

# MEMORANDUM

850-5-X 751

CLASSIFICATION



TO  
A

Dr. J. H. Wiebe,  
Acting Director General,  
Medical Services.

YOUR FILE No.  
Votre dossier

Attention: Dr. W.H. Frost

OUR FILE No.  
Notre dossier

FROM  
De

Chief,  
Public Health Engineering Division

DATE Sept. 22, 1969.

SUBJECT  
Sujet

Arsenic Levels, Drinking Water Supplies  
Yellowknife, N.W.T.

Attached for your information are copies of  
correspondence and data concerning the noted subject.

RGF  
AK

TO	FOR INFO.	FOR ACTION	REMARKS	DISPOSAL AND DATE
MB			Oct 15.	PA

*R. E. Tait*  
R. E. Tait, P. Eng.,  
Chief,  
Public Health Engineering  
Division.

Att.







Mr. R.E. Tait, Chief  
Public Health Engineering Div.  
OTTAWA, Ontario

Aug. 22/69

Edmonton 2, Alberta

Arsenic in Yellowknife Bay

This letter is to confirm our telephone conversation this morning and bring your files up to date.

Enclosed are copies of the letters transmitted, a summary of our continuing surveillance program, and the July daily analysis of the Giant Yellowknife Mines tap water (analysis done by Giant Yellowknife Mines Laboratory).

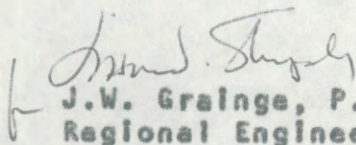
It is of interest to note the following comparison of results:

<u>Arsenic Conc. Mg As/l</u>		
<u>Date</u>	<u>Our Sample</u>	<u>Giant's Sample</u>
July 2/69	0.002	0.106
July 4	1.52	0.022
July 5	0.91	
July 6	0.096	
July 7	0.096	
July 8	0.212	0.154
July 22	0.038	0.045

Notes

1. The samples are not duplicates and were not taken at the same time.
2. Giant's arsenic results have, in the past, been in good agreement with our Vancouver Laboratory results.

The above comparison shows large fluctuations of arsenic concentration in the water during less than a 8-hour period. As a result of this, we are having water samples taken at two-hour intervals during a 10-hour period (normal day operation) to see what can be anticipated in this regard.

  
J.W. Grainge, P. Eng.  
Regional Engineer

JWS/es  
Encl.



WATER SAMPLES TAKEN AT YELLOWKNIFE

Date		Water Supplies			Baker at Mouth	Creek above Giant	Latham Is. North at End Bridge	Indian Village Y.R.	Tail. Pond. Eff.
		Giant	Town	Con					
1	1966								
2	JAN 17	0.007	0.029	0.024					
3	FEB 8	0.012	0.022	0.014					
4	MARCH 23	0.038	0.028	0.030					
5	29	0.038	0.028	0.030					
6	APRIL 25	0.046	0.010	0.024					
7	MAY 10	0.372	0.078	0.064	1.900	1.025			
8	18	0.237	0.046	0.067	3.310	0.663	0.37		
9	JUNE 2	0.246	0.156	0.144	3.125	0.625	0.180	0.020	31.6
10	6	0.091	0.123	0.198	0.702		0.202	0.017	34.05
11	16	0.161	2.920	0.157	3.125	0.340	0.157	0.018	
12	20	0.294	0.114	0.111	1.083		0.111	0.022	57.75
13	27	0.256	0.065	0.059	1.500	0.500	0.072	0.025	40.00
14	JULY 4	0.058	0.055	0.035	2.50	0.390	0.055	0.001	45.38
15	11	0.078	0.045	0.036	3.250	0.165	0.050		58.0
16	15	0.030	0.070	0.068	2.70				42.0
17	22	0.090	0.044	0.036	4.30	0.150	0.050	0.001	56.0
18	29	0.044	0.022	0.009	4.850	0.188	0.024	0.007	48.0
19	AUGUST 1	0.250	0.013	0.012	3.10	0.225	0.017	0.006	48.5
20	8	0.034	0.018	0.008	7.450	0.010		0.004	38.0
21	15	0.026	0.019	0.010	10.88	0.110	0.017	0.005	46.5
22	24	0.080	0.018	0.009	8.55	0.110	0.022	0.004	36.5
23	29	0.014	0.002	0.007	2.00	0.175	0.002		52.0
24	SEPT 6	0.039	0.018	0.014	5.125	0.150	0.022	0.005	50.0
25	12	0.041	0.012	0.006	12.50	0.270	0.028	0.012	37.5
26	19	0.048	0.029	0.020	12.40	0.200	0.038		58.0
27	26	0.050	0.031	0.023	5.500	0.068	0.040		47.5
28	OCT 3	0.052	0.036	0.018	1.75	0.183	0.048	0.006	47.0
29	11	0.076	0.058	0.064	14.25		2.40	0.009	42.5
30	17	0.075		0.046	13.80		0.070	0.124	39.5
31	18		0.068						
32	19			0.030					
33	20	0.070*							
34		0.160**							
35	24	0.058	0.064	0.040	15.9				46.0
36	NOV 1	0.061	0.033	0.031					
37	10	0.050	0.043	0.043				0.006	
38	14	0.051	0.040	0.040				0.010	
39	21	0.055	0.050	0.050				0.046	
40	28	0.040	0.048	0.030				0.036	
41	DEC 5	0.034	0.040	0.030					
42	12	0.040	0.036	0.0					



