Annual Report - 2014

Water Licence 3BM-PEL1419/Renewal

Hamlet of Kugaaruk, Nunavut

By:

Shah Alam, P. Eng.
Municipal Planning Engineer,
Cambridge Bay, NU

Feb 23, 2015

Kugaaruk Water Licence 3BM-PEL 1419

Annual Report 2014

Hamlet of Kugaaruk, Nunavut

Table of Contents

ᑲᑐᑎᓗᒍ ᓄᓇᕗᑦ ᐱᐅᖅᑲᖅᑕᐅᑎᑦᑕᕗᑦ
Building Nunavut Together
Nunavuliuqatigiingniq
Bâtir le Nunavut ensemble

ᓄᓇᓕᖕᓂ ᑲᕙᒪᒃᑯᓐᓄ ᐱᕕᖅᓴᖅᑎᒃᑯᑦ
Department of Community and Government Services
Nunalingni Kavamatkunnilu Pivikhaqautikkut
Ministère des Services Communautaires et gouvernementaux

Kugaaruk Water Licence: 3BM-PEL 1419 **Annual Report 2014**

February 23, 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 Kugaaruk Water Licence 3BM-PEL 1419

Dear Phyllis,

The Hamlet of Kugaaruk 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 No. 3BM-PEL-1419. Copies of required tests reports are attached herewith (Appendix) .

The Licensee has undertaken some effective steps for waste management during the summer and fall which has led improvement to sewage & solid waste facilities and effluent discharge. Facilities monitoring program has been in effect during June-September each year as required in the Licence. Samples test result has shown excellent control on contamination parameters within allowable limit comprising BOD, TSS, E-coli and Toxicity components.

We summarize those conditions and requirements outlined **in Part B through part H** as below:

Part B: General conditions:

Item1. (i through ix):

- Tabular Form of Annual water consumption and sewage disposal are duly filled-up
- Quantities were measured on daily basis of water distribution and sewage disposal
- Modification and improvement to water intake, pumphouse and water supply with new plant
- No modification to sewage waste disposal, wetland or solid waste site during 2014
- No unauthorized discharge of sewage and solid waste during the year 2014 or before.
- Approved O&M manuals for sewage and solid waste facilities active and addendum reported
- Review of Dam Safety inspection carried in August 2014 and report submitted. No immediate action required or reported for sewage sludge removal or containment issue but continue annual decanting with the direction of the inspector and sampling & reporting.

P.O. Bag 200, Helen Maksagak Centre
Cambridge Bay, Nunavut X0B 0C0

(867) 983 4156 (867) 983 4123
www.gov.nu.ca

Items 2-6:

- Some monitoring stations revised location marked by the Inspector with CGS rep during the inspection using GPS locator (see the appendix) and location signage were placed but to be replaced with **standard new signage with Official Languages of Nunavut** by the Licensee.
- 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, Spill Contingency Plan has been updated with the Board.
- Plan of Compliance with an addendum was submitted in March 2014 and updated time to time as requested by the Board. The Licensee considers approved plan and continued for implementation as the Board has not objected or commented on it.

Part C: Water Use:

- Water drawn from the Kugajuk River as the approved source and annual intake quantity didn't exceed **28,834** cubic metres which is within the allowable annual limit of **45,000** cubic metres.
- Erosion protection measure has been carried by soil-gravel berm beside the new treatment plant
- The intake screen has been replaced and installed with sufficient clearance from river bed and allowed potential frozen layer on top (about 3 m clearance from top) before the treatment plant in place and no material removed from river bed in placing the screen.

Part D: Waste Disposal

- All sewage and solid waste disposal carried into the prescribed locations of sewage Lagoon and waste site facilities using hamlet operated trucks and operators. Sewage and effluent samples were taken from location station PEL-3-1, and test result shows parameters of contaminants within allowable limits (FC: 10,000 CFU/dl, BOD_5:120, TSS: 180, P^H, Oil & grease and others).

- Freeboard at sewage lagoon maintained minimum 1.0 m and discharge into secondary cell using a mechanical pump (regulated control dyke also available).
- The existing wetland area and facilities used for effluent treatment and remediation. Test results shown the effluent from Final Discharge Point (PEL- 4) within limiting values (BOD:45, TSS;45, Coliform, p^H) and not acutely toxic to Rainbow Trout or crustacean fish food.

- All solid wastes disposed in the approved waste facility which is gated and fenced around, and facilitated for leachate run-off at the downstream where sampling stations marked for water sample collection. It requires some works to segregate hazardous waste from regular waste and secure in confined or containment- the Licensee will be more diligent in coming year to implement this plan as required and requested by the inspector. Noted burned batteries will be housed in a sea can as well as new collection in coming year.

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

- No modifications to sewage or solid waste facilities and in operation since developed Oct 2009 and final completion in 2010.
  The lagoon area: (short sides 51m & 76m) x (long sides 112 m & 114 m) and capacity 46,600 m3
- Only modification to existing water intake pumphouse which is repurposed as storage facilities for filters, treatment liquids and accessories and existing pumps remains as backup to new PH
- Changes in operation for water intake, treatment and distribution by using the newly built intake pumphouse. Draft O&M manual is ready for final version and will be available by June 2015.
- No geo-inspection or study required, however a review inspection and assessment for sludge blanket and dam safety inspection carried by a consultant in Aug 2014 and report submitted.

Part H: Monitoring Program

- Annual monitoring of sewage and solid waste effluent has been carried during the summer and fall. Samples were taken from monitoring stations where available and convenient, and tested for parameters at Taiga Laboratory at Yellowknife, NWT (CALA approved). Test reports of such samples are included with this report.
- During the summer inspection, some of the monitoring stations found dry and not enough runoff flow of effluent for sampling. Some stations also re-arranged with GPS location and some were recommended for removal as no longer importance (see Appendix)
- Monitoring wells suggested by the consultant at locations PEL-7 through PLE-10 as in the O&M manual for ground water-flow monitoring from upstream to downstream when spring and summer thaw but remained as optional as proposed. Therefore no effective samples be taken from other stations besides PEL 3, 4, 6 and 9-2 as found available and tested for parameters incorporated to hydrocarbon, benzene or ethylene and test results within satisfactory limits of parameters.

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

Best Regards,

Shah Alam, P. Eng.
Municipal Planning Engineer,
Government of Nunavut
Community and Government Services
Kitikmeot Region, Cambridge Bay, Nu
Phone: 867-983-4156, fax: 867-983-4124
salam@gov.nu.ca<mailto:salam@gov.nu.ca>

HAMLET OF KUGAARUK

P.O. BOX 205, KUGAARUK, NUNAVUT
X0B 1KO
867-769-6281 FAX: 867-769-6069
E-mail: sao_kug@qiniq.com

February 4, 2015

Mr. Shah Alam, Engineer
C.G.S. Government of Nunavut
Via Email

RE: OTHER PERTINENT INFORMATION TO WATER LICENSE

Dear Mr. Alam,

Further, Mr. Shah Alam, Engineer C.G.S. Government of Nunavut will be submitting on behalf of the Hamlet of Kugaaruk any and all relevant reports, information for yearly reports to the water board, and renewal process.

Should you want to discuss please do not hesitate to contact myself at 867-769-6281 ext-30

Sincerely,

Roberto Moretti, S.A.O.
Hamlet of Kugaaruk

Annual Report 2014: NWB Form

Water Licence: 3BM-PEL 1419

Hamlet of Kugaaruk, NU

ANNUAL REPORT

YEAR BEING REPORTED: 2014

The following information is compiled pursuant to the requirements of Part B, Item 1 of Water Licence **3BM-PEL1419** issued to the **Hamlet of Kugaaruk**

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 On Tap 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	2,433,767.70	Same
February	2,327,033.10	Same
March	2,505,200.60	Same
April	2,480,304.10	Same
May	2,325,855.80	Same
June	2,162,680.60	Same
July	2,474,236.50	Same
August	2,509,913.60	Same
September	2,395,010.70	Same
October	2,421,916.50	Same
November	2,378,246.50	Same
December	2,419,416.70	Same
ANNUAL TOTAL	**28,833,579.40**	Same

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;

New Water Treatment Plant (46.94 sq. m) installed in place of the previous plant which integrated filtration and UV system in addition to mandatory chlorination. Facilities included:

- 3-phase electrical line for pumps, heat trace, unit heater and single phase for truck-fill, UV, chlorine injection and filtration system.
- New intake screen inside the river for twin intake system.
- Twin truck-fill facility at the new plant on one side of the building.
- Cartage filters ranging 10-micron to 1-micron in two train series.
- Complete UV system for turbidity reduction.
- Salinity control device and auto-dialling to plant operator and light flushing signal for control system.
- Backup generator retains for existing plant including two previous pumps as redundant.

The previous plant building retained for storage facility and a backup pumps with minor improvement and addition of electrical/ mechanical and heating facility inside.

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

- No unauthorized discharge carried anytime during the period (Jan-Dec 2014).
- Sewage effluent decanted outside from the lagoon. Beside house sewage, no other black water (industrial or manufacture wastewater) discharged into the lagoon.
- The lagoon operator has spotted one leak point outside the lagoon berm which shows at the area of new lagoon expansion with the existing lagoon berm, but neither the consultant, nor the inspector found such evidence during the site visit. The Licensee will monitor the spot and will look for a possible inspection in summer 2015 when frozen sewage thaw up.

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

Existing Water Treatment plant was decommissioned and re-purposed for materials storage such as cartage filters, chlorine solution, UV bulbs and backup pumps for emergency when line power disrupts.

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;

Request received from the Board for Sewage lagoon Dam Safety inspection follow up which is related to sewage containment and facility full operation as per development.

- ✓ Geotechnical inspection was carried in Aug 2014 by exp consultants for follow up to lagoon dam safety and sludge management including lagoon bathometry for sludge blanket on lagoon bottom and the Report was submitted.
- ✓ Plan for sludge removal when blanket thickness reach or exceed 0.3 m and recommended for 5- years of construction.

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

Board's request for updating of 'Water Collection and Distribution Operation and Maintenance (O&M) manual including annual quantity and plan within 90 days of the issuance of the amendment Licence, the licensee had submitted the addendum in February 2014, noting for exemption for revision of old O&M, but a new version once the new Water Treatment Plant completed. The licensee will submit the new O&M manual including as-built drawing before June 2015.

ix. Updates or revisions to the approved Operation and Maintenance Plans.

The approved O&M manual for Sewage Treatment Facility, updated October 2010 remains effective and implemented for annual operation and monitoring. On February 17, 2014, the Board was updated with requested information including QA/QC plan of solid waste, Spill Contingency plan and multi-year monitoring Compliance Plan.

x ADDITIONAL INFORMATION THAT THE LICENSEE DEEMS USEFUL:

New water treatment plant is substantially completed and turned over to the Licensee for operation and management since September 2014. GN- CGS hired consultant will continue follow-up training and operation inspection for the year 2015 (warranty period) with a physical travel at the plant at an approximate interval of 3-4 months. Video and theoretical briefing to the operator will be most part, and thus to ease up the operational activity to the community operator, but a certified operator would be given priority.

FOLLOW-UP REGARDING INSPECTION/COMPLIANCE CONCERNS:

Field inspection carried by AANDC during Aug 19-20, 2014 on facilities operation and management activities in regards to the requirements of the Water Licence. Issues related to facilities operation and implementations of plans are addressed under the priority list for compliance. Some issues are carried inherent from the facility development and some are residual to operational matters. Follow up to inspector's direction are summarized as below:

- Erosion control measure beside water intake line and intake pumphouse:
  - ✓ Erosion protection shallow berm completed with soil-gravel materials under the new Treatment Plant project work, which stopped the sediment run-off into the river intake beside the treatment plan.

- Sample collection before decanting of sewage lagoon:
  - ✓ Samples were collected from lagoon, from decanted cell and from wetland during the inspection. Samples were tested at Taiga Lab & results are in compliance.
  - ✓ The Licensee has committed to comply the requirement informing the inspector at least 10 days ahead of any subsequent decanting each year.

- Car batteries burned at metal dump site and not secured with proper containment:

  - ✓ The licensee has explained the unnoticeable fire set at the dump site that caused burning to batteries and waste metals. The Licensee has collected metal Sea Can to secure those burned batteries and subsequent collection of used batteries before they are finally shipping out. The plan for shipping out every 4-5 years frequency.

- Hazardous waste shipping out annually:
  - ✓ The licensee keeps the and budget for shipping out collected hazardous materials through the licenced recipient at a reasonable interval of years when sufficient to shipping out and as direction by the recipient- approximately every 4-5 years. The community is at far remote and not accessible to regular barge, mostly depending on but smaller barge or coast guard ship for materials shipping in/out.

