

October 10, 2014

Gary Brown
100 Elizabeth Dr.
Gander NL A1V 1G7

**Re: 2014 Winter Drinking Water Quality Report
Gander**

Dear Mr. Brown,

Please find attached the 2014 Winter Drinking Water Quality Report for your community's public drinking water supply. You may find attached up to six appendices as listed below, depending upon the type of monitoring undertaken for your water supply:

- Appendix A - Source Water
- Appendix B - Tap Water
- Appendix C - Trihalomethanes (THMs)
- Appendix D - Haloacetic Acids (HAAs)
- Appendix E - Langelier Index (LI) Report
- Appendix F - Water Quality Index (WQI) Report

The following are highlights of the report format that have been implemented in order to make the report more efficient:

- Regular and exceedance water quality information are combined in the same table where aesthetic exceedances are indicated with a partial box around the parameter value and contaminant exceedances are indicated with a full box around the parameter value.
- Less than detect values are stored as zero's and indicated with the text LTD. Less than detect values were previously reported as being equal to half the detection limit.
- For groundwater source samples, a remarks field is shown. The text in this field is used to identify a particular wellhead when multiple source samples are taken in a well field.
- A Water Quality Index Report and a Langelier Index Report may be included for your water supply if all of the required parameters for calculation were available. Information regarding these reports is included below.

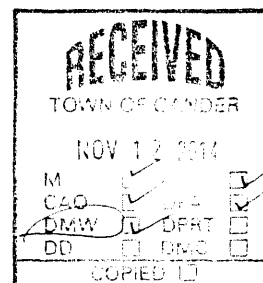
A brief description of each appendix and the rationale for the tested parameters follows.

Appendix A - Source Water

Source water samples are collected directly from the source such as a groundwater well, lake, pond, or stream prior to disinfection or other treatment.

The source water quality is analyzed to determine the quality of water that flows into your water treatment and distribution system. The quality of this water is a direct indicator of the health of the ecosystem that makes up the wellhead recharge area or watershed area. Monitoring of source water quality is the most important tool to assess the impact of land use changes on source water quality and to ensure the integrity of a public water supply.

The exceedance report for source water provides a brief discussion and interpretation of those water quality parameters, if any, that exceed the acceptable limits as set out in the latest edition of the *Guidelines for Canadian Drinking Water Quality* (GCDWQ). This comparison is only for screening purposes since presently, there are no guidelines for untreated source water. The GCDWQ applies to water at consumers tap. However, in the absence of water treatment, these guidelines are applicable to source water quality.



Appendix B - Tap Water

Tap water samples are collected semi-annually or quarterly from drinking water faucets of one or more homes, public buildings, or businesses in your community, approximately three quarters of the way along the distribution system, in accordance with criteria established in the GCDWQ.

Tap or treated water quality is monitored to check its compliance with the GCDWQ. Tap water quality is also monitored so that water that is being consumed at the tap can be compared with the untreated source water quality. Any variations between source and tap water quality represents the effectiveness of the treatment and disinfection system, and the influences of the distribution system due to plumbing in local homes, public buildings, or businesses.

The exceedance report for tap water provides a brief discussion and interpretation of those water quality parameters, if any, that exceed the acceptable limits as set out in the GCDWQ.

Appendix C - Trihalomethanes (THMs)

THM samples are generally collected quarterly from drinking water faucets of one or more homes, public buildings, or businesses in your community, approximately three quarters of the way along the distribution system, in accordance with criteria established in the GCDWQ. The GCDWQ recommend a maximum acceptable concentration (MAC) of 100 micrograms per litre ($\mu\text{g/L}$) for THMs in drinking water, based on a locational running annual average of a minimum of quarterly samples taken in the distribution system. THMs are compounds which may form when source water containing natural organic matter, for example the decay products of living things such as plants, leaves, human and animal wastes, is treated with chlorine. THMs are chlorinated disinfection by-products.

Appendix D - Haloacetic Acids (HAAs)

HAA samples are generally collected quarterly from drinking water faucets of one or more homes, public buildings, or businesses in your community, at an appropriate location in the distribution system. The GCDWQ recommend a maximum acceptable concentration (MAC) of 80 micrograms per litre ($\mu\text{g/L}$) for HAAs in drinking water, based on a locational running annual average of a minimum of quarterly samples taken in the distribution system. HAAs are also compounds that may form in drinking water that has been disinfected with chlorine. HAAs are chlorinated disinfection by-products.

