Grise Fiord Water License Application

prepared for:

The Hamlet of Grise Fiord
Nunavut, Canada

prepared by:

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FSC Project No: 2002-1000-051

Date: January 2003

EXECUTIVE SUMMARY

Enclosed is a water licence application for the Hamlet of Grise Fiord, Nunavut. The Hamlet is seeking a five-year licence, valid through 2008, to obtain water for municipal use from a glacial meltwater pond, located in the center of the community. The projected population for the population of Grise Fiord in the year 2008 is 173 persons. The Hamlet requests an annual water use rate of six million litres.

The water source for the Hamlet is a glacial meltwater pool located in the centre of the community. Each summer the glacial runoff pond is drained by gravity feed into the three large storage tanks with a capacity of 10 million liters. Water is treated with hypochlorination equipment and is trucked to the community.

Liquid sewage is treated in a lagoon adjacent to the solid waste site. The site is discharged annually.

The solid waste site is 125,000 m² and is located 1.4 kilometres west of Grise Fiord. Waste is burned twice weekly and covered annually. A separate bulky waste site occupies an area of 7,500 m². Used oil is stored at this 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

Hamlet of Grise Fiord
P.O. Box 77
NU, Canada
XOA OJO

Phone: _867-980-9959
Fax: _867-980-9052
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: 76 ° 25' N Longitude: 83° 01' W NTS Map No 49 A/6 Scale 1:50,000

4. DESCRIPTION OF UNDERTAKING (attach plans and drawings)

The solid waste site requires cleanup and fencing to contain windblown debris.

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)

15,360 L/day 2002
16,231 L/day 2008

The community is requesting an annual water use volume of 6,000,000 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.)

Water Supply Improvements Grise Fiord, FSC, 2000

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

Robert Sheaves	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 Grise Fiord

(1) Name and Mailing Address of Applicant/Licensee:

The Hamlet of Grise Fiord
P.O. Box 77
Grise Fiord, Nunavut
X0A 0J0

Phone: 1-867-980-9959
Fax: 1-867-980-9052

(3) Location of Undertaking:

Grise Fiord is located on the southern coast of Ellesmere Island at 76°25′ N and 83°01′ W. It is approximately 380 km north-east of Resolute and 1920 km north-east of Yellowknife.

The Community is situated on a narrow strip of beach near the mouth of Grise Fiord. From the beach, the land slopes back into a series of low benches for about 100 m until it reaches the foot of a steep rock-face. The surficial soils in the area consist of free-draining gravel deposits. A major layer of silty sand with traces of gravel was identified over a large portion of the valley above the settlement. The depth of the permafrost table is approximately 0.6 m

Mosses and lichens grow during the very short growing season.

A true arctic desert, Grise Fiord receives an average of 15.2 cm of snowfall each year. There is so little rainfall in the area that the mean annual precipitation totals near 0 cm. July mean high and low temperatures are 10° C and 2.2° C. January mean high and low temperatures are -27.2° C and -35° C. Winds are generally south-east and annually average 18.5 km/h.

Global warming is suspected in reducing the size of the glacier situated above the Hamlet. Although threatening, the danger to the community is not yet known.

Grise Fiord is Canada's most northerly community. Permanent settlement began in 1953, when the RCMP relocated Inuit from Port Harrison (Quebec) and Pond Inlet to the area. The relocation continued into the 1960's when the RCMP brought their station from Craig Harbour (5 km east of Clyde River) and that community's residents with them. In 1962, a school was built and in the late 1960's, residents established a cooperative.

Grise Fiord, blessed with game resources, bases its economy on hunting, trapping and fishing. Tourists are drawn to Ellesmere Island National Park and to view local archaeological sites. Near the Hamlet are ruins of the once prosperous Thule people and evidence of European exploration during the late-nineteenth and early-twentieth centuries. Grise is one of the most traditional, rugged, and beautiful communities in the North.

Grise Fiord gained Hamlet status on October 7, 1987. The Hamlet's traditional name "Aujuittuq", means 'place that never melts'.

(4) Description of Undertaking:

Water Supply and Treatment:

Prior to 1978, ice blocks cut from icebergs frozen into the flow ice were the main source for water for most of the year. The ice blocks would be transported by Bombardier and trailer to residents' water tanks and left to melt. A reverse-osmosis plant for the desalinization of sea water was installed in the late 1980's but was decommissioned due to operational problems.

Water is now obtained from a small glacial runoff pond located in the center of the community. The water is of good to excellent chemical quality for domestic use. The water is clear, very soft, poorly buffered, neutral, and low in dissolved solids. Treated water is below the recommended limit with respect to corrosiveness. Batch chlorination has been shown to have eliminated or greatly reduced most corrosion-intensifying bacteria.

The truckfill point and treatment facilities are located inside the Hamlet garage. The treatment facility consists of two chemical solution mixing tanks (115 L capacity each), a 1/2 hp mixer, and a hypochlorinator.

