



# **Gjoa Haven, NU Sewage Lagoon Operation and Maintenance Manual**

*Hamlet of Gjoa Haven*

*May 31, 2014*

Sewage Lagoon – Operation and Maintenance  
Manual

Department of Community & Government  
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*Submitted by*

**Dillon Consulting Limited**

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## TABLE OF CONTENTS

		<u>Page No.</u>
<b>1</b>	<b>INTRODUCTION .....</b>	<b>1</b>
1.1	Purpose .....	1
1.2	Site Setting.....	1
<b>2</b>	<b>OPERATIONAL AND MAINTENANCE PROCEDURES.....</b>	<b>3</b>
2.1	Sewage Lagoon and Wetland System .....	3
2.2	Yearly Operation and Maintenance.....	3
2.2.1	Operation from Freeze-up to Break-up .....	3
2.2.2	Operation from Break-up to Freeze-up .....	3
2.3	Lagoon and Wetland Monitoring Program .....	4
2.3.1	Program Description .....	4
2.3.2	Program Schedule.....	4
2.3.3	Record of Sampling Events .....	6
2.4	Sewage Sludge Management Plan .....	6
2.4.1	Characterization of Sludge .....	6
2.4.2	Storage, Treatment and Disposal of Sludge .....	6
2.4.3	Methods for Performing Sludge Depth Measurements.....	6
2.4.4	Methods for Sampling Sludge .....	10
2.5	Quality Assurance/Quality Control Plan for Lagoon and Wetland Monitoring Program.....	12
2.5.1	Sample Collection.....	12
2.5.2	Laboratory Analysis.....	15
2.6	Managing Insects and Weeds.....	15
2.6.1	Insect Management .....	15
2.6.2	Weed Management .....	15
2.7	Measures to Prevent Short-Circuiting .....	15
2.8	Measures to Prevent Stagnation and Excessive Odour.....	16
2.9	Site Records .....	16
2.10	Safety Procedures .....	17
2.11	Site Access Control .....	17
2.12	Contact Numbers.....	17
<b>3</b>	<b>EMERGENCY RESPONSE.....</b>	<b>18</b>
3.1	Emergency Contact Numbers .....	18
3.2	Contingency Planning .....	18
3.3	Spill Contingency Plan .....	18
3.4	Fire Response Plan .....	19
<b>4</b>	<b>REFERENCES .....</b>	<b>20</b>

## **LIST OF FIGURES**

Figure 1-1. Site Map of Sewage Lagoon .....	2
Figure 2-1. Sampling Locations for Sewage Lagoon and Wetland Treatment Area .....	5
Figure 2-2. Photo of Sludge Judge® .....	7
Figure 2-3. Locations for Sludge Depth Measurements and Sampling .....	8
Figure 2-4. Sketch of Tube After Retrieving Lagoon Effluent Depth Measurement (Not to Scale) .....	9
Figure 2-5. Sketch of Lagoon Cross-Section and Total Depth Measurement (Not to Scale) .....	10

## **LIST OF TABLES**

Table 2-1. Quality Standards for Effluent Discharged from Station GJO-4 .....	4
Table 2-2. Sampling Program Schedule .....	5

## **LIST OF APPENDICES**

APPENDIX A: Sewage Lagoon Treatment Facility Annual Report Form	
APPENDIX B: Spill Contingency Plan	

## **1 INTRODUCTION**

### **1.1 Purpose**

The purpose of this manual is to assist the Hamlet of Gjoa Haven personnel with the operation and maintenance of their newly constructed sewage treatment facility. The manual has been developed according to the requirements of the Nunavut Water Board (NWB) and is based on the *Guidelines for the Preparation of an Operation and Maintenance Manual for Sewage and Solid Waste Disposal Facilities in the Northwest Territories* (Duong and Kent, 1996).

### **1.2 Site Setting**

The Hamlet of Gjoa Haven is located at 68°37' N latitude and 95°50' W longitude (according to Google Earth Pro, 2007), on the southern tip of King William Island, Kitikmeot Region, Nunavut. Topography consists mostly of sands and gravels with a continuous permafrost zone. Low lying vegetation such as mosses and lichens are predominant with hardy grasses found in some areas. Year round access to the hamlet is limited to air travel, however, during the summer months freight may be brought in by sealift.

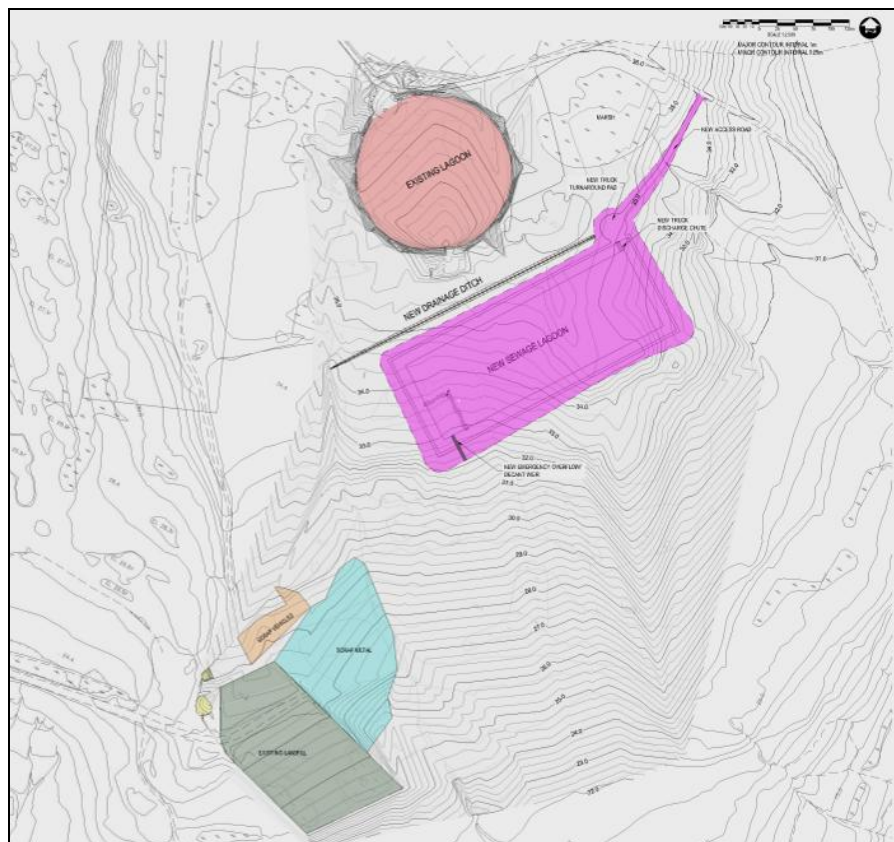
The average annual precipitation in Gjoa Haven consists of 5.1 cm of rainfall and 25.5 cm of snowfall. The mean high in July is 13.1 °C with a mean low of 7.2 °C. In January, the mean high is -23.9 °C and mean low of -35.9 °C. The permafrost is continuous, extending to depths from 20 m to over 120 m. The active layer varies between 0.55 m and 0.25 m.

Prior to construction of the new sewage lagoon, the hamlet was collecting sewage from the community by a sewage truck which was then discharged into a single-cell sewage lagoon connected to a secondary cell outside by an overflow discharge pipe across the berm. The lagoon was located 1.5 km from the community and had an approximate volume of 22,700 m<sup>3</sup>. The sewage lagoon experienced a number of problems relating to the stability of the berm and continuous leaks during summer and fall when raw sewage thaws the inside. The first report of berm instability was in July 2004 when it was noted that raw sewage was being discharged from the lagoon each time a sewage truck disposed of its cargo. In September 2005, the berm walls were reinforced and built back up in order to stop the flow of raw sewage from the lagoon. However, an inspection in September 2006 revealed that a section of the berm wall had collapsed and continuous stream of raw sewage was being discharged into the surrounding environment.

Due to the collapse in the berm wall, sewage was flowing from the lagoon along a 1.2 km path through a natural wetland. Discharge from the wetland percolated into the sandy soil matrix before it reached the ocean edge eliminating a direct discharge route from the wetland into the ocean.

Construction of the new sewage lagoon was completed and commissioned in 2013 and is anticipated to be commissioned in November 2013. The new system is a single-cell rectangular shaped sewage lagoon and has been sized to meet the needs of Gjoa Haven for the next 30 years. Raw sewage is collected from house tank through a vacuum truck, transported to the new lagoon and discharged into the lagoon via the truck discharge chute located at the northeast corner of the lagoon. Treated effluent will be decanted seasonally from the southwest corner of the lagoon using a portable pump. The pump will discharge

effluent into the existing adjacent wetland area as a means of secondary polishing of the effluent. The new lagoon has been constructed to the south of the old lagoon. Please refer to Figure 1-1 for the site location.



**Figure 1-1. Site Map of Sewage Lagoon**

## **2 OPERATIONAL AND MAINTENANCE PROCEDURES**

### **2.1 Sewage Lagoon and Wetland System**

Sewage will continue to be collected by hamlet sewage trucks and brought to the lagoon. Collected sewage will be discharged into the lagoon via the effluent discharge chute. Effluent from the lagoon will be discharged to the adjacent wetland area once per year from July to October, depending on effluent quality and weather.

Discharge of effluent will take place as soon as the stored effluent has thawed and wetland condition persists in receiving effluent from sewage lagoon. A portable pump will be lowered into the southwest corner of the lagoon and will pump effluent out of the lagoon over the decant weir and into the wetland. This flow will be regulated so that the wetland is not overwhelmed by a large volume of effluent, and the flow can continue this slow rate throughout the summer growing season. Effluent from the wetland will eventually discharge into the ocean approximately 1 km from the decant weir. As the ocean is the final destination, it is imperative that the effluent sampling monitoring program be completed every year to ensure that the lagoon and wetland are providing adequate treatment.

