



P.O. Box 119
GJOA HAVEN, NU X0B 1J0
TEL: (867) 360-6338
FAX: (867) 360-6369

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NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN KATIMAYINGI
OFFICE DES EAUX DU NUNAVUT

DECISION

LICENCE NUMBER: 3BM-QIK0712

This is the decision of the Nunavut Water Board (NWB) with respect to an application for a Licence renewal received May 1, 2006, made by:

Hamlet of Qikiqtarjuaq

to allow for the use of water and disposal of waste for the Hamlet of Qikiqtarjuaq, Nunavut. With respect to this application, the NWB gave notice to the public that the Hamlet had filed an application for a water licence.

DECISION

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

Licence Number 3BM-QIK0712 be issued subject to the terms and conditions contained therein. (Motion #: ~~2007-02-08~~ 2007-02-09)

SIGNED this 9th day of May, 2007 at Gjoa Haven, NU.

Original signed by:

Thomas Kabloona
Acting Chief Executive Officer

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I. BACKGROUND

The Hamlet of Qikiqtarjuaq is located at 67° 33' N latitude and 64° 02' W longitude, on the eastern coast of Baffin Island and on an island known as Broughton Island. It is 470 air km northeast of the City of Iqaluit. Qikiqtarjuaq is located within the continuous permafrost zone with a maximal local depth of annual thaw of the active layer up to 1.6 metres depending on the nature of the surface cover. The region sits on glacial drift primarily composed of silty sand and gravels mixed with boulders.

Vegetation is typical of that evidenced on the Arctic tundra with hardy grasses, mosses and lichens in a thin organic layer on the surface. Annual rainfall averages 39mm and snowfall of 223mm per annum. July mean high and low temperatures are 7°C and 1°C, respectively and January mean high and low temperatures are -21°C and -28°C, respectively. Prevailing winds are generally north-northeast with an annual average velocity of 8.3 km/h.

II. PROCEDURAL HISTORY

On May 1, 2006, an application for the renewal of water licence NWB3QIK0106 was received as filed by Nuna Burnside Engineering and Environmental Ltd. (Rankin Inlet) on behalf of the Hamlet of Qikiqtarjuaq. The previous licence NWB3QIK0106, was issued by the Board on November 28, 2000 with an expiry date of December 31, 2006. The Nunavut Water Board publicly posted notice of this application, in accordance with the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* S. 55.1 and Article 13 of the *Nunavut Land Claims Agreement*, on August 23, 2006. An assessment of the Hamlet's request for renewal of the municipal water licence for water use and waste disposal activities within the Hamlet, was then undertaken so that the Board could make a fully informed decision on the merits of application. The scope of the application included the planned upgrades to the water storage reservoir, sewage disposal facilities and the solid waste disposal facilities. This assessment process included the referral of the application to a variety of Federal, Territorial and local organizations for their review and comment. Taking into account the comments received and an internal technical assessment, a request for additional information and clarification was made by the NWB on October 19, 2006. A response was received on March 8, 2007 from the Department of Community and Government Services, Government of Nunavut on behalf of the Hamlet, containing information prepared by Nuna Burnside and AMEC Earth and Environmental, which included the following documents:

- i. Report on Responses to Questions From the Nunavut Water Board;
- ii. a revised Detailed Design Report for the Improvements to the Water Reservoir, Sewage Lagoon, and Solid Waste Disposal Facility;
- iii. Technical Summary Report for the Improvements to the Water Reservoir, Sewage Lagoon, and Solid Waste Disposal Facility;

- iv. Sewage Lagoon and Solid Waste Disposal Facility Geotechnical Services, Qikiqtarjuaq, Nunavut; and
- v. Revised Sewage Treatment Facility Operation and Maintenance (O&M) Plan;

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

Based upon the results of the 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 and issued Licence NWB3QIK0106.

III. ISSUES

Reporting, Plan Submission and Term of the Licence

In accordance with the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* S. 45, the NWB may issue a licence for a term not exceeding twenty-five years. In determining an appropriate term of a water licence, the Board considers a number of factors, including the results of the Department of Indian Affairs and Northern Development (INAC) site inspections and the compliance record of the Applicant. In review of the previous water licence NWB3QIK0106, it was noted that there were several issues of non-compliance with conditions contained therein. The issues varied throughout the duration of the Licence, however re-occurring items were significant and as follows:

- i. The Licensee did not include in Annual Reports, the water quality results for monitoring under Schedule 1: Surveillance Network Program;
- ii. The Licensee did not submit an Operations and Maintenance Plan during the Licence term; and
- iii. Effluent standards regarding Biochemical Oxygen Demand and Fecal Coliform were not met based on Inspectors sampling results.

