

# **COMMUNITY PERSPECTIVES ON THE GIANT MINE, YELLOWKNIFE**

**FOR**

**Orphan Mine Sites Workshop  
June 26-27, 2001 Winnipeg, Manitoba**

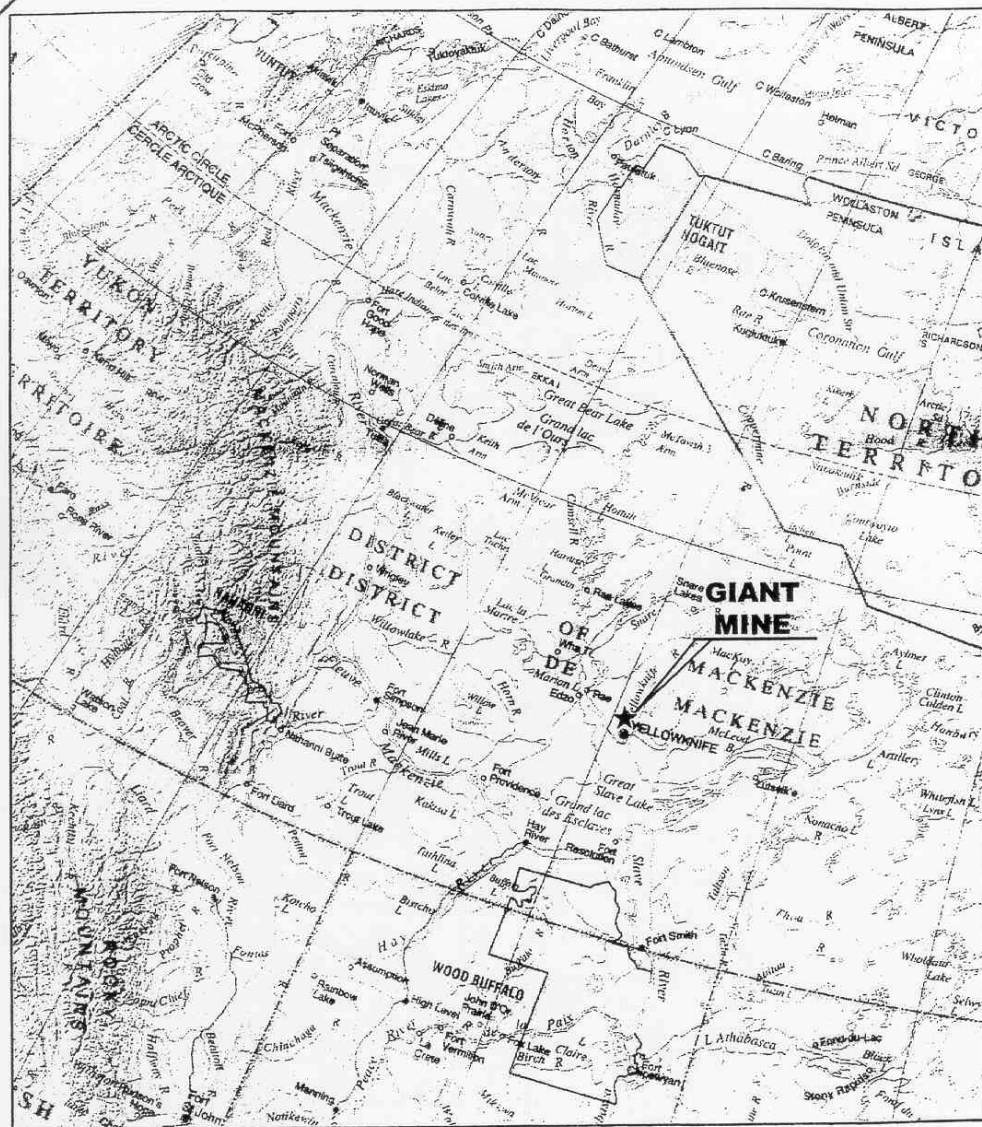
**BY**

**Kevin O'Reilly  
Research Director, Canadian Arctic Resources Committee  
and  
Yellowknife City Councillor**

# **COMMUNITY PERSPECTIVES ON THE GIANT MINE, YELLOWKNIFE**

## **Presentation Overview**

- **Background on Yellowknife and Mining**
- **Background on Giant Mine**
- **Environmental and Community Effects**
- **Role of Government**
- **Conclusions**



