

Hamlet of Kimmirut Environmental Facilities

Quality Assurance/Quality Control Plan

MAY 2016

HAMLET OF KIMMIRUT

BAFFIN REGION

NUNAVUT

Hamlet of Kimmirut Environment Monitoring Program
(QA/QC Plan)

Table of Contents

1.0	Introduction	
1.1	Background-----	03
1.2	Monitoring and Regulatory-----	04
1.3	Objectives-----	04
1.4	Scope of Works-----	04
1.5	Definitions-----	04
2.0	Field sampling-----	05
2.1	Sampling Procedures-----	05
2.2	Sampling collection -----	06
	2.2.1 Locations-----	06
	2.2.2 Sampling Equipment-----	06
	2.2.3 Sampling Methods-----	06
	2.2.3.1 Waste water sampling-----	06
2.3	Sample Handling-----	07
2.4	Quality assurance and quality Control Program-----	08
3.0	Laboratory Analysis-----	09
	3.1 Laboratory Accreditation-----	09
	3.2 Method Detection Limits-----	09
4.0	Reporting Requirements-----	10
	4.1 General submission-----	10
5.0	References-----	11
Appendices		
Appendix A: Site Plan		
Appendix B: Environmental Monitoring Program: Sample Bottle Requirements and Laboratory Accreditation		
Appendix-C: A Chain of Custody Sheet		
Appendix-D: Capacity of Sample bottles: Monitoring Program		

Hamlet of Kimmirut Environment Monitoring Program
(QA/QC Plan)

1.0 Introduction

The purpose of the QA/QC Plan of the Hamlet of Kimmirut Water licence is to ensure that samples taken in the field as part of the Monitoring Program will maintain a high quality, so as to accurately represent the physical and chemical nature of the samples being taken. It should also be noted that while minimum sampling requirements have been imposed, additional sampling may be requested by an inspector.

1.1 Background

Kimmirut is an Inuit Community located on the south end of Baffin Island, located at 62°50'06"N and 69°52'04"W. The current population of the Community is 485. The water licence of the Hamlet of Kimmirut #3BM-KIM0911 expired on January 29, 2011. This licence covers the water supply system, wastewater treatment facility and waste management facility.

Water supply system: The Hamlet of Kimmirut uses Fundo Lake for potable water. The community is 100% serviced by trucked water delivery. The truck fill station is located midway along the eastern shore of Fundo Lake, approximately 1.5 km south of the Community. As per Water Licence # KIM0911, the quantity of water extracted is not to exceed 30,000 cubic meters annually.

Waste Management Facility: The community's waste management facility is located approximately 0.75 km south of the community.

Sewage Treatment Facility: The community's existing wastewater disposal system is located next to the waste management facility approximately 0.75 km south of the community. The wastewater disposal system currently used consists of a trench at the landfill where the trucked sewage is deposited. The sewage flows onto an embankment dropping a total of 40 metres (170 metres horizontally). This is followed by a gradual drop of 20 metres (200 to 300 metres horizontally) to the ocean at Lake Harbour. The lower gradual sloped portion of the discharge area contains a significant grass and willow area that provides some degree of treatment, but this may be limited to preliminary treatment.

The Licensee requests the following two (2) facilities be removed from the water licence:

1. The enhanced sewage lagoon facility located 1.5 km west of the community

In 2001 a new sewage lagoon was constructed about 1.5 km west of the Community. This lagoon consisted of 1 berm across a natural gulch, making use of the existing terrain to form a lagoon. This system was not commissioned and was later determined to be undersized. The system was upgraded to include two lagoons with low permeability berms. Additional treatment is achieved in the downstream wetland area. This 3 hectare wetland ultimately discharges into Tuullitsit Lake. Following the construction of the lagoons, concerns were raised by regulatory agencies and local community members regarding the presence of fish in the wetland area. A fish study was conducted to assess the downstream wetland which would ultimately accept the discharge from

Hamlet of Kimmirut Environment Monitoring Program (QA/QC Plan)

the lagoon system. Through community consultations and site assessments, it was confirmed that the area was fish bearing.