The NWB has imposed, on the Licensee, the requirement to produce an Annual Report. These Reports are for the purpose of ensuring that the NWB has an accurate annual update of municipal activities during a calendar year. This information is maintained on the public registry and is available to interested parties upon request. A “*Standardized Form for Annual Reporting*” is to be used by the Licensee and is available from the NWB file transfer protocol (FTP) site under the Public Registry at the NWB Website.

The NWB recognizes the efforts put forward by the Licensee within the renewal/amendment application with respect to providing the Plans required under the previous Licence. The Plans were very detailed and provided the information to satisfy the Licence. These Plans however, will require minor changes due to the additional information received in response to issues raised during the

review process and to comply with conditions of the License and the variation from the assumptions provided in the Application. As well, all upgrades to the facilities may not be constructed and in use immediately. This License has therefore, included the requirement to review and update the following Plans as identified within the Licence:

- i. Water Storage Operation and Maintenance (O&M) Plan;
- ii. Sewage Treatment Facility Operation and Maintenance (O&M) Plan;
- iii. Solid Waste Facility Operation and Maintenance (O&M) Plan;
- iv. Environmental Emergency Contingency Plan For Water, Sewage and Solid Waste Operations in the Hamlet of Qikiqtarjuaq, Nunavut; and the
- v. Monitoring Program Quality Assurance/Quality Control Plan

The purpose of the Operation and Maintenance Manuals is to assist Hamlet staff in the proper operation and maintenance of their water storage and waste disposal facilities. The manuals should demonstrate to the Nunavut Water Board that the Hamlet is capable of operating and maintaining the infrastructure related to water use and waste disposal adequately. The Plans should be based, at a minimum on the various guidelines available (i.e. *Guidelines for the Preparation of an Operations and Maintenance Manual for Sewage and Solid Waste Disposal Facilities in the Northwest Territories*, Duong and Kent, 1996).

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

Finally, the NWB has imposed on the Licensee the requirement to produce an Abandonment and Restoration Plan for their sewage and solid waste facilities. To ensure that all future abandoned facilities and sites are reclaimed in an appropriate manner, the NWB requires Licensees to submit an Abandonment and Restoration Plan. The requirements of the Licensee in this regard are outlined in Part G of this License. The NWB encourages the Licensee to undertake progressive reclamation on sites where possible.

In review of the application and the comments received from interested persons, there were no objections to the Applicants request for a term of five (5) years for the Licence renewal. The NWB concurs that a term of five (5) years is appropriate, and will allow enough time for the Hamlet to establish a consistent compliance record with the terms and conditions of its licence. Appropriate Plans have been developed to the satisfaction of the NWB for the operation and maintenance of the facilities as well as for the protection of the environment with regard to potential spills through day-to-day operations.

Water Use

The Hamlet of Qikiqtarjuaq currently replenishes the Water Storage Reservoir from the Tulugak River which flows seasonally in a northwest direction toward Davis Strait. Water is conveyed via gravity fill pipe. Water for the community is pumped directly from the river during the summer months and then from the reservoir during the remainder of the year. The Reservoir is to be expanded in 2007 to provide a 10-month storage capacity with a dimension of 90m x 156m and a volume of 31,500 m³.

A truck fill station is located at the Water Storage and Treatment Facility where water is transferred by submersible pump to the distribution vehicles. The water receives chlorine treatment and is then distributed to the community by truck. Water consumption in 2006 was reported to be 20,678 m³ and is projected to reach 37,414 m³ *per annum* by the year 2027 (20 year forecast).

No concerns were raised by the parties in their written submissions as to the amount of water required by the Applicant, the manner in which it is obtained or in the manner in which this water will be used. The NWB has determined that the minimal increase in water use volume requested within this application will not substantially affect the quality, quantity or flow of waters.

A Water Storage and Treatment Facility Operation and Maintenance (O&M) Plan has been prepared and was submitted with the Application. This Plan has met the requirements of the NWB and will become effective upon commissioning of the expanded facility.

Deposit of Waste

Sewage

The Hamlet of Qikiqtarjuaq currently provides trucked sewage services for the Community's residents, businesses and institutions.

The Sewage Treatment Facility, operated by the Hamlet of Qikiqtarjuaq is located approximately 2.3 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 DEW Line Access Road and adjacent to the solid waste disposal facility. The Hamlet currently utilizes a facultative lagoon that was originally designed as two independent cells, however when constructed in 1992, only one of the two cells was completed. It currently has a capacity of 10,558 m³ and is not sufficient to provide the proper storage and treatment of sewage generated by the Hamlet.

The use of a second lagoon cell has been applied for with this renewal application to provide sewage retention for the projected 20-year design population. This double-celled lagoon system will have a combined working capacity of 38,850m³. Sewage effluent from the lagoon will be discharged overland, annually, via engineered facilities, through a large Wetland Treatment Area to the Final

Discharge Point located approximately one kilometer from the discharge point of the Sewage Disposal Facility. This Final Discharge Point eventually discharges into the Davis Strait. Discharge from this upgraded facility is planned to take place annually, weather dependent, from June until October, to provide additional storage and treatment that is available with the Wetland Treatment Area.