**SRK Consulting**  
Engineers and Scientists



**Indian and Northern  
Affairs Canada**

Study of Management Alternatives  
Giant Mine Arsenic Trioxide Dust

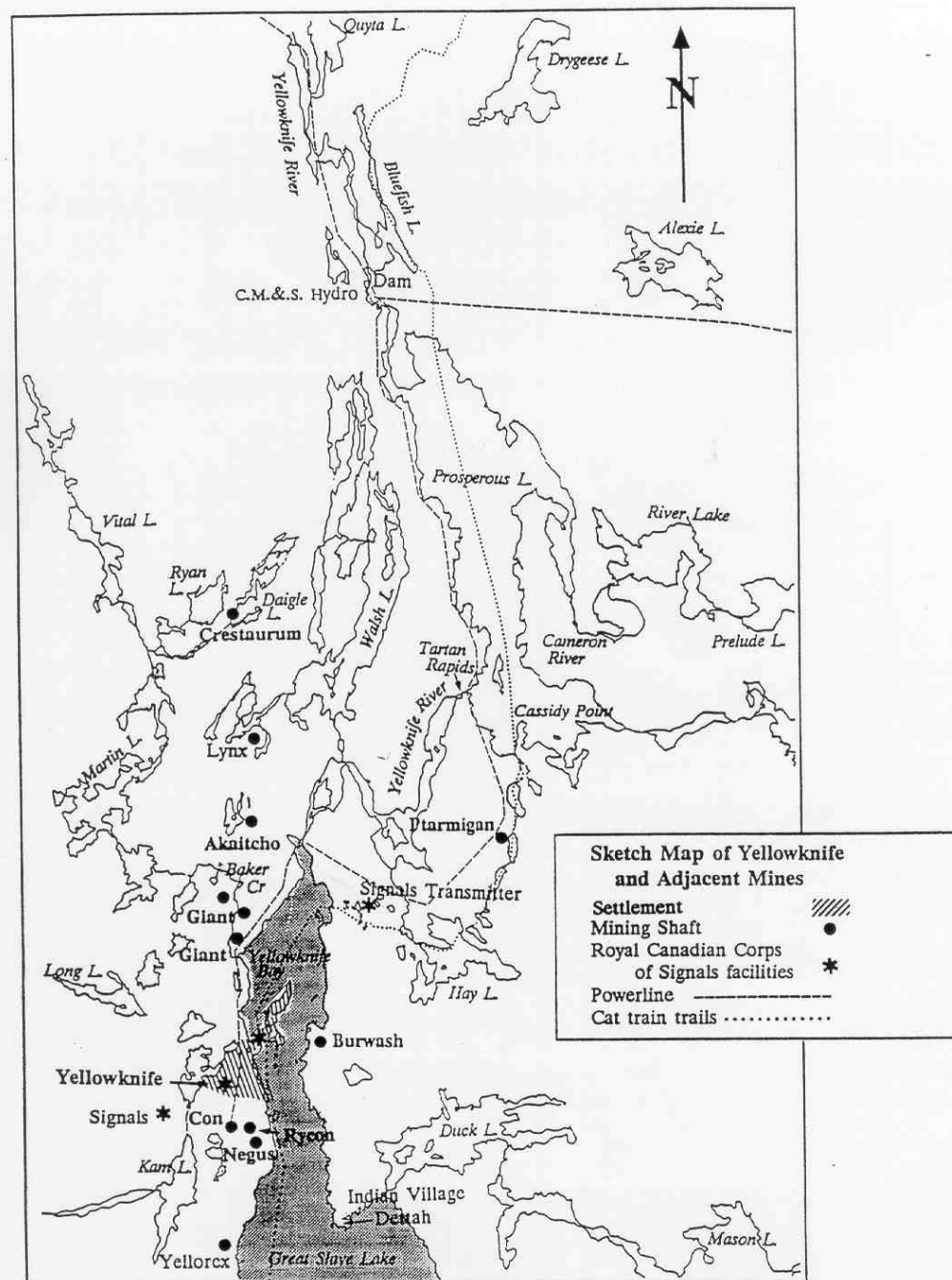
**Location Map**

PROJECT: 1C1001.06	DATE: May 2001	APPROVED:	FIGURE: <b>2.1</b>
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## **COMMUNITY PERSPECTIVES ON THE GIANT MINE, YELLOWKNIFE**

### **Background on Yellowknife and Mining**

- Weledeh Dene have lived in the area for thousands of years, now reside in communities of N'dilo (within municipal boundaries) and Detah
- Yellowknives Dene signed Treaty 11 in 1900, federal government is negotiating land and resources arrangements
- first prospecting in Yellowknife area during Klondike Gold Rush
- Burwash Mine operated from 1934-36 across the Bay from Yellowknife
- Con Mine went into production in 1938 and is still operating
- other gold mines in the area included Camlaren, Ptarmigan, Thompson-Lundmark, and Discovery
- Yellowknife old town settlement started in 1936, new town in late 1940s
- Yellowknife became the capital of the NWT in 1967
- Yellowknife current population is 18,000
- regional service centre and growing tourism
- federal government controls land and resources



## **COMMUNITY PERSPECTIVES ON THE GIANT MINE, YELLOWKNIFE**

### **Background on Giant Mine**

- **claims staked in July 1935 by Burwash Yellowknife Gold Mines**
- **property inactive during World War II and then acquired by Frobisher Exploration**
- **milling began in 1948 at 450 tons per day using mercury amalgamation**
- **roasting and cyanidation plants completed in 1949**
- **production increased to 700 tpd in 1952, 900 tpd in 1960 and 1100 tpd in 1990s**
- **Giant Mine acquired by Falconbridge in 1962, sold to Pamour in 1986**
- **Royal Oak Mines purchases assets of Pamour in 1990 and operated Giant until it went bankrupt in April 1999**
- **Giant mine was then sold to Miramar Mining Corp. in December 1999 and milling and processing on site stopped**
- **June 2001 Miramar informs Department of Indian Affairs and Northern Development it will turn Giant back to the federal Crown in December 2001**

## **COMMUNITY PERSPECTIVES ON THE GIANT MINE, YELLOWKNIFE**

### **Environmental Effects and Community Responses**

- **arsenic trioxide is a proven human carcinogen**

#### **Soil and Air Contamination**

- **problems noted with arsenic soon after Giant roasting began in 1949 (two children died, livestock poisoned, extensive soil contamination)**
- **roaster emissions eventually reduced but not eliminated until mine closure**
- **relatively high background levels of arsenic in local soils but areas are heavily contaminated with no proven methods of decontamination**
- **most soil samples in Yellowknife built up areas exceed CCME guideline of 12ppm, mine site levels range from <100-8500ppm**



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Arctic and inland.

