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Nunalingni Kavamatkunillu Pivikhaqautikkut  
Department of Community Government Services  
Ministère des Services communautaires et gouvernementaux

Phyllis Beaulieu  
Manager of Licensing  
Nunavut Water Board  
P.O. Box 119  
Gjoa Haven, NU X0B 1J0

September 18, 2008

**Sub: Conditions applying to Operation and Maintenance,  
Hamlet of Hall Beach, Water License no. 3MB-HAL0810**

Dear Phyllis,

I am writing you clarifying few issues and concerns of Part F: Conditions applying to operation and maintenance of the Hamlet of Hall Beach Water License No: 3BM-HAL0810 issued on May 16, 2008.

**a. Water Distribution Facility Operation and Maintenance (O&M) Plan:**

The Hamlet has this manual already and they try to regularly maintain the Facilities according to the guidelines as stated in the manual.

**b. Sewage Disposal Facility Operation and Maintenance (O&M) Plan:**

GN-CGS is in a process of hiring a consultant to develop this manual and expecting to complete by 2009.

**c. Sewage Sludge Management Plan:**

This is a part of item b and completed at the same time.

**d. Solid Waste Disposal Facility Operation and Maintenance (O&M) Plan:**

Solid and liquid waste will be combined in a single manual. The same consultant will be working on item b, c and d and completing the product at the same time.

**e. Spill Contingency Plan**

This is also a part of item b.



**f. Monitoring Program Quality Assurance /Quality Control Plan (QA/QC) Plan:**

The QA/QC for water distribution is already a part of item a: Water Distribution and Maintenance O&M manual and available to the Hamlet.

QA/QC plan of Waste and Liquid management will be added in the O&M manual of Item b during the development process.

The Hamlet Foreman has been trained on the QA/QC plans on Water and Waste Water management. The Hamlet has been managing Water quality by testing Chlorine residual of each truck water. They are also doing QA/QC by getting water samples tested for microbiological parameters by GN-Health office in Iqaluit on monthly basis.

The Hamlet is also managing Sewage Lagoon effluent quality by analyzing BOD and TSS following the Water License guidelines in an Accredited Laboratory.

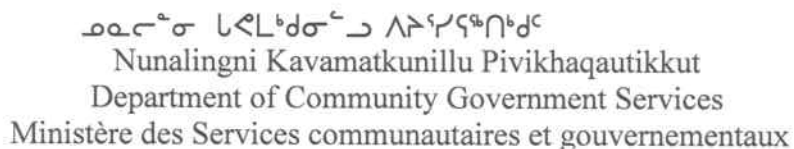
The Hamlet always burns and compacts the domestic wastes inside the landfill site and covers with gravel on annual basis.

An Engineer's inspection was done this summer and recommended implementing the Action plan in 2008 and 2009. Inspection report and Action plan are attached.

**Action Taken:**

1. **Water Truck Fills Station:** An electrical contractor KRT was hired to fix up the heat trace of the intake pipe in order to bring the facility into safe operation.
2. **Sewage Lagoons:** Kudlik construction Ltd was hired to conduct an inspection of garbage under the bed of Sewage Lagoon cell 1. Repairs to the Lagoon have been implemented. They removed garbage and dumped in a designated area of the land fill site, and backfilled those holes with clean and fresh gravel with 95% compaction. Photos are attached.

Wastewater samples from the lagoon and wetlands were tested two times in an accredited laboratory. Results are attached.



Finally a consultant will be hired soon to develop an O&M manual satisfying the conditions of the Hamlet Water License accommodating a strategy for long term monitoring of the stability of the Lagoon berms.