Specific comments relevant to sewage disposal operations in the Hamlet were provided by GN-DOE, INAC and Environment Canada. Environment Canada was in agreement with the proposed final effluent quality recommendations presented by the proponent and imposing these effluent quality limits on the Wetland Treatment Facility. Environment Canada also indicated that it was a significant improvement over the guidelines for marine embayed areas that are currently being followed in Nunavut and those currently in place for the discharge from the Sewage Treatment Facilities. Monitoring of the Sewage Lagoon effluent (Sewage Disposal Facility) was also requested in order to assess the treatment efficiency and verify the accuracy of the models being used to predict effluent quality within the wetland treatment. The NWB concurs with this and has included monitoring requirements for the Sewage Lagoon. The Sewage Lagoon effluent will remain as the point of control for compliance purposes until such a time as construction has been completed and the sewage effluent is being routed through the designed flow control structure to achieve the desired sheet flow pattern (exfiltration berm and perforated drainage pipe). This requirement is reflected in the Effluent Quality Criteria as shown in Part D, Items 3 and 9. The Licensee will be required to provide notification to the Board and an Inspector of the intent to utilize the Wetland Treatment Area for further treatment and use of the Final Discharge Point for compliance with the Licence.

In addition to the Effluent Quality Criteria of Part D, Environment Canada emphasized that there remained the concern for meeting the requirements of the Fisheries Act, Section 36(3) and the importance of the Licensee to comply with all other legislation when discharging effluent of any type including effluent from the Sewage Disposal Facility. In order to effectively monitor these effluents for compliance purposes, the NWB has imposed acute toxicity testing as a licence requirement under Part D, Item 10.

Environment Canada recommendations included the need to determine the treatment efficiencies of the wetland treatment over a suggested period of 1-5 years, 5-10 years, 10-15 years and 15-20 years.

In order to provide the additional design data required to adequately assess the system, a Wetland Treatment Area Assessment Report is to be developed that will provide the criteria needed in order to properly assess the efficiency of the system over time. Verification of assumed sheet flow pattern, residence time and determination of a focal point of release for the Final Discharge Point are all needed in order to demonstrate the effectiveness of the system and the predictive model used in the planning. This requirement is detailed in Part D, Item 7.

In considering that the Licence term has been set to five (5) years, and in allowing for the construction of the facilities, the Board has determined that the treatment efficiency of the Wetland

Treatment Area be assessed in year 3 of this Licence. Further assessment as recommended by EC may be considered by the Board in an application for Licence renewal.

Further, the NWB has included a requirement to provide a follow-up report on the Wetland Treatment Area, Treatment Assessment which is to be provided to the NWB within sixty (60) days of the completion of the third season (2010) of discharge to the Facility from the Sewage Lagoon system. This report will describe the progress to date and provide an assessment of the treatment efficiency of the Wetland Treatment Area along with recommendations and predictions for future treatment by the Facility. This requirement is detailed in Part D, Item 8.

A Sewage Treatment Facility Operation and Maintenance (O&M) Plan has been prepared and was submitted with the Application. This Plan has met the requirements of the NWB and will become effective upon commissioning of the expanded facility. Additional review and revision are required to update the Plan with current operational procedures and Licence requirements.

Solid Waste

The Hamlet's Solid Waste Facility is located approximately 2.3 km east of the community, north of the DEW Line Access Road. Waste is collected by the Hamlet and transported to the waste disposal facility. Specific areas for the segregation of hazardous and bulky waste (Hazardous Waste Segregation Facility and the Bulky Waste Disposal Area) are provided. Hazardous waste is located within the fenced area of at the landfill whereas the bulky disposal area is located in an adjacent, but unfenced area.

A Solid Waste Facility Operation and Maintenance (O&M) Plan has been prepared and was submitted with the Application. This Plan has met the requirements of the NWB and will become effective upon commissioning of the expanded facility. A revision of the Plan has been requested under Part F, Item 1 to ensure the Plan is current and takes into consideration concerns presented during the review of the Application, including any incineration planned at the Solid Waste Facility.

For the storage of solid wastes, Environment Canada has recommends that groundwater monitoring wells be installed downstream of the solid waste landfill and the existing metals dump area. It is understood that diversion ditches will be installed around the landfill to redirect surface runoff, however groundwater monitoring wells will help verify that historical contaminants that may be present in the landfill or metals dump are not migrating off site as a result of precipitation or snowmelt. Monitoring of these wells is therefore included as a requirement of the Licence as presented in Part H, Items 7 and 8.