Appendix A:

Water Licence: 3BM-PEL1419

Date of issuance: May 14, 2014

Date of expiry: May 13, 2019

Hamlet of Kugaaruk, NU

ᓄᓇᕗᑦ ᐃᒪᓕᕆᔨᑦ ᑲᑎᒪᔨᖏᑦ
NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN KATIMAYINGI
OFFICE DES EAUX DU NUNAVUT

File No.: **3BM-PEL1419/Renewal**

May 15, 2014

Greg Holitzki, SAO
Hamlet of Kugaaruk
P.O. Box 205,
Kugaruuk, NU X0B 1K0
Email: sao_kug@qiniq.com

Shah Alam, P. Eng
Municipal Planning Engineer, GN, C&GS
Bag 200
Cambridge Bay, NU, X0B 0C0
Email: salam@gov.nu.ca

RE: NWB Renewal Licence No. 3BM-PEL1419

Dear Mr. Holitzki and Mr. Alam:

Please find attached Licence No. **3BM-PEL1419** issued to the Hamlet of Kugaaruk 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* (*Nunavut Land Claims Agreement or NLCA*). 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 may be in contravention of the *Nunavut Land Claims Agreement* and the *Nunavut Waters and Nunavut Surface Rights Tribunal Act*. 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's 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 time of acceptance by the NWB. It is the responsibility of the Licensee to ensure that all application materials have been received and are acknowledged by the Manager of Licensing.

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

Sincerely,

Thomas Kabloona
Nunavut Water Board
Chair

TK/kk/pb

Enclosure: Licence No. **3BM-PEL1419**
Comments – AANDC, DFO and KIA

Cc: Kitikmeot Distribution List

[1] Aboriginal Affairs and Northern Development Canada (AANDC), April 23, 2014; Department of Fisheries and Oceans Canada (DFO) April 4, 2014; and Kitikmeot Inuit Association (KIA), April 16, 2014.

TABLE OF CONTENTS

DECISION

LICENCE NUMBER: 3BM-PEL1419

This is the decision of the Nunavut Water Board (NWB) with respect to a complete application dated February 5, 2013 (with additional information submitted on February 17, 2014) for a renewal of a Water Licence made by:

HAMLET OF KUGAARUK

to allow for the use of water and deposit of waste during municipal activities by the Hamlet of Kugaaruk located within the Kitikmeot Region, Nunavut generally located at the geographical coordinates as follows:

Latitude: 68° 32' 00" N and Longitude: 89° 49' 00" W

DECISION

After having been satisfied that the application was for a location that falls outside of an area with an approved Land Use Plan and exempt from the requirement for screening as described within Section 12.3.2 / Schedule 12-1 by the Nunavut Impact Review Board in accordance with Article 12 of the *Nunavut Land Claim Agreement* (*NLCA*), the NWB decided that the application could proceed through the regulatory process. In accordance with S.55.1 of the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* (*Act*) and Article 13 of the *NLCA*, public notice of the application was given and interested persons were invited to make representations to the NWB.

After reviewing the submission of the Applicant and considering the representations made by interested persons, 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 *Act*, waived the requirement to hold a public hearing and determined that:

Licence No. 3BM-PEL0712 be renewed as Licence No. 3BM-PEL1419 subject to the terms and conditions contained therein. (Motion #: 2014-B1-007)

Signed this 14th day of May 2014 at Gjoa Haven, NU.

Thomas Kabloona
Nunavut Water Board
Chair

TK/kk/pb

I. BACKGROUND

The Hamlet of Kugaaruk (Kugaaruk or the Hamlet) is located at Latitude 68^{o} 32' 00" N and Longitude: 89^{o} 49' 00" W, on the south-eastern shore of Pelly Bay off the Gulf of Boothia on the western side of the Simpson Peninsula, in the Kitikmeot Region of Nunavut, approximately 142 km NE of Gjoa Haven, and 960 km NW of Iqaluit. The annual snowfall in Kugaaruk is approximately 125 cm and the annual rainfall is approximately 11 cm. In January the daily mean temperature is approximately minus 33^{o}C while in July the daily mean temperature is approximately plus 6^{o}C. Freeze up usually occurs during the month of November but may happen as early as September or October, while spring thaw usually happens between late May and June.

The community has a population of approximately 719 (2008), with approximately 5.0 % as its projected growth rate over a 20-year period.

II. PROCEDURAL HISTORY

On **November 1, 1998**, the Nunavut Water Board ("NWB" or "Board") issued water licence NWB3PEL9803 to the Hamlet of Pelly Bay (renamed to Hamlet of Kugaaruk) for the use of 25,000 m^3 *per year* water and waste disposal activities within the Hamlet. On **September 7, 2007**, the licence was renewed as licence 3BM-PEL0712, with the expiry date set at January 31, 2012, allowing the Hamlet to use 35,000 m^3 *per year* of water and dispose of waste at specific facilities within the Hamlet.

On **February 22, 2012**, Aboriginal Affairs and Northern Development Canada (AANDC) Nunavut Regional Office issued a letter of longstanding issues of non-compliance of water licenses in Nunavut Municipalities, including the Hamlet of Kugaaruk. A summary list of non-compliance identified by AANDC Inspection between 2007 and 2011 was attached to this letter.

On **February 5, 2013**, the Hamlet of Kugaaruk submitted a renewal water licence application ("Application") and pertinent documentation, which included the following:

- Cover Letter for renewal dated December 3, 2012 (identifying incorrect file number);
- Cover Letter for 2011 annual report (identifying incorrect file number);
- 2011 annual report revised from previous submission, received March 29, 2012;
- 2012 annual report;
- Financial information, received February 5, 2013;
- Renewal Application form, received February 5, 2013; and
- Translated information.

On **April 24, 2013** the NWB informed the Licensee about deficiencies in the renewal application that needed to be addressed prior to proceeding with processing the application. Documents required in accordance with the licence and required by the AANDC Inspector included the following:

- Part F, Item 1(i) – Submission of a "Water Collection and Distribution Operation and Maintenance (O&M) Manual";
- Part F, Item 2 – Submission of an Addendum to the Spill Contingency Plan;
- Part F, Item 6 – Information on geotechnical/permafrost inspection(s);
- Part G, Item 1 – Submission of Abandonment and Restoration Plan prior to abandoning any facilities or the construction of new facilities to replace existing ones. Information was required on the status of old lagoon;
- Part H, Item 10 – Submission of a "Quality Assurance/Quality Control (QA/QC) Plan for the Hamlet Sewage Lagoon and Solid Waste Disposal Facility Monitoring Program"; and
- Submission of a Compliance Plan requested by the AANDC Inspector.

On **September 18, 2013** and **February 10, 2014**, the NWB advised the Licensee that outstanding information required for the Board to move forward with the renewal application processing had not been provided.

On **February 17, 2014**, the Board received additional information and clarification of on-going/future activities from the Government of Nunavut, Department of Community and Government Services (GN-CGS) on behalf of the Licensee. The cover letter stated that the information submitted to the Board was with respect to the following Items:

- Part F, Item 1(i) - Water Collection and Distribution Operation and maintenance (O&M) Manual;
- Part F, Item 2 – Spill Contingency Planning;
- Part F, Item 6 - Geotechnical Inspection of engineered facility by a geotechnical engineer;
- Part H, Item 10 - Quality Assurance /Quality Control Plan for Sewage and Solid Waste; and
- AANDC multi-year Compliance Summary including non-compliance overview.

On **March 20, 2014**, following a preliminary internal technical review, the NWB concluded that the Application met the requirements of section 48(1) of the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* (NWNSRTA or Act) and forwarded Notice of the Application to regulators, the council of the municipality most affected by the project, and other interested parties. All parties were invited to make representation to the NWB within thirty (30) days, by April 20, 2014, which was then extended to April 23, 2014 as per AANDC's request.

On or before **April 23, 2014**, comments were received from AANDC, Fisheries and Oceans Canada (DFO) and Kitikmeot Inuit Association (KIA). No public concerns were expressed during the notice period. In consideration of the comments received, the NWB determined that a public hearing would not be required and proceeded with the application process.

Based upon the results of the completed detailed assessment, including consideration of any potential accidents, malfunctions, or cumulative environmental effects that the overall project

might have in the area, the Board approved the application for the renewal of Licence No. 3BM-PEL0712 as Licence No. **3BM-PEL1419**.

III. ISSUES

Term of the Licence

In accordance with S. 45 of the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* (NWNSRTA or the Act), the NWB may issue a licence for a term not exceeding twenty-five (25) years. In determining an appropriate term of a water licence, the Board considers a number of factors, including the results of AANDC's annual site inspection and the compliance record of the Applicant.

AANDC's Multi Year Municipal Compliance Summary letter dated February 22, 2012 provided the NWB with longstanding issues of non-compliance of water licenses in Nunavut Municipalities including the Hamlet of Kugaaruk, identified and summarized by AANDC Inspections between 2007 and 2011.

The NWB is fully aware of recurring Non-Compliance issues with respect to the NWNSRTA in the context of the Licence issued to the Hamlet. The NWB acknowledges however, that improvements have been made by the Licensee during the last year in trying to address the Non-Compliance issues and to reach short-term compliance goals.

The Licensee has requested a five (5) year term for the renewal licence, which is not opposed by interveners. In their submission, AANDC - Water Resources Division stated *that the Hamlet of Kugaaruk appears to have made some efforts over the term of their licence but more effort is required to ensure the protection of water resources in the Pelly Bay area. The Hamlet needs to be more diligent about complying with the terms and conditions in their water licence to ensure that the water in and around Kugaaruk is protected and that any potential impacts are effectively mitigated. Some of the main concerns include non-compliance with their water licence including failure to submit a Plan for Compliance (requested in 2010 by an Inspector).*

The NWB acknowledges, that the application included a summary of the Plan for Compliance outlining short-term and long-term goals to bring the Hamlet into compliance with the obligations of its water licence. Further, the Licensee has committed to forwarding the updated Plan for Compliance directly to an Inspector. It should be noted that some of the commitments and goals have already been reached in the short-term plan, including the submission of annual reports and the implementation of monitoring activities. However, the long-term goals, which are expected to be met under this 5-year renewal licence, are designed to address ongoing issues that the Hamlet must resolve in order to meet its obligations (i.e. continued monitoring, annual reporting, submission of updated plans).

The Board recognizes improvements made by the Licensee during the last year in trying to address the Non-Compliance issues, and the Board believes that a licence term of five (5) years will provide a realistic opportunity for the Licensee to prove to the Board that it can meet the long-term requirements as well as establish a consistent compliance record with respect to the

requirement under the terms and conditions of its licence. The five (5) year renewal licence will also ensure that sufficient time is given to permit the Licensee to develop, submit, and implement the plans required under its licence to the satisfaction of the NWB.

Annual Reports

As part of its obligations under this Licence, the Licensee is required to generate and submit to the Board for review, on an annual basis, a report that pertains to its undertakings and activities. The report is for the purpose of ensuring that the NWB has an accurate update of municipal activities during each calendar year. This information will be maintained on the public registry and available to any interested parties upon request.

Water Use

The Hamlet currently receives its freshwater supply from the Kugajuk River with the intake located approximately 1 km upriver from the community. The intake consists of two one hundred and fifty-two millimeter (152 mm) submerged lines that extend from the shore approximately fifteen meters (15 m) along the bottom of the river. The two intake lines travel up from the shoreline about ten meters (10 m) where they enter the pumping facility. The pumping facility contains two 120 liters/min pumps and a chlorination station. Outgoing water then exits the building where it is pumped through a nozzle into water hauling trucks.

Under the expired licence, 35,000 m^3 of water per year (96 m^3 per day) was allowed, and although the Licensee has initially requested 80 m^3 of water per day for all purposes, on April 23, 2014, the GN-CGS requested via email 45,000 m^3 of water per year or 170 m^3 per day (7 days quantity to 5 days maximum average). The Board has therefore set the maximum water usage for all purposes specified in this Licence at 45,000 m^3 per year or up to 170 m^3 per day.

GN-CGS informed the Board that all operations for water supply remain unchanged. The only change will be the addition of a new intake pump-house, treatment plant and power line to Water System. The construction and installation of the new Water System started in the fall of 2013 and is anticipated to be complete by August 2014.