### **2.2 Yearly Operation and Maintenance**

Operation of the lagoon has been broken down into two sections; operation during the winter months and operation during the summer months. The following dates are estimates as operational changeovers are weather dependent and may occur earlier or later than the anticipated dates.

#### ***2.2.1 Operation from Freeze-up to Break-up***

Operation of the lagoon during this time is for winter operations. Changeover to winter operations should occur when effluent in the lagoon begins to freeze. Sewage will be collected using the hamlet's vacuum truck and will be discharged into the lagoon via the sewage discharge flume. Any sewage spilled onto the truck turn around pad must be cleaned up immediately to prevent the accumulation of ice. Also, any accumulation of ice on the discharge flume should be cleared away to keep the flume clean and free of blockages.

#### ***2.2.2 Operation from Break-up to Freeze-up***

Operation of the lagoon during this time is for summer operations. Changeover to summer operations should occur when stored effluent in the lagoon has thawed. Sewage will be collected and discharged into the lagoon as described for winter operations. The lagoon will also be decanted during this time using a pump and hose to decant effluent into the adjacent wetland. Thawed sewage in the lagoon will start sediment of solid slurry or sludge parts on lagoon bed and watery part will be ready for pumping out into wetland. The portable pump will be lowered into the southwest corner of the lagoon and will begin pumping effluent out of the lagoon and into the wetland. Effluent will be pumped at a slow discharge rate so as not to overwhelm the vegetation in the wetland. Prior to decanting any effluent into the wetland treatment area, the hamlet must provide notice to an Aboriginal Affairs and Northern Development Canada (AANDC) Inspector at least 10 days before decanting occurs. Once the decantation period is over (approximately late September/early October), the pump and hose will be removed and stored for

protection from winter conditions. Remaining sewage will be collected and stored in the lagoon during the winter months.

During summer operations, implementation of the Lagoon and Wetland Monitoring Program will begin. It is the hamlet's responsibility to ensure that this program is carried out each summer to remain in compliance with the hamlet's water licence. Please refer to Section 2.3 for further details.

### **2.3 Lagoon and Wetland Monitoring Program**

As per the conditions set out in the hamlet's water licence, the effluent discharged from the lagoon and wetlands must be monitored during the treatment period. The following sections describe in detail how the program must be completed.

#### **2.3.1 Program Description**

The sampling program is divided into two main parts: the lagoon and the wetland area. The lagoon is the main storage and primary treatment facility for sewage. Solids will settle to the bottom and the remaining effluent is stored until decant occurs. Some treatment will also occur through biological processes when effluent is exposed to warmer temperatures, natural aeration via wind and sunlight. The wetland area provides secondary polishing of the effluent by removing some organic and inorganic materials. The current version of the hamlet's water licence has set the following effluent quality standards for effluent discharged from the lagoon and wetland at station GJO-4 (effluent final discharge point from sewage disposal facility), as illustrated in the table below.

**Table 2-1. Quality Standards for Effluent Discharged from Station GJO-4**

<b>Parameter</b>	<b>Maximum Average Concentration</b>
BOD <sub>5</sub>	80 mg/L
Total Suspended Solids	100 mg/L
Fecal Coliforms	1x10 <sup>4</sup> CFU/dl
Oil and Grease	No visible sheen
pH	Between 6 and 9

Discharged effluent must meet the parameters stated in the most recent version of the water licence. Hamlet staff should check the water licence regularly for updates to effluent quality requirements. Methodology for collecting these samples is covered in Section 2.5.1.

#### **2.3.2 Program Schedule**

Figure 2-1 below shows the locations for each sampling point for both the sewage lagoon and the wetland treatment area as stated in the current version of the hamlet's water licence. As the water licence is renewed on a regular basis, the NWB may change the number of sampling locations, sampling parameters and effluent quality concentrations required. It is the hamlet's responsibility to ensure that they are in compliance with the most recent version of the water licence.



**Figure 2-1. Sampling Locations for Sewage Lagoon and Wetland Treatment Area**

The following table is a sampling schedule for the lagoon and wetland treatment area during the decant period. Note that parameters may change, check the current water licence for updates.

**Table 2-2. Sampling Program Schedule**

Sampling Point	Description	Parameters to be Tested		Sampling Dates
GJO-3	Discharged raw sewage truck offload point.	Volume of sewage discharged		Monthly and annually.
GJO-4	Effluent discharge from the Final Discharge Point of the Sewage Disposal Facility.	Biochemical Oxygen Demand (BOD)	Fecal Coliforms	Monthly during the months of May to August, inclusive.
		pH	Conductivity	
		Total Suspended Solids	Ammonia Nitrogen	
		Nitrate-Nitrite	Oil and Grease (visual)	
		Total Phenols	Sulphate	
		Sodium	Potassium	
		Magnesium	Calcium	
		Total Arsenic	Total Cadmium	
		Total Copper	Total Chromium	
		Total Iron	Total Lead	
		Total Mercury	Total Nickel	
		Total zinc		



All sampling, sample preservation and analysis is to be performed in accordance with methods approved by the NWB in the current edition of “Standard Methods for the Examination of Water and Wastewater”. All analysis must be completed in a CALA (Canadian Association of for Laboratory Accreditation) laboratory accredited according to ISO/IEC Standard 17025.

### **2.3.3     *Record of Sampling Events***

It is the responsibility of the hamlet to file an annual report to the NWB no later than March 31<sup>st</sup> following the reported year. Appendix A contains a blank copy of the Annual Report form to be completed each year. The amount of sewage discharged to the lagoon must be documented monthly and annually. As well, the amount of sludge remove from lagoon (when necessary, recommended in 5-10 years or earlier when a sludge blanket thickness reaches 0.5 m) must be recorded. A copy of sampling results obtained during the annual monitoring program should also be included with the Annual Report.

## **2.4     *Sewage Sludge Management Plan***

### **2.4.1     *Characterization of Sludge***

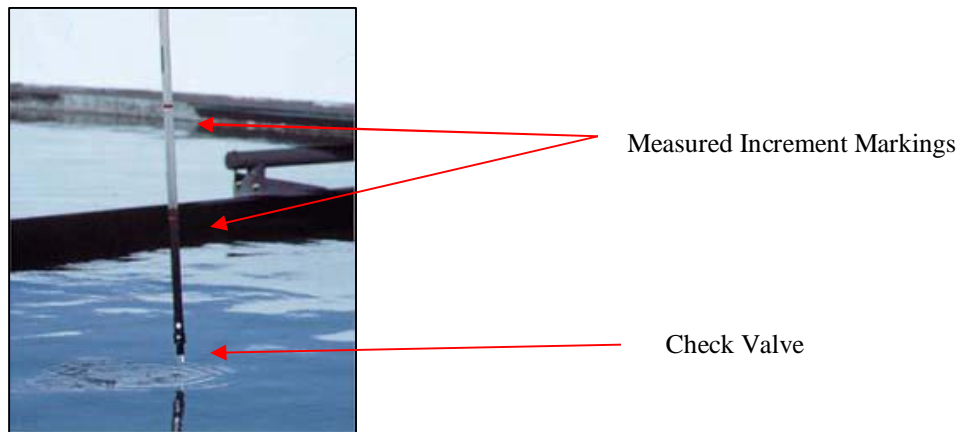
Collected sewage will mostly come from residential buildings in the hamlet as there are no industrial or commercial sources. The sludge will generally be a mixture of fecal matter, organic and inorganic material. However, contaminants such as heavy metals, solvents and petroleum products may enter the lagoon due to municipal activities.

### **2.4.2     *Storage, Treatment and Disposal of Sludge***

During the treatment process, heavier solids in the lagoon will sink to the bottom of the lagoon and collect over time as a sludge blanket. If the depth of the sludge blanket becomes thick enough to decrease the volume of the lagoon cell significantly or contaminant concentrations become too high, the sludge must be collected from the lagoon and treated according to CCME standards.

### **2.4.3     *Methods for Performing Sludge Depth Measurements***

According to the National Guide to Sustainable Municipal Infrastructure (2004), sludge depth measurements should be performed each year to determine the depth of sludge and rate of sludge accumulation within the lagoon. This will help hamlet staff to plan and prepare for lagoon desludging operations. There are a number of methods available for measuring the depth of the sludge blanket; however one of the more common tools is called a Sludge Judge<sup>®</sup>. The Sludge Judge<sup>®</sup> is a clear plastic tube with a check valve on the bottom and measured increment markings on the tube. It comes in 5-foot sections that can be screwed together as necessary. The number of sections required for sampling will be dependent on the depth of the water level in the lagoon.

