



**2008 Annual Report  
to the  
Nunavut Water Board**

**Licensee: Department of National Defence,  
Government of Canada**

**Licence: NWB6FOH0409 - Type "B"**

**Location: FOX-M North Warning System Site,  
Hall Beach, Baffin Region, Nunavut**

**Report submitted by: Nasittuq Corporation,  
31 March 2009**



## **2008 Annual Report to the Nunavut Water Board**

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Hall Beach, Baffin Region, Nunavut

**Report submitted by:** Nasittuq Corporation,  
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### **Executive Summary**

This 2008 Annual Report to the Nunavut Water Board (NWB) is submitted as required by Licence Number NWB6FOH0409 – Type "B", Part B. General Conditions, para. 1.

FOX-M is an attended (manned) North Warning System radar site at Hall Beach, Nunavut. The site population increases from time to time, primarily in the summer, due to project activity at FOX-M and at other radar sites within FOX-M's zone.

The annual water usage was 498.2 cubic meters. This is an average of 1.46 cubic meters per day, well below the maximum of 10 cubic meters per day allowed by the licence.

The volume of sewage processed by the tertiary treatment system was 1,920 cubic meters. Some of the treated effluent is recycled as on site urinal/toilet flush water. The discharged treated effluent is potable water quality. The treated effluent was sent for laboratory analysis.

Hazardous waste was removed from the site for disposal outside of Nunavut. The waste went to Clean Harbors, Thurso, Quebec. The waste was 63 drums of assorted waste (oil, glycol, etc.), 3 crates of batteries, and 33 cylinders.

Nonhazardous domestic solid waste was disposed of through a contract with the Hall Beach community at the local landfill.

Three outdoor spills (oil, fuel) occurred and were cleaned up.

The Spill Contingency Plan was revised. The main changes were: spills are now immediately reported to the NWSCC, and the Nasittuq Emergency Contact List (used only by Nasittuq Corp. staff) was updated to reflect changes in personnel.



## **Introduction**

This annual report is submitted to the Nunavut Water Board (NWB) as required by Licence Number NWB6FOH0409 – Type “B”, Part B. General Conditions, para. 1.

FOX-M is an attended (manned) North Warning System radar site at Hall Beach, Nunavut. The site population increases from time to time, primarily in the summer, due to project activity at FOX-M and at other radar sites within FOX-M’s zone.

## **Water Use**

The annual water usage was 498.2 cubic meters which is an average of 1.46 cubic meters per day, well below the maximum of 10 cubic meters per day allowed by the licence.

Recording of the FOX-M flow meter readings began end of October 2008. Therefore, for January to October, the water usage in Table 1 below was calculated based on 150 liters per person per day multiplied by the actual daily site population.

**Table 1. Monthly and annual water usage in 2008 at FOX-M.**

<b>Month</b>	<b>Water usage in cubic meters (m<sup>3</sup>)</b>
January	16.7
February	21.6
March	11.7
April	49.1
May	32.0
June	40.5
July	114.0
August	74.9
September	49.2
October	23.4
November	31.8
December	33.3
<b>TOTAL for 2008</b>	<b>498.2</b>

### **Treated Sewage Discharge**

The sewage and grey water are both handled by an advanced tertiary wastewater treatment system, *Cycle-let®*. The functionality of the system is monitored on-line and maintained by CWC Wastewater Services Inc. on a quarterly basis. Some of the treated water is recycled as on site urinal/toilet flush water. The remainder is potable water quality and is discharged at the designated outfall.

**Table 2. Monthly and annual sewage discharge in 2008 at FOX-M.**

<b>Month</b>	<b>Volume of sewage treated then discharged or recycled in cubic meters (m<sup>3</sup>)</b>
January	214
February	115
March	132
April	160
May	152
June	172
July	249
August	224
September	159
October	117
November	113
December	113
<b>TOTAL for 2008</b>	<b>1,920</b>

## **Hazardous Waste and Waste Oil Disposal**

Hazardous waste and waste oil were sent to an approved hazardous waste disposal site outside of Nunavut as required by the licence. The waste was sent to Clean Harbors, 200-7305 blvd Marie-Victorin, Brassard, QC, J4W 1A6. The receiving site address is Clean Harbors, 400 Galipeau, Rang 5, Thurso, QC, J0X 3B0.

Table 3 below lists the items sent for disposal.

