Clyde River Water License Application

prepared for:

The Hamlet of Clyde River
Nunavut, Canada

prepared by:

Ferguson Simek Clark
Architects & Engineers
4910 53rd Street
Yellowknife, NWT
X1A 2P4

FSC Project No: 2002-1000-050

Date: January 2003

EXECUTIVE SUMMARY

Enclosed is a water licence application for the Hamlet of Clyde River, Nunavut. The Hamlet is seeking a five-year licence, valid through 2008, to obtain water for municipal use from Water Source Lake. The projected population for the population of Clyde River in the year 2008 is 920 persons. The Hamlet requests an annual water use rate of 37 million litres.

The water source for the Hamlet is Water Source Lake. Located three kilometres west of the Hamlet, it has a storage capacity of 120,000,000 litres. The water is chlorinated by the addition of bleach directly to the tank (18 mL/1000 L of water) and trucked to the Hamlet. Clyde River's water source is of excellent chemical quality for potable use. All tested parameters meet the *Guidelines for Canadian Drinking Water Quality*.

The sewage system is treated in the 19,500 m^3 single-cell sewage lagoon, located next to the landfill site. Wastewater quality is within the municipal wastewater guidelines.

The open dump/landfill is located one and a half kilometres from the Hamlet, approximately 600 m. from the shore. The waste is burned daily and covered once per year with granular material. The current site has been in operation for approximately fourteen years. It has a capacity or 67,500 m^3, and is estimated to service the needs of the community until 2008. Fencing is not adequate, allowing debris to be blown out of the disposal site.

There is a hazardous waste and waste oil storage area, but there are problems with contamination both within this area and within the overall site.

Overall, this project will not substantially affect the quality, quantity, or flow of water through Inuit Owned Lands.

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Section 1
Water Licence Application Form

P.O. BOX 119
GJOA HAVEN, NU X0E 1J0
TEL: (867) 360-6338
FAX: (867) 360-6369
KATIMAYINGI

kNK5 wmoEp5 vtmpq
NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN

WATER LICENCE
APPLICATION FORM

Application for: (check one)

_√_ New __ Amendment ___Renewal ___Assignment

LICENCE NO:
(for NWB use only)

1. NAME AND MAILING ADDRESS OF APPLICANT/LICENSEE

Municipality of Clyde River
P.O. Box 89
Clyde River, NU
X0A 0E0

Phone: 867-924-6220
Fax: 867-924-6293
e-mail: _____

2. ADDRESS OF CORPORATE OFFICE IN CANADA (if applicable)

Phone:_____
Fax: _____
e-mail: _____

3. LOCATION OF UNDERTAKING (describe and attach a topographical map, indicating the main components of the Undertaking)

Latitude: 70° 27' N Longitude: 68° 33' W NTS Map No. 27 F/8 Scale 1:50,000

4. DESCRIPTION OF UNDERTAKING (attach plans and drawings)

Sewage decomposition and treatment may be maximized by extending decant period. Retention capacity of the sewage disposal facility is near limit. (INAC inspection report)

The solid waste site needs improvements to fencing, hazardous wastes segregation/storage and clean up of contamination at oil storage area. There is the possibility the site may be located.

5. TYPE OF UNDERTAKING (A supplementary questionnaire must be submitted with the application for undertakings listed in **"bold"**)

__ Industrial
__ **Mine Development**
__ **Advanced Exploration**
__ **Exploratory Drilling**
__ **Remote/Tourism Camps**
_√_ **Municipal**
__ Power
__ Other (describe): _____

6. WATER USE

_√_ To obtain water
__ To modify the bed or bank of a watercourse
__ To alter the flow of , or store, water
__ To cross a watercourse
__ To divert a watercourse
__ Flood control
__ Other (describe): _____

7. QUANTITY OF WATER INVOLVED (litres per second**,** litres per day or cubic metres per year, including both quantity to be used and quality to be returned to source)

85,624 L/day in 2002
100,378L/day in 2008

The community is requesting an annual volume of 37,000,000 litres.

8. WASTE (for each type of waste describe: composition, quantity, methods of treatment and disposal, etc.)

_√_ Sewage
_√_ Solid Waste
_√_ Hazardous
_√_ Bulky Items/Scrap Metal
_√_ Waste oil
_√_ Greywater
_√_ Sludges
___ Other (describe):_____

9. PERSONS OR PROPERTIES AFFECTED BY THIS UNDERTAKING (give name, mailing address and location; attach if necessary)

Land Use Permit

DIAND __ Yes _√_ No If no, date expected _____

Regional Inuit Association __ Yes _√_ No If no, date expected _____

Commissioner __ Yes _√_ No If no, date expected _____

10. PREDICTED ENVIRONMENTAL IMPACTS OF UNDERTAKING AND PROPOSED MITIGATION MEASURES (direct, indirect, cumulative impacts, etc.)

NIRB Screening __ Yes _√_ No If no, date expected _____

11. INUIT WATER RIGHTS

Will the project or activity substantially affect the quality, quantity, or flow of water flowing through Inuit Owned Lands and the rights of Inuit under Article 20 of the Nunavut Land Claims Agreement?

No

11. (Continued)

If yes, has the applicant entered into an agreement with the Designated Inuit organization to pay compensation for any loss or damage that may be caused by the alteration. If no compensation agreement has been made, how will compensation be determined?

12. CONTRACTORS AND SUB-CONTRACTORS (name, address and functions)

N/A

13. STUDIES UNDERTAKEN TO DATE (list and attach copies of studies, reports, research, etc.)

Clyde River Solid Waste Facility Siting Study – Final Report Dillon July 2002

14. THE FOLLOWING DOCUMENTS MUST BE INCLUDED WITH THE APPLICATION FOR THE REGULATORY PROCESS TO BEGIN

Supplementary Questionnaire (where applicable: see section 5) __√__ Yes __ __ No If no, date expected _____

Inuktitut/English Summary of Project __√__ Yes __ __ No If no, date expected _____

Application fee $30.00 (c/o of Receiver General for Canada) __√__ Yes __ __No If no, date expected _____

15. PROPOSED TIME SCHEDULE

__ __ Annual (or) __√__ Multi Year

Start Date: 2003 Completion Date 2008 .

Raymond Kasalaq	Senior Administrative Officer		
Name (Print)	**Title (Print)**	**Signature**	**Date**

For Nunavut Water Board use only

APPLICATION FEE **Amount: $_____** **Receipt No.:**

WATER USE DEPOSIT **Amount: $_____** **Receipt No.:**

Section 2
Information for the Water Licence Application

Information for the Water License Application for the Hamlet of Clyde River

(1) Name and Mailing Address of Applicant/Licensee

Municipality of Clyde River
P.O. Box 89
Clyde River, NU
X0A 0E0

Phone: 1-867-924-6220
Fax: 1-867-924-6293

(3) Location of Undertaking

Clyde River is located on Patricia Bay on the east coast of Baffin Island, 740-air km north of Iqaluit and 2,153-air km northeast of Yellowknife. Its geographical coordinates are 70°27' N latitude and 68°33' W longitude.

The Community is situated on a south-facing slope that gradually rises to 152 m above sea level. The town site occupies a shallow gravel ridge 3 - 9 m above high tide.

The bedrock is Precambrian crystalline shield, mantled by a thin layer of glacial till. In the past, the land was submerged to a depth of 50 - 60 m. As a result, lacustrine deposits of unconsolidated sands and gravels can be found in the area.

Permafrost found at shallow depths contributes to some drainage problems.

Mosses, lichens and small shrubs are common during the short growing season.

The average annual precipitation is 4.6 cm of rainfall and 168.9 cm of snowfall. Mean annual precipitation totals 20.6 cm. July mean high and low temperatures are 7.8° C and 0.4° C. January mean high and low temperatures are -22.5° C and -30.3° C. Winds are generally northwest and annually average 14.4 km/h.

Clyde River became organized in 1922 when the Hudson Bay Company constructed a trading post across the bay from the current settlement. Many Inuit families relocated to take advantage of local fur resources and the valuable trade goods provided by the Company. This relocation coincided with the closing of the once prosperous whaling stations at Pond Inlet and Cumberland Sound.

The settlement began to concentrate on the east side of Patricia Bay when sealskin prices fell in the late 1950's. At the same time, the school was built, drawing people to the settlement from surrounding hunting grounds. The key to expansion was the building of the Cape Christian Weather and Navigational Aid Station in 1953.

The Cape Christian station closed in 1975, effectively ending most private sector activity. Carving, silk-screening, and tourism are now great contributors to the economy. The Community still thrives

on its wealth of marine mammals and game including whales, seals, and polar bear. A wildlife preserve has been proposed for the protection of the endangered bowhead whale, a staple of traditional Inuit life.

Clyde River gained Hamlet status on July 1, 1978. A traditional name for the Community is Kangiqtugaapik, meaning 'beautiful cove'.

(4) Description of Undertaking

Water Supply and Treatment

Water is obtained from a Water Source Lake, 120,000,000 L, 3 km west of the community. The water is drawn from a pipe on the bottom of the lake at approximately 13 meters. The water is chlorinated by the addition of bleach directly to the tank (18 mL/1000 L of water).

Water Storage and Distribution

Water is drawn directly from the lake into the water truck for delivery. Water delivery is two to three times per week using two water trucks. One truck is a 1984 model (4546 L capacity) and the other is a 1993 model (9092 L capacity). All water deliveries are metered.

Water Quality:

According to INAC's 2002 Municipal Water Inspection Report there are no concerns regarding the Hamlets water intake and supply

Sewage Collection and Disposal:

Sewage is collected by two pump out trucks, a 1989 model and a 1993 model, each with storage capacities of 4546 L. The sewage is treated in the 19,500 m^3 single-cell sewage lagoon, located next to the landfill site 1.5 km outside of the community.

Solid Waste Collection and Disposal:

Garbage is collected twice per week with a stake truck and taken 1.5 km to the solid waste site (90,000 m^2).

The open dump/landfill slopes towards the ocean, approximately 600 m from the shore. There is a dilapidated fence located on the south face of the landfill, which is intended to contain windblown debris from the ocean

The waste is burned at the end of each day under supervision of the hamlet Foreman and covered once per year in the summer, with granular material.