Thanking you,

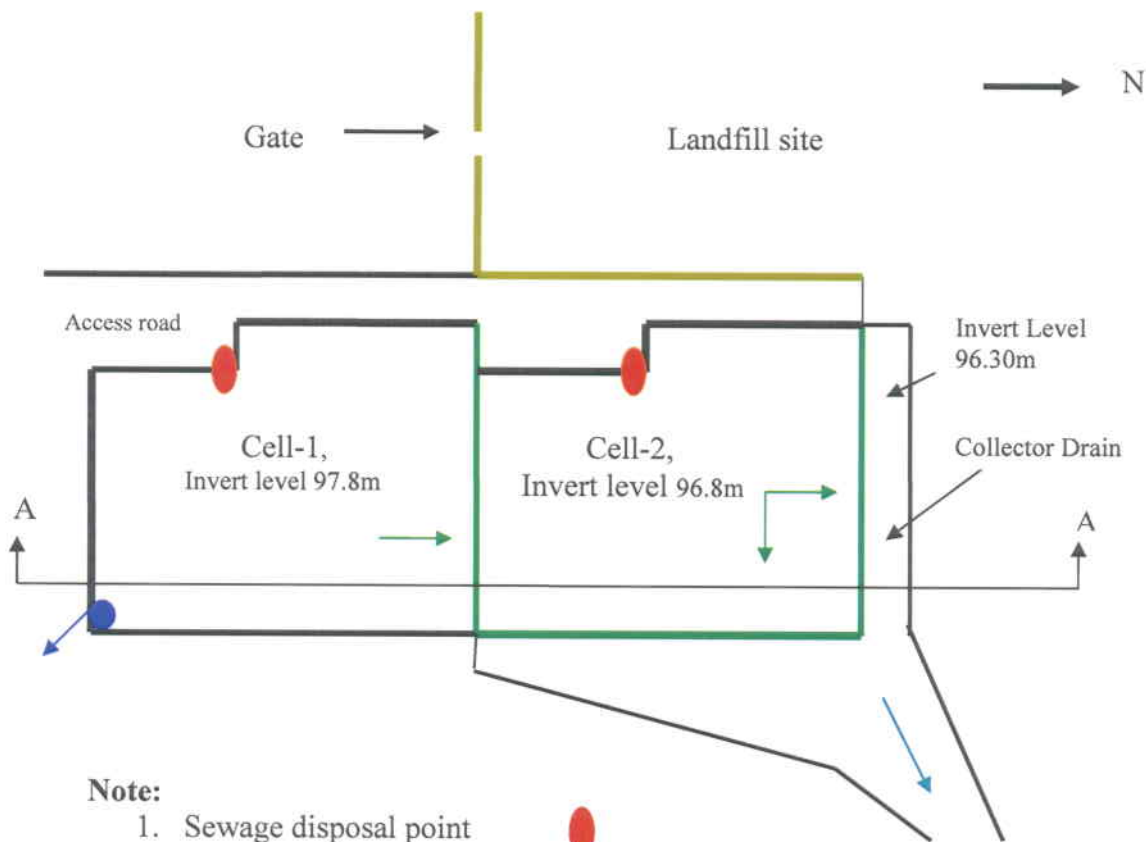
**Bhabesh Roy, M.A.Sc., P.Eng.**  
Municipal Planning Engineer  
Community & Government Services  
Baffin Region, Government of Nunavut  
P.O.Box 379, Pond Inlet, X0A 0S0  
Ph-867 899 7314  
Fax-867 899 7328  
E-mail: [broy@gov.nu.ca](mailto:broy@gov.nu.ca)

Copy to : Patricio Fuentes, Regional Manager of Projects, GN-CGS, Baffin Region  
Johnathan Palluq, Assistant Regional Director, GN-CGS, Baffin Region  
Timoon Toonooo, Regional Director, GN-CGS, Baffin Region  
Michelle Hart, SAO, Hamlet of Hall Beach, Baffin Region

## Action Plan on the remedial works of Hall Beach Sewage Lagoon, Cell -1

**Prepared by: Bhabesh Roy, M.A.Sc., P.Eng.  
MPE, Baffin Region, GN-CGS.**

**Introduction:** Hall Beach is a small community of Baffin Region, Nunavut, with only 700 populations and located within a zone of continuous permafrost. This is the unique community located on sand and gravel raised beaches with flat and gently rolling terrain with numerous lakes and ponds. This community like many others in Baffin Region provides trucked sewage services for the community's residents, businesses and institutions. Currently the wastewater of this community is being treated by two cells aerated Lagoons located more than 1km to the North of this community at  $68^{\circ}48.3'N$  and  $81^{\circ}15.79'W$ . The Land fill site is located almost perpendicular to these lagoons just opposite side of the access road as shown below.

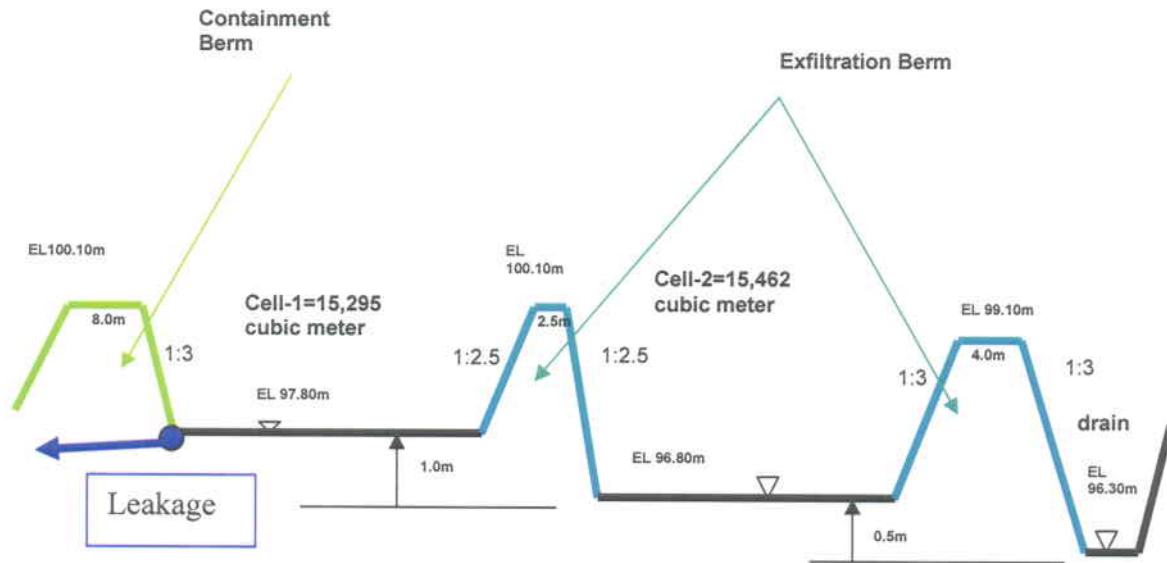


### Note:

1. Sewage disposal point
2. Exfiltration Berm
3. Containment Berm
4. Landfill site fencing
5. Leakage (developed)
6. Effluent flow



