



# **DRINKING WATER QUALITY MONITORING MANUAL PHYSICAL AND CHEMICAL PARAMETERS**

Department of Municipal Affairs and Environment  
Water Resources Management Division  
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## 1.0 INTRODUCTION

### 1.1 Background

Since the early 1990's, the Water Resources Management Division (WRMD) has been responsible for all routine aspects of source water quality monitoring. This water quality monitoring was a component of the Protected Water Supply Areas Program. Its objective was:

- (i) to document the background water quality of water flowing into a public water supply treatment/distribution system, and
- (ii) to assess the impact of watershed activities on water quality.

Water quality monitoring was undertaken on a regular basis, and the frequency of sampling was dependent upon available funding. Information was made available to the municipalities, engineering consultants and the public upon request.

In 1996, in order to have inorganic results to accompany the bacteriological and chlorine residual (monitored by the Service NL), the WRMD began to monitor the inorganic and organic chemistry of tap water. The tap water quality data was used to assess tap water in comparison with the *Guidelines for Canadian Drinking Water Quality (GCDWQ)*. Information was made available to municipalities, including owner/operators of other public water supply systems, engineering consultants and the public upon request.

All tap water data prior to 2000 was dropped due to incorrect flushing protocol.

### 1.2 Purpose

This manual outlines the protocols for the various components of the WRMD's drinking water quality monitoring activities. It is an integral component of the in-house Quality Assurance/Quality Control (QA/QC) program. The manual was prepared to:

- (i) Serve as a reference guide for staff involved in drinking water quality monitoring; and
- (ii) Ensure a consistent approach for drinking water quality monitoring.

This manual is intended to be dynamic in nature and will be modified as the program and activities develop or change.

### 1.3 Scope

Presently, the routine monitoring of drinking water quality in Newfoundland and Labrador is a joint responsibility between the Department of Municipal Affairs and Environment, monitoring inorganic and organic chemistry of source and tap water, and the Service NL, monitoring bacteriological and chlorine residual. This manual depicts monitoring for inorganic and organic chemistry of source and tap water.

The WRMD has also undertaken special monitoring programs to assess the effectiveness of treatment and mitigative measures, emerging parameters, and other tap water quality related issues. Occasionally, circumstances may dictate that other special types of

drinking water quality monitoring be undertaken by one of the two government departments responsible for drinking water quality monitoring. For example, in response to a particular land/water use or development activity, the WRMD may be required to undertake special water quality studies to assess the impact of development activities on water quality. Similarly, during proven or suspected outbreaks of *Giardiasis*, or any other waterborne disease outbreak, the Service NL may be required to undertake special site specific water quality surveys. These non-routine activities are beyond the scope of this manual.

The WRMD's monitoring program has evolved from a simple semi-annual sampling of source water from selected sources, to a well-planned, multifaceted and integrated program aimed at documenting all aspects of water quality from water supply source to the consumer's tap. The policy on Drinking Water Quality Monitoring and Reporting for Public Water Supplies is available in **Appendix A**.

It must be noted that this program deals with **public and potable water dispensing unit** water supply systems only. It does not apply to **private** or **communal** water systems.

## 2.0 LABORATORY CERTIFICATION AND SELECTION

### **2.1 Certification**

All laboratories contracted to analyze water samples (including QA/QC samples) as part of the drinking water quality monitoring program must be accredited with Canadian Association for Laboratory Accreditation (CALA). During an open tendering process, all laboratories in Canada have the opportunity to bid on work, pursuant to the specifications and requirements prescribed by this Department, as listed in **Appendix B**.

### **2.2 Selection**

As a result of the last public tendering process, Eurofins Environment Testing Canada is contracted to provide regular drinking water analysis (inorganic, trihalomethane (THM), and haloacetic acid (HAA) testing) until September 30, 2020.

## 3.0 PLANNING AND PREPARATION

### 3.1 Background

Coordinated planning and preparation are essential for the successful completion of the drinking water quality program. Since the early 90's, the drinking water quality program has grown significantly from less than 100 records per year to tens of thousands of records per year. Paper copies of lab results have been complimented with digital reporting.

Any drinking water quality sample is useless unless its collection has been well planned and documented as outlined below. Adequate planning and documentation of field observations are a pre-requisite for the meaningful interpretation of water quality results.

Consult **Appendix C** for a checklist of materials required for all drinking water quality field work.

### 3.2 Sampling Frequency

As per drinking water standards:

- Tap water samples are collected semi-annually (2x/year) for surface water supplies
- Tap water samples are collected annually (1x/year) for groundwater supplies
- Source water samples are collected every three years
- In certain circumstances (population > 5000), source and tap water samples may be collected quarterly (4x/year).

In water systems where both source and tap samples are to be collected, it is recommended to collect the samples subsequently.

For drinking water sampling purposes, the four seasonal sampling windows for the island portion of the province are as follows:

<b>Spring</b>	<b>May 16<sup>th</sup> - June 30<sup>th</sup></b>
<b>Summer</b>	<b>August 1<sup>st</sup> - September 30<sup>th</sup></b>
<b>Fall</b>	<b>November 1<sup>st</sup> - December 15<sup>th</sup></b>
<b>Winter</b>	<b>January 15<sup>th</sup> - March 15<sup>th</sup></b>

The four seasonal sampling windows for Labrador are as follows:

<b>Spring</b>	<b>May 1<sup>st</sup> - June 30<sup>th</sup></b>
<b>Summer</b>	<b>July 1<sup>st</sup> - August 30<sup>th</sup></b>
<b>Fall</b>	<b>October 1<sup>st</sup> - November 15<sup>th</sup></b>
<b>Winter</b>	<b>January 1<sup>st</sup> - March 15<sup>th</sup></b>

Samples that are not collected within the assigned season sampling windows will be considered “out of season” and will **not** be reported in the desired season. The sampling schedule will not be modified to accommodate samples that have been taken out of season.

Drinking water quality monitoring requirements for each public water supply will be determined annually by using available water quality data, size of the system, and nature and type of water quality issues.

### **3.3 Bottles and Consumable Supplies**

Based upon the annual sampling schedule, it is possible to closely estimate the requirements for the various sample bottles and consumable supplies.

In consultation with the appropriate laboratories, the correct quantity, size, and type of bottles must be ordered each season. Bottle orders are coordinated by one of the Environmental Scientists in each region for their respective region. The laboratories are responsible for a timely delivery of ordered bottles and costs associated with shipping as well as the cost of return shipments of filled bottles to the lab for analysis. To save courier costs, the laboratory requests ample notice (at least **a few weeks**) so that empty bottles can be shipped via ground.

Each sampler is responsible for their own consumable supplies:

- coolers,
- ice packs,
- chlorine reagents (free and total),
- kim wipes,
- fine tip sharpies
- packaging tape & material
- thermometers,
- stopwatch, etc.

Samplers are responsible for ensuring that they have an ample supply of *Chain of Custody Record* forms, which can be obtained from Headquarters located in the St. John's office.

Consult **Appendix C** for a checklist of materials required for all drinking water quality field work.

### **3.4 Performance Verification for Colorimeters for Chlorine Residual Testing**

HACH® Pocket Colorimeters are used by all sampling staff to measure the total and free chlorine residual at the time of sampling. Prior to the start of each sampling season, all staff should check the performance of their colorimeters against the appropriate secondary standard set according to the instructions provided in **Appendix D**.

In addition, all staff should record these performance checks in a log, as provided in **Appendix D**. The date of the performance verification or Chlorine Accuracy Check must be included in the End of Season Email.

### 3.5 Calibration of Handheld pH meters

Many staff have access to handheld pH meters for in situ measurements during sampling. These meters typically require weekly calibrations during periods of usage and proper storage during non-use periods, such as between sampling seasons. Please refer to the specific manual for your pH meter for more details on procedures for calibration and storage.



### 3.6 Sample Location Record Form

Each public water supply has a corresponding *Sample Location Record* to assist field staff in locating each source and tap sampling site. The *Sample Location Record* contains helpful information such as:

- photos,
- coordinates,
- maps, and
- descriptions of the sampling site.

All other structures of interest should also have GPS coordinates such as dams, chlorinators, towers, chlorine boosters, etc. These forms make up the site documentation for the drinking water program. A *Sample Location Record Form* is available in **Appendix E**.

Should any of these details change, the *Sample Location Record Form* must be updated accordingly. Updated *Sample Location Records* must be sent to Headquarters at the end of the sampling season.

Department of Environment and Communities Water Services Management Division		GPS Collected
<b>Drinking Water Quality Sampling Location Record</b>		
Community #: 4445 Water Supply # WS-S-0700 Serviced Area #: SA-0725	Community Name: St. Lewis Water Supply Name: Tub Harbour Pond Serviced Area Name: St. Lewis	
Sample Site - 00 Source at Intake / Wellhead N52 22 12.3 W55 41 47.1  Waypoint# 070000	 <p>Take St. Lewis Access road from TLH, tub harbour pond is opposite school on the left.</p>	
Sample Site - 03 General Store 52°22'8.91"N 55°41'12.34"W  Waypoint#	 <p>Take St. Lewis Access road from TLH through the town. General Store is on the left.</p>	
Location Collected By: Grace de Beer	Date Collected (YYYY-MM-DD): 2012-08-13	

### 3.7 Sampling Organization Protocol

*Drinking Water Quality Sampling Field Records* and labels are provided to staff for all regular drinking water sampling. The sampling organization protocol is as follows:

- ✓ field sheets and bottle labels should be placed in a binder or clipboard,
- ✓ sample numbers are to be used in sequential order (according to date of sampling) while in the field,
- ✓ keep a record of the last sample number used and use the next sequential number for the next sampling day.
- ✓ Ensure hand writing on field sheets and bottle labels is **neat, legible, and uses proper grammar**.

### 3.8 Sample Number

All drinking water quality data stored in each of the drinking water databases has a definite and specific sample number assigned to it which acts as a unique identifier. **Appendix F** clearly outlines the nomenclature for sample numbering. All samples collected must comply with this format, so that they will fit into the similarly structured databases, and comply with QA/QC protocol.

Each Drinking Water Quality Sample Number is associated with a community name, water supply number, and a serviced area number. These terms are defined in **Appendix G**.

A global *Public Water Supply Database* containing community names, water supply numbers, serviced area numbers, and other information, is maintained by the WRMD and is available to all staff (read-only). This database is maintained by the program lead and Hydrologic Modeling staff. Only they have the authority to make changes, as any changes have to be agreed upon by the Departments of Health and Community Services and Service NL through the Safe Drinking Water Technical Working Group. Any significant errors or required changes in this database should be communicated after each sampling season through the end of season email.

The protocol for the addition of a new supply to the database is available in **Appendix H**. The protocol for the removal of a public water supply from the database is available in **Appendix I**.

### **3.9 Sample Bottle Labels**

The purchase of labels in bulk is completed by staff in Headquarters. All labels for regular drinking water quality sampling are pre-printed prior to the beginning of each sampling season, and mailed to the respective samplers. All pre-printed labels reflect information from the latest version of the *Public Water Supply Database*.

At the bottom of the pre-printed labels, blank labels are provided to allow for additional, unanticipated samples, or errors made on the original pre-printed sheets.

An example of a pre-printed sheet of labels is given in **Appendix J**.

It is important to note that all information contained on each label must comply with the nomenclature outlined in **Appendices F** and **G**. An incorrect or inaccurate label may result in the sample results being discarded. Similarly, the hand written information on the label must be legible.

Typical fields to be hand written in black ultra-fine point permanent Sharpie marker or waterproof ink on each pre-printed label are shown below in bold type. For example:

<b>Source</b>	<b>Tap</b>
Samp#: 2020 - <b>2149</b> - 00 - SI - RE WS#: WS-S-0291 Date: 2020 - <b>06</b> - <b>27</b> Desc: Grand Falls-Windsor - Northern Arm Lake	Samp#: 2020 - <b>2149</b> - <b>01</b> - TH - RE SA#: SA-0298 Date: 2020 - <b>06</b> - <b>27</b> Desc: Grand Falls-Windsor - Northern Arm Lake

**Samp#:** Sample number, must be completed by the sampler.

**WS# / SA#:** Besides the respective differences in the **Samp#** field, there is only one other notable difference on the pre-printed label sheets for source and tap

samples.

- source samples must have a Water Supply Number (**WS#**),
- tap water samples must have a Serviced Area Number (**SA#**) as illustrated below:

Source	Tap
Samp#: 2020 - - 00 - SI - RE <b>WS#: WS-S-0291</b> Date: 2020 - - Desc: Grand Falls-Windsor - Northern Arm Lake	Samp#: 2020 - - - TH - RE <b>SA#: SA-0298</b> Date: 2020 - - Desc: Grand Falls-Windsor - Northern Arm Lake

**Date:** Sample date, must be completed by sampler in the following format:  
- **YYYY-MM-DD**

On pre-printed labels, the year field is completed; staff need only fill out the month and day:  
- **2020-MM-DD**

**Desc:** The description of the sample differs for source and tap on the pre-printed labels as follows:

Source	Tap
Samp#: 2020 - - 00 - SI - RE WS#: WS-S-0291 Date: 2020 - - Desc: <b>Community Name</b> – Source Name	Samp#: 2020 - - - TH - RE WS#: SA-0298 Date: 2020 - - Desc: <b>Serviced Area(s)</b> – Source Name

For any samples which are not part of the regular drinking water quality sampling (resamples, special samples), it may be necessary to complete labels from a sheet of blank labels. In these cases, all fields on the label would have to be hand written.

Pre-printed label sheets have three “blank” labels at the bottom of the page where the year is provided:

- For a source sample, choose a label with the WS#: field (there is one of these per page)
- For a tap sample, choose a label with the SA#: field. (there are two of these per page)

Source	Tap
Samp#: 2020 - - - - <b>WS#:</b> Date: 2020 - - Desc:	Samp#: 2020 - - - - <b>SA#:</b> Date: 2020 - - Desc:

**Samp#:** Sample number, must be completed by the sampler in accordance with the

*Drinking Water Quality Sample Numbers* nomenclature in **Appendix F**.

**WS# / SA#:** Complete the appropriate **WS#** or **SA#** in accordance with the global *Public Water Supply Database*.

For unidentified supplies that are not included in the *Public Water Supply Database* and have no **WS#** or **SA#** assigned, enter **0000** as the four digit number:

- **WS-S-0000** for surface water,
- **WS-G-0000** for groundwater, and
- **SA-0000** for serviced area.

**Date:** Sample date, must be completed by sampler in the following format:  
- **YYYY-MM-DD**

On pre-printed labels, the year field is completed; staff need only fill out the month and day:

- **2020-MM-DD**

**Desc:** The description of the sample differs for source and tap and need to be filled out as follows:

- **Community Name – Source Name** for a source sample and
- **Serviced Area(s) – Source Name** for a tap sample.

If the water supply is unidentified (i.e. WS-S-0000, WS-G-0000, SA-0000) use a unique identifier which is not likely to be confused with a community name currently in the *Public Water Supply Database*.

Under the present contract with Eurofins, there are:

- five bottles (three plastic, two glass) for each inorganic source (or tap) sample, requiring five identical labels on each of the bottles,
- two vials for each THM sample, requiring two identical labels on each of the vials, and
- two vials for each HAA sample, requiring two identical labels on each of the vials.

### **3.10 Drinking Water Quality Sampling Field Records**

The accurate completion of the *Drinking Water Quality Sampling Field Record* is an important component of the entire drinking water quality sampling process. This record is the vital link between the actual collection of a sample, and the data report from the laboratory. The data is verified with the *Drinking Water Quality Sampling Field Records* for quality assurance and quality control (QA/QC).

*Drinking Water Quality Sampling Field Records* are pre-printed by the Senior Environmental Scientist (WRIM) and mailed to the appropriate sampler at the same time

as the pre-printed labels. Pre-printed *Drinking Water Quality Sampling Field Records* contain information from the latest version of the *Public Water Supply Database*.

The field sheets include information such as:

- population serviced,
- chlorination/Treatment type

It is important to note that this additional information is up to date from when the field sheets are printed. Always check BWA status before heading in to the field.

Each pre-printed *Drinking Water Quality Sampling Field Record* should include all information in the following fields:

- Community #
- Water Supply #
- Serviced Area #
- Community Name
- Water Supply Name
- Serviced Area Name

Community #: 5145 Water Supply #: WS-S-0868 Serviced Area #: SA-0904	Community Name: Trepassey Water Supply Name: Broom Cove Pond Serviced Area Name: Trepassey
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Prior to leaving the office, it is useful to match up the appropriate labels with the *Drinking Water Quality Sampling Field Records*. Keeping these documents paired together can save time and is useful in identifying any potential errors or mistakes.

For any samples which are not part of the *regular* drinking water quality sampling, it will be necessary to complete a blank *Drinking Water Quality Sampling Field Record*. An example of a blank *Drinking Water Quality Sampling Field Record* is shown in **Appendix K**. In these cases, the following fields in the top box of the record would have to be completed prior to leaving the office:

- Community #
- Water Supply #
- Serviced Area #
- Community Name
- Water Supply Name
- Serviced Area Name

In the most current *Public Water Supply Database* and in subsequent versions, Community #s are listed as LGP #s (Local Government Profile).

On the *Drinking Water Quality Sampling Field Record*, the Sample Site is different for source and tap samples:

- **Sample Site – 00** for source sampling,
- **Sample Site – 01, 02, 03, 04** for tap sampling.

The following boxes indicate the type of sample that is being taken:

- **00-SI-RE** source inorganic – **regular** sample,
- **00-SI-SP** source inorganic – **special** sample (mitigation and control, QA/QC or RTWQ),
- **00-SI-RS** source inorganic – **resample**.

Other fields that must be completed on the *Drinking Water Quality Sampling Field Record* include:

- **Temperature** of the tap and source water,
- **time** the sample was taken (24hr format),
- sample **location**,
- **free** and **total chlorine**, and
- **remarks** (to record special circumstances).

**Information included in the space provided on the field sheet for the above noted fields will be placed in the database. Anything written outside the space provided will not be included in the database.**

### **3.11 Chain of Custody Forms**

Each *Chain of Custody (COC)* form has a preprinted sequential serial number. *Chain of Custody* forms are legal documents.

- ✓ **The Drinking Water Quality Sampling Field Records should be used for all information when filling out COC forms.**
- ✓ Do not rely on your sampling schedule to fill out the *COC* as this may have changed.
- ✓ Ensure bottle labels match the *Drinking Water Quality Sampling Field Records* and *COCs*.
- ✓ Write clearly and press hard when writing on the *COC* to ensure all three copies are legible.
- ✓ Be sure to add your office and cell phone numbers on the *COC*.
- ✓ Ensure page numbers are inserted.
- ✓ Add column totals for each page.
- ✓ If there is a bottle missing in a regular shipment, indicate on the *COC* that it is not being shipped and provide instructions (i.e. “Only one THM vial. Please proceed with THM analysis on the one available vial.”)
- ✓ Tick off “Early Results” column if you want the results before the batch results are ready.
- ✓ For resamples, tick off “RUSH” column to indicate that this sample must be analyzed as soon as possible.
- ✓ Send the white copy of the *COC* to the lab, yellow to Headquarters, and keep pink for the sampler.

If any significant changes need to be made, a new *Chain of Custody (COC)* should be completed. If a minor change needs to be made, ensure that it is legible, and the correction initialed so that it can still be used as a legal document.

A blank example of a *Chain of Custody (COC)* is provided in **Appendix L**.

### **3.12 Logistics**

The objectives of the drinking water quality monitoring program are:

- to assess the effectiveness of the treatment and/or disinfection system,
- the impacts of the distribution system in the community on water quality, and

- the impacts of the plumbing in local homes, public buildings or businesses on water quality.

This is done by comparing tap water quality with source water quality. Accordingly, tap and source samples should be collected subsequently (within a few hours of each other). Raw water quality or treated water quality can vary from season to season, day to day, and hour to hour, depending upon a variety of factors. This is particularly important in terms of THM precursors, pH, turbidity, temperature, and other parameters.

Regularly scheduled THM/HAA samples do not have to be taken if and only if the town/operator verifies that the chlorination system is **not** in operation.

### ***3.13 End of Sampling Season E-mail***

All sampling staff must send an end of sampling season e-mail within one week of the end of sampling for that particular season. This e-mail should include details pertaining to deviations from the sampling schedule, or any other notable items. Once all e-mails have been received, they will be combined and used for completion of QA/QC protocols and procedures. The end of season email should follow the Word template in **Appendix M**.

## 4.0 SAFETY AND SECURITY

Field work activities may require sampling staff to access water bodies during open water and ice conditions, enter confined spaces, enter disinfection facilities, enter water and wastewater treatment facilities, visit project sites, conduct regulatory inspections, handle bottles preserved with chemicals, expose themselves to chemicals, etc. All staff must ensure that they are fully aware of all required precautionary measures, safety requirements, required gear, and training in order to access or undertake above mentioned activities.

Staff safety and well-being is of paramount importance, and it should not be compromised under any circumstances.

It is the Manager's responsibility to provide staff with the required training and tools to ensure their safety and well-being. It is the staff's responsibility to identify safety related needs and training to the Manager.