Change to Monitoring Program Station Identifications

Prior to the issuance of the previous Licence for the Hamlet of Qikiqtarjuaq, the Hamlet operated under a Licence issued by the Northwest Territories Water Board, N4L3-0640. Designated under

this Licence were several monitoring stations. These stations were carried forward into the Licence renewal by the NWB under Licence NWB3QIK0106. Additional monitoring stations were added under the Licence renewal.

Additional monitoring parameters have been incorporated into the Licence to provide for an assessment of the facilities and to identify potential contaminants of concern. This monitoring follows closely the proposed monitoring as presented in the Application supporting: “Sewage Treatment Facility Operation and Maintenance (O&M) Plan” and the “Solid Waste Facility Operation and Maintenance (O&M) Plan”. These monitoring requirements are presented in Part H, Items 2 and 4.

With the issuance of a renewal for Licence NWB3QIK0106, the NWB has adopted a new licence number system as well as requiring a change to the numbering system for the monitoring stations. The summary included in the Monitoring Program lists the previous monitoring stations with their associated number, their description, status and the new numbers that have been adopted under Part H, Item 1 of this Licence.

Abandonment and Restoration

To ensure that all future abandoned facilities are reclaimed in an appropriate manner, the NWB has imposed the requirement for the submission of Abandonment and Restoration Plans. These plans should be submitted six (6) months prior to final closure or upon submission of the final design drawings for the construction of new facilities to replace existing ones.

LICENCE 3BM-QIK0712

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 QIKIQTARJUAQ

(Licensee)

of

P.O. BOX 4, QIKIQTARJUAQ, NUNAVUT X0A 0B0

(Mailing Address)

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

3BM-QIK0712

Licence Number

NUNAVUT 04

Water Management Area

**QIKIQTARJUAQ, NUNAVUT
Latitude 67°33' and Longitude 64°02'**

Location

WATER USE AND WASTE DISPOSAL

Purpose

MUNICIPAL UNDERTAKINGS

Description

37,500 CUBIC METRES ANNUALLY

Quantity of Water Not to Exceed

May 9, 2007

Date of Licence

May 31, 2012

Expiry Date of Licence

Dated this 9th of May 2007 at Gjoa Haven, NU.

Original signed by:

Thomas Kabloona
Acting Chief Executive Officer

PART A: SCOPE AND DEFINITIONS

1. Scope

- a. This Licence allows for the use of water and the disposal of waste for municipal undertakings at the Hamlet of Qikiqtarjuaq, Nunavut (67°33' N, 64°02'W);
- b. This Licence is issued subject to the conditions contained herein with respect to the taking of water and the depositing of waste of any type in any waters or in any place under any conditions where such waste or any other waste that results from the deposits of such waste may enter any waters. Whenever new Regulations are made or existing Regulations are amended by the Governor in Council under the *Nunavut Waters and Nunavut Surface Rights Tribunal Act*, or other statutes imposing more stringent conditions relating to the quantity or type of waste that may be so deposited or under which any such waste may be so deposited, this Licence shall be deemed, upon promulgation of such Regulations, to be subject to such requirements; and;
- c. Compliance with the terms and conditions of this Licence does not absolve the Licensee from responsibility for compliance with the requirements of all applicable Federal, Territorial and Municipal legislation.

2. Definitions

In this Licence: **3BM-QIK0712**

“Act” means the *Nunavut Waters and Nunavut Surface Rights Tribunal Act*;

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

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

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

“Average Concentration” means the arithmetic mean of the last four consecutive analytical results for contained in composite or grab samples collected from the Waste Disposal Facility’s final discharge point;

“Average Concentration For Faecal Coliforms” means the geometric mean of the last four consecutive analytical results for faecal coliforms contained in composite or grab samples collected from the Waste Disposal Facility’s final discharge point;

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

“Chief Administrative Officer” means the Executive Director of the Nunavut Water Board;

“Commercial Waste Water” means water and associated waste generated by the operation of a commercial enterprise, but does not include toilet wastes or greywater;

“Composite Sample” means a water or wastewater sample made up of four (4) samples taken at regular periods over a 24 hour period;

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

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

“Final Discharge Point” means the discharge location at the Sewage Disposal Facility as described in the Final Design Report, to be confirmed through on-site investigation and approval by an Inspector. Part D, Item 7;

“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 a single water or wastewater sample taken at a time and place representative of the total discharge;

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

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

“Licensee” means the holder of this Licence;

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

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

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

“Sewage” means all toilet wastes and greywater;

“Sewage Disposal Facilities” comprises the engineered lagoon and decant structures designed to contain and treat sewage as described in the Application for Water Licence filed by the Applicant on April 20, 2006 and illustrated in Project N-O 09439 Drawing No. 8, 9 and 10;

“Solid Waste Disposal Facilities” means the facilities designated for the disposal of solid waste, as described in the Application for Water Licence filed by the Licensee on April 20, 2006 and illustrated in Project N-O 09439 Drawing No. 13 and 14;

“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;

“Water Supply Facilities” comprises the area and associated intake infrastructure at the Tulugak River, as described in the Application for Water Licence filed by the Licensee on April 20, 2006 and illustrated in Project N-O 09439 Drawing No. 1 through 7;

“Wetland Treatment Area” comprises approximately 22 hectares of land immediately downstream of the Sewage Lagoon, for approximately 1 kilometre and includes the constructed exfiltration berm and perforated drainage pipe as described in the Application for Water Licence filed by the Applicant on April 20, 2006 and partially illustrated in Project N-O 09439 Drawing No. 8 and 9.