**Table 3. Summary of waste sent for disposal in 2008 from FOX-M.**

<b>Site</b>	<b>Description</b>	<b>Quantity</b>
FOX-M	Waste oil	33 drums
FOX-M	Waste oil contaminated soil	9 drums
FOX-M	Waste glycol	4 drums
FOX-M	Waste glycol rags	1 drum
FOX-M	Waste oily rags	5 drums
FOX-M	Waste carbon filters	6 drums
FOX-M	Waste oil filters	2 drums
FOX-M	Waste fuel	1 drum
FOX-M	Waste fuel filters	2 drums
FOX-M	Waste batteries, wet, non-spillable	2 crates total of 3565 kg
FOX-M	Waste batteries, wet, filled with acid	1 crate of 493 kg
FOX-M	Refrigerant gas, R12	3 cylinders
FOX-M	Refrigerant gas, R22	8 cylinders
FOX-M	Refrigerant gas, R502	2 cylinders
FOX-M	Refrigerant gas, R404A	4 cylinders
FOX-M	Oxygen	6 cylinders
FOX-M	Nitrogen	10 cylinders

## **Nonhazardous Solid Waste Disposal**

All nonhazardous domestic solid waste was disposed of through a contract with the Hall Beach community at the local landfill.

## **Monitoring Program**

See Annex A for the location of the treated sewage effluent outfall, FOH-2.  
 See Annex B for analysis of treated sewage effluent.

## **Spills (Unauthorized Discharges)**

Three outdoor spills occurred. They are listed in Table 4 below.

**Table 4. Outdoor spills in 2008 at FOX-M.**

<b>Date</b>	<b>Product</b>	<b>Quantity</b>	<b>Cause and follow-up action</b>	<b>Location at FOX-M</b>
13 Jan 2008	15W40 oil	Less than 200 liters	DEG failure resulted in oil going up exhaust stack, collecting on roof, and being carried with precipitation to the ground.  Contaminated gravel and ice/snow placed in drums.* DEG removed from service and fixed.	Powerplant, southwest corner overhang
23 Aug 2008	Jet A1 fuel	Unknown	Failed weld on pipe flange.  Replaced blind flange. Contaminated soil (area excavated was 28 feet by 14 feet and 1.5 to 3 feet deep) was placed in drums*; area was backfilled with clean fill.	Fuel line at beach
28 Dec 2008	Jet A1 fuel	About 0.6 liter	Leak in refueller hose during refueling of aircraft.  Refueller removed from service until it can be repaired. Fuel truck will be used instead.	Refueller by hangar

\* Drums are retrograded to a licensed waste disposal company outside of Nunavut.



### **Revisions to the Spill Contingency Plan**

The Spill Contingency Plan was revised as follows:

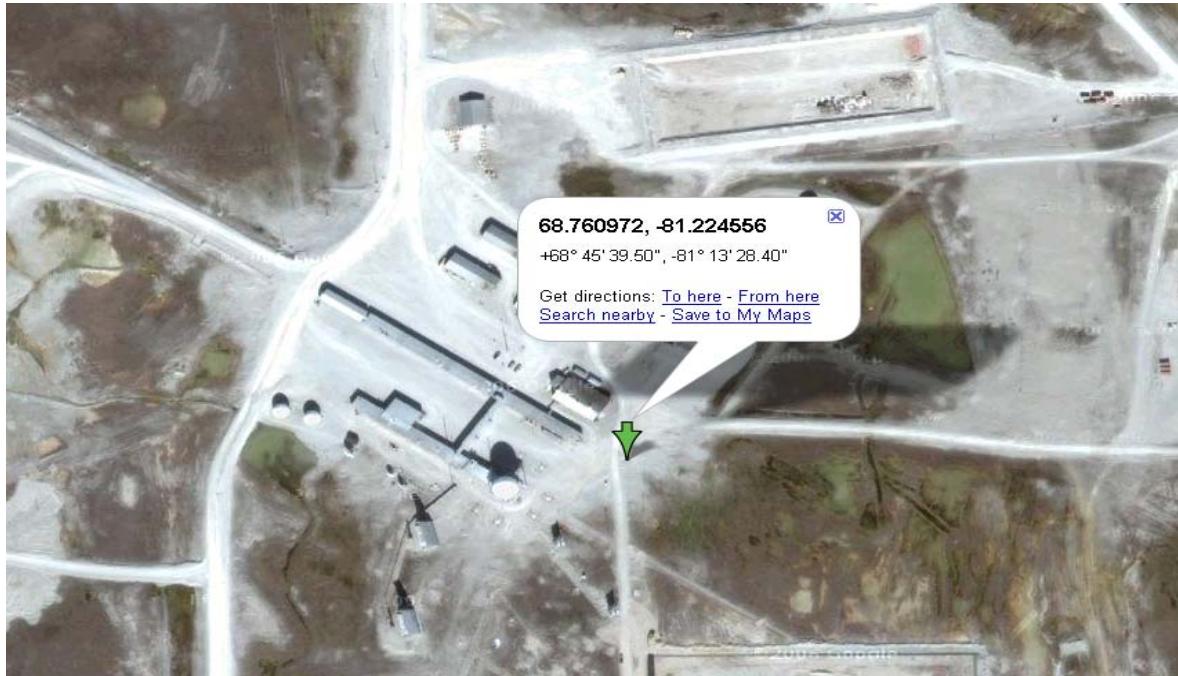
- spills are immediately reported to the NWSCC instead of the LSS Manager;
- Spill Response Flow Chart was updated to show the immediate report to NWSCC;
- all spills, indoors and outdoors, must be reported;
- all statements about burning (i.e. burning recovered fuel, fuel soaked sorbent, etc.) and burn bins were removed; and
- two names (I. Wawryk, S. Cheng) were removed from the Nasittuq Emergency Contact List. This List is used only by Nasittuq Corp. staff.