The current site has been in operation for approximately 14 years. It was designed to be 300 m by 300 m by 0.75 m. (67,500 m^3), and estimated to service the needs of the community until 2008.

The sewage lagoon and the metal/bulky waste disposal site are also located at the site.

Hydrocarbon contaminated soil from the local Nunavut Power Corporation site was accepted at this facility in August 1999. The soil was placed within a fenced area on the landfill site. There have been complaints from hamlet officials that the contaminated soil area has reduced the landfill capacity and has interfered with operation of the landfill. - Clyde River Solid Waste Facility Siting Study- Dillon, July 2002

(5) Type of Undertaking

Municipal

(6) Water Use

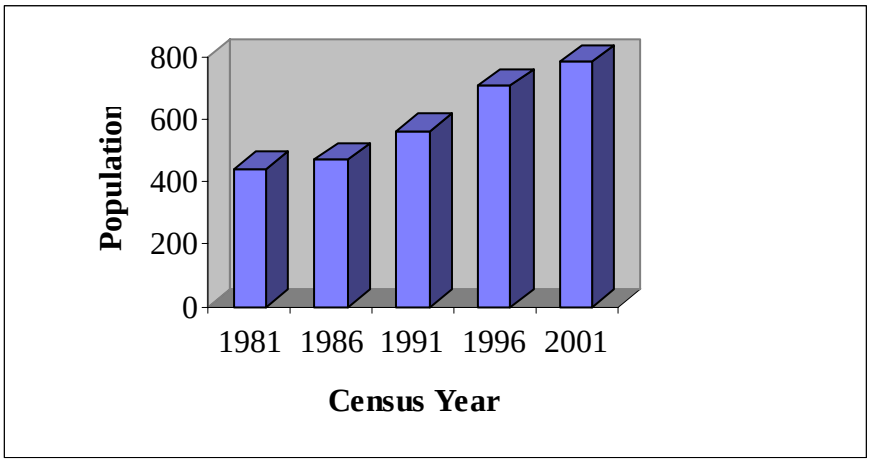
To obtain water

(7) Quantity of Water Involved:

Water Generation Projections:

The 2001 Census Report shows the increase in population of the Hamlet of Clyde River between the census years of 1986 to 2001. Figure 1 illustrates this population increase. A per capita growth rate of 2.30% was determined from data found in "Nunavut: Community Population Projections 2000-2020".

Figure 1 - Population Increase in the Hamlet of Clyde River



CG&T planning guidelines suggest that the increase in the projected per capita water use in a trucked service community should be modelled as follows:

(1) RWU x (1.0 + (0.0023 x Population)) **Population <2000**

The RWU or residential water use is estimated to be 90 litres per capita (Lpcd) for populations lower than 2000.

Ln is the natural logarithm.

The water use is projected as follows:

- The current amount of water use was estimated to be 32,086,340 L annually. This corresponds to a per capita water use of 107.0 Lpcd.
- In the year 2008, the per capita water use would be 109.1 Lpcd corresponding to an annual water use of 36,637,905 L.

Therefore, the community is requesting an annual volume of 37,000,000 litres.

Table 1 - Water Use Projection Hamlet of Clyde River

Planning Year	Calendar Year	Total Population	Projected Water Use	Daily Projected Volume	Annual Projected Volume
		#	Lpcd		
				Litres	Litres
	2001	785	106.2	83,406	30,443,138
0	2002	803	106.6	85,624	31,252,879
	2003	822	107.0	87,908	32,086,340
	2004	840	107.4	90,258	32,944,306
	2005	860	107.8	92,678	33,827,588
	2006	880	108.2	95,170	34,737,027
5	2007	900	108.6	97,736	35,673,497
	2008	920	109.1	100,378	36,637,905
	2009	942	109.5	103,099	37,631,191
	2010	963	109.9	105,902	38,654,330
	2011	985	110.4	108,790	39,708,335
10	2012	1008	110.9	111,765	40,794,258

(8) Waste Generated

Sewage:

The volume for the year 2002 of sewage generated by the community of Clyde River is 31,252,879 litres corresponding to the annual water use. In 2008, the annual volume of sewage generated by the Hamlet of Clyde River will be 36,637,905 litres.
The sewage is treated in the 19,500-m^3 single-cell sewage lagoon, located at the landfill 1.5 km outside of the community.

Sewage Runoff Quality:

With the exception of elevated ammonia levels, samples tested were found to be within the municipal wastewater guidelines. See 2002 INAC report. Issues with sewage quality were found in the 2001 INAC report indicating that Ammonia and Phenol levels considerably exceeded the *Guidelines for Canadian Drinking Water Quality*. It was recommended in the report that the decant of the lagoon could be extended over a longer period in order to maximize aerobic decomposition and secondary biological treatment. It was also noted that the retention capacity of the sewage disposal facility is near its limit. Although there are no imminent plans to replace the lagoon (Steven Aipellee, Assistant SAO, 2003)

Sludges:

Sludge is generated through the sewage lagoon process. If the sludge interferes with the sewage treatment process, they would have to be removed to a Nunavut Water Board approved facility. No plans have been made at this time. The two-cell lagoon design will facilitate sludge removal if/when required.

Greywater:

Greywater is collected with the liquid sewage and deposited in the sewage lagoon.

Solid Waste Treatment:

The solid waste management site is located on sloping ground, 600 m from the ocean shore, 1.5 km west of the hamlet. There is no noticeable flow of water from the site, although there is noticeable hydrocarbon contamination at the site.

Solid Waste Volume Projections:

The types and quantities of materials in the Clyde River waste stream available for reuse, recycling, recover and composting programs was estimated by reviewing current information and by literature.

A recent solid waste composition study has not been conducted in Clyde River. The literature provides an insight. The Heinke and Wong study (1989) used by MACA in their planning studies to determine waste volumes suggests a certain volume and mix of MSW. A study by Quay and Heinke (1992) in Inuvik, Tsiigehtchic, and Fort McPherson suggests similar waste stream mix shown in the table that follows.

Table 2 - Estimated Solid Waste Composition

Food Wastes	20.3 %
Cardboard	9.8 %
Newsprint	2.4 %
Other Paper Products	14.8 %
Cans	4.4 %
Other Metal Products	6.2 %
Plastic, Rubber, Leather	14.0 %
Glass, Ceramics	5.7 %
Textiles	3.8 %
Wood	9.9 %
Diapers	3.8 %
Dirt	4.9 %
	100.0 %

NAPP Protocol

The National Packaging Protocol is an initiative by CCME in 1992 to respond to municipalities and the public over the proliferation of disposable consumer packaging. While per capita consumption of new packaging has decreased overall in the south where the data was generated, the implications for the North and, specifically, for Clyde River is not as clear.
Southern reductions were primarily a result of recycling, an opportunity not available in Clyde River. It is assumed that packaging for shipping foodstuff and consumer products has increased proportionately with population.

However, southern data for post-consumer packaging has shown an increase for various "sectors" of between 100 to 200 percent over a 5-year period (1992-1996). These sectors include: accommodation, food & beverage, amusement, and recreational services; retail; aluminium packaging; plastic; and paper sacks and bags. This data may have a direct implication in Clyde River for increased quantities of waste as the data may transfer directly to current disposal practices.

The classes, "Other paper products", "Cans", and "Plastic, Rubber, Leather" may represent the increasing sectors as per the NAPP data. These first two classes currently account for approximately 19.2% of the estimated waste stream in Clyde River. If it can be assumed equal contribution from each waste in the third stream, then plastics account for an additional 5%.
It appears then, increasing packaging impacts on approximately 24% of the waste stream. Assuming worst case, then, the 200% increase over 5 years is about 40% per year and causes an

overall increase of approximately (40% of 24%) 10% per year. This value may over estimate the additional contribution and is unlikely to remain at this level during the entire planning horizon.

Regardless, it is prudent to assume some increase during the planning horizon not directly attributed to a population increase, assuming that recycling programs may not be cost-effective, or implemented in Clyde River.

Therefore, a 1% increase in the overall garbage generation rate has been incorporated in the volume estimations.

The following assumptions were made to prepare this table:

- Per capita volume described by Heinke and Wong (1990) has been increasing at a rate of 1 % per year
- The per capita population growth rate of the Hamlet of Clyde River is 2.3% per year.
- The waste density is 0.099 tonnes/m^3 (Bryant et al., 1996)

Table 3 - Solid Waste Projection estimates for the Community of Clyde River

Planning Year	Calendar Year	Total Population	Projected Daily Rate (m^3pcd)	Projected Daily Volume (m^3/day)	Projected Daily Weight (Tonnes)	Projected Annual Volume (m^3)	Projected Annual Weight (Tonnes)	Running Total (m^3)
	2001	785	0.014	11.0	1.1	4011	397	4011
0	2002	803	0.014	11.4	1.1	4145	410	8156
	2003	822	0.014	11.7	1.2	4282	424	12438
	2004	840	0.014	12.1	1.2	4425	438	16863
	2005	860	0.015	12.5	1.2	4572	453	21435
	2006	880	0.015	12.9	1.3	4724	468	26159
5	2007	900	0.015	13.4	1.3	4881	483	31040
	2008	920	0.015	13.8	1.4	5043	499	36083
	2009	942	0.015	14.3	1.4	5210	516	41293
	2010	963	0.015	14.7	1.5	5383	533	46676
	2011	985	0.015	15.2	1.5	5562	551	52238
10	2012	1008	0.016	15.7	1.6	5747	569	57985

The amount of solid waste produced in 2002 for a population of 803 is 410 tonnes. In 2008 it is projected to be 499 tonnes with a population of 920.

Solid Waste Water Runoff Quality:

The ground in the area of the solid waste site was dry, according to INAC's 2002 inspection report. Although there is noticeable leakage in the waste oil storage area.

Bulky Waste:

There is a separate area for Bulky/Metal wastes (2400 m^2) next to the sewage lagoon.

Honey Bag Pit:

The municipal honeybag disposal site, 200 m^2, is no longer in use.

Hazardous Waste:

There is a separate hazardous waste area within the bulky waste site in which batteries and waste oil are stored. But the bulky waste site and the household waste site still have numerous batteries and oil drums scattered throughout. These pose a significant hazard, and batteries should be separated and neutralized, and oil drums should be separated in an enclosed area. The Hamlet has plans to purchase a container for hazardous wastes, but finances have not been set aside as of yet.