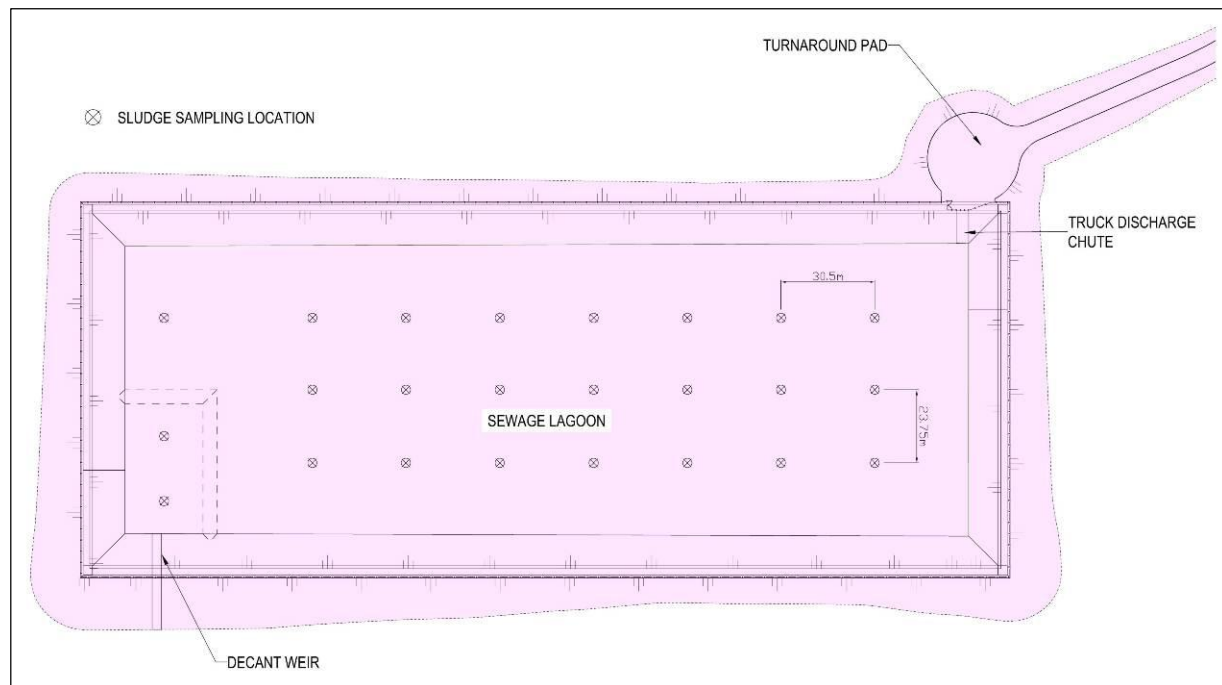


**Figure 2-2. Photo of Sludge Judge®**

Source: <http://geneq.com/en/departments/environment/product/sludge-judge>

Retrieved October 10, 2013

Sludge depth measurements should be taken based on a grid format, and should be taken in the same locations each year. Based on the document *Sludge Survey Methods for Anaerobic Lagoons* (Westerman, Shaffer & Rice, 2008), 6 depths measurements per acre should be collected or up to a maximum of 24. Based on the bottom surface measurements of the lagoon in Gjoa Haven, the estimated bottom surface area of the lagoon is 6.3 acres. Therefore 24 depth sampling locations are required. Please refer to the figure below for the site map showing where each depth measurement should be taken. According to Westerman *et al.* (2008), sampling locations on-site should be marked by survey flags or landmarks (sewage truck discharge chute, boulders, outlet pipe, etc.). Hamlet staff can place markers on the side of the lagoon to indicate sampling point locations at intersecting junctures.



**Figure 2-3. Locations for Sludge Depth Measurements and Sampling**

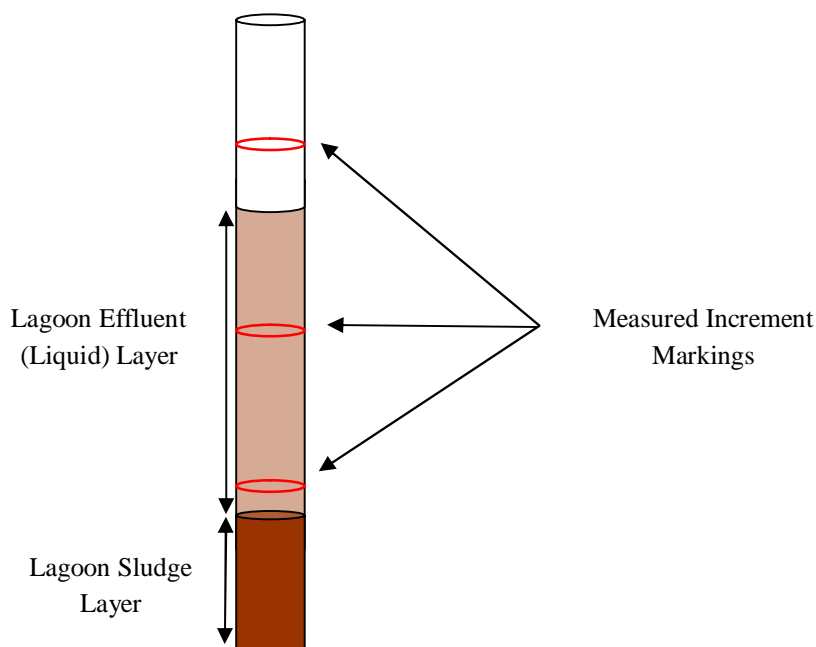
To prepare for sludge depth measuring, the follow items must first be obtained:

- A boat (a flat bottom boat should be used as they are more stable than a canoe or V-bottom boat, Westerman *et al.*, 2008);
- Appropriate floatation devices for each sampling team member;
- Sludge Judge® or a similar measuring device (ensure that the check valve is operating properly);
- Measuring rod to measure total depth from top of water level to bottom of the lagoon;
- Appropriate Personal Protective Equipment (PPE) such as latex or nitrile gloves, CSA certified rubber boots, coveralls, safety goggles, etc;
- Notebook and pen to record measurements.

Choose to take depth measurements during the summer, after the lagoon has completely thawed. Take measurements on a calm day when weather conditions (wind, rain, etc.) will not interfere with the process. According to Westerman *et al.* (2008), always have a team of three people to take measurements. One person will stay on shore to monitor and act as a rescuer should the need arise. The other two team members will be in the boat, one person will help to anchor the boat and record depth measurements while the second person uses the Sludge Judge® and measuring rod to obtain the measurements. All team members, including those on the shore, are to wear appropriate floatation devices (Westerman *et al.*, 2008).

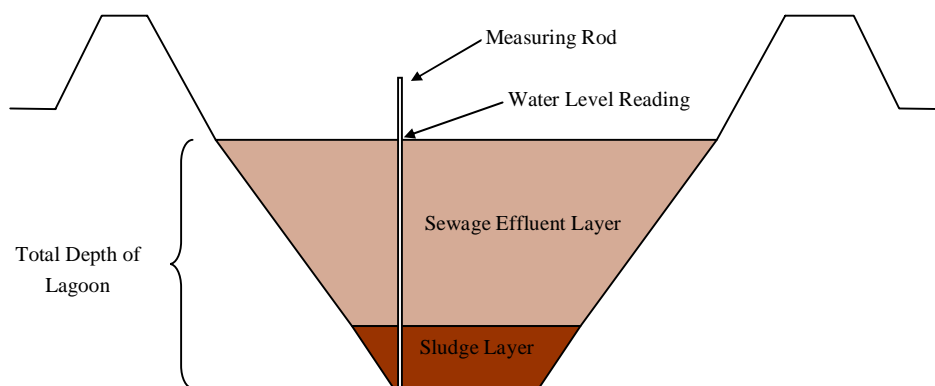
To take the depth measurements, follow these steps provided by Westerman *et al.* (2008):

1. Paddle to the first sampling location. Be sure to mark down which location it is (i.e. depth sampling point #1).
2. Slowly lower the Sludge Judge<sup>®</sup> into the lagoon being careful not to move the tube up and down. To determine when the tube has reached the top of the sludge layer, watch the liquid level inside the tube as it is lowered into the lagoon. When the tube has reached the sludge layer, the water level inside the tube will drop slightly.
3. As soon as the tube has reached the sludge layer, tug on the rope to secure the check valve and pull the tube up slowly.
4. Using the increment markings on the tube, measure the depth of the liquid layer (this is the layer of water that sits above the sludge layer). There should be 1 to 2 inches of sludge at the bottom of the tube, indicating that the tube did reach the sludge layer. The depth of the liquid layer in the tube is measured from the top of the sludge to the top of the liquid (Refer to **Error! Reference source not found.** below). Record the measurement.



**Figure 2-4. Sketch of Tube After Retrieving Lagoon Effluent Depth Measurement (Not to Scale)**

5. Empty the contents of the Sludge Judge<sup>®</sup> back into the lagoon.
6. Take the measuring rod, place it in the lagoon with the zero end pointing downwards. Lower the rod all the way down until the bottom of the rod touches the lagoon floor. Read the water level measurement. This is the total depth of the effluent plus the sludge layer (Refer to **Error! Reference source not found.** below). Record the measurement.



**Figure 2-5. Sketch of Lagoon Cross-Section and Total Depth Measurement (Not to Scale)**

7. To find the thickness of the sludge layer, subtract the depth of the liquid layer from the total depth.
8. Repeat steps 2 through 7 for the rest of the sampling locations. Be sure to record all measurements and the corresponding sample locations.

An alternative method to measure the depth of the sludge blanket is to lower the Sludge Judge<sup>®</sup> all the way to the bottom of the lagoon. Sludge and effluent will enter the tube through the check valve. When the tube is lifted out of the water, a distinct layer of sludge will be visible at the bottom of the tube. The distance from the bottom of the tube to the top of the sludge layer in the tube is the estimated thickness of the sludge blanket. Unfortunately this method can provide inaccurate results as the sludge does not enter the tube as easily as the effluent. This may cause the sludge depth measurement to be less than the actual depth of the sludge blanket (Westerman *et al.*, 2008).

When the sludge layer has become thick enough to affect the operation of the lagoon, the sludge should be removed, treated and disposed. As a guide, if the height of the sludge is thicker than 0.5m from the bottom of the lagoon floor and or has reached the top of the sludge berm located in the southwest corner of the lagoon, the sludge should be removed from the lagoon. At this point, in consultation with the Government of Nunavut, the hamlet should retain the services of a qualified engineer for the design of appropriate sludge removal, treatment and disposal options. The design will need to be submitted and approved by the NWB prior to implementing the sludge removal process. Prior to any lagoon draining or sludge removal, an AANDC inspector must be informed at least ten days in advance.

#### **2.4.4 Methods for Sampling Sludge**

Collecting sludge samples once per year should be sufficient to monitor the contaminant concentrations within the sludge build up at the bottom of the lagoon. Sludge samples can be collected at the same time that sludge depth measurements are taken.