1			2			3			4			5			6			7		
Date			Water Supplies			Baker at Mouth	Creek above Giant	Latham North End	Island at Bridge	Ind- ian Vill.	Yellow- knife River	Tail- Pond Eff.								
			Giant	Town	Con															
1	1967																			
2	JAN	18	0.058	0.068	0.050						0.042									
3		23	0.048	0.050	0.050						0.044									
4		30	0.035	0.056	0.050						0.048									
5	FEB	13	0.050	0.050	0.034															
6		16	0.050	0.008	0.040							0.004								
7		22	0.180	0.043	0.038							0.006								
8		28	0.162	0.086	0.062						0.042	0.010								
9	MARCH	6	0.220	0.030	0.114							0.009								
10		13	0.180	0.034	0.036						0.032	0.005								
11		20	0.120	0.026	0.124						0.170	<0.001								
12	APRIL	3	0.166	0.023	0.144						0.120	<0.001								
13		18	0.154	0.120							0.140	0.001								
14		10(?)	0.158		0.136							0.006								
15		26	0.128	0.016	0.122						0.120	N.D.								
16	MAY	1	0.112	0.026	0.092						0.080	0.002								
17		31(?)	0.102	0.126	0.155							<0.001								
18		25	0.226	0.044	0.155							<0.001								
19	JUNE	5	0.158	0.030	0.124	0.910	0.150					<0.001	0.010							
20		13	0.140	0.110	0.106							0.002								
21		30	0.182	0.066	0.098				0.114		0.048	0.012								
22	JULY	7	0.170	0.010	0.022	1.650		0.082				0.002	61.8							
23		14	0.125	0.038	0.036	5.650			0.126	0.018	0.004	46.0								
24		20	0.094	0.038	0.048	6.250		0.068		0.014	0.008	87.5								
25	DEC	14	0.014	0.010	0.018							0.006								
26	1968																			
27	JAN	8	0.012	0.020	0.026							0.002								
28	FEB	12	0.011	0.010	0.002							0.004								
29	MAY	16	0.148	0.044	0.033							<0.001								
30	JULY	18	0.011	0.017	0.015		1.070		0.018			N.D.	16.40							
31	OCT	23	0.036	0.016	0.008	1.340		0.008	0.012			<0.002	13.695							
32	NOV.	1	0.006																	
33		4		0.010																
34		17										<0.002	14.00							
35		18	0.004	0.010	0.018															
36																				
37																				
38																				
39	NOTES:																			
40	FEB 13 to APRIL 26 - ADDITIONAL SAMPLES <sup>WEEK</sup> TAKEN FROM 3 SAMPLE LOCATIONS ON																			
41	GREAT SLAVE LAKE AND 7 SAMPLES ON YELLOWKNIFE BAY																			
42																				
43																				
44																				
45																				