Waste Oil:

The waste oil area, within the bulky waste site has continually been found to have hydrocarbon contamination. The INAC report of 2001 states "hydrocarbon contamination was once more noted at the waste oil storage site" and that the municipality had in place a plan to deal with this issue. Yet the 2002 report noted the same problem. This is a recurring issue, which should be dealt with by the municipality.

(11) Inuit Water Rights

Will the project or activity substantially affect the quality, quantity, or flow of water flowing through Inuit Owned Lands and the rights of Inuit under Article 20 of the Nunavut Land Claims Agreement? No

(12) Contractors and Sub-contractors:

None

(13) Studies Undertaken to Date:

Clyde River Solid Waste Facility Siting Study, Dillon Consulting 2002

(14) The following documents must be included with the application for the regulatory process to begin

Supplementary Questionnaire (where applicable: see section 5)	Yes
Inuktitut/English Summary of Project	Yes
Application fee of $30.00 (c/o Receiver General for Canada)	Yes

Section 3
Water Licence Application
Supplementary Questionnaire
For Municipalities

P.O. BOX 119
GJOA HAVEN, NT X0E 1J0
TEL: (867) 360-6338
FAX: (867) 360-6369

kNK5 wmoEp5 vtmpq
NUNAVUT WATER BOARD
NUNAVUT
MALIRIYIN KATIMAYING

Water Licence Application
Supplementary Questionnaire
for Municipalities

I. GENERAL

1. Date: January 2003

2. Applicant:

Municipality and Region: The Hamlet of Clyde River, Nunavut

Contacts:

Name of Contact: Raymond Kasalaq
Position: Senior Administrative Officer
Telephone: 867-924-6220
Fax: 867-924-6293

4. Community Status:

__ Village
__ Town
__ City
√ Hamlet
__ Settlement Corporation

5. Indicate the status of the municipality's licence on the date of the application.

√ New Application
__ Renewal Water Licence #

II. ATTACHMENTS

1. Attach current or up-to-date detailed map(s) showing the locations of the:

a. Raw water intake
b. Water storage and treatment facilities
c. Fuel and chemical storage
d. Sewage treatment facilities (lagoon, honey bag pit, wetland)
e. Wastewater treatment area and discharge outlets
f. Solid waste disposal areas
g. Hazardous waste disposal area
h. Transportation access routes
i. Existing water bodies/courses and any changes to these water bodies/courses that have or may occur as a result of water use or waste disposal facilities, locations of environmental monitoring sites
j. Outline drainage basin
k. Traditional use areas outlined on site map and areas around the community used for recreation, camping, fishing, etc.

l. Abandoned and/or restored water treatment, sewage, and solid waste disposal facilities.

Are maps attached?

√ Yes ___ No

If no, please indicate when they will be available.

Indicate which organization has provided the various maps or diagrams.

III. WATER SUPPLY

Water Source

1. Type of source:

   √ Lake
   ___ River
   ___ Well
   ___ Other

2. Name of water source and alternative, if any.

   Primary Source: Water Source Lake 3 km west of the community.
   Secondary Source: Not Applicable

3. Usual break-up & freeze-up period:

   Break-up:
   Freeze-up:

Water Intake

1. Please provide short descriptions for the following:

   a. Freshwater intake facility

   Water is obtained from a small lake approximately 3 km west of the community. Water is drawn directly into the water truck.

   b. Operating capacity of pumps used:

   c. Intake screen size

   Screen has 0.15 mm openings

Water Storage

1. Type of water storage facility. (Check where applicable)

___ Reservoir/Pond
___ Storage tank
√ None

Other

Description:

2. If "reservoir" checked:

Is the reservoir lined?

What type of liner?

When was it installed?

Water Treatment

1. Indicate the quality of the water.

Summer:	√ good	___ fair	___ poor
Fall:	√ good	___ fair	___ poor
Winter:	√ good	___ fair	___ poor
Spring:	√ good	___ fair	___ poor

2. Describe.

Water meets the *Guidelines for Canadian Drinking Water Quality*

3. Type of water treatment.

___ Filtration and chlorination
√ Chlorination only
___ None
___ Other

Description:

Water is chlorinated by addition of bleach directly to the tank (18 mL/1000 L water).

Water Use And Distribution

1. Volume of water use:

Distribution	Estimated number of people on the system **A**	Estimated average water consumption (Litres/capita/day) **B**	Total water consumption (Litres/day) **A x B**
PIPED			
TRUCKED	803	106.6	85,624
TOTAL			85,624

General Condition of the water supply facilities

1. General condition of the:

   Water supply facility

   √ Satisfactory __ Unsatisfactory

   If unsatisfactory, explain.

b. Storage facility

   √ Satisfactory __ Unsatisfactory

   If unsatisfactory, explain.

c. Distribution system

   √ Satisfactory ___ Unsatisfactory

   If unsatisfactory, explain.

Modifications

1. Are there any changes *planned* for the water supply system?

   √ No ___Yes

   If yes, please attach a copy of the plan, or describe changes. Provide information on the implementation schedule.

2. Does the community believe changes needed to the water supply, storage or treatment facilities? Describe.

No

Identification

1. Are there signs identifying drinking water sources presently used by the municipality?

___Yes _√_ No

IV. SEWAGE DISPOSAL

1. What type(s) of sewage treatment does the community have?

_√_ Lagoon
___ Mechanical system
___ Wetland
___ Honey bag
___ Combination/Other: describe

Sewage is collected by two pumpout trucks, a 1989 model and a 1993 model, each with storage capacities of 4546 L. The sewage is treated in the 6000 m² single-cell sewage lagoon.

Lagoon *(if applicable)*

1. Have there been any operating problems with the lagoon?

___ Yes _√_ No

If yes, describe

Mechanical System *(if applicable)*

1. Describe (type, specifications, operation and maintenance program for the mechanical wastewater treatment system).

Not Applicable

2. Are sludges produced?

___ Yes ___ No

If yes, describe how the sludges are disposed of:

***Wetland** (if applicable)*

1. Describe the Wetland wastewater treatment system.

Honey Bag Pit

1. Does the municipality use a honey bag pit?

___ Yes _√_ No

If yes, describe the location, drainage and operation/maintenance of the site:

Commercial, Industrial and/or Hazardous Wastes

1. Are there any sources of commercial or industrial *liquid* waste being discharged or deposited to the wastewater treatment system that may affect the quality of the effluent or leachate produced? *(The municipality should be aware that any commercial or industrial discharge has to be approved by the municipality)*

___ Yes _√_No

If yes, indicate sources, types and quantities.

Sewage Discharge

1. Are fish, shellfish and other wildlife harvested in or near the discharge area?

___Yes √__ No

General Condition of the sewage treatment facilities

1. General conditions

a. Sewage collection system

_√_ Satisfactory ___ Unsatisfactory

If unsatisfactory, explain.

b. Discharge control system

_√_ Satisfactory __ Unsatisfactory

If unsatisfactory, explain

c. Dams, diversion dykes, berms

_√_ Satisfactory __ Unsatisfactory

If unsatisfactory, explain

Modifications

1. Are there any changes *planned* in the sewage treatment facilities?

_√_ No ___ Yes

If yes, please attach a copy of the plan, or describe changes. Provide information on the implementation schedule.

2. Does the municipality or residents believe changes are needed to the sewage treatment facilities? Describe:

Abandonment and Restoration

1. List and describe abandoned or restored sewage treatment facilities.
Refer to original attachment maps.

Identification

Are there signs identifying past and present sewage disposal sites?

___Yes _√_ No

V. SOLID WASTE DISPOSAL

1. Briefly describe how solid wastes are collected and delivered to the disposal area.

Garbage is collected twice per week with a stake truck and taken 1.5 km to the solid waste site (90,000 m²).

2. Is the solid waste site fenced?

_√_ Yes ___ No

3. Is the fence adequate?

___ Yes _√_ No

If no, describe:

Does not fully contain windblown debris

Waste Reduction

1. Does the municipality burn garbage?

_√_ Yes __No

If yes, describe how and when this is done.

*T*he wastes are burned daily, and covered each summer with granular material.

2. Has the municipality considered measures for waste reduction such as recycling or reuse?

___ Yes _√_ No

If yes, describe

Animal Carcasses Pit

1. Does the municipality have an area for the disposal of animal carcasses?

___Yes _√_ No

If yes, describe the location, drainage and operation/maintenance of the site

Waste Oil Pit

1. Describe the waste oil storage area.

The waste oil area, within the bulky waste site has continually been found to have hydrocarbon contamination. The INAC report of 2001 states "hydrocarbon contamination was once more noted at the waste oil storage site" and that the municipality had in place a plan to deal with this issue. Yet the 2002 report noted the same problem. This is a recurring issue, which should be dealt with by the municipality.

Bulky Scrap Metal Waste Disposal Area

1. Does the municipality have a scrap metal or bulky waste disposal area?

   _√_ Yes ___ No

Commercial, Industrial and/or Hazardous Wastes Disposal Area

1. Are there any commercial or industrial waste being discharged or deposited in the solid waste disposal area? *(The municipality should be aware that any discharge of commercial or industrial waste has to be approved by the municipality)*

   ___ Yes _√_ No

   If yes, please indicate sources, types and quantity.

2. Will the municipality use a hazardous waste storage area?

   _√_ Yes ___ No

   If yes, describe*: Improved segregation of hazardous wastes is required*

a. Location

b. Structure

c. Operation and maintenance

General Condition of the Solid Waste Disposal Area

1. Comment on the general conditions of the:

a. Solid waste disposal area

   _√_ Satisfactory __ Unsatisfactory

   If unsatisfactory, explain.

Modifications

1. Are there any changes planned for the solid waste disposal area?

   ___ No _√_ Yes

   If yes, attach a copy of the plan, or describe changes. Provide information on the implementation schedule.

Clyde River Solid Waste Facility Siting Study, Dillon 2002

2. Are changes needed to the solid waste disposal area? Describe.

Abandonment and Restoration

1. List and describe abandoned or restored solid waste facilities.
   Indicate their location on a map.

Identification

1. Are there signs identifying past and present solid waste disposal sites?

   ___ Yes _√_ No

VI. INSPECTION AND MONITORING

1. When were municipal facilities inspected by:

   _√_ Indian and Northern Affairs Inspector Date: August 28, 2002
   __ Community Government and Transportation Date:_____
   __ Other: Date:_____

2. Is there a system in place for reporting spills?

   √ Yes ___ No

   If yes, describe.