PART B: GENERAL CONDITIONS

1. The Licensee shall file an Annual Report with the Board not later than March 31st of the year following the calendar year reported which shall contain the following information:
 - i. tabular summaries of all data generated under the “Monitoring Program”;
 - ii. the monthly and annual quantities in cubic metres of fresh water obtained from all sources;
 - iii. the monthly and annual quantities in cubic metres of each and all waste discharged;
 - 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;
 - v. a list of unauthorized discharges and summary of follow-up action taken;
 - vi. a summary of any abandonment and restoration work completed during the year and an outline of any work anticipated for the next year;
 - vii. a summary of any studies, reports and Plans (i.e., Operations and Maintenance, Abandonment and Restoration, QA/QC) requested by the Board that relate to water use and waste disposal or reclamation, and a brief description of any future studies planned;
 - viii. any other details on water use or waste disposal requested by the Board by November 1st of the year being reported; and

2. The Licensee shall comply with the “Monitoring Program” described in this Licence, and any amendments to the “Monitoring Program” as may be made from time to time, pursuant to the conditions of this Licence.
3. The “Monitoring Program” and compliance dates specified in the Licence may be modified at the discretion of the Board.
4. Meters, devices or other such methods used for measuring the volumes of water used and waste discharged shall be installed, operated and maintained by the Licensee to the satisfaction of an Inspector.
5. The Licensee shall, within ninety (90) days after the first visit by the Inspector following issuance of this Licence, 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.
6. The Licensee shall immediately report to the 24-Hour Spill Report Line (867-920-8130) any spills of Waste, which are reported to, or observed by the Licensee, within the municipal boundaries or in the areas of the Water Supply or Waste Disposal Facilities.
7. The Licensee shall ensure a copy of this Licence is maintained at the municipal office at all times. Any communication with respect to this Licence shall be made in writing to the attention of:

(i) Manager of Licensing:

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

(ii) Inspector Contact:

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

(iii) Analyst Contact:

Taiga Laboratories
Department of Indian and Northern Affairs
4601 – 52 Avenue, P.O. Box 1500
Yellowknife, NT X1A 2R3
Telephone: (867) 669-2781
Fax: (867) 669-2718

8. The Licensee shall submit one paper copy and one electronic copy of all reports, studies, and plans to the Board. Reports or studies submitted to the Board by the Licensee shall include a detailed executive summary in Inuktitut.
9. The Licensee shall ensure that any document(s) or correspondence submitted by the Licensee to the Board is received and acknowledged by the Manager of Licensing.
10. This Licence is not assignable except as provided in Section 44 of the Act.

PART C: CONDITIONS APPLYING TO WATER USE

1. The Licensee shall obtain all fresh water from the Tulugak River using the Water Supply Facilities or as otherwise approved by the Board.
2. The annual quantity of water used for all purposes shall not exceed 37,500 cubic metres.
3. The Licensee shall maintain the Water Supply Facilities to the satisfaction of the Inspector.
4. The Licensee shall equip all water intake hoses with a screen of an appropriate mesh size to ensure that fish are not entrained and shall withdraw water at a rate such that fish do not become impinged on the screen.

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 QIK-6 shall meet the following effluent quality standards until commissioning and use of the Wetland Treatment Area:

Parameter	Maximum Average Concentration
BOD ₅	120 mg/L
Total Suspended Solids	180 mg/L
Faecal Coliforms	1 x 10 ⁴ CFU/100mL
Oil and grease	No visible sheen
pH	between 6 and 9

4. The Licensee shall maintain at all times, a freeboard of at least 1.0 metre, or as recommended by a qualified geotechnical engineer and as approved by the Board, for all dams, dykes or other 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. The Licensee shall provide to the Board for approval, a Sewage Sludge Management Plan, at least sixty (60) days prior to the removal of sludge from the Sewage Disposal Facility and as required under Part F, Item 1.
7. The Licensee shall provide to the Board for approval, prior to the commissioning of the Wetland Treatment Area as an integral component of the sewage treatment, a Wetland Treatment Area assessment that includes, but is not limited to:
- Final, as built plans/drawings that have been signed, stamped and sealed by an Engineer, of the Wetland Treatment Area that include but are not limited to a topographical map, cross and longitudinal sections of the treatment area indicating anticipated flow patterns;
 - Identify the Final Discharge Point as required to complete monitoring requirements under Part D, Item 9;