Mr. Webster's pictures have  
been published in such magazines  
as the National Geographic and  
in a number of British publi-  
cations. He has also copyrighted  
some of them.

## Ladies' Curling Will Start Sun

Sunday night will see the start  
of the ladies' tournament at the  
curling rink here.

Draw for Sunday is as follows:  
7.00 p.m. Johnson vs Christopher-  
son.

## Discharge of Arsenic Being Probed

Federal government officials  
are in Yellowknife this week  
probing complaints from Yellow-  
knife that arsenic from local  
roasters is poisoning live-stock  
and is effecting vegetation.

Chairman of the investigating  
committee is Ken J. Christie,  
chief inspector of mines.

Others with him are R. J.  
Traill, chief of the metallurgy  
division, bureau of mines and Dr.  
K. Kay, chief of the Industrial  
Hygiene Laboratory, department  
of national health and welfare.

It is not expected reports will  
be made public immediately on  
the findings.

That group of citizens who  
have been---or never were hockey  
players, which is known as the  
Mercantile hockey league---are  
preparing for an 18 game  
schedule this winter.

Exact details have not been  
learned---but the three mines  
and town are said to be prepar-  
ing entries for the season of

News of the North

1949 DEC 02

page 8  
(last page)

Copy is actual size.



Dr. C. S. Lord.  
 G. B. McClellan, Mr. R. A.  
 Phillips, Mr. A. J. Pidgeon,  
 T. M. Pink, Commande  
 Pratt, Mr. J. M. Pridd  
 el R. L. Purves, Gro  
 in C. L. Trecarten, Mr.  
 Williamson, Mr. B. Wilson.

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 Apply News of the North  
 49



regular meeting  
 Mellowknife Lodge No. 182  
 and A.M. G.R.A., will be  
 in the Masonic Hall Y  
 knife on Monday evening  
 1 at 7:30 p.m.  
 visiting Brethern Welcome

# WARNING!

Residents are warned NOT TO USE  
 melted snow or snow water for any pur-  
 pose, particularly cooking and drinking.  
 At this time of the year run-off pools of  
 water may contain a highly dangerous  
 arsenic content. Residents of Latham Is-  
 land who may not be using the Town  
 water delivery system are particularly  
 warned NOT to use water from pools, or  
 melt down snow for domestic purposes.

O. L. Stanton M.D.  
 Medical Health Officer.

News of the North 1950 APR 21  
 and 1950 APR 28

A similar message, handwritten appeared  
 in The Mellowknife Blade 1950 APR 29  
 Vol. 7, No. 11, p. 6

# W A R N I N G

During the Spring Run-off Period, standing pools of water are likely to be highly contaminated with

# A R S E N I C

Residents are warned NOT to use snow water for any purpose and to keep children and animals from drinking same.