### **Progressive reclamation work undertaken**

None required.

## Annex A

### FOX-M Sewage Outfall Location with GPS Co-ordinates





## Annex B

### Analysis of Treated Sewage Effluent in 2008 for FOX-M



May 2008 – page 1 of 4

CWC Wastewater Services Inc.  
Suite 1 - 3971 Oakwood St.  
Victoria, BC  
V8N 3M9

FOX-M sewage results May2008 CWC613  
20May08 11:22a  
Treatment Plant  
effluent  
3

TEL: 386-8953  
FAX: 386-8954  
gary@cwcwastewater.com

Samples: Fox Main Wastewater Reclamation Facility

Site_Code	Date	Time	Fecal Coliforms *
Permeate Before	16May08	09:00A	6

\* membrane filtration

Results may be adversely affected if samples are submitted to the laboratory more than 24 to 30 hours after collection.

- see following page for chemistry results -

C. Langlois  
Microbiologist

W. Riggs  
Sr. Microbiologist

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FOX-M sewage results May2008 CWC613		20May08	11:22a	Discharge effluent	w78613 pg2
		Arrival temp.:	8.0C		
Samples: Fox Main Wastewater Reclamation Facility		Permeate Before	16May08 09:00A		
ELEMENTS	SAMPLE	UNITS		Max. Discharge Bylaw #2922 *	
1) Aluminum	Al	0.225	mg/L	no limit listed	
2) Antimony	Sb	<0.500	mg/L	no limit listed	
3) Arsenic	As	<0.500	ug/L	400 ug/L	
4) Barium	Ba	<0.009	mg/L	no limit listed	
5) Beryllium	Be	<0.003	mg/L	no limit listed	
6) Boron	B	0.588	mg/L	no limit listed	
7) Cadmium	Cd	0.761	mg/L	0.300 mg/L	
8) Calcium	Ca	61.0	mg/L	no limit listed	
9) Chromium	Cr	<0.010	mg/L	4.00 mg/L	
10) Cobalt	Co	<0.020	mg/L	5.00 mg/L	
11) Copper	Cu	0.043	mg/L	1.00 mg/L	
12) Gold	Au	<0.040	mg/L	no limit listed	
13) Iron	Fe	0.096	mg/L	50.0 mg/L	
14) Lanthanum	La	<0.020	mg/L	no limit listed	
15) Lead	Pb	<0.500	ug/L	1000 ug/L	
16) Magnesium	Mg	17.7	mg/L	no limit listed	
17) Manganese	Mn	<0.004	mg/L	5.00 mg/L	
18) Mercury	Hg	<0.100	ug/L	20 ug/L	
19) Molybdenum	Mo	<0.020	mg/L	5.00 mg/L	
20) Nickel	Ni	<0.050	mg/L	3.00 mg/L	
21) Phosphorus	P	3.96	mg/L	no limit listed	
22) Potassium	K	31.3	mg/L	no limit listed	
23) Scandium	Sc	<0.050	mg/L	no limit listed	
24) Selenium	Se	<0.500	ug/L	300 ug/L	
25) Silicon	Si	2.80	mg/L	no limit listed	
26) Silver	Ag	<0.010	mg/L	0.500 mg/L	
27) Sodium	Na	237	mg/L	no limit listed	
28) Strontium	Sr	0.147	mg/L	no limit listed	
29) Tin	Tn	<0.020	mg/L	no limits listed	
30) Titanium	Ti	<0.010	mg/L	no limit listed	
31) Tungsten	W	<0.050	mg/L	no limit listed	
32) Vanadium	V	<0.010	mg/L	no limit listed	