## Hall Beach Sewage Lagoons



### Section: A - A

#### Note:

1. The Common berm of cell 1 and 2 is exfiltration berm and it allows seepage from cell 1 to cell 2.
2. The E-W berm of cell 2 is also exfiltration berm and allows seepage from cell 2 to the collector drain.
3. The N-W berm of cell 2 is also an exfiltration berm and allows seepage to the Wetlands from cell 2.
4. The bed level of cell 2 is 1m below from the bed level of cell 1.
5. The invert level of the drain is 0.5m below from the bed level of cell 2.



**Background:**

These facilities were built in 2002. Since then these have been functioning well. On July 01, 2008, SAO of the Hamlet of Hall Beach was informed by her foreman that water level of cell 1 was dropping down rapidly. SAO examined next day and found the cell 1 was almost empty. The liquid was seeping speedily from the S-E corner of cell 1 under the containment berm. Hamlet informed GN-CGS and GN-DOE as well. But they did not report to the spill emergency line.

**Investigation:**

Aulakh Malli, P.Eng. Senior manager infrastructure of CGS capital Planning visited the community on July 4 since Bhabesh Roy, P.Eng., Baffin Regional Engineer was on vacation at that time. He visited the sewage lagoons. The cell 1 was completely empty. He discussed with the Hamlet and locally available contractor kudlik construction ltd for the possible solution. He also instructed hamlet to dig holes where there were leakages until garbage layer ends.

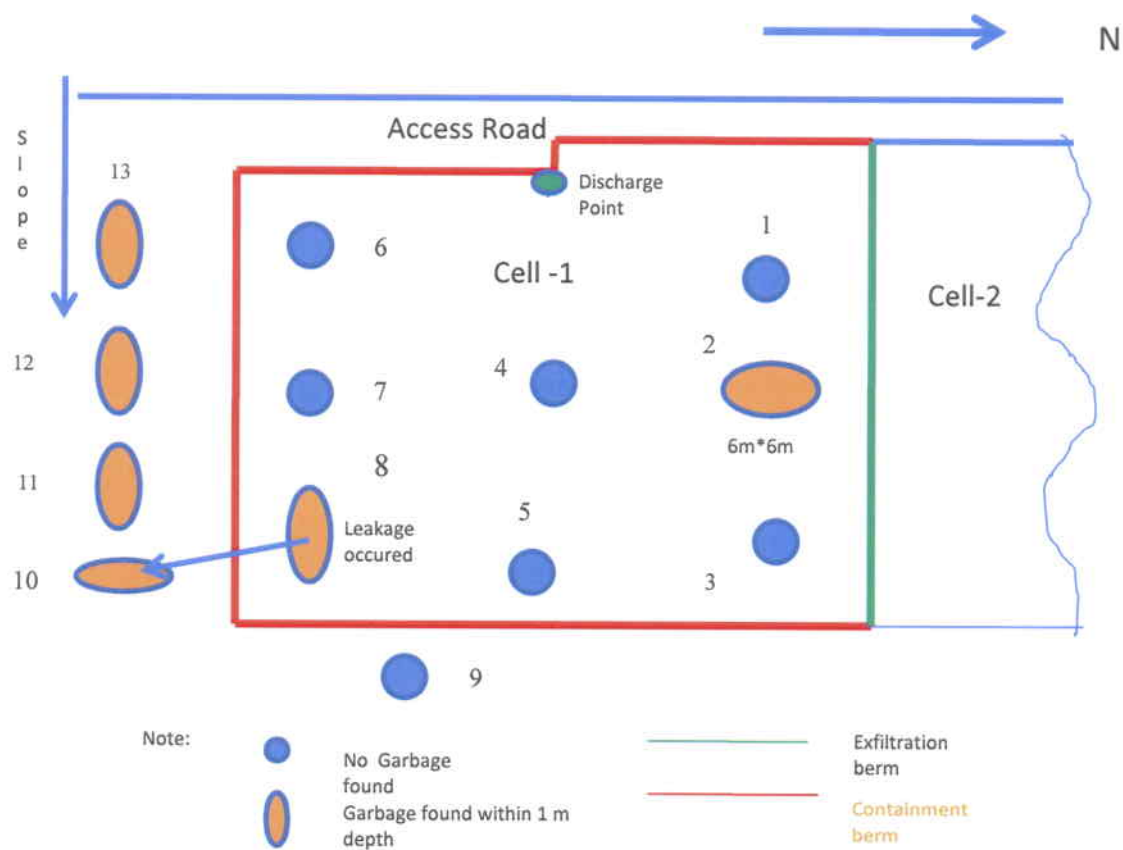
He collected 12 samples, four from the sewage lagoon cell 2 and eight from the wetlands. These samples were tested by Caduceon Laboratory in Ottawa and the results are attached.