### 4.1 Preservatives and Reagents

For many of the analytical procedures that are required, the analyzing laboratory may require that one or more preservative or reagent be added to the sample bottles/vials to preserve the sample or to prevent additional chemical reactions from taking place. These preservatives can be hazardous and should be treated with care. The WRMD will provide the training and safety equipment needed to properly and safely handle preservatives and reagents. Safety equipment includes safety glasses, acid resistant gloves, and lab coats/aprons. It is the sampler's responsibility to wear the safety equipment. Failure to do so may absolve the Department of any responsibility or liability in the event of mishap.

Currently under the contract with Eurofins the following bottles contain preservatives:

<b>Bottle / Vial Type</b>	<b>Preservative</b>
1 x 125 ml plastic used for nutrients	Sulfuric Acid (H <sub>2</sub> SO <sub>4</sub> )
125 ml plastic used for metals	Nitric Acid (HNO <sub>3</sub> )
125 ml amber glass used for TOC	Sulfuric Acid (H <sub>2</sub> SO <sub>4</sub> )
2 x 40 ml VOC glass vials used for THM samples	Sodium Thiosulphate
2 x 40 ml VOC glass vial used for HAA samples	Ammonium Chloride

It is necessary to determine the free and total chlorine residual for systems (surface water and groundwater) that are chlorinating. This is generally done using a HACH® Pocket Colorimeter filter photometer. The use of this meter requires two powdered reagents;

- DPD Free Chlorine Reagent
- DPD Total Chlorine Reagent.

These white powders may cause eye and respiratory tract irritations, as well as allergic skin reactions.

The *Safety Data Sheets (SDS)* for each of the above mentioned preservatives/reagents are found in **Appendix N**. *SDS* sheets should be available in an easy to access location in the departmental laboratories for each region. All staff who handle these bottles, preservatives, or reagents in any way **must** have WHMIS (Workplace Hazardous Materials Information System) training.

#### **4.2 Chlorine and Water Treatment**

The collection of source water samples from some wet wells, drilled wells, and water treatment plants necessitates entering into buildings where chlorine or other chemicals are used and stored. Entry into such premises must only be done with the owner/operator of the facility present. The owner/operator should know the risks and warning signs.

The presence of chlorine is obvious by its smell. Chlorine gas can cause respiratory tract irritation, eye irritation, and death. Chlorine liquid can also cause respiratory tract irritation, eye, and skin irritation. It will also bleach any clothes that it comes in contact with.

Chlorination is the most common form of disinfection used in Newfoundland and Labrador. However, other forms of water treatment can be found such as ozonation, ultraviolet (UV) radiation and mixed oxidant systems. Check with the owner/operator if you have any concerns regarding the safety procedures appropriate in each facility.

#### **4.3 Sample Nabber Safety**

In some cases, it is necessary to collect water samples from wet wells in pump houses. The use of a long pole (sample nabber) can be hazardous, particularly with respect to electrical wires, light fixtures, and electrical outlets. Sample nabber poles should be made of plastic, fiberglass, or some other non-conductive material.

#### **4.4 Water and Ice Safety**

The collection of source water samples requires that a sample be taken directly from a pond, lake, reservoir, stream, river, wet well, drilled, or dug well. The collection of these samples has some inherent risks. Appropriate safety precautions must be employed.

Workplace Health and Safety Regulations specify that under certain circumstances, work around water and ice necessitates having

- ✓ having a second person,
- ✓ having a means of rescue,
- ✓ having a means of communication, and
- ✓ wearing of personal flotation devices.

If a second person is deemed necessary then it must be planned in consultation with the

Program Lead.

Having a means of rescue only applies to a situation with two or more people.

Maintaining a means of communication applies in all circumstances. Field staff have been provided with cell phones or satellite phones, and a SPOT Satellite GPS Messenger. A lone worker monitoring service called SafetyLine is utilized as part of the WRMD's safety precautions for work in the field. It is utilized via mobile application and includes important safety procedures such as check-in intervals and emergency response protocols.

However, in some locations there is no signal and communication is impossible. Always use good judgment and be cautious if communication is lost. Cell phones need to be protected (with doubled zip-lock bags, or similar means) when working around water. The SPOT Satellite GPS Messenger comes with an armband that enables you to transport it in the field "hands free".

Wearing a personal flotation device (floater suit, floater jacket, life jacket, or vest) should be done under **all circumstances** when a person is working in or around any water body. The provision of this personal safety equipment is the responsibility of the employer. However it is the worker's responsibility to ensure that he/she has one that fits appropriately, and wears it.

The following gear is also recommended to be taken into the field:

- helmets,
- throw rope,
- whistle,
- carabineers,
- bear spray/bear bell,
- reflective vest
- quick release harness, etc.

Some important notes for water safety:

1. be aware of your surroundings,
2. your personal safety always comes first,
3. always use the right equipment,
4. always have a backup plan,
5. never go on ice covered intake ponds,
6. never tie a rope around yourself,
7. never stand in the loop of a rope,
8. always stand upstream of a rope,
9. never put your feet down should you be swept away.

## 5.0 SOURCE WATER QUALITY MONITORING

### 5.1 Description

Source water quality is the quality of water prior to any treatment, disinfection, or distribution. In most cases, source water quality samples are collected directly from a pond, lake, reservoir, stream, river, or well, depending on the source of public water supply for a particular community.

The sample is considered to be a **source** sample if:

- It is collected from a dug or drilled well with a hand pump, electric pump, or gravity flow, and
- there is no treatment, disinfection, or distribution.

### 5.2 Parameters

The parameters monitored under this component of the program may include but may not be limited to the following:

- Physical Parameters
  - Temperature
  - Conductivity
  - pH
  - Colour
  - Turbidity
  - Total Dissolved Solids;
- Chemical Parameters
  - Inorganic
    - Metals
    - Major Ions
    - Nutrients; and
  - Organic
    - Total Organic Carbon
    - Hydrocarbons
    - Pesticides
    - Other organic parameters as required.

**Inorganics analysis** - Under present contract with Eurofins, a complete listing of Inorganic parameters is included in **Appendix B**.

**Temperature** of the source water is a required measurement. It must be recorded on the *Drinking Water Quality Sampling Field Record*.

### 5.3 Sample Location

Source water is collected directly from the source (pond, lake, reservoir, stream, river, or well) prior to disinfection or any other treatment. It is analyzed to determine the quality of water that flows into a treatment/distribution system, and is a direct indicator of the health of the ecosystem that makes up the natural drainage basin, watershed, or groundwater recharge area. Monitoring of source water quality is the most important tool

to assess the impact of land use changes on source water and to ensure the integrity of a public water supply. It can also be used in comparison to tap water quality in order to assess the effectiveness of the treatment and/or disinfection system, and the impact of the distribution system.

Source water samples must accurately represent the quality of the water that is being sampled. Therefore, surface water samples are generally taken as grab samples directly from the source body of water, as close as is practical to the water supply intake. At times, site inaccessibility, adverse weather, or ice conditions make this dangerous, physically impractical, or impossible. It is recommended that the source sample be omitted under such circumstances.

When sampling drilled and dug water wells, it is desirable to have the person who operates the well and associated infrastructure with you, or be very familiar with these various and variable systems yourself. The operator is likely familiar with the sampling procedure, equipment and operational details. If possible, have that person turn valves, shut down or bypass pumps and chlorinators, isolate holding or pressure tanks, and operate specialized hatches and doors. If you are taking a water sample without the operator present, a thorough understanding of water systems and associated issues regarding electricity, pressure, cross connection, water quality and quantity, and confined space is essential. For many sites, a length of garden hose (20 – 30 feet long) is necessary for the flushing process. In a few cases, two or more lengths of hose is needed. This should be brought with you. To maintain consistency, make sure all samples are taken as close to the water well as possible. Dug wells require a telescopic water sampling pole with a bottle holder attached. If possible, water samples are taken directly from a dug well.

It is important to realize that a grab sample represents only one instant in time. Water quality can vary from season to season, day to day, and hour to hour depending upon a variety of factors.

#### **5.4 Protocol**

Protocol is utilized to ensure that everyone that is involved in drinking water monitoring collects a sample in the same way. This ensures accurate results, consistency of data, and reduces the number of systematic errors.

While conducting source sampling ensure that safety is your priority. If a source is unsafe to access do not take the sample. Indicate in the Remarks field on the *Drinking Water Quality Sampling Field Record* why the site was inaccessible.

Label the bottles before taking the sample. Labels will not stick to a wet surface. Labeling the bottle prior to its filling ensures that the bottle is labeled and is less likely to get mixed up with another bottle later.

Grab samples are taken directly from source waters. Source samples must be true source samples taken near the intake. Sampling from inside the chlorination or pump house, even if before any treatment, is not considered a true source sample. If a true source

sample is not possible do not sample the source. Indicate in the Remarks field on the *Drinking Water Quality Sampling Field Record* why the source sample was not taken.

The sample bottle is plunged directly into the water in an inverted position. Once below the surface, approximately 30 cm, the bottle is turned upright so that the air is allowed to escape and the water to run in. This avoids the inclusion of any floating debris or organic matter to enter the bottle.

Any bottle containing preservatives must not be rinsed or over filled, as this would wash out the preservatives. A non-preserved bottle shall be used to fill up any preserved bottle. For example, the 500mL plastic bottle for general chemistry analysis may be used to fill the remaining bottles as they have preservatives. There is no need to rinse out the 500ml plastic bottle as it is sterile.

**Inorganics** - Under the present contract with Eurofins there are five bottles to be filled for each inorganic source water sample:

- 1 - 500 ml plastic - no preservative;
- 1 - 125 ml plastic - sulfuric acid;
- 1 – 125 ml plastic – nitric acid
- 1 – 125 ml amber glass – sulfuric acid
- 1 – 125 ml amber glass – no preservative

The *Drinking Water Quality Sampling Field Record* needs to be filled out accurately and at the same time that the samples are being taken.

- Sample Serial Number – see **Appendix F** for nomenclature
- Sample Site - Site numbers should reflect the location of the sample:
  - **00** – sample collected at the source.
- Sample Suffix:
  - **-RE** – if the sample is a regularly scheduled sample,
  - **-SP** – if the sample is part of a special project (mitigation and control, QA/QC, etc.)
  - **-RS** – if the sample is a re-sample.
- Location – describes the sampling location
  - physical description of the location,
  - name of the building’s occupant or owner, or
  - street address, etc.
- Temperature – required for calculating Langelier Index
- Time – 24hr format
- Remarks:
  - The remarks field is the location on the Field Sheets to record special circumstances.
  - This information can be critical for interpreting samples.
  - With the exception of source wells, the remarks field will not be reported on community reports.
- Signature & Date

Note: For Source samples: Field Sheet Remarks appear in the DWQ Search Engine “Remarks” Column.

Optional measurements and information can be recorded in a field book, including but not limited to:

- Conductivity using a portable conductivity meter;
- pH using portable pH meter; and
- Dissolved oxygen using portable DO meter.

When sampling at a source, collect GPS coordinates and take pictures of the following:

- Intake and surrounding area
- Dam or water control structure
- Pump house or other structures of interest

When a “new supply” is found in the field, do **not** sample it immediately as it needs to be added to the *Public Water Supply Database*. Samplers are required to collect all relative information as it pertains to the *Public Water Supply Database* as outlined in the Protocol for New Public Water Supplies.

Only after a new supply is added to the *Public Water Supply Database* will a new Serviced Area(s) number and Water Supply number be assigned. If it is added, the supply can be sampled during the next visit.

The Protocol for New Public Water Supplies is found in **Appendix H** and Protocol for Removal of Public Water Supplies is found in **Appendix I**.

### **5.5 Sampling Protocol for Municipalities (Remote Sampling)**

Under special circumstances (i.e. remote location), the WRMD will request that drinking water samples be collected by municipal staff. In these instances, WRMD staff should ensure that the sampler has been provided with the appropriate information and materials to collect and handle the sample in accordance with our protocol. A copy of the sampling instructions from **Appendix O** should be forwarded to the sampler, along with the appropriate bottles and necessary materials to allow for proper and prompt return shipment. Organization will ensure that the sample is collected properly.

## 6.0 TAP WATER QUALITY MONITORING

### 6.1 Description

Tap water quality is the quality of water at the consumer's tap following any treatment, including disinfection. In most cases, tap water quality samples are collected from faucets inside local homes, public buildings, or businesses.

### 6.2 Parameters

The parameters monitored under this component of the program may include, but may not be limited to the following:

- Physical Parameters
  - Temperature
  - Conductivity
  - pH
  - Colour
  - Turbidity
  - Total Dissolved Solids;
- Chemical Parameters
  - Inorganic
    - Metals
    - Major Ions
    - Nutrients
  - Organic
    - Chlorination Disinfection By-Products (CDBPs)
      - Trihalomethanes (THMs)
      - Haloacetic Acids (HAAs)
    - Total Organic Carbon
    - Hydrocarbons
    - Pesticides
    - Other organic parameters as required
  - Chlorine Residual Testing (Free and Total)

**Inorganics analysis** - Under present contract with Eurofins, a complete listing of Inorganic parameters is included in **Appendix B**.

**THMs analysis** - Under present contract with Eurofins.

**HAAs analysis** - Under present contract with Eurofins.

**Temperature** of the water is a required measurement. It must be recorded on the *Drinking Water Quality Sampling Field Record*.

**Chlorine Residual Testing** - A chlorine residual test shall be conducted for all systems (surface water and groundwater) that are using chlorination as a form of disinfection. This is generally done using a HACH® Pocket Colorimeter filter photometer. Procedures for determining the free and total chlorine residual are outlined in the Operation Manual included with the meter.

There will be cases when the free or total chlorine levels are higher than the maximum recording limit of the chlorine measurement kit (2.2mg/L) when measuring in “low range”. Typically the numbers will flash when the maximum recording limit has been reached. When this happens, retake the reading in the “high range” setting using the procedures outlined in the Operation Manual. Record all values in field sheets. Note chlorine readings greater than 2.2 mg/L in the End of Season Emails. Notify the town of the high chlorine readings, as well as the OETC Regional Staff responsible for that area.

Under certain specific circumstances, tap water samples are collected for organic parameters other than THM or HAA. These samples are collected in specific bottles or vials in accordance with protocols provided by the analyzing laboratory.

### **6.3 Sample Location**

Tap water quality is monitored so that it can be compared with the *GCDWQ*, as amended, and the *Standards for Chemical and Physical Monitoring of Drinking Water*, as listed in the Policy for Drinking Water Quality Monitoring and Reporting (**Appendix A**), or any other guidelines which might be adopted or legislated. Furthermore, tap water quality can also be compared with the source water quality in order to identify the cause of any observed water quality problem. Any variation between source and tap water quality represents the effectiveness of the treatment and/or disinfection system, the influences of the distribution system in the community, and the plumbing in local homes, public buildings, or businesses.

Inorganic samples are typically taken two times per year, four times a year for populations greater than 5000. THM and HAA samples are taken four times a year from all surface water systems that have chlorination; and all groundwater systems that have chlorination and have been determined to have a presence of THM and HAA (i.e. initial samples taken were greater than 10ug/L).

Samples of tap water for inorganic parameters, THMs, and HAAs are usually collected from one location, at the point of maximum THM/HAA formation. This is usually at approximately 2/3<sup>rd</sup> of the way through the distribution system.

**Flushing protocol** is very important. For residential buildings, cold tap water must be run for at least 5 to 10 minutes. Cold and clear water running at a constant temperature indicates that all standing or stagnant water is flushed from the plumbing system, and water has been drawn from the community’s distribution system. However, in some circumstances, it is necessary to run the water for much longer periods of time:

- when the service line is longer than average (homes that are a long way from the street or water main),
- when the building is quite large (lots of interior plumbing),
- or when there is very little water use in a building.

In the interest of time, it is beneficial to choose tap water sampling locations which are close to the road (or water main), and where there is expected to be considerable water

use. In addition, before collecting the tap samples, ensure that there is no filter in the household system and that it is in fact hooked up to the public water supply you are trying to target. If there is a filter, or the location has a private supply, find a different location to take your sample.

Regularly scheduled THM/HAA samples do not have to be taken if and only if the town/operator verifies that the chlorination system is not in operation. See **Appendix P** for Protocol for THM and HAA Collection and Reporting.

It is important to realize that a grab sample represents only one instant in time. Water quality can vary from season to season, day to day, and hour to hour depending upon a variety of factors.

#### **6.4 Protocol**

Protocol is utilized to ensure that everyone involved in drinking water monitoring collects a sample in the same way. This ensures accurate results, consistent data, and reduces the number of systematic errors.

Label the bottles before taking the sample. Labels will not stick to a wet surface. Labeling the bottle prior to its filling ensures that the bottle is labeled and is less likely to get mixed up with another bottle later.

Grab samples are taken from all tap waters. For this type of sample, the tap must be run for several minutes as per the **flushing protocol**, described above. Once the water runs clear and cold, reduce the flow to a small stream or trickle to allow the water to flow into the bottle. Any bottle containing preservatives must not be rinsed or over filled, as this would wash out the preservatives.

**Inorganics** - Under the present contract with Eurofins, there are five bottles to be filled for each inorganic tap water sample:

- 1 - 500 ml plastic - no preservative;
- 1 - 125 ml plastic - sulfuric acid;
- 1 – 125 ml plastic – nitric acid
- 1 – 125 ml amber glass – sulfuric acid
- 1 – 125 ml amber glass – no preservative

**THMs** - Under the present contract with Eurofins, there are two vials to be filled for each inorganic tap water sample:

- 2 - 40 ml glass vials - sodium thiosulphate (white powder / solution)

**HAAs** - Under the present contract with Eurofins, there are two vials to be filled for each inorganic tap water sample:

- 2 – 40 ml glass vials – ammonium chloride (white powder)

The THM & HAA vials need to be filled slowly. Do not rinse or overflow so as to flush out the preservative. Fill vial completely so that there is no head space (air bubbles).

Sometimes it is helpful to let water flow into the cap and then use the cap to top-up the vial. If air bubbles are present, they can be seen by inverting the bottle. See **Appendix P** for THM and HAA Collection and Reporting protocol.

The *Drinking Water Quality Sampling Field Record* needs to be filled out accurately and at the same time that the samples are being taken.

- Sample Serial Number – see **Appendix F** for nomenclature
- Sample Site - Site numbers should reflect the location of the tap sample in the distribution system:
  - **01** – sample collected at the beginning of the distribution system,
  - **02** – sample collected in the middle of the distribution system,
  - **03** – sample collected approximately  $\frac{3}{4}$  of the way along the distribution system, and
  - **04** – sample collected at the end of the distribution system.
- Sample Suffix:
  - **-RE** – if the sample is a regularly scheduled sample,
  - **-SP** – if the sample is part of a special project (mitigation and control, QA/QC, etc.)
  - **-RS** – if the sample is a re-sample.
- Location – describes the sampling location
  - physical description of the location,
  - name of the building’s occupant or owner, or
  - street address, etc.
- Temperature – required for calculating Langelier Index
- Time – 24hr format
- Free & Total Chlorine – as described above
- Remarks:
  - The remarks field is the location on the Field Sheets to record special circumstances.
  - This information can be critical for interpreting samples.
  - With the exception of source wells, the remarks field will not be reported on community reports.
- Signature & Date

Note: For Tap, THM/HAA samples: Field Sheet Remarks and Field Sheet Location appear in the DWQ Search Engine “Remarks” Column.

Optional measurements and information can be recorded in a field book, including but not limited to:

- Conductivity using a portable conductivity meter;
- pH using portable pH meter; and
- Dissolved oxygen using portable DO meter.

Samples that show contaminant exceedances must be resampled according to the Exceedance Reporting Protocol in **Appendix Q** and **Appendix R**.

### **6.5 Sampling Protocol for Municipalities (Remote Sampling)**

Under special circumstances (i.e. remote location), the WRMD will request that drinking water samples be collected by municipal staff. In these instances, WRMD staff should ensure that the sampler has been provided with the appropriate information to collect and handle the sample in accordance with our protocol. A copy of the sampling instructions from **Appendix O** should be forwarded to the sampler, along with the appropriate bottles and necessary materials to allow for proper and prompt return shipment. Organization will ensure that the sample is collected properly.

### **6.6 Quality Assurance/Quality Control**

The QA/QC sampling schedule consists of blind duplicate, blind spikes and blind knowns. Blind duplicate sampling is responsibility of core staff in all regions while blind spikes and blind knowns are the responsibility of core staff at Headquarters.

**Blind Duplicates:** A second sample is collected at the same time and location in separate sample containers and submitted to the laboratory without identifying them as duplicates. The purpose of this QA/QC check is to evaluate laboratory analytical precision, field precision and sample homogeneity. The acceptance level for all parameters have a pre-determine level of acceptance based on historical data.

**Blind Knowns:** A purchased CRM with known parameter values for metals is submitted to the analyzing laboratory blind (like any regular sample). The purpose of this QA/QC check is to evaluate laboratory accuracy and precision on a known set of metal values. The acceptance level for all parameters have a pre-determine level of acceptance based on historical data.

## 7.0 SAMPLE HANDLING

### 7.1 Sample Storage

All samples are transported from the field to the departmental lab in coolers with ice packs, making every effort to keep the samples in the dark and chilled. Samples must remain below 10°C for the laboratory to accept them for analysis. Do not allow the samples to freeze as this will compromise the sample integrity. Once samples are at the departmental lab, all samples are stored in a refrigerator, in a secure location (locked) until shipment to the analyzing laboratory.

