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NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN KATIMAYINGI

June 19th, 2006

Bryan Purdy
Municipal Planning Engineer
Kivalliq Region
Department of Community and Government Services
Government of Nunavut

File: NWB3BAK
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Subject: Baker Lake Water Licence Application

Dear Mr. Purdy,

The **Nunavut Water Board (NWB)** requests further information pertaining to the renewal application for water licence **NWB3CAP9904** as per **Section 48 Item 2** of the *Nunavut Waters and Nunavut Surface Tribunal Act (NWNSRTA)*.

The **NWB** understands that the Government of Nunavut Community and Government Services (GN CGS) aides and assists Nunavut municipalities in completing the requirements of a water licence. To avoid ambiguity and streamline communication the Hamlet of Baker Lake has authorized, through a letter dated February 24th, 2006, GN CGS to communicate on their behalf. The **NWB** would like to reiterate that the Hamlet of Baker Lake is the Licensee and will be bound to the conditions of the licence. With this in mind the NWB will address all correspondence to the GN CGS and carbon copy correspondence to the Hamlet of Baker Lake.

The **NWB** would like to remind the Proponent that as per **Section 57** of the *NWNSRTA*, *the Board may not issue a licence unless the applicant satisfies the Board that any waste produced by the appurtenant undertaking will be treated and disposed of in a manner that is appropriate for the maintenance of the water quality standards and effluent standards that the Board considers acceptable*. The Proponent's past performance will also be considered to ensure the completion of the appurtenant undertaking is adequate and such measures as may be required in mitigation of any adverse impact are properly accounted for. With all of this in mind, the **NWB** understands that Annual Reports (**Part B, Item 1**) have not been filed since 1999 despite numerous reminders from the **NWB** and INAC Water Resources to do so. Annual Reports act as a reporting mechanism to the Board on water and waste matters through the duration of a licence period.

Sufficient detail and an avoidance of ambiguity should be followed in submitting response materials to the following comments:

- i. **(General)** The **NWB** requests a listing of all municipal facilities the Proponent would like included in this licence application. If municipal facilities and works within the municipality are not to be included the Proponent is to outline how they are to be licensed.
- ii. **(General)** For each facility listed by the Proponent in response to **Bullet a.** the **NWB** requests discrete detailed plans and/or engineered drawings of municipal facilities to complement the submitted site map C-1.
- iii. **(General)** The Proponent is to clearly delineate and discuss the location of the barge fuel delivery pipeline relative to the freshwater intake. The **NWB** recommends consulting the Government of Nunavut Department of Sustainable Development's July 30th, 1999 intervener comments. The **NWB** also understands that water sampling has not taken place during fuel barge delivery at BAK-1 (INAC's November 25th, 2003 Inspection Report).

- iv. **(Supplemental Questionnaire Page 2)** As per *II Attachments*, the Proponent is to clearly and sufficiently delineate, highlight, and detail drainage patterns associated with the solid waste disposal area, the location of hazardous waste disposal areas, the locations of environmental monitoring sites, and drainage basins. The Proponent is to also outline areas the community uses for recreation and traditional uses, and sufficiently detail and delineate abandoned and/or restored waste facilities (solid waste, sewage).
- v. **(Supplemental Questionnaire Page 2)** As per *III Water Supply: Water Intake*, The Proponent is to provide further detail of the specifications of the intake screen for the freshwater intake facility.
- vi. **(Supplemental Questionnaire Page 2)** As per *III Water Supply: Water Storage*, The Proponent states that storage tanks are absent yet in *Water Intake 1a*. the Proponent states the presence of emergency water tanks. There is no mention of the Hamlet's piped system. In a supplemental report submitted, by the Proponent (*Site Investigation Report for the Water and Sewage System in the Hamlet of Baker Lake, NU, September 2005*), the Proponent outlines the existence of a piped system for the health centre, hospice, and nurse's residence building. The **NWB** requests consistency in the application with respect to these items. The Proponent is to make the necessary revisions to reflect actuality.
- vii. **(Supplemental Questionnaire Page 5)** As per *III Water Supply: Water Use and Distribution*, The Proponent lists water consumption values. Further information is to be provided in how the parameters were selected. How was the estimated average water consumption rate approximated? What reasoning was in place for this approximation? Was this calibrated with recorded amounts withdrawn? What figure is being used for the estimated number of people on the system? In the submitted *Site Investigation Report for the Water and Sewage System in the Hamlet of Baker Lake, NU, September 2005* a 2004 projection value from the Nunavut Bureau of Statistics was used. What population does the Proponent anticipate towards the end of the requested licence term? Proper referencing and reasoning should be provided with all of this information. What values are for the piped system?
- viii. **(Supplemental Questionnaire Page 6)** As per *III Water Supply: Identification*, The Proponent states that signs identifying drinking water sources have not been erected. As per the expired licence **NWB3BAK9904 (Part B, Item 5 and 6)**, the Proponent was to post necessary signs to identify the water supply facilities by **September 30, 2000**. How does the Proponent plan to take action on this issue? When will these actions take place?
- ix. **(Supplemental Questionnaire Page 6)** As per *IV Sewage Disposal* and the application, the **NWB** understands that sewage is treated via a holding cell and wetland. In considering the Baker Lake application the holding cell is defined as a lagoon. The Proponent has indicated that there have not been any operational problems with the holding cell. This contradicts the many regulatory reports on file. The **NWB** would like to point the Proponent to Environment Canada's August 5th, 1999 Intervener statement. Anne Wilson states the following:

"One of the consistent observations on many inspector's reports is that or erosion at the discharge point. It is recommended that the licence include conditions for regular inspections of the discharge point, and if necessary, erosion protection structure installed."

Part D, Item 4 of Water Licence **NWB3BAK9904** identifies the need for erosion protection at the holding cell. After an inspection of Figures 3 and 4 in the submitted *Site Investigation Report for the Water and Sewage System in the Hamlet of Baker Lake, NU, September 2005* erosion prevention measures appear to be absent.

As per INAC Inspector Scott Stewart's August 23rd, 2005 inspection, the **NWB** understands that:

"The sewage lagoon has no freeboard and sewage is flooding around the berm slowly eroding it. The berm will wash out again if the lagoon is not decanted. The Hamlet should decant the lagoon immediately to prevent another failure of the berm"

INAC Inspectors have clearly identified problems associated with the current sewage lagoon holding cell. The **NWB** would like to point the Proponent to INAC Inspection letters dated

November 25th, 2003, December 2nd, 2002, and November 7th, 2001. The NWB has also reviewed the Government of Nunavut's Department of Sustainable Development Intervention statement dated July 30th, 1999. This letter will not build further on sewage lagoon holding cell issues contained within these reports but recommends that the Proponent revisits these reports.

The NWB requests the following information for the Sewage Disposal System:

- a. Full details on how the sewage lagoon holding cell provides a containment function. The Hamlet of Baker Lake's 1999 Water Licence application states that the berms provide an exfiltration function but more commonly the berms are overtopped. A report shall be submitted by an Engineer practiced in geotechnique and sewage lagoon design registered in Nunavut. This report should include design drawings that are stamped and sealed for the sewage treatment facility.
 - b. Full details are to be provided into what system and structures are in place to convey and channel sewage flow into the holding cell from sewage trucks. Full drawings, appropriately qualified, of systems and structures in place are to be provided.
 - c. Full details into how the sewage lagoon holding cell behaves. Engineering judgment should be used to determine design functions, design retention time, sludge generation and management. This information should be completed by an Engineer registered to practice in Nunavut.
 - d. Full details are to be provided in how effluent waters exit the sewage lagoon holding cell. This should consider anticipated effluent quality and the structural specifics of the outlet as qualified by an Engineer.
 - e. An Engineer, with respect to the **bullets** listed above (**a, b, c, and d**), shall provide adequate detail in how the sewage lagoon holding cell and associated structures will impact or potentially impact waters through the deposition of waste. Limitations to all conclusions stated by an Engineer should also be provided for public and regulatory evaluation. Photographic record should be provided to compliment the submitted discussion.
- x. **(Supplemental Questionnaire Page 7)** As per *IV Sewage Disposal*, the Proponent has given a description of the wetland system. The Board requests a full engineering understanding of the wetland area system. This engineering evaluation is to consider impacts and potential impacts to freshwater through waste and should be appropriately qualified by an Engineer registered in Nunavut. Photographic record should be provided to compliment the submitted discussion. The Proponent has defined the wetland treatment discharge at Baker Lake. As indicated in the Hamlet of Baker Lake's 1999 Water Licence application it has been understood that the inlet to Airplane Lake constitutes the end of the sewage treatment area.

