



Mackenzie Valley Land and Water Board
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Staff Report

Applicant: City of Yellowknife	
Location: Yellowknife, NT	Application: MV2009L3-0007
Date Prepared: January 7, 2019	Meeting Date: January 17, 2019
Subject: Request for monthly Yellowknife Bay water withdrawal	

1. Purpose/Report Summary

The purpose of this Report is to present to the Mackenzie Valley Land and Water Board (MVLWB/the Board) a request from the City of Yellowknife (City) to withdraw water from Yellowknife Bay on a monthly basis for the purpose of maintaining the pumps in Pumphouse #1.

2. Background

- May 31, 2010 – Issuance of Licence MV2009L3-0007;
- December 29, 2017 – Request received;
- January 5, 2018 – Review commenced;
- January 25, 2018 – Reviewer comments and recommendations due and received;
- January 31, 2018 – City’s request to extend the comment response deadline granted by Board staff;
- February 16, 2018 – Responses received;
- March 5, 2018 – Information Request sent to the Chief Environmental Health Officer;
- March 14, 2018 – Response to Information Request received;
- December 21, 2018 – City submits additional information regarding arsenic testing equipment and procedures;
- **January 17, 2019 – Request presented to the Board for decision;** and
- May 30, 2022 – Expiration of Licence MV2009L3-0007.

3. Discussion

Licence Requirements

MV2009L3-0007 defines Water Supply Facilities as “the area and associated intake infrastructure, as identified in Water Licence Renewal Application – Supplementary Report, figure titled ‘Map #2 Piped Water System’, and dated March 24, 2009” (see map attached). Pumphouse #2 is located at the Yellowknife River just upstream of the bridge. Pumphouse #1 is on Yellowknife Bay, just off of School Draw Avenue.

Part C, condition 1 of MV2009L3-0007 states: “The Licensee shall obtain all Waters from the Yellowknife River using the Water Supply Facilities for municipal undertakings as described in the Water Licence Application received by the Board on July 10, 2009 or as otherwise approved by the Board.” The City’s water licence Application included reference to Yellowknife Bay as the alternative source of raw water (see municipal questionnaire attached), as well as a description of the ability of Pumphouse #1 to draw water from Yellowknife Bay in an emergency (see the WL Renewal Supplementary Report attached).

Submission History

On November 12, 2015 the City notified the Board that they would be withdrawing water from Yellowknife Bay on November 19, 2015 to be used for commissioning activities at the new Water Treatment Plant (WTP) (attached). Specifically, the City wanted to test the emergency response capabilities of the new WTP, including high flow testing, given that Yellowknife River will not be used in the case of an emergency due to the limited flow rate.

Following a Board request for further information about withdrawal details from Yellowknife Bay (attached) and the City’s response (attached), the Board wrote to the City on April 18, 2016 (attached) stating that:

1. It approved the City’s request to withdraw water from Yellowknife Bay on a one-time basis; and
2. Should the City find it necessary to withdraw water from Yellowknife Bay for use in a non-emergency situation in the future, the City is required to submit a written request for approval, for the Board’s consideration, a minimum of 40 days prior to the commencement of the withdrawal. The request should include the following information:
 - a) The proposed use for the water;
 - b) The rationale for requiring Yellowknife Bay as the source; and
 - c) The estimated duration and quantity of water to be used.

Submission Description

On December 29, 2017 the City submitted a request (attached) to withdraw water from Yellowknife Bay on a monthly basis, for the purpose of monthly maintenance required for the Yellowknife Bay pumps at Pumphouse #1. The City noted that the monthly maintenance requirement is outlined in the Equipment Supplier’s Operations and Maintenance Manual for the pumps, to ensure they are working properly in the case of an emergency.

The pumps will be run for approximately 1 hour per month and will remove approximately 300 m³ from Yellowknife Bay. The water that is to be withdrawn from Yellowknife Bay for the pump maintenance will be processed through the WTP and distributed in the same manner as water from Yellowknife River. The City will submit a summary of dates, duration and volumes of water withdrawn, along with any other relevant information, in quarterly SNP reports. The City noted that it completes arsenic testing on Yellowknife Bay water on a monthly basis, and that the results are well below the Health Canada maximum acceptable concentration for arsenic in drinking water (10 µg/L).

4. Comments

N/A

5. Reviewer Comments

By January 25, 2018, comments and recommendations on the City's request were received from seven reviewers:

- Fisheries and Oceans Canada: Triage Group Fisheries Protection Program;
- Lois Little (general public);
- Robert Stephen (general public);
- Wayne Balanoff (general public);
- The Government of the Northwest Territories Department of Environment and Natural Resources (GNWT-ENR);
- North Slave Metis Alliance (NSMA); and
- Yellowknives Dene First Nation (YKDFN).

The City responded on February 16, 2018. The Review Summary and Attachments (attached) present the concerns identified through this review.

Several reviewers (Comment ID: Lois Little 1, Robert Stephen 1, and 3, Wayne Balanoff 1, GNWT-ENR 1, NSMA 2, YKDFN 1 and 2) indicated concerns with the withdrawal of water from Yellowknife Bay for maintenance of the Pumphouse #1 emergency pumps. These concerns were primarily associated with the fact that Yellowknife Bay water will be processed through the WTP and distributed in the same manner as water from the Yellowknife River. Some of the reviewers specifically expressed uncertainty regarding Yellowknife Bay water being a safe drinking water source given legacy arsenic contamination and other known contaminants associated with former mining operations at the Giant Mine Site.

Two reviewers (Comment ID: Robert Stephen 2, GNWT-ENR 2) recommended that the Board consider an amendment to MV2009L3-0007 for the monthly withdrawal from Yellowknife Bay for maintenance of the emergency pumps.

GNWT-ENR (Comment ID: 3 and 4) recommended that, to address public concern, the City install an arsenic detection system in the City's WTP, along with describing how, or when, the arsenic treatment system would be installed. GNWT-ENR also recommended providing a breakdown of the efficacy of that treatment system in removing arsenic to the levels below the drinking water standard.

Finally, the focus of two reviewers (Comment ID: NSMA 1, YKDFN 3) was related to confusion over the monthly maintenance requirement for the Pumphouse #1 emergency pumps and how the requirement had been met prior to the City requesting a monthly withdrawal from Yellowknife Bay.