Part F, Item 1(i) of expired 3BM-PEL0712 licence required that the Licensee submit to the Board, for approval within ninety (90) days of issuance of the Licence, a "Water Collection and Distribution Operation and Maintenance (O&M) Manual". In the Clarification and Addendum Document (February 17, 2014), GN-CGS requested an exemption to update or revise the old O&M Manual for water system and distribution, since the existing manual will no longer be useful for the new water treatment plant that has been proposed to be commissioned in August 2014. It was also stated that an application for the inclusion of the Water Treatment Plant and new pump-house will be submitted once completed by August 2014, and that a new O&M Manual for the Water System, pump-house, intake line, treatment plant and water distribution will be submitted to the Board once the new treatment plant is completed and commissioned for operation. The Board has included a requirement to submit for Board approval within six (6) months of issuance of the Licence, a Water Collection and Distribution O&M Manual under Part F, Item1 of the Licence.

Part G, Item 1 of the renewal Licence requires that the Licensee also submit for Board approval within six (6) months of issuance of the Licence, an Abandonment and Restoration (A&R) Plan for the existing pump-house, which will be refurbished for storage of materials and equipment.

Deposit of Waste

Sewage

The Hamlet of Kugaaruk utilizes a Sewage Disposal/Treatment Facility located approximately 2 km from the Hamlet. Sewage is collected by vacuum truck from customer holding tanks and discharged to the sewage lagoon located to the east of the community, north of the Access Road and adjacent to the solid waste disposal facility. Construction of a new sewage lagoon was completed in 2008 and was commissioned in September 2009. The new lagoon was constructed with the improvement of the existing lagoon within the same location and with two cells system. The new lagoon was designed to treat approximately 46,600 m^3 of sewage to meet the Hamlet needs until 2028.

Collected sewage is discharged into the lagoon via the effluent discharge flume. Sewage effluent from the new lagoon system is discharged as before, annually (from July to October, weather dependent) overland through a Wetland Treatment Area to the Final Discharge Point approximately one hundred and sixty meters (160 m) to the ocean shoreline. The wetland is contained by rock outcroppings on both sides. The change in elevation is roughly seventeen meters (17 m) and consists of multiple channels with three or four ponding areas.

The Plan entitled "Hamlet of Kugaaruk, NU Sewage Treatment Facility Operation and Maintenance Manual" dated October 6, 2009, was approved by the Board on February 22, 2010 as required under Part F, Item 1 of previous licence. The Board acknowledges the submission by the Licensee of the document entitled: "Hamlet of Kugaaruk, NU Sewage Treatment Facility Operation and Maintenance Manual" (STF O&M Manual) updated October 27, 2010 that shall be implemented by the Licensee.

AANDC stated that monitoring of sewage effluent was not done consistently over the past seven years and that an assessment of the wetland treatment area was due 2 (two) years ago and is now considered outstanding. AANDC recommends that the Hamlet become more diligent with their monitoring requirements under Part H of 3BM-PEL0712, that they provide an assessment of the wetland treatment area (sewage lagoon and wetland) and identify any necessary improvements once sufficient information is obtained. AANDC further recommends that the water licence require the Licensee to submit annual monitoring reports for sampling conducted during the months of sewage discharge from the lagoon into the wetland area.

The Board was made aware by GN-CGS that a Geotechnical Inspection is planned in August 2014 regarding the lagoon dam safety. The Licensee is advised that under Part F, Item 5, the Engineer's report shall be submitted to the Board within sixty (60) days of the Inspection.

Solid Waste

The Hamlet's Solid Waste Facility is located southeast of the sewage treatment lagoon, approximately 2.3 km east of the community, north of the Access Road. Waste is collected by

the Hamlet and transported to the waste disposal facility. The bulky metal/hazardous waste storage area is located approximately half a kilometer (500 m) southeast of the sewage lagoon and landfill sites.

The Plan entitled "Hamlet of Kugaaruk, NU Solid Waste Facility Operation and Maintenance Manual" dated October 6, 2009, was approved by the Board on February 22, 2010 as required by the Part F, Item 1 of previous licence. The Board acknowledges the submission by the Licensee of the "Hamlet of Kugaaruk, NU Solid Waste Facility Operation and Maintenance Manual" (SWF O&M Manual) updated October 27, 2010, stating that *previous operational practices at the solid waste facility have led to disorganization of the site and improper disposal of waste. No provisions had been made to collect, test, or treat leachate runoff from the site. Enhancements have been made to the site to improve disposal methods and encourage recycling within the community. Modifications to the solid waste and metal dump sites include installation of a chain linked fence around the perimeter of the solid waste site, sorting of wastes into various categories (general household waste, waste batteries, wood products, animal carcasses, hazardous wastes, metals, tires, vehicles, white goods and waste barrels), crating and removal of hazardous wastes from the Hamlet, incineration of waste oil, and construction of leachate drainage structures.*

The solid waste facility has been divided into sections for disposal of different types of waste. The sections located in the solid waste site are:

- General Household Waste;
- Batteries;
- Wood Products;
- Animal Carcasses; and
- Hazardous Materials

AANDC Inspectors have expressed concern over water management and site runoff within the Hamlet's solid waste facility. Specific concerns were noted by the AANDC Inspector during several inspections, including the last July 14, 2011 inspection stating that *water running through and off the facility is not contained or managed in any way*.

The Board requires that the Hamlet should give serious consideration to AANDC Inspector's recommendation, and in the interim take whatever steps are practicable to prevent any impact to the environment.

To ensure that site runoff is properly managed so there is no impact to the natural environment in terms of contamination, the SWF O&M Manual included additional optional sampling points for the solid waste and metal dump sites (2 monitoring wells, respectively) in addition to the ones existing under the previous licence. The Board has included those additional Monitoring Program Stations within the sampling points.

Part F, Item 2 of expired licence required an Environmental Emergency Contingency Plan for Water, Sewage and Solid Waste to be submitted for the Board approval. The Licensee subsequently submitted the Plan entitled "Hamlet of Kugaaruk, NU, Spill Contingency Plan, Sewage and Solid Waste Sites" dated October 6, 2009 that was approved by the Board on

January 22, 2010. However, an addendum requested by the Board wasn't submitted at that time to address minor issues raised by interveners. As such, the Licensee shall be required under Part F, Item 2 of this renewal Licence to submit an updated Environmental Emergency Contingency Plan to incorporate information regarding the new water treatment plant. This requirement has been made by AANDC as well.

Monitoring Program

Environmental Monitoring Plan

Part H of the Licence details the monitoring requirements. Part H, Items 1 and 2 of the expired licence required the Licensee to sample, among others, the ocean water for multiple parameters 5 m from the point where sewage effluent enters the ocean (PEL-5) three times per year (beginning, middle, and near the end of discharge). In their submission, AANDC stated that this monitoring requirement doesn't appear to provide any scientific value and it seems unnecessarily onerous to the Licensee to sample 5 m into the marine environment when an effluent sample is collected at the final discharge point of the wetland treatment area (where the effluent leaves the wetland and discharges into the marine environment). The Board concurs with this recommendation and has removed the PEL-5 Monitoring location from the list of Monitoring Program Stations.

The Board also acknowledges that the STF and SWF O&M Manuals recommended additional optional monitoring wells in the vicinity of the solid waste disposal facility (PEL-10-1 and PEL-10-2) and bulky metal storage area (PEL-9-1 and PEL-9-2). These additional/optional monitoring stations have been included within the Licence Monitoring Program under Part H, Items 1 and 6.

AANDC stated in their submission that acute lethality testing was done in 2009 and results concluded that there was 100% mortality rate for *Oncorhynchus mykiss* and 0% mortality rate for *Daphnia magna.* AANDC recommended that *the Licensee continue to monitor the effluent discharged from PEL-4 and that any acute toxicity failure trigger an investigation with a requirement to report back to the NWB and to develop a plan for adapting the treatment and monitoring system*. The Licensee is advised that the requirement of acute lethality testing of effluent discharged from the wetland at Monitoring Station PEL-4 remains within the renewed Licence under Part D, Item 9. It should also be noted that while minimum sampling requirements have been imposed, additional sampling may be required upon request by an Inspector.

Quality Assurance / Quality Control Plan (QA/QC Plan)

The requirement to submit a Quality Assurance / Quality Control Plan (QA/QC Plan) is to provide the necessary checks and controls under the Licence for sampling, monitoring and reporting for the Hamlet of Kugaaruk. The purpose of the QA/QC Plan is to ensure that samples taken in the field as part of the Monitoring Program will be of a high quality, so as to accurately represent the physical and chemical nature of the samples being taken. These procedures are generally developed from literature and guidelines, and are intended to promote good practices in environmental management.

The QA/QC Plan included within the STF O&M Manual is very general and does not include information about the laboratory accreditation pursuant to ISO/IEC Standard 17025.

The NWB has included a requirement to submit under Part H, Item 11 of the Licence, a "*Quality Assurance/Quality Control (QA/QC) Plan for the Hamlet Sewage Lagoon and Solid Waste Disposal Facility Monitoring Program*" prepared in accordance with the INAC *"Quality Assurance (QA) and Quality Control (QC) Guidelines for use by Class "B" Licensees in Collecting Representative Water Samples in the Field, 1996"*.

The QA/QC Plan shall be submitted to the Board with a current approval letter from an accredited lab and shall meet the requirements set out in Part H, Items 9 and 10.

NUNAVUT WATER BOARD
WATER LICENCE RENEWAL

Licence No. **3BM-PEL1419**

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 KUGAARUK

(Licensee)

P.O BOX 205 KUGAARUK, NUNAVUT, X0B 1K0

(Mailing Address)

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

Licence Number/Type:	3BM-PEL1419 TYPE "B"
Water Management Area:	GULF OF BOOTHIA WATERSHED (34)
Location:	KUGAARUK KITIKMEOT REGION, NUNAVUT
Classification:	MUNICIPAL UNDERTAKING
Purpose:	DIRECT WATER USE AND DEPOSIT OF WASTE
Quantity of Water use not to Exceed:	45,000 CUBIC METRES PER ANNUM OR 170 CUBIC METRES PER DAY
Date of Licence Issuance:	MAY 14, 2014
Expiry of Licence:	MAY 13, 2019

This Licence renewal issued and recorded at Gjoa Haven, Nunavut includes and is subject to the annexed conditions.

Thomas Kabloona,
Nunavut Water Board, Chair

PART A: SCOPE, DEFINITIONS AND ENFORCEMENT

1. Scope

This Licence allows for the use of water and the deposit of waste for a Municipal undertaking classified as per Schedule 1 of the *Regulations* at the Hamlet of Kugaaruk in the Kitikmeot Region, Nunavut (Latitude: 68° 32' 00" N and Longitude: 89° 49' 00" W).

a. 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

b. 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

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

"**Addendum**" means the supplemental text that is added to a full plan or report usually included at the end of the document and is not intended to require a full resubmission of the revised report;

"**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;

"**Appurtenant Undertaking**" means an undertaking in relation to which a use of water 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* and the *Nunavut Waters and Nunavut Surface Rights Tribunal Act;*

"**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 *Consolidation of Engineers and Geoscientists Act S. Nu 2008, c.2*

and the *Engineering and Geoscience Professions Act S.N.W.T. 2006, c.16 Amended by S.N.W.T. 2009, c.12*;

"**Final Discharge Point**" means an identifiable discharge point of a Waste Disposal Facility beyond which the Licensee no longer exercises care and control over the quality of the Effluent;

"**Freeboard**" means the vertical distance between water line and crest on 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 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 an undiluted quantity of material collected at a particular time and place that may be representative of the total substance being sampled at the time and place it was collected;

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

"**High Water Mark**" means the usual or average level to which a body of water rises at its highest point and remains for sufficient time so as to change the characteristics of the land (ref. Department of Fisheries and Oceans Canada, Operational Statement: Mineral Exploration Activities);

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

"**Licensee**" means the holder of this Licence;

"**Modification**" means an alteration to a physical work that introduces a new structure or eliminates an existing structure and does not alter the purpose or function of the work, but does not include an expansion;

"**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;

"**Regulations**" means the *Nunavut Waters Regulations SOR/2013-69 18th April, 2013*;

"**Sewage**" means all toilet wastes and greywater;

"**Sewage Disposal Facilities**" comprises the area and engineered lagoon, decant structures and wetland area designed to contain and treat sewage as described in the Application for Water Licence renewal and associated documents filed by the Applicant on February 5, 2013 and February 17, 2014, and illustrated in Drawings # 101, 102 and 103; Pr. # 05-4755-3000;

"**Solid Waste Disposal Facilities**" comprises the area and associated structures designed to contain solid waste as described in the Application for Water Licence renewal and associated documents filed by the Applicant on February 13, 2013 and February 17, 2014, and illustrated in Drawings # 200 and 201; Pr. # 05-4755-3000;

"**Spill Contingency Plan**" means a Plan developed to deal with unforeseen petroleum and hazardous materials events that may occur during the operations conducted under the Licence;

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

"**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;

"**Waste Disposal Facilities**" means all facilities designated for the disposal of waste, and includes the Sewage Disposal Facilities and Solid Waste Disposal Facilities (including Hazardous Waste management area), as described in the Application for Water Licence renewal filed by the Applicant on October 9, 2003 and August 18, 2013, and illustrated in Drawing # 99-6790;

"**Water**" **or** "**Waters**" means waters as defined in section 4 of the Act; and

"**Water Supply Facilities**" comprises the area and associated intake infrastructure at Kusugak River Water Supply, as described in the Application for Water Licence renewal filed by the Applicant on February 5, 2013 and February 17, 2014, and illustrated in Drawing # 202; Pr. # 05-4755-3000.