\* None Detected



	Date		Water Supplies			Baker at Mouth	Creek above Giant	Latham Is. North At End Bridge		Indian Village	Y.R.	Tail. Pond Eff.
1	1968											
2	DEC	23	0.010	0.012	0.004					0.006	0.004	
3		24	0.004	0.006	0.001					0.005	0.001	
4		27	0.006	0.006	0.010					0.002	0.001	
5		28	0.002	0.004	0.010					0.006	0.004	
6		30	0.006	0.006	0.001					0.004	0.003	
7		31	0.004	0.002	0.002					0.003	0.002	
8	1969											
9	JAN	2	0.004	0.003	0.006					0.012	0.003	
10		3	0.003	0.003	0.012					0.002	0.002	
11		6	0.002	0.006	0.006					0.001	0.003	
12		24	0.007	0.006	0.004					0.003	0.003	
13	JAN	28	0.001	0.002	0.003					0.001	0.001	
14	FEB	3		0.006								
15	FEB	14	0.002	0.006	0.006					0.003	0.001	
16	MARCH	5	0.003	0.006						0.002	0.002	
17		6		0.004	0.002							JOLLIFFE ISLAND FIRE HALL - 0.003
18		7		0.004								
19		28	0.014	0.008	0.012					0.006	0.005	
20	MARCH	31		0.008						0.004		
21	APRIL	4	0.016	0.027	0.033					0.028	0.006	60.40(U)
22					JACKFISH LAKE		0.146					25.80(F)
23		14	0.004	0.012	0.014					<0.002		
24		18	0.010	0.022	0.010		6.45(U)			0.004	0.003	10.80(U)
25							5.25(F)					10.20(F)
26		28								0.016		
27										0.074(S)		
28	APRIL	30	0.060	0.012	0.034		4.85(U)				0.002	86.0(U)
29							4.60(F)					14.0(F)
30	MAY	5	0.540	0.016	0.360		5.00(U)			0.004(S)	0.002	74.0(U)
31							4.80(F)					13.0(F)
32		12					1.150			0.016		
33		16	0.034	0.010	0.046						0.002	
34		20		0.006	0.010					0.032		
35												
36		21	0.072	0.062	0.076			0.124	0.062		0.002	18.0(U)
37		30										15.5(F)
38							GIRANT ABOVE INTAKE			0.022		
39		26								0.044		
40		30	0.012	0.044	0.060		1.740	0.100	0.072		0.004	72.60
41							GIRANT ABOVE INTAKE			0.018		
42												
43	NOTES:											
44	S - SURFACE SKIMMED FOR SAMPLE											
45	U - SAMPLE NOT FILTERED											
	F - SAMPLE FILTERED,											



[illegible]



Mr. M. F. Gillis  
Public Health Inspector  
Health Center  
YELLOWKNIFE, N.W.T.



Aug. 22, 1969

P.H.E.D., Edmonton 2

Arsenic in Yellowknife Bay

Dear Frank:

This letter is to confirm our telephone conversation this morning.

The new sampling program (sample once every two hrs from 0800 to 1800 hrs inclusive) will be conducted on Giant Yellowknife minks tap water as soon as possible. Two or possibly three sampling programs will be conducted, namely; when no abnormal activity is taking place regarding the possible increase of arsenic in the water, when a gross amount of activity is taking place, and a day at random. Please add the Town of Yellowknife tap and Town of Yellowknife raw water (water sampled before entering the reservoir) sample point to the program.

One of the triplicate samples should be given to Assay Laboratory in for analysis.

*J. W. Grainge*  
J. W. Grainge, P. Eng.  
Regional Engineer

JWS/eh

*D. C. R. E. Jait*



21-14-4(4)

Mr. H. P. Gillis  
Public Health Inspector  
Health Center  
YELLOWKNIFE, N.W.T.

P.H.E.D.  
Edmonton 2, Alberta

Aug. 21'69

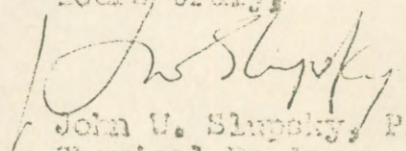
Dear Frank:

Would you arrange your schedule so you may, at the earliest possible date, take Giant tapwater samples every two hours (0000 to 1800 hrs inclusive). The samples should be taken and treated as follows:

1. Identify sample being taken - time, date, and location.
2. Rinse the 32 fluid oz sample bottle used to collect the sample with some of the water being sampled.
3. Take the sample - almost fill the bottle.
4. Make a triplicate sample of each 32 oz sample using the 8 fluid oz plastic bottles to contain the triplicate samples. Be sure to mix the original sample in the 32 oz bottle before making the split. Also, be sure to rinse each of the 8 oz bottles with the water sample before filling them approx 80% full.
5. Identify the triplicate samples.
6. One of each of the triplicate samples (total of 6) is to be given to Giant's Laboratory for analysis, and the rest of the samples (total of 12) are to be sent to the Public Health Eng. Laboratory in Edmonton.