Following the City's response to reviewer comments, Board staff issued an Information Request (IR) to the Chief Environmental Health Officer (CEHO), in an effort to clarify whether the water that would be obtained by the City of Yellowknife, should their request for monthly Yellowknife Bay water withdrawals be approved, be suitable for human consumption (under the *Public Health Act*).

The full IR from March 5, 2018 and the CEHO's responses from March 14, 2018 are attached. The CEHO and Chief Public Health Officer indicated that they are satisfied that the requested 300 m³ of water/month that would be withdrawn from Yellowknife Bay is safe to use for drinking water purposes. Further, the CEHO stated that the *Water Supply System Regulations* that set the standards for the NWT's drinking water systems (through adopting the *Guidelines for Canadian Drinking Water Quality*) require a minimum of one test for chemicals each year for community drinking water systems; therefore, the City's monthly

testing of arsenic for Yellowknife Bay water exceeds this requirement. Additionally, the IR confirmed that the Office of the Chief Public Health Officer had previously given the City authorization to use Yellowknife Bay as a water source for the city once per month. Finally, when asked about the utility and possible type of arsenic detection and treatment systems that should be installed at the existing WTP, the Chief Public Health Officer concluded that the City's current plant was designed to meet the requirements of territorial legislation and national guidelines.

On December 21, 2018, the City submitted additional information regarding new arsenic detection equipment, along with procedural documentation for use by their staff (attached). The City stated in their submission that they will test Yellowknife Bay water before any volume is withdrawn, and that if arsenic concentrations above 10 µg/L are detected, water will not be withdrawn, and the Inspector, Public Health Officer, and Environmental Health Officer will be notified immediately.

6. Security

Not applicable.

7. Conclusion

Board staff conclude that the information received from the Chief Environmental Health Officer following the IR, along with further information that was provided by the City, adequately addresses reviewer comments. The CEHO and Chief Public Health Officer have indicated they are not concerned with the quantity or quality of water that the City is requesting to withdraw from Yellowknife Bay for maintenance of the emergency pumps at Pumphouse #1. By committing to test the Yellowknife Bay water before any volume is withdrawn with their new arsenic detection equipment, the City is addressing several comments made regarding concern of the arsenic levels in Yellowknife Bay water and GNWT-ENR's comments about the need for an arsenic detection system.

The City followed the Board procedure outlined in the April 18, 2016 letter for non-emergency water withdrawal from Yellowknife Bay, including providing information regarding the proposed use for the water, rationale for requiring Yellowknife Bay as the source, and estimated duration and quantity of water to be used.

The City has committed to including a summary of dates, duration and volumes of Yellowknife Bay water withdrawn for emergency pump maintenance, along with any other relevant information, in subsequent quarterly SNP reports.

8. Recommendation

Board staff recommend **the Board make a motion to approve the monthly Yellowknife Bay Water Withdrawal request and associated reasons for decision** for water licence MV2009L3-0007.

9. Attachments

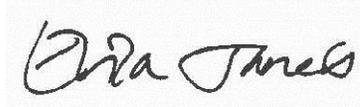
- [Map #2 Piped Water Systems](#)
- [Municipal Questionnaire to accompany MV2009L3-0007 Application](#)
- [WL Renewal Supplementary Report](#)
- [November 12, 2015 submission from the City regarding water withdrawal](#)
- [February 18, 2016 Board request for further information](#)
- [March 1, 2016 City response](#)

- [April 18, 2016 Board directive to the City regarding Yellowknife Bay as a water source](#)
- [City of Yellowknife's Request for monthly Yellowknife Bay water withdrawals](#)
- [March 5, 2018 Information Request to Chief Environmental Health Officer](#)
- [March 14, 2018 IR Response from Chief Environmental Health Officer](#)
- [December 21, 2018 City submission of additional information](#)
- Review Summary and Attachments
- Draft Reasons for Decision
- Draft Decision Letter from the Board

Respectfully submitted,



Kimberley Murray
Regulatory Specialist



Erica Janes
Regulatory Specialist



Heather Scott
Senior Technical Advisor

Review Comment Table

Board:	MVLWB
Review Item:	City of Yellowknife - Request for Monthly Yellowknife Bay Water Withdrawal (MV2009L3-0007)
File(s):	MV2009L3-0007
Proponent:	City of Yellowknife
Document(s):	MV2009L3-0007 - City of YK - REQUEST FOR MONTHLY BAY WATER USAGE - Dec29-17 (181 KB)
Item For Review Distributed On:	Jan 5 at 09:07 Distribution List
Reviewer Comments Due By:	Jan 25, 2018
Proponent Responses Due By:	Feb 16, 2018
Item Description:	<p>Update - January 31, 2018: the City of Yellowknife has requested an extension to the response deadline for this review. The deadline has been moved to February 16, 2018.</p> <hr style="border-top: 1px dashed #000;"/> <p>The City of Yellowknife has submitted a request to withdraw water from Yellowknife Bay on a monthly basis, for the purpose of monthly maintenance required for the Yellowknife Bay (emergency) pumps at Pumphouse 1.</p> <p>The City's Water Licence MV2009L3-0007 defines the Water Supply Facilities as the area and associated intake infrastructure as identified on Map 2, dated March 24, 2009. The water sources licensed under MV2009L3-0007 are included in Part C, condition 1:</p> <p style="text-align: center;"><i>The Licensee shall obtain all Waters from the Yellowknife River using the Water Supply Facilities for municipal undertakings as described in the Water Licence Application received by the Board on July 10, 2009 or as otherwise approved by the Board.</i></p> <p>The Water Licence Application referred to in Part C, condition 1 included the following information regarding the City's water source:</p> <ul style="list-style-type: none"> • Yellowknife River is the primary raw water source, and Yellowknife Bay is the alternative source (Section 2.3 of the Municipal Questionnaire); and • The City receives all of its potable water from the Yellowknife River; Pumphouse No. 1 also has the ability to draw water from Yellowknife Bay in an emergency. Water from Yellowknife Bay of Great Slave Lake would only be used for emergency purposes (failure of Pumphouse No. 2 to

