Annual Report-2014

Water Licence: 3BM-KUG-0914

Hamlet of Kugluktuk, NU

Submitted to the Nunavut Water Board

March 11, 2015

Submitted by
Shah Alam, P. Eng.
Municipal Planning Engineer,
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Department of Community and Government Services
Nunalingni Kavamatkunnilu Pivikhaqautikkut
Ministère des Services Communautaires et gouvernementaux

Kugluktuk Water Licence: 3BM-KUG 0914 Annual Report 2014

March 11, 2015

Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0B 1L0

Attention: Phyllis Beaulieu, Manager of Licensing

RE: Annual Report 2014 - Hamlet of Kugluktuk Water Licence: 3BM-KUG 0914

Dear Ms. Beaulieu,

The Hamlet of Kugluktuk is pleased to submit to Nunavut Water Board the attached file of “Annual Report 2014” of water uses and sewage solid waste disposal as required and directed under the compliance of Water Licence; 3BM-KUG0914. Copies of required tests reports are attached herewith as requested for your reference.

With the help of Government of Nunavut though Community and Government Services, the hamlet has managed the annual monitoring program for sewage and solid waste as set out in the mandatory requirements for environmental compliance. Samples test result shown excellent remediation of contamination parameters within allowable limit comprising BOD, TSS, E-coli and Toxicity components and quality control on effluent before discharging into ocean. We summarized those conditions and requirements outlined in Part B through part H.

We hope that Nunavut Water Board will find this report and enclosed test results valuable to Annual Report in operating the Licence for water, sewage and solid waste facilities.

Best Regards,

Shah Alam
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Shah Alam, P. Eng.
Municipal Planning Engineer,

Government of Nunavut
Community and Government Services
Cambridge Bay, Nu

Part B: General conditions:

Item 1(a through i):

- Tabular Form of Annual water consumption duly filled from daily basis of water distribution and sewage quantity estimated from daily sewage disposal in the lagoon.
- No modification to water supply or sewage disposal from approved scopes, but new integration water treatment plant under construction.
- Decanting happened without written consent from the inspector, but updated quantity with explanation. Requirements will be followed for any subsequent decanting/disposal, and such action will be followed from year 2015 decanting.
- Abandonment of old sewage system with a study report by the consultant has submitted to the Board for information, but a follow up inspection will be carried in next summer 2015 as reported a leaching or leaks and requested by the inspector.
- O & M manuals for sewage and solid waste facilities including A&R plan and Plan of Compliance were submitted to the Board as outlined.

Items 2-7:

- Monitoring program continued without any changes and sampling from stations marked at site of facilities and at locations where signage installed but standard signs yet to be replaced.
- No device Meter was used for volume measurement, however, truck-fill measurement uses as precise in taking the volume of water, sewage and solid waste.
- No Spill or emergency occurrences happened and reported during this period.
- No changes in Plan for Compliance submitted to the Board and followed.

Part C: Water Use:

- Water drawn from the Coppermine river using twin intake lines from new intake pump house and old intake pump house as a backup plus ice melts water using auxiliary hose on shake (when needed). The annual quantity of 54,224 cubic metres limited within the allowable annual limit of 77,015 cubic metres.
- Maintained erosion control measure soil-gravel filled on sides of new intake lines as reported by the inspector and requested to protect sediment to water intake point.

Part D: Waste Disposal

- Raw sewage collect from household sewage tank by hamlet operated vacuum trucks and discharge into the lagoon at designated drop off location KUG-3 through discharge flute. Effluent water finally discharges into Coronation Gulf after flowing over the wetland from the discharge out through overflow pipe and annual decanting by mechanical pump.
- Sewage and effluent samples taken during summer and fall, tested at Taiga laboratory and noted parameters contamination within allowable limits, set out in the *'Guidelines for*

the discharge of treated municipal wastewater in the Northwest Territories' and the *final discharge point for the Sewage lagoon (end -of-pipe).*

- Final discharge point (KUG-4) previously identified, approved and no changes.

Part E-G: Modification, construction, operation, abandonment and restoration

- No dam, dyke or berm constructed during this year, but a site preparation cutting-filling carried out for new Water Treatment plant, design and tender drawings were submitted to the Board including plan of construction development. There will be no modification to water treatment or distribution until the new plant completion and start operation – expected in October 2016
- No changes or modification required to sewage and solid waste facilities during 2014
- Decommissioning of old sewage facility will be naturally remediated as identified in the study plan and explained in the A&R submitted to the Board, unless a partial removal of soil-sludge and dry in designated cell if emergency situation.
- Final design drawings and documents of new Treatment Plant were submitted before the construction started in summer 2014.
- Leachate protection measure from surrounding area through the erosion channel between intake lines was completed by filling and heaping backfill and complete covering ditches.
- The old sewage facility abandonment report was submitted stating the direction for reuse if requires for sludge drying facility or land farm activities, then a restoration plan to the facility, otherwise a natural remediation through water washout. At the moment, no other activities involves or includes, therefore, a natural remediation process leaves to the old sewage facility.

Part H: Monitoring Program

- Annual monitoring of sewage & waste effluent carried from station KUG-2, KUG-3, KUG-4 and KUG-5 during the summer time. Samples were taken from stations where available and convenient, and tested for parameters at Taiga Laboratory at Yellowknife. Test reports of such samples are included in this report.
- Sewage truck operator keeps record for each load of sewage disposes-full load of sewage truck is 10,000 liters and 3 trucks in operation with one standby as back up. Quantity of sewage disposal estimated from total water uses over the year.
- Location of sewage disposal in the lagoon marked before with GPS locator and sample of sewage water collected from the nearby location of the decanting spot which is close near to the other side of disposal. This facility keeps raw sewage away from quick mixing with waited sewage water in the lagoon for decanting.
- During the late summer, monitoring stations found mostly dry and no run-off from solid waste site, therefore, no more samples were possible from solid waste facility in this year.

Monitoring Stations of sewage and solid waste sample collection

Sampling Station	Description	comments
KUG-1	Raw Water source intake location at Coppermine River	Volume of water intake annually
KUG-2	Discharge from Solid Waste water retention	Monitoring station, outside of solid waste facility
KUG-3	Discharge point from Sewage Disposal facility to wetland	Sampling point at sewage lagoon inside
KUG-4	Effluent outfall from wetland	Before meeting to Coronation Gulf
KUG-5	Effluent discharge and run-off from land farm	Sampling point outside of land farm collection sump

ANNUAL REPORT

YEAR BEING REPORTED: 2014

The following information is compiled pursuant to the requirements of Part B, Item 1 of Water Licence **3BM-KUG0914** issued to **Kugluktuk.**

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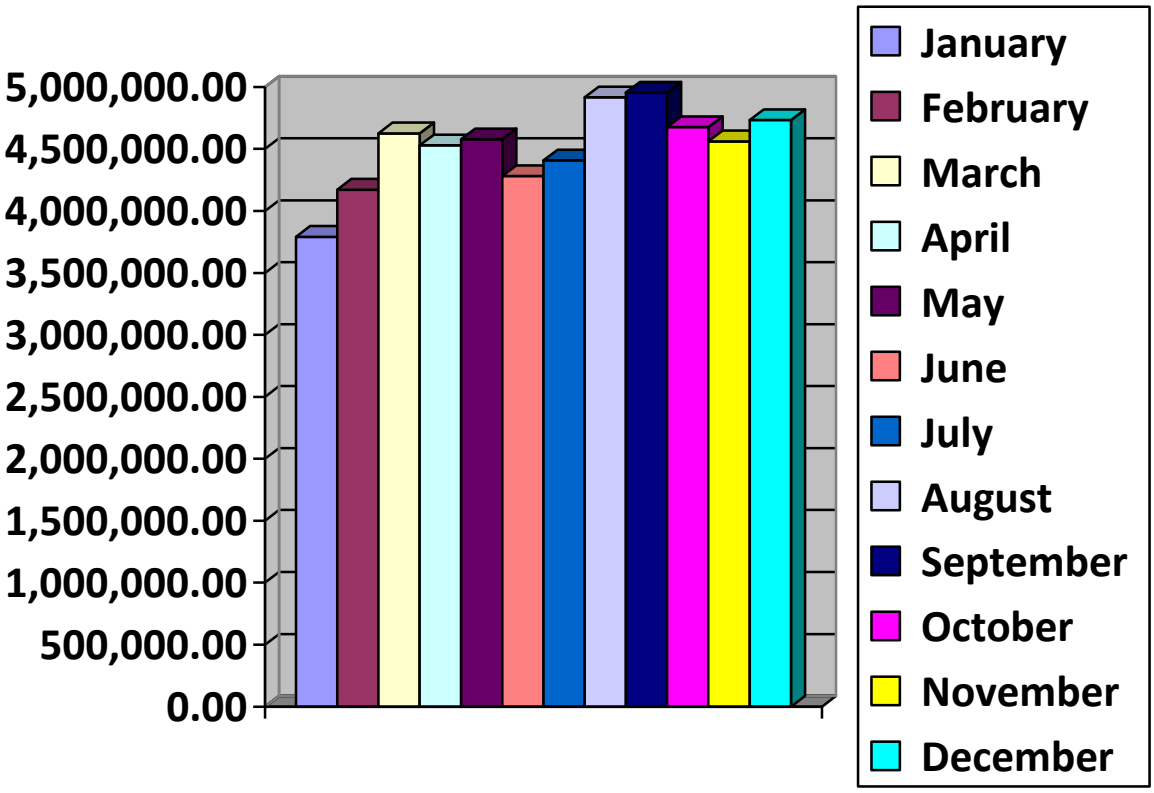
i) - iii) tabular summaries of all data generated under the "Monitoring Program"; monthly and annual quantities in cubic metres of freshwater obtained from all sources; monthly and annual quantities in cubic metres of each and all wastes discharged;

Attached are quantities of water used as reported in our Fluid Manager Water Delivery System and the estimated discharge of sewage waste based on quantities used.

Month Reported	Quantity of Water Obtained from all sources (Litres)	Quantity of Sewage Waste Discharged
January	3,791,857.40	Same
February	4,170,934.80	Same
March	4,625,741.00	Same
April	4,529,129.30	Same
May	4,578,559.40	Same
June	4,281,449.90	Same
July	4,408,064.00	Same
August	4,917,076.70	Same
September	4,955,019.90	Same
October	4,676,523.10	Same
November	4,561,790.80	Same
December	4,733,015.70	Same
ANNUAL TOTAL	**54,224,162.00**	Same



Water intake and distribution 2014 (January – December)
X-axis: Month of the year
Y-axis: Quantity of monthly water intake (histogram)

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;

Water Supply:

- ✓ Maintenance to erosion protection (earth work) around the new intake pipes and new pump house, also covering around the new vault that connects the water delivery line from new PH and existing PH to treatment plant by switching valves.

- ✓ Construction started for new Water Treatment Plant phase-II, building foundation bedding, cutting-filling for access road and site work, and erosion protection to site. Work will resume in early summer 2015. The new treatment Plant will include slow sand filtration and sedimentation process. Expected operation in March 2016.Granular materials for building pad and site improvement obtained from community own granular crushing project.