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*; and

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.

PART B: GENERAL CONDITIONS

1. The Licensee shall file an Annual Report on the Appurtenant Undertaking with the Board no later than March 31st of the year following the calendar year being reported, containing the following information:

   a. tabular summaries of all data generated under the "Monitoring Program";
   b. summary of modifications to the "Monitoring Program" in accordance with Part H, Item 15;
   c. the daily, monthly and annual quantities in cubic metres of freshwater obtained from all sources;
   d. the daily, monthly and annual quantities in cubic metres of each and all waste discharged; including the hazardous and non-hazardous waste accepted at the Solid Waste Facilities;
   e. 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;
   f. a list of unauthorized discharges and summary of follow-up action taken;
   g. a summary of any abandonment and restoration work completed during the year and an outline of any work anticipated for the next year;
   h. Any updates or revisions for manuals and plans *(i.e., Operations and Maintenance, Abandonment and Restoration, QA/QC*) as required by changes in operation and/or technology;
   i. a summary of any studies, reports and plans requested by the Board that relate to waste disposal, water use or reclamation, and a brief description of any future studies planned;
   j. 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 notify the NWB of any changes in operating plans or conditions associated with this project at least thirty (30) days prior to any such change.

3. 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.

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

5. The Licensee shall install flow meters or other such devices, or implement suitable methods required for the measuring of water volumes as required under Part H, Item 1.

6. The Licensee shall, post the necessary signs, where possible, to identify the stations of the "Monitoring Program". All signage postings shall be in the Official Languages of Nunavut, and shall be located and maintained to the satisfaction of an Inspector.

7. The Licensee shall immediately report to the 24-Hour Spill Report Line at (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.

8. 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/or 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.

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

10. The Licensee shall review the Plans referred to in this Licence, as required by changes in operation and/or technology, and modify the Plan accordingly. Revisions to the Plans shall be submitted in the form of an Addendum to be included with the Annual Report.

11. 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 conditions 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.

12. The Licensee shall ensure a copy of this Licence is maintained at the site of operations 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@nwb-oen.ca

(b) Inspector Contact:

Manager of Field Operations, AANDC
Nunavut District, Nunavut Region
P.O. Box 100
Iqaluit, NU X0A 0H0
Telephone: (867) 975-4295
Fax: (867) 979-6445

13. 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 Inuktitut.

14. The Licensee shall ensure that any document(s) or correspondence submitted by the Licensee to the NWB is received and acknowledged by the Manager of Licensing.

15. This Licence is assignable as provided for in Section 44 of the *Act*.

PART C: CONDITIONS APPLYING TO WATER USE

1. The Licensee shall obtain all freshwater processed by the Water Supply Facilities and/or used for municipal purposes from Kusugak River or as otherwise approved by the Board in writing.

2. The annual quantity of water use for all purposes under this Licence shall not exceed forty-five thousand (45,000) cubic metres per year or one hundred seventy (170) cubic metres per day.

3. Where the use of water is of a sufficient volume that the source Water body may be drawn down, the Licensee shall submit to the Board for approval in writing the following: the volume required, a hydrological overview of the water body, details of impacts, and proposed mitigation measures.

4. The Licensee shall maintain the Water Supply Facilities to the satisfaction of the Inspector.

5. The Licensee shall equip all water intake hoses with a screen of 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.

6. The Licensee shall not remove any material from below the ordinary High Water Mark of any water body unless approved by the Board in writing.

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

8. Sediment and erosion control measures shall be implemented prior to and maintained as required during Hamlet operations, 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 or as otherwise approved by the Board.

2. The Licensee shall provide notice to an Inspector at least ten (10) days prior to initiating any decant of the Sewage Disposal Facilities

3. All Effluent discharged from the Sewage Disposal Facilities at Monitoring Program Station PEL-3 shall meet the following effluent quality standards:

Parameter	Maximum Concentration of any Grab
Faecal Coliforms	1×10^4 CFU/dl
BOD_5	120 mg/L
Total Suspended Solids	180mg/L
Oil and grease	No visible sheen
PH	Between 6 and 9

4. A Freeboard limit of at least 1.0 metre, or as recommended by a qualified Geotechnical Engineer and as approved by the Board in writing, shall be maintained at all dams, dykes, or structures intended to contain, withhold, divert or retain water or wastes.

5. The Sewage Disposal Facility shall be maintained and operated, to the satisfaction of an Inspector in such a manner as to prevent structural failure.

6. All effluent discharged from the Wetland Treatment Area at its Final Discharge Point, Monitoring Program Station PEL-4 shall meet the following effluent quality standards:

Parameter	Maximum Concentration of any Grab
Faecal Coliforms	1×10^4 CFU/dl
BOD_5	45 mg/L
Total Suspended Solids	45 mg/L
Oil and grease	No visible sheen
PH	Between 6 and 9

7. All Effluent discharged from the Wetland Treatment Area Final Discharge Point (PEL-4), shall be demonstrated to be Not Acutely Toxic under the following tests to be conducted once annually approximately mid-way through discharge:

    i. Acute lethality to Rainbow Trout, *Oncorhynchus mykiss* (as per Environment Canada's Environmental Protection Series Biological Test Method EPS/1/RM/13); and

ii. Acute lethality to the crustacean, *Daphnia magna* (as per Environment Canada's Environmental Protection Series Biological Test Method EPS/1/RM/14).

8. The Licensee shall dispose of and permanently contain all Solid Wastes at the Solid Waste Disposal Facility or as otherwise approved by the Board in writing.

9. The Licensee shall segregate and store all hazardous materials and/or hazardous waste within the Solid Waste Disposal Facility in a manner as to prevent the deposit of deleterious substances into any water until such a time as proper disposal arrangements are made.

10. The Licensee shall implement measures to prevent hazardous materials and/or leachate from the Solid Waste Disposal Facility from entering water.

PART E: CONDITIONS APPLYING TO MODIFICATION AND CONSTRUCTION

1. The Licensee shall submit to the Board for approval, for construction drawings stamped and signed by a qualified Engineer registered in Nunavut, 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 consent from the Board, carry out Modifications to the Water Supply Facilities 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. such 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. The Modifications for which all of the conditions referred to in Part E, Item 2(a) through (d), have not been met, may only be carried out upon written approval from the Board.

4. The Licensee shall, within ninety (90) days of completion of Modification or Construction of facilities and/or infrastructure associated with the project, submit to the Board a Construction Summary Report along with stamped as-built plans and drawings, providing explanation to reflect any deviations from for construction drawings, taking into account construction and field decisions and how they may affect the performance of engineered facilities.

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 impacts to water resulting from the release of sediment and to minimize erosion.

7. With respect to earthworks, the deposition of debris or sediment into or onto any water body is prohibited. These materials shall be disposed of a distance of at least thirty-one (31) metres from the ordinary High Water Mark in such a fashion that they do not enter the water.

8. The Licensee shall use material that is free of contaminants for construction, operation, and maintenance activities and that is obtained from approved sources and has been demonstrated not to be potentially acid generating and metal leaching.

PART F: CONDITIONS APPLYING TO OPERATION AND MAINTENANCE

1. The Licensee shall submit to the Board for approval, within six (6) months of issuance of the Licence, a "*Water Collection and Distribution Operation and Maintenance (O&M) Manual*", 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"*. These Manuals shall provide details regarding, at a minimum, the water system, pump-house, intake line, treatment plant.

2. The Licensee shall submit to the Board for review within ninety (90) days of issuance of the Licence, an updated Environmental Emergency Contingency Plan for Water, Sewage and Solid Waste Operations. The updated Plan is to take into consideration at a minimum, the comments received during the review of the previous Plan approved by the Board on January 22, 2010, and information regarding the new water treatment plant.

3. The Licensee shall implement the Plan entitled: "Hamlet of Kugaaruk, NU Sewage Treatment Facility Operation and Maintenance Manual" (STF O&M Manual) updated October 27, 2010 that was originally approved by the Board.

4. The Licensee shall implement the Plan entitled: "Hamlet of Kugaaruk, NU Solid Waste Facility Operation and Maintenance Manual" (SWF O&M Manual) updated October 27, 2010 that was originally approved by the Board.

5. An inspection of all engineered facilities related to the management of water and waste shall be carried by an Engineer (Civil, Municipal or Geotechnical) before commissioning any facility. The Engineer's report shall be submitted to the Board within sixty (60) days of the inspection, including a Cover Letter from the Licensee outlining an

implementation plan addressing each of the Engineer's recommendations.

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

7. 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 appropriately approved Spill Contingency Plan for the Hamlet of Kugaaruk. Take whatever steps are immediately practicable to protect human life, health and the environment;
    b. report the incident immediately via the 24-Hour Spill Reporting Line at (867) 920-8130 and to the AANDC Manager of Field Operations 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 any preventative measures to be implemented.

PART G: CONDITIONS APPLYING TO ABANDONMENT AND RESTORATION

1. The Licensee shall submit to the Board for approval within six (6) months of issuance of the Licence, an Abandonment and Restoration Plan for the existing pump-house to be replaced with a new pump-house.

2. 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 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. abandoned water and waste facilities;
    d. petroleum and chemical storage areas;
    e. any site affected by waste spills;
    f. leachate prevention;
    g. an implementation schedule;
    h. maps delineating all disturbed areas, and site facilities;
    i. consideration of altered drainage patterns;
    j. type and source of cover materials;
    k. future area use;
    l. hazardous wastes; and
    m. a proposal identifying measures by which restoration costs will be financed by the

Licensee upon abandonment.

3. The Licensee shall complete all restoration work within the time schedule specified in the Plan, or as subsequently revised and approved by the Board.

4. The Licensee shall carry out progressive reclamation of any components of the project no longer required for the Licensee's operations.

5. In order to promote growth of vegetation and the needed microclimate for seed deposition, all disturbed surfaces shall be prepared by ripping, grading, or scarifying the surface to conform to the natural topography.

6. Areas that have been contaminated by hydrocarbons shall be reclaimed to meet objectives as outlined in the Government of Nunavut's Environmental Guideline for Site Remediation, January 2002. The use of reclaimed soils for the purpose of back fill or general site grading may be carried out only upon consultation and approval by the Government of Nunavut, Department of Environment and an Inspector.

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	Frequency	Status
PEL-1	Raw Water Supply intake at the Kugajuk River	Daily	Active (Volume)
PEL-2	Raw Sewage from pump-out truck	Daily	Active (Volume)
PEL-3-1	Effluent Discharge from Lagoon to Settlement Pond	Monthly (June/July to August/September)	Active (Quality)
PEL-3-2	Effluent Discharge from Settlement Pond to Wetland	Monthly (June/July to August/September)	Active (Quality)
PEL-4	Effluent Final Discharge Point from Wetland to Ocean	Monthly (June/July to August/September)	Active (Quality)
PEL-6	Run-off from the Solid Waste Disposal Facility	During periods of run-off or seepage	Active (Quality)
PEL-7	Monitoring well located up gradient of the Solid Waste Disposal Facility (Metal Dump)	Once during ground thaw	Active (Quality)

PEL-8-1	Monitoring well located up gradient of the Solid Waste Disposal Facilities	Once during ground thaw	Active (Quality)
PEL-8-2	Monitoring well located down gradient of the Solid Waste Disposal Facilities	Once during ground thaw	Active (Quality)
PEL-9-1	Monitoring well located down gradient of the Solid Waste Disposal Facility (Metal Dump)	Once during ground thaw	Active (Quality)
PEL-9-2	Monitoring well located down gradient of the Solid Waste Disposal Facility (Metal Dump)	Once during ground thaw	Active (Quality)
PEL-10-1	Monitoring well (optional) located down gradient of the Solid Waste Disposal Facilities	Once during ground thaw	Active (Quality)
PEL-10-2	Monitoring well (optional) located down gradient of the Solid Waste Disposal Facilities	Once during ground thaw	Active (Quality)

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

3. The Licensee shall measure and record in cubic metres the daily, monthly and annual quantities of raw sewage offloaded from trucks at Monitoring Program Station PEL-2 for all purposes.