	<p>supply) (Sections 4.1 and 4.7.1 of the Water Licence Renewal Application Supplementary Report).</p> <p>On November 12, 2015, the City notified the Board that they would be withdrawing water from Yellowknife Bay on November 19, 2015 for the purposes of commissioning the new Water Treatment Plant. At that time, the City asked the Board for direction and clarification on the process for switching from the primary to secondary water source, and the information they should be submitting when the City withdraws water from Yellowknife Bay.</p> <p>The Board requested further clarification around water withdrawal details in its letter to the City of February 18, 2016. In response, the City submitted additional information on March 1, 2016 and stated that they do “not foresee any future occasions when the Yellowknife Bay will be required as a water source other than in an emergency situation.” Upon conclusion of a public review of the City’s Yellowknife Bay withdrawal request in 2016, the Board wrote to the City on April 18, 2016 that:</p> <ol style="list-style-type: none"> 1. It approved the City’s request to withdraw water from Yellowknife Bay on a one-time basis; and 2. Should the City find it necessary to withdraw water from Yellowknife Bay for use in a non-emergency situation in the future, the City is required to submit a written request for approval, for the Board’s consideration, a minimum of 40 days prior to the commencement of the withdrawal. The request should include the following information: <ul style="list-style-type: none"> o The proposed use for the water; o The rationale for requiring Yellowknife Bay as the source; and o The estimated duration and quantity of water to be used. <p>The City’s current request to use Yellowknife Bay water is in accordance with the Board’s direction from April 18, 2016 (above). Reviewers are invited to submit questions, comments and recommendations on the City’s request by January 25, 2018.</p> <p>If you have questions or comments regarding this review or the Online Review System, please contact Erica Janes at (867)766-7466 or ejanes@mvlwb.com.</p>
<p>General Reviewer Information:</p>	<p>In addition to the email distribution list, the following organizations received review materials by fax:</p> <ul style="list-style-type: none"> • Fort Resolution Métis Council - Trudy King (867)394-3322; • Hay River Metis Council - Trevor Beck, President (867)874-4472; and • Northwest Territory Metis Nation - Tim Heron, NWTMN IMA Coordinator (867)872-3586.
<p>Contact Information:</p>	<p>Erica Janes 867-766-7466 Heather Scott 867-766-7463 Jen Potten 867-766-7468</p>

Comment Summary

City of Yellowknife (Proponent)				
ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Staff Analysis
1	General File	<p>Comment (doc) LETTER TO MVLWB IN RESPONSE TO REVIEWER COMMENTS ON REQUEST FOR MONTHLY BAY WATER WITHDRAWLS FOR MAINTENANCE PURPOSES - FEBRUARY 16, 2018</p> <p>Recommendation</p>	N/A	Noted.
Fisheries and Oceans Canada: Triage Group Fisheries Protection Program				
ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Staff Analysis
1	Yellowknife Bay Water Withdrawal	<p>Comment No concerns.</p> <p>Recommendation Ensure that intake pumps have proper screens to prevent fish impingement.</p>	Feb 16: The intake pipe at Pumphouse #1 has a screen designed to prevent fish impingement.	Noted.
General Public: Lois Little				
ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Staff Analysis
1	City of Yellowknife - Request for Monthly Yellowknife Bay Water Withdrawal (MV2009L3-0007)	<p>Comment In these times of great uncertainty including government commitment to public safety and environmental protection, Yellowknifers should never be complacent about the ever looming threat of 237,000 tonnes of arsenic trioxide at the Giant Mine site to our water systems. The Yellowknife River continues to be the safest source of drinking water.</p> <p>Recommendation As this article and report says, Yellowknife should spend an extra \$15 million to keep taking its drinking water from the Yellowknife River, not from Yellowknife Bay. I agree. https://cabinradio.ca/report-</p>	Feb 16: The item under review is the use of 300 cubic metres of water from Yellowknife Bay on a monthly basis for maintenance purposes. This represents less than 0.1% of the City's annual water usage.	<p>Yellowknife Bay water usage concerns are acknowledged.</p> <p>The City has submitted a request to withdraw Yellowknife Bay water for the purpose of monthly maintenance of the Pumphouse #1 emergency pumps in order to be prepared for an emergency; the primary source of drinking water remains the Yellowknife River,</p>

		tells-city-to-stick-with-yellowknife-river-for-water/		as stipulated in MV2009L3-0007.
General Public: Robert Stephen				
ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Staff Analysis
1	City of Yellowknife request to draw water from Yellowknife Bay on a Monthly Basis	<p>Comment A growing concern for arsenic and other contamination at Giant Mine was the circumstance for moving the water draw from Yellowknife Bay to the Yellowknife River in 1968. Have the circumstances changed? The contamination still exists at Giant mine. City officials, MVLWB and most residents are aware of the arsenic trioxide contamination at Giant Mine (237,000 tonnes of arsenic trioxide stored underground). Giant Mine Remediation Project Annual Reports, critiqued by the Giant Mine Oversight Board (GMOB) indicate that we are still a long way from getting it right at Giant. Giant Mine remediation will only occur within the fenced perimeter of Giant Mine. Full remediation is not expected to begin until 2021 and currently Giant Mine is under care and maintenance during the planning for remediation. The Health Effects Monitoring Program (HEMP) is just beginning to examine the effects of arsenic on residents of Yellowknife, Ndilo and Dettah due to Giant Mine remediation. It's not clear who is responsible, coordinates the approach and what the plan is for offsite contamination from Giant Mine. GMOB (Giant Mine Oversight Board, 2017,</p>	<p>Feb 16: Pumphouse #1 was not designed to cycle water back into Yellowknife Bay, and would require a significant and costly retrofit in order to do so. It should be noted that the City does Bay Water arsenic testing on a monthly basis; all test results (from 2005 to present) are well below Health Canada's maximum acceptable concentration of arsenic in drinking water of 10µg/L.</p>	<p>On December 21, 2018 the City submitted a document with additional information. The document indicated that a summary of dates, duration and volumes of water withdrawn, along with any other relevant information will be submitted in subsequent quarterly SNP reports. Additionally, the City will test the Yellowknife Bay water for arsenic before any volume is withdrawn using a Quick™ Rapid Arsenic Test Kit.</p> <p>This testing will ensure that the small volume of water from Yellowknife Bay that does get processed through the Water Treatment Plant and distributed to residents will be below 10 µg/L (the maximum acceptable concentration as per the Guidelines</p>