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33) Zinc 0.123 FOX-M sewage results May2008 CWC613  
 Hardness (mg/L CaCO<sub>3</sub>) 225 mg/L 3.00 mg/L  
 pH 8.28 mg/L 0.75 mg/L = soft  
 5.5 to 11.0

\* As per Capital Regional District Bylaw #2922, last update-  
 November, 2006 regulating effluent discharges.  
 Maximum concentrations may vary due to specific conditions & permit  
 requirements; the appropriate regulatory agency should be contacted for  
 clarification and advice.

R. Bilodeau  
 Analytical Chemist

M.B. LABS LTD  
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CWC Wastewater Services Inc.  
 Suite 1 - 3971 Oakwood St.  
 Victoria, BC  
 V8N 3M9

TEL: 386-8953  
 FAX: 386-8954  
[gary@cwcwastewater.com](mailto:gary@cwcwastewater.com)

Arrival temp.: 8.0C

20May08 11:22a  
 Discharge  
 effluent  
 3

Samples: Fox Main Wastewater Reclamation Facility

SAMPLE	DATE	TIME	NH3-N (ug/L)	BOD5 (mg/L)	E.C. (uS/cm)	NO3-N (mg/L)	NO2-N (ug/L)
Permeate Before	16May08	09:00A	204	6.03	1340	29.4	428
Permeate after UV	16May08	:	---	5.16	---	---	---
Biomass	16May08		---	---	---	---	---
Lab Blank			ND	ND	ND	ND	ND
So	0.254		0.300	0.300	0.160 ug/L	0.300	0.300
REF. VALUE	100		19.8	1410	1.00	100	100
STD ± 2SD	99.5 ± 7.58		19.6 ± 1.90	1390 ± 97.0	0.997 ± 0.086	99.2	99.2
						± 6.97	± 6.97

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## FOX-M sewage results May2008 CWC613

SAMPLE	DATE	TIME	O&G (mg/L)	Phenols (mg/L)	SO42- (mg/L)	TSS (mg/L)
Permeate Before UV	16May08	09:00A	21.4	ND	54.9	2.33
Permeate after UV	16May08	:	---	---	---	4.00
Biomass	16May08		---	---	---	23300
Lab Blank			ND	ND	ND	ND
So			0.100	0.067	0.075	0.400
REF. VALUE			50.0	0.560	10.0	20.0
STD ± 2SD			50.2 ± 1.22	0.550 ± 0.045	10.2 ± 1.05	19.7 ± 1.59

SD = standard deviation

STD = secondary standard calibrated to primary standard reference material

 So = standard deviation at zero analyte concentration; method detection limit  
 is generally considered to be 3x So value

ND = none detected n/a = not applicable

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 Analytical Chemist

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 end.



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<b>Sample</b>	<b>Date</b>	<b>Time</b>	<b>BOD5 (mg/L)</b>	<b>TSS (mg/L)</b>
Permeate before UV	02 Aug 2008	10:00 a.m.	6.85	2.67
Lab blank			ND	ND

ND = None Detected



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CWC Wastewater Services Inc.  
Suite 1 - 3971 Oakwood St.  
Victoria, BC  
V8N 3M9

20Nov08 9:14a  
Treatment Plant  
effluent  
3

TEL: 386-8953  
FAX: 386-8954  
gary@cwcwastewater.com

Sample: Fox Main Wastewater Reclamation Facility

Site_Code	Date	Time	Fecal Coliforms *
Permeate Outfall			600

\* membrane filtration

Results may be adversely affected if samples are submitted to the laboratory more than 24 to 30 hours after collection.