The Board would like to highlight a few issues stated in past correspondence. The NWB requests commentary from the Proponent on each point. These points are listed below.

- a. Mayor David Aksawnee of Baker Lake filed a letter with the Board on January 28th, 2005 indicating that the sewage lagoon system is inadequate for the treatment of raw sewage in Baker Lake.
- b. Earle Baddaloo filed an Intervener statement on behalf of the Government of Nunavut Department of Sustainable Development on August 13th, 1999 where he identifies the existence of fish in the wetland system and questions if the system has an effect on fish.
- c. Alain Chouinard filed an Intervener statement on behalf of the Government of Nunavut Department of Sustainable Development on July 30th, 1999 indicated the inlet of Airplane Lake as the end of sewage treatment and that Airplane Lake should be protected from contamination.

- d. The “*Baker Lake Water Quality Study*” completed by INAC Water Resources (received October 30th, 1996) firmly states that the inlet to Airplane Lake constitutes the end of the sewage treatment and the public should be aware of this information.
- xi. **(Supplemental Questionnaire Page 7)** As per *IV Commercial, Industrial and/or Hazardous Wastes*, the Proponent indicates that commercial and industrial liquid wastes are not being added into the wastewater treatment system affecting the quality of effluent and/or leachate produced. Where and how are industrial and commercial wastes disposed of?
- xii. **(Supplemental Questionnaire Page 8)** As per *IV General Condition of the Sewage Treatment Facilities*, the Proponent deems the system and sewage facility satisfactory. These aspects must be proven through a report appropriately qualified by an Engineer. The Proponent is to refer to **bullets ix, and x** above in conjunction with this bullet.
- xiii. **(Supplemental Questionnaire Page 9)** As per *IV Modifications*, the Proponent states that no changes are planned for the sewage treatment facilities. The **NWB** would like to point the Proponent to **Part E, Items 1 and 3 of NWB3BAK9904**. Here it states that the Board must be notified of modifications to Waste Disposal Facilities and site plans must be submitted 90 days after the modification is complete. As per Scott Stewart's (INAC) November 25th, 2003 inspector's report:
- “There are obvious signs that the lagoon berm was washed out as new fill is evident and sewage solids (toilet paper) are evident below the new berm. There is no record of a spill occurring recently in Baker Lake so this spill and the subsequent repairs of the lagoon must have gone unreported. The lagoon is again close to overflowing with approximately 50cm of freeboard. Despite the replaced portion of the berm the lagoon is discharging continuously, The Hamlet is required to provide a summary of modifications and/or major maintenance work carried out on the Water Supply and Waste Disposal Facilities. A washed out berm in the holding cell of the sewage disposal facility would definitely fall under this requirement.”*
- The **NWB** requests a list outlining all modifications to the sewage treatment facilities from 1999 onward. The Proponent is to include discussion, site plans and design drawings of such modifications.
- xiv. **(Supplemental Questionnaire Page 9)** As per *IV Modifications*, the Proponent indicates that the municipality and residents do not believe that changes are to be made to the sewage treatment facilities. Has consideration been given to Mayor David Aksawnee's January 28th, 2005 letter to the **NWB**? How has the community been consulted on this matter? The **NWB** requests detailed answers to these questions.
- xv. **(Supplemental Questionnaire Page 9)** As per *IV Abandonment and Restoration*, the Proponent did not list and describe the abandoned and restored sewage treatment facilities. The **NWB** would like further detail in how sewage was treated prior to the installation of the current sewage treatment facility. The **NWB** requests appropriate delineation and discussion on past waste practices and requests an evaluation of the current waste sites including photographic record.
- xvi. **(Supplemental Questionnaire Page 9)** As per *IV Identification*, the Proponent did not list an answer. The **NWB** would like to also point the Proponent to **Part B, Item 6** of Water Licence **NWB3BAK9904**.
- xvii. **(Supplemental Questionnaire Page 10)** As per *V Waste Reduction*, the Proponent states that waste is incinerated. The **NWB** would like further detail in what materials are burned, and how these materials are gathered and managed. How are byproducts from the burnt waste managed and disposed of? Photographic record should be provided to compliment the submitted discussion. The **NWB** would like to point the Proponent and all Regulatory bodies to Figure 6 of INAC's inspection report dated November 25th, 2003.
- xviii. **(Supplemental Questionnaire Page 10)** As per *V Animal Carcasses Pit*, the Proponent describes the disposal location to be in an isolated area with good drainage and cover specifications. The Proponent is to provide further information that appropriately delineates the