		<p>Establishment Report, p. 22) recommends that the federal, territorial and municipal governments make it a priority to initiate a process to ensure off-site contamination is appropriately addressed to protect public health and the environment. AECOM/City of Yellowknife May 10, 2011, Yellowknife Water Treatment Plant Information Session presentation concludes the information about arsenic within Yellowknife Bay is limited, and that long term elevation of arsenic above (drinking water quality standards) 10 ug/l is possible. Yellowknife's new water treatment plant is not equipped to treat arsenic. A passive approach (mixing Yellowknife Bay water with Yellowknife River water within the reservoir) is suggested for mitigating arsenic effects before water is delivered to customers. AECOM, City of Yellowknife, December 6, 2017 Potable Water Source Selection Study recommends an adsorptive media treatment option, however concludes that the option would not be able to remove enough arsenic to meet drinking water standards at all times during a major failure of arsenic treatment at Giant Mine.</p> <p>Recommendation Is it really necessary to mix Yellowknife Bay water with licenced Yellowknife River water? Why not cycle the water drawn from Yellowknife Bay for maintenance back into Yellowknife Bay avoiding any risk from drawing raw water a</p>		<p>for Canadian Drinking Water Quality).</p>
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		few kilometers downstream from the arsenic trioxide and other contamination at Giant Mine.		
2	None	<p>Comment Why is it an emergency now, when the new water treatment plant was commissioned November 19, 2015, 26 months ago. Why the gap in maintenance? Has the pump maintenance plan not been followed for the past 26 months? How were the pumps to Yellowknife Bay maintained in the past? AECOM, City of Yellowknife, December 6, 2017, Potable Water Source Selection Study indicates the City of Yellowknife has the ability to pump raw water from Yellowknife Bay, however YK Bay water draws would be for an emergency when the "normal water supply from the Yellowknife River is unavailable." Water licence MV20009L3-0007, issued to the City of Yellowknife by the MVLWB grants permission to draw raw water (3.6 million cubic metres per year/ not to exceed 575,000 cubic metres per month) from only the Yellowknife River between 2010 and 2022. While the appended licence surveillance network program describes a station (#0032-2) for monitoring the quantity of Yellowknife Bay water for use as an emergency municipal potable water supply source, water quality sampling is not required at the station. There are no other conditions in the licence that speak to Yellowknife Bay as an emergency raw water source.</p>	<p>Feb 16: No Comment - Recommendation from reviewer is directed to the MVLWB</p>	<p>Part C, condition 1 of MV2009L3-0007 states: "The Licensee shall obtain all Waters from the Yellowknife River using the Water Supply Facilities for municipal undertakings as described in the Water Licence Application received by the Board on July 10, 2009 or as otherwise approved by the Board." The City's water licence application included reference to Yellowknife Bay as the alternative source of raw water (see the municipal questionnaire), as well as a description of the ability of Pumphouse #1 to draw water from Yellowknife Bay in an emergency (see the WL Renewal Supplementary Report). On April 18, 2016 the Board wrote the City stating that the City should submit a written request for approval, for the Board's</p>

		<p>Recommendation Does planning for an emergency (one hour maintenance per month) constitute an emergency? A request to the MVLWB for regular water draws from Yellowknife Bay should constitute changes/amendments to water licence MV20009L3-0007. At best, there should be licence conditions including but not limited to:</p> <ul style="list-style-type: none"> - identifying Yellowknife Bay as a raw water source; - reasons for using Yellowknife Bay as a raw water source (e.g. an emergency where normal water supply from the Yellowknife River is unavailable); - water quantity and water quality sampling and a threshold where raw water cannot under any circumstances be drawn from the Bay (e.g. exceeds drinking water standards for arsenic concentration of 10 ug/l). 		<p>consideration, a minimum of 40 days prior to the commencement of withdrawing water from Yellowknife Bay for use in non-emergency situations in the future.</p> <p>As per the Board's April 18, 2016 directive, the City's request has outlined the proposed use for the water for the non-emergency situation, rationale for requiring Yellowknife Bay as the source, and the estimated duration (approximately 1 hour on a monthly basis) and quantity (300 m³) of water to be used. On December 21, 2018 the City committed to testing the Yellowknife Bay water for arsenic before any volume is withdrawn using a Quick™ Rapid Arsenic Test Kit.</p>
3	None	<p>Comment City administration consistently sends the message that Yellowknife Bay water is safe from arsenic contamination. In the December 29, 2017 letter request for monthly Bay draws to the MVLWB, 5 of 7 paragraphs are devoted to assuring that Yellowknife Bay is a stable raw water source below the safe drinking water</p>	<p>Feb 16: The request from the City is to use water from Yellowknife Bay on a monthly basis for maintenance purposes. As has been shown through monthly arsenic testing of water, the water at Yellowknife Bay intake at Pumphouse #1 meets, and often exceeds, the Canadian Drinking Water Guidelines. The City continues to do its</p>	<p>See staff note at Comment ID Lois Little 1.</p>