4. The Licensee shall sample at Monitoring Program Stations PEL-3-1, PEL-3-2 and PEL-4 once at the beginning, middle and near the end of discharge. Samples shall be analyzed for the following parameters:

BOD	Faecal Coliforms
pH	Conductivity
Total Suspended Solids	Oil and Grease (visual)
Nitrate-Nitrite	Ammonia Nitrogen
Chloride	Sulphate
Sodium	Potassium
Magnesium	Calcium
Total Hardness	Total Alkalinity

Total Phenols	Total Manganese
Total Arsenic	Total Aluminum
Total Cadmium	Total Cobalt
Total Copper	Total Chromium
Total Iron	Total Lead
Total Mercury	Total Nickel
Total Zinc	Total Organic Carbon

5. The Licensee shall sample at Monitoring Program Station PEL-6 annually during periods of runoff or seepage. Samples shall be analyzed for the following parameters:

BOD	Faecal Coliforms
pH	Conductivity
Total Suspended Solids	Oil and Grease (visual)
Nitrate-Nitrite	Ammonia Nitrogen
Total Phenols	Total Alkalinity
Total Hardness	Calcium
Magnesium	Potassium
Sodium	Sulphate
Total Arsenic	Total Cadmium
Total Copper	Total Chromium
Total Iron	Total Lead
Total Mercury	Total Nickel

TPH (Total Petroleum Hydrocarbons)
PAH (Polycyclic Aromatic Hydrocarbons)
BTEX (Benzene, Toluene, Ethylbenzene, Xylene)

6. The Licensee shall sample at Monitoring Program Stations PEL-7, PEL-8-1, PEL-8-2, PEL-9-1, PEL-9-2, PEL-10-1 and PEL-10-2 as determined by SWF O&M Manual, giving due consideration to adequate ground thaw and obtaining a representative groundwater sample; Samples shall be analyzed for the following parameters:

BOD	Faecal Coliforms
pH	Conductivity
Total Suspended Solids	Oil and Grease (visual)
Nitrate-Nitrite	Ammonia Nitrogen
Total Phenols	Total Alkalinity
Total Hardness	Calcium
Magnesium	Potassium
Sodium	Sulphate
Total Arsenic	Total Cadmium
Total Copper	Total Chromium
Total Iron	Total Lead
Total Mercury	Total Nickel

TPH (Total Petroleum Hydrocarbons)
PAH (Polycyclic Aromatic Hydrocarbons)
BTEX (Benzene, Toluene, Ethylbenzene, Xylene)

7. The Licensee shall report all results of acute toxicity testing as required under Part D, Item 7 within the Annual Report as per Part B, Item 1.

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

9. 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.

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

11. The Licensee shall submit to the Board for information, within ninety (90) days of issuance of the Licence, a Quality Assurance/Quality Control Plan that conforms to the guidance document *Quality Assurance (QA) and Quality Control (QC) Guidelines For Use by Class "B" Licensees in Collecting Representative Water Samples in the Field and for Submission of a QAQC Plan* INAC (1996). The Plan shall be acceptable to an accredited laboratory and include a covering letter from the accredited laboratory confirming acceptance of the Plan for analyses to be performed under the Licence.

12. The Licensee shall measure and record the annual quantities of sewage solids removed from the Sewage Disposal Facility.

13. The Licensee shall include all of the data and information required by the Monitoring Program in the Licensee's Annual Report, as required per Part B, Item 1 or as otherwise requested by an Inspector.

14. Modifications to the Monitoring Program including the Monitoring Program Stations and parameters may be made only upon written approval of the Board.

Appendix B:

1. **Monitoring Stations re-fixed**
2. **AANDC Inspection Report**

Water, Sewage and Solid Waste facilities

Hamlet of Kugaaruk, NU

Proposed changes to 3BM-PEL1419 Monitoring Program

On August 20 and 21 2014 I conducted an inspection of the new water licence 3BM-PEL1419. As this licence includes unusually onerous monitoring requirements as compared to other similar communities, I undertook to review each station and evaluate its usefulness in monitoring the "impacts to the freshwater aquatic environment of an appurtenant undertaking" as per the object of the monitoring program.

The current monitoring program (Part H Item 1 of the licence) includes the following stations, derived from the stations suggested by Dillon Consulting in the 2010 O&M Manuals:

Monitoring Program Station Number	Description	Frequency	Status
PEL-1	Raw Water Supply intake at the Kugajuk River	Daily	Active (Volume)
PEL-2	Raw Sewage from pump-out truck	Daily	Active (Volume)
PEL-3-1	Effluent Discharge from Lagoon to Settlement Pond	Monthly (June/July to August/September)	Active (Quality)
PEL-3-2	Effluent Discharge from Settlement Pond to Wetland	Monthly (June/July to August/September)	Active (Quality)
PEL-4	Effluent Final Discharge Point from Wetland to Ocean	Monthly (June/July to August/September)	Active (Quality)
PEL-6	Run-off from the Solid Waste Disposal Facility	During periods of run-off or seepage	Active (Quality)
PEL-7	Monitoring well located up gradient of the Solid Waste Disposal Facility (Metal Dump)	Once during ground thaw	Active (Quality)
PEL-8-1	Monitoring well located up gradient of the Solid Waste Disposal Facilities	Once during ground thaw	Active (Quality)
PEL-8-2	Monitoring well located down gradient of the Solid Waste Disposal Facilities	Once during ground thaw	Active (Quality)
PEL-9-1	Monitoring well located down gradient of the Solid Waste Disposal Facility (Metal Dump)	Once during ground thaw	Active (Quality)
PEL-9-2	Monitoring well located down gradient of the Solid Waste Disposal Facility (Metal Dump)	Once during ground thaw	Active (Quality)
PEL-10-1	Monitoring well (optional) located down gradient of the Solid Waste Disposal Facilities	Once during ground thaw	Active (Quality)

PEL-10-2	Monitoring well (optional) located down gradient of the Solid Waste Disposal Facilities	Once during ground thaw	Active (Quality)

The monitoring wells were included in the O&M manuals based on comments from GN-DOE during the 2007 renewal process. The wells were never installed, and GN-DOE did not comment on the 2013 renewal. While the recommendations of the consultant would provide a rigorous monitoring program, I do not find it to be reasonable or realistic. As in all of the communities, even the most basic monitoring program can be challenging due to lack of human resources and logistics. Kugaaruk is a community with few flights each week, and the flights are late in the day. This makes it difficult to meet the hold times on the samples. Other communities in Nunavut have not been required to monitor up-stream/up-hill of the waste facilities. This presents a considerable commitment of time and money that could be better invested in improving the facilities.

My findings at each station are as follows, and recommendations are given in **bold**:

PEL-1: No sign is currently in place as the Water Treatment Plant is undergoing modifications. The sign is to be replaced when the construction is complete. No change to the station is recommended.

PEL-2: The sign is in place at the pump-out location at the lagoon. No issues identified, no change is recommended.

Part D Item 1 reads: "All Effluent discharged from the Sewage Disposal Facilities at Monitoring Program Station *PEL-3* shall meet the following effluent quality standards...". There is no PEL-3 and the licence does not specify whether the criteria apply at PEL-3-1 or PEL-3-2. PEL-3-1 decants from the lagoon into the sediment pond and not to the environment, however there is currently no discharge control on the sediment pond at PEL-3-2. **If PEL-3-1 is to be the last point of active control, I recommend the discharge criteria specified in Part D Item 1 be met at this stage of treatment.**

PEL-3-1: This station was incorrectly placed; it should be located on the NW berm of the lagoon where the effluent discharge to the settlement pond occurs, however, 3-1 and 3-2 are currently both located on the berm of the settlement pond. **PEL-3-1 should be moved to 68°31'16.2" N and 89°50'02.2" W where the pump is stationed. Sampling is only required prior to each decant occurrence**.

PEL-3-2: This station is located on the settlement pond berm. No issues identified; **sampling is only required prior to each decant occurrence**. If criteria are not being met at PEL-4, longer residence time in the settlement pond could be imposed.

PEL-4: Sign is present and at the coordinates indicated below. No issues identified, no change is recommended.

PEL-5: Sign is present near PEL-4, however, the requirement to monitor has been removed as from the licence as recommended.

PEL-6: This is the runoff from the SWF. The sign is in place. As noted in the past inspection reports, there is active flow through the SWF. This creek does not necessarily have a long residence time within the SWF; however, it is transporting pollutants, unimpeded, from the SWF into the ocean[1]. It is easy to sample, and the flow appears to run throughout the summer season. No issues identified, no change is recommended.

[1] Opinion based on preliminary visual observation at the time of the inspection.

PEL-7: No monitoring well has been established at this site and the sign is broken. Sampling is being done in the creek which flows through the Metals Dump. I fail to see the benefit of this information as the water is non-contact water runoff from uphill of the Metals Dump, as communities are not otherwise required to collect baseline data on watershed water quality. **Recommend removal of this station.**

PEL-8-1: No monitoring well has been established at this site; however, the sign is in place. The station is in a wet meadow, however, not at a location where water ponds. As this station is located up-hill of the SWF, I fail to see the benefit of installing a monitoring well here, as communities are not otherwise required to collect baseline data on watershed water quality. **Recommend removal of this station.**

PEL-8-2: No monitoring well has been established at this site; however, the sign is in place. The station is in rocky outcrop uphill of the facility. I fail to see the benefit of installing a monitoring well here, as communities are not otherwise required to collect baseline data on watershed water quality. **Recommend removal of this station.**

PEL-9-1: No monitoring well has been established at this site; however, the sign is in place. This station is located across a hard-packed road and in a rocky, well-drained area. I do not believe there would be a significant amount of effluent coming from the metals dump to this location[2] to make the installation of a monitoring well worthwhile. **I recommend installing a monitoring well across the road in the wet area beneath the crushed barrel storage (coordinates below) and sampling once annually in July/August.**

PEL-9-2: No monitoring well has been established at this site and the sign is broken. Sampling is being done in the creek which flows through the Metals Dump. **I recommend this station be modified to monitor run-off from the Metals Dump, monthly during periods of run-off or seepage, until such time as the facility is upgraded to divert water from running through the facility.**

PEL-10-1: No monitoring well has been established at this site; and the sign is broken. This station is currently marked as 'optional'. Sampling is being done in the creek which flows out of the SWF. This station is only metres upstream from PEL-6, so as a runoff station, this site is redundant. Further, as a leachate monitoring well, it is of limited value as it is not located beneath the main section of the SWF. **Recommend removal of this station.**

PEL-10-2: No monitoring well has been established at this site; however, the sign is in place. This station is currently marked as 'optional'. This is a good area of ponding beneath the SWF. This is the location where the inspector has historically monitored dump leachate. **I recommend installing a monitoring well at this location and sampling once annually in July/August.**

See attached table for summary of recommendations. *Optional recommendation: re-number the stations for simplicity and to make use of the signs that are already made.

[2] Opinion based on preliminary visual observation at the time of the inspection.

WATER LICENCE INSPECTION FORM

☒ Original
☐ Follow-Up Report

Licensee	Licensee Representative
Hamlet of Kugaaruk	Gordon Dinney, Gaetan Apsaktaun
Licence No. / Expiry	**Representative's Title**
3BM-PEL1419	SAO, Director of Public Works
Land / Other Authorizations	**Land / Other Authorizations**
Date of Inspection	**Inspector**
20-21 August 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	1	Water Management Structures	U	5	Storage	A	
Flow Measure. Device	A	1	Culverts / Bridges	NI		Spills	U	8
Source: Kugajuk River	A		Drainage	U	4	Spill Plan	U	9
Water Use:	A		Erosion / Sediment	U	1			
Recirculation (y / n)	NA		Mitigation Measures	U	1,2	**Administrative**		
			Reclamation Activities	NA		Records	C	10
			Materials Storage	NI		Reports	U	11
Waste Disposal			Signage	C	6	Plans	U	12
Waste Water	A					Notifications	U	13
Solid Waste	U	2	**Monitoring**			**Other**		
Hazardous Waste	U	3	Sample Collection / Analysis	U	7			

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

Samples taken by Inspector:	Location(s): PEL-1, PEL-6, PEL-9-2
☒ 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 20 and 21, 2014, in cooperation with Mr. Shah Alam, Municipal Planning Engineer for the Government of Nunavut, Kitikmeot Region. We met with Mr. Gordon Dinney, the interim SAO, and were accompanied by Gaetan Apsaktaun, Director of Public Works for the hamlet for part (but not all) of the inspection. The new Water Treatment Plant (under construction), water intake, Solid Waste Facility, and Sewage Lagoon were inspected for compliance with the water licence. Monitoring Stations were verified, and some changes are recommended as the existing program (developed by the consultant who wrote the O&M Manuals) is onerous and impractical. In some cases stations are to be moved to reflect the licence requirements, and some redundant and unnecessary stations will be recommended for removal from the licence altogether. See Appendix 1, attached. Water usage records were inspected, and a brief administrative compliance review was conducted.