Sewage Lagoon:

- ✓ No effective maintenance requires to the new lagoon, but spotted bubbles remains in observation for any steps in releasing entrapped air those have been since 2011.
- ✓ Final study concluded for old lagoon site for possible restoration if repurposed for sludge drying process in future, otherwise a natural remediation.

Waste Disposal Facility:

- ✓ Repaired fence and gate to waste site and housed hazardous waste from regular type inside confined cell. Segregated metal and bulky waste and reduced volume by breaking and packing larger items.

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

- ✓ No unauthorized water intake or discharge to the source during this period.
- ✓ Annual decanting of sewage water onto wetland using a pump took place for over 40 days which has been noted as unauthorized by the inspector since no written approval received and no samples taken before decanting. But, samples were taken during the inspection and results were acknowledged to the inspector.
- ✓ Also a normal discharge through the overflow pipe across the berm onto wetland when melted sewage water rise above the overflow level.

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

- ✓ Abandonment of existing sewage facility reported with the Board with documents of study and report by the consultant. No restoration plan to the old lagoon, but to possible re-use of the spot in future for sewage sludge drying and contamination substances. Therefore, the facility left for natural remediation of soil-sludge layers with washout through water and any decanting over the area.

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**;

As indicated in AANDC inspection report Aug 12, 2014 for the licensee to follow up:

1. Lagoon decanting without formal authorization or water quality tests results.
   - ✓ The licensee will maintain this requirement for any future year decanting including proper sampling with the direction by the inspector.
2. A float was not in place on the lagoon structure hose to control sewage sludge
   - ✓ Hamlet is in plan to provide a workable float to decant hose in coming summer before the 2015 decanting.
3. Solid waste facility operation and management personnel
   - ✓ Hamlet has appointed a Foreman for solid waste and sewage facilities to supervise operator(s) for both facilities management.
4. Barrels, paints, batteries and other hazardous materials mixing and over loaded
   - ✓ The lined cell facility is in used for all hazardous materials containment inside with separate spots for barrel, battery, paint and others. The licensee has a plan for shipping out for barrels and batteries in approximately every 5-years using 3rd party recipient. Improvement for these hazardous will be carried in summer 2015.
5. Sewage Lagoon bubble and gas entrap inside causing lagoon capacity decrease
   - ✓ Entrapped gas was released in 2013 as part of lagoon maintenance of the project work. Gas generates naturally from HC components of lagoon bed underneath the HDPE liner- gas release pipe inserted from lagoon side under the liner as part of lagoon maintenance work.
6. Erosion protection to water intake at the new intake pump house
   - ✓ Earth work filling and maintenance carried around the IPH
7. Old lagoon reclamation and monitoring
   - ✓ No monitoring requires to old lagoon as it was decommissioned after the consultant's study and report. The lagoon will be naturally remediated and a partial sludge-soil removal suggested by the study if repurposed to new lagoon sludge management. The licensee has no plan for new lagoon sludge removal sooner as suggested in the new lagoon O&M manual.

8. Monitoring station signs:
    - ✓ Signs were in place of noted monitoring stations, but not in standard form and languages. Signs were faded since not painted letters or background on proper board and not installed with proper post. The inspector has relocated two sings KUG-3 (lagoon decanting point) and KUG-2 (effluent outfall from solid waste facility) considering the suitability of sampling. Other monitoring stations KUG-1 (at water intake point), KUG-4 (Final outfall of effluent into Coronation Gulf) and KUG-5 (Land farm runoff) remains unchanged. It will be required to replace those signs to standards and the licensee is looking to plan it in summer 2015.
9. Illegal decanting for over 40 days without sampling or recording quantity
    - ✓ Decanting took place as required and on emergency when the licensee could not delay to have an approval in place because of weather. The licensee has realized the obligation of coordination and will maintain it in coming years.
10. Plans updating:
    - ✓ O&M manual of Sewage facility and A&R plan of old lagoon were updated with the Board.
11. Notification to inspector:
    - ✓ The licensee will maintain this requirement at least 10 days ahead of the plan as well as sampling of sewage water. Mostly, such requirements are once a year and around the time late July or early August.

viii. any other details on water use or waste disposal requested by the Board by November 1st of the year being reported; and

- ✓ As-built drawing of new Intake PH and Tender Drawings of new Treatment Plant Phase-2 were requested and submitted to the Board.
- ✓ All Annual Reports updated from 2005-2008 as identified outstanding.
- ✓ Correct installation of signage will be carried in summer 2015 as explained.
- ✓ Barrels and batteries in the landfarm are requested to be labeled and backhaul for shipped out and soil in landfarm be turned as requested by the inspector. The Licensee has a plan for shipping out those barrels and batteries with the convenience to the recipient. However, temporary containments using sea can on site is the current plan and secure from any leaching before the shipping out. The landfarm will need some removal of soil to make room for new candidate in 2015

ix. **updates or revisions to the approved Operation and Maintenance Plans**

- ✓ O&M manual for new intake pumphouse including as-built drawing.
- ✓ The O&M manual for water system and distribution remains active until the new treatment plant completed and operation- expecting in mid-2016.

ADDITIONAL INFORMATION THAT THE LICENSEE DEEMS USEFUL:

- ✓ A subject matter expert (SME) consultant has been offered for an inspection to the noted leaks close near to the sewage dropping area including extended areas along the berm. At this point it is not sure whether the leaks from the lagoon inside or from melted sludge of the old lagoon that trapped inside confined pockets during the new lagoon berm construction. Such inspection will be only possible during summer time and plan to carry out it in 2015. Remedial action can be planned from the inspection report and suggestion from the SME.
- ✓ The licensee will request for some upgrading and fencing-gating the facility with GN funding assistance including a major waste reduction plan.

FOLLOW-UP REGARDING INSPECTION/COMPLIANCE CONCERNS:

- ✓ The licensee has been operating sewage and waste facilities with own trucks and operators. A full time foreman is employed locally to monitor those facilities operation. A controlled burning incinerator will be helpful in controlling wind flown debris and the licensee is waiting for such funding arrangement.

Appendix - A

NWB Water Licence: 3BM-KUG 0914

Date of issuance: May 14, 2009

Date of expiry: April 30, 2014

Hamlet of Kugluktuk, NU

Amendment Application submitted: Mar 19, 2014

P.O. BOX 119
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NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN KATIMAYINGI
OFFICE DES EAUX DU NUNAVUT

File No.: 3BM-KUG0914

May 14, 2009

Derrick Power
Senior Administrative Officer
Hamlet of Kugluktuk
P.O. Box 271
Kugluktuk, Nunavut
X0B 0E0
Email: saokug@qiniq.com

RE: NWB Licence No. 3BM-KUG0914

Dear Mr. Power,

Please find attached Licence No. 3BM-KUG0914 issued to the Hamlet of Kugluktuk by the Nunavut Water Board (NWB) pursuant to its authority under Article 13 of the *Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in Right of Canada*. The terms and conditions of the attached Licence related to water use and waste disposal are an integral part of this approval.

If the Licensee contemplates the renewal of this Licence, it is the responsibility of the Licensee to apply to the NWB for its renewal. The past performance of the Licensee, new documentation and information, and issues raised during a public hearing, if the NWB is required to hold one, will be used to determine the terms and conditions of the Licence renewal. Note that if the Licence expires before the NWB issues a new one, then water use and waste disposal must cease, or the Licensee will be in contravention of the *Nunavut Land Claims Agreement* (NLCA) and the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* (NWNSRTA). However, the expiry or cancellation of a licence does not relieve the holder from any obligations imposed by the licence. The NWB recommends that an application for the renewal of this Licence be filed at least three months prior to the Licence expiry date.

If the Licensee contemplates or requires an amendment to this licence, the NWB may decide, in the public interest, to hold a public hearing. The Licensee should submit applications for amendment as soon as possible to give the NWB sufficient time to go through the amendment process. The process and timing may vary depending on the scope of the amendment, however a minimum of sixty (60) days is required from the time of acceptance by the NWB. It is the responsibility of the Licensee to ensure that all application materials have

been received and acknowledged by the Manager of Licensing.

The NWB strongly recommends that the Licensee consult the comments received by interested persons on issues identified[1]. This information is attached for your consideration.

Sincerely,

Thomas Kabloona
Nunavut Water Board
Chair

TK/db/dh/pb

Enclosure: Licence No. 3BM-KUG0914
Comments INAC, EC, GN-DoE and GN-DoCLEY

cc: Kitikmeot Distribution List

[1] Indian and Northern Affairs Canada (INAC) dated January 9, 2009; Environment Canada (EC) dated January 9, 2009; Government of Nunavut Department of Environment (GN-DoE) dated January 8, 2009; Government of Nunavut Department of Culture, Language, Elders and Youth (GN-CLEY) dated December 19, 2008.

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NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN KATIMAYINGI
OFFICE DES EAUX DU NUNAVUT

DECISION

LICENCE NUMBER: 3BM-KUG0914

This is the decision of the Nunavut Water Board (NWB) with respect to an application dated November 26, 2008 for a Licence amendment and renewal made by:

HAMLET OF KUGLUKTUK

to allow for the use of water and disposal of waste for the Hamlet of Kugluktuk, located within the Kitikmeot Region, Nunavut. With respect to this application, the NWB gave notice to the public that the Hamlet had filed an application for a water licence amendment and renewal.

DECISION

After having been satisfied that the application was exempt from the requirement for screening by the Nunavut Impact Review Board in accordance with S. 12.3.2 of the *Nunavut Land Claims Agreement* (NLCA), the NWB decided that the application could proceed through the regulatory process. After reviewing the full submission of the Applicant and written comments expressed by interested parties, the NWB, having given due regard to the facts and circumstances, the merits of the submissions made to it and to the purpose, scope and intent of the *NLCA* and of the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* (NWNSRTA), decided to waive the requirement to hold a public hearing and determined that:

Licence Number 3BM-KUG0914 be issued subject to the terms and conditions contained therein. (Motion #: 2009-04-L03)

SIGNED this 14th day of May, 2009 at Gjoa Haven, NU.

Thomas Kabloona
Nunavut Water Board
Chair

TABLE OF CONTENTS

I. BACKGROUND

The Hamlet of Kugluktuk has a population of 1,302 (2006) and is located at the coordinates of 67°49'32" north latitude and 115°05'42" west longitude, at the mouth of the Coppermine River, within the Kitikmeot Region of Nunavut. The Hamlet overlooks Coronation Gulf to the North.

The Hamlet of Kugluktuk is situated in an area of continuous permafrost. The thickness of active layer varies from around 0.5m to over 1m along the sandy waterfront. The community itself is built on a silt plain with outcrops of Precambrian volcanic and sedimentary rocks located sporadically up-shore. Some steep outcrops composed of dolomite, shale and volcanic rock exist near the community (CGS- Government of Nunavut, March 2007).