Appendix E - Water Quality Index (WQI) Report

A WQI is a means to summarize water quality data into simple terms (e.g. good) for reporting to the public in a consistent manner. Similar to the UV index or an air quality index, it tells us in simple terms, the condition of drinking water quality from a water supply. This index is based on the six most recent tap samples.

Appendix F - Langelier Index (LI) Report

The Langelier Index is one of several tools used by a water operator for stabilizing water to control both internal corrosion of the piping system and the deposition of scale. The LI is an approximate measure of the degree of saturation of calcium carbonate in water. It is calculated using the pH, alkalinity, hardness, total dissolved solids, and water temperature of a water sample collected at the tap.

We suggest that this data be posted for public information in a public place, such as a bulletin board in your council office, post office, or otherwise be made available to your community's residents. Please be advised that the Minister of Environment and Conservation may release this data to any third party upon their request, and may also publicly disseminate the information details.

If there are any questions concerning the drinking water quality monitoring program or the attached reports, please contact the Department of Environment and Conservation's representative listed below:

➤ Ben Hammond (709) 729-1157

Ben Hammond
Environmental Scientist

cc Mr. Haseen Khan, P.Eng., Director, Water Resources Management Division, Department of Environment and Conservation
Pat Murray, Medical Officer of Health

Attachments

Appendix B-1
Tap Water Quality for Public Water Supplies
Physical Parameters and Major Ions

Source Name	Sample Date	Alkalinity Units	Colour TCU	Conductivity µS/cm	Hardness mg/L	pH	TDS mg/L	TSS mg/L	Turbidity NTU	Boron mg/L	Bromide mg/L	Calcium mg/L	Chloride mg/L	Fluoride mg/L	Potassium mg/L	Sodium mg/L	Sulfate mg/L
Gander	Gander Lake	Feb 18, 2014	20.00	15	62.0	2.00	6.7	40	0.50	LTD	LTD	1.00	6	LTD	LTD	12	3
										A	C	C	A	C	A	A	

Gander

Tap water samples are collected semi-annually or quarterly from drinking water faucets of one or more homes, public buildings, or businesses in your community. Tap or treated water quality is monitored to check its compliance with the GCOWQ. Tap water quality is also monitored so that water that is being consumed at the tap can be compared with the untreated source water quality. Any variations between source and tap water quality represents the effectiveness of the treatment and disinfection system, and the influences of the distribution system due to plumbing in local homes, public buildings, or businesses. The values for each parameter are as reported by the lab and verified by the department.

Quality Assurance / Quality Control (QA/QC) - The department is striving to improve the quality of the data using standard QA/QC protocols. This is an evolving process which may result in minor changes to the reported data.

LTD - Less Than Detection Limit - The detection limit is the lowest concentration of a substance that can be determined using a particular test method and instrument. Detection limits vary from parameter to parameter and change from time to time due to improvements in analytical procedures and equipment.

The exceedance report for tap water provides a brief discussion and interpretation of health related water quality parameters, if any, that exceed the acceptable limits as set out in the GCOWQ.

Aesthetic (A) Parameters - Aesthetic parameters reflect substances or characteristics of drinking water that can affect its acceptance by consumers but which usually do not pose any health effects.

Contaminants (C) - Contaminants are substances that are known or suspected to cause adverse effects on the health of some people when present in concentrations greater than the established Maximum Acceptable Concentrations (MACs) or the Interim Maximum Acceptable Concentrations (IMACs) of the Interim Maximum Acceptable Concentrations (IMACs) of the GCOWQ. Each MAC has been derived to safeguard health assuming lifelong consumption of drinking water containing the substance at that concentration. IMACs are reviewed periodically as new information becomes available. Please consult your Medical Officer of Health for additional information on the health aspects on contaminants.

A review of the tap water quality data indicates that the following parameter(s) has (have) exceeded the Guidelines for Canadian Drinking Water Quality, Sixth Edition.