Water Storage and Distribution

Numerous steps have been taken to improve the water storage system. In 1978, a 1,393,000 L water tank was erected. The tank was sized for a population of 150 on the erroneous assumption that daily consumption would be 32 L per capita and that only 9 1/2 months storage was required. In 1988, another storage tank of 3,896,000 L capacity was constructed to meet the actual requirements. There is now a third storage tank (3,940,000) and the total storage capacity of the truckfill point is presently 10,000,000 L.

Each summer the glacial runoff pond is drained by gravity feed into the three storage tanks. It requires up to 36 days to fill all the tanks. The tanks are connected by a heated walkway. Valve pumps, hypochlorination equipment, and a control panel are located in the walkway.

The 1994 (4546 L) water truck is filled through a chain-operated, quick-opening valve. When this valve is opened, a flow-switch is activated automatically starting the booster pump and the hypochlorinator. A 3 m truckfill arm extends from the roof of the building.

Water delivery is provided by the Hamlet five times per week or upon request. Most residential holding tanks have 227 L capacities. All water deliveries are metered.

Water Quality:

Water is now obtained from a small glacial runoff pond located in the centre of the community. The water is of good to excellent chemical quality for domestic use. The water is clear, very soft,

poorly buffered, neutral, and low in dissolved solids. Treated water is below the recommended limit with respect to corrosiveness. Batch chlorination has been shown to have eliminated or greatly reduced most corrosion-intensifying bacteria. The 2001 Municipal water inspection report found good water quality. All tested parameters met the Canadian water quality guidelines, with the exception of marginally high pH of 8.9.

In July 2002, tank one was sandblasted repainted and later pressure washed with chlorine. People since complained of chlorine taste in the water, which was likely the result of the cleaning process. This is no longer a problem and has not recurred.

Sewage Collection and Disposal

Most buildings are equipped with pressurized water systems and sewage holding tanks. The sewage truck is a 1993 Ford F-350 (4546 L). No buildings in the Hamlet currently have honeybucket toilets.

Sewage tanks are pumped out regularly. The waste is trucked 1.4 km to the waste management site adjacent to the airstrip, west of the community. The new lagoon, 500m^3, was completed in 1998 and is decanted each year in the summer.

Solid Waste Collection and Disposal:

Residents place solid waste outside the home in wooden boxes for collection. The wastes are not burned by the residents. The waste is collected twice per week using a Ford model F-350 pickup truck and hauled to the 125,000 m^2 solid waste management site. Wastes are burned twice weekly. An annual spring clean-up is organized by the Community. The solid waste site requires ongoing work, local concern exists about clean-up of the site and the requirement of a fence around the site. There is an issue of wind scattered refuse, which a fence would address. It is estimated that the site could have an extended lifespan given the proper treatment and cleanup.

A separate bulky waste site occupies an area of 7,500 m^2. Used oil is stored at this site.

(5) Type of Undertaking

Municipal

(6) Water Use:

To obtain water

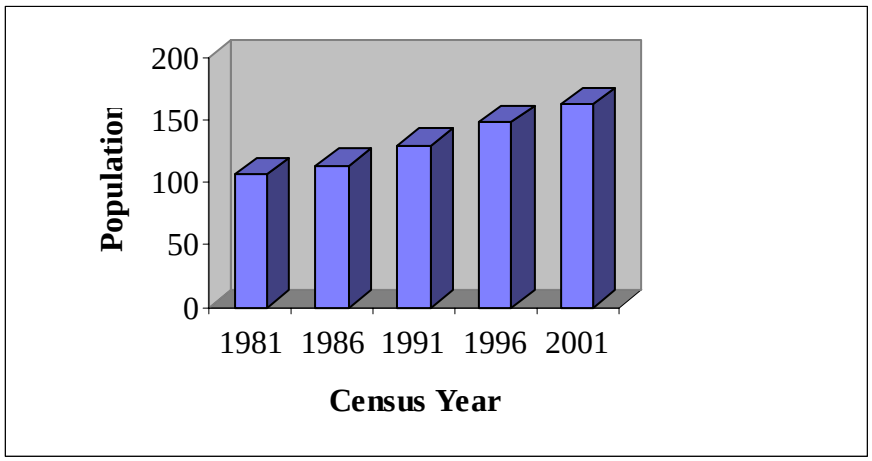
(7) Quantity of Water Involved:

Water Generation Projections:

The 2001 Census Report shows the increase in population of the Hamlet of Grise Fiord between the census years of 1981 to 2001. Figure 1 illustrates this population increase. A per capita growth

rate of 0.89% was determined from data found in “Nunavut: Community Population Projections 2000-2020”.

Figure 1 - Population Increase in the Hamlet of Grise Fiord



The Municipal and Community Affairs (MACA) planning guidelines suggest that the increase in the projected per capita water use in a community should be modelled through the following series of equations.

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

(2) RWU x (-1.0 + (0.323 x Ln (Population)) **2000<Population<10,000**

(3) RWU x 2 **Population >10,000**

The RWU or residential water use is estimated to be 90 litres per capita (Lpcd) for populations lower than 2000. The RWU is estimated to be 220 Lpcd for populations greater than 2000.

Ln is the natural logarithm.

From these equations, the sewage generation of the community of Grise Fiord was modelled within a 5-year span (Table 1). The amount of water use in 2002 was estimated to be 5,606,537 L annually. This corresponds to a per capita water use of 93.4 Lpcd. In the year 2008, the per capita water use would be 93.6 Lpcd corresponding to an annual water use of 5,924,433 litres.