- see following page for chemistry results -

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Microbiologist

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Suite 1 - 3971 Oakwood St.  
Victoria, BC  
V8N 3M9

TEL: 386-8953  
FAX: 386-8954  
gary@cwcwastewater.com

20Nov08 9:14a  
Treatment Plant  
effluent  
3

w81219 pg2

Arrival temp.: 13.0C  
Sampler: Gary Jenzak

Sample: Fox Main Wastewater Reclamation Facility -1) Permeate outfall

ELEMENTS	SAMPLE	UNITS	Max. Discharge Bylaw #2922 *
1) Aluminium	A1	0.167 mg/L	no limit listed
2) Antimony	Sb	<0.500 mg/L	no limit listed
3) Arsenic	As	<0.500 ug/L	400 ug/L
4) Barium	Ba	<0.009 mg/L	no limit listed
5) Beryllium	Be	<0.003 mg/L	no limit listed
6) Boron	B	1.95 mg/L	no limit listed
7) Cadmium	Cd	<0.100 ug/L	300 ug/L
8) Calcium	Ca	51.2 mg/L	no limit listed
9) Chromium	Cr	<0.010 mg/L	4.00 mg/L
10) Cobalt	Co	<0.020 mg/L	5.00 mg/L
11) Copper	Cu	0.259 mg/L	1.00 mg/L
12) Gold	Au	<0.040 mg/L	no limit listed
13) Iron	Fe	0.113 mg/L	50.0 mg/L
14) Lanthanum	La	<0.020 mg/L	no limit listed
15) Lead	Pb	<0.500 ug/L	1000 ug/L
16) Magnesium	Mg	15.9 mg/L	no limit listed
17) Manganese	Mn	0.031 mg/L	5.00 mg/L
18) Mercury	Hg	<0.100 ug/L	20 ug/L
19) Molybdenum	Mo	<0.020 mg/L	5.00 mg/L
20) Nickel	Ni	<0.050 mg/L	3.00 mg/L
21) Phosphorus	P	14.1 mg/L	no limit listed
22) Potassium	K	80.8 mg/L	no limit listed
23) Scandium	Sc	<0.050 mg/L	no limit listed
24) Selenium	Se	<0.500 ug/L	300 ug/L
25) Silicon	Si	2.88 mg/L	no limit listed
26) Silver	Ag	<0.010 mg/L	0.500 mg/L

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27) Sodium	Na	329	mg/L	no limit	listed
28) Strontium	Sr	0.054	mg/L	no limit	listed
29) Tin	Tn	<0.020	mg/L	no limits	listed
30) Titanium	Ti	<0.010	mg/L	no limit	listed
31) Tungsten	W	<0.050	mg/L	no limit	listed
32) Vanadium	V	<0.010	mg/L	no limit	listed
33) Zinc	Zn	0.115	mg/L	3.00	mg/L
Hardness (mg/L CaCO <sub>3</sub> )		193	mg/L	150-300	mg/L = hard
pH		7.70	mg/L	5.5 to 11.0	

\* As per Capital Regional District Bylaw #2922, last update-November, 2006 regulating effluent discharges. Maximum concentrations may vary due to specific conditions & permit requirements; the appropriate regulatory agency should be contacted for clarification and advice.

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CwC Wastewater Services Inc.  
Suite 1 - 3971 Oakwood St.  
Victoria, BC  
V8N 3M9

20Nov08 9:14a  
Treatment Plant  
effluent  
3

TEL: 386-8953  
FAX: 386-8934  
gary@cwcwastewater.com

Arrival temp.: 13.0C  
Sampler: Gary Jerzak

Sample: Fox Main Wastewater Reclamation Facility

SAMPLE	DATE	TIME	NH3-N (ug/L)	BOD5 (mg/L)	$\bar{E}_C$ ( $\mu$ s/cm)	NO3-N (mg/L)	NO2-N (ug/L)
Permeate Outfall	360		6.05	919	52.8	972	---
Permeate aft UV	---		ND	---	---	---	---
Biomass	---		---	---	---	---	---



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SAMPLE	DATE	TIME	O&G (mg/L)	Phenols (mg/L)	SO42- (mg/L)	TSS (mg/L)
Permeate Outfall			5.40	ND	42.5	ND
Permeate aft UV			---	---	---	4.00
Biomass			---	---	---	9000
Lab Blank			ND	ND	ND	ND
So			0.160	0.067	0.075	0.400
REF. VALUE			50.0	0.560	10.0	20.0
STD ± 2SD			49.8 ± 4.96	0.549 ± 0.045	10.2 ± 1.03	19.7 ± 1.56
REF. VALUE					2000	
STD ± 2SD					1990 ± 121	

SD = standard deviation

STD = secondary standard calibrated to primary standard reference material

So = standard deviation at zero analyte concentration; method detection limit  
is generally considered to be 3x So value

ND = none detected n/a = not applicable

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end.

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