O. L. Stanton, M.D.

Medical Health Officer

We Set the Pace :: Equipped to  
**ASSOCIATED AIRWAYS, L**

ed to his chores for the re  
minute or so of play.  
The fifth game of the se

*Copy is actual size.*

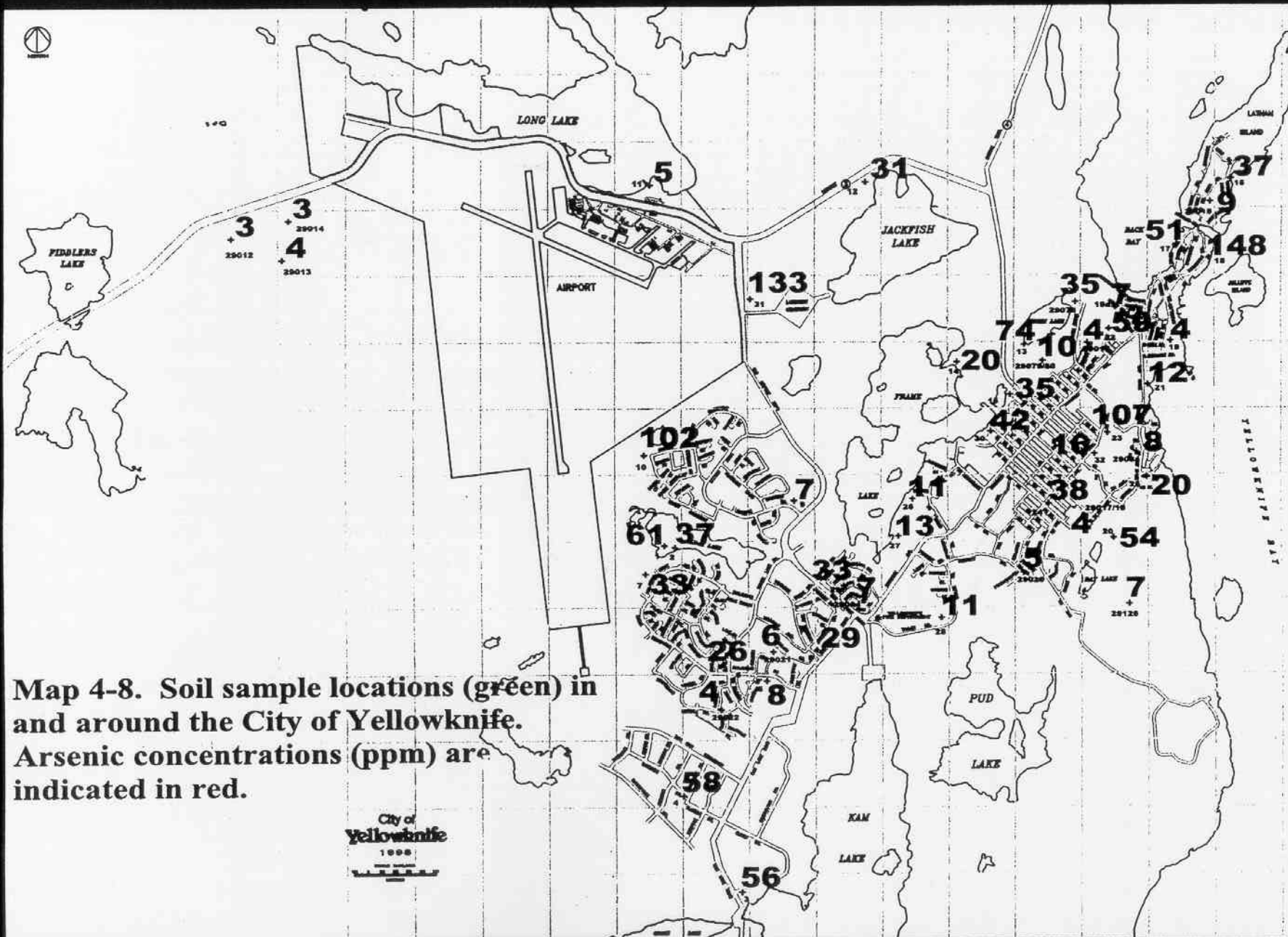
*and 1951 APR 20, page 3*

TABLE 4-1

**ESTIMATED ARSENIC RELEASES TO THE AIR  
FROM GOLD ROASTERS IN YELLOWKNIFE 1949 TO 1977**

<b>YEAR</b>	<b>GIANT (kg/day)</b>	<b>CON (kg/day)</b>	<b>TOTAL (kg/day)</b>
1949	7300	NR	>7300
1950	7300	90	7390
1951	7300	90	7390
1952	NR	90	NR
1953	NR	NR	NR
1954	5500	180	5680
1955	2900	185	3085
1956	2700	190	2890
1957	3000	180	3180
1958	1500	175	1675
1959	52	200	252
1960	75	265	340
1961	150	200	350
1962	150	200	350
1963	150	200	350
1964	310	135	445
1965	NR	170	NR
1966	240	140	380
1967	130	155	285
1968	230	150	380
1969	300	195	495
1970	220	250	470
1971	880	0	880
1972	400	0	400
1973	400	0	400
1974	220	0	220
1975	215	0	215
1976	165	0	165
1977	135	0	135

NR indicates no results available.



Map 4-8. Soil sample locations (green) in and around the City of Yellowknife. Arsenic concentrations (ppm) are indicated in red.