Therefore, the community is requesting an annual water use volume of 6,000,000 litres.

Table 1 - Water Use Projection for the Hamlet of Grise Fiord

Planning Year	Calendar Year	Total Population	Projected Water Use (lpcd)	Projected Volume (litres/day)	Projected Volume (litres/year)
	2001	163	93.4	15,220	5,555,292
0	2002	164	93.4	15,360	5,606,537
	2003	166	93.4	15,502	5,658,270
	2004	167	93.5	15,645	5,710,496
	2005	169	93.5	15,790	5,763,220
	2006	170	93.5	15,935	5,816,448
5	2007	172	93.6	16,083	5,870,184
	2008	173	93.6	16,231	5,924,433
	2009	175	93.6	16,381	5,979,201
	2010	177	93.7	16,533	6,034,493
	2011	178	93.7	16,686	6,090,314
10	2012	180	93.7	16,840	6,146,670

(8) Waste Generated

Sewage:

The new lagoon was constructed in 1998, with a retention period of 365 days. There have been no reported problems with the lagoon.

The lagoon is decanted each year in the summer. The treated discharge is pumped over the lagoon berm into a stream 100 m from the ocean.

The current volume for the year 2002 of sewage generated by the community of Grise Fiord is 5,606,537 litres, corresponding to the annual water use. In 2008, the annual volume of sewage generated by the Hamlet of Grise Fiord will be 5,924,433 litres.

Sewage Disposal:

A new sewage lagoon was constructed in 1998. This has enough capacity for the community and there have been no reported problems with the lagoon. (phone correspondence, Marty Kuluguqtuk, 2003).

Sludges:

Sludges are generated through the sewage lagoon process. It does not appear that the sludge has interfered with the treatment process and has not been removed from the lagoon system. If the sludges interfered with the sewage treatment process, the sludges would have to be removed to a Nunavut Water Board approved facility.

Greywater:

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

Old Sewage Lagoon:

There is an old sewage lagoon adjacent to the solid waste site, which was abandoned in 1998. It has since been turned into a waste site where bulky metals have been dumped. Backfilling of this and the old honeybag pit are planned. (Correspondence, Marty Kuluguqtuk, 2003).

Solid Waste Treatment:

The landfill consists of 125,000 m² solid waste management site. Wastes are burned twice weekly. An annual spring clean-up is organized by the Community. The solid waste site requires ongoing work, local concern exists about ongoing clean-up of the site and the requirement of a fence around the site. It is estimated that the site could have an extended lifespan given the proper treatment and cleanup.

A separate bulky waste site occupies an area of 7,500 m². Used oil is stored at this site.

The landfill consists of three main areas. The bulky waste area at the back of the site, a honeybag pit (no longer is use) and garbage trenches. The site is divided into strips of holding cells (10 m x 50 m per cell) running generally from the SW to NE direction.

The solid waste site is operated using a modified trench method. The solid waste is placed in the trenches and then burned, then occasionally covered with granular material.

There is a large amount of waste metal in the bulky waste area. This includes such items as vehicles, appliances, barrels, tanks and wood waste. There are also separate areas for hazardous wastes, wood, and metal with signs but without fencing to separate them.

Solid Waste Volume Projections

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

A recent solid waste composition study has not been conducted in Grise Fiord. 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 Grise Fiord is not as clear.

Southern reductions were primarily a result of recycling, an opportunity not available in Grise Fiord. 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 Grise Fiord 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 Grise Fiord. 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 Grise Fiord.

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 Grise Fiord is 0.89% 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 Grise Fiord

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/year)	Projected Annual Weight (tonnes)	Running Total m^3
	2001	163	0.014	2.3	0.2	833	82	833
0	2002	164	0.014	2.3	0.2	849	84	1682
	2003	166	0.014	2.4	0.2	865	86	2547
	2004	167	0.014	2.4	0.2	881	87	3428
	2005	169	0.015	2.5	0.2	898	89	4326
	2006	170	0.015	2.5	0.2	915	91	5241
5	2007	172	0.015	2.6	0.3	932	92	6173
	2008	173	0.015	2.6	0.3	950	94	7123
	2009	175	0.015	2.7	0.3	968	96	8091
	2010	177	0.015	2.7	0.3	987	98	9078
	2011	178	0.015	2.8	0.3	1005	100	10083
10	2012	180	0.016	2.8	0.3	1024	101	11107

Solid Waste Water Runoff Quality:

Samples taken down slope from the dump, showed elevated levels of ammonia and iron, though the microtox test indicated that this was not due to the leachate. (INAC's Municipal Water Use Inspection Report, July 2001.)

Bulky Waste:

There is a separate bulky waste site adjacent to the solid waste facility. It occupies an area of 7,500 m^2, and used oil is also stored at this site. It is noted on the Municipal inspection report that the Hamlet is diligently attempting to find a user of their stockpiled scrap metals.

Waste Oil:

Is disposed of at the Hamlet garage by incineration.