location within the solid waste facility, how drainage is managed (through specifics), and cover specifications and management protocol for the area. As per INAC's inspection report dated December 2, 2002, the area adjacent to Sewage Lake, where a large amount of animal remains, have been removed from the dump and this practice should not be continued.

- xix. **(Supplemental Questionnaire Page 10)** As per *V Waste Oil Pit*, the Proponent indicates there is a waste oil protocol in place. Question 8 of the Water Licence Application form does not indicate waste oil as a waste. The Proponent is advised to alter the Application form to reflect actuality. As per INAC's August 23rd, 2005 inspection a number of drums of waste had been placed on pallets and waste oil is a problem and should be used in the waste oil burner. INAC's December 3rd, 2002 inspection report details that waste oil drums were located in a ditch with visible indications that oil had leaked out. The Proponent is to provide sufficient detail in what protocols and management strategy in place to manage waste oil and waste oil drums within the Hamlet.
- xx. **(Supplemental Questionnaire Page 10)** As per *V Bulky Scrap Metal Waste Disposal Area*, the Proponent indicates there is protocol in place for bulky scrap metal. Question 8 of the Water Licence Application form does not indicate scrap metal as a waste. The Proponent is advised to alter the Application form to reflect actuality. The **NWB** requests additional information (including photographic record and site maps) in how bulky scrap metal waste is managed and what management protocols and procedures are in place.
- xxi. **(Supplemental Questionnaire Page 11)** As per *V Commercial, Industrial and or Hazardous Wastes Disposal Area*, commercial or industrial waste is not being discharged or deposited in the solid waste disposal area. If this is not the case, where is commercial and industrial waste discharged and disposed of in the Municipality? The **NWB** requests full detail on what system is in place to handle commercial and industrial waste.
- xxii. **(Supplemental Questionnaire Page 11)** As per *V Commercial, Industrial and or Hazardous Wastes Disposal Area*, the Proponent indicates there is protocol in place for hazardous waste. Question 8 of the Water Licence Application form does not indicate hazardous waste as a waste. The Proponent is advised to alter the Application form to reflect actuality. The Proponent states that the Hamlet follows environmental guidelines set out in publications issued by various government departments. The **NWB** would like detailed references to each guideline the Hamlet follows.
- xxiii. **(Supplemental Questionnaire Page 11 and 12)** As per *V General Condition of the Solid Waste Disposal Area*, the Proponent rules the Solid Waste Disposal Area as satisfactory and indicates that no changes are needed nor planned.

Referencing INAC's August 23rd, 2005 inspection the **NWB** understands that "*the landfill has not been covered in quite some time and should be covered quite soon as waste has built up quite a bit since last year.*" and "*batteries are generally stacked on pallets and hopefully will be shipped down south this fall*".

Referencing INAC's November 25th, 2003 inspection report the **NWB** understands that "*no containment exists for hazardous material (i.e. batteries) and run off from the landfill into Finger Lake is a concern. Steps need to be taken to control leachate and prevent it from entering Finger Lake*".

Scott Stewart (INAC) had also identified in his November 25th, 2003 inspection report that there were issues with results obtained from SNP's BAK-2 and BAK-4.

- a. BAK 2 - "*The sample location is just downstream of the first pond which is a catchment for effluent leaving the lagoon. The results for BAK-2 exceeded Licensed Guidelines for Total Iron (1021 ug/L >> 300 ug/L) Canadian Water Quality Guidelines for the Protection of Aquatic Life 2002. The samples also greatly exceeded the Canadian Guideline for phenol concentration (165 ug/L >> 4.0 ug/L). The elevated iron and phenol levels may be a result of runoff from the landfill which is very close to Finger Lake*".