- iii. An ecological/vegetative assessment of the area to be used, including a prediction of the time required to achieve the effluent quality as described in the Application for Water Licence renewal filed by the Licensee on April 20, 2006, within ninety (90) days of completion; and
 - iv. A Description of the gradient, holding capacity, and verification of the total area utilized which has been predicted as required to attain the proposed effluent quality, describing any discrepancies and the affects it will have on the predictive model outcome along with contingencies.
 - v. Provide an assessment of the potential effects of the release of any leachate from the Solid Waste Disposal Facilities to the Wetland Treatment Area, as well as any migration measures that may be required.
8. The Licensee shall notify the Board and the Inspector, at least sixty (60) days prior to the commissioning of the Wetland Treatment Area for sewage treatment.
9. Upon commissioning of the Wetland Treatment Area, effluent quality standards under Part D, Item 2 shall cease to apply and all effluent discharges from the Wetland Treatment Area at the Final Discharge Point, Monitoring Program Station QIK-12 shall meet the following effluent quality standards:

Parameter	Maximum Average Concentration
BOD ₅	45 mg/L
Total Suspended Solids	45 mg/L
Faecal Coliforms	(2 x 10 ² CFU/100ml)
Oil and grease	No visible sheen
pH	between 6 and 9

10. All Effluent discharged from the Sewage Treatment Facility, Monitoring Station QIK-6 or the Wetland Treatment Area, Monitoring Station QIK-11 as determined to be the Final Discharge Point, 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).
- 11. The Licensee shall dispose of and contain all solid wastes at the Solid Waste Disposal Facilities or as otherwise approved by the Board.
- 12. 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.

PART E: CONDITIONS APPLYING TO MODIFICATION AND CONSTRUCTION

- 1. The Licensee shall submit to the Board for approval design drawings stamped by a qualified engineer registered in Nunavut prior to the construction of any dams, dykes or structures intended to contain, withhold, divert or retain water or wastes.
- 2. The Licensee may, without written approval from the Board, carry out modifications to the Water Supply and Waste Disposal Facilities provided that such modifications are consistent with the terms of this Licence and the following requirements are met:
 - i. the Licensee has notified the Board in writing of such proposed modifications at least sixty (60) days prior to beginning the modifications;
 - ii. these modifications do not place the Licensee in contravention of the Licence or the Act;
 - iii. 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
 - iv. the Board has not rejected the proposed modifications.
- 3. Modifications for which all of the conditions referred to in Part E, Item 1, have not been met may be carried out only with written approval from the Board. The Licensee shall provide as-built plans and drawings of the Modifications referred to in this Licence within ninety (90) days of completion of the Modification. These plans and drawings shall be stamped by an Engineer.
- 4. 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

5. The Licensee shall ensure that sediment and erosion control measures are implemented prior to and maintained during the operation to prevent the release of sediment and minimize erosion during excavation for the expansion of the reservoir.
6. The Licensee shall designate an area for the deposition of excavated and stockpiled materials that is at least thirty (30) metres above the ordinary high water mark of any water body and in such a manner as to prevent sediment from entering any surrounding water body.
7. 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.
8. The Licensee shall ensure that all fill material used in construction and that the ground to be constructed upon, is free of contaminants. If contaminated soils are identified, notification shall be made in the Licensee's annual report. All contaminated soils shall be treated and disposed of as approved by the Board.
9. The Licensee shall provide a final construction report, within ninety (90) days of completion of the construction, outlining any alteration or deviation from the Final Design and Specifications, which will include, but not be limited to, as built plans/drawings that have been signed, stamped and sealed by an Engineer, of the improvements to the Water Reservoir, Sewage Disposal Facilities and Solid Waste Disposal Facilities as described in the Application for Water Licence renewal filed by the Licensee on April 20, 2006.

PART F: CONDITIONS APPLYING TO OPERATION AND MAINTENANCE

1. The Licensee shall submit to the Board for approval within ninety (90) days of issuance of the Licence, a revised
 - i "Water Storage Operation and Maintenance (O&M) Plan, February 2006";
 - ii "Sewage Treatment Facility Operation and Maintenance (O&M) Plan, February 2007". This Plan shall specifically address, but not be limited to, characterization of the sludge, identifying the chemical composition of the sludge and how the sludge will be stored, treated and eventually disposed of. This Plan is to be included within the Sewage Treatment Facility O&M Plan as an appendix; and
 - iii "Solid Waste Facility Operation and Maintenance (O&M) Plan, February 2006" .

The Plan revisions shall take into consideration, at a minimum, the comments received during the Application review process and any necessary changes to be consistent with this Licence.