   The community uses the RWED spill line.

3. Is there a contingency plan for clean up of spills?

   __ Yes √ No

   If yes, describe

4. Have any spills occurred in the past five years?

   √ Yes ___ No

   If yes, describe and show on a map the locations of the spills. What action has

been taken to clean the affected areas?

See attached spill report

Monitoring Program

1. Is water sampling and analysis done?

√ Yes ___No

If Yes, answer questions a through e

a. Briefly describe how samples are taken and sent to the laboratory.

Done by INAC, reports attached

b. Briefly describe any monitoring done for wastewater effluent and leachate.

Done by INAC, reports attached

c. Who is responsible for water sampling?

Name:
Position:
Telephone:
Fax:
Level of training:

d. Recognized laboratory performing analysis of samples.

Name:	Taiga Environmental Laboratory
Address:	4601 52nd Ave. PO Box 1500
	Yellowknife, NT, Canada, X1A 2R3
Telephone #:	(867) 669-2788
Fax #:	(867) 669-2718

e. Are any changes planned in the water quality monitoring program?

___ Yes __No

If Yes, describe.

VII. PUBLIC CONCERNS

1. What concerns does the municipality or residents have regarding the municipal water supply or waste disposal facilities? List the concerns and describe what steps have been taken to address those concerns.

VIII. PUBLIC HEALTH

Help may be obtained from the Regional Environmental Health Officer if you have difficulty with this section.

1. Date:
2. Municipality:
3. Contact: Phillip Reeve
   Telephone: (867) 975-4815
   Fax: (867) 975-4830

4. Have there been any problems or health/environmental concerns with drinking water?

   ___ Yes _√_ No

   If yes, describe

5. Have there been any problems or health/environmental concerns with sewage disposal/treatment?

   ___ Yes _√_ No

   If yes, describe

6. Have there been any problems or health/environmental concerns with solid waste disposal?

   _√_ Yes ___ No

   If yes, describe

   There is hydrocarbon contamination at the waste oil storage site, batteries and other hazardous wastes are not being properly stored, and fencing is not adequate allowing debris to be blown out of the disposal site.

Monitoring Program

1. Does the Regional Health Board perform water quality sampling?

___No ___ Yes

If Yes, answer questions (a) to (e)

a. Briefly describe the sampling methodology.

b. Briefly describe any monitoring of wastewater effluent and leachate.

c. Who is responsible for sampling?

Name:
Position:
Telephone #:
Fax #:
Level of training:

d. Recognized laboratory performing analysis of samples.

Name:
Address:

Telephone #:
Fax #:

e. Are any changes planned in the water quality monitoring program?

___ Yes __ No

If yes, describe

IX. TECHNICAL INFORMATION

Assistance may be obtained from the Regional Community Government (CG&T) office if you have difficulty with this section.

1. Date:
2. Municipality: The Hamlet of Clyde River, Nunavut
3. Contact:

Telephone # 867-924-6220
Fax # 867-924-6293

4. Population (according Hamlet Government): 803
5. Estimated growth rate over next 5 years: 2.3%
6. Has any baseline data collection and evaluation been undertaken with respect to the physical, biological, and chemical characteristics of the main water bodies in the area?

__Yes _√_No

If yes, provide a summary of program details or site title, authors, cities, and dates:

If no, are such studies being planned?

__Yes _√_No (If yes, when and by whom):

7. Have Elders been consulted in the collection of baseline data on main water bodies in the area?

__Yes _√_No

If yes, specify

8. Has any baseline data collection and evaluation been undertaken with respect to the various biophysical components of the environment potentially affected by the project?

__Yes _√_No

If yes, provide details below.

Prepared by:
Title:
Completion Date:

If no, are such studies being planned?

__Yes _√_No

If yes, specify:

Attachments

1. Attach detailed plan or drawing(s) of the present *solid waste disposal area*. Include the following information:

   a. Details of pond size and elevation:
   b. Details of all retaining structures:
   c. Details of the drainage basin, and existing and proposed drainage modifications:
   d. Details of all decant, siphon mechanisms etc., treatment facilities:
   e. Details regarding direction and path of wastewater flow from the area:
   f. Distance from watercourses and fish bearing waters:
   g. Location and construction of liners:
   h. Leachate and groundwater collection systems; and control structures:

2. Attach detailed plan or drawing(s) of the present *sewage treatment system*. The drawing(s) should include the following:

   a. Details of all retaining structures:
   b. Details of the drainage basin, and existing and proposed drainage modifications:
   c. Details regarding direction and path of wastewater flow from the area:
   d. Indications of the distance from watercourses and fish bearing waters:
   e. All sources of seepage presently encountered near these areas, including volumes(m^3/day) and directions
   f. The volume of seepage flow (m^3 / day):
   g. The direction of each flow:

3. Are drawings for the solid waste disposal area and sewage treatment system attached?

   __ Yes √ No

   If yes, who has provided them?

   If no, indicate when they will be available.

Hydrology

1. Effects on surface water flow:

   Are any stream channels altered?

   __ Yes _√_ No

   Is the natural storage or water level of any lake or pond changed?

   __ Yes _√_ No

Are there changes in water flow downstream of the project?

__ Yes _√_No

Is a storage reservoir created in a natural channel?

__ Yes _√_ No

If yes to any of the above, briefly describe the expected change in flow or storage:

2. Drainage Area:

What is the drainage area:

What is the average elevation of the drainage basin?

0-90 M (drains to ocean)

Is the drainage basin outlined on an attached map?

__Yes __No

Describe the drainage basin characteristics, (vegetation, general soil type, lakes, swamps and permafrost areas, etc.)

The Community is situated on a south-facing slope, which gradually rises to 152 m above sea level. The town site occupies a shallow gravel ridge 3 - 9 m above high tide.

The bedrock is Precambrian crystalline shield, mantled by a thin layer of glacial till. In the past, the land was submerged to a depth of 50 - 60 m. As a result, lacustrine deposits of unconsolidated sands and gravels can be found in the area.

Permafrost found at shallow depths contributes to some drainage problems.

Mosses, lichens and small shrubs are common during the short growing season.

3. Channel characteristics:

Is the course of any channel changed?

___ Yes _√_No

If yes, describe measures to maintain streambed and bank stability.

4. Will the cross-section of any watercourse be changed?

___ Yes _√_ No

If yes, describe the change and its effect on the flow capacity of the channel.

Water Supply

1. What is the rate of withdrawal from the source?

85.6 m^3/day

2. Is water drawn from the source
___ intermittently
√ ___continuously

3. If it is drawn intermittently, during what month(s) is it drawn?

4. For what period is it drawn (days/weeks/months)?

5. What is the rate of flow of source (if river) or size (if lake)?

Water Source Lake capacity is 120,000,000 L.

6. At the intended rate of water usage, describe the effects on the river or lake from which water will be drawn.

Water Storage

1. Is a dam or dyke being used to store or alter the flow of water?

___Yes _√_No

2. What are the dimensions of the dam or dyke?

3. Does the proposed dam create a reservoir in a natural watercourse?

If yes, what is the storage capacity and surface area of the reservoir?

4. Will the dam or dyke affect fish migration or movement?

If yes, describe all measures for compensation of fish habitat lost due to the dam or dyke, and mitigation for fish migration or movement.

Water Treatment

1. Indicate the capacity of the treatment facility:

   Bleach is added directly to the truck tanks. One holds 4546 L and the other 9092 L

2. What is the capacity of the water storage facility: Not Applicable

3. Describe the method of water treatment (i.e., backwash, flocculation, sedimentation, chemicals used), and provide the results of the most recent bacteriological and chemical analysis. Attach a diagram, if possible.

   Water is chlorinated by the addition of bleach directly to the tank (18 mL/1000 L of water).

4. Are there any changes planned in the water treatment facilities?

   √ No ___Yes

   If yes, attach a copy of the plan or indicate changes and include an implementation schedule. Include excerpt from MACA Capital Plan if available.

Sewage Disposal

1. Indicate the level of sewage treatment:
   _√_ primary
   ___ secondary
   ___ tertiary

   Pre-treatment (if applicable):

   ___ screening
   ___ maceration

   Lagoons (if applicable):

   ___ anaerobic
   _√_ aerobic
   ___ facultative

2. Indicate the capacity of the sewage treatment facility:

   19 500m3

3. Based on current population projections, the facility will meet the needs of the community until the year:

4. Average depth of the wastewater lagoon

   2.85m

5. What is the design freeboard:

6. Indicate the retention time of the sewage while in the treatment facility
   days

7. Indicate the estimated rate of discharge of wastewater:

8. Indicate the location of the discharge point:

9. Is the discharge:

   _√_ seasonal
   ___ continuous

   If the discharge is seasonal, during what month(s) is it done?

   August

   What is the duration of the discharge (days/weeks/months)?

   1 month

10. Are there any changes planned in the sewage disposal facilities?

    _√_ No ___Yes

    If yes, attach a copy of the plan or indicate changes and include an implementation schedule. Include excerpt from MACA Capital Plan if available.

Solid Waste Disposal

1. Indicate the capacity of the disposal area: 67,500 m^3

2. The average depth of the solid waste disposal site 0.75 m

3. The current facility will meet community needs until the year: 2008

4. Do any natural watercourse enter the solid waste disposal area? What methods are

used to decrease the amount of runoff water entering these areas?

No

5. Indicate the volume of water that may enter these areas from any source(s) and attach all pertinent details of the diversions.