Parameters to be analyzed in sludge samples have not been identified in the hamlet's water licence. Therefore, prior to initiating the sludge sampling program, the hamlet must contact the NWB to determine which parameters (ie. microbiological, nutrients, physical, metals, etc.) to test for during the program.

Sludge samples should be collected as a composite sample. This means that sludge samples are taken from various points in the lagoon and mixed together before bottling and sending to a laboratory for analysis (Westerman *et al.*, 2008). To collect sludge samples, gather all items listed in Section 2.4.3 for sludge depth measurements as well as the following:

- Sample bottles;
- Preservatives (if required);
- Clean 5 gallon bucket (must be clean as an unclean bucket may contaminate the sample, leading to inaccurate results);
- Cooler;
- Ice packs to keep samples cool;
- Chain of custody forms (also called COCs);
- Permanent marker to mark on bottles;
- Pen to fill out chain of custody forms;
- Packing tape;
- Shipping label to send samples back to the lab;
- Clean stir-stick to mix sludge samples in 5 gallon bucket (must be clean as an unclean mixer may contaminate the sample, leading to inaccurate results);
- Sealable freezer bag.

Samples must be collected shortly before they are sent to the lab for analysis. For example, if the samples must be at the airport by 2:00 pm, the samples should be collected that morning. Make sure that there is enough time to collect and package all samples for transport. This is important because the samples must be at the lab within 24 hours from the time they are collected, otherwise some of the samples will no longer be good for analysis. Be sure to contact the airport and ask what time the samples must be there to make the flight. Contact the lab to let them know that samples will be arriving and ask if they are able to pick them up at the airport.

To collect a composite sludge sample, follow the procedure below (adapted from Westerman *et al.*, 2008):

1. Prior to beginning sampling, label the sample bottles with the date, time of collection, your name and description of sample (ie. sludge from Gjoa Haven sewage lagoon).
2. After taking the sludge depth measurement using the Sludge Judge<sup>®</sup>, dip the Sludge Judge<sup>®</sup> into the lagoon to collect a sample of sludge in the tube. Pull the tube out and release the valve at the bottom to discharge sludge into the 5 gallon bucket. Be careful not to empty any of the effluent (liquid) into the bucket.
3. Continue this step until a sample of sludge has been collected from each sampling location.

4. Mix the sludge samples together in the 5 gallon bucket. Collect samples by dipping sample bottles carefully into the bucket. If preservatives are already in the bottles, do not allow any of the preservatives in the bottles to spill out of the bottle while filling it. If preservatives are required (this will be dependent on the type of analysis to be completed, confirm with the laboratory which samples if any require preservatives) and are not already in the bottle, add the preservative after the sludge sample has been collected in the bottle. Cap bottles and place in cooler.
5. Once all bottles have been filled, pack bottles in cooler with ice packs for shipping. Fill out chain of custody forms, place in a sealable freezer bag and place in the cooler with the samples. Close cooler and secure with packing tape and place shipping label on top of the cooler.
6. Take cooler to the airport and ship to the laboratory immediately. Some sample parameters must be analyzed within 24 hours of collection, otherwise they will be no longer good for analysis. Call the laboratory and give them the shipping number of the cooler.

Samples should be only of sludge and include as little effluent as possible. This is because of the desludging procedure for the lagoon. When it is time to desludge the lagoon, the lagoon effluent will first be discharged to the wetland area leaving mostly sludge (Westerman *et al.*, 2008). Once the sludge is removed, it will most likely require further treatment prior to disposal. Sampling only the sludge will give a more accurate analysis of the amount of contaminants within the sludge to be treated. Results are to be reported once analysis has been completed and are to be included in the annual report.

## **2.5 Quality Assurance/Quality Control Plan for Lagoon and Wetland Monitoring Program**

The following sections describe the Quality Assurance/Quality Control (QA/QC) Plan for sampling of the Sewage Lagoon and Wetland Treatment Facility. This plan outlines general QA/QC procedures, however, once the hamlet has chosen a specific laboratory to complete the sample analysis they should obtain more specific instructions on sample collection and handling from the chosen laboratory. They must also obtain a certificate from the laboratory stating that the laboratory is certified as a CALA Laboratory. Information in developing this plan was taken from *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, Water Resource Division and the Northwest Territories Water Board, July 1996) and *Wastewater Sampling Instructions, Kitikmeot Region* (IEG Environmental, July 2005).

### **2.5.1 Sample Collection**

#### **2.5.1.1 Preparing for Sample Collection**

Samples are to be collected from the marked Surveillance Network Program (SNP) locations (ie. GJO-4) as described in the hamlet’s water licence. Each location should be marked with a sign and GPS coordinates in order to ensure that samples are collected from the same site each time. Please refer to Figure 2-1 for a map of the SNP locations. It is the responsibility of the hamlet to maintain these markers in good condition.

Before collecting samples, follow the list of instructions below:

1. Contact the laboratory and tell them you need 1 set of sampling bottles and equipment to test the list of parameters identified in Table 2-2 above. As well you will need travel blanks and field blanks. Travel blanks are jars of deionized water that are filled in the laboratory and travel in the coolers with the field samples to determine if there is any possible contamination from traveling and handling methods. Field blanks are also filled with deionized water, but must be filled in the field by the sampler during the sample collection process. Also ask the laboratory for an instruction sheet for collecting the samples.
2. Contact the airport and find out what time the samples must be dropped off in order to make the flight to the laboratory where you are sending them. The samples should be collected shortly before they are shipped. For example, if the samples must be at the airport by 2:00pm, the samples should be collected that morning. Make sure that you have enough time to collect and package all samples for transport. This is important because the samples must be at the lab within 24 hours from the time they are collected, otherwise they are no longer good for analysis.
3. Go to the sampling locations shown in Figure 2-1 and familiarize yourself with the area. Walk to each location so you know where each sample must be taken.

Once you have received the sampling bottles and equipment from the lab, make sure you have the following items with you before you begin collecting samples:

1. Sample bottles;
2. Preservatives;
3. Coolers that the bottles and preservatives were sent in;
4. Field blanks;
5. Chain of custody forms (also called COCs);
6. Permanent marker to mark on bottles;
7. Pen to fill out chain of custody forms;
8. Nitrile gloves;
9. Packing tape;
10. Ice packs; and
11. Shipping label to send samples back to the lab.

Once you have gathered everything, determine which day you will collect the samples. Be sure to check the flight schedule for that day and call the laboratory to ask if they are able to pick up the samples at the airport when they arrive.



### **2.5.1.2 Instructions for Sample Collection**

Follow these instructions to collect samples from the sewage lagoon and wetland treatment area:

1. Place ice packs in freezer the night before sampling.
2. In the morning, place ice packs and other equipment into coolers and load into vehicle. Make sure that the travel blanks and field blanks are in the cooler as well.
3. Drive to site and park in a safe spot away from traffic. DO NOT park on the truck turn around pad for the sewage lagoon.
4. Take coolers and equipment to sample location GJO-4.
5. Put on a pair of nitrile gloves.
6. Fill the field blanks with deionized water.
7. Take out bottles needed to sample at this location and place beside the cooler. DO NOT OPEN THE BOTTLES.
8. Select the bottles NOT requiring or containing preservatives and put aside.
9. Take the bottles requiring or containing preservatives and sample these first.
10. Please note that some bottles MUST be rinsed and some bottles MUST NOT be rinsed. Please refer to the water sampling instructions provided by the laboratory that sent the sample bottles to determine if the bottle requires rinsing. If rinsing is required, discard rinse water downstream and away from the sampling location. Rinse the bottle three times. If the bottle must not be rinsed, carefully unscrew the cover and place bottle slowly into the water open end up and slightly tilted to allow water to slowly fill the bottle. If the bottle contains preservatives already, be sure not to tip or overfill the bottle as the preservatives will be washed out. Fill as directed by the water sampling instructions provided by the laboratory that sent the sample bottles. To add preservatives (if not already in the bottle) refer to the water sampling instructions provided by the laboratory that sent the sample bottles to determine which preservative to add to the sample. Carefully pour contents into the sample bottle. Screw the cover on tightly and mix by gently tipping the bottle back and forth.
11. Label the bottle with the sampling location number (GJO-4), your name, date, time of collection and preservative added. Make sure to use a waterproof/permanent marker to label the bottles. Place filled sample jar in cooler.
12. Continue until all preserved samples have been taken.
13. Now fill the bottles not requiring preservatives. Refer to the water sampling instructions provided by the laboratory that sent the sample bottles to determine which bottles need to be rinsed.
14. Fill bottle as directed in the water sampling instructions provided by the laboratory that sent the sample bottles and screw cover on tightly. Label and place in cooler.
15. Continue until the rest of the bottles have been filled.
16. Take off nitrile gloves and dispose in garbage bag.
17. Once all samples have been collected and labeled, put on a new pair of nitrile gloves and pack samples into coolers tightly with ice packs to limit movement during shipping. Remove gloves and wash hands thoroughly.
18. Fill out the chain of custody form.

19. Place form in a sealable freezer bag, seal and put in the cooler with samples. Tape up the cooler with packing tape. Tape shipping label to top of cooler and bring to the airport. Always wash hands thoroughly after handling the cooler.
20. Fill out the shipping forms for sending the cooler to the laboratory and check that the plane will be on time.
21. Call the laboratory and tell them that the samples are on the way and give them the flight information.

As part of QA/QC testing, a second set of samples should be taken from one of the sampling points. This means filling two sets of sampling bottles from the same location. This second set of samples is to verify that sample results are accurate and that sampling methods are consistent. The second set of samples should be taken from a different sampling point during each sampling period if possible.

### **2.5.2    *Laboratory Analysis***

Once the laboratory has received the samples, they will begin processing them. A report stating all results as well as the detection limits will be produced and sent to the hamlet office. The report will also state any problems that may have occurred during analysis of the samples.