- b. BAK 4 – “Water samples taken at BAK-4 were very high in total iron with a concentration of 1860 ug/L greatly exceeding the Canadian Guideline of 300 ug/L. As this concentration is much greater than the concentration measured in Finger Lake the contamination may be coming from the old landfill site which is close by. Problems with leachate should have been addressed in an A&R plan for the old site but I have found no evidence of an A&R Plan”.

Referencing **INAC's** December 3rd, 2002 inspection report the **NWB** understands that “There are 3 culverts that drain from the dump to the sewage treatment lake. Enclosed analysis of seepage samples from the dump at (BAK-4) indicate that Total Ammonia (72.8 mg/L vs. 2.2 mg/L), Turbidity (2160 NTU vs. 8 NTU), Total Suspended Solids (658 mg/L vs. 120 mg/L) and Biological Oxygen Demand (180 mg/L vs. 100 mg/L)”.

The NWB requests the following information for Solid Waste Facilities:

- a. Full details on how the landfill provides a containment function. A report shall be submitted by an Engineer practiced in geotechnique and landfill design registered in Nunavut. This report should include design drawings that are stamped and sealed for all solid waste facilities.
- b. Full details are to be provided into what system and structures are in place to convey, channel, and manage leachate flow within solid waste facilities. Full details are also to be provided indicating what structures and management techniques are in place to limit freshwaters entering landfill facilities. Full drawings, appropriately qualified, of systems and structures in place are to be provided.
- c. Full details into how solid waste facilities behave. Engineering judgment should be used to determine design functions, anticipated leachate amounts generated through operation, leachate treatment and management, cover specifications, and appropriate delineation of the entire facility. This information should be completed by an Engineer registered to practice in Nunavut.
- d. Full details are to be provided in how effluent waters (treated leachate) exit landfill facilities. This should consider anticipated effluent quality, the structural specifics of the outlet as qualified by an Engineer.
- e. An Engineer, with respect to the **bullets** listed above (**a, b, c, and d**), shall provide adequate detail in how the solid waste facilities and associated structures will impact or potentially impact waters through the deposition of waste. Limitations to all conclusions stated by an Engineer should also be provided for public and regulatory evaluation. Photographic record should be provided to compliment the submitted discussion.

xxiv. **(Supplemental Questionnaire Page 12)** As per *V Abandonment and Restoration*, the Proponent states “N/A”. Was waste deposited at a site other than where it is currently deposited? If so, please fully delineate and adequately develop an Abandonment and Restoration plan for the facility. The **NWB** would like to point the Proponent to INAC's November 23rd, 2003 inspection report that states “an A&R plan has not been developed for the old landfill”.

xxv. **(Supplemental Questionnaire Page 12)** As per *V Identification*, the Proponent did not fill in a response.

xxvi. **(Supplemental Questionnaire Page 12)** As per *VI Inspection and Monitoring*, it appears as if the Proponent has not installed spill contingency procedures through a Spill Contingency Plan. The Proponent is to prepare a Spill Contingency Plan in accordance with the “*Northwest Territories Water Board Guidelines for Contingency Planning (1987)*”. If you do not have a copy of this guideline make the **NWB** aware and a copy will be sent to you.

xxvii. **(Supplemental Questionnaire Page 13)** As per *VI Inspection and Monitoring*, the Proponent states that no spills have occurred in the past 5 years. The NWB would like the Proponent to restate that this is the case. The **NWB** would suggest contacting the Government of Nunavut's

Environmental Protection Division. The **NWB** requests a complete chronological listing of all spills occurring since 1999 with a brief description of the spill event and response measures taken by the Hamlet.