II. PROCEDURAL HISTORY

On July 9, 1996, regulatory authority over freshwaters was transferred from the Northwest Territories Water Board to the Nunavut Water Board. At the time the Hamlet of Kugluktuk held a water licence with an expiry date of June 30, 2003. On June 9, 2003 the NWB received a request for a sixty (60) day extension of the licence expiry date to allow additional time for a renewal application to be put together. The NWB responded on June 18, 2003 that it is unable to extend the expiry date of a licence and looks forward to receiving their renewal application.

The NWB received a renewal application on June 1, 2003 with additional documents arriving on July 1st and 14th. The renewal Licence was issued on November 30, 2003 with an expiry date of November 30, 2008.

During the term of the previous Licence, 3BM-KUG0308, one amendment was issued on August 12, 2007. The application for water licence amendment was received by the NWB on August 29, 2006 with additional documents arriving thereafter. The amendment was for the redevelopment and upgrading of the Sewage Disposal Facilities and Solid Waste Disposal Facilities which included the construction and operation of a landfarm.

Derrick Power, the acting Senior Administrative Officer for Kugluktuk, with the technical support of the Department of Community and Government Services, Nuna Burnside Engineering and A.D. Williams Engineering Inc., consultants for the Hamlet, submitted on November 27, 2008, an application for water licence amendment and renewal to the NWB. Following a preliminary review of the application, the NWB concluded that the application met the requirements of section 48(1) of the *Nunavut Waters and Surface Rights Tribunal Act* (the Act) and advised the Applicant and distribution list accordingly on December 10, 2008 of receipt of the application and requested a technical review.

The renewal application that was distributed for review consisted of the following information:

- Letter for the Assignment of Authority, received on October 9, 2008;
- Application cover letter, received on November 25, 2008;
- English Executive Summary, November 27, 2008;
- NWB Municipal licence questionnaire, received on November 27, 2008;
- NWB Licence renewal application received on November 27, 2008;
- Hamlet of Kugluktuk, Detailed Design Report for the Improvements to the Sewage Treatment Facility and Solid Waste Facility, Nuna Burnside, March 2007; received on December 3, 2008;
- Request for Proposals, CGS-Government of Nunavut, March 2007; received on December 3, 2008; and
- Preliminary Engineering Report, Water Supply Improvements, Kugluktuk, NU, A.D. Williams Engineering Inc., October 2008; received on December 3, 2008;

The scope of the renewal application includes 1) ongoing operation of the existing Sewage Disposal Facility and Solid Waste Disposal Facility including a landfarm within the Solid Waste Disposal Facilities, 2) submission of the proposed upgrades and redevelopment of the Water Supply Facilities, in the preliminary design phase.

The A.D. Williams Preliminary Engineering Report, October 2008 provided conclusions and recommendations as follows:

- Relocation of Intake Options;
- Intake Design;
- Treatment Process Changes;
- Water Storage; and
- Truck fill rate;

As this is a preliminary report that provides a variety of options for the improvement of water quality and availability for the Hamlet of Kugluktuk, the Hamlet is encouraged to submit, within an application for amendment, a final design report, complete with for construction drawings stamped by the appropriate engineer for review and approval of the Board prior to proceeding with the proposed changes.

The Nunavut Water Board publicly posted notice of this application, in accordance with Section 55.1 of the *Act* and Article 13 of the *Nunavut Land Claims Agreement* (NLCA), on December 10, 2008. This assessment process included the referral of the application to a variety of Federal, Territorial and local organizations for review and comment.

As no public concern was expressed, the NWB waived the requirement to hold a public hearing and proceeded with the application process.

The NWB received comments on the application from interested parties, including Environment Canada (EC), the Government of Nunavut Department of Environment (GN-DoE) and

Government of Nunavut Department of Culture, Language, Elders and Youth (GN-DoCLEY) on or prior to January 10, 2009.

Based upon the results of the detailed assessment, including consideration of any potential accidents, malfunctions, or impacts to water that the overall project might have in the area, the Board approved the application and has issued Licence 3BM-KUG0914.

III. ISSUES

Term of Licence

In accordance with Section 45 of the *Act*, the NWB may issue a licence for a term not exceeding twenty-five years. In determining an appropriate term of a water licence, the Board considers a number of factors, including the results of INAC site inspections and the compliance record of the Applicant. In review of the previous water licence 3BM-KUG0308 inspection reports and administrative requirements set out in the licence, the NWB has noted the following issue of non-compliance:

a. No annual reports received by the NWB for 2005, 2006, 2007 and 2008

In review of the application and the comments received from interested parties, there were no comments provided with respect to the Hamlet's request for a term of five (5) years for the Licence renewal. The NWB has considered the request and determined that a term of five (5) years for the Licence would be appropriate. Although the Board has recently issued municipal licences for terms of two (2) years where compliance issues have been of a concern, the Board finds that a five (5) year term is warranted in this case, as the application was fairly comprehensive and the Licensee has submitted O&M Plans.

Annual Report

The NWB has imposed on the Licensee, the requirement to produce an Annual Report not later than March 31st of the year following the calendar year being reported. This same requirement was imposed in the previous Licence. During the term of the previous Licence, the NWB did not receive Annual Reports for 2005, 2006 and 2007. The requirement to produce Annual Reports is to ensure that the NWB has an accurate and timely annual update of municipal activities during a calendar year. This information is maintained on the Public Registry and is available to interested parties upon request. A *"Standardized Form for Annual Reporting"* is available for use from the NWB file transfer protocol (ftp) site under the Public Registry link at the NWB Website.

Link = ftp://nunavutwaterboard.org/ADMINISTRATION/Standardized%20Forms/

Operational Plans

The NWB notes that the Licensee has submitted, with the application, the following Operation and Maintenance Plans which were a requirement under the previous Licence:

a. *Solid Waste Management Facility Operation and Maintenance (O&M) Plan, Hamlet of Kugluktuk*;
b. *Sewage Treatment Facility Operation and Maintenance (O&M) Plan, Hamlet of Kugluktuk, Nunavut*;
c. *Monitoring Program and Quality Assurance/Quality Control Plan, Hamlet of Kugluktuk; and*
d. *Environmental Emergency Contingency Plan, Hamlet of Kugluktuk.*

These plans have been reviewed and will need to be updated with minor addendums. The required revisions are intended to address deficiencies in the plans and will need to be submitted within ninety (90) days of the issuance on this Licence. The details on the requirements of the revised O&M Plans can be found under Part F Item 1. This condition has combined the required O&M Plans into one O&M Manual for ease of reference.

Water Use

The Hamlet of Kugluktuk currently utilizes the Coppermine River as a source of potable water with the authorized quantity not to exceed 64,000 cubic metres annually. The renewal/ amendment application requested an increase in volume to 77,015 cubic metres annually. No concerns were raised by the parties in their written submissions as to the amount of water required by the Hamlet, the manner in which it is obtained or the manner in which this water will be used. The NWB has renewed the terms and conditions associated with water use by the Hamlet and increased the water volume accordingly.

Included with the Application documents for review, was a design report entitled "Preliminary Engineering Report, Water Supply Improvements, Kugluktuk, NU, A.D. Williams Engineering Inc., October 2008; received on December 3, 2008. This report was prepared for the Government of Nunavut, Community and Government Services (GN-CGS), to be submitted on behalf of the Hamlet of Kugluktuk, NU. The report provides options for, and expands on the improvements that were implemented in 2003 based on the recommendations of FSC Architects and Engineers. Should the GN-CGS make the decision to implement these or any other recommendations provided, an amendment application complete with a final design report and for construction drawings stamped by the appropriate engineer is required to be submitted to the NWB for processing prior to proceeding with any construction.

Sewage

The Hamlet of Kugluktuk currently provides trucked sewage collection services for the Community's residents, businesses and institutions. The trucked sewage is discharged to the

Sewage Disposal Facilities, where primary treatment occurs in a recently built Sewage Lagoon. Effluent entering the Sewage Lagoon is off-loaded through flumes located at the South-East corner of the lagoon and undergoes settling and decomposition prior to being discharged through an effluent pipe located at the north-west corner of the lagoon. The discharged effluent is then redirected east by an exfiltration berm to a wetland area. Effluent is finally discharged into Coronation Gulf after flowing through the wetland area.

EC commented that effluent standards for sewage treatment should, at the very least, meet the parameters set in the '*Guidelines for the discharge of treated municipal wastewater in the Northwest Territories*' and that these parameters should be met at the final discharge point for the Sewage Lagoon (end-of-pipe) and not at the end of the wetland. The NWB agrees that the last point of control for effluent would be at the discharge point for the Sewage Lagoon and as such, this is considered the Final Discharge Point and will be where effluent quality limits are to be met. EC also commented that the point of discharge from the wetland should be monitored to determine the effectiveness of the wetland as a supplementary treatment system. The NWB also agrees with this recommendation and has incorporated the appropriate monitoring conditions into the Licence.

As noted by EC in its January 9th, 2009 submission, the Licensee must also ensure that any effluent discharged from the system's Final Discharge Point is in compliance with Section 36(3) of the *Fisheries Act*. According to Section 36(3) of the *Fisheries Act*, no person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance or any other deleterious substance that results from the deposit of the deleterious substance may enter any such water. The Licensee is advised that compliance with this Licence does not absolve the Licensee from the responsibility to comply with other applicable legislation.

Solid Waste

The Hamlet of Kugluktuk is currently using a Solid Waste Disposal Site located approximately 3km southwest of the community. The site covers an area of approximately 1.2 ha. The Solid Waste Disposal Facilities include a Landfarm Facility, a hazardous waste storage area and a bulky waste storage area.

The bulky waste storage area includes a large buried area south east of the landfill and an unburied pit for receiving future bulky materials.

The Landfarm Facility is located in a bermed area which compromises the south east corner of landfill. The landfarm is gently sloped to allow the accumulation of effluent in the north east corner of the landfarm.

Landfarm

The Landfarm Facility shall only accept Sewage Sludge or Type B Soil. Type B Soil is defined

as soil contaminated with hydrocarbons in which the primary petroleum product present in the soil as determined by laboratory analysis consists of fuel oil and/or diesel fuel and /or gasoline. Type A Soils, soils contaminated by hydrocarbons that are resistant to, or preclude biological treatment by landfarming, shall not be accepted. The Landfarm Facility shall not be used to store Sewage Sludge prior to use as landfill cover. Sewage Sludge being treated in the Landfarm Facility shall be used as landfill cover as soon as it is deemed acceptable for use as landfill cover.

The Board, having duly considered these issues and the submission of the Applicant, has set the terms and conditions in the water licence, which govern the segregation and treatment of hydrocarbon contaminated soil for eventual re-use for industrial purposes during the proposed undertaking, accordingly.

During the previous licence term the NWB issued an amendment to the licence for the operation of a Landfarm Facility for treating hydrocarbon contaminated soils and Sewage Sludge. No comments were received that deal directly with the Landfarm Facility operation.