Maximum holding times, including shipment, are followed as prescribed by the analyzing laboratory:

Parameter	Hold Time
Turbidity, nitrite, color	2 days
Alkalinity	14 days
THMs & HAAs	14 days
DOC, TKN, NH <sub>4</sub>	28 days
Conductivity & Mercury	28 days
Anions	28 days
Metals	6 months

Under the present contract with Eurofins samples should be shipped within five (5) days of collection. There are circumstances where samples must be stored for longer periods:

- travel to remote locations (islands, Labrador, south coast of Newfoundland),
- long weekends,
- transportation delays, etc.

No samples should be greater than 7 days old when received by the laboratory. If remote samples are returned to the regional offices after 7 days from the day of sampling, the sample is not to be sent to the laboratory. In this case, staff are required to send correspondence to the Town in the form of a letter to inform them that the sample was not sent to the laboratory due to sample hold time exceedances. This letter is to be cc'd to the Manager of the Drinking Water program.

Depending upon courier service, shipping samples on Friday is not advisable in the regions due to unavailability of Saturday shipping. Samples shipped from St. John's however, can ship on Friday provided they request Saturday shipping. It is better to store samples in a controlled environment (fridge), rather than in a cooler stored in a van, truck, warehouse or hanger, where it may be subject to extreme changes in temperature.

### 7.2 Drinking Water Quality Sampling Field Records

Prior to the samples being shipped, it is important to double-check that information on the *Drinking Water Quality Sampling Field Records* is consistent with the bottle labels and *Chain of Custody Records*.

The *Drinking Water Quality Sampling Field Records* are to be photocopied. The original copies are sent to the Program Lead (Head Office), and the copies kept by the sampler. It is recommended that the field sheets and corresponding COC's are sent to Head Office at the same time the samples are shipped to the lab.

### **7.3 Sample Shipping**

Samples from St. John's office are dropped off to the Purolator office in St. John's. Samples from Grand Falls-Windsor and Corner Brook are sent via Purolator. Samples shipped from Labrador are via Air Canada Cargo. All samples are to be labelled for shipping via AIR. The laboratory pays for all shipping costs.

Package coolers so that bottles will not break, use bubble wrap or shredded paper. THM/HAA bottles can be shipped in the bubble envelopes as long as they are well packaged within the cooler. All samples are shipped in coolers with ice packs, making every effort to keep the samples in the dark and chilled. Samples must remain below 10°C for the laboratory to accept them for analysis.

- Don't forget to fill out the date, the number of coolers, and signature.
- Indicate that the coolers are to be sent by air, and type of package as other.
- No insurance is required.
- Indicate Saturday service if you are sending your samples on a Friday.

A completed *Chain of Custody Record* is required to be sent with the sample. Before the samples are shipped, make sure the *Chain of Custody Record* has the following information:

- region from which samples are being shipped from,
- column totals are noted on each individual page,
- name of the courier (Purolator),
- the date shipped,
- the waybill number or identification number,
- page numbering,
- name,
- contact phone numbers (work and cell).

Including the name of the courier, the date shipped, and the waybill number/identification number ensures continuity and sample security can be guaranteed. Lost or missing shipments can be easily tracked, and sample delivery and turn-around time can be determined.

If shipping on a Wednesday or later day in the week, it is recommended that online waybills be used. These can be completed online with a Purolator account, printed and attached to the cooler. If shipping on a Friday, Saturday delivery should be checked when completing the online waybill.

## 8.0 SPECIAL PARAMETERS

### **8.1 *Special Parameters Monitoring***

Staff may be required to take special samples for specific parameters outside of our regular inorganics package. These special parameters may require unique bottle(s) and handling instructions. Usually staff will be required to take a full inorganics suite in addition to the special parameter for comparative purposes.

Detailed information for special parameter monitoring will be provided by the program lead.

## 9.0 DATA MANAGEMENT AND REPORTING

### 9.1 Paper Work

When the sample season is complete, ensure all relevant paper work (original field sheets, COCs) is sent to the Program Lead (Head Office). It is not necessary to wait until the end of the season to send in paper work. Sending paper work as it is completed facilitates the exceedance notification protocol.

### 9.2 Data Input

Water quality data will be received from the laboratory(s) in printed and digital form. This data is verified with *Drinking Water Quality Sampling Field Records* for quality assurance and quality control (QA/QC). After completion of the QA/QC process, the digital data is imported into the appropriate databases according to pre-defined protocols.

### 9.3 Data Storage

Paper copies of all laboratory reports are filed at the Head Office in the Confederation Building. The digital data is archived in one of six databases, as follows:

- Raw Water Quality Database (Physical and Inorganic Parameters)
- Raw Water Quality Database (Organic Parameters)
- Tap Water Quality Database (Physical and Inorganic Parameters)
- Tap Water Quality Database (Organic Parameters)
- THMs Database
- HAAs Database

### 9.4 Data Retrieval

Data can be retrieved from the Drinking Water Quality Search Engine ([www.wrmd.env.gov.nl.ca/DWQSearchEngine\\_v4/default.aspx](http://www.wrmd.env.gov.nl.ca/DWQSearchEngine_v4/default.aspx)). This is an internal search engine. The Drinking Water Quality Search Engine and digital databases are updated on a seasonal basis. Software and protocols have been developed to generate *Contaminant Exceedance Reports*, drinking water quality summary reports, seasonal reports, and exceedance summaries.

### 9.5 Data Reports

Data reports are generated in a prescribed format using customized software that has been developed by the WRMD. All reports can be retrieved using the Water Resources Portal ([www.env.gov.nl.ca/env/waterres/portal.html](http://www.env.gov.nl.ca/env/waterres/portal.html)). This is a public website that provides a wealth of information relating to water quality monitoring results, seasonal and annual reports and protected public water supplies. Data can also be retrieved by the public on the Water Resource Portal.

### 9.6 Data Reporting

#### 9.6.1 First Indication of Exceedances (Exceedance Reports)

The protocol for exceedance reporting of tap samples is in **Appendix Q** and **Appendix R**.

- a) The laboratory will inform the WRMD by fax and email whenever a parameter

exceeds a maximum acceptable concentration or interim maximum acceptable concentration based on the *GCDWQ*. The WRMD is required to acknowledge receipt of this information by return fax/email. This protocol does not apply to parameters such as pH, turbidity, aluminum, aesthetic parameters or other water quality objectives. It also does not apply to THMs and HAAs since the guideline value is based on a running average of four seasonal samples.

- b) If the exceedance is for lead, the protocol outlined in **Appendix Q** must be followed. If the exceedance is for anything other than lead, the protocol outline in **Appendix R** must be followed.
- c) The *Contaminant Exceedance Report* will include a section on the sheet which will contain a signature area. An acknowledgment of receipt must be signed by the community representative and sent back to the WRMD to confirm transmission of the results. In cases where fax access is not available to the community, the report will be mailed. The community is required to provide this information to their residents and other consumers.
- d) The *Contaminant Exceedance Report* will be e-mailed concurrently to the Medical Officer of Health and representatives from the Department of Health and Community Services and Service NL.
- e) The staff of the WRMD will be available to provide a detailed explanation of the *Contaminant Exceedance Report*, and the communities will be encouraged to contact the staff for additional information.

### 9.6.2 Seasonal Data Reporting

- a) After the completion of the QA/QC process for a given season, the results are published on the Department's webpage and the Water Resources Portal.  
<http://www.mae.gov.nl.ca/waterres/quality/drinkingwater/chemical.html>  
<http://maps.gov.nl.ca/water/>
- b) An email is sent to all communities which have been sampled to notify them that the seasonal results are available on the Department's webpage. The communities are required to provide this information to their residents and other consumers.
- c) The staff of the WRMD are required to review the seasonal data reports using the following check protocols:
  - a. Source water data
    - i. Aesthetic exceedances (A) (half box) – is there anything outside the normal (normal, pH, iron and manganese)?
    - ii. Contaminant exceedance (C) (full box) – are there any contaminant exceedances and were they reported to the Town as per the exceedance protocol?
  - b. Tap water data

- i. Aesthetic exceedances (A) (half box) – is there anything outside the normal (normal, pH, iron and manganese)?
    - ii. Contaminant exceedance (C) (full box) – are there any contaminant exceedances and were they reported to the Town as per the exceedance protocol?
  - c. THM data
    - i. Running THM average – is there anything outside the normal values reported?
  - d. HAA data
    - i. Running HAA average – is there anything outside the normal values reported?
  - e. Langelier index
    - i. Is there anything outside the normal values expected?
  - f. DWQI
    - i. Is there anything outside the normal values expected?
- d) The staff of the WRMD will be available to provide a detailed explanation of the data, and the communities are encouraged to contact the regional staff for additional information.

### **9.6.3 Annual Report to the House of Assembly**

The WRMD will also provide an annual report to the House of Assembly on drinking water quality. This is a high profile product that goes through Multi-Departmental Executive level review. The Auditor General has noted this report as a required project. Every report should have its own unique theme. This report is based on the fiscal year. Drinking water staff are expected to provide ideas for topics and success stories to be included in the report. Photographs are also expected from all field staff. The following is a list (not exhaustive) of photos that would be appropriate:

- Protected Water Supplies – with PWS signs
- Inspections of all types
- Infrastructure
- Sampling – both source and tap
- Sampling meters and equipment
- Products
- Best practices
- Education training sessions and meetings
- On-site training sessions
- Annual water and wastewater workshop
- New water treatment plants
- Consumptive uses

## **Appendix A**

### **Policy on “Drinking Water Quality Monitoring and Reporting for Public Water Supplies”**



Department of Environment and Conservation

**POLICY DIRECTIVE**

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Division:	Water Resources Management	P.D.	W.R. 09-1
Prepared By:	Annette Tobin, Haseen Khan, P.Eng	Issue Date:	Jan. 2, 2009
Approved By:	Martin Goebel, P.Eng	Director	Re-Issue Date: _____
Approved By:	_____	ADM	Review Date: _____
Authorized By:	_____	DM	Superseded: _____
	_____	Minister	Cancelled: _____

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**Subject:**

Drinking Water Quality Monitoring and Reporting for Public Water Supplies

**1.0 Objectives:**

This policy establishes the Department of Environment and Conservation’s drinking water quality monitoring and reporting requirements for all public water supplies.

**2.0 Legislation**

*Water Resources Act, SNL 2002 cW-4.01, Section 39*

**3.0 Policy**

The water quality monitoring and reporting activities for public water supplies will be subject to the following policy guidelines established under Section 39 of the *Act*.

**4.0 Background**

The Government of Newfoundland and Labrador utilizes the Multi-Barrier Strategic Action Plan (MBSAP) to ensure the public is provided with clean and safe drinking water. The MBSAP is considered the most effective method to manage drinking water systems because it provides multiple levels of security against potential water contamination. The MBSAP has three levels;

- (1) Source water protection; drinking water treatment; drinking water distribution system;
- (2) Monitoring; inspection and enforcement; data management and reporting; operator education, training and certification;
- (3) Legislative and policy frameworks; public involvement and awareness; guidelines, standards and objectives; research and development; and corrective measures.

This policy addresses monitoring and reporting in Level Two and legislative and policy frameworks and guidelines in Level Three.

## 5.0 Drinking Water Quality Monitoring

### 5.1 Regular Monitoring

All public water supply systems shall be monitored for drinking water quality purposes.

#### 5.1.1 *Sampling Seasons*

There are four seasons (winter, spring, summer and fall) that water quality monitoring occurs. There is a six to eight week sampling window within each season.

The four sampling windows for the Island portion of the province are:

Spring	May 16 <sup>th</sup> – June 30 <sup>th</sup>
Summer	August 1 <sup>st</sup> – September 30 <sup>th</sup>
Fall	November 1 <sup>st</sup> – December 15 <sup>th</sup>
Winter	January 15 <sup>th</sup> – March 15 <sup>th</sup>

The four sampling windows for Labrador are:

Spring	May 1 <sup>st</sup> – June 30 <sup>th</sup>
Summer	July 1 <sup>st</sup> – August 30 <sup>th</sup>
Fall	October 1 <sup>st</sup> – November 15 <sup>th</sup>
Winter	January 1 <sup>st</sup> – March 15 <sup>th</sup>

#### 5.1.2 *Monitoring Parameters*

Inorganic parameters analyzed for both source and tap water samples may include but are not limited to:

Alkalinity	Conductivity	Nitrate and Nitrite
Aluminum	Copper	pH
Ammonia	Dissolved Organic Carbon	Potassium
Arsenic	Fluoride	Selenium
Barium	Hardness	Sodium
Boron	Iron	Sulphate
Bromide	Kjeldahl Nitrogen	Total Dissolved Solids
Cadmium	Lead	Total Phosphorus
Calcium	Magnesium	Turbidity
Chloride	Manganese	Uranium
Chromium	Mercury	Zinc
Colour	Nickel	

Disinfection by-products analyzed for tap water samples may include but are not limited to:

Trihalomethanes  
Haloacetic Acids

Monitoring parameters may be added or changed due to site-specific circumstances.

#### 5.1.3 *Sampling Frequency*

Source water shall be sampled every two to three years. During the year the sources are sampled, the frequency is semi-annually.

Tap water shall be sampled a minimum of semi-annually for inorganic parameters. Tap water shall be sampled seasonally for large population centers with populations greater than 5,000.

Disinfection by-products shall be sampled four times per year for all surface water supplies that utilize chlorine as a disinfectant. The four samples must encompass the four seasons.

Disinfection by-products shall be sampled at least once for all groundwater supplies that utilize chlorine as a disinfectant to establish background levels. If the value is below 10 µg/L no further sampling is required. If the value is above 10 µg/L then it will be sampled four times per year and will encompass the four seasons.

Sampling rotations occur over a three-year period. Groundwater samples are taken during the summer and winter months and surface water samples during the spring and fall months for a three year period. During the next three year period, groundwater samples are taken during the spring and fall months and surface water samples during the summer and winter months. This ensures that seasonality of samples is assessed for all public drinking water supplies.

#### 5.1.4 *Performance Monitoring*

Performance monitoring shall be completed on water treatment plants on a site-specific basis to determine the effectiveness of the water treatment systems. For comparative purposes, samples are to be taken before and after the water treatment system. To determine the effectiveness of the water treatment systems, monitoring for extreme variations in flows and water quality are to be conducted. Performance monitoring shall include parameters in section 5.1.2 along with other parameters deemed relevant.

#### 5.1.5 *Monitoring Protocols*

Source water samples shall be collected directly from the source prior to disinfection or any other treatment. The sample shall be collected in close proximity to the intake as possible to ensure it represents the quality of water that flows into a treatment and/or distribution system.

Tap water samples shall be collected from a consumer tap using a grab sample method. The tap must be run for five minutes, or until it runs cold and clear and at a constant temperature, indicating that all standing or stagnant water is flushed from the plumbing system, and water has been drawn from the community's distribution system. Samples shall be typically taken from one location, approximately 2/3<sup>rd</sup> of the way through the distribution system.

Disinfection by-products should be sampled at the point of maximum formation. The maximum formation for THMs is typically 2/3<sup>rd</sup> of the way through the system. The maximum formation of HAAs is typically towards the beginning of the system.

Samples shall be received by the laboratory a maximum of five days after sampling occurred. This is required to ensure sample hold times are met.

#### 5.2 *Special Monitoring*

A review of emerging water quality parameters is to be completed on a yearly basis. Parameters that are determined to have potential impact for Newfoundland and Labrador are to be scheduled for special monitoring to determine the possible extent of the emerging parameter. On a site-specific basis emerging parameters are to be considered when there is a potential concern of a water quality parameter throughout the year. Emerging water quality parameters are to be added to the monitoring schedule as required.

Special monitoring shall be completed in the event of water quality issues, contamination events, special studies, evaluation of compromise to water distribution systems, environmental monitoring, pilot monitoring, or any other issue deemed necessary for water quality monitoring.

### **6.0 Drinking Water Quality Reporting**

#### 6.1 Exceedance Reports

Exceedance reports shall be provided to all communities when a laboratory result is above the *Guidelines for Canadian Drinking Water Quality* for contaminant parameters. These reports shall be faxed and/or mailed to the community as soon as the results are received by the Department. The community shall acknowledge the correspondence and fax and/or mail a signed copy of the exceedance report to the Department. An email shall be sent to the Medical Officer of Health, Health and Community Services, Government Services and Municipal Affairs to inform them of the water quality exceedance. A confirmation sample shall be collected for any community that has no history for that exceedance. The community shall be informed of the results of the confirmation sample by fax and/or mail.

## 6.2 Seasonal Drinking Water Quality Reports to specific communities

All communities with public water supplies shall be provided an interpretative report for any seasonal monitoring conducted. This report will clearly indicate any exceedances of parameters from the Guidelines for Canadian Drinking Water Quality.

## 6.3 Annual Drinking Water Quality Reports

All communities with public water supplies shall receive an annual interpretative report for all drinking water quality monitoring activities conducted during the calendar year. This report will clearly indicate any exceedances of parameters from the Guidelines for Canadian Drinking Water Quality.

## 6.4 Annual Drinking Water Safety in Newfoundland and Labrador Reports

A drinking water safety report shall be published annually which outlines accomplishments and activities under the Multi-Barrier Strategic Action Plan for drinking water safety. All communities shall be provided with a copy of the Annual Drinking Water Safety report when it is published.

## 6.5 Web Documents on Drinking Water Quality

Chemical drinking water quality monitoring schedule shall be published on the WRMD website at the beginning of each fiscal year. This schedule will detail the planned monitoring for the fiscal year for each public water supply. The schedule shall include the type and frequency of monitoring. Drinking water data for the preceding year is available on the WRMD website:

[http://www.env.gov.nl.ca/env/Env/water\\_resources.asp](http://www.env.gov.nl.ca/env/Env/water_resources.asp)

## 7.0 Guidelines for Drinking Water Quality in Newfoundland and Labrador

Guidelines used by the Government of Newfoundland and Labrador for drinking water quality are based on the “*Guidelines for Canadian Drinking Water Quality*” developed by Health Canada.

The guidelines listed below do not include all parameters in the *Guidelines* rather only those included in standard chemical analysis and metal scan packages.

<u>Chemical Parameters</u>	<u>MAC</u>	<u>Description</u>
Antimony	0.006 mg/L	Contaminant
Arsenic	0.01 mg/L	Contaminant
Barium	1.0 mg/L	Contaminant
Boron	5 mg/L	Contaminant
Cadmium	0.005 mg/L	Contaminant
Chloride	250 mg/L	Contaminant
Chromium	0.05 mg/L	Contaminant
Copper	1.0 mg/L	Aesthetic
Fluoride	1.5 mg/L	Contaminant
Iron	0.3 mg/L	Aesthetic
Lead	0.01 mg/L	Contaminant
Mercury	0.001 mg/L	Contaminant
Nitrate and Nitrite	10 mg/L	Contaminant
Selenium	0.01 mg/L	Contaminant
Sodium	200 mg/L	Aesthetic
Sulphate	500 mg/L	Aesthetic
Uranium	0.02 mg/L	Contaminant
Zinc	5.0 mg/L	Aesthetic

### Physical Parameters

Colour	15 TCU	Aesthetic
pH	6.5-8.5	Aesthetic
Total Dissolved Solids	500 mg/L	Aesthetic
Turbidity	1.0 NTU	Contaminant

### Disinfection By-Products

Trihalomethanes	100 µg/L*	Contaminant
Haloacetic Acids	80 µg/L*	Contaminant

\* Based on a running annual average of quarterly samples, collected at a point of the highest formation potential. 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.

Aesthetic 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.

Contaminant Parameters – 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 Concentration (MAC) of the “*Guidelines for Canadian Drinking Water Quality*”. Each MAC has been derived to safeguard health assuming lifelong consumption of drinking water containing the substance at that concentration.

Additional information on drinking water quality guidelines is available on the Health Canada website:

<http://www.hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/index-eng.php>

### Radionuclide Parameters

<u>Natural radionuclides</u>	<u>MAC</u>	<u>Artificial radionuclides</u>	<u>MAC</u>
Lead-210	0.1 Bq/L	Cesium-134	7 Bq/L
Radium-224	2 Bq/L	Cesium-137	10 Bq/L
Radium-226	0.6 Bq/L	Iodine-125	10 Bq/L
Radium 228	0.5 Bq/L	Iodine-131	6 Bq/L
Thorium-228	2 Bq/L	Molybdenum-99	70 Bq/L
Thorium-230	0.4 Bq/L	Strontium-90	5 Bq/L
Thorium-232	0.1 Bq/L	Tritium	7,000 Bq/L
Thorium-234	20 Bq/L		
Uranium-234	4 Bq/L		
Uranium-235	4 Bq/L		
Uranium-238	4 Bq/L		

### Bacteriological Parameters

	<u>MAC</u>
Escherichia coli ( <i>E.coli</i> )	None detectable per 100mL.
Total coliforms	No consecutive samples from the same site or no more than 10% of the samples from each distribution system in a given sample set should show the presence of total coliforms.