- xxviii. **(Supplemental Questionnaire Page 13)** As per *VI Inspection and Monitoring*, the Proponent states that “*Samples are taken at intake site in Baker Lake and periodically before water is placed into the truck*”. The **NWB** would like further detail on the determined frequency of sampling. What is involved in the decision making process in when and how a water sample is taken?
- xxix. **(Supplemental Questionnaire Page 13)** As per *VI Inspection and Monitoring*, the Proponent states that “*Samples are taken at designated monitoring stations in bottles provided for samples*”. The **NWB** requests sufficient detail in the location of where samples are taken from. This should include appropriate delineation through a site map and detailed discussion on the reasoning behind the selection of these locations.
- xxx. **(Supplemental Questionnaire Page 13)** As per *VI Inspection and Monitoring*, the Proponent does not state the level of training for Jeremy Singaqti. The **NWB** requests this information to be provided in the revised application. The NWB also requests details pertaining to the certification level of National Testing Laboratories Ltd.
- xxxi. **(Supplemental Questionnaire Page 14)** As per *VII Public Consultation*, the Proponent states that the public consultation has not taken place on issues related to the municipal water supply and waste disposal. The Proponent also states that there are no public concerns related to water supply and waste disposal. The **NWB** would like to point the Proponent to Mayor David Aksawnee’s January 28th, 2005 letter to the **NWB**.
- xxxii. **(Supplemental Questionnaire Page 15)** As per *VIII Public Health*, the Proponent states, under Monitoring Program, that samples are taken by CGS at designated monitoring stations. The **NWB** requests detailed particulars in how samples are collected, what is being analyzed in the samples, what sampling protocols are in place, and the location where samples are to be collected (through appropriate delineation).
- xxxiii. **(Supplemental Questionnaire Page 16)** As per *VIII Public Health*, the Proponent lists Environmental Health Services as the laboratory that performs the analysis. Is this a governmental laboratory or are samples sent off site? The Proponent also briefly mentions changes to the water quality monitoring program. The Proponent is to clearly detail all changes to the Monitoring Program. Please consult **Bullet xxxii** in preparing a response to this
- xxxiv. **(Supplemental Questionnaire Page 16)** As per *IX Technical Information*, the Proponent lists a population of 1500 and an estimated growth rate of 2% over the next 5 years. The NWB requests an appropriate reference to these values.
- xxxv. **(Supplemental Questionnaire Page 17)** As per *VIII Technical Information*, the Proponent lists a set of documents prepared by Jianguo ‘George’ Zhang in September 2005. It should be noted that these reports conflict with materials found within the supplemental questionnaire. It should also be noted that the contents of these reports have not been appropriately qualified and are reference documents only (they have not been completed by a P.Eng registered in Nunavut). The **NWB** advises in comparing the reference documents to the answers provided in the application and supplemental questionnaire.
- xxxvi. **(Supplemental Questionnaire Page 17)** As per *VIII Technical Information*, the Proponent states that elders have not been consulted in the collection of baseline data on main water bodies in the area despite concerns brought up by the community. Does the Proponent believe that community consultation is not needed?

In closing the **NWB** requests a detailed response to the bulleted items in this letter. The **NWB** would like the Proponent to understand that the waste disposal facilities (wetland, holding cell, and solid waste facilities) should be considered as discrete when filing application materials. It is understood that that the waste disposal facilities are connected and influence one another but each facility should be considered independent in communicating its function, operation, and design. This will compliment cumulative and influential effects each individual facility has on one another. **The NWB requests an implementation plan, with approximate timelines, that clearly explains what and how additional application materials for the sewage lagoon holding cell, wetlands system, and solid waste facilities (Bullets ix, x, xxiii) will be provided to the Board. The NWB would like to remind the Proponent that the Hamlet of Baker Lake is currently unlicensed and requests this implementation plan no later than 60 days following the issuance date of this letter (August 19th, 2006). If there are any questions whatsoever regarding the scope of the implementation plan the NWB suggests that you contact the undersigned.**

The **NWB** would like to remind the Proponent that **Section 70 Item (c)** of the NWNSRTA allows the Board to install licence conditions that it considers appropriate including conditions relating to the quality, concentration and types of waste that may be deposited and the manner of depositing waste, and studies to be undertaken, works to be constructed, plans, including contingency plans, to be submitted, and monitoring programs to be undertaken.

Should you have any questions regarding the above, please feel free to contact the undersigned at (867) 360-6338.

Sincerely,

Original signed by:

Joe Murdock
Technical Advisor

cc. Dennis Zettler (Hamlet of Baker Lake)
Jim Rogers (INAC)
Peter Kusugak (INAC)
Wayne Thistle (GN-CGS)

Encl. INAC Inspector Reports (2005, 2003, 2002, 2001)
Mayor David Aksawnee of Baker Lake letter dated January 28th, 2005