Source:
Volume:

6. Please describe any diversions of watercourses:

7. Are there any changes planned in the solid waste disposal facilities?

__ No _√_ Yes

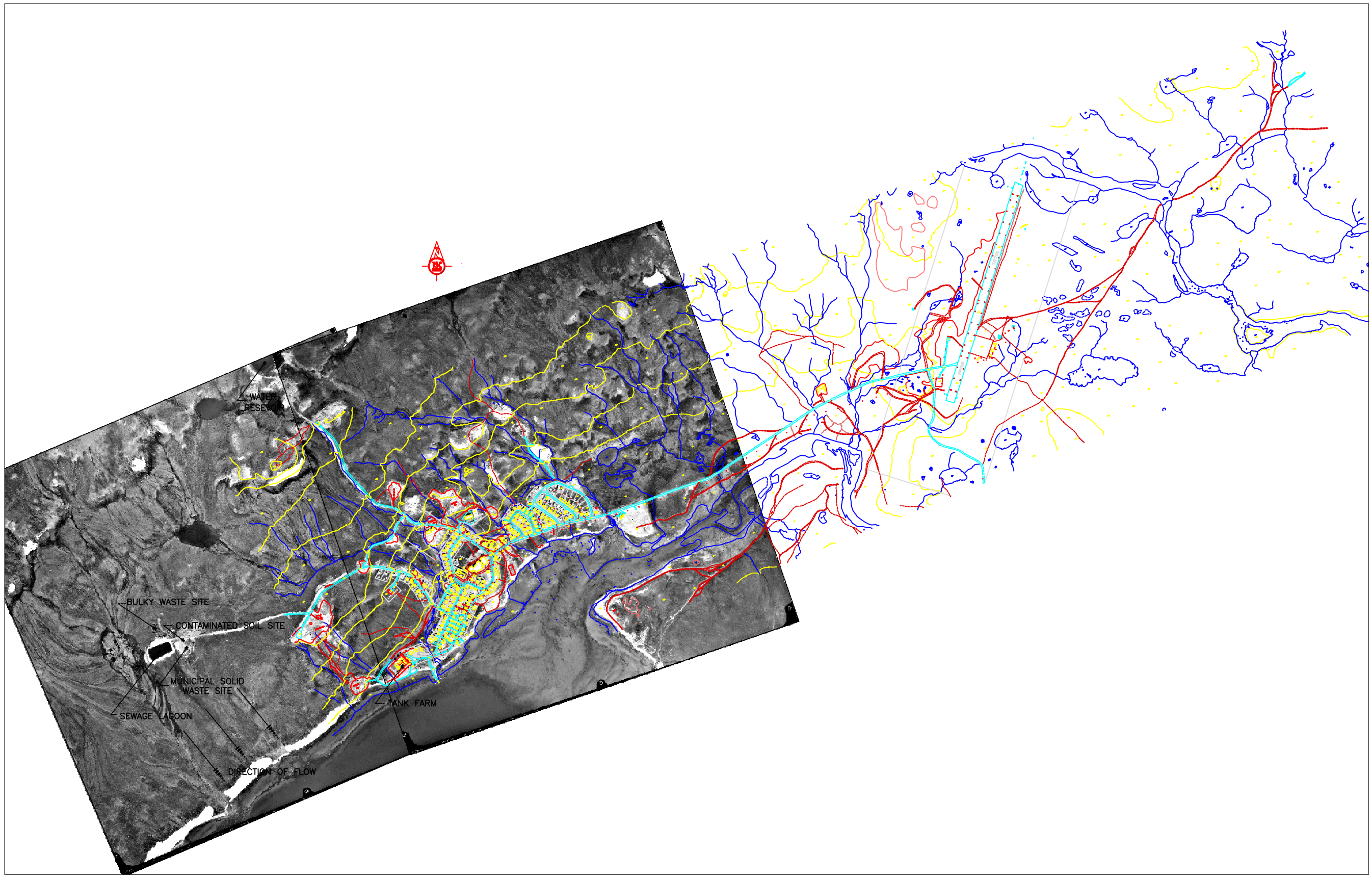
If yes, attach a copy of the plan or indicate changes and include an implementation schedule. Include excerpt from MACA Capital Plan if available.

Clyde River Solid Waste Facility Siting Study – Final Report Dillon 2002

Other

1. Describe any additional details on the existing municipal facilities which should be considered by the Nunavut Water Board during its review.

Appendix 1
Maps and Drawings



FSC GROUP

FERGUSON SIMEK CLARK

ENGINEERS AND ARCHITECTS

4918-50th Street, P.O. Box 1717
Yellowknife, NWT, Canada
X1A 2P4

NO	REVISION	DATE	BY	APP'D

JOB TITLE

CLYDE RIVER
WATER LICENCE

CLYDE RIVER, NU

DRAWING TITLE

CLYDE RIVER
HAMLET FACILITIES

DESIGNED BY: KH	SCALE: NTS
DRAWN BY: KH	DATE: DEC 19, 2002
CHECKED BY: RJK	CLIENT PROJECT NO.
F.S.C. FILE NO.	F.S.C. JOB NO.: 2002-1000-050
SHEET: 1 OF 1	DRAWING NO: 1

Appendix 2
Hazardous Materials Spill Reports

Hazardous Materials Spill Database

Northwest Territories

Environmental Protection Service of RWED

600, 5102-50th Avenue; Yellowknife, NT X1A 3S8

Phone: (867) 873-7654 Fax: (867) 873-0221

Resources, Wildlife and Economic Development

Wednesday, January 08, 2003

5 Year Historial - Clyde River Spills Report

Spill No	Spill Date	Region	Location	Description	Commodity	Quantity (L or kg)	Party	Source	Agency
1998113		BAF	Clyde River	Landfill	Transformer Oil/Used M	0	NWTPC & Hamlet of Clyde Rive	OTH	GNWT
1998152	15-Sep-98	BAF	Clyde River	Unit #242	Diesel P-50	700	Children	ST<	GNWT
2000306	25-Sep-00	BAF	Clyde River	Shore of Patricia Bay	Used Oil	23	Hamlet of Clyde River	DRUM	GN
2000307	21-Nov-00	BAF	Clyde River	Clyde River	Diesel Fuel	326	Apilak Development Corporation	ST<	GN
2001136	27-Apr-01	BAF	Clyde River	Lot 20 Unit 248	Diesel P-50	1000	Clyde River Housing Association	ST<	GN
2001198	20-Jun-01	BAF	Clyde River	Anglican Church Moving Toward Patricia Bay	Heating Oil	205	le River Anglican Church Associ	ST<	GN
2001217	29-Jun-01	BAF	Clyde River	House 37-201 70:29N 68:31W	Diesel P-50	550	Timusic Illauq	ST<	GN
2002026	20-Dec-01	BAF	Clyde River	House 221 70:29N 68:31W	Diesel Fuel	68	Clyde River Housing Association	PL	GN
2002277	18-Apr-02	BAF	Clyde River	Clyde River Tank Farm	Diesel Fuel	205	Aarruja Development Corporation	ST<	GN
2002482	24-Aug-02	BAF	Clyde River	Clyde River Tank Farm	Arctic Diesel	25	Government of Nunavut	PL	-

Total Spills on this Report: 10

This report contains information regarding spills that were reported to the NWT 24-Hour Spill Line. The absence of information on any particular location in no way guarantees that contamination has not occurred at that location.

LEGEND

Region:

BAF - Baffin
DEH - Deh Cho
INU - Inuvik
KEE - Keewatin
KIT - Kitikmeot
NSL - North Slave
SAH - Sahtu
SSL - South Slave

Source:

AIR - Aircraft
DRUM - Drum or Barrel
MV - Marine Vessel
NS - Natural Seepage
OTH - Other Transportation
PL - Pipe or Line
RT - Rail Train
SL - Sewage Lagoon
ST< - Storage Tank <4000 litres
ST> - Storage Tank >4000 litres
TP - Tailings Pond
TRU - Truck
UK - Unknown
WELL - Wet Wells Flaring Boom

Agency:

CCG - Canadian Coast Guard
EPS - Environment Canada
GN - Government of Nunavut
GNWT - Government of the Northwest Territories
ILA - Inuvialuit Lands Administration
INAC- Indian and Northern Affairs Canada
NEB - National Energy Board

JAN-08-2003 WED 11:12 AM RWED YELLOWKNIFE FAX NO. 8678730221 P. 04

Appendix 3
INAC Inspection Reports

Indian and Northern Affairs Canada
Affaires indiennes et du Nord Canada

NUNAVUT WATER BOARD
SCANNED
NOV 28 2001
REF. #011108clyinspection
-TTAE

INAC, Nunavut District Office
P.O. Box 100
Iqaluit, NU
X0A 0H0

tel.: (867) 975-4275
fax.: (867) 979-6445

Your file / Votre référence

Our file / Notre référence
unlicenced

November 8, 2001.

Water
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NOV 27 2001
Public Registry

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PFC
DSP nov29/01

Jonathan Palluq
Senior Administrative Officer
Municipality of Clyde River
P.O. Box 89
Clyde River, NU X0A 0E0

August 2, 2001 Municipal Water Use Inspection - Report

Firstly, I wish to thank David Arreak for the much appreciated time and assistance provided during the tour of the Municipality's water use and waste disposal facilities. Attached for your records is the Municipal Water Use Inspection Report pertaining to the August 2, 2001 inspection; a handful of concerns, some of which outstanding since the previous inspection, were encountered. Accordingly, the following considerations were outlined and will need to be addressed:

- **Water supply:** No concerns were noted with the water intake and supply facility. Further, the attached analytical results relating to a sample collected from the vicinity of the intake station reveal that all tested parameters meet the *Guidelines for Canadian Drinking Water Quality*, save for a slight exception: a turbidity value of 1.5 Nephelometric Turbidity Unit (NTU) which hovers between the 1 NTU maximum acceptable concentration and the 5 NTU aesthetic objective.

- **Sewage disposal:** At the time of the inspection, the sewage disposal facility had already been almost entirely decanted (figure 1). However, it was mentioned that recurring concerns with the sewage lagoon's freeboard and decant structure were again noted this summer. In relation to the annual decant, the inspector points out that it may be advisable to restrict the flow of discharge, thus spreading the decant over a longer period of time in order to maximize aerobic decomposition and secondary biological treatment. Indeed, the attached analytical results relating to a sewage effluent sample collected 10 metres downstream of the decant structure (figure 2) reveal that concentrations of ammonia (118 mg/L vs 2.2 mg/L) and phenol (590 µg/L vs 4 µg/L) considerably exceed the *Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life*. Furthermore, while values of biological oxygen demand (291 mg/L) and of faecal coliform (510 000 CFU/100 ml) are also high, the Microtox sample, constituting a reliable toxicity indicator (IC_{50}), shows that half of light-producing bacteria were inhibited by a sample concentration of 5.6%, whereas 50% and over is considered non-toxic.