See <http://www.env.gov.nl.ca/Env/env/waterres/Policies/WQ-Standards-Microbiological.asp>

## **Appendix B**

### **Specifications for Drinking Water Analysis and Data Reporting Services**

**Invitation to Tender**

**for**

**Water Sample Analysis  
and Data Reporting Services**

**Department of Municipal Affairs and Environment  
St. John's, Newfoundland and Labrador**

**January 2018**

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## 1.0 Introduction

The Government of Newfoundland and Labrador, under its Multi-Barrier Strategic Action Plan (MBSAP) for drinking water safety, has made a commitment to enhance the protection of public water supplies and the delivery of clean, safe and reliable drinking water to the people of this province. As a part of this commitment, the Department of Municipal Affairs and Environment (hereafter referred to as the "Department") is responsible for monitoring physical and chemical characteristics of drinking water quality of all public water supplies. This activity is an important proactive component of the MBSAP for drinking water safety.

The drinking water quality monitoring program has three phases:

- 1) Water sample collection,
- 2) Analysis of water samples and data reporting,
- 3) Data management, interpretation and reporting.

The Department is responsible for the first and last phases of the program. The Department is soliciting the services of an accredited analytical water testing laboratory (hereafter referred to as the "Laboratory") for the second phase of the program. The Laboratory must be accredited by the Canadian Association for Laboratory Accreditation (CALA) or the Standards Council of Canada (SCC) for all the requested water quality parameters.

This document provides the administrative and technical requirements for the required analytical and data reporting work.

## 2.0 Objectives and Scope

The main objective of the drinking water quality monitoring program is to determine if public water supplies are meeting the current *Guidelines for Canadian Drinking Water Quality (GCDWQ)*. A secondary objective is to obtain baseline and trend data on the water quality of public water supplies.

The selected Laboratory must perform all work using accredited analytical techniques and instrumentation. The reported data must be thoroughly checked using standard quality assurance and quality control procedures, and must be scientifically acceptable and legally defensible. The Department may conduct a site visit of the selected Laboratory to verify the reported facilities.

The selected Laboratory is required to analyse the collected water samples for all parameters discussed in Section 3.0.

### 3.0 Service Requirements

#### 3.1 Water Analysis

The selected Laboratory will be required to provide the analysis of water samples for the following parameters:

- a. Trihalomethanes (THMs)
- b. Inorganics
- c. Haloacetic Acids (HAAs)
- d. Total suspended solids (TSS)

##### 3.1.1 Sample Parameter Details

###### Trihalomethanes (THMs) Analysis

The results are to be reported for the listed parameters in the following units using, at a minimum, the Method Detect Limit (MDL) indicated (see Section 3.4 for more information on MDL requirements):

Parameter	Units	MDL
Chloroform	µg/L	1.0
Bromodichloromethane	µg/L	1.0
Bromoform	µg/L	1.0
Dibromochloromethane	µg/L	1.0

###### Inorganic Analysis

The results are to be reported for the listed parameters in the following units using, at a minimum, the Method Detect Limit (MDL) indicated (see Section 3.4 for more information on MDL requirements):

Parameter	Units	MDL
Alkalinity	mg/L	5
Aluminium	mg/L	0.01
Ammonia (N-NH3)	mg/L	0.05
Antimony	mg/L	0.001
Arsenic	mg/L	0.001
Barium	mg/L	0.01
Boron	mg/L	0.05
Bromide	mg/L	0.25
Cadmium	mg/L	0.0001
Calcium	mg/L	1.0
Chloride	mg/L	1.0
Chromium	mg/L	0.001

Parameter	Units	MDL
Colour	TCU	5.0
Conductivity	µS/cm	5.0
Copper	mg/L	0.002
Dissolved Organic Carbon	mg/L	0.5
Fluoride	mg/L	0.1
Hardness	mg/L	1.0
Iron	mg/L	0.05
Lead	mg/L	0.001
Magnesium	mg/L	1.0
Manganese	mg/L	0.01
Mercury	mg/L	0.0001
Nickel	mg/L	0.005
Nitrate (N-NO <sub>3</sub> )	mg/L	0.1
Nitrite (N-NO <sub>2</sub> )	mg/L	0.1
pH	-	-
Potassium	mg/L	1.0
Selenium	mg/L	0.001
Sodium	mg/L	2.0
Strontium	mg/L	0.002
Sulphate	mg/L	2.0
Total Dissolved Solids	mg/L	5.0
Total Kjeldahl Nitrogen	mg/L	0.10
Total Organic Carbon	mg/L	0.5
Total Phosphorus	mg/L	0.01
Turbidity	NTU	0.1
Uranium	mg/L	0.001
Zinc	mg/L	0.01

### Haloacetic Acids (HAAs) Analysis

The results are to be reported for the listed parameters in the following units using the Method Detect Limit (MDL) indicated (see Section 3.4 for more information on MDL requirements):

Parameter	Unit	MDL
(Mono) Chloroacetic acid	µg/L	5.0
(Mono) Bromoacetic acid	µg/L	5.0
Dichloroacetic acid	µg/L	5.0
Trichloroacetic acid	µg/L	5.0

Dibromoacetic acid	µg/L	5.0
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Total Suspended Solids (TSS) Analysis

The results are to be reported for the listed parameters in the following units using, at a minimum, the Method Detect Limit (MDL) indicated (see Section 3.4 for more information on MDL requirements):

Parameter	Units	MDL
Total suspended solids	mg/L	1.0

**3.1.2 Sample Parameter Hold Times**

All sample parameters must meet a 7 day hold time with the exception of pH, turbidity, color and nitrite.

**3.1.3 Estimated Number of Samples**

The **estimated** number of samples to be analysed during a given fiscal year (April 1<sup>st</sup> - March 31<sup>st</sup>) are as follows:

- a. THM Analysis – 1,400
- b. Inorganic Analysis – 1,700
- c. HAA Analysis – 1,400
- d. TSS Analysis – 150

**3.2 Data Reporting - General**

The selected Laboratory must meet the following requirements:

- The complete record of Laboratory reports and electronic data for samples analysed for a given season must be provided to the Department within 30 days from the date of the last samples submitted for that season.
- Seasons are defined as follows:
  - Winter - January 1 to March 31
  - Spring - April 1 to June 30
  - Summer - July 1 to September 30
  - Fall - October 1 to December 31
- Samples will not be taken over the whole season. The Department may designate a shorter period of time, typically six weeks, in each season during which all sampling will occur.
- A printed copy of the analysis report must be provided for every sample tested. Analysis results will be reported with only one sample per page or sample results can be grouped by

a single community per page. The four fields from each bottle label discussed below must appear on the analysis report for each sample. Additionally, each parameter must be identified by the full parameter name and also show measurement units using SI, method detect limit, less than detect flag, the parameter result and any related comments. The results sheet must indicate that the results have been approved. For example, signed by a Laboratory official or the Head Chemist.

- Reports must also be grouped by season.
- A digital file of all the sample data must be sent by email at the same time as the printed copy.
- Four data fields will appear on the label of each sample bottle. These four fields must appear as separate fields for each sample in the electronic data file. These four fields must also appear on the paper copy of the results. These fields must appear, electronically and on paper, exactly as presented on the sample label: matching case of letters, hyphens and spaces. Most of this information will be typewritten but parts of it such as the date will be handwritten. An example is shown below.

Samp# 2018- **0423** -00-SI-RE  
 WS#: WS-S-0231  
 Date: 2018- **05** - **15**  
 DESC: Englee - Island Cove Pond

Samp# 2018- **0423** - **03** -TI-RE  
 SA#: SA-0237  
 Date: 2018- **05** - **15**  
 DESC: Englee - Island Cove Pond

- The specifics of these four fields are as follows:
  - Sample # - Text Field - 18 Characters  
 Full Sample Number: XXXX-XXXX-XX-XX-XX  
 e.g. **2018-0423-03-TI-RE**
  - Water Supply Number **or** Serviced Area Number - Both are Text Fields - 9 Characters Maximum.  
  
 Water Supply Number (WS#): WS-X-YYYY e.g. WS-S-0231.  
  
 Serviced Area Number (SA#): SA-YYYY e.g. SA-0237.
  - Sample Date - Text Field - 11 Characters. In the electronic data file this may be stored in an internal date format.  
  
 YYYY-MM-DD e.g. 2018-05-15

- Description - Text Field - 60 Characters  
Descriptive text may include town names, lake names, etc.
- The Department will perform QA/QC checks on the accuracy of the Laboratory data entry of these four fields and document the frequency of misidentified samples. When, 1% of samples per season are considered by the Department as misidentified then the Laboratory will be notified to take corrective action. After three such incidents the Department may cancel the contract as outlined in Section 4.0. The QA/QC checks will be reviewed by the Department as a component of the extension of the contract.
- For each sample in the electronic file, the results for each parameter must be recorded on a single line with the following information appearing on each line:
  - Sample#, Parameter, SA/WS#, Description, Sample Date, Units, Reportable Detection Limit (RDL), Less Than Detect Flag, Value and Comments
  - A partial example for an inorganic sample is shown below:

Sample#	Parameter	SA/WS#	Description	Samp-Date	Units	RDL	Flag	Value	Comments
2018-0423-03-TI-RE	Alkalinity as CaCO3	SA-0237	Englee	2018-05-15	mg/L	5	<	5	
2018-0423-03-TI-RE	Aluminium	SA-0237	Englee	2018-05-15	mg/L	0.01		0.1	
2018-0423-03-TI-RE	Arsenic	SA-0237	Englee	2018-05-15	mg/L	0.001	<	0.001	
2018-0423-03-TI-RE	Boron	SA-0237	Englee	2018-05-15	mg/L	0.05		0.08	
2018-0423-03-TI-RE	Barium	SA-0237	Englee	2018-05-15	mg/L	0.01	<	0.01	
2018-0423-03-TI-RE	Calcium	SA-0237	Englee	2018-05-15	mg/L	1		1.1	
2018-0423-03-TI-RE	Cadium	SA-0237	Englee	2018-05-15	mg/L	0.0001	<	0.0001	
2018-0423-03-TI-RE	Turbidity	SA-0237	Englee	2018-05-15	NTU	0.1		9	Holding time for turbidity analysis was exceeded.

- All e-mail sent to the Department must be verified as computer virus-free by the contractor using industry accepted computer virus scanning software.
- Electronic data must be archived by the contractor for a period of one year from the date of issue to the Department to account for any data that may be lost during transmission or re-transmission requests by the Department.
- Data can be in the form of an Excel spreadsheet or Comma Separated Value (CSV) file. There is some flexibility for the supplied file format, however, it must be capable of designating less than detection limit values and conceptually be similar to that previously listed.
- The agreed upon file format and structure must remain consistent for the duration of the contract period.
- The file format must remain consistent for any special samples not outlined in Section 3.1 that are subcontracted.

- The Laboratory must have an operational Laboratory Information Management System (LIMS) and supply details on the LIMS as part of their tender response.

### 3.2.1 Sample Integrity Forms

The laboratory will be responsible for submitting sample integrity forms to the Department. This document must be faxed or emailed to the Department when there is any discrepancy in the paperwork and/or samples submitted to the laboratory. The following information will be required:

1. Chain of custody number
2. Sample ID
3. Issue
  - a. This would include but is not limited to: inconsistencies in matching bottle labels and chain of custodies, missing or broken bottles; received temperature is not in the appropriate range; samples received past hold times; incorrect quantity of bottles.
4. Action taken by the laboratory would include but not limited to:
  - a. Analysis will proceed as requested.
  - b. Analysis will not proceed.
  - c. Samples on hold until direction from the Department.

### 3.2.2 Early Results Reporting Protocol

- The protocol applies only to samples that are listed as “Early Results” on the chain of custody.
- Results must be emailed when analysis is complete and approved by a Laboratory official or the Head Chemist.
- Results must also remain in the regular electronic data file.

### 3.2.3 Rush Service and Reporting Protocol

- The protocol applies only to samples that are listed as “RUSH” on the chain of custody. This will consist of a maximum of 2% of the samples.
- Sample results must be provided within three (3) days of receipt of sample.
- Additional cost cannot be applied for this rush service.
- Results must also remain in the regular electronic data file.

### 3.3 Data Reporting - Exceedance Reporting Protocol

- The protocol applies only to samples for Inorganic parameters.
- The Laboratory must inform the Department by fax immediately (Fax (709) 729-0320) whenever a health related parameter exceeds a MAC guideline based upon the *GCDWQ*.
  - The protocol does not apply to aesthetic parameters or turbidity.
  - The protocol does not apply to Total THMs or Total HAAs.

- The exceedance report faxed to the Department must include the following sample information:
  - Sample Number;
  - Community Name;
  - Water Supply Name;
  - SA# or WS#;
  - Date of Sampling; and
  - Full set of results as attachment.

### 3.4 Other Requirements

The selected Laboratory must comply with the following requirements:

- **The MDLs used for analysis by the Laboratory must be comparable to those listed above and are subject to the approval of the Department.** The bidder must supply a list of MDLs and testing methods that they will use for the analysis with the tender.
- The Department must be notified of changes in the detection limits or methods used for the analysis of the samples within each sampling season.
- The Laboratory must provide the required number of sampling bottles, ice packs and coolers to four Departmental offices (St. John's, Grand Falls-Windsor, Corner Brook and Happy Valley-Goose Bay). All sampling bottles must be prepared as per sampling and analytical protocols.
- The Department reserves the right to order a complete second shipment of sample bottles (**at cost to the Laboratory**) if the bottles are expired, incorrectly preserved or preservative is found to be leaking from bottles (due to improper bottle capping or broken bottles). This action is necessary since some sample bottle preservatives are highly corrosive and can burn personnel handling the shipment of bottles.
- The Laboratory must receive unused bottles passed expiry dates for proper disposal of preservatives.
- The Laboratory must provide a protocol detailing the time frames associated with sample storage and shipment for analysis of the various parameters after the contract is awarded.
- The Laboratory must use the Chain of Custody Form that will be supplied by the Department. The "date received" and "received by" blanks on the form must be completed and a copy returned to the Department during the billing process.

### 3.5 Invoicing

The Laboratory must submit invoices to the Department on a monthly basis. Invoices will be processed after the analytical work has been completed to the satisfaction of the Department. The invoice must identify each Chain of Custody number with the quantity of each analysis type.

**4.0 Termination of Contract**

The Department may terminate any or all components of the work or portions thereof within 30 days by written notice. In the event of such termination notice being delivered, the Laboratory will have no claim against the Department for loss of anticipated profits or damages occasioned by such termination. Upon delivery and acceptance of the portion of the work performed up to the date of termination, the Laboratory will be paid the appropriate portion of the fees owing.

The first season of the contract will be considered a probationary period and at the end of the period the Department reserves the right to cancel the contract as described above.

**5.0 Bidder Qualifications Criteria**

In addition to the information described previously, the information outlined in Sections 5.1 to 5.3 must be included in the tender response.

**5.1 Accreditation**

The bidder must provide documentation confirming current CALA or SCC accreditation for all parameters quoted. In addition, documentation must be provided for proficiency testing for the requested parameters.

**5.2 Pricing**

Laboratories **must bid** on all parameters types. Complete columns: Unit Price “B”, Extended Total “AxB” and row: Sum of Extended Totals column Lines 1-4.

Item	Description	Estimated Quantity (for Evaluation Purposes) “A”	Unit Price “B”	Extended Total “AxB”
1	Inorganic	1,700		
2	Trihalomethane	1,400		
3	Haloacetic Acid	1,400		
4	Total suspended solids	150		
		Sum of “Extended Totals” column Lines 1-4		

The pricing must include:

- The cost of bottles, ice packs and coolers and any bottle preparation and disposal costs
- The cost of data processing

- The cost of shipping empty bottles to four Departmental offices (St. John's, Grand Falls-Windsor, Corner Brook and Happy Valley-Goose Bay) and return of samples to the Laboratory via air courier (i.e. sending and receiving bottles)

**Low bidder criteria will be based upon the Sum of "Extended Totals" column Lines 1-4.**

### **5.3 Other**

- A list of the MDLs for each parameter along with testing methods and equipment used
- An example report of sample results
- An example electronic file of sample results
- A description of the Laboratory's Laboratory Information Management System (LIMS).
- An example of the Laboratory's proposed exceedance report fax.

### **6.0 Contract Duration**

The contract is valid from the date of issue to March 31, 2019 (with the option to renew the contract up to an additional two years). Renewal will be based on a review of QA/QC performance.

## **Appendix C**

### **Field Work Checklist**

## Drinking Water Sampling Checklist

Accommodations

### Document Preparation

- Sample Numbers
- Sampling Schedule
- Field Sheets
- Sample Labels
- Sampling Manual
- Sampling Location Records
- Provincial Road Map
- Chain of Custody Records
- Community Contact List
- Boil Water Advisory List
- Courier Slips & Contact Info (for shipping)
- All Documents Checked
- \_\_\_\_\_

### Sample Bottles

- Inorganic Bottles (5 per kit)
- Haloacetic Acid (HAA) Bottles (2 per sample)
- Trihalomethane (THM) Bottles (2 per sample)
- Extra Bottles (all types)
- \_\_\_\_\_

### Pocket Colorimeter

- Calibration Check
- Working
- Reagents ( Enough Free and Total Chlorine Packets )
- \_\_\_\_\_

### Equipment

- Markers)
- Pen (s)
- Thermometer
- Colorimeter
- GPS (in correct datum?)
- Camera
- Cooler (s)
- Ice Packs
- Sample Transport Case
- Styrofoam Bottle Holders
- Sample Collecting Pole
- Cell Phone (vehicle and outlet charger)
- Axe (cut ice winter sampling)
- Ice Auger (winter sampling)
- \_\_\_\_\_

### Consumables

- Paper Towels
- Batteries (charged?)
- Ziploc bags
- Chlorine Reagents (Enough Free and Total Packets)
- Garbage Bags
- Packaging tape
- \_\_\_\_\_

### Safety Equipment

- Steel toed boots
- Hard hat
- Safety Glasses
- Lifejacket
- Winter clothing (gloves, boots)
- Ice Grips
- Floater Jacket
- \_\_\_\_\_

### Pre – Travel Check

- Sample Bottles in Good Condition (expired?)
- Truck in good running condition (tires, wipers, fuel)
- Truck walk around
- Ice packs frozen and enough
- Outlook Calendar marked for sampling period
- Out of Office on in Calendar
- Windshield wash
- Gas
- \_\_\_\_\_
- \_\_\_\_\_

### Miscellaneous

- Date of Check: \_\_\_\_\_
- Date of Departure: \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

Sampler: \_\_\_\_\_

Date: \_\_\_\_\_

## **Appendix D**

### **Verification Protocol and Recording Log for Colorimeters**

## HACH Chlorine Pocket Colorimeter

Check the cat. # on the top of the HACH case. Most likely you will have either # 46700-00 or #58700-00. Follow the procedure below to check your digital colorimeter readings against 3 known standards. Compare your readings to those included in the chart below. Make sure you are looking at the readings and ranges specific to your model number (cat.#).

1. Insert the “blank” into the digital colorimeter slot and zero the colorimeter.
2. Insert STD 1 into colorimeter and press “read”. Compare the reading with the chart below.
3. Insert STD 2 into digital colorimeter and press “read”. You don’t have to “zero” the colorimeter between standards. Compare the reading with the chart below.
4. Insert STD 3 into digital colorimeter and press “read”. (Don’t “zero” the colorimeter). Compare the reading with the chart below.

The readings are acceptable if they fall within the recommended ranges below. If you obtain readings that lie outside the recommended ranges for each standard, the readings are not reliable and you may need to send the instrument to HACH Company for calibration (or purchase a new instrument at a cost comparable to calibration). Contact information for HACH can be found at [www.hach.com](http://www.hach.com).

<b>Instrument</b>	<b>Blank</b>	<b>STD1 (mg/L)</b>	<b>STD2 (mg/L)</b>	<b>STD3 (mg/L)</b>
<b>Pocket Colorimeter 11 (LR) PN 58700-00</b>	<b>0</b>	<b>0.21 (+/- 0.09)</b>	<b>0.90 (+/-0.10)</b>	<b>1.63 (+/-0.14)</b>
<b>Pocket Colorimeter (LR) PN 46700-00</b>	<b>0</b>	<b>0.19 (+/-0.09)</b>	<b>0.83 (+/- 0.10)</b>	<b>1.51 (+/-0.14)</b>

\*Complete chart including values for various models of HACH chlorine test kits is provided in Certificate of Analysis, included with Secondary Standards Kit.