Modifications and Construction

For construction and modifications of licensed facilities, the NWB generally requires that final design reports accompanied by "for construction drawings" are provided, that are stamped and signed by a qualified engineer which provides assurance to the Board that proper engineering practices will be in place through all phases of construction and operation. In follow-up to the pre-construction drawings and post construction, the NWB requires that "as-built drawings" are provided under the Licence, to be maintained in the Public Register for future reference. The as-built drawings should be accompanied by a final field report, prepared by the supervising engineer, that identifies any diversion or change from the planned design for future reference.

These drawings may also be used by enforcement during inspections to verify that the facilities in place are built as approved by the Board. Conditions requiring the submission of these drawings are included in Part E, Items 3 and 4 of the Licence. Item 4 includes the required submission of as-built drawings for the Water Supply Facilities, as constructed under the previous licence. These drawings were a previous requirement and to date, these drawings have not been received by the NWB. The 2003 Annual Report, submitted August 30, 2004, had indicated that the drawings had been requested of the Government of Nunavut. by the Hamlet. As plans for upgrading of the current Water Supply Facilities are currently taking place, the necessity of having an as-built record of the facilities is ever important.

Abandonment, Restoration and Closure

To ensure that all existing end-of-life facilities are reclaimed in an appropriate manner, the NWB requires Licensees to submit an *Abandonment and Restoration Plan* (A&R Plan). This Plan is to be submitted at least six (6) months prior to final closure of any licensed facility or upon submission of the final design drawings for the construction of new facilities to replace existing

ones. The requirements for the Plan are outlined in Part G, Item 1 of this Licence. During the term of previous Licence an amendment was issued by the NWB for the construction and operation of a new sewage lagoon which replaced an older sewage lagoon. Since the older sewage lagoon is no longer in use, the Licensee shall submit for Board approval an *Abandonment and Restoration Plan* for the Decommissioned Sewage Disposal Facilities. The requirements for a specific A&R Plan is outlined in Part G, Item 2 of this Licence.

Monitoring Program

The volume of water taken at the raw water intake is to be measured monthly and reported annually in order for the NWB to have an accurate and timely update on the volume of water use by the Hamlet.

The Water Retention Area for the Solid Waste Disposal Facilities is designed to accumulate effluent run-off and to discharge the effluent through two overflow channels in the berm. Effluent from the Water Retention Area shall be sampled during planned discharges or monthly during periods of observed flow.

During seasonal decanting of the Sewage Disposal Facilities, sampling shall be performed monthly at the point of discharge from the Sewage Lagoon. Similarly the Wetland Treatment Area downstream of the Sewage Lagoon is also to be sampled monthly during periods of observed flow. Weekly inspections for observed flow will need to be conducted from May to October inclusive at the Wetland Treatment Area and the Water Retention Area in order to determine monitoring requirements and effectively assess the treatment efficiency of the Wetland Treatment Area.

In their submission, Environment Canada (EC) highlighted the importance of the development of a Canada Wide Strategy for the Management of Municipal Waste Water Effluents (CWS MMWWE) and that EC would be working towards the development of a regulation under the Fisheries Act in support of this strategy. The focus would be on setting maximum allowable limits for Carbonaceous Biological Oxygen Demand (cBOD), Biological Oxygen Demand (BOD_5), residual Chlorine and Total Suspended Solids (TSS). On February 17, 2009 the Canadian Council of Ministers of the Environment (CCME) endorsed the CWS MMWWE. With this endorsement, the NWB is in agreement with EC in that monitoring of these effluents for cBOD should take place in order to assist in the development of the regulations and new criteria for the discharge of municipal effluent. The monitoring of sewage effluent has therefore included this parameter under Part H, Item 3.

IV. LICENCE 3BM-KUG0914

Pursuant to the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Agreement Between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in Right of Canada*, the Nunavut Water Board, hereinafter referred to as the Board, hereby grants to

HAMLET OF KUGLUKTUK

(Licensee)

of

P.O. BOX 271, KUGLUKTUK, NUNAVUT X0B 0E0

(Mailing Address)

hereinafter called the Licensee, the right to alter, divert or otherwise use water for a period subject to restrictions and conditions contained within this Licence:

Licence Number	**3BM-KUG0914**
Water Management Area	**NUNAVUT 07**
Location	**KUGLUKTUK, KITIKMEOT REGION, NU (Latitude 67°49'32"N and Longitude 115°05'42"W)**
Purpose	**WATER USE AND WASTE DISPOSAL**
Description	**MUNICIPAL UNDERTAKINGS**
Quantity of Water Not to Exceed	**77,015 CUBIC METRES ANNUALLY**
Date of Licence	**MAY 14, 2009**
Expiry Date of Licence	**APRIL 30, 2014**

Dated this 14th day of May, 2009 at Gjoa Haven, NU.

Thomas Kabloona
Nunavut Water Board
Chair

PART A: SCOPE AND DEFINITIONS

1. Scope

a. This Licence allows for the use of water and the disposal of waste for municipal undertakings at the Hamlet of Kugluktuk, Kitikmeot Region, Nunavut (67°49'32" N; 115°05'42"W);

b. This Licence is issued subject to the conditions contained herein with respect to the taking of water and the depositing of waste of any type in any waters or in any place under any conditions where such waste or any other waste that results from the deposits of such waste may enter any waters. Whenever new Regulations are made or existing Regulations are amended by the Governor in Council under the Nunavut Waters and Nunavut Surface Rights Tribunal Act, or other statutes imposing more stringent conditions relating to the quantity or type of waste that may be so deposited or under which any such waste may be so deposited, this Licence shall be deemed, upon promulgation of such Regulations, to be subject to such requirements; and

c. Compliance with the terms and conditions of this Licence does not absolve the Licensee from responsibility for compliance with the requirements of all applicable Federal, Territorial and Municipal legislation.

2. Definitions

In this Licence: **3BM-KUG0914**

"Act" means the *Nunavut Waters and Nunavut Surface Rights Tribunal Act;*

"Amendment" means a change to original terms and conditions of this Licence requiring correction, addition or deletion of specific terms and conditions of the Licence; modifications inconsistent with the terms of the set terms and conditions of the Licence;

"Analyst" means an Analyst designated by the Minister under Section 85 (1) of the *Act*;

''Appurtenant undertaking'' means an undertaking in relation to which a use of waters or a deposit of waste is permitted by a licence issued by the Board;

"Board" means the Nunavut Water Board established under the *Nunavut Land Claims Agreement*;

"Decommissioned Sewage Disposal Facilities" comprises the 'Existing Sewage Lagoon' as identified on Nuna Burnside Project No. N-O 09755.0, Drawing No.2, The Hamlet of Kugluktuk Sewage Lagoon Plan, and dated November 18, 2008;

"Effluent" means treated or untreated liquid waste material that is discharged into the environment from a structure such as a settling pond, landfarm or a treatment plant;

"**Engineer**" means a professional engineer registered to practice in Nunavut in accordance with the *Engineering, Geological and Geophysical Act (Nunavut)* S.N.W.T. 1998, c.38, s.5;

"Final Discharge Point" in respect of an effluent means an identifiable discharge point of a facility beyond which the operator of the facility no longer exercises control over the quality of the effluent;

"Freeboard" means the vertical distance between water line and the designed maximum operating height on the crest of a dam or dyke's upstream slope;

"Geotechnical Engineer" means a professional engineer registered with the Association of Professional Engineers, Geologist and Geophysicists of Nunavut and whose principal field of specialization is with the engineering properties of earth materials in dealing with man-made structures and earthworks that will be built on a site. These can include shallow and deep foundations, retaining walls, dams, and embankments;

"Grab Sample" means a single water or wastewater sample taken at a time and place representative of the total discharge;

"Greywater" means all liquid wastes from showers, baths, sinks, kitchens and domestic washing facilities, but does not include toilet wastes;

"**Inspector**" means an Inspector designated by the Minister under Section 85 (1) of the Act;

"Landfarm Facility" means an area designed to biologically treat Type B soils and Sewage Sludge and compromising the 'Land Farming Area' and associated structures, identified as the "land farming area" on Nuna Burnside Project No. N-O 09755.0 Drawing No.1, The Hamlet of Nunavut Kugluktuk, Solid Waste Disposal Facility Improvements, record drawing dated November 18, 2008;

"Licensee" means the holder of this Licence;

"Modification" means an alteration to a physical work that introduces new structure or eliminates an existing structure and does not alter the purpose or function of the work, but does not include an expansion, and changes to the operating system that are consistent with the terms of this Licence and do not require amendment;

"Monitoring Program" means a monitoring program established to collect data on surface water and groundwater quality to assess impacts to the freshwater aquatic environment of an appurtenant undertaking;

"Nunavut Land Claims Agreement" (NLCA) means the *"Agreement Between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada*", including its preamble and schedules, and any amendments to that agreement made pursuant to it;

"Sewage" means all toilet wastes and greywater;

"Sewage Disposal Facilities" comprises the 'Sewage Lagoon' as identified on the Nuna Burnside Project No. N-O 09755.0 construction Drawing No.2, The Hamlet of Kugluktuk, Sewage Lagoon Plan, stamped and signed June 18, 2007 and Drawing No.4 Sewage Lagoon Details, record drawing dated November 18, 2008;

"Sewage Sludge" means the semi-solid sewage material which settles at the bottom of the Sewage Lagoon;

"Solid Waste Disposal Facilities" means the facilities designated for the disposal of solid waste, as identified on Nuna Burnside Project No. N-O 09755.0 Drawing No.1, The Hamlet of Nunavut Kugluktuk, Solid Waste Disposal Facility Improvements, record drawing dated November 18, 2008;

"Toilet Wastes" means all human excreta and associated products, but does not include greywater;

"Treatment Objective" means the treatment objective for the Landfarm Facility which is based on the Canadian Council of Ministers of the Environment (CCME), 2001 *Canada – Wide Standard for Petroleum Hydrocarbon in Soil*, for Industrial land use; or as determined by the Government of Nunavut, Environmental Protection Service based on the 2002 *Environmental Guideline for Site Remediation*;

"**Type A Soil**" means soil contaminated with hydrocarbons in which the primary petroleum product present in the soil as determined by laboratory analysis consists of lubricating oil and grease;

"**Type B Soil**" means soil contaminated with hydrocarbons in which the primary petroleum product present in the soil as determined by laboratory analysis consists of fuel oil and/or diesel fuel and /or gasoline;

"Waste" means, as defined in S.4 of the Act, any substance that, by itself or in combination with other substances found in water, would have the effect of altering the

quality of any water to which the substance is added to an extent that is detrimental to its use by people or by any animal, fish or plant, or any water that would have that effect because of the quantity or concentration of the substances contained in it or because it has been treated or changed, by heat or other means;

"Water Supply Facilities" compromises the upgraded water supply facilities including the 'New Supply Line' or 'New Supply Line Alignment', 'New Building Intake' and 'New Water Treatment Plant' as identified on FSC Job No. 97-0170 Drawing No. C-1, Proposed Alignment Layout and Site Plan and C-2, Proposed Alignment Plan/Profile, Tender drawings dated May 31, 2002;

"Water Retention Area" compromises the 'Water Retention Area' as identified on Nuna Burnside Project No. N-O 09755.0 Drawing No.1, The Hamlet of Kugluktuk, Solid Waste Disposal Facility Improvements, record drawing dated November 18, 2008; and

"Wetland Treatment Area" compromises the 'Expanded Wetland Treatment Area' as identified on Nuna Burnside Project No. N-O 09755.0 Drawing No.2, The Hamlet of Kugluktuk Sewage Lagoon Plan and the 'Meandering Wetland Treatment Area' as identified on Drawing No.3, The Hamlet of Nunavut Kugluktuk Proposed Sewage Lagoon Sections, stamped and dated June 18, 2007.