## **2.6    *Managing Insects and Weeds***

### **2.6.1    *Insect Management***

In order to discourage attracting insects, the wetland surrounding the lagoon should be inspected regularly for areas of ponding water. Hamlet staff must cover up any puddles or potholes by filling them with soil (Municipal and Community Affairs, Small Wastewater Treatment Systems Operator Student Manual). Weeds growing in and around the lagoon surface may also attract insects. For information about weed management, please refer to Section 2.6.2.

### **2.6.2    *Weed Management***

Weeds growing in and around the lagoon may cause a number of problems such as attracting unwanted insects, causing excessive odours, and impeding photosynthesis. Surface weeds block sunlight from entering the lagoon that is required for photosynthesis to occur. Photosynthesis is the reaction that provides energy for algae and that in turn allows algae to provide oxygen to bacteria in the lagoon. Bacteria require oxygen in order to break down wastes within the lagoon (Municipal and Community Affairs, Small Wastewater Treatment Systems Operator Student Manual). Wastes that are not being broken down may result in excessive odours.

Weeds/plants on the surface and edges of the lagoon must be removed promptly. Hamlet staff should skim weeds off the top of the lagoon and trim them at the edges. Any weeds that have been removed must be buried in the landfill immediately to prevent odours and attracting insects or other wildlife.

## **2.7    *Measures to Prevent Short-Circuiting***

The lagoon is a rectangular shape where sewage is dumped in at one end of the rectangle (the end furthest from the outfall) and discharged from the other end (at the outfall). Sewage effluent is therefore forced to

pass through the longer length of the lagoon prior to being discharged to the wetland. As long as effluent is discharged in and out in these locations, short-circuiting should be minimized. However, should a break or breach of the lagoon berm occur, effluent may discharge from the breach potentially causing a short-circuiting effect.

## **2.8 Measures to Prevent Stagnation and Excessive Odour**

It is recommended that the lagoon be discharged over the period of July to October. Continuous flow provided by the lengthy discharge period should help to prevent stagnation of effluent in the lagoon and the wetland. If stagnation does become a problem, the Hamlet (in consultation with Community and Government Services, Government of Nunavut) may want to consider a mechanical option such as installation of an aeration pump to aerate the lagoon.

Excessive odour may result from one of the following (Municipal and Community Affairs, Small Wastewater Treatment Systems Operator Student Manual):

- Shortly after the spring melt when anaerobic conditions in the lagoon are still present;
- During periods of extensive cloud cover;
- Stagnation;
- Excessive presence of weeds in and around the lagoon; or
- Presence of sludge mats, floating scum or algae mats on the surface of the lagoon.

Anaerobic conditions experienced shortly after the spring melt should naturally resolve themselves as effluent in the lagoon begins to experience warmer temperatures and aerobic conditions become more dominant. A lagoon under aerobic conditions should provide minimal odour. Similarly, if periods of extensive cloud cover are experienced, anaerobic conditions may occur. Once sunny periods are experienced, aerobic conditions should return.

Discharging the lagoon over the July to October period should help prevent stagnation of effluent in the lagoon and reduce excessive odour resulting from the spring melt. As well, natural wind on the surface of the lagoon should act to aerate the lagoon and prevent stagnation. Any mats and/or scum that accumulate on the surface of the lagoon must be promptly broken up and dispersed by hamlet staff. For weed management methods please refer to Section 2.6.2.

## **2.9 Site Records**

Copies of records pertaining to operation and maintenance of the sewage lagoon should be kept at both the hamlet office and the hamlet's maintenance garage. Information that must be included in these records are (*Guidelines for the Preparation of an Operation and Maintenance Manual for Sewage and Solid Waste Facilities in the Northwest Territories*, Duong and Kent, 1996):

- Volumes of any effluent discharged to the environment through an accidental spill;
- Sewage volume collected (both monthly and annually);
- Details of any maintenance undertaken at site;

- Record sheets;
- Copies of annual reports submitted to the NWB;
- Copy of the hamlet's water licence;
- Copies of all manuals pertaining to the operation and maintenance of the sewage lagoon and wetland treatment area (i.e. Operation and Maintenance Manual, QA/QC Plan, Spill Contingency Plan, Abandonment and Restoration Plan, Sludge Management Plan); and
- Copies of spill reports and related regulations.

## **2.10 Safety Procedures**

The following safety procedures should be obeyed in order to minimize health risks to personnel working in and around the wastewater and solid waste facilities:

- Equipment is to be kept clean;
- Wear protective clothing such as gloves and boots at all times;
- Work clothes must be kept in a designated change room and employees are to change into them when they arrive for work. Work clothes must NOT be worn home. The hamlet's PW&S maintenance garage should be equipped with laundry facilities to wash work coveralls onsite;
- Hands to be washed frequently; as a minimum before eating and after work; and
- Personnel should receive appropriate vaccinations and ensure they are kept up-to-date. Please contact the Department of Health for a list of the appropriate vaccinations.

## **2.11 Site Access Control**

Currently, there is a barrier fence along the perimeter of the sewage lagoon to prevent residents from driving ATVs and snowmobiles along the top of the berm. As well, in order to prevent sewage trucks from backing up too far over the edge of the lagoon, bollards are placed along the edge of the discharge chute.

## **2.12 Contact Numbers**

Contacts of those responsible for overseeing the operation and maintenance of the lagoon are as follows:

<b>Contact Name</b>	<b>Office Contact Number</b>
Shawn Stuckey (SAO)	(867) 360-7141
Jacob Keanik, Public Works Foreman	(867) 360-7141

### **3 EMERGENCY RESPONSE**

The hamlet must be able to respond efficiently and effectively to all possible emergencies that may be encountered in the operation of the hamlet's facilities. These include, but are not limited to fuel, chemical and wastewater spills as well as fires. Due to the nature of the hamlet's facilities, burning or spillage of unknown or hazardous materials may occur. Only personnel who are properly trained to deal with these situations should respond to such emergencies.

Personnel must familiarize themselves with the emergency preparedness plans before an accident or emergency occurs. Copies of these plans must be kept in all sewage and solid waste disposal vehicles as well as in all common work areas. The following sections list contact numbers and outline procedures to follow in the event of an emergency.

#### **3.1 Emergency Contact Numbers**

The following is a list of contact numbers in the case of an emergency:

Fire Department:	(867) 360-6333
RCMP Detachment:	(867) 360-1111
24 Hour Spill Response Line:	(867) 920-8130

#### **3.2 Contingency Planning**

In the case of a service disruption, caused by a breach in the sewage lagoon berm, the hamlet should follow the emergency measures listed below:

- Notify the Municipal Supervisor and the SAO;
- Report the spill to the NT-NU Spill Line (867) 920-8130;
- Contain or divert the spill where possible (consult with the Hamlet of Gjoa Haven Spill Contingency Plan for appropriate containment measures); and
- Consult with regulatory personnel on next steps.

In the event that the lagoon is not accessible by road and the sewage trucks are not able to discharge sewage to the lagoon, the following procedures should be implemented:

- Notify the Municipal Supervisor and the SAO;
- Notify the public and implement water use restrictions on the community; and
- Consult with regulatory personnel on next steps.

#### **3.3 Spill Contingency Plan**

A spill contingency plan has been created for sewage lagoon. A copy of the plan may be found in Appendix B. Hamlet personnel must familiarize themselves with the plan in order to respond quickly and effectively in the event of a spill.

### **3.4 Fire Response Plan**

The hamlet's fire department is responsible for creating a contingency plan to deal with fires in the hamlet. As burning of waste may produce harmful gases, special precautions should be taken when responding to fires in and around the solid waste facility. In the event of an uncontrolled fire in the hamlet, the following steps should be taken:

- Immediately evacuate the area and go to the hamlet's meeting place;
- Keep everyone including hamlet personnel up-wind from the source; and
- Contact the hamlet's fire department at (867) 360-6333.

#### **4 REFERENCES**

1. Department of Indian and Northern Affairs Canada, Water Resources Division & The Northwest Territories Water Board. (1996). *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.*
2. Department of Municipal and Community Affairs, Government of the Northwest Territories. *Small Wastewater Treatment Systems Operator – Student Manual.* Yellowknife: Municipal and Community Affairs, Government of the Northwest Territories.
3. Duong, D. and R. Kent. (1996). *Guidelines for the Preparation of an Operation and Maintenance Manual for Sewage and Solids Waste Disposal Facilities in the Northwest Territories.* Produced for MACA.
4. GENEQ inc. – Scientific Instruments Distributor. Photograph Retrieved October 10, 2013 from <http://geneq.com/en/departments/environment/product/sludge-judge>
5. IEG Environmental. (2005). *Wastewater Sampling Instructions, Kitikmeot Region.* Produced for Department of Community and Government Services, Government of Nunavut.
6. National Guide to Sustainable Municipal Infrastructure. (2004). *Optimization of Lagoon Operation.* Issue No. 1.0. Retrieved March 29, 2010 from [http://www.sustainablecommunities.fcm.ca/files/Infraguide/storm\\_and\\_wastewater/optimization\\_lagoon\\_operations.pdf](http://www.sustainablecommunities.fcm.ca/files/Infraguide/storm_and_wastewater/optimization_lagoon_operations.pdf)
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9. Westerman, P. W., Shaffer, K. A., and Rice, J. M. (2008). *Sludge Survey Methods for Anaerobic Lagoons.* Retrieved October 10, 2013 from [http://www.bae.ncsu.edu/programs/extension/manure/sludge-survey/sludge\\_survey.pdf](http://www.bae.ncsu.edu/programs/extension/manure/sludge-survey/sludge_survey.pdf)

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## **APPENDIX A**

### **Annual Report Form**

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**ANNUAL REPORT  
FOR THE HAMLET OF GJOA HAVEN**

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**YEAR BEING REPORTED:** \_\_\_\_\_

The following information is compiled pursuant to the requirements of Part B, Item 1 of Water Licence NWB3GJO 0409 issued to the Hamlet of Gjoa Haven.