City of  
Yellowknife  
1998

## **COMMUNITY PERSPECTIVES ON THE GIANT MINE, YELLOWKNIFE**

### **Environmental Effects and Community Responses (continued)**

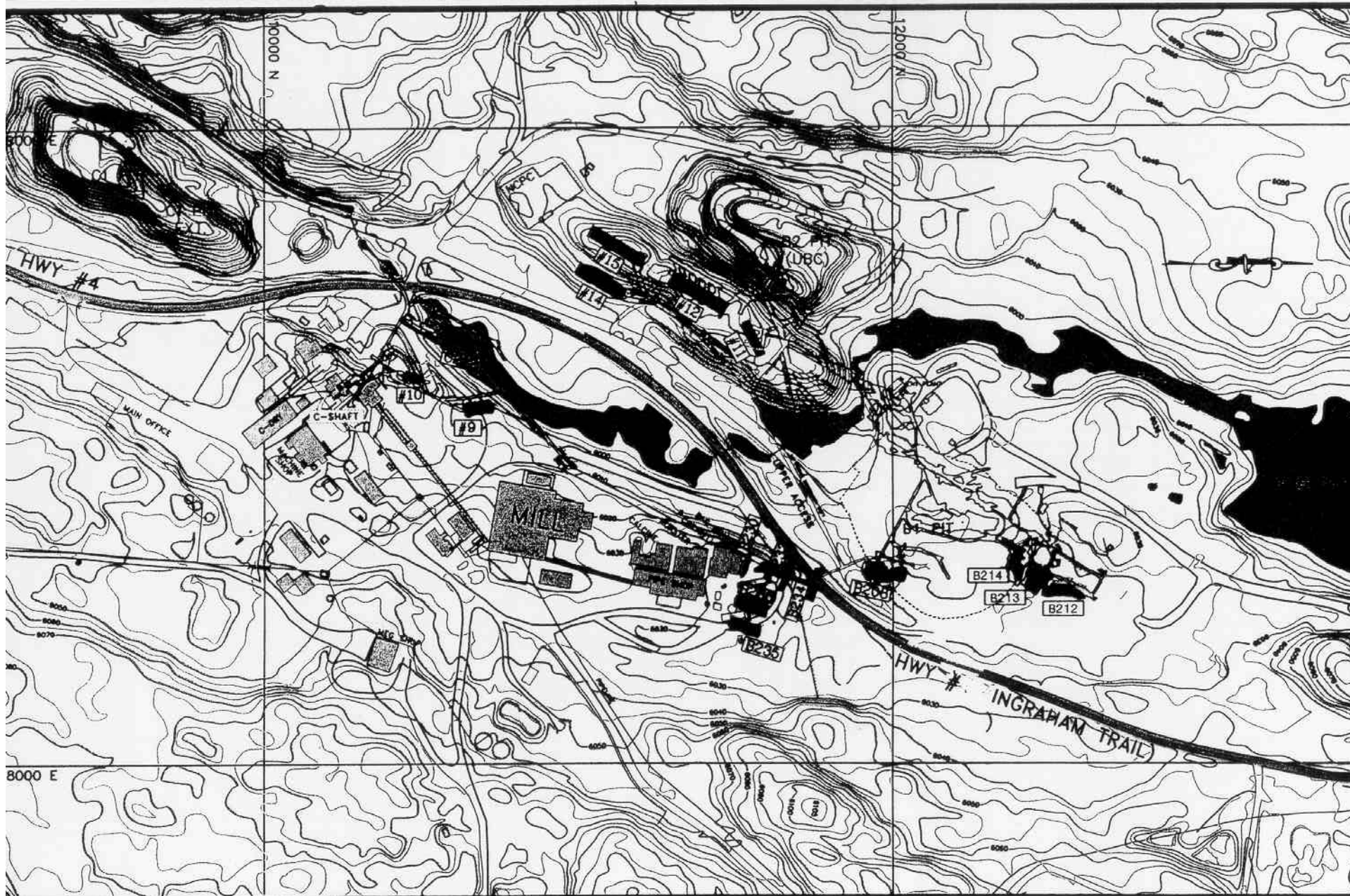
#### **Water Contamination**

- **local lake waters and sediments are also contaminated and signs have recently been posted by the Chief Medical Health Officer**
- **contamination of surface waters from tailings spills directly into Yellowknife Bay and Baker Creek, discharges from tailings ponds and from wind-blown dust from uncapped tailings ponds**

#### **Underground Arsenic**

- **beginning in October 1951, arsenic trioxide was pumped underground for storage**
- **5 mined out stopes and 10 special chambers now hold 237,000 tonnes of arsenic trioxide**





# ARSENIC CHAMBERS' LOCATIONS

LEGEND:



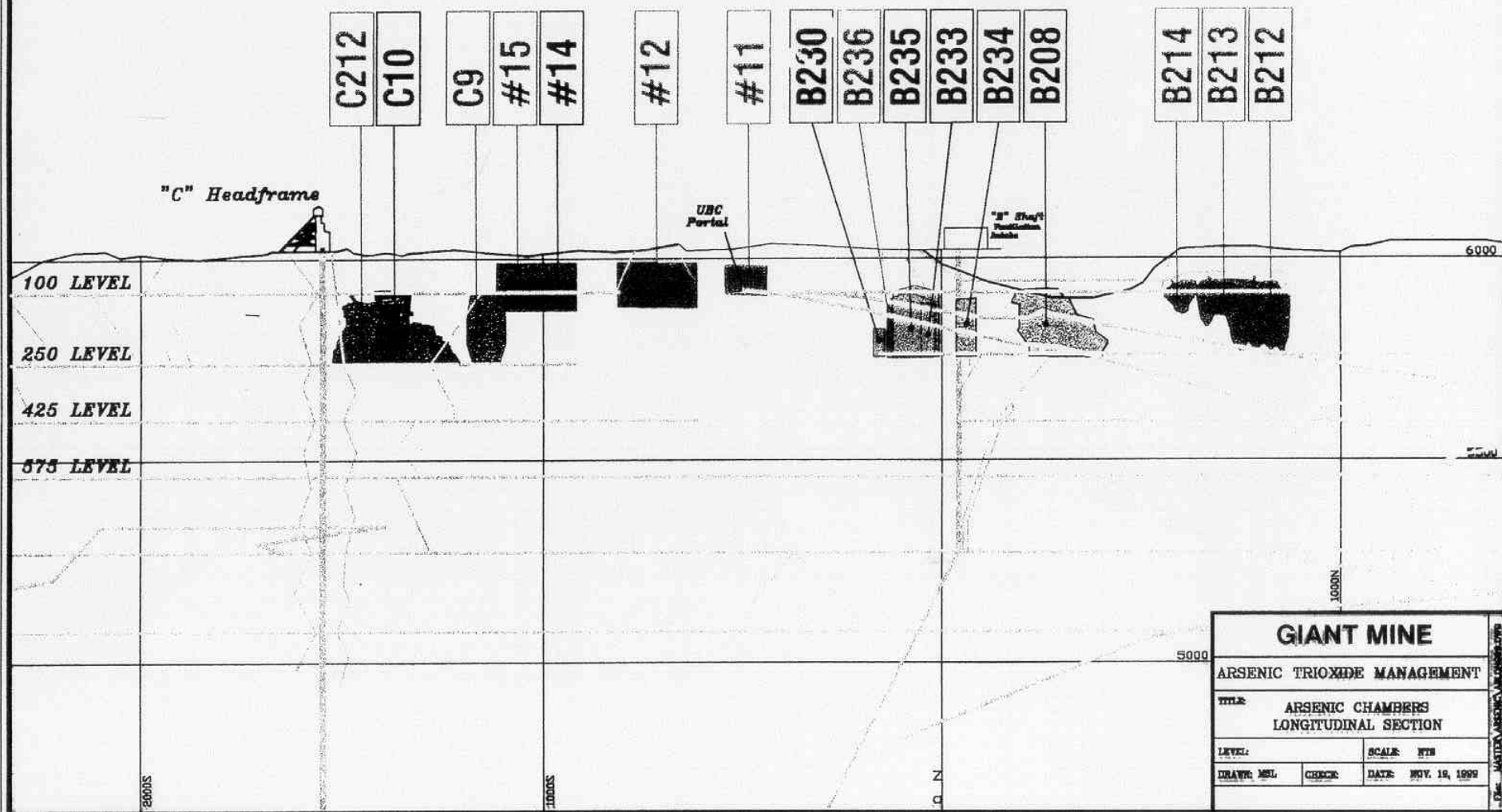
UNDERGROUND  
ARSENIC CHAMBER

SCALE: NTS

DATE: DEC. 14, 1999

FILE: C:\MASTER\ARSENIC\PROJDOC\ARSURFAC.DWG

**ARSENIC CHAMBERS**



**GIANT MINE**

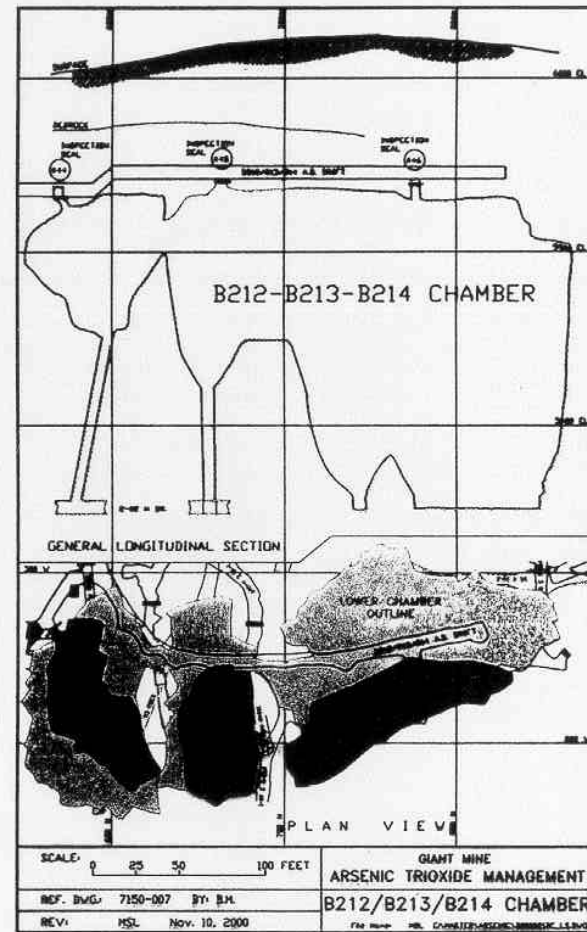
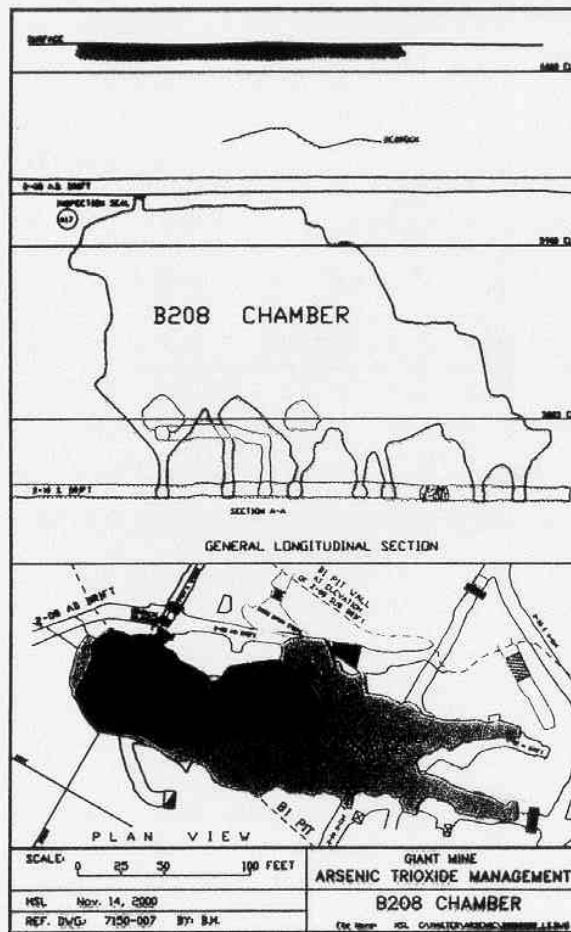
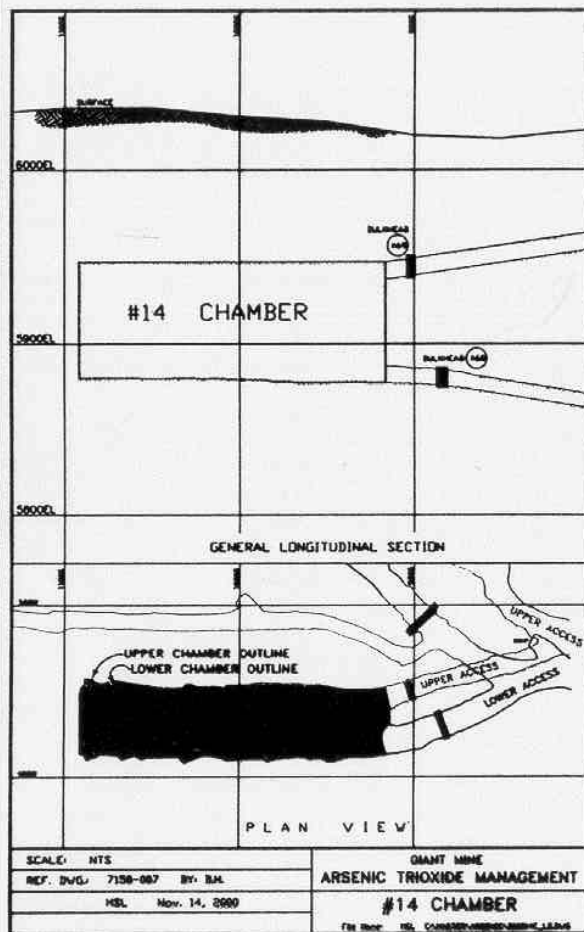
ARSENIC TRIOXIDE MANAGEMENT