The Hamlet recognizes that the current wastewater disposal practice is not supported by the regulatory agencies. Over the course of 2016/2017 the Hamlet and CGS will work with the appropriate authorities to determine if the enhanced sewage lagoon can comply with all relevant regulations and be brought online. In the event that this system cannot be brought online CGS will initiate the necessary steps to develop a new sewage treatment system that complies with the terms and conditions of the water licence.

2. The solid waste disposal facility located 1.5 KM west of the community adjacent to the enhanced sewage lagoon.

In 2001 an area of land was fenced to provide a new waste management facility. This fenced area of land is not appropriate for a solid waste site, and as such there are no future plans to use this site as a municipal solid waste site.

1.2 Monitoring and Regulatory Requirement

Item 3 of Part H water licence requires that the Licensee shall conform to the Quality Assurance/Quality Control (QA/QC) Plan, which shall be provided to the licensee by the NWB within 6 months of the issuance of this licence.

1.3 Objectives

The objectives of this QA/QC plan are to (i) to ensure the reliability of the data collected during monitoring activities at the locations specified in the Hamlet's water licence , and (ii) satisfy the requirement of the water licence.

1.4 Scope of work

The QA/QC Plan covers the environmental monitoring program undertaken under the Hamlet Water licence such as Water supply system, waste water treatment system and wastes management as shown in the site plan.

1.5 Definitions

The following definitions that are relevant to this plan include:

Quality Assurance is a system that ensures that quality control procedures are correctly performed and documented.

Hamlet of Kimmirut Environment Monitoring Program
(QA/QC Plan)

Quality control refers to the established procedures observed both in the field and in the laboratory, designed to ensure that the resulting end data meet intended quality objectives.

Trip Blank is a sample of clean water that was prepared by the analytical laboratory and shipped to the sample site in the cooler along with the empty sample bottles. This trip blank sample remains unopened and is transported back to the laboratory with the monitoring program samples. The trip blank is analyzed by the Laboratory along with the monitoring program samples. The purpose of the trip blank is to assess contamination introduced during shipping and field handling procedures.

CALA refers to the Canadian Association for Laboratory Accreditation, formally known as the Canadian Association of Environmental Analytical laboratories (CAEAL).

Chain of Custody Documentation refers to the documentation that accompanies samples set to an analytical laboratory. It is a legal document which ensures that the sample taken at a specific site is the sample received in the laboratory. It also provides information on the sample condition and integrity as received by the laboratory.

2.0 Field Sampling

2.1 Sampling procedures

All sampling, sample preservation and analyses shall be conducted in accordance with methods prescribed in the current edition of Standard Methods for the examination of Water and Waste water, or by such other methods approved by the Board. All analyses shall be performed in a Laboratory certified by the Canadian Association of Environmental Analytical Laboratories (CAEAL) or as otherwise approved by NWB.

To obtain meaningful results from the analyses, the following six factors are of particular importance:

- Sample collection as per schedule and location
- Correct usage of container/sample bottle for parameter being tested.
- Correct labeling of sample bottles and filling out record/field sheet
- Correct procedure for field sampling
- Proper and timely shipment of samples to the laboratory
- Timely delivery of samples to the laboratory from the air cargo facility.

2.2 Sampling Collection

Refer to the Environmental Monitoring Program Checklist, found in **Appendix C** for the specific details on the sampling locations, equipment and sampling methods.

Hamlet of Kimmirut Environment Monitoring Program
(QA/QC Plan)

2.2.1

The Water Licence issued to the Hamlet of Kimmirut by the NWB specifies three monitoring stations across the licensed facilities:

KIM- 1: Raw water supply intake at Fundo Lake.

KIM-2: Runoff from the solid waste disposal Facilities

KIM-3: Effluent discharge from the existing Sewage disposal facilities.