2. If the revised Plans referred to in Part F, Item 1 are not approved, the Licensee shall make the necessary revisions and resubmit the Plan(s) within thirty (30) days following notification from the Board.
3. The Licensee shall implement the Plans specified in Part F, Item 1 as and when approved by the Board.
4. An inspection of all engineered facilities related to the management of water and waste shall be carried out annually in July by a Geotechnical Engineer. The engineer's report shall be submitted to the Board within sixty (60) days of the inspection, including a covering letter from the Licensee outlining an implementation plan addressing each of the Engineer's recommendations.
5. The Licensee shall perform more frequent inspections of the engineered facilities at the request of an Inspector.
6. The Licensee shall submit to the Board for approval within ninety (90) days of issuance of the Licence, a revised "Environmental Emergency Contingency Plan For Water, Sewage and Solid Waste Operations in the Hamlet of Qikiqtarjuaq, Nunavut", taking into consideration at a minimum, the comments received during the Application review process and any necessary changes to be consistent with this Licence.
7. If the revised Plan referred to in Part F, Item 6 is not approved, the Licensee shall make the necessary revisions and resubmit the Plan within thirty (30) days following notification from the Board.
8. The Licensee shall implement the Plan specified in Part F, Item 6 as and when approved by the Board.
9. The Licensee shall review the Plans referred to in this Part as required by changes in operation and/or technology and modify the Plan accordingly. Revisions to the Plan are to be submitted in the form of an Addendum to be included with the Annual Report, unless directed otherwise by an Inspector.
10. If, during the period of this Licence, an unauthorized discharge of waste occurs, or if such a discharge is foreseeable, the Licensee shall:

- i. employ the appropriate contingency plan as provided for in the Operation and Maintenance Plan;
- ii. report the incident immediately via the 24-Hour Spill Reporting Line at (867) 920-8130 and to the Inspector at (867) 975-4295; and
- iii. 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), propose disposal options for dealing with contaminated materials and preventative measures to be implemented.

PART G: CONDITIONS APPLYING TO ABANDONMENT AND RESTORATION

1. The Licensee shall submit to the Board for approval an Abandonment and Restoration Plan at least six (6) months prior to abandoning any facilities and the construction of new facilities to replace existing ones. The Plan shall include, but not be limited to: (where applicable)
 - i. water intake facilities;
 - ii. the water treatment and waste disposal sites and facilities;
 - iii. petroleum and chemical storage areas;
 - iv. any site affected by waste spills;
 - v. leachate prevention;
 - vi. an implementation schedule;
 - vii. maps delineating all disturbed areas, and site facilities;
 - viii. consideration of altered drainage patterns;
 - ix. type and source of cover materials;
 - x. future area use;
 - xi. hazardous wastes; and
 - xii. a proposal identifying measures by which restoration costs will be financed by the Licensee upon abandonment.
2. If the Plan referred to in Part G, Item 1 is not approved, the Licensee shall make the necessary revisions and resubmit the Plan within thirty (30) days following notification from the Board.
3. The Licensee shall implement the plan specified in Part G, Item 1 as and when approved by the Board.

4. The Licensee shall revise the Plan referred to in Part G, Item 1 if not approved. The revised Plan shall be submitted to the Board for approval within thirty (30) days of receiving notification of the Board's decision.
5. The Licensee shall revise the Plan referred to in Part G, Item 4 if not approved. The revised Plan shall be submitted to the Board for approval within thirty (30) days of receiving notification of the Board's decision.
6. The Licensee shall complete the restoration work within the time schedule specified in the Plan, or as subsequently revised and approved by the Board.

PART H: CONDITIONS APPLYING TO THE MONITORING PROGRAM

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

New Monitoring Program Station Number	Description	Status	Historical Monitoring Program Station
QIK-1	Raw water supply intake at the Tulugak River	Active (Volume)	0640-1
QIK-2	Raw water supply intake at the Reservoir truck fill station	Active (Volume)	0640-2
QIK-3	Raw Sewage from pump-out truck	Active (Volume)	0640-3
QIK-4	Run-off below the abandoned Sewage disposal area prior to discharge to ocean	Not Active	0640-4
QIK-5	Ocean water five (5) metres from point where effluent enters ocean (abandoned site)	Not Active	0640-5
QIK-6	Discharge from the Sewage Disposal Facilities at the controlled point of release following treatment	Active	0640-6
QIK-7	Current Sewage Disposal Facilities effluent five (5) metres prior to entering the ocean	Active	0640-6A
QIK-8	Run-off from the Solid Waste Disposal Facility that has collected within the constructed collection pond	Active	0640-7
QIK-9	Unnamed stream located between the	Active	0640-8