TITLE: ARSENIC CHAMBERS  
LONGITUDINAL SECTION

LEVEL:	SCALE: NTS
DRAWN: MEL	CHECK: DATE: NOV. 18, 1999

FILE: MASTER ARSENIC CHAMBERS





## **COMMUNITY PERSPECTIVES ON THE GIANT MINE, YELLOWKNIFE**

### **Environmental Effects and Community Responses (continued)**

#### **Underground Arsenic**

- **arsenic trioxide is being leached out of some of the chambers by ground water which is then collected and treated**
- **no known technology that can be used to permanently process or treat the underground arsenic trioxide**

#### **Community Effects**

- **workers exposed to arsenic during roasting and baghouse operations, several claims for compensation filed**
- **long and bitter strike in 1994-95 that divided the community**
- **Royal Oak brought in replacement workers, underground explosion during the strike and nine men killed**

## **COMMUNITY PERSPECTIVES ON THE GIANT MINE, YELLOWKNIFE**

### **Environmental Effects and Community Responses (continued)**

#### **Community Effects**

- **300 workers lost their jobs at closure, 100 eventually hired back and now down to 35**
- **workers at time of bankruptcy lost their severance pay and had their pensions reduced due to Royal Oak mismanagement of funds**
- **City lost \$600,000 in back taxes and forced into concessions**

## **COMMUNITY PERSPECTIVES ON THE GIANT MINE, YELLOWKNIFE**

### **Role of Government**

- emission controls on roaster brought in as a result of government intervention but arsenic and sulphur dioxide never regulated
- virtually no environmental regulation of mine until 1970s
- Canadian Public Health Association special Task Force on Arsenic reported in 1977 as a result of Steelworker and Dene Nation independent testing, many recommendations never carried out
- no air quality regulations for the NWT covering arsenic or sulphur dioxide
- arsenic compounds found to be “toxic” under *Canadian Environmental Protection Act* in 1994, Environment Canada failed to bring in any regulations or implement a draft 1997 management plan
- surface lease for the mine site with Government of the NWT, no provisions for security, no legally-binding standards for clean-up, clean-up responsibility in dispute, surface clean-up estimated at \$16 MILLION