3. Enforcement

a. Failure to comply with this Licence will be a violation of the *Act*, subjecting the Licensee to the enforcement measures and the penalties provided for in the *Act*;

b. All inspection and enforcement services regarding this Licence will be provided by Inspectors appointed under the *Act*;

c. For the purpose of enforcing this Licence and with respect to the use of water and deposit or discharge of waste by the Licensee, Inspectors appointed under the *Act,* hold all powers, privileges and protections that are conferred upon them by the *Act* or by other applicable law; and

PART B: GENERAL CONDITIONS

1. The Licensee shall file an Annual Report with the Board not later than March 31st of the year following the calendar year reported which shall contain the following information:

a. tabular summaries of all data generated under the "Monitoring Program";

b. the monthly and annual quantities in cubic metres of fresh water obtained at the

Water Supply Facilities;

c. the monthly and annual quantities in cubic metres of all effluent discharged;

d. 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;

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

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

g. Any addendum with updates or revisions for manuals and plans (i.e., *Operations and Maintenance Manual*) as required by changes in operation and/or technology;

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

i. any other details on water use or waste disposal requested by the Board by November 1st of the year being reported;

2. The Licensee shall comply with the "Monitoring Program" described in this Licence, and any amendments to the "Monitoring Program" as may be made from time to time, pursuant to the conditions of this Licence.

3. The "Monitoring Program" and compliance dates specified in the Licence may be modified at the discretion of the Board in writing.

4. Meters, devices or other such methods as approved by the Board in writing, used for measuring the volumes of water used and waste discharged shall be installed, operated and maintained by the Licensee.

5. The Licensee shall maintain the necessary signs to appropriately identify the stations of the Monitoring Program. Signs are to be posted in the Official Languages of Nunavut, following confirmation by the Inspector.

6. The Licensee shall immediately report to the 24-Hour Spill Report Line (867-920-8130), any spills of Waste which are reported to or observed by the Licensee, within the municipal boundaries or in the areas of the Water Supply or Waste Disposal Facilities.

7. The Licensee shall ensure a copy of this Licence is maintained at the Municipal Office at all times. Any communication with respect to this Licence shall be made in writing to

the attention of:

(a). Manager of Licensing:
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0B 1J0
Telephone: (867) 360-6338
Fax: (867) 360-6369
Email: licensing@nunavutwaterboard.org

(b). Inspector Contact:
Water Resources Officer
Nunavut District, Nunavut Region
P.O. Box 100
Iqaluit, NU X0A 0H0
Telephone: (867) 975-4295
Fax: (867) 979-6445

8. The Licensee shall submit one paper copy and one electronic copy of all reports, studies, and plans to the Board. Reports or studies submitted to the Board by the Licensee shall include a detailed executive summary in both English and Inuktitut.

9. The Licensee shall ensure that all document(s) and correspondence submitted by the Licensee to the Board are received and acknowledged by the Manager of Licensing.

10. The Licensee shall, for all Plans submitted under this Licence, include a proposed timetable for implementation. Plans submitted, cannot be undertaken without subsequent written Board approval and direction. The Board may alter or modify a Plan if necessary to achieve the legislative objectives and will notify the Licensee in writing of acceptance, rejection or alteration of the Plan.

11. The Licensee shall, for all Plans submitted under this Licence, implement the Plan as approved by the Board in writing.

12. Every Plan to be carried out pursuant to the terms and conditions of this Licence shall become a part of this Licence, and any additional terms and condition imposed upon approval of a Plan by the Board become part of this Licence. All terms and conditions of the Licence should be contemplated in the development of a Plan where appropriate.

13. This Licence is not assignable except as provided in Section 44 of the Act.

PART C: CONDITIONS APPLYING TO WATER USE

1. The Licensee shall obtain all fresh water from the Coppermine River using the Water Supply Facilities or as otherwise approved by the Board in writing.

2. The annual quantity of water used for all purposes shall not exceed seventy-seven thousand and fifteen (77,015) cubic metres.

3. The Licensee shall equip all water intake hoses with a screen of an appropriate mesh size to ensure that fish are not entrained and shall withdraw water at a rate such that fish do not become impinged on the screen.

4. The Licensee shall not remove any material from below the ordinary high water mark of any water body unless otherwise approved by the Board in writing.

5. The Licensee shall not cause erosion to the banks of any body of water and shall provide necessary controls to prevent such erosion.

6. Sediment and erosion control measures shall be implemented prior to and maintained during the operation to prevent entry of sediment into water.

PART D: CONDITIONS APPLYING TO WASTE DISPOSAL

1. The Licensee shall direct all Sewage to the Sewage Disposal Facilities.

2. All Effluent discharged from the Sewage Disposal Facilities to the Wetland Treatment Area, at Monitoring Program Station KUG-3, shall not exceed the following effluent quality limits:

Parameter	Maximum Concentration of any Grab Sample
BOD_5	120 mg/L
Total Suspended Solids	180 mg/L
Fecal Coliforms	1×10^6 CFU/100 mL
Oil and grease	No visible sheen
pH	between 6 and 9

3. The Licensee shall maintain at all times, a freeboard of at least 1.0 metre, or as recommended by a qualified geotechnical engineer and as approved by the Board in writing, for all dams, dykes or other structures intended to contain, withhold, divert or retain water or wastes.

4. The Sewage Disposal Facilities shall be maintained and operated in such a manner as to prevent structural failure.

5. The Licensee shall treat, to the Treatment Objective, Type B Soil in the Landfarm Facility, in a manner in accordance with the Solid Waste Management Operation and Maintenance (O&M) Plan dated March 2007, and any subsequent revisions approved by the Board in writing.

6. All discharge of effluent at Monitoring Station KUG-5, from within the perimeter of the Landfarm Facility, shall not exceed the following effluent quality limits:

Parameter	Maximum Concentration of any Grab Sample (µg/L)
pH	6 to 9 (units)
Oil and Grease	5000
Arsenic (total)	100
Cadmium (dissolved)	10
Chromium (dissolved)	100
Cobalt (dissolved)	50
Copper (dissolved)	200
Lead (dissolved)	50
Mercury (total)	0.6
Nickel (dissolved)	200
PCB (total)	1000
Phenols	20
Zinc (total)	500
Benzene	370
Toluene	2
~~Xylene~~ Ethylbenzene	90

7. If effluent does not meet the effluent quality limits of Part D, Item 6 above, it shall be considered hazardous waste and disposed off-site at an approved facility.

8. The discharge location for all treated effluents described in Part D Items 6 shall be to the satisfaction of an Inspector and shall be located at a minimum of thirty (30) metres from the ordinary high water mark of any water body and where direct or indirect flow into a water body is not possible and no additional impacts are created.

9. Sewage Sludge shall only be placed in the Landfarm Facility if the quality is determined to be unsuitable for use as landfill cover and it shall remain only until such time as it is suitable for use as landfill cover or removed disposal at an approved facility or as otherwise approved by the Board in writing.

10. The Licensee shall, prior to the removal of any treated soil for future use, confirm with the Government of Nunavut, Environmental Protection Service that the soils have been treated so as to meet all legislatively-required Treatment Objective.

11. The Licensee shall provide at least ten (10) days notice to an Inspector, of the intent to discharge effluent from the Landfarm Facility or the Sewage Disposal Facility.

12. The Licensee shall dispose of and permanently contain all solid wastes at the Solid Waste Disposal Facilities or as otherwise approved by the Board in writing.

13. The Licensee shall segregate and store all hazardous materials and/or hazardous waste within the Solid Waste Disposal Facilities in a manner to prevent the deposit of deleterious substances into any water, until such a time that the materials have been removed for proper disposal at an approved facility.

PART E: CONDITIONS APPLYING TO MODIFICATION AND CONSTRUCTION

1. The Licensee shall submit to the Board for approval in writing, for construction design drawings stamped by a qualified Engineer, sixty (60) days prior to the construction of any dams, dykes or structures intended to contain, withhold, divert or retain water or wastes.

2. The Licensee may, without written approval from the Board, carry out modifications to the Water Supply and Waste Disposal Facilities provided that such modifications are consistent with the terms of this Licence and the following requirements are met:

    a. the Licensee has notified the Board in writing of such proposed modifications at least sixty (60) days prior to beginning the modifications;

    b. these modifications do not place the Licensee in contravention of the Licence or the Act;

    c. the Board has not, during the sixty (60) days following notification of the proposed modifications, informed the Licensee that review of the proposal will require more than sixty (60) days; and

    d. the Board has not rejected the proposed modifications.

3. Modifications for which all of the conditions referred to in Part E, Item 2, have not been met may be carried out only with written approval from the Board. The Licensee shall provide as-built plans and drawings of the Modifications referred to in this Licence within ninety (90) days of completion of the Modification. These plans and drawings shall be stamped by an Engineer.

4. The Licensee shall provide to the NWB for review, as-built plans and drawings, stamped and signed by an Engineer, within ninety (90) days of completion of construction or, if already constructed, within ninety (90) days of issuance of this Licence.

    a. The Water Supply Facilities, as defined in Part A, Item 2 and as detailed in the application dated July 5, 2003 for renewal and amendment of Licence N3L4-1526 and the additional submitted documents with the application.

5. All activities shall be conducted in such a way as to minimize impacts on surface drainage and the Licensee shall immediately undertake any corrective measures in the event of any impacts on surface drainage.

6. The Licensee shall implement and maintain sediment and erosion control measures prior to and during activities carried out under this Part, to prevent the release of sediment and minimize erosion.

PART F: CONDITIONS APPLYING TO OPERATION AND MAINTENANCE

1. The Licensee shall submit to the Board within ninety (90) days of issuance of the Licence, an updated consolidated Operations and Maintenance (O&M) Manual, consisting of the previously submitted Plans:

    a. *Solid Waste Management Facility Operation and Maintenance (O&M) Plan, Hamlet of Kugluktuk*;
    b. *Sewage Treatment Facility Operation and Maintenance (O&M) Plan, Hamlet of Kugluktuk, Nunavut*;
    c. *Monitoring Program and Quality Assurance/Quality Control Plan, Hamlet of Kugluktuk; and*
    d. *Environmental Emergency Contingency Plan, Hamlet of Kugluktuk*

    and prepared where appropriate, in accordance with the *"Guidelines for the Preparation of an Operation and Maintenance Manual for Sewage and Solid Waste Disposal Facilities in the Northwest Territories; 1996"*. The updated Manual shall take into consideration of the comments received during the application review process and include the following information where applicable:

    a. The updated sampling locations, parameters and timing required under the Licence;
    b. A plan for the inspection and management of Sewage Sludge that indentifies the remediation objective for Sewage Sludge treated in the Landfarm Facility;
    c. An expanded *Spill Contingency Plan* that has the emergency contact information for the DFO, KIA, EC and the GN-DoE, includes a map and MSDS sheets and the

Plan shall describe all chemicals and fuels stored by the Hamlet, their locations and quantities*; and*

d. An approved QA/QC Plan as required by Part H, Item 9.