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In parallel, it was mentioned during the inspection that since the retention capacity of the sewage disposal facility is nearly exceeded before the annual decant, the Municipality intends to commission a replacement sewage disposal facility. In this regards, the Inspector underlines that both the abandonment of the current facility and the establishment of a replacement one are undoubtedly of concern to the Nunavut Water Board (NWB), even though the Municipality has not yet been issued its Water licence. Therefore, the Inspector trusts that the Municipality will adopt a diligent stance and provide relevant plans to the NWB before reclamation and/or construction work is undertaken.

- **Solid waste disposal:** Combustible wastes are regularly burnt and covered, and the wastepile at the solid waste disposal facility is covered on an annual basis (figure 3). Further, despite the fact that a section of fence was erected according to prevailing winds, a considerable amount of windblown waste is nonetheless noticeable beyond the perimeter of the facility. Therefore, the Inspector reiterated during the inspection that the existing fence should be expanded upon to fully enclose the solid waste disposal facility. Additionally, while pooled water and marshy areas were noted immediately downslope of the wastepile (figure 4), no flow of leachate could be observed along an apparent path of runoff from the site (figure 5). In related matters, hydrocarbon contamination was once more noted at the waste oil storage site (figure 6). Consequently, the Inspector acknowledges that the Municipality's plans to install a larger form of containment, and is investigating different on-site disposal options.

- **Non-compliance of Act:** The Municipality does not currently hold the Water licence it requires under both the *Northwest Territories Waters Act* and the *Nunavut Land Claims Agreement* for its municipal water use and waste disposal. However, the Municipality has submitted an application to the NWB in September 2000, and the procedural delay is primarily linked to third party material remaining lacking despite numerous requests from the NWB. Hence, by copy of this letter to Community Government and Transportation, the Inspector stresses that this situation is unacceptable, and consequently trusts that the NWB will forthwith receive the required information, thus enabling the timely issuance of a Water licence.

Please feel free to contact me at (867) 975-4298 or lavalleep@inac.gc.ca should any questions/comments arise.

Sincerely,

Philippe Lavallée
Water Resources Officer
INAC, Nunavut District

c.c. - Nunavut Water Board, Gjoa Haven
- CG&T, Iqaluit (Doug Sitland)
- Environmental Health Officer, Iqaluit (Shaun Mackie)
- EC Environmental Protection, Yellowknife (Anne Wilson)

Indian and Northern Affairs Canada | Affaires Indiennes et du Nord Canada

MUNICIPAL WATER USE INSPECTION FORM

Date: 2001/08/02 **Licensee Rep.** (Name/Title)**:** David Arreak / Foreman

Licensee: Municipality of Clyde River **Licence No.:** unlicenced

WATER SUPPLY

Source(s): Water Lake **Quantity used:** meter @ 10 994 600 L

Owner:/Operator: Municipality

Indicate: **A** - Acceptable **U** - Unacceptable **NA** - Not Applicable **NI** - Not Inspected

Intake Facilities: A **Storage Structure:** NA **Treatment Systems:** A **Chemical Storage:** A

Flow Meas. Device: A **Convey. Lines:** NA **Pumping Stations:** NA

Comments: No concerns noted in regards to the water intake facility. Water use is metered at intake and recorded at truck delivery. Chlorination in use.

WASTE DISPOSAL

Sewage: **Sewage Treatment System** (Prim./Sec/Ter.)**:** primary; discharge overland to ocean

Natural Water Body: **Continuous Discharge** (land or water)**:**

Seasonal Discharge: x **Wetlands Treatment:** limited **Trench:**

Solid Waste: **Owner/Operator:** Municipality

Landfill: **Burn & Landfill:** x **Other:**

Indicate: **A** - Acceptable **U** - Unacceptable **NA** - Not Applicable **NI** - Not Inspected

Discharge Quality: sampled **Decant Structure:** U **Erosion:** A

Discharge Meas. Device: none **Dyke Inspection:** NA **Seepages:** U

Dams, Dykes: A **Freeboard:** A **Spills:** none reported

Construction: NA **O&M Plan:** NA **A&R Plan:** NA

Periods of Discharge: A **Effluent Discharge Rate:** not measured

Comments: Decant of the sewage disposal facility initiated through pump siphoning over the berm; active thawing of the drain valve again required. Reportedly very little freeboard remaining prior to the sewage lagoon's decant. Slightly slumped sections noticeable along the decant face of the lagoon berm, but less seepage noted than during the previous inspection. Bulky metal wastes and hazardous materials segregated (batteries are neutralized prior to disposal) from the household wastes which are regularly burnt, and annually covered. Pooled water and marshy areas present along the toe of the partially fenced solid waste disposal facility, but no flow observed along an apparent path of runoff. Signs of ground contamination at the waste oil storage site. Landfarm site for hydrocarbon-contaminated soil erected by a third party alongside the solid waste disposal facility; winter winds tore down part of its perimeter fence and snowdrifts from the site reportedly hindered access to the dumpsite.

FUEL STORAGE

Owner/Operator:

Indicate: **A** - Acceptable **U** - Unacceptable **NA** - Not Applicable **NI** - Not Inspected

Berms & Liners: **Water within Berms:** **Evidence of Leaks:**

Drainage Pipes: **Pump Station & Catchment Berm:**

Pipeline Condition: **Not Applicable:** x **Condition of Tanks:**

SURVEILLANCE NETWORK PROGRAM (SNP)

Samples Collected **Hamlet:** none

INAC: drinking water @ lake intake, sewage discharge 10m from decant point

Signs Posted **SNP:** not applicable **Warning:** none

Records & Reporting: not applicable

Geotechnical Inspection: not applicable

Non-Compliance of Act or Licence: Community is unlicenced; however, a Water licence application has been submitted to the Nunavut Water Board, and is currently being processed.

Philippe Lavallée

Inspector's Name **Inspector's Signature**

figure 1. Recently-decanted sewage disposal facility; 2001/08/02.

figure 2. Decant structure and path of discharge from the sewage lagoon; 2001/08/02.

figure 3. Solid waste disposal facility; 2001/08/02.

figure 4. Toe of the solid waste disposal facility; 2001/08/02.

figure 5. Apparent path of runoff from the solid waste disposal facility; 2001/08/02.

figure 6. Hydrocarbon contamination at the waste oil storage site; 2001/08/02.

Taiga Environmental Laboratory
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
Tel: (867)-669-2788
Fax: (867)-669-2718

- CERTIFICATE OF ANALYSIS -

Prepared For: Nunavut District Office DIAND, Operations *Attn:* Philippe Lavalllee

Sample ID: Raw Water **Taiga Sample ID:** 211888

Client Project: **Sample Type:** **Received Date:** 03-Aug-01

Location: Clyde River **Sampling Date:** 03-Aug-01

Report Status: **Final** ***Approved by:***

Test Parameter	Result	Units	Detection Limit	Analysis Date
Physicals				
Colour	5		5	08-Jul-01
Solids, Total Dissolved	11	mg/L	10	04-Sep-01
Turbidity	1.5	NTU	0.1	08-Jul-01
Nutrients				
Ammonia as N	< 0.005	mg/L	0.005	22-Aug-01
Biological Oxygen Demand	< 2	mg/L	2	03-Aug-01
Nitrate+Nitrite as N	< 0.008	mg/L	0.008	17-Aug-01
Major Ions				
Chloride	4.0	mg/L	0.2	14-Aug-01
Sodium	2.52	mg/L	0.02	15-Aug-01
Sulphate	< 3	mg/L	3	08-Aug-01
Microbiology				
Coliforms, Fecal	< 1	CFU/100mL	1	03-Aug-01
Metals, Total				
Arsenic	< 1.0	µg/L	1.0	10-Aug-01

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Report Date: October 15, 2001

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Fax: (867)-669-2718

- CERTIFICATE OF ANALYSIS -

Prepared For: Nunavut District Office DIAND, Operations *Attn:* Philippe Lavalllee

Sample ID: Raw Water **Taiga Sample ID: 211888**

Cadmium	< 0.3	µg/L	0.3	09-Aug-01
Chromium	< 3	µg/L	3	09-Aug-01
Cobalt	< 1	µg/L	1	09-Aug-01
Copper	< 2	µg/L	2	09-Aug-01
Iron	56	µg/L	30	13-Aug-01
Lead	1	µg/L	1	09-Aug-01
Manganese	2	µg/L	1	09-Aug-01
Mercury	< 0.01	µg/L	0.01	03-Aug-01
Nickel	< 1	µg/L	1	09-Aug-01
Zinc	< 10	µg/L	10	09-Aug-01

Field Data (01/08/02) **raw water**
Temperature: 16.0 °C
Conductivity: 38 µS/cm
pH: 7.7 **Time:** 13:34

Report Date: October 15, 2001

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4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
Tel: (867)-669-2788
Fax: (867)-669-2718

- CERTIFICATE OF ANALYSIS -

Prepared For: Nunavut District Office DIAND, Operations *Attn:* Philippe Lavalllee

Sample ID: Sewage Discharge **Taiga Sample ID:** 211889

Client Project: **Sample Type:** **Received Date:** 03-Aug-01

Location: Clyde River **Sampling Date:** 03-Aug-01

Report Status: **Final** ***Approved by:***

Test Parameter	Result	Units	Detection Limit	Analysis Date	Data Qualifier
Physicals					
Solids, Total Suspended	106	mg/L	3	22-Aug-01	
Nutrients					
Ammonia as N	118	mg/L	0.005	22-Aug-01	
Biological Oxygen Demand	291	mg/L	2	03-Aug-01	
Nitrate+Nitrite as N	0.012	mg/L	0.008	17-Aug-01	
Phosphorous, Total	13.9	mg/L	0.004	13-Sep-01	
Microbiology					
Coliforms, Fecal	510000	CFU/100mL	1	03-Aug-01	
Organic					
Phenols	590.0	µg/L	0.5	22-Aug-01	
Metals, Total					
Mercury		µg/L	0.01		14

Field Data (01/08/02) **sewage**
Temperature: 19.5 °C
Conductivity: 1 367 µS/cm
pH: 7.7 Time: 14:13

Report Date: Tuesday, October 09, 2001

REPORT OF TOXICITY USING MICROTOX

COMP. Y/LOCATION: **Clyde River, Lagoon Discharge**

Sample Collected By: Philippe Lavallee

Date/Time Sampled: **August 2, 2001, 14:13**

Date/Time Received: **N/A**

Date/Time Test Start: **August 13, 2001, 11:51 AM**

Sample Type: Elutriate
Sampling Method: Grab

Method: ***Environment Canada Laboratories SOP#830.0 Revision 1, for Microtox Testing in Compliance wit November 1992: Biological Test Method: Toxicity Test Using Luminescent Bacteria Photobacterium phosphoreum), November 1992, EPS 1/RM/24.***

Environment Canada has conducted testing on the material sampled according to its own Microtox standards an procedures. The data proceeding from that testing is intended as a preliminary screening tool only, and cannot b used for any other purpose. This data is provided on the condition that it not be used in any report that is intende for public or official use.