- i)- iii) tabular summaries of all data generated under the “Monitoring Program”;  
monthly and annual quantities in cubic metres of freshwater obtained from all sources; monthly and annual quantities in cubic metres of each and all wastes discharged;

Attached are results for Monitoring station GJO-3, as well as detailed chemical, physical and biological analysis required at GJO-4 (for the months of May to August, inclusive)

<b>Month Reported</b>	<b>Quantity of Water Obtained from all sources</b>	<b>Quantity of Sewage Waste Discharged</b>
<b>January</b>		
<b>February</b>		
<b>March</b>		
<b>April</b>		
<b>May</b>		
<b>June</b>		
<b>July</b>		
<b>August</b>		
<b>September</b>		
<b>October</b>		
<b>November</b>		
<b>December</b>		

**ANNUAL REPORT  
FOR THE HAMLET OF GJOA HAVEN**

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<b>ANNUAL TOTAL</b>		
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Please indicate volumes in cubic metres - 1 cubic meter equals 1000 litres

- iv. a summary of modifications and/or major maintenance work carried out on the Water Supply and Waste Disposal Facilities, including all associated structures and facilities;

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- v. a list of unauthorized discharges and summary of follow-up action taken;

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- vi. a summary of any abandonment and restoration work completed during the year and an outline of any work anticipated for the next year;

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- vii. a summary of any studies requested by the Board that relate to waste disposal, water use or reclamation, and a brief description of any future studies planned;

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- viii. any other details on water use or waste disposal requested by the Board by November

**ANNUAL REPORT  
FOR THE HAMLET OF GJOA HAVEN**

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1st of the year being reported; and

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- ix. updates or revisions to the approved Operation and Maintenance Plans (ie. O&M Manual, Abandonment and Restoration Plan, QA/QC, etc.).

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**ADDITIONAL INFORMATION THAT THE LICENSEE DEEMS USEFUL:**

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**FOLLOW-UP REGARDING INSPECTION/COMPLIANCE CONCERNS:**

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## **APPENDIX B**

### **Spill Contingency Plan**

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# **Gjoa Haven, NU Sewage Disposal – Spill Contingency Plan**

*FINAL*

May 31, 2014

Spill Contingency Plan, Sewage Disposal

Hamlet of Gjoa Haven, NU

11-5029

Gary Strong – Project Manager

*Submitted by*

**Dillon Consulting Limited**

R:\PROJECTS\FINAL\2011\115029 Gjoa Haven Waste  
Treatment Facilities\Task 6 - Post Construction  
Phase\Preparation of Operation and Maintenance Manual\Spill  
Contingency Plan - Hamlet of Gjoa Haven.doc

## TABLE OF CONTENTS

	<u>Page No.</u>
<b>1 INTRODUCTION AND COMMUNITY DETAILS.....</b>	<b>1</b>
1.1 COMMUNITY CONTACT INFORMATION .....	1
1.2 PURPOSE AND SCOPE .....	1
1.3 COMMUNITY ENVIRONMENTAL POLICY .....	1
1.4 PROJECT DESCRIPTION .....	1
1.5 SITE DESCRIPTION .....	1
1.6 FACILITY DESCRIPTION .....	1
1.7 SPILL PREVENTION MEASURES .....	2
1.8 ADDITIONAL COPIES .....	3
1.9 PROCESS FOR STAFF RESPONSE TO MEDIA AND PUBLIC INQUIRES .....	3
<b>2 RESPONSE ORGANIZATION .....</b>	<b>4</b>
2.1 RESPONSE PERSONNEL .....	4
2.2 FLOWCHART OF RESPONSE ORGANIZATION AND COMMUNICATION LINES .....	4
2.3 SUMMARY OF AVAILABLE COMMUNICATION EQUIPMENT .....	6
<b>3 ACTION PLAN.....</b>	<b>7</b>
3.1 POTENTIAL ENVIRONMENTAL IMPACTS OF SEWAGE SPILL .....	7
3.2 PROCEDURES.....	7
3.2.1 <i>Procedures for Initial Actions</i> .....	7
3.2.2 <i>Spill Reporting Procedures</i> .....	7
3.2.3 <i>Procedures for the Protection of Human Health and Safety</i> .....	8
3.2.4 <i>Public Notification Procedure</i> .....	8
3.2.5 <i>Procedures for Containing and Controlling Spill</i> .....	8
3.2.6 <i>Procedures for Transferring, Storing and Managing Spill Related Wastes</i> .....	9
3.2.7 <i>Procedures for Restoring Affected Areas</i> .....	9
<b>4 RESOURCE INVENTORY.....</b>	<b>10</b>
4.1 ON-SITE RESOURCES .....	10
4.2 OFF-SITE RESOURCES .....	11
<b>5 TRAINING PROGRAM.....</b>	<b>12</b>
5.1 OUTLINE OF TRAINING PROGRAM .....	12
5.2 TRAINING SCHEDULE AND RECORDKEEPING .....	12

## LIST OF FIGURES

Figure 1: Gjoa Haven Sewage Lagoon - Site Plan .....	2
Figure 2: Flowchart of Communication Lines .....	5

## LIST OF TABLES

Table 1. Response Personnel Contact Information .....	4
---	---

## LIST OF APPENDICES

Appendix A: NWT Spill Report Form	
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## **1 INTRODUCTION AND COMMUNITY DETAILS**

### **1.1 Community Contact Information**

Shawn Stuckey  
Senior Administrative Officer  
Hamlet of Gjoa Haven  
Box 200  
Gjoa Haven, NU, X0B 1J0  
Tel: (867) 360-7141

### **1.2 Purpose and Scope**

The purpose of this plan is to outline response actions for potential spills. The plan identifies key response personnel and their roles and responsibilities in the event of a spill, as well as the equipment and other resources available to clean up a spill. It details spill response procedures that will minimize potential health and safety hazards, environmental damage and clean-up efforts.

### **1.3 Community Environmental Policy**

The Hamlet of Gjoa Haven is committed to operating in an environmentally sensitive manner, and complying with requirements of the Nunavut Water Board (NWB).

### **1.4 Project Description**

This spill contingency plan will be used by the hamlet, for activities associated with hamlet operations pertaining to the operation of the sewage disposal site.

### **1.5 Site Description**

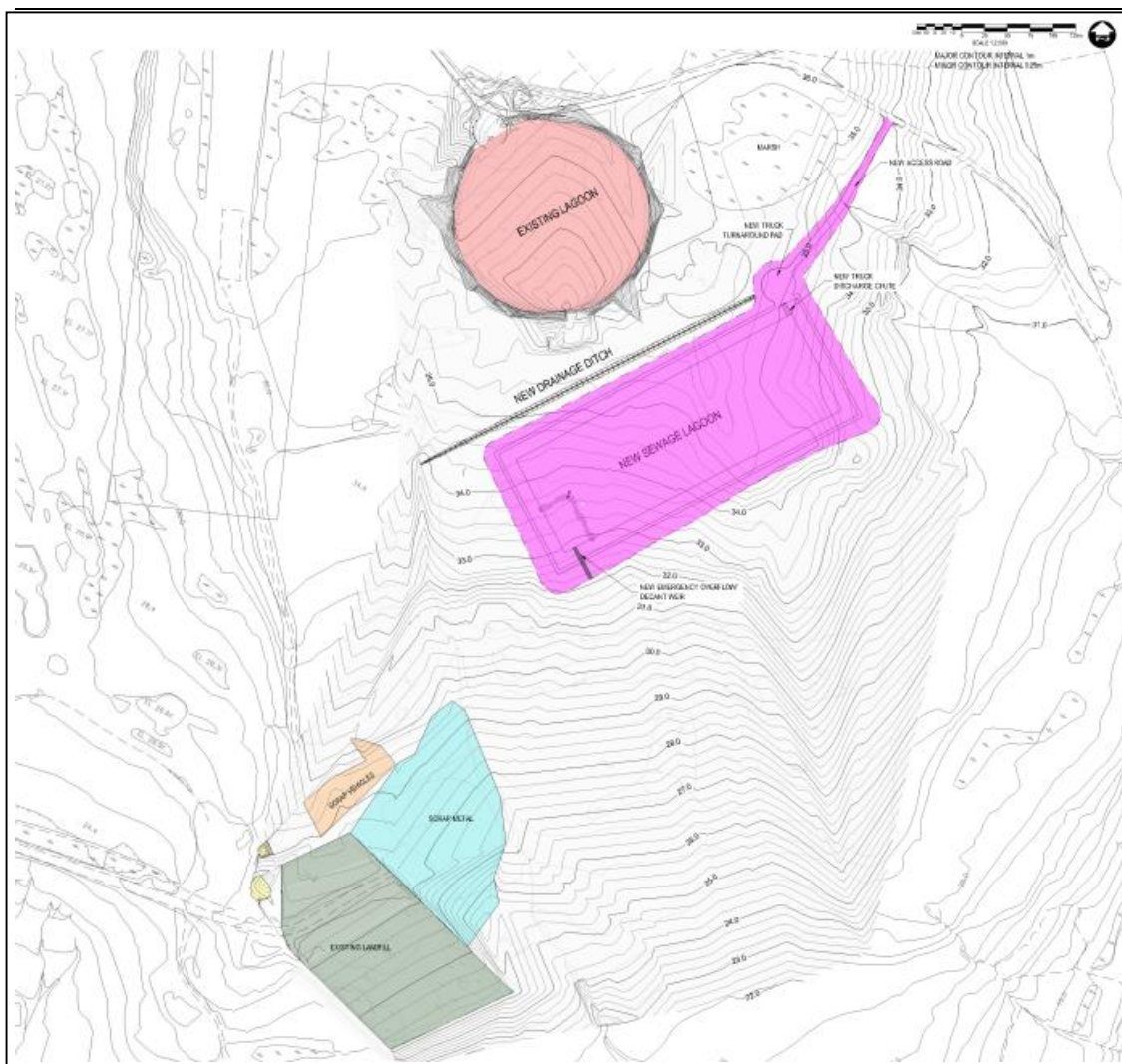
The Hamlet of Gjoa Haven is located at 68°37' N latitude and 95°50' W longitude (according to Google Earth Pro, 2007), on the southern tip of King William Island, Kitikmeot Region, Nunavut. Topography consists mostly of sands and gravels with a continuous permafrost zone. Low lying vegetation such as mosses and lichens are predominant with hardy grasses found in some areas. Year round access to the Hamlet is limited to air travel, however, during the summer months freight may be brought in by sealift.