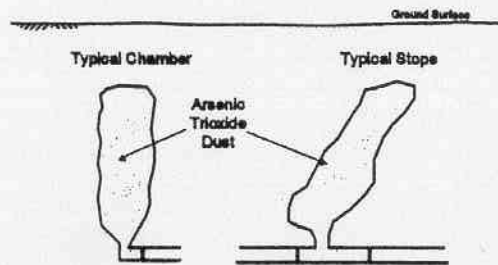
## **COMMUNITY PERSPECTIVES ON THE GIANT MINE, YELLOWKNIFE**

### **Role of Government (continued)**

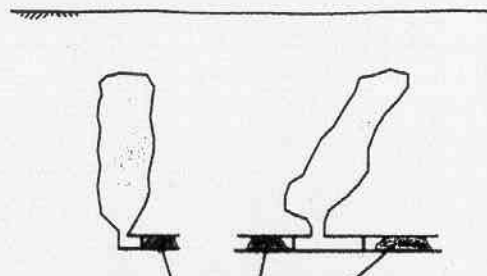
- **City took part of the surface lease as a potential marina site without adequate undertakings for clean-up or liability, federal government later stated they will clean up to “industrial standards”**
- **underground arsenic covered by water licence held by Royal Oak Mines with security set at \$400,000, estimated management costs \$50 MILLION to \$1.7 BILLION**
- **federal Crown now responsible for clean-up as a result of Royal Oak bankruptcy and under a “secret” agreement with Miramar**
- **funding reduced and delayed last fiscal year for research into clean-up, no long-term funding identified for clean-up, environmental assessment required for underground arsenic management**
- **no regulatory standards for mine site reclamation or bonding in the NWT, mine site reclamation policy still under development**

**TABLE 4.12**  
**Summary of Costs and Risks for Representative Alternatives**

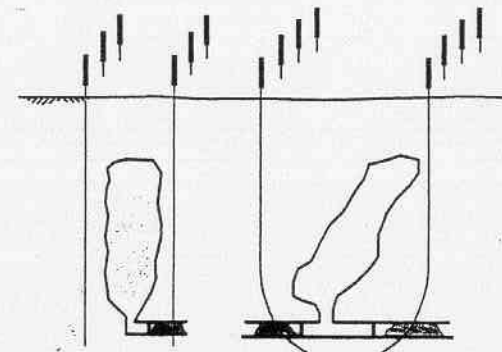
Assessment Item	Alternative 1 <i>In Situ</i> Management with Ground Freezing	Alternative 2 Arsenic and Gold Recovery by Fuming	Alternative 3 Gold Recovery and Arsenic Stabilization by Pressure Oxidation	Alternative 4 Stabilization with Cement
Costs (millions of \$CDN)				
Capital	23.4	81.5	122.3	42.1
Operating	29.4	199.0	313.2	189.3
Revenue	-	95.1	35.6	-
Net	52.8	185.4	399.9	231.4
Maximum Net	69	344	409	256
Minimum Net	39	143	319	186
Risk				
Probability of Short-term Arsenic Release	1 in 10,000	1 in 500	1 in 500	1 in 500
Probability of Long-term Arsenic Release	1 in 10,000	1 in 4000	1 in 3000	1 in 5000
Worker Health & Safety	Low	Medium to High	Medium to High	Medium
Air Emissions	n/a	Very Low	n/a	n/a



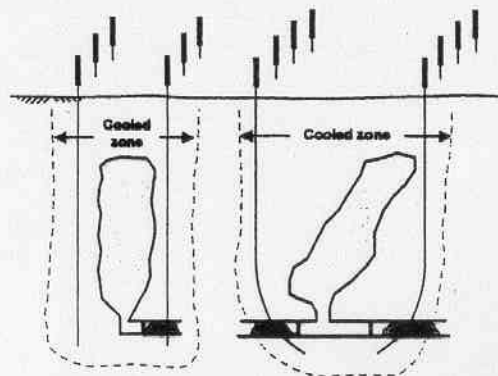
1. Typical chamber and stope with arsenic trioxide dust



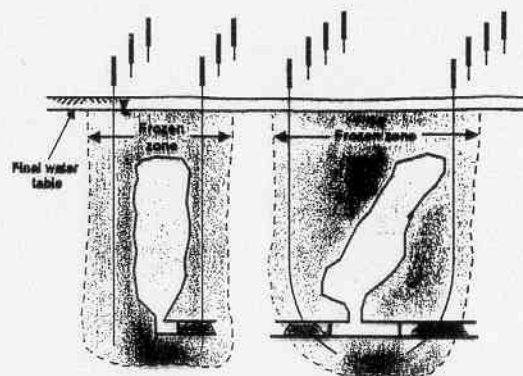
2. Plug drills with waste rock



3. Install thermosyphons at 3-4m centers to below arsenic trioxide dust



4. Allow 3 years for ground to freeze



5. Control water level rise to allow ice formation

**SRK Consulting**  
Engineers and Scientists

**Indian and Northern  
Affairs Canada**

Study of Management Alternatives  
Glant Mine Arsenic Trioxide Dust

**In Situ Management with  
Ground Freezing**

PROJECT: 1C1001.06	DATE: May 2001	APPROVED:	FOUR: 4.1
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## **COMMUNITY PERSPECTIVES ON THE GIANT MINE, YELLOWKNIFE**

### **Conclusions**

- **Need for retrospective financial analysis of how much money was made by the Giant Mine, where it went, and then compare it against clean-up costs.**
- **Need for long-term, secure funding (a community-held trust) for research and development into arsenic contamination in the community, underground arsenic clean-up technology, and eventual clean-up.**
- **National program or fund needed for mine site clean-up with industry contribution.**
- **Nothing in legislation would prevent the Giant Mine from happening again.**
  - **Need for legislated reclamation and security standards for the NWT.**