The above method of sampling and treatment of the samples has been spelled out in order to be sure that all the sampling has been done the same way.

Yours truly,

  
John U. Slipsky, P. Eng.  
Chemical Engineer

cc: Area Director

JES/ojh



GIANT YELLOWKNIFE MINES LIMITED  
YELLOWKNIFE P.O.  
NORTHWEST TERRITORIES  
CANADA

TELEX 037-4-5514

August 1, 1969.

Mr. J. W. Grainge, Regional Engineer,  
Department of National Health & Welfare,  
Public Health Engineering Division,  
257 Federal Public Building,  
EDMONTON 2, Alberta.

Dear Jack:

Listed below are the daily tap water assays for the month  
of July, 1969.

		<u>ppm As</u>			<u>ppm As</u>
July	2	0.106	July	18	0.042
	3	0.071		21	0.083
	4	0.022		22	0.045
	8	0.154		23	0.081
	9	0.134		24	0.058
	10	0.336		28	0.052
	11	0.156		29	0.060
	14	0.054		30	0.058
	17	0.166		31	0.038

The average for the month was 0.099 ppm As. The high reading on the 10th was preceded by two days of southeast wind. It would appear that, because of the low water level in Great Slave Lake, Back Bay is unable to drain off through the channel between Latham Island and the mainland and as a result the residual is creeping up. Any comments on this?

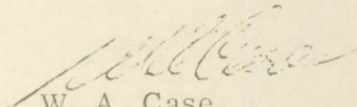
Yours very truly,

GIANT YELLOWKNIFE MINES LIMITED.

WAC\*ms

c.c. Mel Brown  
M.F. Gillis

P. H. E. D. EDMONTON	
AUG 5 1969	
J. W. G.	<input checked="" type="checkbox"/>
R. H. O.	<input type="checkbox"/>
J. W. G.	<input type="checkbox"/>
J. A. K.	<input type="checkbox"/>
J. W. G.	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>

  
W. A. Case,  
Mine Manager.



2114-7(1)

Public Health Engineering Division  
257 Federal Public Building  
Edmonton 2, Alberta

July 4, 1969

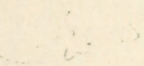
Mr. W.A. Case, Mine Mgr.  
Giant Yellowknife Mines Ltd.  
YELLOWKNIFE, N.W.T.

Dear Mr. Case:

We note the June 6th sample of Giant Yellowknife Mines tap water contained 0.206 mg/l arsenic. This is very much higher than the suggested permissible limit (Canadian Drinking Water Standards and Objectives - 1968) of 0.05 mg/l arsenic.

Would you please inform us of any reasons you may know of for this increase in the arsenic content of the water as well as forward arsenic results for all the water samples your laboratory obtained during the period June 4th to 13th inclusive.

Yours truly,

  
J.W. Slupsky, P. Eng.  
Chemical Engineer

JWS/es



*Dr. Butler*

Regional Director  
Northern Region  
Medical Services Dir.  
EDMONTON, Alberta

July 11, 1969

Public Health Eng. Div.  
Edmonton 2, Alberta

Arsenic In Giant Yellowknife  
Mines Water Supply

This letter is to confirm our telephone conversation on  
July 7, 1969.

I contacted Mr. W.A. Case regarding the reason for the high arsenic concentrations in the Giant water supply. He stated that Giant Yellowknife Mines have been doing some work on their dock which is in the immediate vicinity of their pump-house (water intake). This work disturbed the tailings on the lake bottom and probably resulted in some of the tailings being taken into the water supply which would cause the arsenic concentration to increase. Also, there have been moderately strong south winds which back up the water around the mouth of Baker Creek and reduced the dispersion of Baker Creek water into Back Bay. This could be another reason for the increase in the arsenic concentration of the water supply. Mr. Case stated that there are no major leaks in the tailings dam and no tailings flow toward the Yellowknife River. He also said that he is watching the results of their arsenic analyses on daily samples from the water supply and will haul Yellowknife River water when the arsenic concentration reaches or exceeds 0.3 mg/l.

