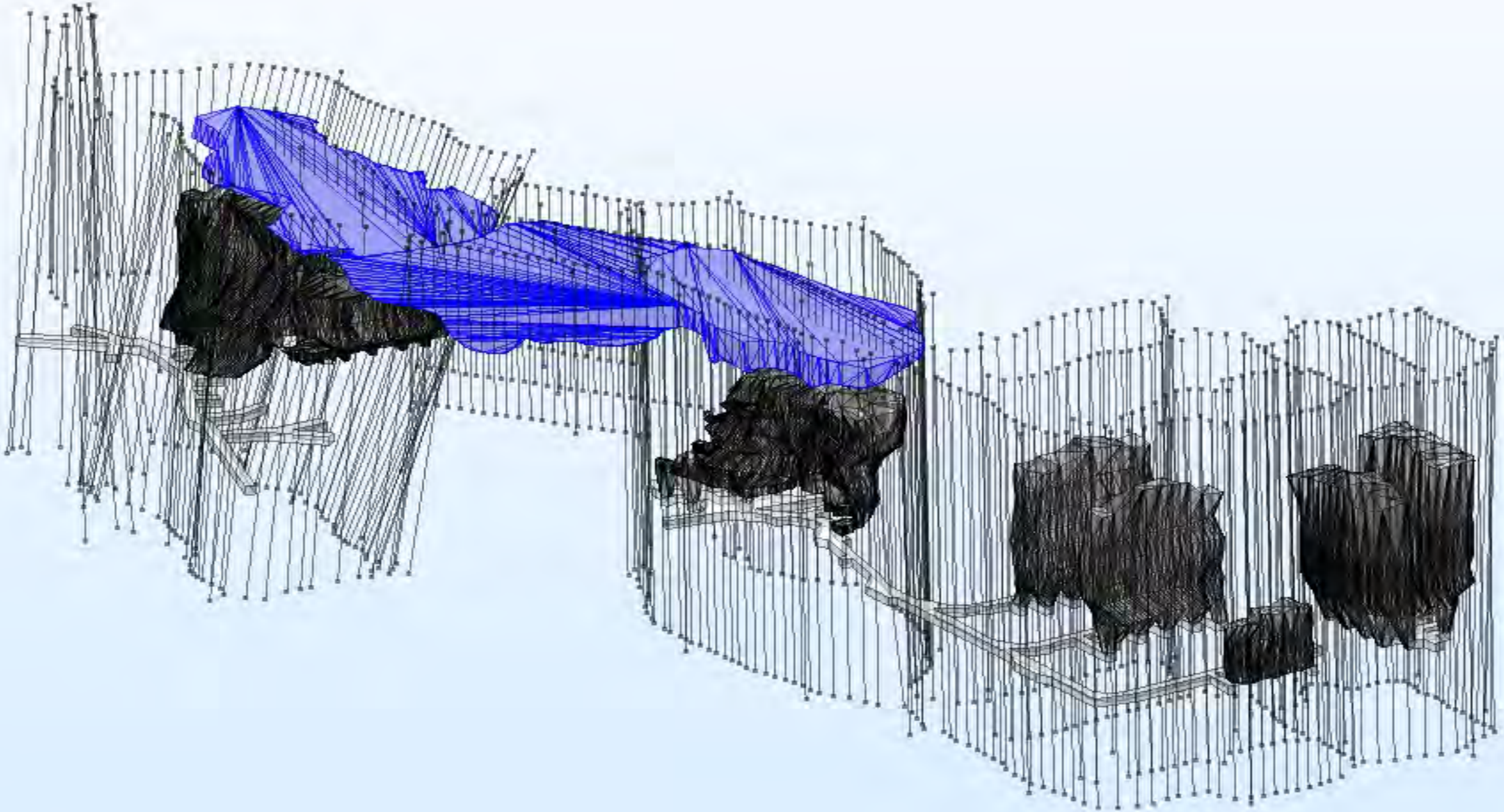
Tailings Containment Areas

- Approximately 237,000 tonnes of arsenic trioxide
- Contained within 5 stopes and 10 chambers