Contaminants

Aesthetic Parameters

Contaminant Exceedance	Aesthetic Exceedance	LTD = Less Than Detect
mg/L = milligrams per litre or parts per million DOC = dissolved organic carbon	µS/cm = micro Siemens per centimeter Nitrate(m) = Nitrate + Nitrite	NTU = nephelometric turbidity units WS# = water supply number
Notes: Guidelines for Canadian Drinking Water Quality have not been developed for all the parameters listed in this report. pH has no units		TDS = total dissolved solids SA# = serviced area number TSS = total suspended solids GCOWQ = Guidelines for Canadian Drinking Water Quality
		TCU = true colour units

Community Name: Gander
Serviced Area(s): Gander
Source Name: Gander Lake

Trihalomethanes (THMs) are compounds which may form when source water containing natural organic matter, for example the decay products of living things such as plants, leaves, human and animal wastes, is treated with chlorine. THMs are chlorinated disinfection by-products. THMs formation is highly variable, being dependent upon a variety of factors including: source water quality, chlorine dose, temperature, pH, chlorine demand, distribution system characteristics, and contact time.

THMs samples are collected from drinking water faucets of one or more homes, public buildings, or business in your community. At each site, the chlorine residual (free and/or total) and water temperature are also measured.

The Department of Environment and Conservation has staff permanently assigned to work with communities where THMs levels are routinely higher than the recommended limit.

Please note that running annual averages of quarterly samples or simple averages are posted on the Department of Environment and Conservation's web site, and are updated periodically. If you have any questions please feel free to contact the nearest regional office of the Department of Environment and Conservation. If you have access to the Internet, more information is available at:

<http://www.gov.nf.ca/env/Env/waterres/Surfacewater/THM/THM.asp>

The Guidelines for Canadian Drinking Water Quality, Sixth Edition recommend an interim maximum acceptable concentration of 100 micrograms per litre ($\mu\text{g/L}$) for THMs in drinking water, based on a running annual average of quarterly samples, collected at a point with the highest potential THM levels.

The running annual average THM concentrations for your community was 79.8 $\mu\text{g/L}$.

This value meets the recommended guideline of 100 $\mu\text{g/L}$.

Appendix C-2
THMs Summary for
Public Water Supplies

COMMUNITY NAME	SERVICED AREA	SOURCE NAME	SAMPLE DATE	THM TOTAL
Gander	Gander	Gander Lake	February 18, 2014	70.90

µg/l - All THM values are reported in micrograms per litre (µg/l) which is the same as parts per billion.

Community Name: Gander
Serviced Area(s): Gander
Source Name: Gander Lake

Haloacetic acids (HAAs) are compounds which may form when source water containing natural organic matter (for example decaying leaves and vegetation) is treated with chlorine. HAAs are a chlorinated disinfection by-product. HAA formation is highly variable both within and between drinking water systems. Factors affecting HAA formation include: source water quality (natural organic material, bromide, pH season, temperature) and treatment conditions (chlorine dose, chlorine demand, distribution system characteristics, and contact time).

HAA samples are collected from drinking water faucets of one or more homes, public buildings, or business in your community. At each site, the chlorine residual (free and/or total) and water temperature are also measured. The Department of Environment and Conservation has staff permanently assigned to work with communities where HAA levels are routinely higher than the recommended limit.

Please note that running annual averages of quarterly samples or simple averages are posted on the Department of Environment and Conservation's web site, and are updated periodically. If you have any questions please feel free to contact the nearest regional office of the Department of Environment and Conservation. If you have access to the Internet, more information is available at:
<http://www.gov.nf.ca/env/Env/waterres/Surfacewater/HAA/HAA.asp>

The Guidelines for Canadian Drinking Water Quality recommend a maximum acceptable concentration (MAC) of 80 micrograms per litre ($\mu\text{g/L}$) for HAAs in drinking water, based on a locational running annual average of a minimum of quarterly samples taken in the distribution system. As per guideline, total HAAs refers to the total of monochloroacetic acid (MCA), dichloroacetic acid (DCA), trichloroacetic acid (TCA), monobromoacetic acid (MBA) and dibromoacetic acid (DBA).

The collect point for HAAs should be where historical data show the highest HAA concentrations. A minimum of four samples per year, one in each season, are required to determine if a particular water supply meets or exceeds the recommended limit.

Running Annual Average is computed when data is available for all of the past 4 quarterly sampling periods. Running Annual averages are directly comparable with the national guideline of 80 $\mu\text{g/l}$.

Simple Average is computed when data is not available for all of the past 4 quarterly sampling periods. This data cannot be compared to the recommended guideline.

The running annual average HAA concentrations for your community was 96.6 $\mu\text{g/L}$

This value exceeds the recommended guideline of 80 $\mu\text{g/L}$.