RESULTS: **TOXIC - IC_{50} Concentration: 5.6%** **(Toxic 0 to 50%)**

TEST ORGANISMS:
Species: Vibrio fisheri (Photobacterium phosphoreum)
Test Apparatus: Model 500 Analyzer

TEST SUBSTANCE/CONDITIONS

pH of Sample: **6.6** (No pH adjustment)

Sample Appearance: **no colour adjustment**

Lot # of Osmotic Adjusting Solution: OAS007

Lot # of Reconstitution Solution: RSN099Y

Lot # of Diluent: DIL034L

TEST METHODS AND CONDITIONS

Test Start Date/Time: **August 13, 2001 / 11:51 AM**

Test Method: Basic 45% Test, 15 minute incubation.

QUALITY CONTROL

Reference Toxicant: Zinc Sulfate Standard

Reagent Lot #: ACV026-6

IC_{50} - 15 minutes mg/L: **3.4 mg/L**

IC_{50} Confidence Range: **2.3 to 5.1 mg/L**

TEST ANALYST: Ron Bujold

INITIAL: RB

Indian and Northern Affairs Canada
www.inac.gc.ca

Affaires indiennes et du Nord Canada
www.ainc.gc.ca

Nunavut District Office
P.O. Box 100
Iqaluit, NU, X0A 0H0

Tel: (867) 975-4289
Fax:(867) 979-6445

Your file - Votre reference

Our file - Notre référence
(Unlicenced)

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CEO	
BRD	
EXT.	

December 2, 2002

Raymond Kasalaq
Senior Administrative Officers
Municipality of Clyde River
P.O. Box 89
Clyde River, NU XOA OEO

Nunavut Water Board
DEC 19 2002
Public Registry

Re: August 28 , 2002 Municipal Water Inspection - Report

I would like to thank David Arreak for his time and assistance provided during the tour of the Municipality's water use and waste disposal facilities. Attached for your records is the Municipal Water Use Inspection Report along with the Certificate of Analysis Report pertaining to the August 28, 2002 inspection. Considering the limited resources at its disposal, the municipality appears to manage its facilities fairly well. However, there is one (1) issue that must be addressed that relates to the solid waste disposal which is noted in this report.

1. **Water supply:** No concerns were noted regarding the water intake and supply facility. Further, the attached analytical results relating to samples taken in the vicinity of the intake station indicate that all tested parameters meet the *Guidelines for the Canadian Drinking Water Quality*. Please find attached analysis report. (Figure 1 Refers to Water Source)

2. **Sewage disposal:** During the time of inspection the sewage lagoon was discharging through the lower valve that it has in place, (annual decant). The inspector questioned how long the valve is left open for, and was told that it was conducted during the month of August, no further information was provided. Samples were collected 92 meter downstream for the lagoon, duplicate samples collected. This community is within the municipal waste water guidelines. However, the attached analytical report reveals sight exception of ammonia (56.0 mg/l vs 2.2 mg/l). (Figure 2 Refers to Sewage Disposal)

3. **Solid waste disposal:** The inspector observed during inspection, bulky metal waste mixed with combustible household material. Also during the inspection the inspector observed hazardous material (e.g. batteries, waste oil) within both waste disposal sites. There are numerous waste oil drums with hydrocarbon contamination within the solid waste site. To prevent further environmental damage to the surrounding area, it was recommended that, some action be taken to improve this situation. No sample were collected in this area, as it was dry.

It was further noted that due lack of fencing windblown garbage is scattered within the surrounding area. It was recommended that the community of Clyde River looks into completing the fencing around the perimeter of the dump to limit further environment concerns. (Figure 3, 4,7, 8 Refers to the Solid Waste & Waste Oil Sites)

4. **Non-compliance of the licence:** Municipality of Clyde River does not currently hold the Water licence required under both the *Nunavut Waters Act* and the *Nunavut Land Claims Agreement* for its municipal water use and waste disposal. It was also noted that Government of Nunavut was assisting the community of Clyde River, and were in process of completing related documents, this community should be licenced soon.

If you have any concerns or questions, please feel free to contact me.

Sincerely,

James Leo Noble
Water Resource Officer
INAC - Nunavut District Office
P.O. Box 100, Iqaluit, NU, X0A 0H0
(867) 975-4289
(867) 975-6445
noblej@inac.gc.ca

cc. Nunavut Water Board, Gjoa Haven, NU
DIAND Water Resources Division, Iqaluit, NU
CG&T, Iqaluit, NU (Doug Sitland)
Baffin Health & Social Services, Iqaluit, NU
EC, Environmental Protection, Yellowknife, NT (Anne Wilson)

Taiga Environmental Laboratory
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
Tel: (867)-669-2788
Fax: (867)-669-2718

- CERTIFICATE OF ANALYSIS -

Prepared For: Nunavut Regional Officer, Operati Indian Affairs and Northern D *Attn:* James Lee Noble

Sample ID: 1 Potable Water **Taiga Sample ID:** 222663

Client Project: **Sample Type:** wastewater **Received Date:** 04-Sep-02

Location: Clyde River, NU **Sampling Date:** 28-Aug-02

Report Status: **Final** *Approved by:*

Test Parameter	Result	Units	Detection Limit	Analysis Date
Physicals				
Alkalinity	4.1	mg/L	0.3	22-Sep-02
Colour	5		5	06-Nov-02
Conductivity, Specific	28.0	µS/cm	0.3	22-Sep-02
pH	6.69	pH units	0.05	22-Sep-02
Major Ions				
Calcium	1.02	mg/L	0.05	10-Sep-02
Chloride	4.0	mg/L	0.2	17-Sep-02
Hardness as CaCO3	5.68	mg/L	0.17	10-Sep-02
Magnesium	0.75	mg/L	0.02	10-Sep-02
Potassium	0.53	mg/L	0.03	11-Sep-02
Silica, Reactive	< 0.02	mg/L	0.02	12-Sep-02
Sodium	2.71	mg/L	0.02	11-Sep-02
Sulphate	3	mg/L	3	02-Oct-02

Report Date: Thursday, November 07, 2002

Taiga Environmental Laboratory
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
Tel: (867)-669-2788
Fax: (867)-669-2718

- CERTIFICATE OF ANALYSIS -

Prepared For: Nunavut Regional Officer, Operati Indian Affairs and Northern D *Attn:* James Lee Noble

Sample ID: 2 Potable Water **Taiga Sample ID:** 222664

Client Project: **Sample Type:** wastewater **Received Date:** 04-Sep-02

Location: Clyde River, NU **Sampling Date:** 28-Aug-02

Report Status: Final ***Approved by:***

Test Parameter	Result	Units	Detection Limit	Analysis Date
Physicals				
Solids, Total Dissolved	20	mg/L	10	08-Oct-02
Solids, Total Suspended	6	mg/L	3	08-Oct-02
Turbidity	0.9	NTU	0.1	17-Sep-02
Nutrients				
Ammonia as N	< 0.005	mg/L	0.005	09-Sep-02
Nitrate+Nitrite as N	< 0.008	mg/L	0.008	09-Sep-02
Organic Carbon, Dissolved	1.4	mg/L	0.5	07-Oct-02
Organic Carbon, Total	1.6	mg/L	0.5	07-Oct-02
Ortho-Phosphate as P	0.003	mg/L	0.002	23-Sep-02
Phosphorous, Dissolved	0.052	mg/L	0.004	20-Sep-02
Phosphorous, Total	0.059	mg/L	0.004	18-Sep-02

Report Date: Wednesday, November 06, 2002

Taiga Environmental Laboratory
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
Tel: (867)-669-2788
Fax: (867)-669-2718

- CERTIFICATE OF ANALYSIS -

Prepared For: Nunavut Regional Officer, Operati Indian Affairs and Northern D *Attn:* James Lee Noble

Sample ID: 3 Sewage **Taiga Sample ID:** 222665

Client Project: **Sample Type:** wastewater **Received Date:** 04-Sep-02

Location: Clyde River, NU **Sampling Date:** 28-Aug-02

Report Status: **Final** ***Approved by:***

Test Parameter	Result	Units	Detection Limit	Analysis Date
Physicals				
Alkalinity	489	mg/L	0.3	02-Oct-02
Colour	350		5	06-Nov-02
Conductivity, Specific	1250	µS/cm	0.3	22-Sep-02
pH	7.39	pH units	0.05	22-Sep-02
Major Ions				
Calcium	8.20	mg/L	0.05	10-Sep-02
Chloride	71.5	mg/L	0.2	15-Oct-02
Hardness as CaCO3	46.4	mg/L	0.17	10-Sep-02
Magnesium	6.30	mg/L	0.02	10-Sep-02
Potassium	25.9	mg/L	0.03	11-Sep-02
Silica, Reactive	13.8	mg/L	0.02	12-Sep-02
Sodium	88.4	mg/L	0.02	11-Sep-02
Sulphate	16	mg/L	3	02-Oct-02

Report Date: Thursday, November 07, 2002

Taiga Environmental Laboratory
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Iqaluit NU

- CERTIFICATE OF ANALYSIS -

Prepared For: Nunavut Regional Officer, Operati Indian Affairs and Northern D. ***Attn:*** James Lee Noble