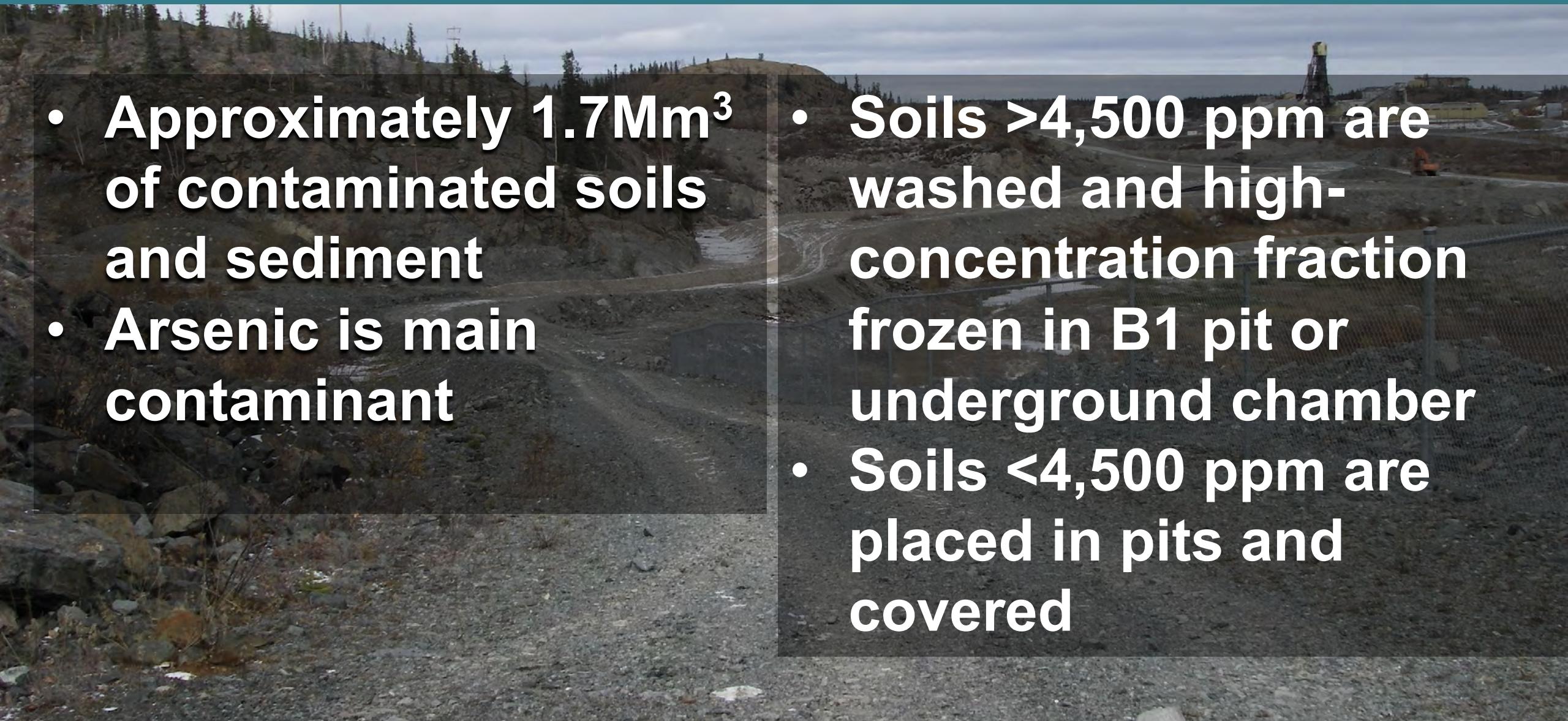
- These chambers and stopes will be frozen to prevent groundwater mobilization
- Not a permanent solution

Arsenic Trioxide


C212
C10
C9
#15
#14
#12
#11
B230
B236
B235
B233
B234
B208
B214
B213
B212
"C" Headframe
UBC
Portal
"B" Shaft
Ventilation Intake
100 LEVEL
250 LEVEL
425 LEVEL
575 LEVEL
6000
5500
5000
2000S
1000S
0N
1000N