	<p>guideline of 10 ug/l arsenic. During the past decade, City administration has promoted a Yellowknife River vs Yellowknife Bay discussion based on the impending \$10 million-\$33 million cost to replace the 8.5 km pipeline to the Yellowknife River around 2020. AECOM, City of Yellowknife May 10, 2011, Yellowknife Water Treatment Plant Information Session presentation compares Yellowknife Bay and Yellowknife River sources of raw water and lays out how capital and operating costs would be less with the Yellowknife Bay source. It addresses arsenic contamination research at length and based on current scientific research concludes that long term elevation of arsenic above 10 ug/l is possible. It further recommends a water treatment plant using Yellowknife Bay as its raw water source combined with an arsenic treatment stage. CBC News North, June 27, 2016, Weighing Options, Yellowknife Drinking Water Up For Discussion reported that City Council was to discuss the options of replacing the Yellowknife River 8 km water pipeline at a cost of \$20 million or drawing water from Yellowknife Bay at an upgrade cost of \$5 million for an arsenic treatment option at the water treatment facility. AECOM, City of Yellowknife, December 6, 2017, Potable Water Source Selection Study concludes that the Yellowknife River</p>	<p>due diligence in evaluating all options for the future drinking water source for Yellowknife. At this time, the City is not requesting a change in its primary water source.</p>	
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		<p>source with a new submarine pipeline has a higher capital cost, but has less risk of arsenic contamination. This research also points out that the preferred adsorptive media system would provide some removal of arsenic, but may have difficulty removing enough arsenic to meet drinking water quality guidelines during a Giant Mine major arsenic treatment failure.</p> <p>Recommendation Is the City conditioning the public and the MVLWB for subsequent requests to increase the draw of Yellowknife Bay water and eventually eliminate the Yellowknife River source? In its decision, the MVLWB discourage the City from using Yellowknife Bay for a raw water source for maintenance purposes or for a future permanent raw water source by advising the proponent about the need for renewal or amendment of its water licence.</p>		
4	None	<p>Comment In this age of catastrophic climate related events, we should be vigilant about knowingly putting ourselves at risk. Confidence in the Giant Mine passive thermosyphon freezing technology is reduced by the independent GMOB mandated/funded to research different, more permanent, treatment options. The effects of a failure of a Giant Mine contamination treatment (e.g. water treatment, tailings pond breach, thawing of passive thermosyphon freezing of 237,000 tons of arsenic</p>	Feb 16: No comment	Noted.

		<p>trioxide contamination) could have catastrophic results contaminating groundwater around Giant Mine and potentially Yellowknife Bay raw water source. A Giant Mine treatment failure, higher than drinking water arsenic contamination in Yellowknife Bay, limited water treatment facility capacity to treat arsenic contamination combined with elimination of the Yellowknife River raw water source would compromise the City's potable water supply. The City of Yellowknife has an opportunity to be exemplary to other municipalities in Canada. Yellowknife has state-of-the art water treatment facilities, a stable quality raw water source, world class contamination at Giant Mine and an opportunity to avoid any risk. The City of Yellowknife should be discouraged from promoting the lower cost Yellowknife Bay raw water source and get on with planning, permitting and replacing the 8.5 km submarine pipeline. The clock is ticking on the 2020 useful life of the existing pipeline. I'm sure most Yellowknifers would prefer to drink the clean, safe waters of the Yellowknife River. We should not look to low cost alternatives for something as important as our drinking water.</p> <p>Recommendation None</p>		
General Public: Wayne Balanoff				
ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Staff Analysis

1	Water withdrawal	<p>Comment As a long time resident of Yellowknife, I want to on record that I do not support the City of Yellowknife taking drinking water from Yellowknife Bay.</p> <p>Recommendation They should replace existing water pipeline from Yellowknife River.</p>	<p>Feb 16: No Comment. The Recommendation does not address the issue raised by the letter submitted by the City.</p>	<p>See staff note at Comment ID Lois Little 1.</p>
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GNWT - ENR: Central Email GNWT

ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Staff Analysis
5	General File	<p>Comment (doc) ENR Letter with Comments and Recommendations</p> <p>Recommendation</p>	-	Noted.
1	Topic 1: One-time Use of Yellowknife Bay for Drinking Water on an Emergency Basis	<p>Comment The City of Yellowknife's (the City) current Water Licence indicates Yellowknife River as the principal source of potable water, and Yellowknife Bay (Great Slave Lake) is identified as an emergency potable water source only (at Pumhouse no. 1). There is a long history of public concerns expressed by residents and local Aboriginal groups over the use of Yellowknife Bay for potable water instead of the existing source which is the Yellowknife River. ENR does not wish to reiterate these comments and recommendations here but would refer the MVLWB to the public registry on this issue. It appears to ENR, based on the MVLWB letter dated April 18, 2016, that the Board approved a one-time use of Yellowknife Bay for potable water to facilitate commissioning of the City's new Water Treatment Plant. The letter also seems to</p>	<p>Feb 16: The City has been in the process of finalizing commissioning of the new Water Treatment Plant. This included finalizing maintenance requirements for new equipment. It was recently determined that the pumps that bring water from Yellowknife Bay to the Water Treatment Plant in the case of an emergency need to be run at least once a month. This requirement has come directly from the equipment maintenance manuals. Running the pumps less than once a month may have an adverse affect on the City's ability to supply drinking water to Yellowknife.</p>	<p>As per the Board's April 18, 2016 directive, the City's request has outlined the proposed use for the water for the non-emergency situation, rationale for requiring Yellowknife Bay as the source, and the estimated duration (monthly) and quantity (300 m³) of water to be used. On December 21, 2018 the City committed to testing the Yellowknife Bay water for arsenic before any volume is withdrawn using a Quick™ Rapid Arsenic Test Kit.</p>

		<p>indicate that in the future if the City finds it necessary to withdraw water from Yellowknife Bay for a non-emergency use, that Board approval be required. It isn't clear if the MVLWB considered that the City would require withdrawal from Yellowknife Bay on a regular basis (i.e. monthly), as on March 1 2016 the City indicated that they did not foresee any future occasions when Yellowknife Bay will be required as a water source other than in an emergency. It isn't clear to ENR what has changed since 2016 that the City now needs to use Yellowknife Bay on a monthly basis.</p> <p>Recommendation 1) Considering the public concerns regarding the sensitivity of using Yellowknife Bay as a water source, the City should provide rationale regarding why Yellowknife Bay water is required for maintenance of infrastructure on a monthly basis, versus on a more limited basis (e.g. annual).</p>		
2	None	<p>Comment None</p> <p>Recommendation 2) ENR recommends that if the City requires water from Yellowknife Bay on a regular basis (i.e. monthly), that an amendment to their existing Water Licence be required as currently only the Yellowknife River is the approved source for potable water. The use of Yellowknife Bay for a secondary potable water source would be outside of the scope of the current Water Licence.</p>	<p>Feb 16: No Comment - Recommendation from reviewer is directed to the MVLWB</p>	<p>See staff note at to Comment ID Robert Stephen 2.</p>