The following table includes the geographic coordinates for the three monitoring stations described above:

Monitoring Station	Latitude	Longitude
KIM-1	TBD	TBD
KIM-2	TBD	TBD
KIM-2	TBD	TBF

TBD: To be determined.

Hamlet of Kimmirut Environment Monitoring Program
(QA/QC Plan)

2.2.2 Sampling Equipment

Dedicated latex or nitrile gloves (i.e., one pair per sample) are to be used during sample handling. Dedicated sampling equipment such as sampling poles (see photo below for an example) are to be cleaned with soap and water after each sample is collected to prevent cross-contamination. Environmental monitoring samples collected for analysis of selected chemical parameters are to be placed directly into new pre-cleaned, laboratory-supplied sample bottles. All monitoring samples are to be placed in clean coolers for transportation to the subcontract laboratory. The samples are transported/submitted under Chain of Custody documentation. Included on a Chain of Custody form is the client information, the sample information, the analyses requested, the relevant regulations, the turnaround time for the analytical results, comments, and temperature of the samples at the time they arrived in the laboratory. An example of a completed Chain of Custody form is included in **Appendix C**.



2.2.3 Sampling Methods

Please see Appendix B for the Environmental Monitoring Program Schedule. As a general recommendation, please refrain from using insect repellent, disinfection hand gel or

other chemical products before and during sample collection. Also, please refrain from smoking during sample collection.

2.2.3.1 Wastewater Sampling

Wastewater influent samples are collected from the active sewage disposal facility at station KIM-3. Wastewater influent samples are collected from the Sewage effluent stream by immersing the sample bottle into the neck first to a depth of 0.20 to 0.50 m if possible). The sampling container is filled with influent wastewater and the sample bottle is raised neck first to prevent sample spillage.

On monthly basis, from May to August, samples will be collected from the stations at KIM-2 and KIM-3 as long as the flow is observed.

Hamlet of Kimmirut Environment Monitoring Program
(QA/QC Plan)

2.3 Sample Handling

All water samples are to be collected in laboratory-supplied containers with the proper preservative where applicable. All sample containers are to be tightly sealed and properly labeled with the sample ID, date and time of sample collection, location of sample collection and parameters to be analyzed. The outside of the bottles are to be cleaned with soap and water after sampling and dried off prior to placing the samples in the cooler. The samples are to be stored on ice in a cooler until delivery to the laboratory. A chain of custody form is to be filled out completely and is used to track the samples and placed in the cooler with the samples, in a zip lock bag. Keep the last page of the Chain of Custody and give it to the Hamlet Foreman for their records.

The following checks are generally performed by the laboratory upon receipt:

- Verification of the integrity and condition of all sample coolers.
- Verification of the integrity and condition of all sample containers.
- Checks for leakage, cracked or broken closures or containers, evidence of grossly contaminated container exteriors or shipping cooler interiors, and obvious odors, etc.
- Verification of receipt of complete documentation for each container.
- Verification that sample identification numbers on sample transmittal forms corresponds to sample identification numbers on the sample containers.
- Verifications that holding times were met and samples were kept cool during transit.

2.4 Quality Assurance and Quality Control Program

Cross contamination is a common source of error in sampling procedures. QC samples help identify when and how contamination might occur. There are various types of QC samples. For the purposes of the Hamlet's environmental monitoring, CGS recommends the use of trip blanks if and where applicable.

It is essential to request a trip blank sample to be prepared when placing the bottle order with the contract laboratory.

Hamlet of Kimmirut Environment Monitoring Program
(QA/QC Plan)

3.0 Laboratory Analyses

3.1 Laboratory Accreditation

As indicated in the Guidelines, the Hamlet of Kimmirut should use an analytical laboratory accredited by the Canadian Association for Laboratory Accreditation (CALA); formally known as the Canadian Association for Environmental Analytical Laboratories (CAEAL) for the monitoring program for NWB Licence # 3BM-KIM0911. Appendix B includes a copy of the laboratory's CALA accreditation certificate.