Following his investigation, Bhabesh Roy, P.Eng. visited the site on July 24 and stayed there until July 27 mainly for dealing the Hamlet Water Licensing issues. He also investigated those holes and found garbage there. Bhabesh collected samples on July 26 from the Lagoon cell 2 and wetlands for the analysis of BOD and TSS. He also did sampling on August 27 prior to decanting of cell 2. These samples were collected from the Sewage truck, cell 2 and wetlands and results are not yet available.

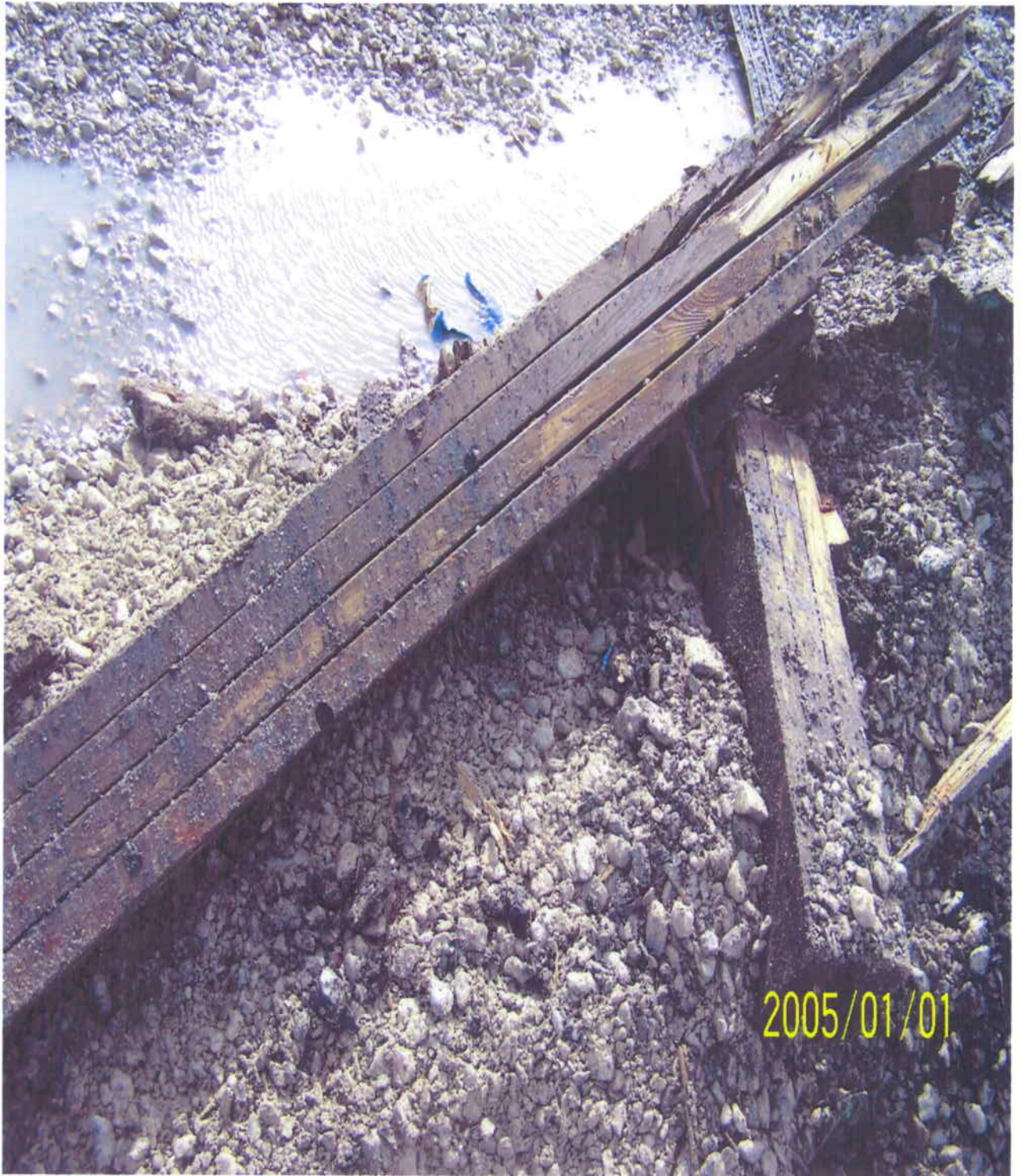
For further investigation, Bhabesh again visited the site on August 20 and worked there with Kudlik construction ltd until August 21. A massive investigation was conducted by digging 8 holes inside of cell 1 with an excavator to find out the extent of garbage under this lagoon bed and five holes outside of cell 1 to know the surroundings. It has been observed that these two holes (2 and 8) inside cell 1 only contains garbage but they are not connected each other. This confirms that the corner hole which drained out entire liquid from cell 1. No other garbage spot was identified inside the cell 1. But the corner hole (8) has shown garbage also under the E-W containment berm of cell 1.