3	<p>Topic 2: Monthly Use of Yellowknife Bay as Water Source</p>	<p>Comment The City has requested use of Yellowknife Bay be changed from a One-time Emergency Water Source - to a Monthly Supply Source of Potable Water where 300 m3 (300,000 L) of water would be drawn every second Tuesday of the month, processed through the Water Treatment Plant and distributed to residents through the same system as water from Yellowknife River (Principal source). Rationale provided for this request is to allow for maintenance of Pumphouse No. 1 (located near the Water Treatment Plant). ENR notes that using Yellowknife Bay at this frequency would constitute a change in water use from solely Yellowknife River to both the River and the Bay. A review of an options analysis conducted by AECOM indicated that using Yellowknife Bay as a potable Water Source received the lowest score. However, it was also noted that monthly test results from Yellowknife Bay collected since 2005 are showing decreasing arsenic trends. As specified in AECOM's report, Arsenic contamination of Yellowknife Bay due to potential failure of Giant Mine tailings (Upset Condition) has a low probability of occurring, but is also considered plausible. AECOM further specified that the risks of using Yellowknife Bay could not be quantified, as no risk assessment had been conducted. In addition to the report above, public concerns raised by citizens</p>	<p>Feb 16: The City will commit to looking into technology for an arsenic detection system, but cannot commit to a timeframe for installation should suitable equipment be found.</p>	<p>On December 21, 2018 the City committed to testing the Yellowknife Bay water for arsenic before any volume is withdrawn using a Quick™ Rapid Arsenic Test Kit. Municipal and Community Affairs (MACA) will provide training to the city water treatment plant operators on its use.</p>
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		<p>about the use of Yellowknife Bay for drinking water include the absence of arsenic treatment in the current Water Treatment Plant, the absence of early detection system, the absence of a broad community Emergency Plan to address potential contamination/remediation of the water source [and of Great Slave Lake], the unknown feasibility/efficiency of an arsenic treatment system once operational to fully treat contaminated water if an Upset Condition was to occur or contamination was detected.</p> <p>Recommendation 1) ENR recommends that if the City wants to use Yellowknife Bay on a more frequent basis other than annually that an effective arsenic detection system be fully installed and online in the City’s Water Treatment Plant.</p>		
4	None	<p>Comment None</p> <p>Recommendation 2) ENR recommends that the City address public concerns raised by citizens on how, or when, an arsenic treatment system would be installed and provide a breakdown on the efficacy of that treatment system in removing arsenic to the levels below the drinking water standard.</p>	<p>Feb 16: The City has been testing the water intake at Yellowknife Bay since 2005 and all test results have been below the Canadian Drinking Water Guidelines for arsenic concentration. At this time, the City has no plans for installing arsenic treatment equipment at the existing Water Treatment Plant.</p>	<p>On December 21, 2018 the City committed to testing the Yellowknife Bay water for arsenic before any volume is withdrawn using a Quick™ Rapid Arsenic Test Kit.</p> <p>Should the equipment detect arsenic concentrations equal to or greater than 10 µg/L (the maximum acceptable concentration as per the Guidelines for Canadian</p>

				Drinking Water Quality), then water shall not be withdrawn from Yellowknife Bay, and the Water Inspector, Public Health Officer and Environmental Health Officer will be notified immediately.
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North Slave Metis Alliance: Nicole Goodman

ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Staff Analysis
1	Bay Pump Maintenance Requirements	<p>Comment The City of Yellowknife's (the City's) request for monthly water draw from Yellowknife Bay indicates that the monthly maintenance necessitating the draw is required operational procedure to ensure emergency preparedness "as outlined in the Equipment Suppliers Operations and Maintenance Manual for the pumps." If this maintenance is required by the Operations and Maintenance Manual (O&M), NSMA would like to know why this maintenance has not been performed (or why it has not involved water draw) until now. Is there any other suggested testing or maintenance that is not currently being performed to manufacturer specifications, or has not not yet been triggered by factors such as run time elapsed or volume pumped, that may require additional draw requests?</p> <p>Recommendation NSMA requests that the City provide an explanation as to why the proposed monthly</p>	<p>Feb 16: The City has been in the process of finalizing commissioning of the new Water Treatment Plant. This included finalizing maintenance requirements for new equipment. It was recently determined that the pumps that bring water from Yellowknife Bay to the Water Treatment Plant in the case of an emergency need to be run at least once a month. This requirement has come directly from the equipment maintenance manuals. The items brought forward by the City in this letter, are the only items that require a draw of water from Yellowknife Bay.</p>	<p>As per the Board's April 18, 2016 directive, the City's request has outlined the proposed use for the water for the non-emergency situation, rationale for requiring Yellowknife Bay as the source, and the estimated duration (monthly) and quantity (300 m³) of water to be used.</p> <p>Any further concerns regarding the monthly maintenance requirements should be directed to the City.</p>

		<p>maintenance has not been performed or proposed until now. NSMA also requests that the City provide a table of all the testing/maintenance requirements included in the O&M that may require water draw, including triggers/frequencies, and whether or not it is currently being performed to manufacturer specifications.</p>		
2	<p>Maximum Allowable Arsenic Concentration for Withdrawn Water</p>	<p>Comment The City's request for monthly water draw states that "the withdrawn Bay water could have a potential arsenic concentration of up to 251.49ug/L. At that extremely unlikely concentration, the output from the Water Treatment Plant will still meet the Health Canada maximum allowable concentration for arsenic in drinking water of 10ug/L." NSMA would like to know what concentrations of arsenic would trigger a cessation in water draw from the bay, and the concentration that this would result in in the reservoir assuming it is kept a minimum of 85% full.</p> <p>Recommendation NSMA requests that the City clarify the maximum allowable concentrations of arsenic in withdrawn water, and the resulting maximum allowable concentration in the reservoir (assuming reserervoir is maintained at a minimum of 85% of total volume sourced from the Yellowknife River).</p>	<p>Feb 16: In the event monthly testing shows that the concentration of arsenic in Yellowknife Bay is higher than Health Canada's maximum acceptable concentration of arsenic in drinking water, there would be no withdrawal of water from Yellowknife Bay.</p>	<p>See staff note at Comment ID GNWT-ENR 3 and GNWT-ENR 4.</p>

ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Staff Analysis
1	March 16, 2016 letter from city of Yellowknife addressed to Water Board	<p>Comment In the letter to the Board dated March 16th, 2016 the city states " ., the City does not foresee any future occasions when the Yellowknife Bay will be required as a water source other than an emergency situation." . Less than two years later the city is requesting permission for monthly withdrawals. It stretches YKDFN's credulity to accept that the city did not anticipate the need for monthly withdrawals for maintenance purposes when the March 2016 letter was drafted. Particularly when we know that the City has been considering using YK as a primary water source for some time.</p> <p>Recommendation YKDFN recommends that the city of Yellowknife find an alternate method for performing their monthly maintenance that does not require drawing water from Back Bay, as proposed. Perhaps using whatever maintenance method they have been doing to date. YKDNF would also like to suggest that the city take a longer view when considering infrastructure maintenance. To be clear, YKDFN opposes the City's proposal for monthly water withdrawal YK Bay.</p>	<p>Feb 16: The City is finalizing its maintenance processes now that the construction of the water treatment plant is complete. The monthly maintenance process at Pumphouse #1 ensures that in the event of failure of the underwater pipeline, the City of Yellowknife can continue to provide drinking water to its residents.</p>	<p>See staff note at Comment ID Lois Little 1.</p> <p>Any further concerns regarding the monthly maintenance requirements should be directed to the City.</p>
2	City of YK's long-term intension to	<p>Comment YKDFN is aware that the City has been discussing using water from</p>	<p>Feb 16: No Comment - Recommendation from</p>	<p>See staff note at Comment ID Lois Little 1.</p>

	draw water from YK Bay as a primary water source.	<p>YK Bay as a primary water source City for a number of years. YKDFN has always opposed this, and we're reassured to find out that the City's own commissioned report supports our position that drinking water should not be drawn from YK Bay. YKDFN feels that the city's proposal represents a kind of incrementalism towards using YK Bay as a primary water source for the city. YKDFN views the plan to draw water from YK Bay as a cynical attempt to save money at the expense of the long-term safety of the people relying on the city for safe drinking water.</p> <p>Recommendation We recommend that the City not be granted permission to make monthly water draws from YK Bay. We do not think that it is prudent, and we have serious concerns as to the long-term intension for making YK Bay the primary water source.</p>	reviewer is directed to the MVLWB	
3	Instruction Manual for Pump House 1	<p>Comment It is YKDFN's understanding that Pump House 1 is not new. By exention, we have to assume that the city was aware of these monthly maintenance requirements for some time now (we can only assume that the City has been conducting maintenance to date). The City even cites the user manual for as justification for drawing water. So while YKDFN is glad that the City read the instructions for the pumb house equipment, we remain concerned that their internal planning processess were unable to capture the</p>	<p>Feb 16: The City has been in the process of finalizing commissioning of the new Water Treatment Plant, which included significant changes to Pumphouse #1 and the overall piping in Pumphouse #1. This included finalizing maintenance requirements for new equipment. It was recently determined that the pumps that bring water from Yellowknife Bay to the Water Treatment Plant in the case of an emergency need to be run at least once a month. This requirement has come directly from the equipment maintenance manuals.</p>	<p>See staff note at Comment ID Robert Stephen 1.</p> <p>Any further concerns regarding the monthly maintenance requirements should be directed to the City.</p>

		<p>supposed need for monthly water withdrawals from YK Bay in March 2016 when they stated that they did not anticipate the need to draw water from YK Bay, baring emergencies</p> <p>Recommendation YKDFN recommends that if the City legitimately did not anticipate this montly maintenance requirement for pump house 1, it conduct an internal review of its planning processess. Fortunately, YKDFN does not actually believe that this was an oversight since we have it on good authority that the city read the instructions for their equipment.</p>		
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January 25, 2018

Erica Janes
Regulatory Officer
Mackenzie Valley Land and Water Board
7th Floor – 4910 50th Avenue
P.O. Box 2130
Yellowknife, NT
X1A 2P6

Dear Ms. Janes,

**Re: City of Yellowknife
Water Licence – MV2009L3-0007
Request for Monthly Yellowknife Bay Water Withdrawal
Request for Comment**

The Department of Environment and Natural Resources (ENR), Government of the Northwest Territories has reviewed the request at reference based on its mandated responsibilities under the *Environmental Protection Act*, the *Forest Management Act*, the *Forest Protection Act*, the *Species at Risk (NWT) Act*, the *Waters Act* and the *Wildlife Act* and provides the following comments and recommendations for the consideration of the Board.

Topic 1: One-time Use of Yellowknife Bay for Drinking Water on an Emergency Basis

Comment(s):

The City of Yellowknife's (the City) current Water Licence indicates Yellowknife River as the principal source of potable water, and Yellowknife Bay (Great Slave Lake) is identified as an emergency potable water source only (at Pumphouse no. 1).

There is a long history of public concerns expressed by residents and local Aboriginal groups over the use of Yellowknife Bay for potable water instead of the existing source which is the Yellowknife River. ENR does not wish to reiterate these comments and recommendations here but would refer the MVLWB to the public registry on this issue.

It appears to ENR, based on the MVLWB letter dated April 18, 2016, that the Board approved a one-time use of Yellowknife Bay for potable water to facilitate commissioning of the City's new Water Treatment Plant. The letter also seems to indicate that in the future if the City finds it necessary to withdraw water from Yellowknife Bay for a non-emergency use, that Board approval be required. It isn't clear if the MVLWB considered that the City would require withdrawal from Yellowknife Bay on a regular basis (i.e. monthly), as on March 1 2016 the City indicated that they did not foresee any future occasions when Yellowknife Bay will be required as a water source other than in an emergency.

It isn't clear to ENR what has changed since 2016 that the City now needs to use Yellowknife Bay on a monthly basis.

Recommendations:

- 1) Considering the public concerns regarding the sensitivity of using Yellowknife Bay as a water source, the City should provide rationale regarding why Yellowknife Bay water is required for maintenance of infrastructure on a monthly basis, versus on a more limited basis (e.g. annual).
- 2) ENR recommends that if the City requires water from Yellowknife Bay on a regular basis (i.e. monthly), **that an amendment to their existing Water Licence be required** as currently only the Yellowknife River is the approved source for potable water. The use of Yellowknife Bay for a secondary potable water source would be outside of the scope of the current Water Licence.