The average annual precipitation in Gjoa Haven consists of 5.1 cm of rainfall and 25.5 cm of snowfall. The mean high in July is 13.1 °C with a mean low of 7.2 °C. In January, the mean high is -23.9 °C and mean low of -35.9 °C. The permafrost is continuous, extending to depths from 20 m to over 120 m. The active layer varies between 0.55 m and 0.25 m.

### **1.6 Facility Description**

Construction of the new sewage lagoon was completed in 2013. Sewage is collected from the community by a sewage truck and then discharged into the sewage lagoon. The new facility consists of single cell lagoon and incorporates the use of the adjacent wetland area as a means of secondary polishing of the effluent. The new lagoon has been built adjacent to the old lagoon. Please refer to **Figure 1** for the site location.

The sewage lagoon was designed to treat approximately 58,000 m<sup>3</sup> of sewage. Collected sewage will mostly come from residential buildings in the hamlet as there are limited industrial or commercial sources. The sludge will generally be a mixture of fecal matter, organic and inorganic material. However, contaminants such as heavy metals, solvents and petroleum products may enter the lagoon due to municipal activities.



**Figure 1: Gjoa Haven Sewage Lagoon - Site Plan**

### **1.7 Spill Prevention Measures**

The community is concerned about the environment and the possibility of a spill occurring and takes precautions when working with hazardous materials. In order to prevent spill occurrences, the hamlet must take the following spill preventions measures for sewage:

- Sewage truck operators must be trained in safe truck operation and sewage disposal procedures;
- Operators must take caution to ensure that the sewage trucks are not filled to capacity;



- Inspections of sewage trucks and equipment must be performed and recorded on a regular basis; and
- An effective reporting system for reporting potentially hazardous situations where spills might occur must be developed and implemented.

### **1.8 Additional Copies**

Several copies of this plan will be kept in the community, in the Hamlet Office.

### **1.9 Process for Staff Response to Media and Public Inquires**

All media enquiries are directed to the SAO, Shawn Stuckey.

## **2 RESPONSE ORGANIZATION**

### **2.1 Response Personnel**

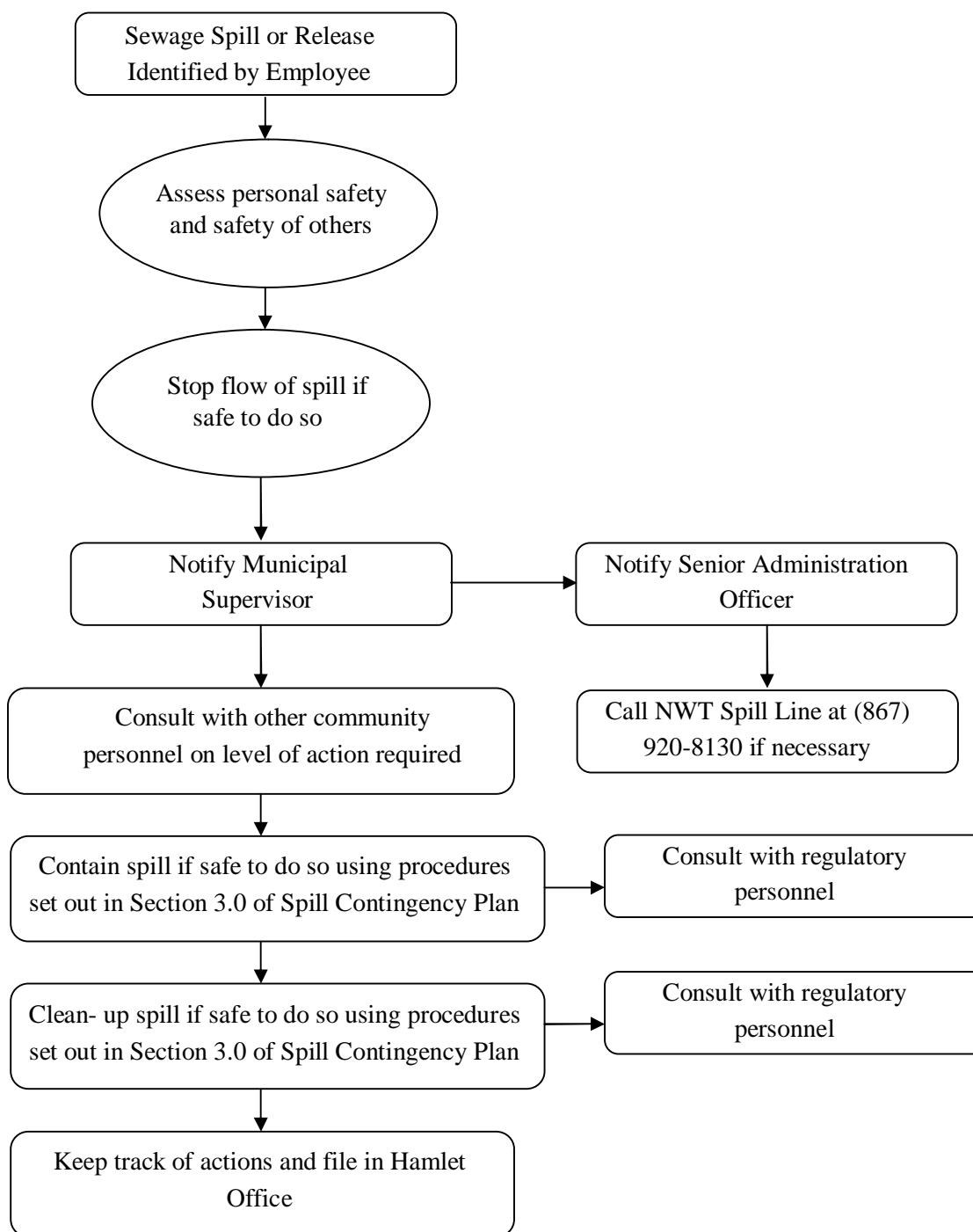
The following table lists the personnel who will be involved in the spill response. Contact information is also provided.

**Table 1. Response Personnel Contact Information**

<b>Name</b>	<b>Contact Information</b>	<b>24 hour Contact Number</b>
Shawn Stuckey (SAO)	(867) 360-7141	Unavailable
Jacob Keanik, Public Works Foreman	(867) 360-7141	Unavailable

### **2.2 Flowchart of Response Organization and Communication Lines**

The following flowchart outlines the chain of communication to be followed, upon discovery of a sewage spill or release by an employee of the community.



**Figure 2: Flowchart of Communication Lines**

### **2.3 Summary of Available Communication Equipment**

The following equipment is available in the community for communication purposes:

- Telephone with land line;
- Computers with internet connection in Hamlet Office; and
- Fax machine.

### **3 ACTION PLAN**

#### **3.1 Potential Environmental Impacts of Sewage Spill**

Generally, for sewage spills, environmental impacts are lower during the winter, as snow is a natural sorbent and ice forms a barrier lining for limiting soil or water contamination. Spills can be more readily recovered when identified and reported.

##### **Sewage Spill Concerns:**

- Human and wildlife health hazard, and unsightly appearance; and
- High nutrient concentrations could negatively impact water bodies and runoff into water bodies must be avoided.

**Worst Case Scenario:** Full sewage truck releases all of its contents onto ground or into water body and surrounding environment or substantial failure of the sewage lagoon berm that releases the entire contents of the lagoon uncontrolled into the surrounding environment.

#### **3.2 Procedures**

##### **3.2.1 Procedures for Initial Actions**

The following list of actions should be followed by the first person on the scene:

- Ensure safety of all personnel.
- Assess the hazards and risks to persons in the vicinity of the spill.
- If possible, without further assistance, control the danger to human life.
- If it is safe to do so, and if possible, stop the spill (i.e. shut off pump, replace cap, etc.).
- Gather information on the status of the situation, including:
  - Estimated size of spill; and
  - Estimated migration route.
- Contact Municipal Supervisor, as per flowchart in Figure 2.

##### **3.2.2 Spill Reporting Procedures**

Spills should be reported immediately to the Municipal Supervisor, who will notify the SAO. Together they will determine if the spill is to be reported to the 24-Hour Spill Report Line at 867-920-8130.

Copies of the Spill Report form are available in each spill kit and in Appendix A of this manual. The form will be filled out by the Public Works Foreman (or designate), and faxed or emailed to the 24-Hour Spill Report Line. Contact information is as follows:

24-Hour Spill Report Line  
Phone: (867) 920-8130  
Fax: (867) 873-6924  
Email: spills@gov.nt.ca

Report all spills to the 24-Hour Spill Report Line.

### **3.2.3 Procedures for the Protection of Human Health and Safety**

Following a spill, the health and safety of workers as well as the general public is a priority.

**In the event of a sewage spill:** Restrict public access (including pets and animals) to the spill area. Workers involved in the clean-up of the spill must be properly trained to deal with the type of spill and must wear appropriate personal protective equipment (PPE).

### **3.2.4 Public Notification Procedure**

The Contingency Planning and Spill Reporting Regulations for Nunavut require that Spill Contingency Plans include a public reporting procedure used to alert anyone who may be affected by a spill.