2. The Licensee shall review the O&M Manual referred to in Part F, Item 1 as required by changes in operation and/or technology and modify accordingly. Revisions are to be submitted in the form of an Addendum to be included with the Annual Report.

3. An inspection of all engineered facilities related to the management of water and waste shall be carried out annually in July or August by a Geotechnical Engineer. The engineer's report shall be submitted for review to the Board within sixty (60) days of the inspection, including a covering letter from the Licensee outlining an implementation plan addressing each of the Engineer's recommendations.

4. The Licensee shall perform more frequent inspections of the engineered facilities at the request of an Inspector.

5. If, during the period of this Licence, an unauthorized discharge of waste occurs, or if such a discharge is foreseeable, the Licensee shall:

   a. employ the appropriate contingency measures as approved under the Operation and Maintenance Manual for the Hamlet of Kugluktuk;
   b. report the incident immediately via the 24-Hour Spill Reporting Line at (867) 920-8130 and to the Inspector at (867) 975-4295; and
   c. submit to the Inspector, a detailed report on each occurrence, not later than thirty (30) days after initially reporting the event, that provides the necessary information on the location (including the GPS coordinates), initial response action, remediation/clean-up, status of response (ongoing, complete), proposed disposal options for dealing with contaminated materials and preventative measures to be implemented.

PART G: CONDITIONS APPLYING TO ABANDONMENT, RESTORATION AND CLOSURE

1. The Licensee shall submit to the Board for approval an *Abandonment and Restoration Plan* at least six (6) months prior to abandoning any facilities or upon submission of the final design drawings for the construction of new facilities to replace existing ones. Where applicable, the Plan shall include information on the following:

   a. water intake facilities;
   b. the water treatment and waste disposal sites and facilities;
   c. petroleum and chemical storage areas;
   d. any site affected by waste spills;

e. leachate prevention;
f. an implementation schedule;
g. maps delineating all disturbed areas, and site facilities;
h. consideration of altered drainage patterns;
i. type and source of cover materials;
j. future area use;
k. hazardous wastes; and
l. a proposal identifying measures by which restoration costs will be financed by the Licensee upon abandonment.

2. The Licensee shall submit to the Board for approval within sixty (60) days of issuance of this Licence, an Abandonment and Restoration Plan for the Decommissioned Sewage Disposal Facilities prepared in accordance with applicable sections of the "Guidelines for Abandonment and Restoration Planning for Mines in the Northwest Territories (1990)". In addition, the Plan is to include the following:

a. any site affected by waste spills;
b. leachate prevention;
c. an implementation schedule;
d. maps delineating all disturbed areas, and site facilities;
e. consideration of altered drainage patterns;
f. type and source of cover materials;
g. future area use; and
h. a proposal identifying measures by which restoration costs will be financed by the Licensee upon abandonment.

PART H: CONDITIONS APPLYING TO THE MONITORING PROGRAM

1. The Licensee shall maintain Monitoring Program Stations at the following locations:

Monitoring Program Station Number	Description	Status
KUG-1	Raw water supply intake at Coppermine River	Active (Volume)
KUG-2	Effluent discharged from the Water Retention Area in the Solid Waste Disposal Facilities	Active
KUG-3	Final Discharge Point for effluent from the Sewage Disposal Facilities to the Wetland Treatment Area	Active

KUG-4	Outfall area for the Wetland Treatment Area	Active
KUG-5	Effluent discharge and run-off from the Landfarm Facility	Active

2. The Licensee shall measure and record, in cubic metres, the monthly and annual quantities of water pumped at Monitoring Program Station KUG-1, for all purposes.

3. The Licensee shall sample monthly at Monitoring Program Station KUG-2, KUG-3 and KUG-4 during periods of observed flow and annual discharges, to be analyzed for the following parameters:

Biochemical Oxygen Demand (BOD_5)	Fecal Coliforms
Carbonaceous Biochemical Oxygen Demand (cBOD)	
Total Suspended Solids	pH
Conductivity	Nitrate-Nitrite
Oil and Grease (visual)	Total Phenols
Magnesium	Calcium
Sodium	Potassium
Chloride	Sulphate
Total Hardness	Total Alkalinity
Ammonia Nitrogen	Total Zinc
Total Cadmium	Total Iron
Total Cobalt	Total Manganese
Total Chromium	Total Nickel
Total Copper	Total Lead
Total Aluminum	Total Arsenic

4. The Licensee shall carry out inspections at Monitoring Program Stations KUG-2 and KUG-4 weekly from May to October inclusive, to determine effluent or water flow in order to fulfill the monitoring requirements of Part H, Item 3. A record of inspections shall be retained and made available to an Inspector upon request.

5. The Licensee shall sample prior to discharge at Monitoring Program Station KUG-5, to verify compliance with effluent quality criteria under Part D, Item 6.

6. Additional monitoring stations, sampling and analysis may be requested by an Inspector.

7. All sampling, sample preservation and analyses shall be conducted in accordance with methods prescribed in the current edition of *Standard Methods for the Examination of Water and Wastewater*, or by such other methods approved by the Board in writing.

8. All analyses shall be performed in a laboratory accredited according to ISO/IEC Standard 17025 for all required analyses. The accreditation shall be current and in good standing.

9. The Licensee shall submit to the Board upon approval by an analyst, for inclusion with the O&M Manual, required under Part F, Item 1(f), a Quality Assurance/Quality Control (QA/QC) Plan. The Plan shall include up to date sampling methods to all applicable standards, acceptable to an accredited laboratory as required by Part H, Item 7 and Part H, Item 8. The Plan shall include a covering letter from the accredited laboratory and analyst, confirming acceptance of the Plan for analyses to be performed under this Licence

10. The Licensee shall annually review the Quality Assurance/Quality Control Plan in Part H, Item 9 and modify it as necessary. Proposed modifications shall be submitted to the accredited laboratory for approval.

11. The Licensee shall measure and record the annual quantities of Sewage Sludge removed from the Sewage Disposal Facilities.

12. The Licensee shall include all of the data and information required by the "Monitoring Program" complete with an interpretation and discussion of the results, in the Licensee's Annual Report, as required *per* Part B, Item 1, or as requested by an Inspector.

13. Modifications to the Monitoring Program may be made only upon written approval of the Board.

Appendix: B

Field Inspection and Report:

Aug 12-13, 2014

Water Licence: 3BM-KUG 0914

WATER LICENCE INSPECTION FORM

☒ Original
☐ Follow-Up Report

Licensee	Licensee Representative
Hamlet of Kugluktuk	Donald LeBlanc
Licence No. / Expiry	**Representative's Title**
3BM-KUG0914 (Expired)	Senior Administrative Officer
Land / Other Authorizations	**Land / Other Authorizations**
-	-
Date of Inspection	**Inspector**
12/08/2014	Eva Paul

Activities Inspected

☐ Camp ☐ Drilling ☐ Mining ☒ Construction ☒ Reclamation ☐ Fuel Storage
☐ Roads/Hauling ☒ Other: Municipal Works ☐ Other:

Conditions: A - Acceptable C - Concern U - Unacceptable NA – Not Applicable NI – Not Inspected

Water Use	Condition	Comment	Site Conditions	Condition	Comment	Haz/Mat Management	Condition	Comment
Intake/Screen	A		Water Management Structures	C	5	Storage	A	
Flow Measure. Device	A		Culverts / Bridges	NI		Spills	A	
Source: Coppermine R.	C	1	Drainage	C	5	Spill Plan	U	10
Water Use:	A	1	Erosion / Sediment	U	6			
Recirculation (y /n)	NA		Mitigation Measures	U	6	**Administrative**		
			Reclamation Activities	U	7	Records	A	1
			Materials Storage	A		Reports	A	
Waste Disposal			Signage	U	8	Plans	U	10
Waste Water	U	2				Notifications	C	11
Solid Waste	C	3	**Monitoring**			**Other**		
Hazardous Waste	U	4	Sample Collection / Analysis	U	9			

**The number in the comments field will correspond with specific comments provided below.*

Samples taken by Inspector:	Location(s): Sewage Lagoon (KUG-3), Landfill Water Retention Area (KUG-2) and within the landfill downslope from the landfarm.
☒ Yes ☐ No	

SECTION 1 ☒ **Comments** (s.1) ☒ **Non-Compliance with Act or Licence** (s.2) ☒ **Action Required** (s.3)

An inspection was conducted on August 12, 2014, in cooperation with Mr. Shah Alam, Municipal Planning Engineer for the Government of Nunavut, Kitikmeot Region. We were accompanied by George Egotak of the hamlet throughout the inspection. The Water Treatment Plant, water intakes (old and new), Landfill, and Sewage Lagoon were inspected for compliance with the water licence. Monitoring Stations were verified, and the locations of KUG-2 and KUG-5 were modified to more accurately reflect the licence requirements. Water usage records were inspected, and a brief administrative compliance review was conducted.

1. The water distribution system includes automatic recording of water usage. Mr. LeBlanc provided water usage records to July 31 at the request of the Inspector. Daily logs are maintained at the Water Treatment Plant showing the volume as well as chlorination records. While both intake facilities are acceptable, there is open access to the water source areas. During the inspection, a community member drove his quad right into the river and filled his personal water jugs. The community water source would be better protected if access was restricted to authorized personnel. Additionally, it was noted that Qulliq Energy is storing a considerable quantity of waste oil and other hazardous waste up-slope from the water reservoir and no secondary containment is employed. This poses a risk to this essential community water structure.
2. Waste water from the lagoon and the landfill are being discharged without water quality testing. The sewage lagoon is not to be decanted without submitting compliant sample results to the Inspector. A float was not in place on the lagoon suction hose, meaning that the material being discharged was sludge rather than the liquid. This is unacceptable practice, contrary to the licence and approved operating plans, and constitutes a contravention of the Act. Hydrocarbon-contaminated water from the landform may be running directly into the landfill due to overfilling, rather than being contained as intended within the landform. I am concerned that the water retention area at the bottom of the landfill is not functioning as intended; the construction drawings and O&M Manual indicate that water is intended to accumulate within the structure and be discharged deliberately when required (after testing). Contact water currently flows freely from this structure.
3. There is currently no person responsible for operating the Solid Waste Management Facility (landfill). Garbage segregation is inconsistent, although some segregation is evident at the Bulky Metals Area. Garbage is being dumped and burned by the garbage truck drivers, without direction, and is choking the entry to the landfill area. Waste should be moved out of the entry area, and segregation practices implemented. A review of the existing O&M Manual will provide guidance on the intended management of the landfill. Operations not consistent with the approved plan are in contravention of the licence and the Act.
4. The hazardous waste storage area and landform cell are both lined, but both also full. The small hazardous waste area contains barrels, batteries, paint and other hazardous goods, and has clearly been full for some time. The overflow of barrels and hazardous waste has been placed in the landform cell. While it is good that the hazardous waste is in a lined containment area, the volume of waste makes it impossible to manage the landform as intended. Barrels are not to be stored in the landform. The approved O&M Manual clearly describes how to treat the contaminated soil so as to be able to remove it and use it for fill in the landfill. This is not being undertaken; the soil piles have not been actively managed and vegetation is growing within the

landfarm. The piles of soil are pushed over against the northwest wall, enabling runoff water to flow directly into the landfill instead of accumulating within the berm. Barrels stored within the lined areas are not labelled to identify the waste. The hamlet is not authorized for long term storage of hazardous waste; regular backhaul to a hazardous waste receiver is required. It should also be noted that the hamlet is not an authorized receiver of hazardous waste; the municipal facility should not accept hazardous waste from contractors, industry, or non-municipal sources. Guidelines for management of hazardous waste in Nunavut can be found at: http://env.gov.nu.ca/node/82#Guideline Documents. Mr. LeBlanc indicated that a backhaul of batteries is intended for September; please consult the guidelines and consult with the DOE to ensure packaging is consistent with TDG requirements. In future, the batteries stored in the hazardous waste storage area should be stored in such a manner to prevent water accumulation and any risk of acid spills.