Pocket Colorimeter Serial # \_\_\_\_\_

Date of Precision Check	Instrument	Blank	STD1 (mg/L)	My Reading	STD2 (mg/L)	My Reading	STD3 (mg/L)	My Reading
	Pocket Colorimeter 11 (LR) PN 58700-00	0	0.21 (+/- 0.09)		0.90 (+/- 0.10)		1.63 (+/- 0.14)	
	Pocket Colorimeter (LR) PN 46700-00	0	0.19 (+/- 0.09)		0.83 (+/- 0.10)		1.51 (+/- 0.14)	
Date of Precision Check	Instrument	Blank	STD1 (mg/L)	My Reading	STD2 (mg/L)	My Reading	STD3 (mg/L)	My Reading
	Pocket Colorimeter 11 (LR) PN 58700-00	0	0.21 (+/- 0.09)		0.90 (+/- 0.10)		1.63 (+/- 0.14)	
	Pocket Colorimeter (LR) PN 46700-00	0	0.19 (+/- 0.09)		0.83 (+/- 0.10)		1.51 (+/- 0.14)	
Date of Precision Check	Instrument	Blank	STD1 (mg/L)	My Reading	STD2 (mg/L)	My Reading	STD3 (mg/L)	My Reading
	Pocket Colorimeter 11 (LR) PN 58700-00	0	0.21 (+/- 0.09)		0.90 (+/- 0.10)		1.63 (+/- 0.14)	
	Pocket Colorimeter (LR) PN 46700-00	0	0.19 (+/- 0.09)		0.83 (+/- 0.10)		1.51 (+/- 0.14)	
Date of Precision Check	Instrument	Blank	STD1 (mg/L)	My Reading	STD2 (mg/L)	My Reading	STD3 (mg/L)	My Reading
	Pocket Colorimeter 11 (LR) PN 58700-00	0	0.21 (+/- 0.09)		0.90 (+/- 0.10)		1.63 (+/- 0.14)	
	Pocket Colorimeter (LR) PN 46700-00	0	0.19 (+/- 0.09)		0.83 (+/- 0.10)		1.51 (+/- 0.14)	

## **Appendix E**

### **Sampling Location Record Form**



## Drinking Water Quality Sampling Location Record

Community #:  
Water Supply #:  
Serviced Area #:

Community Name:  
Water Supply Name:  
Serviced Area Name:

**Sample Site – 00**  
**Source at Intake / Wellhead**  
NAD83

Lat: \_\_\_\_° \_\_\_\_' \_\_\_\_"

Long: \_\_\_\_° \_\_\_\_' \_\_\_\_"

Waypoint# \_\_\_\_\_

Map

**Sample Site – 03**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

NAD83

Lat: \_\_\_\_° \_\_\_\_' \_\_\_\_"

Long: \_\_\_\_° \_\_\_\_' \_\_\_\_"

Waypoint# \_\_\_\_\_

Map

Location Collected By:

Date Collected (YYYY-MM-DD):

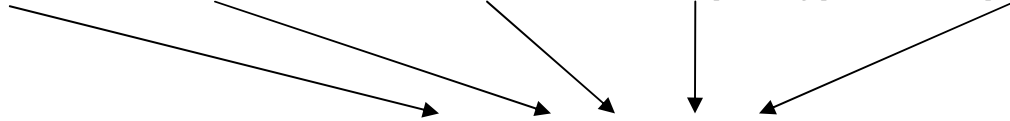
## **Appendix F**

### **Drinking Water Quality Sample Numbering Scheme**



## Drinking Water Quality Sample Numbers

**Year – Serial Number – Site Number – Sample Type – Sample Class**



e.g. **2010-2423-01-TH-RE**

A sample taken in **2008** in **Central** region (the **423<sup>rd</sup>**) at **Site #1** for **THM** analysis as part of the **regular** sampling program to be recorded in the database. Note that there are no spaces and all letters are uppercase.

**YYYY** - Calendar year using four digits. This resets every January 1<sup>st</sup>.

**Serial Number** - A four digit number that increases by one for each new Drinking Water Quality Sampling Field Record. Ranges of numbers are assigned by Region with each staff member having a unique range. **Each calendar year the number is reset to the start of the range.**

0000 - East                      2000 - Central      4000 - West  
6000 - Labrador              6500 - 6999 - Groundwater Section

Inside of each regional range, blocks of numbers can be assigned for temporary staff. For example, in Central one staff member would start at 2000 and the next Central staff member could start at 3000 and the next at 3500 etc. This is a simple method to ensure that sample numbers are not duplicated or unnecessarily long. Unique sample numbers are critical to data processing and management.

**Site Number** - These numbers indicate where in the system each sample is taken.

**00** - Source      **01** - Site #1      **02** - Site #2      **03** - Site #3      **04** - Site #4

The 00 site number cannot be changed but you can use other site number designations as long as they are used consistently and are only two digits. You can edit your Field Record and Label Word files to reflect these changes.

**Sample Type** - This two character alphabetic code indicates the type of sample. The codes below are the only ones allowed at present and please use uppercase letters when writing.

**SI** - Source Inorganic    **TI** - Tap Inorganic    **TH** – THM      **HA** - HAA

**Sample Class** - Sample class indicates the purpose of the sample and whether or not it is to be stored in the database, is part of a mitigation project or is a QA/QC sample. The codes below are the only ones allowed at present and please use uppercase letters when writing.

**RE** - Regular                      **RS** - Resampling (RE and RS samples kept in database)  
**SP** - Special (Mitigation and Control, QA / QC or RTWQ - Not Stored in Database)

## **Appendix G**

### **Drinking Water Quality Database Dictionary of Terms**



## Drinking Water Quality Database Dictionary of Terms

**Community Name** - An official name used by the Department of Municipal and Provincial Affairs (MAPA). It's status can be municipality (MUN), local service district (LSD) or an unincorporated area (UNC). Native communities are classified as unincorporated communities. Each of these has been assigned a unique number referred to as the MUN number or LGP (Local Government Profile) number. There are a very small number of communities that have not been assigned MUN numbers by MAPA. For these cases the Department has assigned numbers starting at 9000 and incrementing by 10. Both the original MUN number and our modified MUN number have been recorded in the database. The population refers to the census population as recorded under the legal name of the community.

**Water Supply** - A single physical source of drinking water. The SUPPLY TYPE can be surface water (SW) or groundwater (GW). SUPPLY STATUS can be Municipal or Private. Municipal refers to a public water supply which is funded by the government and operated and maintained by any level of government (federal, provincial, municipal, water committees and citizens groups). Private indicates a supply installed and operated by a non-government entity such as individual homes, a group of private citizens or a commercial operation. The SOURCE TYPE can be Drilled, Dug, Spring, Reservoir, Pond, Lake, Brook, and River.

Water Supplies have been assigned a unique code by the Department of the form WS-X-YYYY where X is either S (surface water), G (groundwater) or P (Private) and YYYY is a four digit number that is padded with leading zeros (e.g. 008). For example, WS-S-0008.

**Serviced Area** - This is a conceptual description used to undertake the Tap Water Quality Monitoring Program. Serviced area is a combination of legal Community Name or Sub-division Name(s) within a community and water supply source. Its purpose is to link legal community name or sub-division name(s) within a community with a unique water supply source identifier for tap water quality monitoring purposes.

Serviced Areas have been assigned a unique code by the Department of the form SA-YYYY where YYYY is a four digit number that is padded with leading zeros (e.g. 0078)

**Field Record** - A printed sheet that documents a site visit to a serviced area at a specific date. Each sheet lists several sites each with it's own field data (e.g. water temperature). Additionally, at the top right hand corner of every sheet there is a written master sample serial number as described in the Drinking Water Quality Sample Numbers document.

**Sample** - A collection of water for a group of analyses such as organics, inorganics, THM, and HAA. Each analyses may generate several parameters.

**Parameter** - A single test result (or sum of test results for THM and HAA) such as Temperature, pH, colour, alkalinity.

## **Appendix H**

### **Protocol for New Public Water Supplies**

February 11, 2010

## **Protocol for New Public Water Supplies**

---

### **Rationale**

The public water supply (PWS) list is maintained by Water Resources Management Division (WRMD) and contains all public water supplies, both surface and ground water, in the province. The list must be updated when a new public water supply is activated.

### **Current Protocol**

A new PWS is initiated when Department of Municipal Affairs agrees to provide funding through Capital Works for the project.

### **Surface Water**

The community must apply for a "Permit to Construct" for water supply related infrastructure such as intake, pumps, chlorination, etc, through the Community Water and Wastewater section of Department of Environment and Conservation. Information or results of a study on water quantity and quality of the supply is required as a component of the application for permit. Upon approval of the permit a tender is issued by Department of Municipal Affairs.

### **Groundwater**

The community must apply for a "Permit to Construct a Non-Domestic Well" from the Groundwater section of Department of Environment and Conservation. Upon approval of the permit a tender is issued by Department of Municipal Affairs. Three documents, the completions report, pump test results and chemical test results of the new well, must be submitted by the proponent when the well drilling is completed.

After the well is drilled, the community must apply for a "Permit to Construct" for water-supply related infrastructure such as pumps and chlorination systems. The application is reviewed by the Community Water and Wastewater section. The Groundwater section provides approval on acceptable yield and quality to Community Water and Wastewater Section.

### **New Water Supplies**

Upon issuing of the permit, Director (WRMD) and Coordinator of Drinking Water Monitoring (SWS) are copied on the "Permit to Construct". Coordinator of Drinking Water Monitoring (SWS) is responsible for informing Environmental Scientists (SWS) of the potential new supplies in their respective communities. The Environmental Scientists (SWS) will be responsible for informing Coordinator of Drinking Water Monitoring (SWS) when the supply is established in their community.

### **New Water Supply Documentation**

When it is determined that a new water supply is established and functioning, the Environmental Scientist (SWS) for the community is responsible for collecting the information required for the PWS list. The information is forwarded to the Director (WRMD) for approval by Safe Drinking Water Committee.

Once approved, the information is forwarded to the Senior Environmental Scientist (HMS). This information is used to generate the water supply number (WS#) and serviced area number (SA#) and then added to the

PWS list. The new supply is entered in the GIS database with the watershed's boundary file. Department of Municipal Affairs is informed of the new PWS to ensure that it is entered in the MIMS database. Department of Government Services is informed of the new water supply to ensure scheduling for bacteriological sampling is established.

The Senior Environmental Scientist (HMS) is responsible for updating the two tables in the Oracle: add SA# to SA\_Sampledby and SA\_WS\_Owned in WRMD\_Out.

The new PWS is then scheduled for chemical sampling and integrated into the flow of the sampling schedule. The sampling schedule is updated on the Division's webpage. The Environmental Scientist for the community is responsible for sending a letter advising the community on the Protected Water Supply Area application.

**Checklist for Addition of Public Water Supply to Official List:**

Water Supply is maintained by the Town/LSD of: \_\_\_\_\_

Verified by (ie. town clerk; chairperson, etc.): \_\_\_\_\_

Water Supply type: SW            GW \_\_\_\_no. of wells (if a part of a wellfield)

Suggested Water Supply name: \_\_\_\_\_

Water Supply coordinates: (DD MM SS.SSS) \_\_\_\_\_

Reason for addition: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Date commissioned: \_\_\_\_\_

Water Supply will replaced (if applicable): \_\_\_\_\_

\_\_\_\_\_

Additional Comments: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

---

WRMD staff name: \_\_\_\_\_

## **Appendix I**

### **Protocol for Removal of Public Water Supplies**

February 11, 2010

## **Protocol for Removal of Public Water Supplies**

---

### **Rationale**

The public water supply (PWS) list is maintained by Water Resources Management Division (WRMD) and contains all public water supplies, both surface and ground water, in the province. The list must be updated when a public water supply is decommissioned.

### **Current Protocol**

The decommissioning of groundwater supplies requires a completion report to the Groundwater Section from the community. The decommissioning of surface water supplies is usually determined by the Environmental Scientists responsible for drinking water quality monitoring.

### **Removal of Public Water Supplies**

When the Department of Environment and Conservation confirms that a PWS has been decommissioned the Safe Drinking Water Committee must be notified by the Director (WRMD).

### **Removal of Public Water Supply Documentation**

When it is confirmed from the Town or LSD that the PWS has been decommissioned the following activities must take place:

1. Groundwater Manager is responsible for ensuring all well decommissioning is completed within the "Guidelines for Sealing Groundwater Wells".
2. Senior Environmental Scientist (HMS) and Coordinator of Drinking Water Monitoring (SWS) are jointly responsible for removing the PWS from the PWS list.
3. Senior Environmental Scientist (HMS) is responsible for removing the PWS from the drinking water quality monitoring schedule and updating the Division's webpage.
4. Environmental Scientist (HMS) is responsible for removing the delineated watershed from the GIS database.
5. Department of Municipal Affairs is responsible for removing the PWS from MIMs.
6. Department of Department of Government Services is responsible for removing the PWS from the bacteriological sampling schedule.
7. The Environmental Scientists (SWS) are responsible for ensuring the protected status, if applicable, of the PWS is repealed.

**Checklist for Removal of Public Water Supply from Official List:**

Water Supply was maintained by the Town/LSD of: \_\_\_\_\_

\_\_\_\_\_

Verified by (ie. town clerk; chairperson, etc.): \_\_\_\_\_

\_\_\_\_\_

Water Supply type: SW                      GW \_\_\_\_no. of wells (if a part of a wellfield)

Suggested Water Supply name: \_\_\_\_\_

\_\_\_\_\_

Reason for removal: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Date decommissioned: \_\_\_\_\_

Protection status: Protected                                      Not Protected

Should be repealed

Should not be repealed

Comments: \_\_\_\_\_

Water Supply will be replaced by: \_\_\_\_\_

\_\_\_\_\_

Additional Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

---

WRMD staff name: \_\_\_\_\_

## **Appendix J**

### **Labels for Sampling Bottles**

Samp# 2017- -00-SI-RE  
WS#: WS-S-0593  
Date: 2017- -  
Desc: Portugal Cove South - Wrights Brook

Samp# 2017- -00-SI-RE  
WS#: WS-S-0593  
Date: 2017- -  
Desc: Portugal Cove South - Wrights Brook

Samp# 2017- -00-SI-RE  
WS#: WS-S-0593  
Date: 2017- -  
Desc: Portugal Cove South - Wrights Brook

Samp# 2017- -00-SI-RE  
WS#: WS-S-0593  
Date: 2017- -  
Desc: Portugal Cove South - Wrights Brook

Samp# 2017- -00-SI-RE  
WS#: WS-S-0593  
Date: 2017- -  
Desc: Portugal Cove South - Wrights Brook

Samp# 2017- -00-SI-RE  
WS#: WS-S-0593  
Date: 2017- -  
Desc: Portugal Cove South - Wrights Brook

Samp# 2017- - -TI-RE  
SA#: SA-0614  
Date: 2017- -  
Desc: Portugal Cove South - Wrights Brook

Samp# 2017- - -TI-RE  
SA#: SA-0614  
Date: 2017- -  
Desc: Portugal Cove South - Wrights Brook

Samp# 2017- - -TI-RE  
SA#: SA-0614  
Date: 2017- -  
Desc: Portugal Cove South - Wrights Brook

Samp# 2017- - -TI-RE  
SA#: SA-0614  
Date: 2017- -  
Desc: Portugal Cove South - Wrights Brook

Samp# 2017- - -TI-RE  
SA#: SA-0614  
Date: 2017- -  
Desc: Portugal Cove South - Wrights Brook

Samp# 2017- - -TI-RE  
SA#: SA-0614  
Date: 2017- -  
Desc: Portugal Cove South - Wrights Brook

Samp# 2017- - -TH-RE  
SA#: SA-0614  
Date: 2017- -  
Desc: Portugal Cove South - Wrights Brook

Samp# 2017- - -TH-RE  
SA#: SA-0614  
Date: 2017- -  
Desc: Portugal Cove South - Wrights Brook

Samp# 2017- - -TH-RE  
SA#: SA-0614  
Date: 2017- -  
Desc: Portugal Cove South - Wrights Brook

Samp# 2017- - -HA-RE  
SA#: SA-0614  
Date: 2017- -  
Desc: Portugal Cove South - Wrights Brook

Samp# 2017- - -HA-RE  
SA#: SA-0614  
Date: 2017- -  
Desc: Portugal Cove South - Wrights Brook

Samp# 2017- - -HA-RE  
SA#: SA-0614  
Date: 2017- -  
Desc: Portugal Cove South - Wrights Brook

Samp# 2017- - - -  
SA#:  
Date: 2017- -  
Desc:

Community: Portugal Cove South  
Sampled By: A. Tobin

## **Appendix K**

### **Drinking Water Quality Sampling Field Record**

### Drinking Water Quality Sampling Field Record

Community #: 4005  
Water Supply #: WS-S-0593  
Serviced Area #: SA-0614  
Pop. Serviced: 150

Community Name: Portugal Cove South  
Water Supply Name: Wrights Brook  
Serviced Area Name: Portugal Cove South

Chlorination / Treatment: Liquid / Infiltration gallery

**Sample Site -00**    -00-SI   
                                   -RE   
                                   -SP   
                                   -RS

Temperature \_\_\_\_\_ °C  
Time \_\_\_\_\_ (24 Hr)

Remarks \_\_\_\_\_  
 \_\_\_\_\_

**Sample Site -**    01     02     03     04   
                                   -TI                     -TH                     HA   
                                   -RE                     -RE                     -RE   
                                   -SP                     -SP                     -SP   
                                   -RS                     -RS                     -RS

Temperature \_\_\_\_\_ °C  
Time \_\_\_\_\_ (24 Hr)

Free Chlorine \_\_\_\_\_ mg/L    Total Chlorine \_\_\_\_\_ mg/L    Other ( \_\_\_\_\_ ) \_\_\_\_\_

Location \_\_\_\_\_  
 \_\_\_\_\_

Remarks \_\_\_\_\_  
 \_\_\_\_\_

**Sample Site -**    01     02     03     04   
                                   -TI                     -TH                     HA   
                                   -RE                     -RE                     -RE   
                                   -SP                     -SP                     -SP   
                                   -RS                     -RS                     -RS

Temperature \_\_\_\_\_ °C  
Time \_\_\_\_\_ (24 Hr)

Free Chlorine \_\_\_\_\_ mg/L    Total Chlorine \_\_\_\_\_ mg/L    Other ( \_\_\_\_\_ ) \_\_\_\_\_

Location \_\_\_\_\_  
 \_\_\_\_\_

Remarks \_\_\_\_\_  
 \_\_\_\_\_

Sample Collected By: \_\_\_\_\_

Date Sampled (YYYY-MM-DD): \_\_\_\_\_

## **Appendix L**

### **Chain of Custody**



## **Appendix M**

### **End of Season Email Template**



## **Appendix N**

### **Safety Data Sheets**

# Sulphuric Acid

## SECTION 1. IDENTIFICATION

<b>Product Identifier</b>	Sulphuric Acid
<b>Other Means of Identification</b>	Sulfuric Acid
<b>Recommended Use</b>	Process chemical, laboratory and scientific research and development.
<b>Restrictions on Use</b>	None known.
<b>Manufacturer/Supplier Identifier</b>	Caledon Laboratories Ltd, 40 Armstrong Avenue, Georgetown, Ontario, L7G-4R9, (905) 877-0101, www.caledonlabs.com
<b>Emergency Phone No.</b>	CANUTEC, (613) 996-6666
<b>SDS No.</b>	0056

## SECTION 2. HAZARD IDENTIFICATION

### Classification

Corrosive to metals - Category 1; Skin corrosion - Category 1; Serious eye damage - Category 1; Carcinogenicity - Category 1A; Specific target organ toxicity (single exposure) - Category 1; Specific target organ toxicity (repeated exposure) - Category 1; Aquatic hazard (Acute) - Category 3

### Label Elements



Signal Word:

Danger

Causes severe skin burns and eye damage.

Causes serious eye damage.

Causes damage to organs (respiratory system).

Causes damage to organs (respiratory system) through prolonged or repeated exposure.

Harmful to aquatic life with long lasting effects.

Precautionary Statement(s):

Do not breathe mist, vapours.

Use only outdoors or in a well-ventilated area.

Wash hands thoroughly after handling.

Do not eat, drink or smoke when using this product.

Wear protective gloves/protective clothing/eye protection/face protection.

Keep container tightly closed.

Response:

Immediately call a POISON CENTRE or doctor.

IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.

Continue rinsing.

IF INHALED: Remove person to fresh air and keep comfortable for breathing.

Wash contaminated clothing before reuse.

Absorb spillage to prevent material damage.

---

Product Identifier:	Sulphuric Acid
SDS No.:	0056
Date of Preparation:	January 11, 2017

Storage:  
Store locked up.  
Store in corrosive resistant container with a resistant inner liner.  
Store in a well-ventilated place. Keep container tightly closed.  
Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

**Other Hazards**

None known.

**SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS**

Chemical Name	CAS No.	%	Other Identifiers
Sulphuric acid	7664-93-9	95.0 - 98.0	EU EINECS/ELINCS Number: 231-639-5

**SECTION 4. FIRST-AID MEASURES**

**First-aid Measures**

**Inhalation**

Immediately call a Poison Centre or doctor. Move to fresh air. If breathing is difficult, trained personnel should administer emergency oxygen if advised to do so by Poison Centre or doctor. If breathing has stopped, trained personnel should begin rescue breathing.

**Skin Contact**

Avoid direct contact. Wear chemical protective clothing if necessary. Quickly and gently blot or brush away excess chemical. Immediately rinse skin with lukewarm, gently flowing water for at least 30 minutes. Take off contaminated clothing, shoes and leather goods (e.g. watchbands, belts). DO NOT INTERRUPT FLUSHING. If it can be done safely, continue flushing during transport to hospital. Double bag, seal, label and leave contaminated clothing, shoes and leather goods at the scene for safe disposal.

**Eye Contact**

Immediately call a Poison Centre or doctor. Immediately rinse the contaminated eye(s) with lukewarm, gently flowing water for at least 30 minutes, while holding the eyelid(s) open.

**Ingestion**

Immediately call a Poison Centre or doctor. Never give anything by mouth if person is rapidly losing consciousness, or is unconscious or convulsing. Do not induce vomiting.

**First-aid Comments**

Get medical advice or attention if you feel unwell or are concerned.