3.2 Method Detection Limits

The method detection limits (MDLs) are provided on the contract laboratory's Certificates of Analysis.

Hamlet of Kimmirut Environment Monitoring Program
(QA/QC Plan)

4.0 Reporting Requirements

4.1 General Submissions

As a condition of NWB Licence # 3BM-KIM 0911, the Hamlet of Kimmirut is required to submit an Annual Report to the NWB, no later than March 31st of the year following the calendar year reported which shall contain the information of item 1 of Part B of the Water Licence.

The annual lab results are attached with the Annual Report.

Hamlet of Kimmirut Environment Monitoring Program
(QA/QC Plan)

References

Quality Assurance (QA) and Quality Control (QC) Guidelines for use by Class “B” Licensees in Collecting Representative Water Samples in the Field and for Submission of a QA/QC Plan, Department of Indian and Northern Affairs Canada, July 1996.

Standard Methods for the Examination of Water and Wastewater, American Public Health Association, American Water Works Association, and Water Environment Federation, 22nd Edition, 2012.

exp Services Inc. (2013); QA/QC Plan for Cape Dorset, Kimmirut and Hall Beach

Appendices:

Appendix-A: Site Plan

Appendix-B: Environmental Monitoring Program Checklist, Summary of Sample Bottles requirements and Subcontract Laboratory Accreditation

Appendix-C: Chain of Custody Sheet

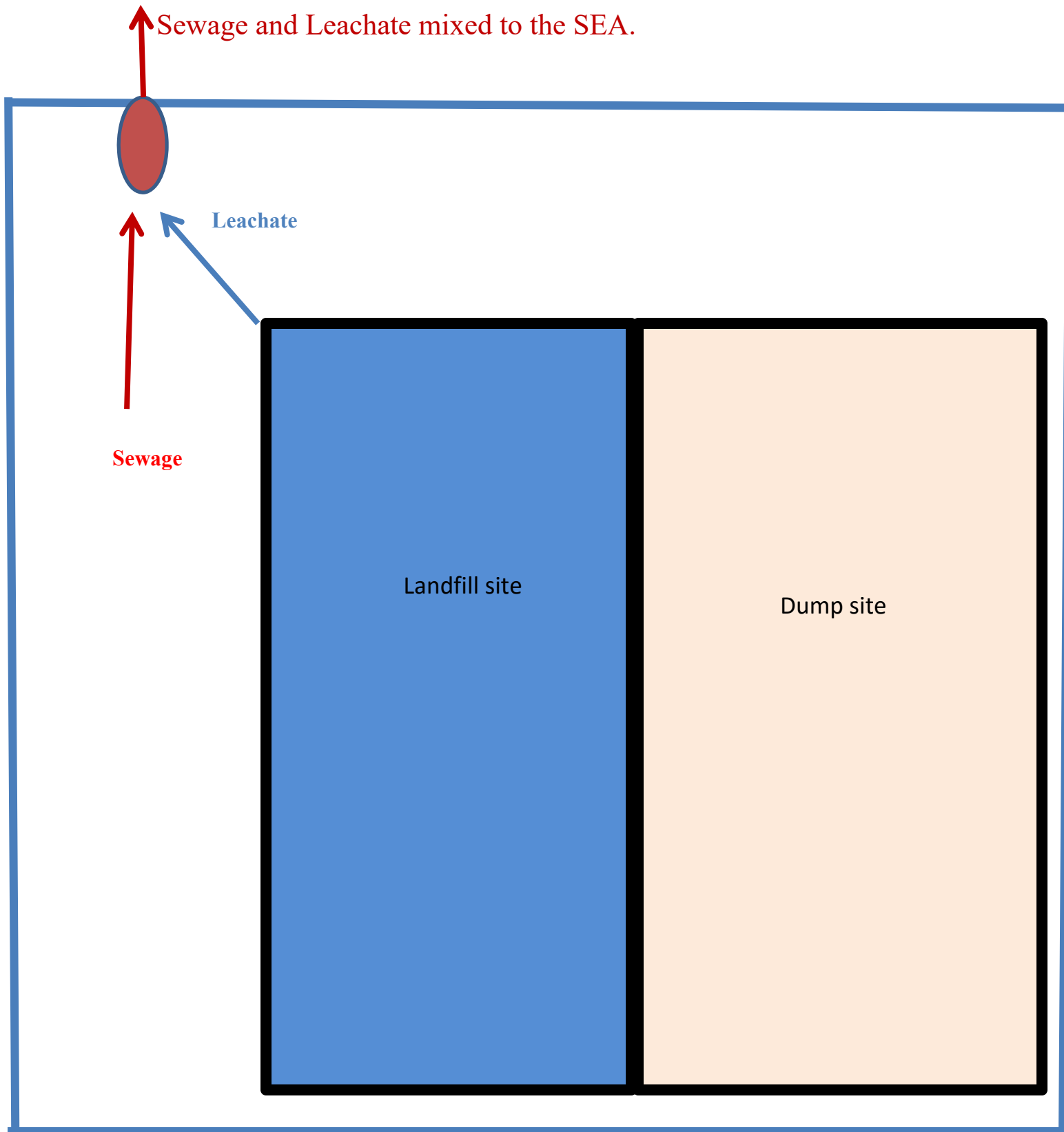
Appendix-D: Designated sample bottles and their capacities: Monitoring Program