Topic 2: Monthly Use of Yellowknife Bay as Water Source

Comment(s):

The City has requested use of Yellowknife Bay be changed from a *One-time Emergency Water Source* – to a *Monthly Supply Source of Potable Water* where 300 m³ (300,000 L) of water would be drawn every second Tuesday of the month, processed through the Water Treatment Plant and distributed to residents through the same system as water from Yellowknife River (Principal source). Rationale provided for this request is to allow for maintenance of Pumphouse No. 1 (located near the Water Treatment Plant).

ENR notes that using Yellowknife Bay at this frequency would constitute a change in water use from solely Yellowknife River to both the River and the Bay. A review of an options analysis conducted by AECOM indicated that using Yellowknife Bay as a potable Water Source received the lowest score. However, it was also noted that monthly test results from Yellowknife Bay collected since 2005 are showing decreasing arsenic trends. As specified in AECOM's report, Arsenic contamination

of Yellowknife Bay due to potential failure of Giant Mine tailings (Upset Condition) has a low probability of occurring, but is also considered plausible. AECOM further specified that the risks of using Yellowknife Bay could not be quantified, as no risk assessment had been conducted.

In addition to the report above, public concerns raised by citizens about the use of Yellowknife Bay for drinking water include the absence of arsenic treatment in the current Water Treatment Plant, the absence of early detection system, the absence of a broad community Emergency Plan to address potential contamination/remediation of the water source [and of Great Slave Lake], the unknown feasibility/efficiency of an arsenic treatment system once operational to fully treat contaminated water if an Upset Condition was to occur or contamination was detected.

Recommendation(s):

- 1) ENR recommends that if the City wants to use Yellowknife Bay on a more frequent basis other than annually that an effective arsenic detection system be fully installed and online in the City's Water Treatment Plant.
- 2) ENR recommends that the City address public concerns raised by citizens on how, or when, an arsenic treatment system would be installed and provide a breakdown on the efficacy of that treatment system in removing arsenic to the levels below the drinking water standard.

Comments and recommendations were provided by ENR technical experts in the Water Resources Division and the North Slave Region and were coordinated and collated by the Environmental Assessment and Monitoring Section (EAM), Conservation, Assessment and Monitoring Division(CAM).

Should you have any questions or concerns, please do not hesitate to contact Patrick Clancy, Environmental Regulatory Analyst at (867) 767-9233 Ext: 53096 or email patrick.clancy@gov.nt.ca.

Sincerely,



Patrick Clancy
Environmental Regulatory Analyst
Environmental Assessment and Monitoring Section
Conservation, Assessment and Monitoring Division
Department of Environment and Natural Resources



CITY OF YELLOWKNIFE

February 16, 2018

Mackenzie Valley Land and Water Board
Box 2130, 7th Floor - 4910 50th Avenue
Yellowknife, NT X1A 2P6

Attention: Erica Janes, Regulatory Officer

RE: Response to Reviewer Comments on Request for Monthly Water Draw from Yellowknife Bay

Dear Ms. Janes,

This letter is in response to reviewer comments on the City's request for drawing water from Yellowknife Bay on a monthly basis for maintenance purposes.

A number of reviewers indicated concern that the City was planning to change its water source. It needs to be clarified that the item under review was the request to withdraw 300 cubic metres of water from Yellowknife Bay on a monthly basis for pump maintenance purposes. This amount of water represents less than 0.1% of Yellowknife's annual water usage. The City is not prepared to respond to comments or recommendations from reviewers about changing Yellowknife's primary water source as this is not the item that is under review.

There were also a number of comments showing concern for the use of water potentially contaminated by arsenic. The City is aware of public concerns over arsenic concentrations and will continue to implement reasonable controls to alleviate these concerns, including monthly testing for arsenic in Yellowknife Bay water. It must also be noted that arsenic testing of Yellowknife Bay water at the intake of Pumphouse #1 since 2005 has indicated that the water meets the Canadian Drinking Water Guidelines for arsenic concentrations. Attached is an email from the GNWT Chief Environmental Health Officer reconfirming their position on water quality from Yellowknife Bay that was expressed in 2016.

Should you have any questions or require further clarification for the City's responses to reviewer comments, please contact me directly.

Sincerely,

Rene Hawkes, P.Eng.
Municipal Engineer

Enclosure – Email from GNWT Chief Environmental Health Officer

(Docs# 512266)

Rene Hawkes

From: Peter Workman <Peter_Workman@gov.nt.ca>
Sent: Tuesday, February 13, 2018 2:57 PM
To: Rene Hawkes
Subject: RE: Bay Water Withdrawals Request

Hi Rene

In April of 2016, the following response was sent to the water board from Environmental Health Unit about a request to draw water from Yellowknife Bay by the City of Yellowknife.

Topic: Public Health considerations as per the *Public Health Act and Regulations*

Comment: Environmental Health, under the authority of the Office of the Chief Public Health Officer, Has reviewed the monthly arsenic results taken from the wet well in Yellowknife Bay. The arsenic levels have always been below the required 10ppb.

Recommendation: Continuing monthly testing for arsenic will greatly help in the handling of any future drinking water safety considerations pertaining to the Public Health Act

This is the response that was submitted to the MVLWB. The response is still applicable for the current request. I hope this is sufficient at this time.

Peter Workman

Mársı | Kinanāskomitin | Thank you | Merci | Hąj' | Quana | Qujannamiik | Quyanainni | Máhsı | Máhsı | Mahsı

Peter Workman

Chief Environmental Health Officer | Hygiéniste en chef du milieu
Population Health | Santé de la population
Department of Health and Social Services | Ministère de la Santé et des Services sociaux
Government of the Northwest Territories | Gouvernement des Territoires du Nord-Ouest

Phone | Tél. : 867-767-9066, ext. | poste 49260

Fax | Téléc. : 867-669-7517

Outside of regular business hours (afterhours or on weekends) if you require urgent EHO assistance please contact the Confidential Public Health Line staff at 867-920-8646.

Si vous avez besoin d'aide immédiate de l'agent d'hygiène du milieu en dehors des heures normales de travail (les soirs et les fins de semaine), communiquez avec le personnel de la ligne téléphonique confidentielle de la santé publique au 867-920-8646.

www.gov.nt.ca

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