**Most Important Symptoms and Effects, Acute and Delayed**

Can cause lung injury. Corrosive to skin and eyes. Symptoms may develop hours after exposure and are made worse by physical effort. A severe exposure can cause death.

**Immediate Medical Attention and Special Treatment**

**Target Organs**

Respiratory system.

**Special Instructions**

Symptoms of pulmonary edema can be delayed up to 48 hours after exposure.

**SECTION 5. FIRE-FIGHTING MEASURES**

**Extinguishing Media**

**Suitable Extinguishing Media**

Not combustible. Use extinguishing agent suitable for surrounding fire. Carbon dioxide, dry chemical powder or appropriate foam. Use water to keep non-leaking, fire-exposed containers cool.

### Unsuitable Extinguishing Media

Do not use water as an extinguisher.

### Specific Hazards Arising from the Product

Contact with water causes violent frothing and spattering.

In a fire, the following hazardous materials may be generated: corrosive sulfur oxides.

### Special Protective Equipment and Precautions for Fire-fighters

Before entry, especially into confined areas, use an appropriate monitor to check for: toxic gases or vapours. Dike and recover contaminated water for appropriate disposal.

Chemical protective clothing (e.g. chemical splash suit) and positive pressure SCBA may be necessary.

## SECTION 6. ACCIDENTAL RELEASE MEASURES

### Personal Precautions, Protective Equipment, and Emergency Procedures

Evacuate the area immediately. Isolate the hazard area. Keep out unnecessary and unprotected personnel. Evacuate downwind locations. Do not touch damaged containers or spilled product unless wearing appropriate protective equipment. Increase ventilation to area or move leaking container to a well-ventilated and secure area.

### Environmental Precautions

Do not allow into any sewer, on the ground or into any waterway. If the spill is inside a building, prevent product from entering drains, ventilation systems and confined areas.

### Methods and Materials for Containment and Cleaning Up

Neutralize spill area and washings with soda ash or lime. Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Clean surface thoroughly to remove residual contamination. Dike far ahead of larger spill for later recovery and disposal.

### Other Information

Contact supplier, local fire and emergency services for help. Report spills to local health, safety and environmental authorities, as required.

## SECTION 7. HANDLING AND STORAGE

### Precautions for Safe Handling

Do not get in eyes, on skin or on clothing. Do not breathe in this product. Do not swallow. Only use where there is adequate ventilation. Get medical advice or attention for all exposures. Symptoms can be delayed. Wear personal protective equipment to avoid direct contact with this chemical. Never add water to a corrosive. Always add corrosives slowly to COLD water. Keep containers tightly closed when not in use or empty. Do NOT eat, drink or store food in work areas. Wash hands thoroughly after handling this material.

### Conditions for Safe Storage

Store in an area that is: well-ventilated. Store in a dry place. Store in corrosive resistant container with a resistant inner liner. Keep container tightly closed.

## SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### Control Parameters

Chemical Name	ACGIH TLV®		OSHA PEL		AIHA WEEL	
	TWA	STEL	TWA	Ceiling	8-hr TWA	TWA
Sulphuric acid	0.2 mg/m <sup>3</sup>		1 mg/m <sup>3</sup>			

### Appropriate Engineering Controls

Provide eyewash and safety shower if contact or splash hazard exists. Use local exhaust ventilation, if general ventilation is not adequate to control amount in the air.

### Individual Protection Measures

#### Eye/Face Protection

Wear chemical safety goggles and face shield when contact is possible.

### Skin Protection

Wear chemical protective clothing e.g. gloves, aprons, boots.  
Butyl rubber, Viton®/butyl rubber, Viton®.

### Respiratory Protection

For non-routine or emergency situations: wear a full facepiece NIOSH approved air-purifying respirator with an acid gas cartridge.

## SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

### Basic Physical and Chemical Properties

Appearance	Clear oily.
Odour	Odourless
Odour Threshold	Not available
pH	0.3 (5% solution)
Melting Point/Freezing Point	-32 - 3 °C (-26 - 37 °F) (melting); -32 - 3 °C (-26 - 37 °F) (freezing)
Initial Boiling Point/Range	~ 290 °C (554 °F)
Flash Point	Not applicable
Evaporation Rate	Not available
Flammability (solid, gas)	Not applicable
Upper/Lower Flammability or Explosive Limit	Not applicable (upper); Not applicable (lower)
Vapour Pressure	Very low.
Vapour Density (air = 1)	3.4
Relative Density (water = 1)	1.84 at 25 °C
Solubility	Soluble in all proportions in water
Partition Coefficient, n-Octanol/Water (Log Kow)	Not applicable
Auto-ignition Temperature	Not applicable
Decomposition Temperature	340 °C (644 °F)
Viscosity	10.7 - 11.5 mm <sup>2</sup> /s at 25 °C (kinematic); Not available (dynamic)
<b>Other Information</b>	
Physical State	Liquid
Molecular Formula	H <sub>2</sub> SO <sub>4</sub>
Molecular Weight	98.08

## SECTION 10. STABILITY AND REACTIVITY

### Reactivity

Not reactive under normal conditions of use.

### Chemical Stability

Normally stable.

### Possibility of Hazardous Reactions

Hazardous polymerization does not occur.

### Conditions to Avoid

Water, moisture or humidity.

### Incompatible Materials

Reacts violently with: reducing agents (e.g. hydroquinone), strong bases (e.g. sodium hydroxide), water, nitriles (e.g. butyronitrile), inorganic acids (e.g. hydrofluoric acid), oxidizing agents (e.g. peroxides), cyanides, potassium.  
Corrosive to: aluminum alloys, carbon steel, cast iron.

Product Identifier: Sulphuric Acid  
SDS No.: 0056  
Date of Preparation: January 11, 2017

## Hazardous Decomposition Products

Decomposes at 340 deg C into sulfur trioxide and water.

## SECTION 11. TOXICOLOGICAL INFORMATION

Emergency Overview: POISON! DANGER! CORROSIVE. LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED OR CONTACTED WITH SKIN. HARMFUL IF INHALED. AFFECTS TEETH. WATER REACTIVE. CANCER HAZARD. STRONG INORGANIC ACID MISTS CONTAINING SULFURIC ACID CAN CAUSE CANCER. Risk of cancer depends on duration and level of exposure.

### Likely Routes of Exposure

Inhalation; skin contact; eye contact.

### Acute Toxicity

Chemical Name	LC50	LD50 (oral)	LD50 (dermal)
Sulphuric acid	510 mg/m <sup>3</sup> (rat) (2-hour exposure)	2140 mg/kg (rat)	

### Skin Corrosion/Irritation

Animal tests show skin corrosion. Contact can cause pain, redness, burns, and blistering. Permanent scarring can result. Can cause sore throat, vomiting, diarrhea. Circulatory collapse with clammy skin, weak and rapid pulse, shallow respirations, and scanty urine may follow ingestion or skin contact. Circulatory shock is often the immediate cause of death.

### Serious Eye Damage/Irritation

Contact causes severe burns with redness, swelling, pain and blurred vision. Permanent damage including blindness can result.

### STOT (Specific Target Organ Toxicity) - Single Exposure

#### Inhalation

Causes severe nose and throat irritation. Symptoms may include coughing, shortness of breath, difficult breathing and tightness in the chest. Symptoms may develop hours after exposure and are made worse by physical effort. May cause lung edema, a medical emergency.

#### Ingestion

Causes severe irritation or burns to the mouth, throat and stomach. Symptoms may include difficulty swallowing, intense thirst, nausea, vomiting, diarrhea, and in severe cases, collapse and death.

### Aspiration Hazard

May be drawn into the lungs (aspirated) if swallowed or vomited. Death can result.

### STOT (Specific Target Organ Toxicity) - Repeated Exposure

Irritation of the respiratory system. Respiratory tract injury has been observed, mucus production, chronic bronchitis and chronic cough, dental erosion.

### Respiratory and/or Skin Sensitization

In sensitized people, exposure to a very small amount of product can cause symptoms including wheezing, difficult breathing, sneezing and runny or blocked nose. Can cause death. Symptoms can develop immediately following exposure or hours later. Repeated exposure will make the reaction worse. Not a skin sensitizer.

### Carcinogenicity

IARC has classified "strong inorganic acid mists containing sulfuric acid" as a known human carcinogen, (IARC category 1). This classification applies only to mists containing sulfuric acid and not to sulfuric acid or sulfuric acid solutions.

### Reproductive Toxicity

#### Development of Offspring

Not known to harm the unborn child.

#### Sexual Function and Fertility

Product Identifier: Sulphuric Acid  
SDS No.: 0056  
Date of Preparation: January 11, 2017

Not known to cause effects on sexual function or fertility.

#### Effects on or via Lactation

No information was located.

#### Germ Cell Mutagenicity

Not known to be a mutagen.

#### Interactive Effects

No information was located.

No information was located for: Effects on or via Lactation

## SECTION 12. ECOLOGICAL INFORMATION

#### Ecotoxicity

Harmful to aquatic life, based on acute toxicity tests.

#### Persistence and Degradability

Expected to be readily biodegradable.

#### Bioaccumulative Potential

No information was located.

#### Mobility in Soil

The product is water soluble and may spread in water systems. Contamination of groundwater could occur.

#### Other Adverse Effects

The product may affect the acidity (pH-factor) in water with risk of harmful effects to aquatic organisms.

## SECTION 13. DISPOSAL CONSIDERATIONS

#### Disposal Methods

Dispose of contents and container in accordance with local, regional, national and international regulations. Empty containers retain product residue. Follow label warnings even if container appears to be empty.

## SECTION 14. TRANSPORT INFORMATION

Regulation	UN No.	Proper Shipping Name	Transport Hazard Class(es)	Packing Group
Canadian TDG	UN1830	Sulphuric Acid	8	II
US DOT	UN1830	Sulphuric Acid	8	II
IATA (Air)	UN1830	Sulphuric Acid	8	II
IMO (Marine)	UN1830	Sulphuric Acid	8	II

**Environmental Hazards** Not applicable

**Special Precautions** Not applicable

**Transport in Bulk According to Annex II of MARPOL 73/78 and the IBC Code**

Not applicable

## SECTION 15. REGULATORY INFORMATION

#### Safety, Health and Environmental Regulations

##### Canada

**Domestic Substances List (DSL) / Non-Domestic Substances List (NDSL)**

Listed on the DSL.

##### USA

Product Identifier: Sulphuric Acid

SDS No.: 0056

Date of Preparation: January 11, 2017

### Toxic Substances Control Act (TSCA) Section 8(b)

All ingredients are listed on the TSCA Inventory.

#### Additional USA Regulatory Lists

CERCLA: Listed.

SARA Title III - Section 302:

Acute Health Hazard: Yes

Chronic Health Hazard: Yes

Fire Hazard: No

Pressure Hazard: No

Reactive Hazard: No.

## SECTION 16. OTHER INFORMATION

<b>NFPA Rating</b>	<b>Health - 3</b>	<b>Flammability - 0</b>	<b>Instability - 2</b>
<b>SDS Prepared By</b>	Caledon Laboratories Ltd		
<b>Date of Preparation</b>	January 11, 2017		
<b>References</b>	CHEMINFO database. Canadian Centre for Occupational Health and Safety (CCOHS). Supplier Safety Data Sheets.		
<b>Disclaimer</b>	Caledon Laboratories Ltd. believes that the information contained herein is reliable and accurate. Caledon makes no warranty thereto, and expressly disclaims all liability for reliance thereon. Such information is solely for your consideration, investigation, and verification.		

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Product Identifier: Sulphuric Acid  
SDS No.: 0056  
Date of Preparation: January 11, 2017

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# Nitric Acid

## SECTION 1. IDENTIFICATION

Product Identifier	Nitric Acid
Other Means of Identification	Aqua fortis
Other Identification	EU EINECS/ELINCS Number: 231-714-2
Recommended Use	Laboratory chemical.
Restrictions on Use	None known.
Manufacturer/Supplier Identifier	Caledon Laboratories Ltd, 40 Armstrong Avenue, Georgetown, Ontario, L7G-4R9, (905) 877-0101, www.caledonlabs.com
Emergency Phone No.	CANUTEC, (613) 996-6666
SDS No.	0034

## SECTION 2. HAZARD IDENTIFICATION

### Classification

Oxidizing liquid - Category 3; Skin corrosion - Category 1A; Serious eye damage - Category 1; Specific target organ toxicity (single exposure) - Category 1; Specific target organ toxicity (repeated exposure) - Category 1

### Label Elements



### Signal Word:

Danger

### Hazard Statement(s):

May cause fire or explosion; strong oxidizer.

Causes severe skin burns and eye damage.

Causes serious eye damage.

Causes damage to organs (respiratory system).

Causes damage to organs (respiratory system, teeth) through prolonged or repeated exposure.

### Prevention:

Take any precaution to avoid mixing with combustibles.

Keep away from heat.

Keep or store away from clothing and other combustible materials.

Do not breathe mist, vapours.

Wash hands and skin thoroughly after handling.

Do not eat, drink or smoke when using this product.

Wear protective gloves/protective clothing/eye protection/face protection.

IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

### Response:

IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

IF INHALED: Remove person to fresh air and keep comfortable for breathing.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.

Continue rinsing.

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Product Identifier:	Nitric Acid
SDS No.:	0034
Date of Preparation:	October 24, 2016

IF ON CLOTHING: Rinse immediately contaminated clothing and skin with plenty of water before removing clothes. Immediately call a POISON CENTRE or doctor.

In case of fire: Use carbon dioxide, dry chemical powder, water, water spray or fog to extinguish.

In case of major fire and large quantities: Evacuate area. Fight fire remotely due to the risk of explosion.

**Storage:**

Store locked up.

Store in a well-ventilated place. Keep container tightly closed.

Store in corrosive resistant container with a resistant inner liner.

**Disposal:**

Dispose of contents and container in accordance with local, regional, national and international regulations.

**Other Hazards**

None known.

### SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS No.	%	Other Identifiers
Nitric acid	7697-37-2	68-70	EU EINECS/ELINCS Number: 231-714-2
Water	7732-18-5	30-32	EC 231-791-2

### SECTION 4. FIRST-AID MEASURES

**First-aid Measures**

**Inhalation**

Move to fresh air. If breathing is difficult, trained personnel should administer emergency oxygen if advised to do so by Poison Centre or doctor. If breathing has stopped, trained personnel should begin rescue breathing. Call a Poison Centre or doctor.

**Skin Contact**

Take off immediately contaminated clothing, shoes and leather goods (e.g. watchbands, belts). Immediately rinse with lukewarm, gently flowing water for 15-20 minutes. Immediately call a Poison Centre or doctor. Thoroughly clean clothing, shoes and leather goods before reuse or dispose of safely.

**Eye Contact**

Immediately rinse the contaminated eye(s) with lukewarm, gently flowing water for 15-20 minutes, while holding the eyelid(s) open. Remove contact lenses, if present and easy to do. Immediately call a Poison Centre or doctor.

**Ingestion**

Have victim drink about 250ml (8fl. oz.) of water to dilute material in stomach. Never give anything by mouth if person is rapidly losing consciousness, or is unconscious or convulsing. Do not induce vomiting. Immediately call a Poison Centre or doctor.

**First-aid Comments**

If exposed or concerned, get medical advice or attention.

**Most Important Symptoms and Effects, Acute and Delayed**

Causes severe skin burns and eye damage. Causes digestive tract burns. Spray mists may cause respiratory tract irritation.

**Immediate Medical Attention and Special Treatment**

**Target Organs**

Eyes, respiratory system, teeth, skin, digestive system.

**Special Instructions**

Symptoms of pulmonary edema can be delayed up to 48 hours after exposure.

### SECTION 5. FIRE-FIGHTING MEASURES

Product Identifier: Nitric Acid

SDS No.: 0034

Date of Preparation: October 24, 2016

## Extinguishing Media

### Suitable Extinguishing Media

Carbon dioxide, dry chemical powder, appropriate foam, water spray or fog.

### Unsuitable Extinguishing Media

DO NOT use dry chemical fire extinguishing agents containing ammonium compounds (such as some A:B:C agents). Nitric acid does not burn. Extinguish fire using extinguishing agent suitable for the surrounding fire and not contraindicated for use with nitric acid. Nitric acid is an oxidizer. Therefore, flooding quantities of water spray or fog should be used to fight fires involving nitric acid.

## Specific Hazards Arising from the Product

Strong oxidizer. May cause a fire or explosion.

Fire may produce irritating, corrosive and/or toxic gases.

## Special Protective Equipment and Precautions for Fire-fighters

Oxidizer. Prevent contact with flammable and combustible materials. Knock down vapours or gases with water fog or fine water spray. Before entry, especially into confined areas, use an appropriate monitor to check for: toxic gases or vapours, sufficient oxygen.

Chemical protective clothing (e.g. chemical splash suit) and positive pressure SCBA may be necessary.

## SECTION 6. ACCIDENTAL RELEASE MEASURES

### Personal Precautions, Protective Equipment, and Emergency Procedures

Evacuate the area immediately. Isolate the hazard area. Keep out unnecessary and unprotected personnel. Do not touch damaged containers or spilled product unless wearing appropriate protective equipment. Increase ventilation to area or move leaking container to a well-ventilated and secure area. Eliminate all ignition sources. Use grounded, explosion-proof equipment.

### Environmental Precautions

Do not allow into any sewer, on the ground or into any waterway. If the spill is inside a building, prevent product from entering drains, ventilation systems and confined areas.

### Methods and Materials for Containment and Cleaning Up

Do not use absorbents. Contain spill using noncombustible material such as vermiculite, earth or sand. Do NOT use combustible materials such as sawdust. Flush spill area. Dike and recover contaminated water for appropriate disposal. Store recovered product in suitable containers that are: corrosion-resistant, tightly-covered.

### Other Information

Report spills to local health, safety and environmental authorities, as required.

## SECTION 7. HANDLING AND STORAGE

### Precautions for Safe Handling

Prevent accidental contact with flammable and combustible materials. Do not get in eyes, on skin or on clothing. Wash hands thoroughly after handling this material. Do NOT smoke in work areas. Do NOT eat, drink or store food in work areas. Never add water to a corrosive. Always add corrosives slowly to COLD water. Do not swallow.

### Conditions for Safe Storage

Do not store in metal containers. Store in an area that is: cool, dry, well-ventilated, clear of combustible and flammable materials (e.g. old rags, cardboard). Store in a closed container. Protect from sunlight.

## SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### Control Parameters

Chemical Name	ACGIH TLV®		OSHA PEL		AIHA WEEL	
	TWA	STEL	TWA	Ceiling	8-hr TWA	TWA
Nitric acid	2 ppm	4 ppm	2 ppm			

### Appropriate Engineering Controls

Product Identifier: Nitric Acid

SDS No.: 0034

Date of Preparation: October 24, 2016

Use local exhaust ventilation and enclosure, if necessary, to control amount in the air. Provide eyewash and safety shower if contact or splash hazard exists.

#### Individual Protection Measures

##### Eye/Face Protection

Wear chemical safety goggles and face shield when contact is possible.

##### Skin Protection

Wear chemical protective clothing e.g. gloves, aprons, boots.

Butyl rubber, neoprene rubber, Barrier® (PE/PA/PE), Viton®/butyl rubber, Silver Shield/4H® (PE/EVAL/PE).

##### Respiratory Protection

Wear a full facepiece NIOSH approved air-purifying respirator with an acid gas cartridge.

## SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

### Basic Physical and Chemical Properties

Appearance	Clear colourless - yellow. Absorbs moisture from the air.
Odour	Suffocating
Odour Threshold	Not available
pH	0.1 (1.0 N solution)
Melting Point/Freezing Point	~ -42 °C (-44 °F) (melting); ~ -42 °C (-44 °F) (freezing)
Initial Boiling Point/Range	~ 122 °C (252 °F)
Flash Point	Not applicable
Evaporation Rate	Not available
Flammability (solid, gas)	Not applicable
Upper/Lower Flammability or Explosive Limit	Not applicable (upper); Not applicable (lower)
Vapour Pressure	48 mm Hg (6 kPa) at 20 °C
Vapour Density (air = 1)	2.17
Relative Density (water = 1)	1.419
Solubility	Soluble in all proportions in water; Not available (in other liquids)
Partition Coefficient, n-Octanol/Water (Log Kow)	Not available
Auto-ignition Temperature	Not applicable
Decomposition Temperature	Not available
Viscosity	Not available (dynamic)
<b>Other Information</b>	
Physical State	Liquid
Molecular Formula	HNO <sub>3</sub>
Molecular Weight	63.02

## SECTION 10. STABILITY AND REACTIVITY

### Reactivity

Class 2 oxidizer - 40 - 80% Nitric acid class 2 Oxidizers cause a moderate increase in the burning rate of combustible materials with which they come into contact.

### Chemical Stability

Normally stable.

### Possibility of Hazardous Reactions

Decomposes in the presence of air, heat, light.

### Conditions to Avoid

---

Product Identifier:	Nitric Acid
SDS No.:	0034
Date of Preparation:	October 24, 2016

High temperatures. Exposure to air. Light.