Hamlet of Kimmirut Environment Monitoring Program
(QA/QC Plan)

APPENDIX- A

SITE PLAN

Hamlet of Kimmirut Environment Monitoring Program
(QA/QC Plan)



Site Plan

Hamlet of Kimmirut Environment Monitoring Program
(QA/QC Plan)

APPENDIX-B
ENVIRONMENTAL MONITORING PROGRAM
AND
SAMPLE BOTTLE REQUIREMENTS

Hamlet of Kimmirut Environment Monitoring Program
(QA/QC Plan)

Bottle Order	At least two weeks before upcoming environmental sampling, send a request to the contract laboratory for the appropriate sample sets (bottles) for the required sampling test groups (see conditions 2 of Part H of Nunavut Water Board Licence #NWB3YRB0308).	
Personal Procedure Equipment	Ensure that the required personal protective equipment (PPE), such as latex gloves, is on hand before commencing the environmental monitoring program.	
Bottle shipment	Ensure that bottles shipment has arrived from the laboratory in time for the sampling program and verify the integrity of all sampling containers. Report any missing bottles or broken bottles to the lab as soon as possible so that the replacement bottles may be shipped.	
Sampling Location Inspections	Perform an initial inspection of all the monitoring sampling program stations before the commencement of the monitoring program. Make sure of any equipment damage or conditions that may prevent the collection of the Environmental monitoring program samples.	
	General sampling Instructions	
Prevention of cross Contamination	Ensure that any laboratory provided sampling instructions are strictly followed. Latex or nitrile gloves should be worn during sampling and should be replaced with fresh gloves after all sampling containers are filled at each location. Dedicated sampling equipment such as sampling poles should be cleaned with soap and water after each sample is collected to prevent cross-contamination. As a general recommendation, please refrain from using insect repellent, disinfection hand gel or other chemical products before and during sample collection. Also refrain from smoking during sampling.	
Sample Care(including packing of Cooler)	All the sample containers should be tightly sealed and properly labeled with sample ID, date and time of sample collection, location of sample collection and parameters to be analyzed. The outside of the bottles should be cleaned with soap and water and dried prior to placing the samples in the cooler. The samples should be stored on ice in a cooler until delivery to the laboratory. A chain of Custody form should be filled out completely and be used to track the samples and placed in the cooler with the samples, in a Zip lock bag. Keep the last page of the chain of Custody and retain in the Hamlet garage for their records.	
	Raw Water Supply	
Sampling station KIM-1	Raw water prior to chlorination can be collected from the intake pipe coming from the Pump station located at Fundo Lake.	
	Waste Disposal Facility.	
Sampling Station KIM-2	Runoff from the Solid waste disposal Facilities. Monthly from June to Sep.	
Sampling Station KIM-3	Effluent discharge is collected from the Final effluent discharge point of the Sewage Disposal Facility monthly from June to Sep.	