Honey Bag Pit:

Honeybags are no longer used in the Hamlet. Hamlet is planning to backfill the abandoned pit.

Hazardous Waste:

There is separation of hazardous wastes in the solid waste site. A separate signed area (not enclosed) is available for used batteries/paint etc. There are no plans to ship these products south for recycling/disposal.

There are approximately 150 drums of unknown substance on site, which cannot be disposed of. There are plans to send them on a sealift container for proper disposal. (INAC inspection July 2001)

(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:

Water Supply Improvements Grise Fiord Nunavut, Ferguson Simek Clark, 2000

(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:

2. Applicant:

   Municipality and Region: The Hamlet of Grise Fiord, Nunavut

   Contacts:

   Name of Contact: Robert Sheaves
   Position: Senior Administrative Officer
   Telephone: 867-980-9959
   Fax: 867-980-9052

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.

FSC Architects and Engineers

III. WATER SUPPLY

Water Source

1. Type of source:

__ Lake
__ River
__ Well
√ Other

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

Primary Source: A small glacial runoff pond located in the centre of the community.
Secondary Source: ice blocks

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

Break-up: July
Freeze-up: August/September

Water Intake

1. Please provide short descriptions for the following:

a. Freshwater intake facility

The truckfill point and treatment facilities are located inside the Hamlet garage. Each summer the glacial runoff pond is drained by gravity feed into the three storage tanks. It requires up to 36 days to fill all three tanks.

The 1994 (4546 L) water truck is filled through a chain-operated, quick-opening

valve. When this valve is opened, a flow-switch is activated automatically starting the booster pump and the hypochlorinator. A 3 m truckfill arm extends from the roof of the building.

b. Operating capacity of pumps used:

c. Intake screen size

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.

The water is of good to excellent chemical quality for domestic use. The water is clear, very soft, poorly buffered, neutral, and low in dissolved solids. Treated water is below the recommended limit with respect to corrosiveness. Batch chlorination has been shown to have eliminated or greatly reduced most

corrosion-intensifying bacteria.

3. Type of water treatment.

___ Filtration and chlorination
√ Chlorination only
___ None
___ Other

Description:

The truckfill point and treatment facilities are located inside the Hamlet garage. Treatment facilities consist of two chemical solution mixing tanks (each 115 L capacity), a 1/2 hp mixer, and a hypochlorinator.

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	166	93.4	15,790
TOTAL			15,790

General Condition of the water supply facilities

1. General condition of the:

a. 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? No Describe.

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

The raw sewage is deposited in a lagoon for primary treatment.

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).

2. Are sludges produced?

   If yes, describe how the sludges are disposed of:

Wetland *(if applicable)*

1. Describe the Wetland wastewater treatment system.

   Not Applicable

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.

"Frost line has receded over past years. Lagoon has started to leech."

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:

"Yes. With new water (extra) lagoon will overfill".

Abandonment and Restoration

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

Old sewage lagoon, abandoned honey bag pit

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.

   Residents place solid waste outside the home in wooden boxes for collection. The waste is collected twice per week using a Ford model F-350 pickup truck and hauled to the 125,000 m² solid waste management site. An annual spring clean-up is organized by the Community.

2. Is the solid waste site fenced?

   __ Yes √_No

3. Is the fence adequate?

   __ Yes __ No

   If no, describe:

Waste Reduction

1. Does the municipality burn garbage?

   √_Yes __No

   If yes, describe how and when this is done.

   Wastes are burned twice weekly.

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.

Waste oil is disposed of at the Hamlet garage by incineration.

Bulky Scrap Metal Waste Disposal Area

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

√_ Yes __ No

If yes, briefly describe its location and operation plan.

A separate bulky waste site occupies an area of 7,500 m².

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.

"Government contractors doing what they want. (PPD)"

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

√_ Yes __ No

If yes, describe:

There is separation of hazardous wastes in the solid waste site. A separate signed area (not enclosed) is available for used batteries/paint etc. There are no plans to ship these products south for recycling/disposal. There are approximately 150 drums of unknown substance on site, which cannot be disposed of. There are

plans to send them on a sealift container for proper disposal.

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.

"Requires ongoing work and installation of a perimeter fence"

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.

"Unknown detail, CG&T Capital Plans"

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

Installation of fence

Abandonment and Restoration

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

"One buried site to the south of town."

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 2002
__ Community Government and Transportation Date:
__ Other: Date:

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

√_ Yes ___ No

If yes, describe.

"Standard Territorial Report Form"

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

√_ Yes ___ No

If yes, describe.

"Spill will dictate action".

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 line 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"

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.

"Plans in progress, Training"

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.

"Fencing, Cleanup"

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

   "Need cleanup"

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:
3. Contact:

Telephone #
Fax #

4. Population (according to most recent census results): 163
5. Estimated growth rate over next 5 years: 0.89%
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:

Prepared by:

Title:
Completion Date:

If no, are such studies being planned?

√_ No ___Yes (If yes, when and by whom):

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

√_No __Yes

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?

√_No ___Yes

If yes, provide details below.

Prepared by:
Title:
Completion Date:

If no, are such studies being planned?