#### Incompatible Materials

Metals (e.g. aluminum), unsaturated hydrocarbons (e.g. turpentine), strong bases (e.g. sodium hydroxide), acid anhydrides (e.g. acetic anhydride), alcohols (e.g. ethanol), aldehydes (e.g. acetaldehyde), amines (e.g. triethylamine), ketones (e.g. acetone), nitriles (e.g. butyronitrile).

#### Hazardous Decomposition Products

Corrosive, oxidizing nitrogen oxides.

## SECTION 11. TOXICOLOGICAL INFORMATION

### Likely Routes of Exposure

Inhalation; skin contact; eye contact; ingestion.

### Acute Toxicity

Chemical Name	LC50	LD50 (oral)	LD50 (dermal)
Nitric acid	67 ppm (mouse) (4-hour exposure)		

LD50 (oral): No information was located.

LD50 (dermal): No information was located.

### Skin Corrosion/Irritation

Causes severe skin burns.

### Serious Eye Damage/Irritation

May irritate or burn the eyes. Permanent damage including blindness may result.

### STOT (Specific Target Organ Toxicity) - Single Exposure

#### Inhalation

At high concentrations nose and throat irritation. Symptoms may include coughing, shortness of breath, difficult breathing and tightness in the chest. Symptoms may develop hours after exposure and are made worse by physical effort.

#### Skin Absorption

At low concentrations skin to darken. Symptoms may include redness, rash, swelling and itching. At high concentrations causes severe skin burns.

#### Ingestion

May cause burns of the gastrointestinal tract if swallowed.

### Aspiration Hazard

No information was located.

### STOT (Specific Target Organ Toxicity) - Repeated Exposure

May cause irritation of the respiratory system. May cause respiratory tract injury. Symptoms may include shortness of breath, rapid breathing, and coughing. The ability to do some physical activities can be reduced. Mucus production, chronic bronchitis and chronic cough.

### Respiratory and/or Skin Sensitization

Not a respiratory sensitizer. Not a skin sensitizer.

### Carcinogenicity

Conclusions cannot be drawn from the limited studies available.

### Reproductive Toxicity

#### Development of Offspring

Conclusions cannot be drawn from the limited studies available.

#### Sexual Function and Fertility

Conclusions cannot be drawn from the limited studies available.

Product Identifier: Nitric Acid

SDS No.: 0034

Date of Preparation: October 24, 2016

Effects on or via Lactation

No information was located.

Germ Cell Mutagenicity

Not known to be a mutagen.

Interactive Effects

No information was located.

## SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Studies were not located.

Persistence and Degradability

Expected to be readily biodegradable.

Bioaccumulative Potential

No information was located.

Mobility in Soil

The product is water soluble and may spread in water systems.

Other Adverse Effects

The product may affect the acidity (pH-factor) in water with risk of harmful effects to aquatic organisms.

## SECTION 13. DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose of contents and container in accordance with local, regional, national and international regulations. Empty containers retain product residue. Follow label warnings even if container appears to be empty.

## SECTION 14. TRANSPORT INFORMATION

Regulation	UN No.	Proper Shipping Name	Transport Hazard Class(es)	Packing Group
Canadian TDG	UN2031	Nitric Acid	8, 5.1	II
US DOT	UN2031	Nitric Acid	8, 5.1	II
IATA (Air)	UN2031	Nitric Acid	8, 5.1	II
IMO (Marine)	UN2031	Nitric Acid	8, 5.1	II

Environmental Hazards Not applicable

Special Precautions Not applicable

Transport in Bulk According to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

## SECTION 15. REGULATORY INFORMATION

Safety, Health and Environmental Regulations

Canada

Domestic Substances List (DSL) / Non-Domestic Substances List (NDSL)

Listed on the DSL.

CEPA - National Pollutant Release Inventory (NPRI)

Part 1A.

USA

Product Identifier: Nitric Acid

SDS No.: 0034

Date of Preparation: October 24, 2016

Toxic Substances Control Act (TSCA) Section 8(b)

All ingredients are listed on the TSCA Inventory.

Additional USA Regulatory Lists

CERCLA: Listed

SARA Title III - Section 302:

Acute Health Hazard: Yes

Chronic Health Hazard: Yes

Fire Hazard: Yes

Pressure Hazard: No

Reactive Hazard: No

SARA Title III - Section 311/312

Hazardous chemical: No.

## SECTION 16. OTHER INFORMATION

NFPA Rating	Health - 4	Flammability - 0	Instability - 3
	Special Hazard - Oxidizing		
SDS Prepared By	Caledon Laboratories Ltd		
Date of Preparation	October 24, 2016		
Revision Indicators	The following SDS content was changed on November 14, 2016: Section 8 - Exposure Controls/Personal Protection; Exposure Guidelines.		
References	CHEMINFO database. Canadian Centre for Occupational Health and Safety (CCOHS). Supplier Safety Data Sheets.		
Disclaimer	Caledon Laboratories Ltd. believes that the information contained herein is reliable and accurate. Caledon makes no warranty thereto, and expressly disclaims all liability for reliance thereon. Such information is solely for your consideration, investigation, and verification.		

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Product Identifier: Nitric Acid  
SDS No.: 0034  
Date of Preparation: October 24, 2016

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## SAFETY DATA SHEET

according to the Global Harmonized System (and with all of the information required by the CPR)

Date of issue: 05/12/2014

Version 1.0

### SECTION 1. Identification

#### Product identifier

Product number	AX1270
Product name	Ammonium Chloride GR ACS
CAS-No.	12125-02-9

#### Relevant identified uses of the substance or mixture and uses advised against

Identified uses	Reagent for analysis
-----------------	----------------------

#### Details of the supplier of the safety data sheet

Company	EMD Millipore Corporation   290 Concord Road, Billerica, MA 01821, United States of America   General Inquiries: +1-978-715-4321   Monday to Friday, 9:00 AM to 4:00 PM Eastern Time (GMT-5)
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Emergency telephone	800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week
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### SECTION 2. Hazards identification

#### GHS Classification

Acute toxicity, Category 4, Oral, H302  
Eye irritation, Category 2, H319

For the full text of the H-Statements mentioned in this Section, see Section 16.

#### GHS-Labeling

##### *Hazard pictograms*



*Signal Word*  
Warning

##### *Hazard Statements*

H302 Harmful if swallowed.  
H319 Causes serious eye irritation.

##### *Precautionary Statements*

# SAFETY DATA SHEET

according to the Global Harmonized System (and with all of the information required by the CPR)

Product number  
Product name

AX1270  
Ammonium Chloride GR ACS

Version 1.0

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

## Other hazards

None known.

---

## SECTION 3. Composition/information on ingredients

Formula	NH <sub>4</sub> Cl	H <sub>4</sub> CIN (Hill)
Molar mass	53.49 g/mol	

### Hazardous ingredients

*Chemical Name (Concentration)*

CAS-No.

*ammonium chloride (>= 90 % - <= 100 %)*

12125-02-9

Exact percentages are being withheld as a trade secret.

---

## SECTION 4. First aid measures

### Description of first-aid measures

#### *Inhalation*

After inhalation: fresh air.

#### *Skin contact*

After skin contact: wash off with plenty of water. Remove contaminated clothing.

#### *Eye contact*

After eye contact: rinse out with plenty of water. Call in ophthalmologist.

#### *Ingestion*

After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

Never give anything by mouth to an unconscious person.

### Most important symptoms and effects, both acute and delayed

#### irritant effects

The following applies to ammonium salts in general: after swallowing: local irritation symptoms, nausea, vomiting, diarrhea. Systemic effect: after the uptake of very large quantities: drop in blood pressure, collapse, CNS disorders, spasms, narcotic conditions, respiratory paralysis, hemolysis.

### Indication of any immediate medical attention and special treatment needed

No information available.

---

## SECTION 5. Fire-fighting measures

### Extinguishing media

#### *Suitable extinguishing media*

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

**SAFETY DATA SHEET**

according to the Global Harmonized System (and with all of the information required by the CPR)

Product number  
Product name

AX1270  
Ammonium Chloride GR ACS

Version 1.0

*Unsuitable extinguishing media*

For this substance/mixture no limitations of extinguishing agents are given.

**Special hazards arising from the substance or mixture**

Not combustible.

Ambient fire may liberate hazardous vapors.

Fire may cause evolution of:

nitrogen oxides, Hydrogen chloride gas

**Advice for firefighters**

*Special protective equipment for fire-fighters*

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

*Further information*

Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

---

**SECTION 6. Accidental release measures**

**Personal precautions, protective equipment and emergency procedures**

Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.

Advice for emergency responders: Protective equipment see section 8.

**Environmental precautions**

Do not empty into drains.

**Methods and materials for containment and cleaning up**

Cover drains. Collect, bind, and pump off spills.

Observe possible material restrictions (see sections 7 and 10).

Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

---

**SECTION 7. Handling and storage**

**Precautions for safe handling**

Observe label precautions.

**Conditions for safe storage, including any incompatibilities**

Tightly closed. Dry.

Store at room temperature.

**SAFETY DATA SHEET**

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Ammonium Chloride GR ACS

Version 1.0

**SECTION 8. Exposure controls/personal protection**

**Exposure limit(s)**

*Ingredients*

Basis	Value	Threshold limits	Remarks
<i>ammonium chloride 12125-02-9</i>			
CAD AB OEL	Time Weighted Average (TWA):	10 mg/m <sup>3</sup>	Form of exposure: Fume.
	Short Term Exposure Limit (STEL):	20 mg/m <sup>3</sup>	Form of exposure: Fume.
CAD BC OEL	Short Term Exposure Limit (STEL):	20 mg/m <sup>3</sup>	Form of exposure: Fume.
	Time Weighted Average (TWA):	10 mg/m <sup>3</sup>	Form of exposure: Fume.
CAD MB OEL	Time Weighted Average (TWA):	10 mg/m <sup>3</sup>	Form of exposure: Fume.
	Short Term Exposure Limit (STEL):	20 mg/m <sup>3</sup>	Form of exposure: Fume.
CAD ON OEL	Time Weighted Average (TWAEV):	10 mg/m <sup>3</sup>	Form of exposure: Fume.
	Short Term Exposure Limit (STEL):	20 mg/m <sup>3</sup>	Form of exposure: Fume.
OEL (QUE)	Short Term Exposure Limit (STEL):	20 mg/m <sup>3</sup>	Form of exposure: Fume.
	Time Weighted Average (TWA):	10 mg/m <sup>3</sup>	Form of exposure: Fume.

**Engineering measures**

Technical measures and appropriate working operations should be given priority over the use of personal protective equipment.

**Individual protection measures**

Protective clothing should be selected specifically for the workplace, depending on concentration and quantity of the hazardous substances handled. The chemical resistance of the protective equipment should be inquired at the respective supplier.

*Hygiene measures*

Change contaminated clothing. Application of skin- protective barrier cream recommended. Wash hands after working with substance.

*Eye/face protection*

Safety glasses

*Hand protection*

Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

*Other protective equipment:*

protective clothing

*Respiratory protection*

required when dusts are generated.

Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

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**SECTION 9. Physical and chemical properties**

Physical state	solid
Color	colorless
Odor	odorless
Odor Threshold	not applicable
pH	4.5 - 5.5 at 50 g/l 68 °F (20 °C)
Melting point	335 °C (sublimed)
Boiling point/boiling range	not applicable
Flash point	not applicable
Evaporation rate	No information available.
Flammability (solid, gas)	The product is not flammable.
Lower explosion limit	No information available.
Upper explosion limit	No information available.
Vapor pressure	67 hPa at 482 °F (250 °C)  1.3 hPa at 86 °F (30 °C)
Relative vapor density	No information available.
Density	1.52 g/cm <sup>3</sup> at 68 °F (20 °C)
Relative density	No information available.
Water solubility	372 g/l at 68 °F (20 °C)
Partition coefficient: n-octanol/water	log Pow: -4.37 (calculated) (Lit.) Bioaccumulation is not expected.
Autoignition temperature	No information available.

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Decomposition temperature	not applicable
Viscosity, dynamic	No information available.
Explosive properties	Not classified as explosive.
Oxidizing properties	none
Ignition temperature	> 752 °F (> 400 °C)
Bulk density	ca.500 kg/m <sup>3</sup>

---

## SECTION 10. Stability and reactivity

### Reactivity

See below

### Chemical stability

sublimable

### Possibility of hazardous reactions

Violent reactions possible with:

alkali hydroxides, acids

Risk of ignition or formation of inflammable gases or vapors with:

halogen-halogen compounds, alkalines, alkaline substances

Risk of explosion with:

nitrates, chlorates, Heavy metal salts, nitrites, Hydrogen cyanide (hydrocyanic acid), Chlorine, silver salt, Strong oxidizing agents

### Conditions to avoid

no information available

### Incompatible materials

Aluminum, Lead, Iron, Copper, copper compounds

### Hazardous decomposition products

in the event of fire: See section 5.

---

## SECTION 11. Toxicological information

### Information on toxicological effects

#### *Likely route of exposure*

Eye contact, Skin contact, Ingestion

#### *Acute oral toxicity*

LD50 rat: 1,410 mg/kg (External MSDS)

absorption

Symptoms: Irritations of mucous membranes in the mouth, pharynx, oesophagus and gastrointestinal tract.

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## *Acute inhalation toxicity*

Symptoms: Possible damages:, mucosal irritations

### *Skin irritation*

rabbit

Result: No irritation  
(External MSDS)

### *Eye irritation*

rabbit

Result: Eye irritation  
(External MSDS)

Causes serious eye irritation.

### *Sensitization*

In animal experiments:

Result: negative  
(External MSDS)

### *Genotoxicity in vitro*

Mutagenicity (mammal cell test): micronucleus.

Result: negative  
(IUCLID)

Ames test

Result: negative  
(IUCLID)

### *Specific target organ systemic toxicity - single exposure*

The substance or mixture is not classified as specific target organ toxicant, single exposure.

### *Specific target organ systemic toxicity - repeated exposure*

The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

### *Aspiration hazard*

Regarding the available data the classification criteria are not fulfilled.

## **Carcinogenicity**

IARC

No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

OSHA

No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

NTP

No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

ACGIH

No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

## **Further information**

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The following applies to ammonium salts in general: after swallowing: local irritation symptoms, nausea, vomiting, diarrhea. Systemic effect: after the uptake of very large quantities: drop in blood pressure, collapse, CNS disorders, spasms, narcotic conditions, respiratory paralysis, hemolysis. Handle in accordance with good industrial hygiene and safety practice.

---

## SECTION 12. Ecological information

### Ecotoxicity

#### *Toxicity to fish*

LC50 *Cyprinus carpio* (Carp): 209 mg/l; 96 h (IUCLID)

#### *Toxicity to daphnia and other aquatic invertebrates*

EC50 *Daphnia magna* (Water flea): > 100 mg/l; 48 h (Lit.)

### Persistence and degradability

#### *Biodegradability*

The methods for determining the biological degradability are not applicable to inorganic substances.

### Bioaccumulative potential

#### *Partition coefficient: n-octanol/water*

log Pow: -4.37

(calculated)

(Lit.) Bioaccumulation is not expected.

### Mobility in soil

No information available.

#### *Additional ecological information*

Discharge into the environment must be avoided.

---

## SECTION 13. Disposal considerations

The information presented only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations. Disposal should be in accordance with applicable regional, national and local laws and regulations.

---

## SECTION 14. Transport information

### Land transport (DOT)

Not classified as dangerous in the meaning of transport regulations.

### Air transport (IATA)

Not classified as dangerous in the meaning of transport regulations.

### Sea transport (IMDG)

Not classified as dangerous in the meaning of transport regulations.

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## SECTION 15. Regulatory information

United States of America

Canada

### WHMIS Classification

D2B

Toxic Material Causing Other Toxic Effects

Eye irritant

This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.

### Notification status

TSCA:

All components of the product are listed in the TSCA-inventory.

DSL:

All components of this product are on the Canadian DSL.

---

## SECTION 16. Other information

### Training advice

Provide adequate information, instruction and training for operators.

### Full text of H-Statements referred to under sections 2 and 3.

H302

Harmful if swallowed.

H319

Causes serious eye irritation.

### Key or legend to abbreviations and acronyms used in the safety data sheet

Used abbreviations and acronyms can be looked up at [www.wikipedia.org](http://www.wikipedia.org).

Date of issue: 05/12/2014

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The information contained herein is based on the present state of our knowledge. It characterizes the product with regard to appropriate safety precautions. It does not represent a warranty of any product properties and we assume no liability for any loss or injury which may result from the use of this information. Users should conduct their own investigations to determine the suitability of the information.

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## SODIUM THIOSULPHATE.

## PRODUCT IDENTIFICATION

**Chemical Name and Synonyms:** Sodium thiosulphate. Hypo. Sodium hyposulphite.  
**Chemical Family:** Inorganic salt  
**Product Use:** Laboratory reagent  
**Manufacturers Name and Address:** Caledon Laboratories Ltd. 40 Armstrong Avenue Georgetown, Ontario L7G 4R9  
**Telephone No:** (905) 877-0101  
**Fax No:** (905) 877-6666  
**Emergency Telephone No:** CANUTEC (613) 996-6666

## HAZARDOUS INGREDIENTS OF MATERIALS

**Ingredients, %, TLY Units, CAS No:** Sodium thiosulphate pentahydrate, > 99, Not established, 10102-17-7 OR Sodium thiosulphate anhydrous, > 99, Not established, 7772-98-7

## PHYSICAL DATA

**Physical State:** Solid  
**Odour and Appearance:** Colourless or white crystals; odourless  
**Odour Threshold (ppm):** Not applicable.  
**Vapour Pressure (mm Hg):** Not applicable.  
**Vapour Density (Air = 1):** Not applicable.  
**Evaporation Rate:** Not applicable.  
**Boiling Point (degrees C):** > 100  $\diamond$ C (loses water)  
**Melting Point (degrees C):** 40  $\diamond$ C - 45  $\diamond$ C  
**pH:** 5.5 - 7.5 (5 % solution)  
**Specific Gravity:** 1.685  
**Coefficient of Water/Oil distribution:** Not available.

## SHIPPING DESCRIPTION

**UNs:** Not regulated.  
**T.D.G. Class:** Not regulated.  
**Pkg. Group:** Not regulated.

## REACTIVITY DATA

**Incompatibility with other substances:** Efflorescent in warm, dry air. Slightly deliquescent in moist air. Strong oxidizers cause vigorous exothermic reactions. Reaction with acids releases SO<sub>2</sub>. Reacts violently with sodium nitrite after losing water at 100  $\diamond$ C. Strong exothermic reaction between hydrate and water reactive materials (e.g. Sodium). Reacts with acids, iodine, lead, mercury, silver salts, metal nitrates.  
**Reactivity:** Avoid excessive heat, ignition sources, and all incompatible materials. Avoid generating dust or vapours.

## FIRE AND EXPLOSION DATA

**Flammability:** Not flammable. Releases toxic, irritating or flammable gases and residue when heated.  
**Extinguishing Media:** Use any means suitable for surrounding fire. Use water as spray or fog to absorb heat, cool containers, and disperse vapours. Fight fire from a safe distance and from upwind. Firefighters should wear self-contained breathing apparatus and protective clothing sufficient to prevent contact.  
**Flash Point (Method Used):** Not applicable.  
**Autoignition Temperature:** Not applicable.  
**Upper Flammable Limit (% by volume):** Not applicable.  
**Lower Flammable Limit (% by volume):** Not applicable.  
**Hazardous Combustion Products:** SO<sub>x</sub>, hydrogen sulphide, flammable, irritating sodium sulphide residue.  
**Sensitivity to Impact:** None identified.

## TOXICOLOGICAL PROPERTIES AND HEALTH DATA

**Toxicological Data:**  
**LD50: (oral, rat)** > 8 g/kg LDLO (ivn, mus) 32,350 mg/kg  
**LC50:** Not available.

## Effects of Acute Exposure to Product:

**Inhaled:** May cause irritation of the nasal and respiratory passages. Sulphur dioxide, and hydrogen sulphide, which are released when the product is heated, are highly irritating and toxic. Extent of damage depends on concentration and duration of exposure.  
**In contact with skin:** Dust may cause irritation. Solutions may cause moderate to severe irritation, depending on concentration and duration of exposure.  
**In contact with eyes:** Dust causes severe irritation. Solutions may cause moderate to severe irritation, depending on concentration and duration of exposure.  
**Ingested:** Low toxicity. Large amounts may be irritating to gastrointestinal tract, causing nausea, vomiting, abdominal pain and diarrhea.  
**Effects of Chronic Exposure to Product:** Chronic skin exposure may cause irritation.  
**Carcinogenicity:** No human or animal information available. Not expected to be carcinogenic.  
**Teratogenicity:** No information available.  
**Reproductive Effects:** No information available.  
**Mutagenicity:** No information available.  
**Synergistic Products:** None known.