Name:

Signature:

Date:

Hamlet of Kimmirut Environment Monitoring Program
(QA/QC Plan)

Laboratory Accreditation & Supporting
Documentation



CALA Directory of Laboratories

Canadian Association for

Laboratory Accreditation Inc.

Membership Number: 2644

Laboratory Name: **Caduceon Environmental Laboratories {Ottawa}**

Parent Institution: Caduceon Enterprises Inc.

Address: 2378 Holly Lane Ottawa ON K1V 7P1

Contact: Mr. Greg Clarkin

Phone: {613} 526-0123; Fax: {613} 526-1244; Email: gclarkin@caduceonlabs.com

Standard: Conforms with requirements of ISO/IEC

17025 Clients Served: Revised On: May 9, 2013

Valid To: October 25, 2015

Note:

1. The Licensee shall sample monthly at Monitoring Station YRB-3 during the months of May to August , inclusive and analyze samples for the following parameters:

BOD, pH, Total Suspended Solids, Nitrate-Nitrite, Total Phenols, Sodium, Magnesium, Total Arsenic, Total Copper, Total Iron, Total Mercury, Total Zinc, Faecal Coliform, Conductivity, Ammonia Nitrogen, Oil and Grease (Visual), Sulphate, Potassium, Calcium, Total Cadmium, Total Chromium, Total Lead and Total Nickel.

2. The Licensee shall conform to the Quality Assurance and Quality Control (QA/QC) Plan attached.

APPENDIX-C
A CHAIN OF CUSTODY SHEET

<p>CADUCEUS ENVIRONMENTAL LABORATORIES <i>Client committed. Quality assured.</i></p>						TESTING REQUIREMENTS <input type="checkbox"/> O.Reg 153 Table _____ <input type="checkbox"/> Surface Soil <input type="checkbox"/> Sub Surface Soil <input type="checkbox"/> Yes <input type="checkbox"/> No Record of Site Condition <input type="checkbox"/> Provincial Water Quality Objectives <input type="checkbox"/> Sewer Use By-Law: _____								REPORT NUMBER (Lab Use)										
Indicate Laboratory Samples are submitted to:										Kingston		<input type="checkbox"/>		Ottawa		Richmond Hill		Windsor						
Organization:		Address and Invoicing Address (if different)							YES REQUESTED (Print Test in B)						TURNAROUND SERVICE REQUESTED (see back page)									
Contact:																								
Tel:																								
Fax:									Quote No.:			Project Name:												
Email:		P.O. No.:			Additional Info:																			
Are any samples to be submitted intended for Human Consumption under any Drinking Water Regulations? (If yes, submit all drinking water samples on a drinking water Chain of Custody)																								
* Sample Matrix Legend: WW=Waste Water SW=Surface Water GW=Groundwater LS=Liquid Sludge SS=Solid Sludge S=Soil Sed=Sediment PC=Paint Chips F=Filter Oil = Oil																								
Lab No:	Sample Identification	S.P.L.	Sample Matrix *	Date Collected (yy-mm-dd)	Time Collected	Indicate Test For Each Sample (Check Mark In The Box Provided)									Field pH		Temp.	# Bottles/Sample	Field Filtered(Y/N)					
1																								
2																								
3																								
SAMPLE SUBMISSION INFORMATION			SHIPPING INFORMATION					SAMPLE RECEIVING INFORMATION (LABORATORY USE ONLY)																
Sampled by:		Submitted by:		Client's Courier		Invoice		Signature:																
Print:				Caduceus's Courier				Time Received:																
Sign:				Drop Off		# of Pieces		Laboratory Prepared By <input type="checkbox"/> Yes <input type="checkbox"/> No																
				Caduceon (Pick-up)				Labeled by:																
Date (yy-mm-dd)/Time:		Date (yy-mm-dd)/Time:																						
Laboratory Locations/Shipping Addresses: Kingston Lab - 285 Dalton Ave., Kingston, ON K7K 6Z1, Tel: (613) 544-2001 Fax: (613) 544-2770 Email: contactkingston@caduceonlabs.com Ottawa Lab - 2378 Holly Lane, Ottawa, ON K1V 7P1, Tel: (613) 526-0123 Fax: (613) 526-1244 Email: contactottawa@caduceonlabs.com Richmond Hill Lab - #14-110 West Beaver Creek Rd., ON L4B 1J9, Tel: (289) 475-5442 Fax: (866) 562-1963 Email: contactrichmondhill@caduceonlabs.com Windsor Lab - #5-3201 Marentette Ave., Windsor, ON N8X 4G3, Tel: (519) 966-9541 Fax: (519) 966-9567 Email: contactwindsor@caduceonlabs.com																								
Page ____ of ____																								
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APPENDIX-D