1. Construction of the new water treatment facility is nearly complete. Pumps, screens, and lines have been upgraded. There remain concerns regarding salinity issues; there is no alternative water intake established at this time. The old pump-house has been retrofitted with two rooms; one encloses the back-up generator for the WTP, and the other is a storage area for the chlorine. An issue identified by staff at the new WTP is that the truck-fill pads on which the water trucks will back up are not built of sufficient depth to safely back up the trucks. The operational side is barely long enough, and the side not yet running is certainly too short; the truck risks driving over the bank. These areas will require some work to build up; meanwhile silt fences should be erected to reduce sediment deposition in the river. On the operational side, the truck drivers appear to be over-filling the trucks, and an erosion channel has formed down to the river. Care is to be taken by the truck drivers and mitigation measures put in place to prevent sediment deposition in the river.

2. The O&M Manual for the Solid Waste Facility (2010), while thorough, is not being implemented and is currently unrealistic for the community of Kugaaruk. While the plan calls for 'crews' to carry out various activities on a daily basis, the Hamlet does not have even a single employee dedicated to managing solid waste in the community. Some basic segregation occurred when the facility was built, but is not being maintained within the SWF. Basic landfill management techniques (compacting and covering) do not appear to be employed consistently and in accordance with the plan. Currently no burning of any kind is allowed within the landfill (by the approved O&M Manual); however, burning of clean woods and cardboard in a designated area would reduce the volume of waste within the landfill.

3. Car batteries were located in the SWF within the lined cell provided for that purpose; however, at some point the car batteries have been burned. This is extremely dangerous, as now the battery acid is no longer contained within the batteries; and any water touching the burned batteries is transporting acid out of the facility. Barrels of hazardous waste are not being stored in the lined areas provided for that purpose in the SWF; they are stockpiled in large quantity in an unlined area at the metals dump. A vast majority of the barrels belong to Diamonds North, who should not be permitted to deposit hazardous waste in a municipal facility within Nunavut. The Inspector will contact Diamonds North regarding the removal of the barrels. A ditch has been constructed to direct the groundwater that flows through the metals dump; however no measures have been taken to prevent

waste from entering this creek, which also flows through the barrels of hazardous waste before leaving the dump area. Car batteries were also seen piled near the barrels. A plan for management of contaminated soil is required, as it has been determined that the landfarm, under 1BR-KRK1318, belongs to the GN and is not currently authorised for use by the municipality.

4. Both parts of the landfill (SWF and Metals dump) have water flowing through, transporting pollutants downstream to the ocean. It appears that the trench was put in the metals dump deliberately; however no mitigation measures are in place to keep pollutants from that stream. Water should not be permitted to flow through the landfill; water management structures should be in place to divert water around the facility, and to retain any contact water for testing and treatment if necessary.
5. The Sewage Lagoon is not operating according to the O&M Manual. Currently the valve that should allow free flow from the lagoon to the sediment pond (during summer months) is frozen closed. The hamlet is therefore pumping the effluent into the pond. The operators' understanding of the system is to actively pump to the sediment pond, and passively allow the effluent to exfiltrate or overtop the sediment pond. However, the manual calls for passively allowing the effluent to flow into the sediment pond, and actively decanting from the pond to the wetland. If the hamlet does not intend to fix the frozen valve; the current system should be assessed by an engineer to ensure that passive management of the sediment pond will not compromise the integrity of the berm. Discharge criteria must then be met at the last point of active control: within the first cell of the sewage lagoon (at station PEL-3-1).
6. Monitoring station signage was installed as required, however some signs have been broken. Following the approval of the Board to modify the monitoring requirements, please ensure that new signage is installed to reflect the updated stations.
7. Monitoring wells as required by the licence were not installed. Monitoring has not been consistently completed (only once in 2013). Staff are not confident in the sampling requirements or methodology. Samples were not received by the lab within 24 hours, therefore some of the results (BOD and Fecal Coliforms) are not valid. Please check with the lab to ensure they received the samples on time, and also review the sampling reports carefully to determine whether the results are valid. If a plane is delayed or it is known that the holding times will be exceeded, a second set of samples should be taken and submitted.
8. Hydrocarbon spills were noted at the truck-fill station from one of the water trucks. This has the potential to contaminate the water source. As a temporary measure while the old water truck is in use, Gaetan put down spill pads weighted down with a metal grate to absorb the hydrocarbon and prevent it from following the erosion channel into the water source. These will have to be monitored and changed regularly. Small spills were noted on the sewage lagoon berm from filling the generator. A spill tray should be employed to prevent spills.
9. Please note that the updated *Environmental Emergency Contingency Plan for Water, Sewage and Solid Waste Operations* is now due. The updated Plan is to take into consideration at a minimum, the comments received during the review of the previous Plan approved by the Board on January 22, 2010, and information regarding the new water treatment plant.
10. Also note that an updated Quality Assurance/Quality Control Plan that conforms to the guidance document *Quality Assurance (QA) and Quality Control (QC) Guidelines For Use by Class "B" Licensees in Collecting Representative Water Samples in the Field and for Submission of a QAQC Plan INAC (1996)* is now due.
11. Please ensure that records of water use during the pump-house construction are maintained for reporting purposes.
12. The annual report did not make note of the invalid sampling results; they were reported as valid.
13. O&M Manual for SWF is not being implemented. The existing QA/QC Plan (monitoring) is not being implemented.
14. A minimum of 10 days notice is to be given to the Inspector prior to decanting of the lagoon. Samples must be taken to ensure that discharge criteria are met.
15. Please note that as per Part F Item 1, the *Water Collection and Distribution Operation and Maintenance (O&M) Manual* for the new WTP is due for submission on or before November 14, 2014.

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

Part B Item 3: Failure to comply with the monitoring program, in that samples were not collected in the frequency outlined, and monitoring wells were not installed as prescribed.
Part B Item 9: Failure to implement plans as approved (QA/QC and O&M plans).
Part C Item 7: Causation of erosion to the banks of the Kusugak River at the water intake, and failure to implement controls to prevent erosion.
Part C Item 8: Failure to implement and maintain sediment and erosion control measures.
Part D Item 9: Failure to segregate and store all hazardous materials and/or hazardous waste within the Solid Waste Disposal Facility in an appropriate and safe manner.
Part D Item 10: Failure to implement measures to prevent hazardous materials and/or leachate from the Solid Waste Disposal Facility from entering water.
Part E Item 6: Failure to implement and maintain sediment and erosion control measures prior to and during construction activities.
Part F Item 2: Failure to submit the *Environmental Emergency Contingency Plan for Water, Sewage and Solid Waste Operations* plan within 90 days of issuance of the licence.
Part F Item 3: Failure to implement the *Sewage Treatment Facility Operation and Maintenance Manual* (QA/QC and monitoring) plan.
Part F Item 4: Failure to implement the *Solid Waste Facility Operation and Maintenance Manual* (plan).
Part H Item 11: Failure to submit the updated *Quality Assurance/Quality Control Plan* within 90 days of issuance of the licence.

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

1. Measures to prevent sediment from entering the water are to be implemented **immediately** at the water treatment plant.
2. Trucks are not to be over-filled, as this is causing erosion of the banks to the river.
3. Trucks are to be serviced to prevent leaking of fluids, and spill pads at the truck-fill changed regularly to prevent contamination

of the water source.

4. Ideally, access to the water treatment plant should be restricted to authorised personnel only.
5. All car batteries should be collected **immediately** and placed in lined crates or a lined sea-can for backhaul; packaged in accordance with Transportation of Dangerous Goods requirements. Photos demonstrating the completion of this action are to be sent **to the Inspector by September 12 2014**.
6. All hazardous waste is to be placed within the lined cells that are available. Hazardous waste should be shipped out annually if possible.
7. Updating of the O&M Manual for Solid Waste is recommended to include practices that are viable in the community and that are consistent with "*Guidelines for the Preparation of an Operation and Maintenance Manual for Sewage and Solid Waste Disposal Facilities in the Northwest Territories; 1996*". Segregation of wastes should be implemented, as per the Manual, as should 'compacting and covering', in order to prolong the life-span of the facility. A plan for contaminated soil generated by the community should be included. Industrial waste should not be accepted in the municipal facility. An interim plan to improve management of the SWF (including hazardous waste as described in items 5 and 6) is to be provided **to the Inspector by November 30 2014**.
8. Upgrades to the SWF and Metals dump should be contemplated to stop water that flows through the facilities.
9. Pending the approval of the Board to modify the monitoring requirements, please ensure that new signage is installed to reflect the updated stations.
10. Pending the approval of the Board to modify the monitoring requirements, please ensure that the required monitoring wells are installed.
11. **Effective immediately**, sampling station 3-1 is to be moved to the upper berm of the sewage lagoon, where the pumping occurs from cell 1 to cell 2 (coordinates provided in Appendix 1).
12. Monthly sampling at stations 3-1, 3-2, 4, and 6 is required until any changes to the monitoring program are approved. Lab results are to be submitted to the inspector prior to decant until further notice.
13. The *Environmental Emergency Contingency Plan for Water, Sewage and Solid Waste Operations* is to be prepared and submitted to the Board with the Annual Report.
14. The updated *Quality Assurance/Quality Control Plan* is to be prepared submitted to the Board with the Annual Report.
15. Plans are to be implemented as written unless otherwise approved by the Board.
16. A minimum of 10 days written notice is to be given to the Inspector prior to decanting of the lagoon. Samples must be taken to ensure that discharge criteria are met.

Licensee or Representative	**Inspector's Name**
-	Eva Paul
Signature	**Signature**
-	Sent electronically
Date	**Date**
-	September 3, 2014

APPENDICES: ☐ **Inspection Photos** ☐ **Sample Results** ☒ **Other: Proposed changes to monitoring prgm**

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

	New #		Plan Coordinates		**Recommended Coordinates**		Frequency	
Station	****optional***	**Description**	**Latitude**	**Longitude**	**Latitude**	**Longitude**		**Status**
PEL-1	*PEL-1*	Raw Water Supply intake at the Kugajuk River			Install when station is complete		Daily	Active (Volume)
PEL-2	*PEL-2*	Raw Sewage from pump-out truck	68°31'13.66 N	89°49'49.25"W	No change		Daily	Active (Volume)
PEL-3-1	*PEL-3-1*	Effluent Discharge from Lagoon to Settlement Pond	68°31'16.74"N	89°50'05.68" W	**68°31'16.2"N**	**89°50'02.2"W**	**Prior to each decant**	Active (Quality)
PEL-3-2	*PEL-3-2*	Effluent Discharge from Settlement Pond to Wetland	68°31'17.91"N	89°50'03.19"W	No change		**Prior to each decant**	Active (Quality)
PEL-4	*PEL-4*	Effluent Final Discharge Point from Wetland to Ocean	68°31'21.38"N	89°50'16.06"W	No change		Monthly (June/July to August/September)	Active (Quality)
PEL-9-2	***PEL-5***	**Run-off from the Metal Dump**	68°30'59.94"N	89°49'26.21"W	**Recommend change of status, not location**		Monthly (June/July to August/September)	Active (Quality)
PEL-6	*PEL-6*	Run-off from the Solid Waste Disposal Facility	68°31'14.01"N	89°49'43.67"W	No change		Monthly (June/July to August/September)	Active (Quality)
PEL-7		Monitoring well located up gradient of the Solid Waste Disposal Facility (Metal Dump)	68°31'03.65"N	89°49'03.14"W	Recommend removal – non-contact water.			
PEL-8-1		Monitoring well located up gradient of the Solid Waste Disposal Facilities	68°31'08.93"N	89°49'31.79"W	Recommend removal – non-contact water.			
PEL-8-2		Monitoring well located down gradient of the Solid Waste Disposal Facilities	68°31'13.30"N	89°49'23.75"W	Recommend removal – non-contact water. This was up-gradient, not down.			
PEL-9-1	***PEL-8-1***	Monitoring well located down gradient of the Solid Waste Disposal Facility (Metal Dump)	68°30'58.76"N	89°49'24.04"W	**68° 30'58.6"N**	**89° 49'16.4"W**	Once during ground thaw	Active (Quality)
PEL-10-1		Monitoring well (optional) located down gradient of the Solid Waste Disposal Facilities	68°31'13.50"N	89°49'42.05"W	Recommend removal			
PEL-10-2	***PEL-8-2***	Monitoring well ~~**(optional)**~~ located down gradient of the Solid Waste Disposal Facilities	68°31'09.61"N	89°49'41.99"W	No change		Once during ground thaw	Active (Quality)