√_ No __Yes

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 feet"

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 narrow strip of beach near the mouth of Grise Fiord. From the beach, the land slopes back into a series of low benches for about 100 m until it reaches the foot of a steep rock-face. The surficial soils in the area consist of free-draining gravel deposits. A major layer of silty sand with traces of gravel was identified over a large portion of the valley above the settlement. The depth of the permafrost table is approximately 0.6 m.
Mosses and lichens grow during the very 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?

"Gravity feed"

2. Is water drawn from the source

   √ intermittently
   ___ continuously

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

   July/August

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

   Up to 6 weeks

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

   "Unknown, varies yearly"

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

   Not Applicable

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:

   "230L – 2 chemical solution mixing tanks at 115L capacity each"

2. What is the capacity of the water storage facility:

   10,000,000 litres

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.

   Treatment facility consists of two chemical solution mixing tanks (each 115 L capacity), a 1/2 hp mixer, and a hypochlorinator.

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:

   500 m^3 solid retention pond (according to SAO)

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

"Currently at capacity"

4. Average depth of the wastewater lagoon

5. What is the design freeboard:

6. Indicate the retention time of the sewage while in the treatment facility days:
   11-12 months

7. Indicate the estimated rate of discharge of wastewater:

   "~10,000 L/hour"

8. Indicate the location of the discharge point:

   Northwest corner of lagoon

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)?

   3 weeks

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:

   125,000 m^2

2. The *average* depth of the solid waste disposal site

   Unknown

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

   "with work – years to come"

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?

   "Unknown"

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

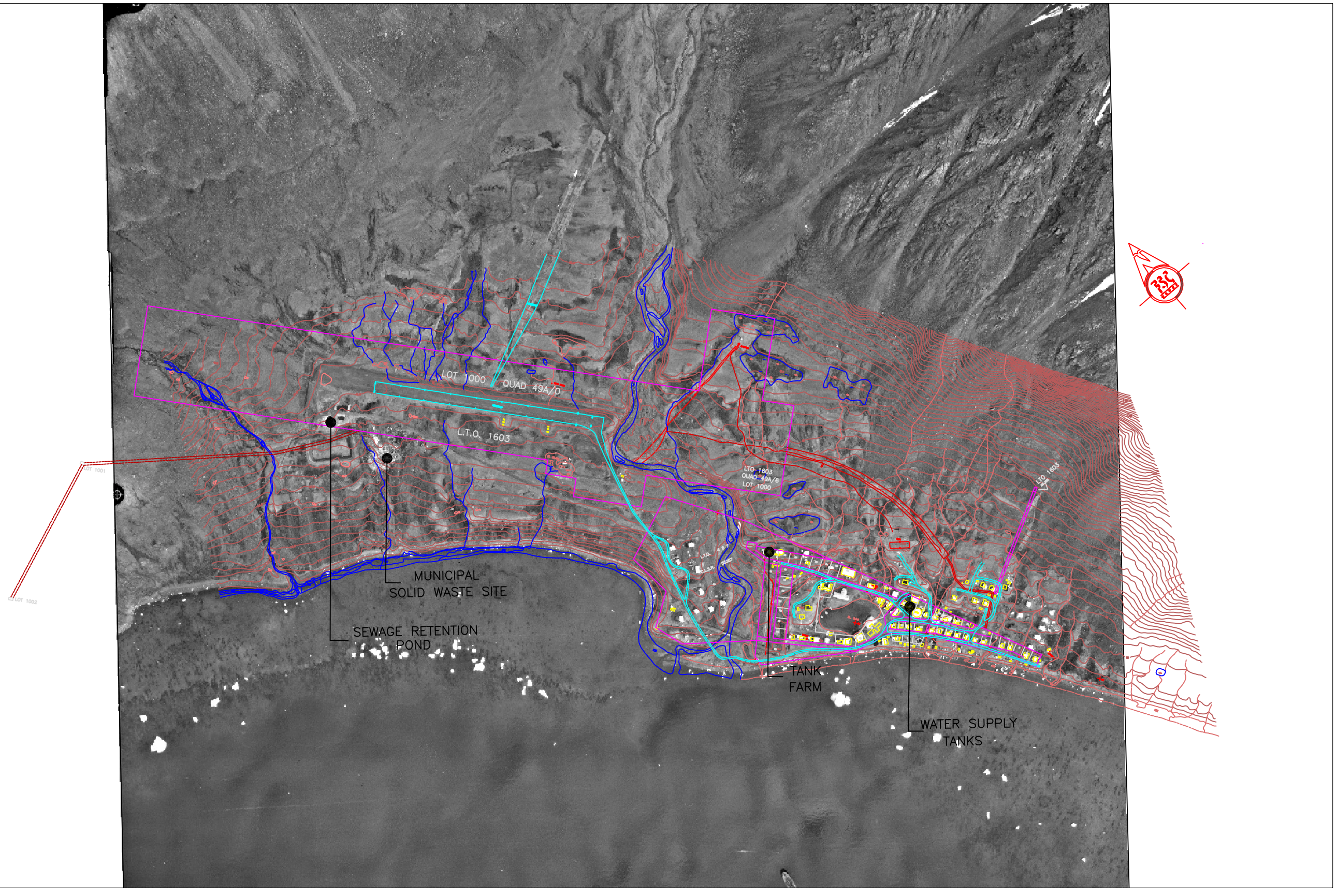
   If yes, attach a copy of the plan or indicate changes and include an implementation schedule.