Outside of this containment berm of cell 1, along E-W direction, a big garbage area has been identified. It appears that this containment berm might be built on the garbage area. Since no geotechnical report is available, it is also difficult to ascertain the extent of the garbage area under this berm. No garbage was found in hole (9) outside of the N-S berm of cell 1. The field assessment sketch is attached.

Hall Beach Sewage Lagoon-Cell 1, field Inspection Report







**Garbage Found in Hole 2,  
Photo taken on August 20, 2008**





**Garbage Found in Hole 2,  
Photo taken on August 20, 2008**





**Garbage shown inside the berm, hole 8,  
Photo taken on August 26, 2008**





**Hole no.8, shows garbage still collecting,  
Photo taken on August 26, 2008**





**Digging holes in Progress inside the Cell 1,  
Photo taken on August 20, 2008**



**Kudlik Excavator digging holes in Sewage Lagoon cell 1,  
Photo taken on August 20,2008**





**Clean bottom, no Garbage inside cell 1,  
Photo taken on August 26, 2008**





**Garbage found outside of the E-W berm of lagoon Cell 1,  
Photo taken August 20, 2008**



**Garbage found outside of the E-W berm of lagoon Cell 1  
(A cane showed 1986)  
Photo taken on August 20, 2008**





**Excavated along the E-W berm where leakage occurred of Lagoon cell 1**  
**Photo taken in July 25, 2008**





**Hole developed outside of the E-W containment berm of Lagoon cell 1,  
Which drained out cell 1.  
Photo taken, July 25, 2008.**

**Spill Reporting:** Following the discussion with GN- DOE, a spill report was also filed on August 14, 2008 and attached a copy.





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

<b>A</b>	REPORT DATE: MONTH – DAY – YEAR <b>August 14, 2008</b>	REPORT TIME <b>4.00 PM EST</b>	<input checked="" type="checkbox"/> ORIGINAL SPILL REPORT, OR		REPORT NUMBER <b>01 -</b>
<b>B</b>	OCCURRENCE DATE: MONTH – DAY – YEAR <b>July 01, 2008</b>	OCCURRENCE TIME <b>3.00 PM EST</b>	<input type="checkbox"/> UPDATE # TO THE ORIGINAL SPILL REPORT		
<b>C</b>	LAND USE PERMIT NUMBER (IF APPLICABLE) <b>N/A</b>		WATER LICENCE NUMBER (IF APPLICABLE) <b>3BM-HAL0810</b>		
<b>D</b>	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM THE NAMED LOCATION <b>Baffin Region</b>			REGION <input type="checkbox"/> NWT <input checked="" type="checkbox"/> NUNAVUT <input type="checkbox"/> ADJACENT JURISDICTION OR	
<b>E</b>	LATITUDE DEGREES <b>89 N</b> MINUTES SECONDS		LONGITUDE DEGREES <b>33 W</b> MINUTES SECONDS		
<b>F</b>	RESPONSIBLE PARTY OR VESSEL NAME <b>SAO, Hamlet of Hall Beach</b>	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION <b>Hall Beach, Box- 3, X0A 0K0</b>			
<b>G</b>	ANY CONTRACTOR INVOLVED <b>NIL</b>	CONTRACTOR ADDRESS OR OFFICE LOCATION			
<b>H</b>	PRODUCT SPILLED <b>Sewage</b>	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES <b>13,552 cubic meters</b>		U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE) <b>NIL</b>	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES		U.N. NUMBER	
<b>I</b>	SPILL SOURCE <b>Sewage Lagoon- Cell 1</b>	SPILL CAUSE <b>Leaked underneath the Berm</b>		AREA OF CONTAMINATION IN SQUARE METRES <b>A big wetland of about 6 Ha.</b>	
<b>J</b>	FACTORS AFFECTING SPILL OR RECOVERY <b>Equipment availability and ground conditions</b>	DESCRIBE ANY ASSISTANCE REQUIRED <b>Heavy equipment and Operator</b>		HAZARDS TO PERSONS, PROPERTY OR ENVIRONMENT <b>NIL</b>	
<b>K</b>	ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS  <b>Sewage leaked into the wetland and natural treatment took place over a period of probably 30 days, with the leak increasing in volume on or near the date that the leak was noticed. Up until July 01, the leak was probably occurring underground, and since the cells are designed to exfiltrate, the leak was not realized until the ground started to become saturated with grey water. Samples were taken and tested and found satisfactory. Lab results are attached. CGS is dispatching the Regional Engineer to perform a detailed investigation of the extent of the damage, and also why the berm failed to contain the effluent. This inspection (@Aug 18-21) will include some non evasive excavation of inside and outside the berm to determine the makeup of the soil and conditions. Based upon these findings a repair/remediation plan will be formulated and presented for approval.</b>				
<b>L</b>	REPORTED TO SPILL LINE BY <b>Michelle Hart</b>	POSITION <b>SAO</b>	EMPLOYER <b>Hamlet of Hall Beach</b>	LOCATION CALLING FROM <b>Hall Beach</b>	TELEPHONE <b>867 928 8829</b>
<b>M</b>	ANY ALTERNATE CONTACT <b>Bhabesh Roy</b>	POSITION <b>Regional Engineer, CD</b>	EMPLOYER <b>GN-CGS</b>	ALTERNATE CONTACT LOCATION <b>NIL</b>	ALTERNATE TELEPHONE <b>867 899 7314</b>
REPORT LINE USE ONLY					
<b>N</b>	RECEIVED AT SPILL LINE BY	POSITION <b>Station operator</b>	EMPLOYER	LOCATION CALLED <b>Yellowknife, NT</b>	REPORT LINE NUMBER <b>(867) 920-8130</b>
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					