Appendix C:

Sewage and Effluent Test Results

Water Licence: 3BM-PEL1419

Samples Date: August 21, 2014

Hamlet of Kugaaruk, NU

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

Taiga Batch No.: 140722

- FINAL REPORT -

Prepared For: Hamlet of Kugaaruk

Address: Box 205
Kugaaruk, NU,X0B 1K0

Attn: **Gord Dinney** **Facsimile: 867-769-6069**

Final report has been reviewed and approved by:

Judy Mah
Client Service 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: Friday, September 05, 2014
Print Date: ***Friday, September 05, 2014***

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

Taiga Batch No.: 140722

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL 3-2 **Taiga Sample ID:** 001

Client Project: KUGA2014-08
Sample Type: Wastewater
Received Date: 22-Aug-14
Sampling Date: 21-Aug-14
Sampling Time: 11:30
Location: Kugaaruk, NU
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	94.7	0.005	mg/L	04-Sep-14	SM4500-NH3:	
Biochemical Oxygen Demand	151	2	mg/L	22-Aug-14	SM5210:B	
Organic Carbon, Total	125	0.5	mg/L	26-Aug-14	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	395	0.4	mg/L	22-Aug-14	SM2320:B	
Conductivity, Specific (@25C)	1160	0.4	µS/cm	22-Aug-14	SM2510:B	
pH	7.64		pH units	22-Aug-14	SM4500-H:B	
Solids, Total Suspended	54	3	mg/L	27-Aug-14	SM2540:D	
Major Ions						
Calcium	25.0	0.1	mg/L	22-Aug-14	SM4110:B	
Chloride	89.0	0.7	mg/L	22-Aug-14	SM4110:B	
Hardness	108	0.7	mg/L	22-Aug-14	SM4110:B	
Magnesium	11.1	0.1	mg/L	22-Aug-14	SM4110:B	
Nitrate as Nitrogen	0.08	0.01	mg/L	22-Aug-14	SM4110:B	

ReportDate: Friday, September 05, 2014
Print Date: ***Friday, September 05, 2014***

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

Taiga Batch No.: 140722

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL 3-2 **Taiga Sample ID:** 001

Nitrate+Nitrite as Nitrogen	0.10	0.01	mg/L	22-Aug-14	SM4110:B
Nitrite as Nitrogen	0.02	0.01	mg/L	22-Aug-14	SM4110:B
Potassium	25.1	0.1	mg/L	22-Aug-14	SM4110:B
Sodium	72.3	0.1	mg/L	22-Aug-14	SM4110:B
Sulphate	3	1	mg/L	22-Aug-14	SM4110:B
Microbiology					
Coliforms, Fecal	28000	1000	CFU/100mL	22-Aug-14	SM9222:D
Coliforms, Total	2420000	1000	MPN/100mL	22-Aug-14	SM9223:B
Organics					
Oil and Grease, visible	Non-visible			03-Sep-14	Visual Exam
Subcontracted Organics					
Phenols, Total	1.040	0.001	mg/L	03-Sep-14	AB ENV.06537
Trace Metals					
Aluminum	147	5	µg/L	04-Sep-14	EPA200.8
Antimony	0.7	0.1	µg/L	04-Sep-14	EPA200.8
Arsenic	0.9	0.2	µg/L	04-Sep-14	EPA200.8
Barium	3.9	0.1	µg/L	04-Sep-14	EPA200.8
Beryllium	< 0.1	0.1	µg/L	04-Sep-14	EPA200.8
Cadmium	< 0.10	0.1	µg/L	04-Sep-14	EPA200.8
Cesium	0.1	0.1	µg/L	04-Sep-14	EPA200.8
Chromium	0.8	0.1	µg/L	04-Sep-14	EPA200.8
Cobalt	0.6	0.1	µg/L	04-Sep-14	EPA200.8
Copper	70.4	0.2	µg/L	04-Sep-14	EPA200.8
Iron	474	5	µg/L	04-Sep-14	EPA200.8
Lead	1.0	0.1	µg/L	04-Sep-14	EPA200.8

ReportDate: Friday, September 05, 2014
Print Date: *Friday, September 05, 2014*

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

Taiga Batch No.: 140722

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL 3-2 **Taiga Sample ID:** 001

Lithium	3.5	0.2	µg/L	04-Sep-14	EPA200.8
Manganese	167	0.1	µg/L	04-Sep-14	EPA200.8
Mercury	0.01	0.01	µg/L	04-Sep-14	EPA200.8
Molybdenum	1.1	0.1	µg/L	04-Sep-14	EPA200.8
Nickel	2.7	0.1	µg/L	04-Sep-14	EPA200.8
Rubidium	23.6	0.1	µg/L	04-Sep-14	EPA200.8
Selenium	< 0.5	0.5	µg/L	04-Sep-14	EPA200.8
Silver	0.6	0.1	µg/L	04-Sep-14	EPA200.8
Strontium	56.8	0.1	µg/L	04-Sep-14	EPA200.8
Thallium	< 0.1	0.1	µg/L	04-Sep-14	EPA200.8
Titanium	3.1	0.1	µg/L	04-Sep-14	EPA200.8
Uranium	5.5	0.1	µg/L	04-Sep-14	EPA200.8
Vanadium	0.5	0.1	µg/L	04-Sep-14	EPA200.8
Zinc	56.5	5	µg/L	04-Sep-14	EPA200.8

ReportDate: Friday, September 05, 2014
Print Date: *Friday, September 05, 2014*

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

Taiga Batch No.: 140722

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL-4 **Taiga Sample ID:** 002

Client Project: KUGA2014-08
Sample Type: Wetland
Received Date: 22-Aug-14
Sampling Date: 21-Aug-14
Sampling Time: 11:00
Location: Kugaaruk, NU
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	71.9	0.005	mg/L	04-Sep-14	SM4500-NH3:	
Biochemical Oxygen Demand	23	2	mg/L	22-Aug-14	SM5210:B	
Organic Carbon, Total	41.0	0.5	mg/L	26-Aug-14	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	360	0.4	mg/L	22-Aug-14	SM2320:B	
Conductivity, Specific (@25C)	1050	0.4	µS/cm	22-Aug-14	SM2510:B	
pH	7.49		pH units	22-Aug-14	SM4500-H:B	
Solids, Total Suspended	10	3	mg/L	27-Aug-14	SM2540:D	
Major Ions						
Calcium	29.2	0.1	mg/L	22-Aug-14	SM4110:B	
Chloride	88.9	0.7	mg/L	22-Aug-14	SM4110:B	
Hardness	121	0.7	mg/L	22-Aug-14	SM4110:B	
Magnesium	11.8	0.1	mg/L	22-Aug-14	SM4110:B	
Nitrate as Nitrogen	0.11	0.01	mg/L	22-Aug-14	SM4110:B	
Nitrate+Nitrite as Nitrogen	0.13	0.01	mg/L	22-Aug-14	SM4110:B	
Nitrite as Nitrogen	0.02	0.01	mg/L	22-Aug-14	SM4110:B	

ReportDate: Friday, September 05, 2014
Print Date: ***Friday, September 05, 2014***

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

Taiga Batch No.: 140722

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL-4 **Taiga Sample ID:** 002

Potassium	23.0	0.1	mg/L	22-Aug-14	SM4110:B
Sodium	73.4	0.1	mg/L	22-Aug-14	SM4110:B
Sulphate	2	1	mg/L	22-Aug-14	SM4110:B
Microbiology					
Coliforms, Fecal	710	10	CFU/100mL	22-Aug-14	SM9222:D
Organics					
Oil and Grease, visible	Non-visible			03-Sep-14	Visual Exam
Subcontracted Organics					
Phenols, Total	0.0221	0.001	mg/L	03-Sep-14	AB ENV.06537
Trace Metals					
Aluminum	46.5	5	µg/L	04-Sep-14	EPA200.8
Antimony	0.6	0.1	µg/L	04-Sep-14	EPA200.8
Arsenic	1.9	0.2	µg/L	04-Sep-14	EPA200.8
Barium	6.0	0.1	µg/L	04-Sep-14	EPA200.8
Beryllium	< 0.1	0.1	µg/L	04-Sep-14	EPA200.8
Cadmium	< 0.10	0.1	µg/L	04-Sep-14	EPA200.8
Cesium	< 0.1	0.1	µg/L	04-Sep-14	EPA200.8
Chromium	0.6	0.1	µg/L	04-Sep-14	EPA200.8
Cobalt	1.9	0.1	µg/L	04-Sep-14	EPA200.8
Copper	14.6	0.2	µg/L	04-Sep-14	EPA200.8
Iron	1160	5	µg/L	04-Sep-14	EPA200.8
Lead	0.9	0.1	µg/L	04-Sep-14	EPA200.8
Lithium	3.6	0.2	µg/L	04-Sep-14	EPA200.8
Manganese	416	0.1	µg/L	04-Sep-14	EPA200.8
Mercury	< 0.01	0.01	µg/L	04-Sep-14	EPA200.8

ReportDate: Friday, September 05, 2014
Print Date: *Friday, September 05, 2014*

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

Taiga Batch No.: 140722

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL-4 **Taiga Sample ID:** 002

Molybdenum	0.5	0.1	µg/L	04-Sep-14	EPA200.8
Nickel	4.1	0.1	µg/L	04-Sep-14	EPA200.8
Rubidium	19.5	0.1	µg/L	04-Sep-14	EPA200.8
Selenium	< 0.5	0.5	µg/L	04-Sep-14	EPA200.8
Silver	0.1	0.1	µg/L	04-Sep-14	EPA200.8
Strontium	61.9	0.1	µg/L	04-Sep-14	EPA200.8
Thallium	< 0.1	0.1	µg/L	04-Sep-14	EPA200.8
Titanium	3.2	0.1	µg/L	04-Sep-14	EPA200.8
Uranium	2.1	0.1	µg/L	04-Sep-14	EPA200.8
Vanadium	2.8	0.1	µg/L	04-Sep-14	EPA200.8
Zinc	9.9	5	µg/L	04-Sep-14	EPA200.8

ReportDate: Friday, September 05, 2014
Print Date: *Friday, September 05, 2014*

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

Taiga Batch No.: 140722

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL-6 **Taiga Sample ID:** 003

Client Project: KUGA2014-08
Sample Type: Wastewater
Received Date: 22-Aug-14
Sampling Date: 21-Aug-14
Sampling Time: 9:30
Location: Kugaaruk, NU
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	3.16	0.005	mg/L	04-Sep-14	SM4500-NH3:	
Biochemical Oxygen Demand	17	2	mg/L	22-Aug-14	SM5210:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	213	0.4	mg/L	22-Aug-14	SM2320:B	
Conductivity, Specific (@25C)	617	0.4	µS/cm	22-Aug-14	SM2510:B	
pH	7.55		pH units	22-Aug-14	SM4500-H:B	
Solids, Total Suspended	8	3	mg/L	27-Aug-14	SM2540:D	
Major Ions						
Calcium	76.8	0.1	mg/L	22-Aug-14	SM4110:B	
Chloride	35.8	0.7	mg/L	22-Aug-14	SM4110:B	
Hardness	228	0.7	mg/L	22-Aug-14	SM4110:B	
Magnesium	8.8	0.1	mg/L	22-Aug-14	SM4110:B	
Nitrate as Nitrogen	0.10	0.01	mg/L	22-Aug-14	SM4110:B	
Nitrate+Nitrite as Nitrogen	0.11	0.01	mg/L	22-Aug-14	SM4110:B	
Nitrite as Nitrogen	0.01	0.01	mg/L	22-Aug-14	SM4110:B	
Potassium	7.3	0.1	mg/L	22-Aug-14	SM4110:B	

ReportDate: Friday, September 05, 2014
Print Date: ***Friday, September 05, 2014***

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

Taiga Batch No.: 140722

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL-6 **Taiga Sample ID:** 003