   Include excerpt from MACA Capital Plan if available.

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

NO	REVISION	DATE	BY	APP'D

JOB TITLE

GRISE FIORD
WATER LICENCE

GRISE FIORD, NU

DRAWING TITLE

GRISE FIORD
HAMLET FACILITIES

DESIGNED BY: KH	SCALE: NTS
DRAWN BY: KH	DATE: JAN. 2, 2003
CHECKED BY: RJK	CLIENT PROJECT NO.
F.S.C. FILE NO.	F.S.C. JOB NO.: 2002-1000-051
SHEET: 1 OF 1	DRAWING NO: 1

Appendix 2
Hazardous Materials Spill Reports

Resources, Wildlife and Economic Development
investing in our future

Hazardous Materials Spill Database

Enviromental Protection Service of RWED

600, 5102-50th Avenue; Yellowknife, NT X1A 3S8
Phone: (867) 873-7654 Fax: (867) 873-0221

Northwest Territories

Thursday, September 26, 20 — **Grouped by Location:** Grise Fiord — **For the year(s) : 1998-2003** —

Spill No	Spill Date	Region	Location	Description	Commodity	Quantity (L or kg)	Party	Source	Agency
1999016	09-Feb-99	BAF	Grise Fiord	Tank Farm	Gasoline	100	Grise Fiord Co-op (POL)	PL	GNWT
1999127	30-Aug-99	BAF	Grise Fiord	Near Diesel/Gas Dispenser	Diesel P-50	205	Grise Fiord Co-op (POL)	ST>	GN
2000157	17-Jun-00	BAF	Grise Fiord	NTPC Tank Farm	Diesel P-50	100	NWTPC	ST>	GN

Total Spills in the Community of Grise Fiord: 3

1998155	13-Sep-98	BAF	Pond Inlet	Gas Station	Jet A-1	91	POL	TRU	GNWT
1999072		BAF	Pond Inlet	Takijualook School Main Tank	Heating Fuel P-50	150	Takijualook School	ST>	GN
1999142	16-Oct-99	BAF	Pond Inlet	Side Entrance of Pond Inlet Housing Shop	Diesel P-50	184	Housing Association	DRUM	GN
2001183	12-Jun-01	BAF	Pond Inlet	Water Lake	Hydraulic Fluid	0	-	TRU	GN
2001184	30-Sep-00	BAF	Pond Inlet	-	Sewage	0	Hamlet of Pond Inlet	SL	GN
2001212		BAF	Pond Inlet	-	Sewage	0	Hamlet of Pond Inlet	SL	GN
2001213		BAF	Pond Inlet	-	Used Crude Oil	0	Hamlet of Pond Inlet	ST<	GN
2001214		BAF	Pond Inlet	Dump	Crude Oil	0	Hamlet of Pond Inlet	DRUM	GN
2001233	17-Jul-01	BAF	Pond Inlet	Sewage Lagoon	Sewage	500	Hamlet of Pond Inlet	SL	INAC
2002359	04-Jun-02	BAF	Pond Inlet	Small Lake	Heating Fuel P-50	0	Unknown	UK	GN
2002363	01-Jun-02	BAF	Pond Inlet	Building 1030 Gov't Staff House	Fuel Oil P-50	91	T-S CoOp	ST<	GN

Total Spills in the Community of Pond Inlet: 11

Total Spills on this Report: 14

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
EP - 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

Appendix 3
INAC Inspection Reports

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 16, 2001.

Robert Sheaves
Senior Administrative Officer
Hamlet of Grise Fiord
General Delivery
Grise Fiord, NU X0A 0J0

July 20-21, 2001 Municipal Water Use Inspection - Report

Firstly, I wish to thank yourself for the much appreciated time and assistance provided during the tour of the Hamlet's water use and waste disposal facilities. Attached for your records is the Municipal Water Use Inspection Report pertaining to the July 20-21, 2001 inspection; considering the relatively limited resources at the Hamlet's disposal, its water use and waste disposal facilities appear efficiently managed. Nevertheless, the following considerations were noted:

- **Water supply:** Given the seasonal nature of the municipal water source, all efforts should be taken in order to ensure that the Hamlet possesses adequate water storage structures. However, as the commission of the additional storage tank is reportedly proceeding at a very slow pace, the Hamlet will once again be faced with the possibility of a water shortage prior to springtime. Accordingly, the Inspector trusts that the parties responsible for the work will see to its prompt completion. This being said, the attached analytical results relating to a sample collected from the catchment basin (figure 1) reveal that all tested parameters meet the *Guidelines for Canadian Drinking Water Quality*, save for a slight exception: a field pH value of 8.9 which rests above the 6.5-8.5 aesthetic objective.