**Proposed remediation Action plan:**

The daily production of liquid wastes of the community is roughly 84000 litres. For nine month storage considering zero exfiltration, capacity of the lagoon requires roughly 23,000 cubic meters. The holding capacity of Cell 2 is only 15, 462 cubic metres. Therefore, Cell 1 must be required for additional storage.

This project has not been budgeted under GN-CGS Capital Planning process in the current fiscal year 2008-09. Also it is technically difficult to conduct any major work without further geotechnical investigation. On the other hand, cell 1 must be used for at least winter storage from December to May. During this period the ground is expected to become freeze up and permafrost is considered thicker inside the berm. In this case seepage is unlikely occurred during the winter season.

Therefore, the following remedial works have been planned in order to bring this facility (Cell 1) into operation for at least six (6) months winter storage.

1. Remove all the garbages from both the holes (2 and 8) of cell 1.
2. Dump the garbage contaminated soil in the designated area of the landfill site.
3. Backfill in layers with fresh gravel imported from the Hamlet stockpile with 95% compaction.
4. Back fill all the holes (1, 3,4,5,6 and 7) inside of the cell 1 and hole 9 out side of cell 1 with the existing excavated materials in layers with 95% compaction.
5. Remove the garbage collected from outside holes (10, 11, 12 and 13).
6. Dump the contaminated soil in the same designated area of the landfill site.
7. Backfill in layers with fresh gravel with 90% compaction.

Hire locally available contractor Kudlik construction ltd to complete the remedial works utilizing their operators, excavator, dump trucks and compactor. Estimated time is 5 (five) days with the supervision and satisfaction of Bhabesh Roy, P.Eng. Baffin Regional Municipal Engineer. The remedial works have been planned to complete by September 15, 2008.

In order to keep using both facilities with highest satisfaction, Cell 2 will be decanted



Phone: (867)-928-8829

Fax (867) 928-8871

Fax (867) 928-8871

August 20, 2008

Andrew Keim  
Water Resources Officer  
INAC Nunavut Regional Office  
P.O. Box 2200  
Iqaluit, Nunavut X0A 0H0

Dear Andrew:

Please be advised that we are preparing to decant sewer lagoon #2 on August 27, 2008.

If you wish to come it would be appreciated but if you are not able to come we will take the samples ourselves. We understand that samples are to be taken prior to, during and at the end of the decantation process.

If you have any comments please let me know.



Regards,

Michelle Hart, SAO

Hi Michelle,

Thank you for the required notification.  
I will not be available to attend myself.  
Please proceed with the decant and collect the required samples.  
I left three sets of bottles for you in the cooler which is sufficient  
for your staff to collect the samples.  
Again Taiga has a website that has everything you need to collect the  
samples.  
[http://nwt-tno.inac-ainc.gc.ca/taiga/index\\_e.htm](http://nwt-tno.inac-ainc.gc.ca/taiga/index_e.htm)

If you have any questions or concerns please let me know.

Andrew Keim  
Water Resources Officer  
INAC Nunavut Regional Office  
P.O. Box 2200  
Iqaluit, Nunavut X0A 0H0  
Email: KeimA@inac-ainc.gc.ca  
Phone: (867) 975-4289  
Fax: (867) 979-6445

>>> "Michelle Hart" <sao\_hbhamlet@qiniq.com> 8/20/2008 5:58 PM >>>  
Good Afternoon Andrew

I have attached a letter regarding the decantation of Sewer Lagoon #2  
in  
Hall Beach for your information.

Thanks

Michelle

C.O.C.: 114927

REPORT No. B08-24369

**Report To:**

**Hamlet of Hall Beach**  
P.O. Box 3  
Hall Beach, NU, X0A 0K0  
**Attention:** Michelle Hart - SAO

**Caduceon Environmental Laboratories**


2378 Holly Lane  
Ottawa, Ontario, K1V 7P1  
Tel: 613-526-0123  
Fax: 613-526-1244

DATE RECEIVED: 29-Jul-08  
DATE REPORTED: 06-Aug-08  
SAMPLE MATRIX: Waste Water

JOB/PROJECT NO.:  
P.O. NUMBER:  
WATERWORKS NO.