**Appendix D-2
HAAs Summary for Public Water Supplies**

Region: C

COMMUNITY NAME	SERVICED AREA	SOURCE NAME	SITE #	SAMPLE DATE	MCA	MBA	DCA	TCA	DBA	HAA5	BCA	HAA5 TOTAL
Gander	Gander	Gander Lake	03	February 18, 2014	10.10	0.00	48.00	33.70	0.00	91.80		91.80

Haloacetic acids (HAAs) are a chlorinated disinfection by-product. HAAs are compounds which may form when source water containing natural organic matter (for example decaying leaves and vegetation) is treated with chlorine. The Guidelines for Canadian Drinking Water Quality recommend a maximum acceptable concentration (MAC) of 80 micrograms per litre (µg/L) for HAAs in drinking water, based on a locational running annual average of a minimum of quarterly samples taken in the distribution system (see Appendix D-1 for your HAA Average).

As per the guideline, HAAs refers to the total of monochloroacetic acid (MCA), dichloroacetic acid (DCA), trichloroacetic acid (TCA), monobromoacetic acid (MBA) and dibromoacetic acid (DBA). These are the most commonly occurring HAAs and are referred to as HAA5. It is HAA5 that is used in calculating the running annual average which is compared to the guideline. These are the parameters in bold and outlined by the box above. The lab which analyzes your water quality also reports bromochloroacetic acid (BCA) and adds this to the sum of HAA5 to report HAA Total. These values are not used in the HAA Average calculation.

Discrepancies between the HAAs Total reported by the lab and the summing of the individual HAA components are related to the management and reporting of Less Than Detect (LTD) values.

µg/l - All HAA5 values are reported in micrograms per litre (µg/l) which is the same as parts per billion.

What is the Langelier Index?

The Langelier index (LI) is an approximate measure of the degree of saturation of calcium carbonate in water. It is calculated using the pH, alkalinity, hardness, total dissolved solids, and water temperature of a water sample collected at the tap. If the;

- LI is negative: The water is under saturated with calcium carbonate and will tend to be corrosive in the distribution system
- LI is positive: The water is over saturated with calcium carbonate and will tend to deposit calcium carbonate forming scales in the distribution system
- If LI is close to zero: The water is just saturated with calcium carbonate and will neither be strongly corrosive or scale forming.

The LI is one of several tools used by the water operator for stabilizing water to control both internal corrosion and the deposition of scale.

What You Should Do?

Experience has shown that LI in the range of -1 to +1 has a relatively low corrosion impact on metallic components of the distribution system. LI values outside this range may result in laundry stains or leaks. If you are experiencing major leaks or laundry staining complaints please contact the Water Resources Management Division at (709)729-2563 for additional information.

COMMUNITY NAME	SERVICED AREA	SOURCE NAME	SAMPLE DATE	LANGELIER INDEX
Gander	Gander	Gander Lake	February 18, 2014	-3.75

Community: Gander

Serviced Area: Gander

Source Name: Gander Lake

Serviced Area #: SA-0274

A Drinking Water Quality Index (DWQI) is a means to summarize water quality data into simple terms (e.g. good) for reporting to the public in a consistent manner. Similar to the UV index or an air quality index, it tells us, in simple terms, what the quality of drinking water is from your drinking water supply.

Essentially the DWQI is calculated by comparing the water quality data to the Guidelines for Canadian Drinking Water Quality. This calculation produces a score between 0 and 100. A higher score means a better quality of drinking water. The scores are then ranked into one of the six categories described below:

Excellent: (DWQI Value 95-100) - Water quality is protected with a virtual absence of impairment; conditions are very close to pristine levels; these index values can only be obtained if all measurements meet recommended guidelines virtually all of the time.

Very Good: (DWQI Value 89-94) - Water quality is protected with a slight presence of impairment; conditions are close to pristine levels.

Good: (DWQI Value 80-88) - Water quality is protected with only a minor degree of impairment; conditions rarely depart from desirable levels.

Fair: (DWQI Value 65-79) - Water quality is usually protected but occasionally impaired; conditions sometimes depart from desirable levels.

Marginal: (DWQI Value 45-64) - Water quality is frequently impaired; conditions often depart from desirable levels.

Poor: (DWQI Value 0-44) - Water quality is almost always impaired; conditions usually depart from desirable levels.

Based on the 6 most recent tap samples your drinking water quality is ranked as follows:

DWQI Score = **Not Given**

DWQI Ranking = **Not Ranked**

HAA: Drinking water quality was NOT ranked due to the presence of the following HAA value which exceeds the current guideline. HAA Average = 96.6 ug/l (Please see HAA report for details).