- **Sewage disposal:** At the time of the inspection, the annual decant of the sewage disposal facility was to begin shortly since limited freeboard remained (figure 2). In this regards, it was mentioned that it may be advisable to restrict the flow of discharge by using a decanting line of smaller diameter, thus spreading the effluent release over a longer period of time in order to maximize aerobic decomposition and secondary biological treatment. It must also be noted that veins of seepage were noticeable along the downslope berm of the facility (figure 3), even if the extent of the seepage was minimal and did not permit sampling. In related matters, the Inspector acknowledges the partial reclamation of both the old sewage lagoon cell and the honeybag pit.

- **Solid waste disposal:** A considerable amount of segregation is undertaken at the solid waste disposal facility, as wood, hazardous materials, and bulky metal wastes are separated from the combustible household wastes. Further, it was mentioned that the Hamlet was diligently attempting to find southern end-users for its stockpiled scrap metal (figure 4). Regardless, a path of runoff from the solid waste disposal facility was observed during the inspection. As such, the attached analytical results relating to a leachate sample taken 30 metres downslope from the toe of the dump (figure 5) indicate that ammonia (3.62 mg/L vs 2.2 mg/L), cadmium (0.6 µg/L vs 0.017 µg/L), and iron (857 µg/L vs 300 µg/L) exceed the *Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life*. Nevertheless, the Microtox sample, which constitutes a reliable toxicity indicator (IC_{50}), did not attribute toxicity to the leachate.

Also of note are the numerous drums of 'unknown' contents stored alongside the solid waste disposal facility (figure 6). Since these cannot be disposed of at the Hamlet's waste oil furnace due to their unidentified nature, the Inspector acknowledges that the hamlet plans to see to their eventual placement on a sealift backhaul. Lastly, it was recognized that when the Hamlet's resources allow such undertakings, the erection of a perimeter fence around the solid waste disposal facility and the securing of a sealift container for the storage of hazardous materials would both significantly reduce the likelihood of waste being deposited into waters.

- **Non-compliance of Act or Licence:** The Hamlet does not currently hold the licence it requires under the *Northwest Territories Waters Act* and the *Nunavut Land Claims Agreement* for its municipal water use and waste disposal. Consequently, a licence application form was provided during the inspection, and the Inspector points out that INAC and/or other agencies can provide assistance in order to facilitate its submission to the Nunavut Water Board.

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)
- Baffin Health & Social Services, 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: 2001/07/20-21 **Licensee Rep.** (Name/Title): Robert Sheaves / SAO

Licensee: Hamlet of Grise Fiord **Licence No.:** unlicenced

WATER SUPPLY

Source(s): Catchment area from glacier-fed runoff **Quantity used:** recorded @ truck delivery

Owner:/Operator: GN/Hamlet

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

Intake Facilities: A	**Storage Structure:** U	**Treatment Systems:** A	**Chemical Storage:** A
Flow Meas. Device: NA	**Convey. Lines:** A	**Pumping Stations:** NA	

Comments: Improvements to the catchment basin planned for late summer, once the runoff stream will have dried up: dig to enlarge the pit, line, then cover. Aging water storage tank undersized for the community's needs; additional one still not erected. The required work, if at all undertaken by a this party this summer, will likely come too late in the year to allow for the testing/filling of the additional storage tank.

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:** **Trench:**

Solid Waste: **Owner/Operator:** GN/Hamlet

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

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

Discharge Quality: NA	**Decant Structure:** U	**Erosion:** A
Discharge Meas. Device: none	**Dyke Inspection:** NA	**Seepages:** U
Dams, Dykes: NA	**Freeboard:** U	**Spills:** none reported
Construction: NA	**O&M Plan:** NA	**A&R Plan:** NA
Periods of Discharge: A	**Effluent Discharge Rate:** not measured	

Comments: The imminent decant of the sewage lagoon has been postponed; no discharge sample could be collected. Very little freeboard remains. Decant structure located in an impractical area, therefore annual decant is carried on via pump and line over the downslope berm; the use of a smaller diameter line was suggested in order to spread the discharge over time and maximize effluent treatment. Several veins of seepage noted along the toe of the downslope berm. Honeybuckets no longer relied upon; old lagoon cell has been filled with scrap metal, and the backfilling of the cell and the honeybag pit is planned. Wood, hazardous materials and bulky metal wastes are segregated from the combustible household wastes at the unfenced solid waste disposal facility. Waste oil is adequately disposed of at the Hamlet garage (furnace). Approximately 150 drums which cannot be burned due to their 'unknown' contents are stored and monitored at the dump; plans to ship out on sealift backhauls.

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 required; may be collected during lagoon decant

INAC: raw water @ catchment basin, dump leachate

Signs Posted **SNP:** not applicable **Warning:** yes @ waste disposal facilities

Records & Reporting: not applicable

Geotechnical Inspection: not applicable

Non-Compliance of Act or Licence: Community is unlicenced.

Philippe Lavallée

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

figure 1. Catchment basin for seasonal glacier-fed runoff; 2001/07/20.

figure 2. Limited freeboard at the sewage disposal facility; 2001/07/20.

figure 3. Veins of seepage from the sewage disposal facility; 2001/07/20.

figure 4. Bulky metal wastes section of the solid waste disposal facility; 2001/07/20.

figure 5. Path of leachate from the toe of the solid waste disposal facility; 2001/07/20.

figure 6. Storage area for drums of 'unknown' contents; 2001/07/20.