On a case-by-case basis, hamlet's Senior Operating Officer and the Hamlet Council decide on the type of public notification procedure that is to be implemented to ensure public health and safety in the case of a spill.

Typically, in the case of a large scale spill that is deemed to have a potential impact on public health and safety, the hamlet will notify local residents verbally and in person, via individual household visits.

In the case of a small spill, where a negative impact on public health and safety is unlikely, the hamlet gives public notice of the spill via the local community radio.

### **3.2.5 Procedures for Containing and Controlling Spill**

General procedures noted below will be used to contain and control all spills. Specific procedures for spills on land, water, snow and ice follow.

- First anticipate what will be affected by the spill.
- Assess direction and speed of spill, and any factors that could affect these.
- Determine best location for containing spill.

#### **3.2.5.1 Spills on Land:**

Dykes and trenches can be constructed to contain spills on land. Soil surrounding the spill area can be dug out, and piled up, to create a barrier for the spill. A plastic tarp can be placed at the base of the dyke, so that the pooled material can be removed with sorbent materials. Conversely, trenches can be excavated to permafrost, which will provide a natural containment of the spill. Once the material is contained, it can be pumped out, or removed by using sorbent materials. If the spill is moving very slowly, such structures may not be necessary and the material can be removed before migrating away from the spill location.

#### **3.2.5.2 Spills on Water:**

Spills on water are considered the most serious types of spills, as there is often no containment of the spilled material and water quality and aquatic life are negatively impacted. Booms and weirs can be

installed to contain the spill. Booms are designed to float, and are made of absorbent material to soak up the spill. They are deployed from the shore or a boat, to create a circle around the spill. Weirs are installed across a stream, to prevent further migration. Plywood or other materials found onsite can be used. Barriers made of fence or netting can be used as well, with sorbent material placed at the base of the barrier. Once contained, the spill contents can be removed by absorbent materials, pumped out or allowed to volatilize.

#### *3.2.5.3 Spills on Snow:*

Snow acts as a natural sorbent for spills. Impacted snow is easily visible, and can be shoveled into empty drums or barrels for proper disposal. If the spill is migrating down a hill, a snow dyke can be constructed to contain the spill. A plastic tarp can be placed at the base of the dyke, where spills are expected to pool. The collected spill and impacted snow can be removed with absorbent materials, pumped out, or shoveled into barrels for disposal.

#### *3.2.5.4 Spills on Ice:*

Ice is considered impermeable to spills, so these spills are generally easy to clean up. Small spills can be cleaned up by placing absorbent materials on top of the ice. Impacted snow and slush can then be removed by shovels, and placed in barrels for disposal. For larger spills, dykes of snow and trenches can be constructed to contain the spill. The pooled spill can then be removed by adsorbent materials or pumped out. Impacted snow and slush can be shoveled into barrels for disposal.

#### *3.2.5.5 Worst Case Scenarios:*

Worst case scenarios include a dyke or trench overflowing and a large spill on water that cannot be contained with materials available in the community. In the first case, a trench or collection pit could be constructed downstream to collect the spill. In the second case, an emergency response team would need to be called, with appropriate equipment to deal with the spill.

### ***3.2.6 Procedures for Transferring, Storing and Managing Spill Related Wastes***

Spills are generally cleaned up starting at the outer limit of the spill, and working towards the point of the spill. Sorbent materials and hand tools such as cans and shovels are used for smaller spills. Larger spills can be contained with the use of a pump and/or heavy equipment.

Spill wastes include using absorbent materials and containers of impacted water and snow. Sorbent materials should be placed in plastic bags for proper disposal. The containers of impacted water and snow should be sealed and stored until disposal at an approved facility can be arranged.

Following a spill, all used materials need to be properly washed and/or replaced.

### ***3.2.7 Procedures for Restoring Affected Areas***

Once a spill has been contained, community personnel will consult with regulatory personnel assigned to the file to determine the level of clean-up required. Regulatory personnel may request that a site specific study be conducted, to ensure appropriate clean-up levels are met.

## **4 RESOURCE INVENTORY**

### **4.1 On-site Resources**

It is recommended that the Hamlet of Gjoa Haven retain one spill kit in the community, located at the Maintenance Garage. The spill kit should contain the following:

- 30 socks/booms (3" x 4');
- 30 pillows (2L);
- 24 dispersal bags;
- 4 pairs gloves;
- 2 pairs goggles;
- 6 pairs Tyvek coveralls;
- 4 shovels;
- 2 spill signs;
- 2 repair putty;
- 1 Emergency Response Guidebook;
- 1 Safety and Compliance Directory;
- 1 Spill Response Pocket Guide.

This response kit is designed to contain and collect up to 56 gallons of spilled material. Additional volumes will be accommodated with the use of absorbent products that will be maintained in inventory in sufficient quantities.



#### **4.2 Off-site Resources**

The following resources are available for assistance if needed:

NU 24-Hour Spill Line	<u>(867) 920-8130</u>
Aboriginal Affairs and Northern Development Canada - Nunavut	<u>(867) 975-4500</u>
GN – Department of Environment	<u>(867) 975-7700</u>
GN – Department of Environment - Gjoa Haven	<u>(867) 360-7605</u>
Gjoa Haven Health Centre	<u>(867) 360-7441</u>
RCMP (Gjoa Haven) Emergency	<u>(867) 360-1111</u>
Emergency Duty Officer (Environment Canada) Nunavut	<u>(867) 920-8130</u>
GNWT Environmental Health Office (Yellowknife Office)	<u>(867) 669-8979</u>
Medivac (Yellowknife)	<u>(867) 669-4115</u>
First air Cargo Call Center <u>1-800-568-7497</u>	Gjoa Haven Cargo : <u>(867) 360-6612</u>
Adlair Aviation (1983) Ltd.	<u>(867) 983-2569</u>
Kenn Borek Air Ltd. (Iqaluit office)	<u>(867) 979-0040</u>
Director, Environmental Protection - Prairie and Northern Environment Canada	<u>(708) 951-8718</u>
Gjoa Haven Department of Environment's Conservation Offices	<u>(867) 360-7605</u>
Kevin Niptanatiak, Head Kitikmeot Regional Director, CGS	<u>(867) 983-4138</u>
Fisheries Management, Department of Fisheries and Oceans - Iqaluit	<u>(867) 979-8000</u>
SAO currently Shawn Stuckey	<u>(867)-360-7141</u>
Public Works Foreman Jacob Keanik	<u>(867) 360-7141</u>

## **5 TRAINING PROGRAM**

### **5.1 Outline of Training Program**

The Department of Environment and Natural Resources schedules a few training sessions each year for spill contingency. Selected members from the community works department can attend these training sessions. Once key personnel have the fundamental information, training sessions will be conducted as a part of the normal operation of the community. To obtain more information on training needs, please contact the Federal Programs Division, Environment Canada.

### **5.2 Training Schedule and Recordkeeping**

Training will be conducted on an as-needed basis. Records will be kept in the community office.

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## **APPENDIX A**

### **NWT Spill Report Form**

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Canada

# NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE

TEL: (867) 920-8130

FAX: (867) 873-6924

EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR		REPORT TIME		<input type="checkbox"/> ORIGINAL SPILL REPORT, OR <input type="checkbox"/> UPDATE # _____ TO THE ORIGINAL SPILL REPORT	<b>REPORT NUMBER</b> _____
	OCCURRENCE DATE: MONTH – DAY – YEAR		OCCURRENCE TIME			
C	LAND USE PERMIT NUMBER (IF APPLICABLE)			WATER LICENCE NUMBER (IF APPLICABLE)		
	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM NAMED LOCATION				REGION <input type="checkbox"/> NWT <input type="checkbox"/> NUNAVUT <input type="checkbox"/> ADJACENT JURISDICTION OR OCEAN	
E	LATITUDE			LONGITUDE		
	DEGREES	MINUTES	SECONDS	DEGREES	MINUTES	SECONDS
F	RESPONSIBLE PARTY OR VESSEL NAME		RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION			
	ANY CONTRACTOR INVOLVED		CONTRACTOR ADDRESS OR OFFICE LOCATION			
H	PRODUCT SPILLED		QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES		U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE)		QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES		U.N. NUMBER	
I	SPILL SOURCE		SPILL CAUSE		AREA OF CONTAMINATION IN SQUARE METRES	
	FACTORS AFFECTING SPILL OR RECOVERY		DESCRIBE ANY ASSISTANCE REQUIRED		HAZARDS TO PERSONS, PROPERTY OR EQUIPMENT	
K	ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS					
L	REPORTED TO SPILL LINE BY	POSITION	EMPLOYER	LOCATION CALLING FROM	TELEPHONE	
	ANY ALTERNATE CONTACT	POSITION	EMPLOYER	ALTERNATE CONTACT LOCATION	ALTERNATE TELEPHONE	

## REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION	EMPLOYER	LOCATION CALLED	REPORT LINE NUMBER
		STATION OPERATOR		YELLOWKNIFE, NT	(867) 920-8130
LEAD AGENCY <input type="checkbox"/> EC <input type="checkbox"/> CCG <input type="checkbox"/> GNWT <input type="checkbox"/> GN <input type="checkbox"/> ILA <input type="checkbox"/> INAC <input type="checkbox"/> NEB <input type="checkbox"/> TC			SIGNIFICANCE <input type="checkbox"/> MINOR <input type="checkbox"/> MAJOR <input type="checkbox"/> UNKNOWN		FILE STATUS <input type="checkbox"/> OPEN <input type="checkbox"/> CLOSED
AGENCY		CONTACT NAME	CONTACT TIME	REMARKS	
LEAD AGENCY					
FIRST SUPPORT AGENCY					
SECOND SUPPORT AGENCY					
THIRD SUPPORT AGENCY					