5. Issues with the sewage lagoon structure remain largely unchanged since 2010. Gasses beneath the lagoon liner push the liner to the surface of the lagoon ("bubbles"), causing mixing of the lagoon contents and reducing the effective capacity of the lagoon. There is suspicion that the liner was installed upside-down. There are reports of leakage coming from the lagoon, though none was evident during the inspection. The lagoon was constructed on a wetland, and overland flow is causing erosion to south wall. The old lagoon which has not been remediated causes ponding against the east wall. Mr. Alam of the GN has submitted a funding proposal to investigate the extent of and reasons for malfunction of the sewage lagoon.
6. The new water intake was constructed in 2012. Since that time, a large erosion channel has formed along the intake, causing sediment to wash into the river (water source). No erosion control measures are in place and no corrective action has been taken. Mr. Alam will determine whether corrective action can be required of the contractor who conducted the work.
7. The old sewage lagoon, not in use since 2010, has not been reclaimed. The sides are collapsed and a pool of water remains within. No active control or water monitoring is being undertaken. In essence, the facility has been abandoned.
8. Monitoring station signs (KUG-1 to KUG-5) were posted in incorrect locations. The new GPS coordinates were determined during this inspection and signs are to be posted on permanent metal stakes or affixed to the fences where appropriate. Facility signage (Water Intake Facilities, Sewage Lagoon, Solid Waste Disposal Facility and Landform) is faded or absent and does not provide sufficient public warning. Clear signage within the landfill should facilitate waste segregation practices.
9. Lack of water quality monitoring shows blatant disregard of the licence and the Act, despite previous training provided to hamlet employees by Mr. Alam. No samples were collected prior to the lagoon decanting; as such an estimated 40 days of illegal discharging has taken place in 2014. No record is kept of the volume of discharge; also required for reporting under the water licence.
10. Four plans were required to be updated pursuant to issuance of the 2009 licence. Of these four plans, only one (the sewage treatment O&M plan) has been updated, and was submitted with then 2014 renewal documentation. These plans date back to 2006 and 2007. These plans are to be updated as required by the 2009 licence, incorporating the information that was specified in the 2009 licence, and any changes to operations. The A&R plan for the old sewage lagoon is to be submitted to the Board.
11. Notification to the Inspector (by e-mail) is required prior to any decant of the sewage lagoon, and prior to any release of water from the landfarm. Samples must indicate compliance with the discharge criteria outlined in the water licence or alternative treatment measures will be required. Sample results must be submitted to the Inspector before authorization will be given to decant, and in the case of the sewage lagoon, a current photo of the lagoon level and a short justification for the decant to ensure that the decant is consistent with the operational plan.

SECTION 2 ☐ Comments ☒ Non-Compliance with Act or Licence ☐ Action Required

Part B Item 1: Reporting of monthly discharges of effluent. The estimates given in the report are not reflective of actual discharges from the sewage lagoon.

Part B Item 2: Failure to implement the Monitoring Program as required by the licence.

Part B Item 5: Failure to maintain the necessary signs to appropriately identify the stations of the Monitoring Program.

Part B Item 11: Failure to implement Plans as approved by the Board.

Part C Item 6: Failure to implement sediment and erosion control measures in relation to the new water intake facility.

Part D Item 2: Failure to ensure compliance with discharge criteria prior to decanting of the Lagoon.

Part D Item 5: Failure to treat soil in the landfarm facility in accordance with the Solid Waste Management Operation and Maintenance (O&M) Plan, March 2007.

Part D Item 6: Failure to monitor water from the landfarm facility.

Part F Item 1: Failure to provide updated Plans and Manuals as required by the licence.

Part F Item 3: Failure to provide annual geotechnical reports.

Part G Item 2: Failure to provide updated A&R plan for the old sewage lagoon.

Part H Item 1: Failure to maintain Monitoring Program Stations.

Part H Item 3: Failure to carry out monitoring as specified in the licence.

Part H Item 9: Failure to provide an updated QA/QC Plan.

SECTION 3 ☐ Comments ☐ Non-Compliance with Act or Licence ☒ Action Required

Hamlet of Kugluktuk:

1. A float is to be installed on the lagoon suction hose prior to the next decant.
2. Monitoring program is to be implemented including lagoon sampling at KUG-3 prior to any decant, and monthly sampling at KUG-2, -4, and -5 during periods of flow.
3. A report showing the correct installation of the Monitoring Station signs is to be submitted to the Inspector by **August 30 2014**.
4. Samples must indicate compliance with the discharge criteria outlined in the water licence or alternative treatment measures will be required. Sample results must be submitted to the Inspector before authorization will be given to decant, and in the case

of the sewage lagoon, a current photo of the lagoon level and a short justification for the decant. Results from KUG-5 are to be submitted to the Inspector prior to any release of water from the landfarm. An appropriate discharge location for the landfarm is to be determined with the Inspector at the time of the next visit.

5. Safe, covered containment for used batteries (eg – a sea-container) should be set up at the landfill for future accumulation and to facilitate shipment.
6. Barrels in the landfarm are to be removed, labelled, and prepared for backhaul according to TDG requirements. To the extent possible, hazardous waste should be sent annually to a licensed receiver. Records of the shipment are to be kept for future inspections, and included in the Annual Report.
7. Soil in the landfarm is to be turned according to the O&M manual and re-distributed in the cell so as to leave a trench around the perimeter. This will prevent un-treated water from draining out of the cell, facilitate implementation of the monitoring program, and facilitate treatment of the soils as intended. This remediation work should also be reported in the Annual Report.
8. Action Items 6 and 7 are to be completed by **October 30 2014** and photos of the completed works submitted to the Inspector by **November 15**.
9. Segregation of non-hazardous waste is also important. There should be a hamlet employee dedicated to management of the landfill and landfarm facilities according to the O&M manual. Ideally, the facility would be gated to preclude unauthorized dumping, but at minimum should be well-signed and well laid-out in order to facilitate waste segregation.
10. Access to the water intake areas (water source) should be restricted to authorized personnel, in order to reduce the risk of contamination.
11. Hazardous waste stored up-hill from the water reservoir should be moved to an appropriate location.
12. The Solid Waste Management Facility Operation and Maintenance (O&M) Plan, Sewage Treatment Facility Operation and Maintenance (O&M) Plan, Monitoring Program and Quality Assurance/Quality Control Plan, and Environmental Emergency Contingency Plan are to be updated as required by the 2009 licence, incorporating the information that was specified in the 2009 licence, and any changes to operations since that time. It is best if the Hamlet be involved in the review of these Plans so as to take ownership of the content.

<u>Government of Nunavut in relation to capital projects:</u>

13. Mr. Alam is to keep the Mr. LeBlanc and the Inspector apprised of studies and works in relation to the sewage lagoon.
14. The A&R plan for the sewage lagoon decommissioning is to be submitted to the Board immediately.
15. Mr. Alam is to pursue corrective measures with respect to the erosion channel formed at the new water intake.

Licensee or Representative	Inspector's Name
	Eva Paul
Signature: Donald LeBlanc.	Signature:
Date: August 14 /2014.	Date: 14 August 2014

APPENDICES: ☐ Inspection Photos ☐ Sample Results ☐ Other:

Office Use Only: Follow-up report to be issued by Inspector ☐ Yes ☐ No

CC: Phyllis Beaulieu, Manager of Licensing, NWB
Erik Allain, Manager of Field Operations, AANDC
Shah Alam, Municipal Planning Engineer, GN

Appendix: C

Effluent Water sample Results: 2014

Hamlet of Kugluktuk, NU

Date of sampling: Aug 13, 2014

Ref.: Water Licence: 3BM-KUG 0914

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-765-6645 Fax: (867)-669-2718

Taiga Batch No.:
140670

- FINAL REPORT -

Prepared For: Hamlet of Kugluktuk

Address: P.O. Box 271
Kugluktuk, NU,X0B 0E0

Attn: **George Egotak** **Facsimile: 867-982-3060**

Final report has been reviewed and approved by:

Angelique Ruzindana
Quality Assurance Officer

NOTES:

- Test methods and data are validated by the laboratory's Quality Assurance Program. Taiga Environmental Laboratory is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) to ISO/IEC 17025 as a testing laboratory for specific tests registered with CALA.
- Routine methods are based on recognized procedures from sources such as
  - Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF;
  - Environment Canada
  - USEPA
- Samples shall be kept for thirty (30) days after the final report is issued. All microbiological samples shall be disposed of immediately upon completion of analysis to minimize biohazardous risks to laboratory personnel. Please contact the laboratory if you have any special requirements.
- Final results are based on the specific tests at the time of analysis and do not represent the conditions during sampling.