Sample ID: 4 Sewage **Taiga Sample ID:** 222667

Client Project: **Sample Type:** wastewater **Received Date:** 04-Sep-02

Location: Clyde River, NU **Sampling Date:** 28-Aug-02

Report Status: **Final** ***Approved by:***

Test Parameter	Result	Units	Detection Limit	Analysis Date
Physicals				
Solids, Total Dissolved	433	mg/L	10	08-Oct-02
Solids, Total Suspended	103	mg/L	3	08-Oct-02
Turbidity	95.5	NTU	0.1	17-Sep-02
Nutrients				
Ammonia as N	56.0	mg/L	0.005	09-Sep-02
Nitrate+Nitrite as N	17.9	mg/L	0.008	09-Sep-02
Organic Carbon, Dissolved	85.0	mg/L	0.5	07-Oct-02
Organic Carbon, Total	140	mg/L	0.5	07-Oct-02
Ortho-Phosphate as P	10.1	mg/L	0.002	23-Sep-02
Phosphorous, Dissolved	12.8	mg/L	0.004	20-Sep-02
Phosphorous, Total	14.0	mg/L	0.004	18-Sep-02

Report Date: Wednesday, November 06, 2002

Taiga Environmental Laboratory
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Tel: (867)-669-2788
Fax: (867)-669-2718

- CERTIFICATE OF ANALYSIS -

Prepared For: Nunavut Regional Officer, Operati Indian Affairs and Northern D *Attn:* James Lee Noble

Sample ID: 6 Sewage **Taiga Sample ID:** 222668

Client Project: **Sample Type:** wastewater **Received Date:** 04-Sep-02

Location: Clyde River, NU **Sampling Date:** 28-Aug-02

Report Status: **Final** ***Approved by:***

Test Parameter	Result	Units	Detection Limit	Analysis Date
Physicals				
Solids, Total Dissolved	393	mg/L	10	08-Oct-02
Solids, Total Suspended	177	mg/L	3	08-Oct-02
Turbidity	66.1	NTU	0.1	17-Sep-02
Nutrients				
Ammonia as N	60.9	mg/L	0.005	09-Sep-02
Nitrate+Nitrite as N	0.153	mg/L	0.008	12-Sep-02
Organic Carbon, Dissolved	58.0	mg/L	0.5	07-Oct-02
Organic Carbon, Total	76	mg/L	0.5	07-Oct-02
Ortho-Phosphate as P	7.80	mg/L	0.002	23-Sep-02
Phosphorous, Dissolved	10.8	mg/L	0.004	20-Sep-02
Phosphorous, Total	12.3	mg/L	0.004	18-Sep-02

Report Date: Wednesday, November 06, 2002

Indian and Northern Affairs Canada
www.inac.gc.ca

Affaires indiennes et du Nord Canada
www.ainc.gc.ca

Nunavut District Office
P.O. Box 100
Iqaluit, NU, X0A 0H0

Your file - Votre référence

August 28, 2002

Our file - Notre référence

Community Site Inspections / Waypoint Information

Clyde River 1	Sample One, Reservoir / Truck Fill	N70 28 57.4 W68 36 53.5
Clyde River 2	Waste Disposal (Main Dump)	N70 28 09.9 W68 38 03.9
Clyde River 3	Sample Two, Sewage Disposal	N70 28 10.7 W68 38 00.9
Clyde River 4	Solid Waste Disposal (Metals)	N70 28 08.5 W68 37 47.8
Clyde River 5	Community Tank Farm	N70 28 06.9 W68 35 57.7

James Leo Noble
Water Resource Officer
INAC, Nunavut District
Iqaluit, Nu.

Canada

(Figure 1)

- Clyde River, Water Supply, Site Located N70 28 57.4 W68 36 53.5

(Figure 2)

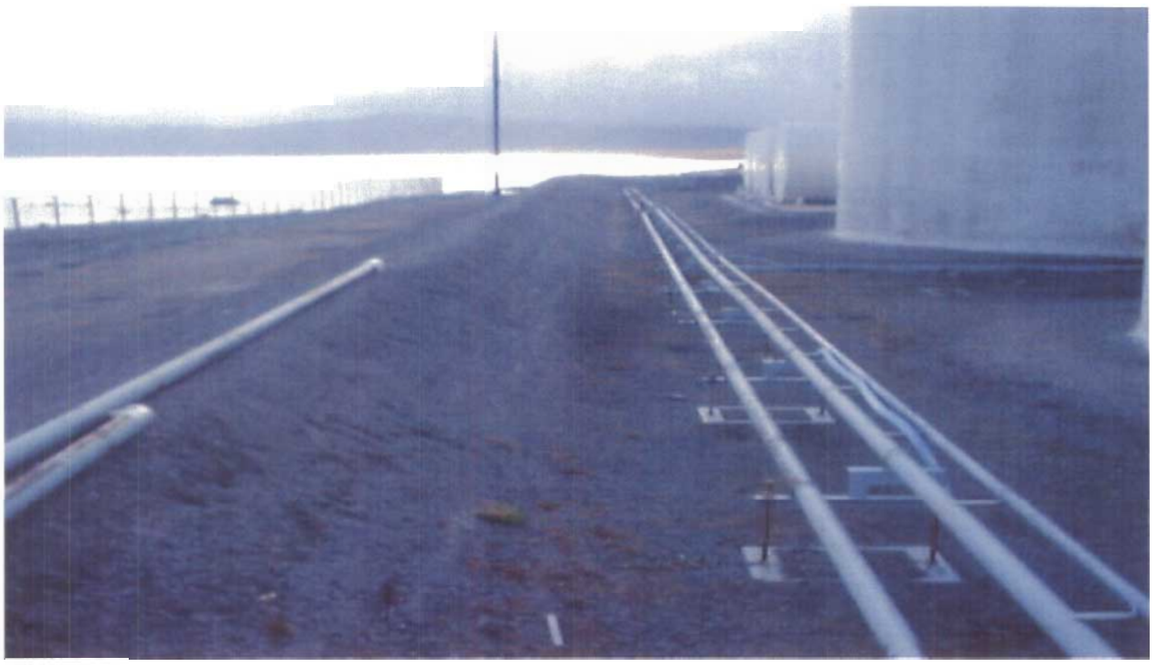
- Clyde River, Sewage Disposal, Site Located N70 28 10.7 W68 38 00.9

(Figure 3)

- Clyde River, Solid Waste Disposal (Main Dump) Site: N70 28 09.9 W68 38.03.9

(Figure 4)

- Clyde River, Solid Waste Disposal (Metal Dump) Site: N70 28 08.5 W68 37 47.8



(Figure 5)

- Clyde River, Community Tank Farm, Site Located N70 28 06.9 W68 37 47.8

(Figure 6)

- Clyde River, Community Tank Farm, Site Located N70 28 06.9 W68 37 47.8

(Figure 7)

- Clyde River, "Waste Oil Drums Shows Evidence of Leaks"

(Figure 8)

- Clyde River, "Waste Oil Drums Shows Evidence of Leaks"

Indian and Northern Affairs Canada | Affaires Indiennes et du Nord Canada

MUNICIPAL WATER USE INSPECTION REPORT

Date: August 28, 2002 **Licensee Rep.** (Name/Title)**:** David Arreak, Hamlet Foreman

Licensee: Municipality of Clyde River **Licence No.:** Unlicenced, File # NWB3CLY

WATER SUPPLY

Source(s): Water Lake **Quantity used:** Unable to locate Meter

Owner:/Operator: Municipality

Indicate: **A** - Acceptable **U** - Unacceptable **NA** - Not Applicable **NI** - Not Inspected

Intake Facilities: A **Storage Structure:** A **Treatment Systems:** A **Chemical Storage:** A

Flow Meas. Device: NI **Conveyance Lines:** NA **Pumping Stations:** A

Comments: During the time of inspection, there were no copies of the chlorine records, requested copies of these documents but was unsuccessful, no major issues to note with respect the water supply

WASTE DISPOSAL

Sewage: **Sewage Treatment System** (Prim./Sec/Ter.)**:** Primary, Discharge over land to ocean

Natural Water Body: **Continuous Discharge** (land or water)**:**

Seasonal Discharge: X **Wetlands Treatment:** **Trench:**

Solid Waste: **Owner/Operator:** Municipality

Landfill: **Burn & Landfill:** x **Other:**

Indicate: **A** - Acceptable **U** - Unacceptable **NA** - Not Applicable **NI** - Not Inspected

Discharge Quality: A / U **Decant Structure:** A **Erosion:** A

Discharge Meas. Device: NA **Dyke Inspection:** A **Seepages:** A

Dams, Dykes: A **Freeboard:** A **Spills:** None Reported

Construction: A **O&M Plan:** NA **A&R Plan:** NA

Periods of Discharge: U **Effluent Discharge Rate:** Not Measured

Comments: With respect to the sewage treatment, very little seepage occurs from the structure of lagoon. Siphoning from the lagoon was quit apparent from the previous months, as it left an obvious path - (runoff). It was noted that the valve was still open during the time of inspection. When the inspector questioned as to how long it was it was opened, it was replied that it usually open for the month of August. No further details to note.
As for the solid waste disposal site; recommendations were made, with respect to the ground contamination at the waste oil storage site, to look into having it cleaned. Also bulky metal waste site, still has a lot of batteries laying around, that aren't neutralized, a plan to properly store items such as batteries and other hazardous material should be in place for this community. Burn and landfill site, once again a lot of wind blown garbage within the down slope of the main dump.

FUEL STORAGE

Owner/Operator: Aarruja Development Corp. / GN

Indicate: **A** - Acceptable **U** - Unacceptable **NA** - Not Applicable **NI** - Not Inspected

Berms & Liners: U **Water within Berms:** A **Evidence of Leaks:** U

Drainage Pipes: A **Pump Station & Catchment Berm:** NA

Pipeline Condition: NA **Not Applicable:** **Condition of Tanks:** NI

SURVEILLANCE NETWORK PROGRAM (SNP)

Samples Collected **Hamlet:** None

INAC: Raw water, Sewage discharge,

Signs Posted **SNP:** None **Warning:** None

Records & Reporting: None

Geotechnical Inspection: None

Non-Compliance of Act or Licence: Like most communities, this is another community being assisted by the Government of Nunavut with the process of the Water Licence Application and should be licenced shortly.

James Leo Noble

Inspector's Name **Inspector's Signature**