*John W. Slupsky*

John W. Slupsky, P. Eng.  
Chemical Engineer

Jws/es



GIANT YELLOWKNIFE MINES LIMITED  
YELLOWKNIFE P. O.  
NORTHWEST TERRITORIES  
CANADA

July 7, 1969.

Public Health Engineering Division,  
257 Federal Public Building,  
EDMONTON 2, Alberta.

Attention: Mr. J. W. Slupsky,  
Chemical Engineer.

P. H. E. D. EDMONTON	
JUL 9 1969	
J. W. G.	
R. N. D.	
J. W. S.	
S. K. F.	
J. W. SH.	

Dear John:

With respect to your letter of July 4, 1969 please be advised that I have no record of a sample of our water taken by your Department on June 6, 1969. However on June 12th, the sample of our tap water analysed by your Chemist showed 0.206 ppm As. Our assay on a sample of tap water taken on June 12 ran 0.064 ppm As. However on June 13th our assay was 0.150 ppm As.

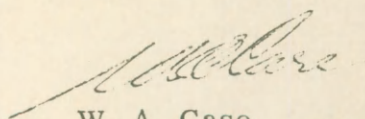
The probable reasons for these high readings are:

1. We had a dragline digging for new dock foundations about 100 feet west of the intake and likely some dirty water was ingested into the system.
2. On June 12th the wind was from the south and was moderately strong. As you know, southerly winds prevent the discharge from Baker Creek from dispersing freely into Back Bay.

Concerning our samples for June 4th to 13th, these were sent in to Mr. Grainge on July 4th.

Yours very truly,

GIANT YELLOWKNIFE MINES LIMITED.

  
W. A. Case,  
Mine Manager.

WAC\*ms



GIANT YELLOWKNIFE MINES LIMITED  
YELLOWKNIFE P. O.  
NORTHWEST TERRITORIES  
CANADA

July 4, 1969.

Mr. J. W. Grainge, P. Eng.,  
Regional Engineer, Northern Region,  
Department of National Health & Welfare,  
Public Health Engineering Division,  
257 Federal Public Building,  
EDMONTON 2, Alberta.

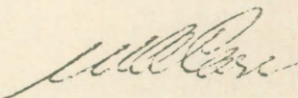
Dear Jack:

The Giant tap water averaged 0.084 ppm arsenic during  
the month of June, 1969. The assays by days are as follows:

June	2	0.174	June	17	0.027
	3	0.087		18	0.032
	4	0.020		19	0.192
	5	0.036		20	0.096
	6	0.039		23	0.020
	9	0.051		24	0.112
	10	0.049		25	0.186
	11	0.062		26	0.108
	12	0.064		27	0.076
	13	0.150		30	0.056
	16	0.121			

Yours very truly,

GIANT YELLOWKNIFE MINES LIMITED.



W. A. Case,  
Mine Manager.

WAC\*ms

c.c. Mr. M. L. Brown  
Mr. M. F. Gillis

P. H. E. D. EDMONTON	
JUL 7 1969	
J. W. D.	
R. G. D.	
S. W.	
E. R.	
J. W. SH.	



21-14-Y/4/

Mr. M.F. Gillis  
Public Health Inspector  
Health Center  
YELLOWKNIFE, N.W.T.

Public Health Eng. Div.  
Edmonton 2, Alberta

July 4, 1969

High Arsenic Concentration  
In Giant Tap Water

This letter is to confirm your suggestions during our telephone conversations of June 30th and July 3rd that daily water samples should be taken from the Giant supply during the period that the arsenic concentration exceeds 0.1 mg/l As. This procedure is in accordance with the recommendations of J.W. Grainge as described on P.9 of the report on "Water Pollution, Yellowknife Bay, N.W.T.," Dec. 23, 1963. Daily sampling should begin immediately.

*JWS*

John W. Slupsky, P. Eng.  
Chemical Engineer

JWS/es

*c.c. Dr. Britt*