Sodium	36.0	0.1	mg/L	22-Aug-14	SM4110:B
Sulphate	51	1	mg/L	22-Aug-14	SM4110:B
Microbiology					
Coliforms, Fecal	80	10	CFU/100mL	22-Aug-14	SM9222:D
Organics					
Benzene	< 0.005	0.005	mg/L	22-Aug-14	EPA8260B
Ethylbenzene	< 0.005	0.005	mg/L	22-Aug-14	EPA8260B
Hexane Extractable Material	< 2.0	2.0	mg/L	05-Sep-14	EPA1664A
Hydrocarbons, Total Extractable	< 0.2	0.2	mg/L	29-Aug-14	EPA8015B
Hydrocarbons, Total Purgeable	< 0.3	0.3	mg/L	29-Aug-14	EPA8015
Oil and Grease, visible	Non-visible			03-Sep-14	Visual Exam
Toluene	< 0.005	0.005	mg/L	22-Aug-14	EPA8260B
Xylenes	< 0.005	0.005	mg/L	22-Aug-14	EPA8260B
Subcontracted Organics					
Acenaphthene	0.000077	0.00005	mg/L	30-Aug-14	EPA3510
Acenaphthylene	< 0.000050	0.00005	mg/L	30-Aug-14	EPA3510
Anthracene	< 0.000010	0.00001	mg/L	30-Aug-14	EPA3510
Benzo(a)anthracene	< 0.000015	0.000015	mg/L	30-Aug-14	EPA3510
Benzo(a)pyrene	< 0.000010	0.00001	mg/L	30-Aug-14	EPA3510
Benzo(bj)fluoranthene	< 0.000050	0.00005	mg/L	30-Aug-14	EPA3510
Benzo(g,h,i)perylene	< 0.000050	0.00005	mg/L	30-Aug-14	EPA3510
Benzo(k)fluoranthene	< 0.000050	0.00005	mg/L	30-Aug-14	EPA3510
Chrysene	< 0.000050	0.00005	mg/L	30-Aug-14	EPA3510
Dibenzo(a,h)anthracene	< 0.000050	0.00005	mg/L	30-Aug-14	EPA3510
Fluoranthene	< 0.000020	0.00002	mg/L	30-Aug-14	EPA3510

ReportDate: Friday, September 05, 2014
Print Date: *Friday, September 05, 2014*

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

Taiga Batch No.: 140722

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL-6 **Taiga Sample ID:** 003

Fluorene	< 0.000050	0.00005	mg/L	30-Aug-14	EPA3510
Indeno(1,2,3-cd)pyrene	< 0.000050	0.00005	mg/L	30-Aug-14	EPA3510
Naphthalene	0.000116	0.00005	mg/L	30-Aug-14	EPA3510
Phenanthrene	< 0.000050	0.00005	mg/L	30-Aug-14	EPA3510
Phenols, Total	0.0190	0.001	mg/L	03-Sep-14	AB ENV.06537
Pyrene	< 0.000020	0.00002	mg/L	30-Aug-14	EPA3510
Trace Metals					
Aluminum	28.0	5	µg/L	04-Sep-14	EPA200.8
Antimony	2.6	0.1	µg/L	04-Sep-14	EPA200.8
Arsenic	1.1	0.2	µg/L	04-Sep-14	EPA200.8
Barium	18.2	0.1	µg/L	04-Sep-14	EPA200.8
Beryllium	< 0.1	0.1	µg/L	04-Sep-14	EPA200.8
Cadmium	0.11	0.1	µg/L	04-Sep-14	EPA200.8
Cesium	< 0.1	0.1	µg/L	04-Sep-14	EPA200.8
Chromium	0.8	0.1	µg/L	04-Sep-14	EPA200.8
Cobalt	0.4	0.1	µg/L	04-Sep-14	EPA200.8
Copper	4.8	0.2	µg/L	04-Sep-14	EPA200.8
Iron	1320	5	µg/L	04-Sep-14	EPA200.8
Lead	1.7	0.1	µg/L	04-Sep-14	EPA200.8
Lithium	4.8	0.2	µg/L	04-Sep-14	EPA200.8
Manganese	810	0.1	µg/L	04-Sep-14	EPA200.8
Mercury	< 0.01	0.01	µg/L	04-Sep-14	EPA200.8
Molybdenum	0.9	0.1	µg/L	04-Sep-14	EPA200.8
Nickel	2.0	0.1	µg/L	04-Sep-14	EPA200.8
Rubidium	5.7	0.1	µg/L	04-Sep-14	EPA200.8

ReportDate: Friday, September 05, 2014
Print Date: *Friday, September 05, 2014*

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

Taiga Batch No.: 140722

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL-6 **Taiga Sample ID:** 003

Selenium	< 0.5	0.5	µg/L	04-Sep-14	EPA200.8
Silver	< 0.1	0.1	µg/L	04-Sep-14	EPA200.8
Strontium	253	0.1	µg/L	04-Sep-14	EPA200.8
Thallium	< 0.1	0.1	µg/L	04-Sep-14	EPA200.8
Titanium	1.1	0.1	µg/L	04-Sep-14	EPA200.8
Uranium	6.3	0.1	µg/L	04-Sep-14	EPA200.8
Vanadium	0.8	0.1	µg/L	04-Sep-14	EPA200.8
Zinc	123	5	µg/L	04-Sep-14	EPA200.8

ReportDate: Friday, September 05, 2014
Print Date: *Friday, September 05, 2014*

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

Taiga Batch No.: 140722

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL 9-2 **Taiga Sample ID:** 004

Client Project: KUGA2014-08
Sample Type: Leachate
Received Date: 22-Aug-14
Sampling Date: 21-Aug-14
Sampling Time: 10:00
Location: Kugaaruk, NU
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	0.005	0.005	mg/L	04-Sep-14	SM4500-NH3:	
Biochemical Oxygen Demand	< 2	2	mg/L	22-Aug-14	SM5210:B	
Nitrogen, Total	0.20	0.06	mg/L	26-Aug-14	ISO/TR 11905:	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	36.7	0.4	mg/L	22-Aug-14	SM2320:B	
Conductivity, Specific (@25C)	160	0.4	µS/cm	22-Aug-14	SM2510:B	
pH	7.54		pH units	22-Aug-14	SM4500-H:B	
Solids, Total Suspended	< 3	3	mg/L	27-Aug-14	SM2540:D	
Major Ions						
Chloride	21.0	0.7	mg/L	22-Aug-14	SM4110:B	
Fluoride	< 0.1	0.1	mg/L	22-Aug-14	SM4110:B	
Hardness	45.3	0.7	mg/L	22-Aug-14	SM4110:B	
Nitrate as Nitrogen	0.12	0.01	mg/L	22-Aug-14	SM4110:B	
Nitrate+Nitrite as Nitrogen	0.14	0.01	mg/L	22-Aug-14	SM4110:B	
Nitrite as Nitrogen	0.01	0.01	mg/L	22-Aug-14	SM4110:B	
Sulphate	8	1	mg/L	22-Aug-14	SM4110:B	

ReportDate: Friday, September 05, 2014
Print Date: ***Friday, September 05, 2014***

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

Taiga Batch No.: 140722

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL 9-2 **Taiga Sample ID:** 004

Microbiology					
Coliforms, Fecal	< 1	1	CFU/100mL	22-Aug-14	SM9222:D
Organics					
Benzene	< 0.005	0.005	mg/L	22-Aug-14	EPA8260B
Ethylbenzene	< 0.005	0.005	mg/L	22-Aug-14	EPA8260B
Hexane Extractable Material	< 2.0	2.0	mg/L	05-Sep-14	EPA1664A
Hydrocarbons, Total Extractable	< 0.2	0.2	mg/L	29-Aug-14	EPA8015B
Hydrocarbons, Total Purgeable	< 0.3	0.3	mg/L	29-Aug-14	EPA8015
Toluene	< 0.005	0.005	mg/L	22-Aug-14	EPA8260B
Xylenes	< 0.005	0.005	mg/L	22-Aug-14	EPA8260B
Subcontracted Organics					
Acenaphthene	< 0.000050	0.00005	mg/L	30-Aug-14	EPA3510
Acenaphthylene	< 0.000050	0.00005	mg/L	30-Aug-14	EPA3510
Anthracene	< 0.000010	0.00001	mg/L	30-Aug-14	EPA3510
Benzo(a)anthracene	< 0.000015	0.000015	mg/L	30-Aug-14	EPA3510
Benzo(a)pyrene	< 0.000010	0.00001	mg/L	30-Aug-14	EPA3510
Benzo(bj)fluoranthene	< 0.000050	0.00005	mg/L	30-Aug-14	EPA3510
Benzo(g,h,i)perylene	< 0.000050	0.00005	mg/L	30-Aug-14	EPA3510
Benzo(k)fluoranthene	< 0.000050	0.00005	mg/L	30-Aug-14	EPA3510
Chrysene	< 0.000050	0.00005	mg/L	30-Aug-14	EPA3510
Dibenzo(a,h)anthracene	< 0.000050	0.00005	mg/L	30-Aug-14	EPA3510
Fluoranthene	< 0.000020	0.00002	mg/L	30-Aug-14	EPA3510
Fluorene	< 0.000050	0.00005	mg/L	30-Aug-14	EPA3510
Indeno(1,2,3-cd)pyrene	< 0.000050	0.00005	mg/L	30-Aug-14	EPA3510
Naphthalene	< 0.000050	0.00005	mg/L	30-Aug-14	EPA3510

ReportDate: Friday, September 05, 2014
Print Date: *Friday, September 05, 2014*

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

Taiga Batch No.: 140722

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL 9-2 **Taiga Sample ID:** 004

Phenanthrene	< 0.000050	0.00005	mg/L	30-Aug-14	EPA3510
Phenols, Total	< 0.0010	0.001	mg/L	03-Sep-14	AB ENV.06537
Pyrene	< 0.000020	0.00002	mg/L	30-Aug-14	EPA3510
Trace Metals					
Aluminum	53.4	0.6	µg/L	04-Sep-14	EPA200.8
Antimony	< 0.1	0.1	µg/L	04-Sep-14	EPA200.8
Arsenic	< 0.2	0.2	µg/L	04-Sep-14	EPA200.8
Barium	5.6	0.1	µg/L	04-Sep-14	EPA200.8
Beryllium	< 0.1	0.1	µg/L	04-Sep-14	EPA200.8
Cadmium	< 0.05	0.05	µg/L	04-Sep-14	EPA200.8
Cesium	< 0.1	0.1	µg/L	04-Sep-14	EPA200.8
Chromium	< 0.1	0.1	µg/L	04-Sep-14	EPA200.8
Cobalt	< 0.1	0.1	µg/L	04-Sep-14	EPA200.8
Copper	0.6	0.2	µg/L	04-Sep-14	EPA200.8
Iron	40	5	µg/L	04-Sep-14	EPA200.8
Lead	0.2	0.1	µg/L	04-Sep-14	EPA200.8
Lithium	0.3	0.2	µg/L	04-Sep-14	EPA200.8
Manganese	1.0	0.1	µg/L	04-Sep-14	EPA200.8
Mercury	< 0.01	0.01	µg/L	04-Sep-14	EPA200.8
Molybdenum	0.6	0.1	µg/L	04-Sep-14	EPA200.8
Nickel	0.2	0.1	µg/L	04-Sep-14	EPA200.8
Rubidium	1.3	0.1	µg/L	04-Sep-14	EPA200.8
Selenium	< 0.3	0.3	µg/L	04-Sep-14	EPA200.8
Silver	< 0.1	0.1	µg/L	04-Sep-14	EPA200.8
Strontium	34.2	0.1	µg/L	04-Sep-14	EPA200.8

ReportDate: Friday, September 05, 2014
Print Date: *Friday, September 05, 2014*

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

Taiga Batch No.: 140722

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL 9-2 **Taiga Sample ID:** 004

Thallium	< 0.1	0.1	µg/L	04-Sep-14	EPA200.8
Titanium	2.2	0.1	µg/L	04-Sep-14	EPA200.8
Uranium	1.4	0.1	µg/L	04-Sep-14	EPA200.8
Vanadium	0.1	0.1	µg/L	04-Sep-14	EPA200.8
Zinc	8.3	0.4	µg/L	04-Sep-14	EPA200.8

ReportDate: Friday, September 05, 2014
Print Date: *Friday, September 05, 2014*

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

Taiga Batch No.: 140722

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL 9-2 **Taiga Sample ID:** 004

*** 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: Friday, September 05, 2014

Print Date: *Friday, September 05, 2014*