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: DIAND District Office : Nunavut DIAND Operations *Attn:* Philippe Lavalllee

Sample ID: raw water **Taiga Sample ID:** 211657

Client Project: **Sample Type:** raw water **Received Date:** 22-Jul-01

Location: Grise Fiord **Sampling Date:** 20-Jul-01

Report Status: **Preliminary** ***Approved by:***

Test Parameter	Result	Units	Detection Limit	Analysis Date
Physicals				
Colour	<5		5	25-Jul-01
Solids, Total Dissolved	20	mg/L	10	21-Aug-01
Turbidity	0.5	NTU	0.1	25-Jul-01
Nutrients				
Ammonia as N	0.076	mg/L	0.005	06-Sep-01
Nitrate as N	0.043	mg/L	0.008	01-Aug-01
Major Ions				
Chloride	2.4	mg/L	0.2	01-Aug-01
Sodium	1.80	mg/L	0.02	26-Jul-01
Sulphate	<3	mg/L	3	08-Aug-01
Metals, Total				
Arsenic	<1.0	µg/L	1.0	30-Jul-01
Cadmium	<0.3	µg/L	0.3	26-Jul-01
Chromium	<3	µg/L	3	26-Jul-01
Cobalt	<1	µg/L	1	26-Jul-01

Field Data (01/07/20) **raw water**
Temperature: 12.0 °C
Conductivity: 44 µS/cm
pH: 8.9 **Time:** 13:44

Report Date: October 19, 2001

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Fax: (867)-669-2718

- CERTIFICATE OF ANALYSIS -

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

Sample ID: raw water **Taiga Sample ID: 211657**

Copper	< 2	µg/L	2	26-Jul-01
Iron	94	µg/L	30	27-Jul-01
Lead	< 1	µg/L	1	26-Jul-01
Manganese	1	µg/L	1	26-Jul-01
Mercury	< 0.01	µg/L	0.01	03-Aug-01
Nickel	< 1	µg/L	1	26-Jul-01
Zinc	< 10	µg/L	10	26-Jul-01

Report Date: October 19, 2001

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: DIAND District Office : Nunavut DIAND Operations *Attn:* Philippe Lavalllee

Sample ID: Grise Fiord **Taiga Sample ID:** 211658

Client Project: **Sample Type:** Sewage **Received Date:** 22-Jul-01

Location: Grise Fiord **Sampling Date:** 20-Jul-01

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

Lab Section	Test Parameter	Result	Units	Detection Limit	Analysis Date
Nutrients	Ammonia as N	3.62	mg/L	0.005	01-Aug-01
Organic	Oil and Grease	0.9	mg/L	0.2	07-Aug-01
Physicals	Solids, Total Suspended	10	mg/L	3	02-Aug-01
Total Metals	Arsenic	<1.0	µg/L	1.0	30-Jul-01
	Cadmium	0.6	µg/L	0.3	26-Jul-01
	Chromium	<3	µg/L	3	26-Jul-01
	Cobalt	<1	µg/L	1	26-Jul-01
	Copper	<2	µg/L	2	26-Jul-01
	Iron	857	µg/L	30	27-Jul-01
	Lead	<1	µg/L	1	26-Jul-01
	Manganese	1	µg/L	1	26-Jul-01
	Mercury	<0.01	µg/L	0.01	03-Aug-01
	Nickel	<1	µg/L	1	26-Jul-01
	Zinc	<10	µg/L	10	26-Jul-01

Report Date: August 9, 2001

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: DIAND District Office : Nunavut DIAND Operations *Attn:* Philippe Lavalllee

Sample ID: Grise Fiord

Taiga Sample ID: 211658

Field Data (01/07/20) dump
Temperature: 11.0 °C
Conductivity: 867 µS/cm
pH: 7.5 **Time:** 14:20

Report Date: August 9, 2001

REPORT OF TOXICITY USING MICROTOX

COMPANY/LOCATION: **Grise Fiord Dump Leachate**

Sample Collected By: Philippe Lavallee

Date/Time Sampled: July 20, 2001

Date/Time Received: N/A

Date/Time Test Start: July 24, 2001

Sample Type: Elutriate
Sampling Method: Grab

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

RESULTS: **NON TOXIC at 45% Concentration**

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

TEST SUBSTANCE/CONDITIONS

pH of Sample: 8.0 (No pH adjustment)

Sample Appearance: Clear, no colour adjustment

Lot # of OAS: OSA007
(Osmotic Adjusting Solution)

Lot # of Reconstitution Solution: RSN099Y

Lot # of Diluent: DIL034L

TEST METHODS AND CONDITIONS

Test Start Date/Time: July 24, 2001 / 11:45 PM

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

QUALITY CONTROL

Reference Toxicant: Zinc Sulfate Standard

Analyst: RB

Date of Test: July 24, 2001

Reagent Lot #: ACV023-3

IC_{50} - 15 minutes mg/L: 2.7 mg/L

IC_{50} Confidence Range: 1.8 to 3.9 mg/L

TEST ANALYST: Ron Bujold

INITIAL: RB