Parameter:	BOD	Total Suspended Solids			
Units:	mg/L	mg/L			
M.D.L.:	3	3			
Reference Method:	SM 5210	SM 2540			
Date/Site Analyzed:	30-Jul-08/O	06-Aug-08/O			
Client I.D.	Sample I.D.	Date Collected			
Sewage Lagoon #1	B08-24369-1	26-Jul-08	127	216	
Sewage Lagoon #2	B08-24369-2	26-Jul-08	>121	228	
Sewage Lagoon #3	B08-24369-3	26-Jul-08	>121	216	
Wetlands #4	B08-24369-4	26-Jul-08	50	184	
Wetlands #5	B08-24369-5	26-Jul-08	30	80	
Wetlands #6	B08-24369-6	26-Jul-08	< 3	< 3	

Note: Sample # 2 & #3 dilution was missed on BOD therefore a accurate value could not be calculated. I did COD ontheses samples #2 551 mg/L & #3 535 mg/L usually COD results are 3 times the BOD value.



Gord Murphy  
Lab Supervisor

M.D.L. = Method Detection Limit

Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,P-Peterborough,M-Moncton

Accredited by CAEAL for specific tests.

The analytical results reported herein refer to the samples as received. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.



**C.O.C.: 11266**

**REPORT No. B08-21156**

**Report To:**

**Hamlet of Hall Beach**

P.O. Box 3

Hall Beach, NU, X0A 0K0

**Attention:** Michelle Hart - SAO

**Caduceon Environmental Laboratories**

2378 Holly Lane

Ottawa, Ontario, K1V 7P1

Tel: 613-526-0123

Fax: 613-526-1244

DATE RECEIVED: 07-Jul-08

JOB/PROJECT NO.: Lagoon Sewage

DATE REPORTED: 15-Jul-08

P.O. NUMBER:

SAMPLE MATRIX: Waste Water

WATERWORKS NO.

Parameter:	BOD	Total Suspended Solids			
Units:	mg/L	mg/L			
M.D.L.:	3	3			
Reference Method:	SM 5210	SM 2540			
Date/Site Analyzed:	08-Jul-08/O	14-Jul-08/O			

Client I.D.	Sample I.D.	Date Collected				
WET LAND -1 #3	B08-21156-1	05-Jul-08	10	--		
WET LAND -1 #4	B08-21156-2	05-Jul-08	11	--		
WET LAND -1 #1	B08-21156-3	05-Jul-08	--	6		
WET LAND -1 #2	B08-21156-4	05-Jul-08	--	42		
WET LAND -2 #7	B08-21156-7	05-Jul-08	22	17		
WET LAND -2 #8	B08-21156-8	05-Jul-08	24	16		
LAGOON #9	B08-21156-9	05-Jul-08	--	88		
LAGOON #10	B08-21156-10	05-Jul-08	--	96		
LAGOON #11	B08-21156-11	05-Jul-08	102	--		
LAGOON #12	B08-21156-12	05-Jul-08	84	--		

*K. Pipin*

Krystyna Pipin, M. Sc.

Lab Supervisor

M.D.L. = Method Detection Limit

Site Analyzed=K-Kingston, W-Windsor, O-Ottawa, P-Peterborough, M-Moncton

Accredited by the Standards Council of Canada and CAEAL for specific tests.

The analytical results reported herein refer to the samples as received. Reproduction of this analytical report in full or in part is prohibited without prior written consent from Caduceon Environmental Laboratories.

**Short term Monitoring and Quality control:**

During decanting, Water License guidelines will be followed. Samples from the Lagoon and Wetlands will be tested for BOD and TSS three times, prior, during and at the end of decanting period. These samples will be tested in an accredited lab in Ottawa.





**Raw sample is being collected from the Wastewater Truck prior to decanting the Sewage Lagoon cell 2, Photo taken on august 27, 2008.**



**Sample of Sewage Lagoon cell-2 is being collected prior to decanting ,  
Photo taken on August 27, 2008**



**Sample is being taken from the wetland prior to decanting the sewage lagoon cell 2, Photo taken on August 27, 2008**



**Long term Monitoring:**

1. The functionality of both the cells will be monitored closely by the Hamlet staff during the winter time.
2. INAC's decanting guidelines will be followed during decanting the cells and samples test results will be kept in order.
3. A detailed soil investigation works and a comprehensive performance evaluation will be carried out in the next summer. Following the findings, the necessary steps will be taken.
4. Once geothermal model is developed, Ground temperature monitoring by installing thermisters might be considered for long term berm integrity and stability purposes avoiding any catastrophic failure in future.
5. The wetlands will be kept well maintained free from any garbage.
6. The Land fill site will be budgeted for complete fencing possibly in next year. O&M Manual will be developed together with the Spill Contingency and QA/QC plans as the requirements and satisfaction of the conditions and guidelines of the Hamlet current Water License No. 3BM-HAL 0810 in the next financial year.
7. The land fill garbage will be compacted and covered with gravel each year in order to control garbage flowing all over as a contingency plan. This process will help the Sewage lagoon keeps out of garbage.
8. Following the conditions of the Hamlet current Water License, an inspection of all Engineered facilities related to the management of Water and Waste shall be carried out annually in July/August by a Geotechnical Engineer. The engineer's report shall be submitted to the Board within sixty (60) days of the inspection, including a covering letter from the Hamlet outlining an implementation plan addressing each of the Engineer's recommendations.