## PREVENTIVE MEASURES

**Engineering Controls:** Local exhaust ventilation required.  
**Respiratory Protection:** Dust mask or respirator with high efficiency particulate filter. For emergency or unknown concentrations, positive pressure, full-facepiece self-contained breathing apparatus.  
**Skin Protection:** Impervious gloves. Other protective clothing, sleeves, apron, boots, or coveralls, sufficient to prevent contact.  
**Other Personal Protective Equipment:** Safety shower and eye wash fountain readily available in work area.  
**Leak and Spill Procedure:** Ventilate area and restrict access. Cleanup personnel must be thoroughly trained in the handling of hazardous materials, and must wear protective equipment and clothing sufficient to prevent any contact or inhalation. Mix with inert material and collect in a manner that does not raise dust. Prevent from entering sewers and waterways. Wash site of spill thoroughly with water. Contaminated absorbent may pose the same hazards as the product.  
**Waste Disposal:** Dispose of in compliance with local, provincial and federal regulations.  
**Handling Procedures and Equipment:** EYE IRRITANT. Workers using this chemical must be properly trained in its hazards and its safe use. Wear appropriate protective clothing and equipment. Keep well away from combustible and incompatible materials. Use the smallest amount possible for the purpose in an area with adequate ventilation. Avoid generating dust or vapours. Avoid contact. Avoid inhalation. Keep containers tightly closed.  
**Storage Requirements:** Store in cool, dry, well-ventilated area, out of direct sunlight, and away from heat or ignition sources and incompatible materials. Keep containers tightly closed. Inspect regularly for signs of leaking or damage.

## FIRST AID MEASURES

**Specific Measures:**  
**Eyes:** Flush eyes thoroughly with gently running water for at least fifteen (15) minutes, holding eyelids open while flushing. Avoid flushing contaminated water into unaffected eye. Get medical attention.  
**Skin:** Remove contaminated clothing. Brush or wipe off dry material. Wash skin with plenty of running water for five to ten (5 to 10) minutes, or until no trace of chemical remains. If irritation persists, get medical attention.  
**Inhalation:** Remove to fresh air. Give oxygen and get medical attention for any breathing difficulty.  
**Ingestion:** If victim is alert and NOT convulsing rinse mouth thoroughly with water. Do not induce vomiting. Give 2 to 4 glasses of water to dilute material. If discomfort occurs, or if a large amount has been ingested, get medical attention.

## REFERENCES USED

Budavari: The Merck Index, 12th ed., 1997  
 CCINFO disc: MSDS  
 Sax, Lewis: Hawleys Condensed Chemical Dictionary, 11th ed., 1987  
 Suppliers Material Safety Data Sheets:

## ADDITIONAL INFORMATION

Date Issued: 20-Feb-90  
 Revision: Feb 2016  
 Proposed WHMIS Designation: D2B (eye irritation)  
 Prepared by: Caledon Laboratories Ltd. (905) 877-0101

# SAFETY DATA SHEET

## 1. Identification

**Product identifier** Sodium Thiosulphate

**Other means of Identification** Disodium Thiosulphate, Anhydrous

**Other Identification** EC Number: 231-867-5

**Recommended Use** Laboratory Chemical

**Restrictions on use** None known.

**Manufacturer/Supplier Identifier** Caledon Laboratories Ltd, 40 Armstrong Avenue, Georgetown, Ontario, L7G-4R9, (905) 877-0101, www.caledonlabs.com

**Emergency Phone No.** CANUTEC, (613) 996-6666

## 2. Hazard(s) identification

### Hazard Classification

Not classified

### Label Elements

**Hazard Symbol:** No symbol

**Signal Word:** No signal word.

**Hazard Statement:** not applicable

**Precautionary Statement** not applicable

**Other hazards which do not result in GHS classification:** None.

## 3. Composition/information on ingredients

### Substances

**Composition Comments:** The components are not hazardous or are below required disclosure limits.

## 4. First-aid measures

<b>General information:</b>	Get medical advice/attention if you feel unwell. Show this safety data sheet to the doctor in attendance.
<b>Ingestion:</b>	Rinse mouth thoroughly. Call a POISON CENTER or doctor/physician if you feel unwell.
<b>Inhalation:</b>	Move to fresh air. Get medical attention if symptoms persist.
<b>Skin Contact:</b>	Wash skin thoroughly with soap and water. Get medical attention if irritation persists after washing. Wash contaminated clothing before reuse.
<b>Eye contact:</b>	Flush thoroughly with water. If irritation occurs, get medical assistance.

**Most important symptoms/effects, acute and delayed**

**Symptoms:** May cause irritation to skin, eyes, and respiratory tract.

**Indication of immediate medical attention and special treatment needed**

**Treatment:** Treat symptomatically. Symptoms may be delayed.

**5. Fire-fighting measures**

**General Fire Hazards:** In case of fire and/or explosion do not breathe fumes.

**Suitable (and unsuitable) extinguishing media**

**Suitable extinguishing media:** Use fire-extinguishing media appropriate for surrounding materials.

**Unsuitable extinguishing media:** None known.

**Specific hazards arising from the chemical:** During fire, gases hazardous to health may be formed.

**Special protective equipment and precautions for firefighters**

**Special fire fighting procedures:** Move containers from fire area if you can do so without risk. Use water spray to keep fire-exposed containers cool. Cool containers exposed to flames with water until well after the fire is out.

**Special protective equipment for fire-fighters:** Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.

**6. Accidental release measures**

**Personal precautions, protective equipment and emergency procedures:** Keep unauthorized personnel away. Use personal protective equipment. Ventilate closed spaces before entering them. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. See Section 8 of the SDS for Personal Protective Equipment.

**Methods and material for containment and cleaning up:** Avoid dust formation. Sweep up and place in a clearly labeled container for chemical waste. Clean surface thoroughly to remove residual contamination.

**Notification Procedures:** Prevent entry into waterways, sewer, basements or confined areas. Inform authorities if large amounts are involved.

**Environmental Precautions:** Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

## 7. Handling and storage

**Precautions for safe handling:** Use personal protective equipment as required. Avoid contact with eyes, skin, and clothing. Avoid inhalation of dust. Wash thoroughly after handling. Use only with adequate ventilation.

**Conditions for safe storage, including any incompatibilities:** Keep containers tightly closed. Store in cool, dry place. Store in a well-ventilated place.

## 8. Exposure controls/personal protection

### Control Parameters

#### Occupational Exposure Limits

None of the components have assigned exposure limits.

**Appropriate Engineering Controls** No data available.

### Individual protection measures, such as personal protective equipment

**General information:** Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

**Eye/face protection:** Use tight fitting goggles if dust is generated.

#### Skin Protection

**Hand Protection:** Wear protective gloves.

**Skin protection:** Wear suitable protective clothing.

**Respiratory Protection:** In case of inadequate ventilation use suitable respirator.

**Hygiene measures:** Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Provide eyewash station and safety shower.

## 9. Physical and chemical properties

### Appearance

**Physical state:** solid

**Form:** Crystals or powder.

**Color:** Colorless

**Odor:** Odorless

**Odor threshold:** No data available.

**pH:** 6,0 - 8,5 (50 g/l, 20 °C)

**Melting point/freezing point:** 52 °C Decomposes

**Initial boiling point and boiling range:** No data available.

**Flash Point:** No data available.

**Evaporation rate:** No data available.

<b>Flammability (solid, gas):</b>	No data available.
<b>Upper/lower limit on flammability or explosive limits</b>	
<b>Flammability limit - upper (%):</b>	No data available.
<b>Flammability limit - lower (%):</b>	No data available.
<b>Explosive limit - upper (%):</b>	No data available.
<b>Explosive limit - lower (%):</b>	No data available.
<b>Vapor pressure:</b>	No data available.
<b>Vapor density:</b>	No data available.
<b>Relative density:</b>	1,67 (20 °C)
<b>Solubility(ies)</b>	
<b>Solubility in water:</b>	210 g/l (20 °C)
<b>Solubility (other):</b>	No data available.
<b>Partition coefficient (n-octanol/water):</b>	No data available.
<b>Auto-ignition temperature:</b>	No data available.
<b>Decomposition temperature:</b>	No data available.
<b>Viscosity:</b>	No data available.
<b>Other information</b>	
<b>Molecular weight:</b>	158,13 g/mol (H <sub>2</sub> O <sub>3</sub> S <sub>2</sub> .2Na)

## 10. Stability and reactivity

<b>Reactivity:</b>	No dangerous reaction known under conditions of normal use.
<b>Chemical Stability:</b>	Material is stable under normal conditions.
<b>Possibility of hazardous reactions:</b>	Hazardous polymerization does not occur.
<b>Conditions to avoid:</b>	Excessive heat.
<b>Incompatible Materials:</b>	Strong oxidizing agents. Nitrates. Acids. Inorganic salts.
<b>Hazardous Decomposition Products:</b>	Thermal decomposition may produce oxides of sulfur. Sodium oxides

## 11. Toxicological information

### Information on likely routes of exposure

<b>Ingestion:</b>	May cause irritation of the gastrointestinal tract.
<b>Inhalation:</b>	May cause irritation to the respiratory system.
<b>Skin Contact:</b>	May cause irritation.
<b>Eye contact:</b>	May cause temporary eye irritation.

### Information on toxicological effects

#### Acute toxicity (list all possible routes of exposure)

<b>Oral Product:</b>	No data available.
<b>Dermal Product:</b>	No data available.

**Inhalation**  
**Product:** No data available.

**Repeated dose toxicity**  
**Product:** No data available.

**Skin Corrosion/Irritation**  
**Product:** May cause skin irritation.

**Serious Eye Damage/Eye Irritation**  
**Product:** No data available.

**Respiratory or Skin Sensitization**  
**Product:** Not a skin sensitizer.

**Carcinogenicity**  
**Product:** This substance has no evidence of carcinogenic properties.

**IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:**  
No carcinogenic components identified

**US. National Toxicology Program (NTP) Report on Carcinogens:**  
No carcinogenic components identified

**ACGIH Carcinogens:**  
No carcinogenic components identified

#### **Germ Cell Mutagenicity**

**In vitro**  
**Product:** No mutagenic components identified

**In vivo**  
**Product:** No mutagenic components identified

**Reproductive toxicity**  
**Product:** No components toxic to reproduction

**Specific Target Organ Toxicity - Single Exposure**  
**Product:** No data available.

**Specific Target Organ Toxicity - Repeated Exposure**  
**Product:** No data available.

**Aspiration Hazard**  
**Product:** Not classified

**Other effects:** None known.

## **12. Ecological information**

### **Ecotoxicity:**

#### **Acute hazards to the aquatic environment:**

**Fish**  
**Product:** No data available.

**Aquatic Invertebrates**  
Product: No data available.

**Chronic hazards to the aquatic environment:**

**Fish**  
Product: No data available.

**Aquatic Invertebrates**  
Product: No data available.

**Toxicity to Aquatic Plants**  
Product: No data available.

**Persistence and Degradability**

**Biodegradation**  
Product: There are no data on the degradability of this product.

**BOD/COD Ratio**  
Product: No data available.

**Bioaccumulative Potential**

**Bioconcentration Factor (BCF)**  
Product: No data available on bioaccumulation.

**Partition Coefficient n-octanol / water (log Kow)**  
Product: No data available.

**Mobility in Soil:** No data available.

**Known or predicted distribution to environmental compartments**

**Other Adverse Effects:** The product components are not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

**13. Disposal considerations**

**Disposal instructions:** Discharge, treatment, or disposal may be subject to national, state, or local laws.

**Contaminated Packaging:** Since emptied containers retain product residue, follow label warnings even after container is emptied.

**14. Transport information**

**TDG**  
Not regulated.

**IMDG**  
Not regulated.

**IATA**  
Not regulated.

## 15. Regulatory information

### Canada Federal Regulations

#### List of Toxic Substances (CEPA, Schedule 1)

Not Regulated

#### Export Control List (CEPA 1999, Schedule 3)

Not Regulated

### National Pollutant Release Inventory (NPRI)

#### Canada. National Pollutant Release Inventory (NPRI) Substances, Part 5, VOCs with Additional Reporting Requirements

NPRI PT5 Not Regulated

#### Canada. Canadian Environmental Protection Act (CEPA). National Pollutant Release Inventory (NPRI) (Parts 1-4)

NPRI Not Regulated

### Greenhouse Gases

Not Regulated

### Controlled Drugs and Substances Act

CA CDSI Not Regulated

CA CDSII Not Regulated

CA CDSIII Not Regulated

CA CDSIV Not Regulated

CA CDSV Not Regulated

CA CDSVII Not Regulated

CA CDSVIII Not Regulated

### Precursor Control Regulations

Not Regulated

### International regulations

#### Montreal protocol

not applicable

#### Stockholm convention

not applicable

#### Rotterdam convention

not applicable

#### Kyoto protocol

not applicable

**Inventory Status:**

Australia AICS:	On or in compliance with the inventory
Canada DSL Inventory List:	On or in compliance with the inventory
EINECS, ELINCS or NLP:	On or in compliance with the inventory
Japan (ENCS) List:	On or in compliance with the inventory
China Inv. Existing Chemical Substances:	Not in compliance with the inventory.
Korea Existing Chemicals Inv. (KECI):	On or in compliance with the inventory
Canada NDSL Inventory:	Not in compliance with the inventory.
Philippines PICCS:	On or in compliance with the inventory
US TSCA Inventory:	On or in compliance with the inventory
New Zealand Inventory of Chemicals:	On or in compliance with the inventory
Japan ISHL Listing:	On or in compliance with the inventory
Japan Pharmacopoeia Listing:	Not in compliance with the inventory.

**16. Other information, including date of preparation or last revision**

<b>Issue Date:</b>	Jan 30, 2018
<b>Revision Date:</b>	No data available.
<b>Version #:</b>	1.0
<b>Further Information:</b>	No data available.

Caledon Laboratories Ltd. believes that the information contained herein is reliable and accurate. Caledon makes no warranty thereto, and expressly disclaims all liability for reliance thereon. Such information is solely for your consideration, investigation, and verification.

## **Appendix O**

### **Sampling Protocol for Municipalities**

## Instructions for Sampling Community Water - Tap, THM & HAA

**\*\*Remember: Freeze the freezer packs prior to shipping the samples back!!\*\***

You will be using **5** bottles for tap inorganic sampling (1 500ml plastic bottle, 2 small amber glass bottles and 2 small plastic bottles) as well as **4** small glass vials for THM and HAA sampling. Most of these bottles (with the exception of the larger 500ml plastic bottle) have a small amount of chemical preservative in them and **must not be rinsed or overfilled**. Do not spill preservative. Rinse thoroughly with water if preservative comes in contact with skin.

1. Fill the 5 plastic bottles labelled “**TAP**” all from the tap location located approximately 2/3 of the way through the distribution system:
  - a. Let the tap water **flush** for about **3 minutes** before filling the bottles/vials.
  - b. **Do not rinse** or overfill the bottles – this may be tricky so turn your tap pressure down to slowly fill up the bottles.

THM & HAA vials -

- c. **Do not rinse** the vials. Fill all vials completely without over-spilling – this can be tricky so be sure to **fill slowly**. Try to avoid trapping air in the vial but lightly pushing down on the flexible cap centre while twisting the cap on.
2. On the field sheet, fill out the **Tap Sample** section including:
  - a. Location (ie. Gas station)
  - b. Water temperature & pH (if you can)
  - c. Time
  - d. Free chlorine and Total chlorine (if you have a chlorine test kit)
3. **Sign and date** the field sheet.
4. Store the samples in a refrigerator at around 4°C until they can be shipped. Do not freeze the samples.
5. Freeze the freezer packs in a freezer prior to shipping the samples back.
6. Samples should be shipped back **within 1 day** after being collected.
7. Return the field sheets in the zip lock bag, the samples, and the freezer packs in the cooler provided. Make sure the samples are packaged to prevent breakage.
8. Attach the return address and Xpresspost label provided to the cooler and drop it off at your local post office for shipping.

*Feel free to call Christa Ramsay at 709-729-4817 if you have any questions.*

***---Please ship samples no later than march 15<sup>th</sup> ---***

## **Appendix P**

### **Protocol for THM & HAA Collection and Reporting**

March 11, 2010

## Protocol for THM and HAA Collection and Reporting

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### Rationale

Trihalomethanes (THMs) and Haloacetic Acids (HAAs) are disinfection by-products (DBPs) that are formed when precursor material, such as natural organic matter reacts with a disinfectant, such as chlorine, in a distribution system. DBP formation is dependent on the functioning of the chlorination equipment.

### Current Protocol

#### Collection

A THM and/or HAA sample does not have to be taken if the Town/operator verifies that the chlorination system is not in operation. If the operation of the system is not verified by the Town/operator the THM and/or HAA sample must be taken.

#### Reporting

A THM and/or HAA level of 0.0µg/L does not mean that the system is not chlorinating.

Because of the above statement noted above, a THM and/or HAA results of 0.0µg/L cannot be rejected.

A free or total chlorine residual reading of 0.0mg/L does not mean that the system is not chlorinating.

Because of the above noted statement, a THM and/or HAA sample should not be excluded because of a 0.0mg/L free or total chlorine residual reading.

#### Calculation of THM and HAA averages

The THM and HAA averages are based on the last four season values. These averages are classified as locational running annual averages and are comparable to the *Guidelines for Canadian Drinking Water Quality*.

If a value for either season is missing the remaining values are averaged over the number of season sampled and are classified as a simple average which is not comparable to the *Guidelines for Canadian Drinking Water Quality*.

## **Appendix Q**

### **Protocol for Exceedance Reporting for Tap Samples (Lead Only)**

July 20, 2003  
Revised: May 29, 2010  
Revised: March 6, 2013  
Revised: February 6, 2020

## Protocol for Lead Exceedance Reporting for Tap Samples – REVISED

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### Rationale

An exceedance is defined as a value that is above the aesthetic objective or maximum acceptable concentration established by GCDWQ. An examination of recent tap water samples in which lead was found in exceed of the Guidelines for Canadian Drinking Water Quality (GCDWQ) indicates that approximately 75% of lead exceedances are not confirmed by the resample results. This is indicative of lead contamination of samples due to lead plumbing and low water usage but not due to general contamination of the water supply as such. These results mean that false positives for lead are being reported to the public. To avoid unnecessary inconvenience to the consumers this revised protocol for lead exceedance reporting is proposed.

### Revised Protocol

1. For water supplies for which the history of water analysis results shows little of no lead in the water

When a lead exceedance report is received from the chemical analysis laboratory, **reporting of the exceedance will be put on hold until the results of the confirmation sample are received.** Three confirmation samples will be collected, one each from the original sampling location, a location upstream of the original location and a location downstream of the original location. Samples must be taken within three days of notification from the same water supply after appropriate flushing and sent to the laboratory for urgent analysis of all parameters.

- a. If the **confirmation samples confirms the results of the first sample** the community will be informed immediately of the exceedance and the information will be copied to various government agencies for appropriate action. **Both sample results will be stored in the main drinking water database.**
  - b. If the **confirmation sample at the original location confirms the results of the first sample** and the **upstream and downstream samples negate the results of the first sample** the community will be informed immediately of the site-specific exceedance and the information will be copied to various government agencies for appropriate action. **The two samples confirmed to be a locational (site-specific) exceedance will be exported to an “outlier” table within the drinking water quality database. The upstream and downstream samples will be stored in the main drinking water quality database.**
  - c. However, if the **confirmation sample negates the results of the first sample** the exceedance will not be reported to the community. The results of the first sample will be exported to an “outlier” table within the drinking water quality database and **only the results of the confirmation sample will be stored in the main drinking water quality database.**
2. For water supplies which are known to have elevated levels of lead and/or if the system has undergone changes that could account for elevated lead levels

When a lead exceedance report is received from the chemical analysis laboratory, **the lead exceedance will be reported** to the community and various government agencies but **a confirmation sample will not be taken.** The **sample results will be stored** in the main drinking water quality database.

## **Appendix R**

### **Protocol for Exceedance Reporting for Tap Samples (With the Exception of Lead)**

May 30, 2008  
Revised: May 29, 2010

## Exceedance Reporting of Tap Samples (with the exception of Lead)

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### Rationale

Water analysis results for all public water supplies in Newfoundland and Labrador are compared to the Guidelines for Canadian Drinking Water Quality (GCDWQ). An exceedance is defined as a value that is above the aesthetic objective or maximum acceptable concentration established by GCDWQ. At times there are exceedances of these guidelines for contaminants in either source or tap samples. The chemical analysis laboratory sends an exceedance report to the Department of Environment and Conservation that must be signed by the Manager to inform the lab that the Department has received the exceedance report. Due to the possible implications of contaminant exceedances, the Department may have to resample the drinking water system to determine if there is a potential problem in the system.

### Protocol

When an exceedance report is received from the chemical analysis laboratory, the community is immediately informed of the exceedance and the information is copied to various government agencies for appropriate action.

1. For water supplies for which the **history of water analysis results shows concentrations below GCDWQ**

When an exceedance report is received from the chemical analysis laboratory, **the exceedance will be reported to the community and various government agencies**. The confirmation sample will be collected within three days of notification from the same water supply after appropriate flushing and sent to the laboratory for **urgent analysis of all parameters**.

- a. If the **confirmation sample confirms the results of the first sample** the community will be informed immediately of the exceedance and the information will be copied to various government agencies for appropriate action. **Both sample results will be stored in the main drinking water database.**
  - b. However, if the **confirmation sample negates the results of the first sample** the community will be informed immediately of the confirmation results. The results of the first sample will be exported to an "outlier" table within the drinking water quality database and **only the results of the confirmation sample will be stored in the main drinking water quality database.**
2. For water supplies which are **known to have concentrations above the GCDWQ**

When an exceedance report is received from the chemical analysis laboratory, **the exceedance will be reported** to the community and various government agencies but **a confirmation sample will not be taken.** The **sample results will be stored** in the main drinking water quality database.