ReportDate: Thursday, August 21, 2014
Print Date: ***Thursday, August 21, 2014***

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-765-6645 Fax: (867)-669-2718

Taiga Batch No.: 140670

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-2 **Taiga Sample ID:** 001

Client Project: KUG
Sample Type: Water
Received Date: 13-Aug-14
Sampling Date: 13-Aug-14
Sampling Time: 9:30
Location: Kugluktuk
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	0.033	0.005	mg/L	18-Aug-14	SM4500-NH3:	
Biochemical Oxygen Demand	3	2	mg/L	14-Aug-14	SM5210:B	81
CBOD	4	2	mg/L	14-Aug-14	SM5210:B	81
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	249	0.4	mg/L	14-Aug-14	SM2320:B	
Conductivity, Specific (@25C)	2560	0.4	µS/cm	14-Aug-14	SM2510:B	
pH	7.66		pH units	14-Aug-14	SM4500-H:B	
Solids, Total Suspended	18	3	mg/L	18-Aug-14	SM2540:D	
Major Ions						
Calcium	261	0.1	mg/L	14-Aug-14	SM4110:B	
Chloride	341	0.7	mg/L	14-Aug-14	SM4110:B	
Hardness	995	0.7	mg/L	14-Aug-14	SM4110:B	
Magnesium	83.4	0.1	mg/L	14-Aug-14	SM4110:B	
Nitrate as Nitrogen	0.04	0.01	mg/L	14-Aug-14	SM4110:B	

ReportDate: Thursday, August 21, 2014
Print Date: ***Thursday, August 21, 2014***

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Taiga Batch No.: 140670

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-2 **Taiga Sample ID:** 001

Nitrite as Nitrogen	< 0.01	0.01	mg/L	14-Aug-14	SM4110:B
Potassium	35.4	0.1	mg/L	14-Aug-14	SM4110:B
Sodium	220	0.1	mg/L	14-Aug-14	SM4110:B
Sulphate	762	1	mg/L	14-Aug-14	SM4110:B
Microbiology					
Coliforms, Fecal	5	1	CFU/100mL	13-Aug-14	SM9222:D
Organics					
Oil and Grease, visible	Non-visible			20-Aug-14	Visual Exam
Trace Metals					
Aluminum	28.7	5	µg/L	16-Aug-14	EPA200.8
Arsenic	1.1	0.2	µg/L	16-Aug-14	EPA200.8
Cadmium	< 0.10	0.1	µg/L	16-Aug-14	EPA200.8
Chromium	0.8	0.1	µg/L	16-Aug-14	EPA200.8
Cobalt	0.4	0.1	µg/L	16-Aug-14	EPA200.8
Copper	0.3	0.2	µg/L	16-Aug-14	EPA200.8
Iron	776	5	µg/L	16-Aug-14	EPA200.8
Lead	0.2	0.1	µg/L	16-Aug-14	EPA200.8
Manganese	134	0.1	µg/L	16-Aug-14	EPA200.8
Nickel	5.5	0.1	µg/L	16-Aug-14	EPA200.8
Zinc	< 5.0	5	µg/L	16-Aug-14	EPA200.8

ReportDate: Thursday, August 21, 2014
Print Date: *Thursday, August 21, 2014*

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Tel: (867)-765-6645 Fax: (867)-669-2718

Taiga Batch No.: 140670

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-3 **Taiga Sample ID:** 002

Client Project: KUG
Sample Type: Water
Received Date: 13-Aug-14
Sampling Date: 13-Aug-14
Sampling Time: 9:30
Location: Kugluktuk
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	35.9	0.005	mg/L	18-Aug-14	SM4500-NH3:	
Biochemical Oxygen Demand	60	2	mg/L	14-Aug-14	SM5210:B	
CBOD	57	2	mg/L	14-Aug-14	SM5210:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	192	0.4	mg/L	14-Aug-14	SM2320:B	
Conductivity, Specific (@25C)	602	0.4	µS/cm	14-Aug-14	SM2510:B	
pH	8.27		pH units	14-Aug-14	SM4500-H:B	
Solids, Total Suspended	140	3	mg/L	18-Aug-14	SM2540:D	
Major Ions						
Calcium	11.2	0.1	mg/L	14-Aug-14	SM4110:B	
Chloride	52.1	0.7	mg/L	14-Aug-14	SM4110:B	
Hardness	49.2	0.7	mg/L	14-Aug-14	SM4110:B	
Magnesium	5.2	0.1	mg/L	14-Aug-14	SM4110:B	
Nitrate as Nitrogen	< 0.01	0.01	mg/L	14-Aug-14	SM4110:B	
Nitrite as Nitrogen	< 0.01	0.01	mg/L	14-Aug-14	SM4110:B	
Potassium	20.8	0.1	mg/L	14-Aug-14	SM4110:B	

ReportDate: Thursday, August 21, 2014
Print Date: ***Thursday, August 21, 2014***

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Tel: (867)-765-6645 Fax: (867)-669-2718

Taiga Batch No.: 140670

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-3 **Taiga Sample ID:** 002

Sodium	52.9	0.1	mg/L	14-Aug-14	SM4110:B	
Sulphate	9	1	mg/L	14-Aug-14	SM4110:B	
Microbiology						
Coliforms, Fecal	4500	100	CFU/100mL	13-Aug-14	SM9222:D	20
Organics						
Oil and Grease, visible	Non-visible			20-Aug-14	Visual Exam	
Trace Metals						
Aluminum	115	5	µg/L	16-Aug-14	EPA200.8	
Arsenic	0.6	0.2	µg/L	16-Aug-14	EPA200.8	
Cadmium	< 0.10	0.1	µg/L	16-Aug-14	EPA200.8	
Chromium	0.6	0.1	µg/L	16-Aug-14	EPA200.8	
Cobalt	0.4	0.1	µg/L	16-Aug-14	EPA200.8	
Copper	34.5	0.2	µg/L	16-Aug-14	EPA200.8	
Iron	357	5	µg/L	16-Aug-14	EPA200.8	
Lead	0.6	0.1	µg/L	16-Aug-14	EPA200.8	
Manganese	44.4	0.1	µg/L	16-Aug-14	EPA200.8	
Nickel	2.2	0.1	µg/L	16-Aug-14	EPA200.8	
Zinc	31.3	5	µg/L	16-Aug-14	EPA200.8	

ReportDate: Thursday, August 21, 2014
Print Date: *Thursday, August 21, 2014*

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Taiga Batch No.: 140670

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-4 **Taiga Sample ID:** 003

Client Project: KUG
Sample Type: Water
Received Date: 13-Aug-14
Sampling Date: 13-Aug-14
Sampling Time: 9:30
Location: Kugluktuk
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	4.22	0.005	mg/L	18-Aug-14	SM4500-NH3:	
Biochemical Oxygen Demand	14	2	mg/L	14-Aug-14	SM5210:B	
CBOD	6	2	mg/L	14-Aug-14	SM5210:B	81
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	103	0.4	mg/L	14-Aug-14	SM2320:B	
Conductivity, Specific (@25C)	482	0.4	µS/cm	14-Aug-14	SM2510:B	
pH	7.52		pH units	14-Aug-14	SM4500-H:B	
Solids, Total Suspended	6	3	mg/L	18-Aug-14	SM2540:D	
Major Ions						
Calcium	16.7	0.1	mg/L	14-Aug-14	SM4110:B	
Chloride	78.6	0.7	mg/L	14-Aug-14	SM4110:B	
Hardness	98.8	0.7	mg/L	14-Aug-14	SM4110:B	
Magnesium	13.9	0.1	mg/L	14-Aug-14	SM4110:B	
Nitrate as Nitrogen	0.97	0.01	mg/L	14-Aug-14	SM4110:B	
Nitrite as Nitrogen	0.05	0.01	mg/L	14-Aug-14	SM4110:B	
Potassium	5.2	0.1	mg/L	14-Aug-14	SM4110:B	

ReportDate: Thursday, August 21, 2014
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Tel: (867)-765-6645 Fax: (867)-669-2718

Taiga Batch No.: 140670

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-4 **Taiga Sample ID:** 003

Sodium	50.7	0.1	mg/L	14-Aug-14	SM4110:B
Sulphate	8	1	mg/L	14-Aug-14	SM4110:B
Microbiology					
Coliforms, Fecal	6	1	CFU/100mL	13-Aug-14	SM9222:D
Organics					
Oil and Grease, visible	Non-visible			20-Aug-14	Visual Exam
Trace Metals					
Aluminum	42.1	5	µg/L	16-Aug-14	EPA200.8
Arsenic	0.8	0.2	µg/L	16-Aug-14	EPA200.8
Cadmium	< 0.10	0.1	µg/L	16-Aug-14	EPA200.8
Chromium	0.5	0.1	µg/L	16-Aug-14	EPA200.8
Cobalt	0.5	0.1	µg/L	16-Aug-14	EPA200.8
Copper	2.5	0.2	µg/L	16-Aug-14	EPA200.8
Iron	1770	5	µg/L	16-Aug-14	EPA200.8
Lead	0.1	0.1	µg/L	16-Aug-14	EPA200.8
Manganese	315	0.1	µg/L	16-Aug-14	EPA200.8
Nickel	2.7	0.1	µg/L	16-Aug-14	EPA200.8
Zinc	< 5.0	5	µg/L	16-Aug-14	EPA200.8

ReportDate: Thursday, August 21, 2014
Print Date: *Thursday, August 21, 2014*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-765-6645 Fax: (867)-669-2718

Taiga Batch No.: 140670

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-5 **Taiga Sample ID:** 004

Client Project: KUG
Sample Type: Water
Received Date: 13-Aug-14
Sampling Date: 13-Aug-14
Sampling Time: 9:30
Location: Kugluktuk
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
CBOD	5	2	mg/L	14-Aug-14	SM5210:B	81
Inorganics - Physicals						
pH	7.40		pH units	14-Aug-14	SM4500-H:B	
Microbiology						
Coliforms, Fecal	10	10	CFU/100mL	13-Aug-14	SM9222:D	
Organics						
Benzene	< 0.005	0.005	mg/L	18-Aug-14	EPA8260B	
Ethylbenzene	< 0.005	0.005	mg/L	18-Aug-14	EPA8260B	
Hexane Extractable Material		2.0	mg/L		EPA1664A	16
Toluene	< 0.005	0.005	mg/L	18-Aug-14	EPA8260B	
Xylenes	< 0.005	0.005	mg/L	18-Aug-14	EPA8260B	
Subcontracted Organics						
Phenols, Total	0.0058	0.001	mg/L	20-Aug-14	AB ENV.06537	
Polychlorinated Biphenyls	< 0.0025	0.0025	mg/L	19-Aug-14	EPA3510	
Trace Metals						
Arsenic	1.0	0.2	µg/L	16-Aug-14	EPA200.8	

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Taiga Batch No.: 140670

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-5 **Taiga Sample ID:** 004

Mercury	< 0.01	0.01	µg/L	16-Aug-14	EPA200.8
Trace Metals, Dissolved					
Cadmium	< 0.05	0.05	µg/L	16-Aug-14	EPA200.8
Chromium	0.2	0.1	µg/L	16-Aug-14	EPA200.8
Cobalt	0.7	0.1	µg/L	16-Aug-14	EPA200.8
Copper	0.9	0.2	µg/L	16-Aug-14	EPA200.8
Lead	< 0.1	0.1	µg/L	16-Aug-14	EPA200.8
Nickel	5.5	0.1	µg/L	16-Aug-14	EPA200.8

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Taiga Batch No.: 140670

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-5 **Taiga Sample ID:** 004

- DATA QUALIFERS -

Data Qualifier Descriptions:

16 *Test requested but no sample bottle received*

20 *Possible matrix interference, reported result uncertain.*

81 *Results are inconclusive due to insufficient depletion of sample, minimum 2 mg/L required over 5 days.*

*** Taiga analytical methods are based on the following standard analytical methods**

SM - Standard Methods for the Examination of Water and Wastewater

EPA - United States Environmental Protection Agency

ReportDate: Thursday, August 21, 2014

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