	Sewage Disposal Facilities and Solid Waste Disposal Facilities		
QIK-10	Unnamed stream located between the Sewage Disposal Facilities and Solid Waste Disposal Facilities; Sample site located below the facilities	Active	0640-9
QIK-11	Unnamed stream located between the Sewage Disposal Facilities and Solid Waste Disposal Facilities; Sample site located above the facilities	Active	0640-10
QIK-12	The Final Discharge Point of the Wetland Treatment Area	Not Active	0640-11
QIK-13	Monitoring well located up gradient of the Solid Waste Disposal Facilities	New	0640-12
QIK-14	Monitoring well located down gradient of the Solid Waste Disposal Facilities	New	0640-13
QIK-15	Monitoring well located down gradient of the metals dump	New	0640-14

2. The Licensee shall sample at Monitoring Program Stations QIK-6, QIK-7 and QIK-12 once at the beginning, middle and near the end of discharge. Samples shall be analyzed for the following parameters:

Biochemical Oxygen Demand - BOD
Total Suspended Solids
Conductivity
Oil and Grease (visual)
Magnesium
Sodium
Chloride
Total Hardness
Ammonia Nitrogen
Total Cadmium
Total Cobalt
Total Chromium
Total Copper
Total Aluminum
Total Mercury

Faecal Coliforms
pH
Nitrate-Nitrite
Total Phenols
Calcium
Potassium
Sulphate
Total Alkalinity
Total Zinc
Total Iron
Total Manganese
Total Nickel
Total Lead
Total Arsenic
Total Organic Carbon (TOC)

3. If, for whatever reason, the discharge at Station QIK-6 has been suspended and subsequently restarted with more than a 48 hour lapse, the sampling sequence described in Part H, Item 2 of the Monitoring Program shall be repeated.
4. The Licensee shall sample at Monitoring Program Station QIK-8 prior to any discharge. Samples shall be analyzed for the following parameters:

BOD	Faecal Coliforms
pH	Conductivity
Total	Suspended Solids Ammonia Nitrogen
Nitrate-Nitrite	Oil and Grease
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

5. The Licensee shall report all results of acute toxicity testing as required under Part D, Item 10 within the Annual Report as per Part B, Item 1.
6. Upon completion of construction and prior to any use, the Licensee shall provide a Temperature Monitoring Program and Implementation Plan for the collection of ground temperatures within each berm structure and foundation through the installation of thermistors. This Plan shall take into consideration the following:
 - i. The frequency of temperature readings shall be such to allow the determination of the maximum freeze and thaw of the berm and underlying native materials and provide adequate data for thermal modeling of the berms.
 - ii. This frequency may be reviewed and adjusted upon collection of adequate data and as recommended by the Geotechnical Engineer in order to assess the berms through thermal modeling and provide an assessment with respect to berm stability and potential seepage.
 - iii. This information is to be reported along with the results of the annual geotechnical inspection as required under Part F, Item 6.

7. The Licensee shall install groundwater monitoring wells at the Solid Waste Disposal Facilities. These wells shall be located with at least one located upstream of the facility for background data collection and at least one downstream of the landfill and one downstream of the metals dump.
8. The Licensee shall sample at Monitoring Program Stations QIK-13, QIK-14 and QIK-15 once annually in the summer, giving consideration to adequate ground thaw and obtaining a representative groundwater sample. Samples shall be analyzed, in addition to the parameters identified in Part H, Item 4, for the following:
 - TPH (Total Petroleum Hydrocarbons)
 - PAH (Polycyclic Aromatic Hydrocarbons)
 - BTEX (Benzene, Toluene, Ethylbenzene, Xylene)
9. The Licensee shall measure and record in cubic metres, the monthly and annual quantities of water pumped at Monitoring Program Station QIK-2 and when use is directly from Station QIK-1, for all purposes.
10. The Licensee shall measure and record in cubic metres the monthly and annual quantities of raw sewage offloaded from trucks at Monitoring Program Station QIK-3 for all purposes.
11. Additional sampling and analysis may be requested by an Inspector.
12. The Licensee shall submit to the Board, a revised "Quality Assurance/Quality Control (QA/QC) Plan for the Hamlet Water Reservoir, Sewage Lagoon and Solid Waste Disposal Facility Monitoring Program, February 2006" for approval within (60) days of issuance of the Licence. The Plan shall take into consideration comments received during the Application review process.
13. If the Plan referred to in Part H, Item 12 is not approved, the Licensee shall make the necessary revisions and resubmit the Plan within thirty (30) days following notification from the Board.
14. The Licensee shall implement the Plan referred to in Part H, Item 12 as and when approved by the Board.
15. 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.
16. All analyses shall be performed in a Canadian Association of Environmental Analytical Laboratories (CAEAL) Certified Laboratory, or as otherwise approved by an Analyst.

17. The Licensee shall measure and record the annual quantities of sewage solids removed from the Sewage Disposal Facility.
18. The Licensee shall, unless otherwise requested by an Inspector, 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.