**HALL BEACH SEWAGE LAGOON : CELL 1**

**REMEDIAL WORKS CARRIED OUT**

**BY**

**KUDLIK CONSTRUCTION LTD**



Excavating along the Southern Berm of Cell 1





Excavating the floor along the Southern Berm of Cell 1

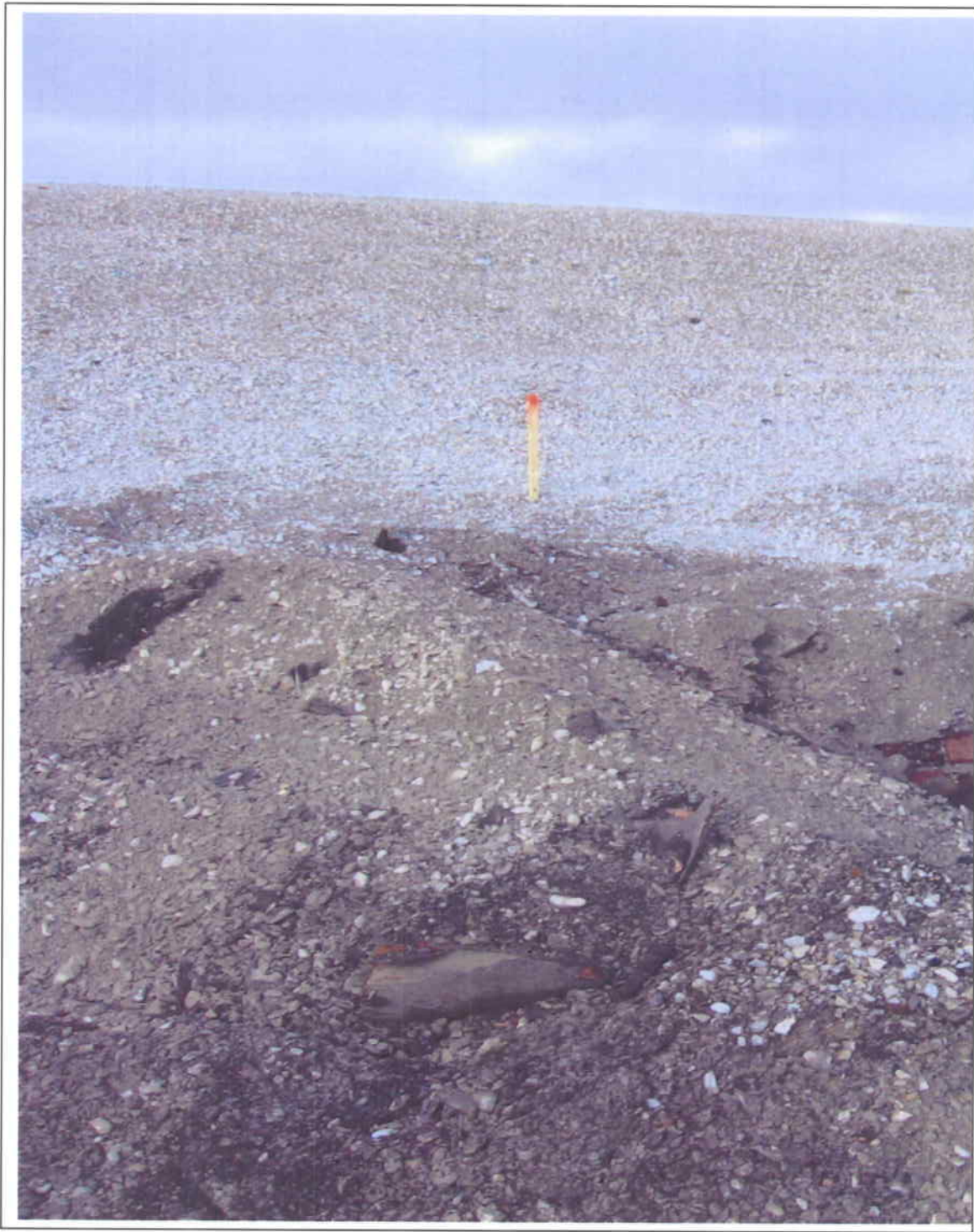


Excavating the floor along the Southern Berm of Cell 1



Excavating the floor along the Southern Berm of Cell 1





Removing Garbage from the middle of cell 1



Removing Garbage from the middle of cell 1





Dumping excavated garbage in the Landfill Site