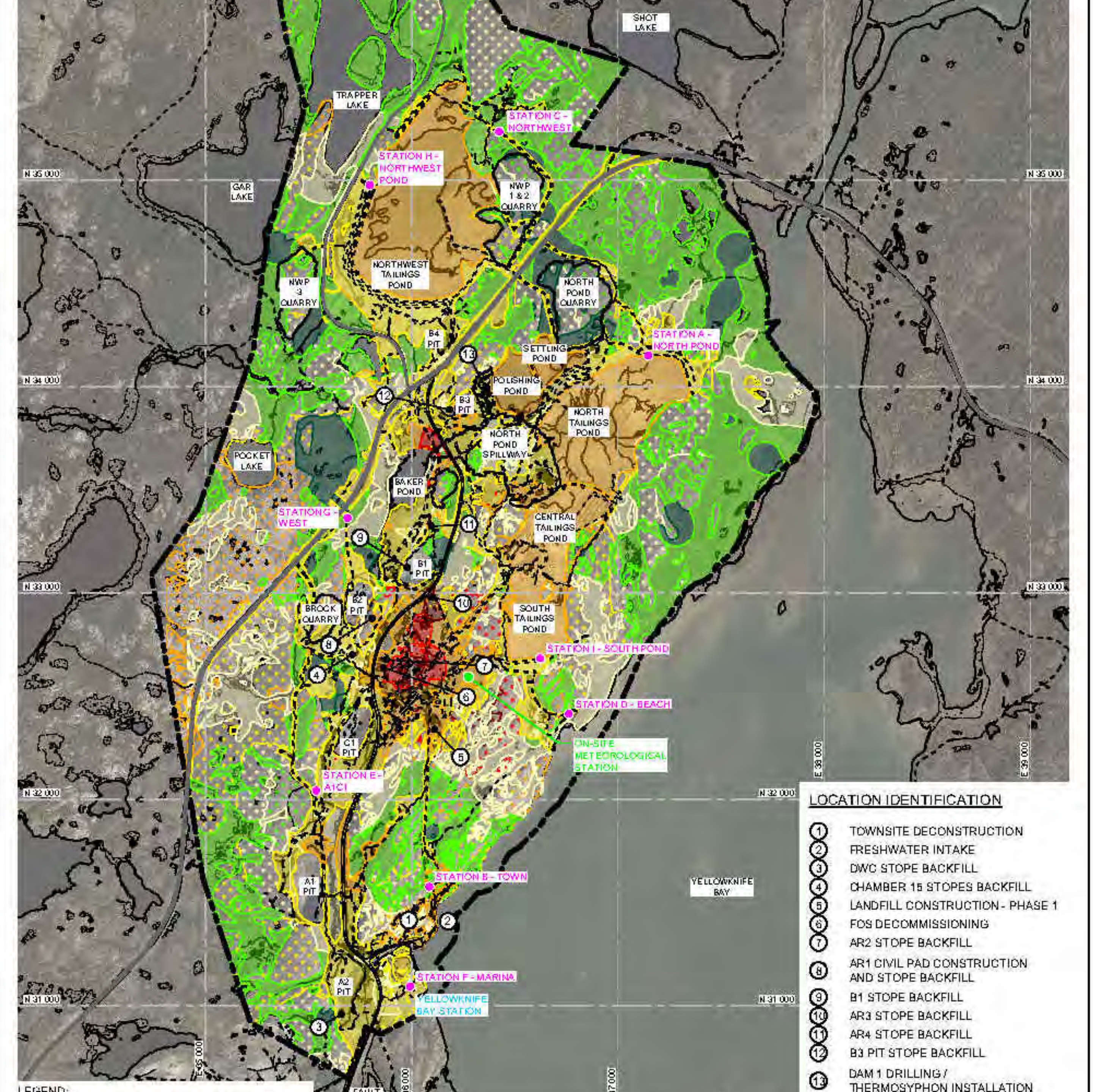
Contaminated Soils



- Approximately 1.7Mm^3 of contaminated soils and sediment
- Arsenic is main contaminant

- Soils >4,500 ppm are washed and high-concentration fraction frozen in B1 pit or underground chamber
- Soils <4,500 ppm are placed in pits and covered


CAT
CAT4464
RVITA
866-391-0444
CONTAINMENT FOR CONTAMINATED SOILS
SOIL BAG MAY ALSO BE USED FOR:
ACTIVATED CARBON
MOLECULAR SIEVE
ASBESTOS
SPENT CATALYSTS
OTHER SOLID REGULATED WASTE MATERIALS
TERVITA SOIL BAG NOT SUITABLE FOR:
MATERIALS CONTAINING FREE LIQUIDS
PYROPHORIC OR SELF-HEATING SUBSTANCES
PLEASE NOTE:
BAG SHOULD BE STORED ON PALLET
REEF LID CLOSED WHEN NOT IN USE
NO NON-CONFORMING WASTE NEEDLES, SHARPS, GLASS,
HOXIOUS MATERIALS OR OTHER MATERIAL THAT COULD CAUSE
PERSONAL INJURY OR POSE A HEALTH THREAT
6000 kg max
13H3 /Y / 06 / 13
CAN / E.P.C. 4-548
10800/1500


SHOT LAKE
TRAPPER LAKE
STATION C - NORTHWEST
STATION H - NORTHWEST POND
GAR LAKE
NWP 1 & 2 QUARRY
NORTHWEST TAILINGS POND
NWP -3 QUARRY
NORTH POND QUARRY
STATION A - NORTH POND
B4 PIT
SETTLING POND
POLISHING POND
B3 PIT
NORTH TAILINGS POND
NORTH POND SPILLWAY
POCKET LAKE
BAKER POND
STATION G - WEST
CENTRAL TAILINGS POND
B1 PIT
BROCK QUARRY
B2 PIT
SOUTH TAILINGS POND
STATION I - SOUTH POND
STATION D - BEACH
ON-SITE METEOROLOGICAL STATION
C1 PIT
STATION E - A1CI
STATION B - TOWN
YELLOWKNIFE BAY
A1 PIT
A2 PIT
STATION F - MARINA
YELLOWKNIFE BAY STATION
N 35 000
N 34 000
N 33 000
N 32 000
N 31 000
E 38 000
E 39 000
LEGEND:
FAULT
LOCATION IDENTIFICATION
1 TOWNSITE DECONSTRUCTION
2 FRESHWATER INTAKE
3 DWC STOPE BACKFILL
4 CHAMBER 15 STOPES BACKFILL
5 LANDFILL CONSTRUCTION - PHASE 1
6 FOS DECOMMISSIONING
7 AR2 STOPE BACKFILL
8 AR1 CIVIL PAD CONSTRUCTION AND STOPE BACKFILL
9 B1 STOPE BACKFILL
10 AR3 STOPE BACKFILL
11 AR4 STOPE BACKFILL
12 B3 PIT STOPE BACKFILL
13 DAM 1 DRILLING / THERMOSYPHON INSTALLATION

Non-Hazardous Waste Landfill


Questions?
www.giant.gc.ca