Guide Lines for Water, Wastewater and Leachate sampling Baffin Communities

Drinking water:

Monthly Sampling: (Bacteria analysis)

1. Collect five samples (**200 ml each**) from five different locations and send to Iqaluit Health Lab through your local health center. One of the five samples should be raw water sample.
Once in a month for Resolute Bay.

Annual Sampling: (Microbiological and Chemical Analysis)

2. Send samples to Caducean Environmental Lab, Ottawa, Ontario.

Caducean Environmental Lab

Gord Murphy/Rebecca Marshall, Lab Supervisor

2378 Holly Lane

Ottawa, ON, K1V 7V1

Ph-613-526-0123

Fax-613-526-1244

Precautions of Sampling:

1. Be careful not to let the mouth of the bottle or lid touch anything including sampler's fingers.
2. Do not overfill the bottle or rinse out
3. Fill the bottle to the 200ml line from water tap, valve or water truck delivery hose nozzle. When sampling from a water tap, remove screen, aerator or other attachment from tap and allow the cold water to run for 2-3 minutes before collecting. Do not dip into the filled water truck tank to take a sample.
4. Ensure each bottle label information is filled for:
 - Date and time sample was taken
 - Sample point location
 - Sampler's name
5. Persons' name and contact address where to send sample Test results and invoice.
6. Samples must arrive at the Labs either Iqaluit or Ottawa within 24 hrs. from the time of sampling.

Wastewater:

1. Collect five treated samples from the first point of discharge of Sewage (YRB-3).
2. Collect Five raw samples directly from the truck discharge (YRB-2)

Sample bottles specifications for Wastewater and leachate:

All the wastewater and Leachate samples will be sent to Caducean Lab, Ottawa, ON.

Waste water you get 8 bottles / sample with 3 samples / cooler.

2 Pet 500 ml
1 O& G 1000 ml
1 Metals red Cap 125 ml
1 TKN/TP Yellow 125 ml
1 Phenol Glass 125 ml
1 300 ml Bacteria
2 TOC 40 ml x 2

Raw Drinking Water 7 Bottles per sample

1 L amber 1000 ml for surfactants
1 Metals red Cap 125 ml
1 Phenol Glass 125 ml
1 GWC clear 500 ml
2 x 250 ml TSS Raw and Treated
1 Green cap CN 125 ml

Precautions of sampling:

1. Use hand gloves
2. Ensure each bottle level information is filled:
 1. Date and time sample taken
 2. Location with GPS coordinates
 3. Sampler's name
 4. Person's name and contact information where to send sample Test Results and invoice.
5. Samples must be arrived Ottawa Lab within 24 hours from the time of sampling.

Hamlet of Kimmirut Environment Monitoring Program
(QA/QC Plan)