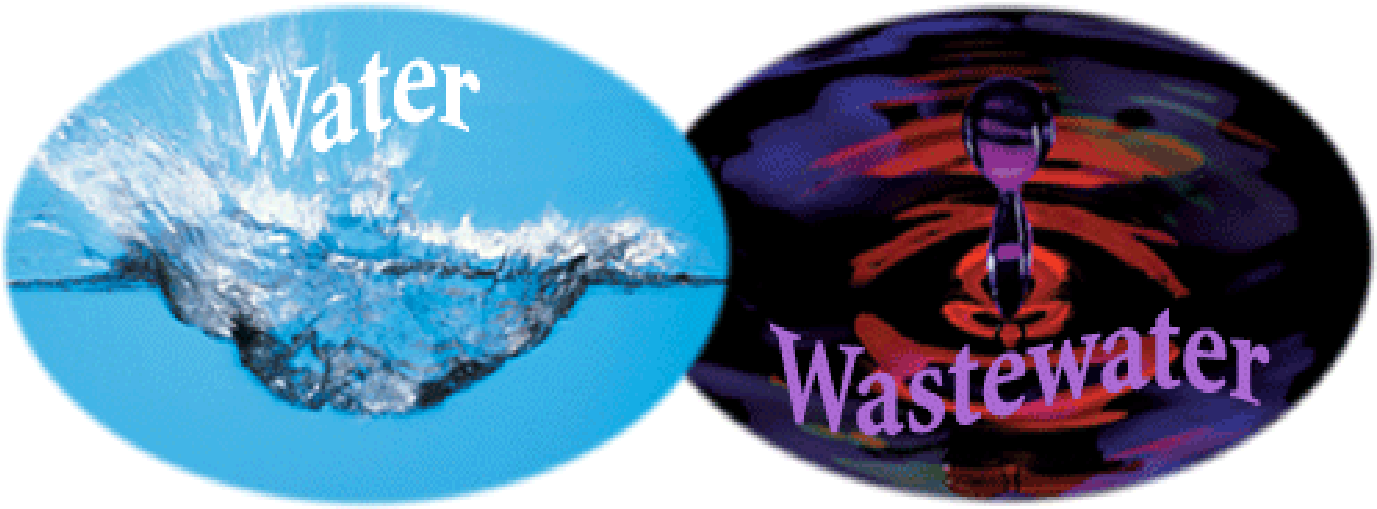
Prince Edward Island
CANADA

**Environment,
Labour and Justice**

Environment Division

Water and Wastewater



Sample Collection and Analysis

December 2011

Introduction

Accurate testing of drinking water is crucial to maintaining the health and safety of Islanders who rely on this resource. To protect Islanders and to detect any possible contamination of water at the earliest possible time, operators of public and private water supply systems and operators of public and private wastewater treatment facilities should follow the sampling and testing methods outlined in this document.

It is vital that utility operators collect samples for testing in the volumes required by the Department of Environment, Labour and Justice, using the bottles provided by the department's laboratory. Failure to follow procedures may lead to tests that are delayed, or possibly refused, and may compromise a utilities ability to show that it is delivering the quality of drinking water required by law and/or that it is treating the wastewater to acceptable levels prior to release to the environment

To make sure that testing is carried out properly, the Department of Environment, Labour and Justice strongly recommends that this document be kept in utility offices, with sampling equipment and in vehicles used to gather water samples. Proper sampling is the front line in guaranteeing the safety of the customers who rely on Prince Edward Island's water supply systems and wastewater treatment systems.

These protocols are based on the requirements of the *Environmental Protection Act* Drinking Water and Wastewater Facility Operating Regulations. A copy of the regulations can be viewed on the PEI Government web page at:

http://www.gov.pe.ca/law/regulations/pdf/E&09-04.pdf

Regulatory Requirements

Wastewater Quality Monitoring

The regulations specify minimum sampling requirements for wastewater treatment systems based on system classification. As well, sampling requirements for wastewater treatment systems may also be stipulated in a Certificate of Approval (COA) issued under Section 16 of the *Environmental Protection Act.*

The following minimum sampling requirements apply to a Class I wastewater treatment facility:

- Carbonaceous biochemical oxygen demand ($cBOD_5$), total suspended solids (TSS), and faecal coliform on a quarterly basis
- Ammonia (NH_3), total phosphorous (TP) and total nitrogen (TN) on an annual basis

The following minimum sampling requirements apply to a Class II, Class III or Class IV wastewater treatment facility:

- Carbonaceous biochemical oxygen demand ($cBOD_5$), Total suspended solids, and faecal coliform on a monthly basis
- Ammonia (NH_3), total phosphorous (TP) and total nitrogen (TN) on an annual basis

The regulations also require that the utility report summary statistics on effluent quality to their customers at least once a year.

Drinking Water Quality Monitoring

The regulations specify minimum sampling requirements for drinking water systems based on the population served and whether or not a system is chlorinated. Please note that these are minimum requirements only, and depending on water system design and size, common sense may suggest additional sampling activity.

Small System

Bacteria: -Total coliform / E.coli sampling from each source of supply and at least two sites in the distribution system on a quarterly basis

Chemistry: - sample each source of supply for general chemistry once per year
- sample each source of supply for detailed chemistry once per 5 years

Chlorinated supply, less than 5000 people served

Bacteria: - Total coliform / E.coli sampling (2 samples) of distribution system at least once every two weeks for a minimum total of 4 samples / month
- sampling of each source of supply once per month
- chlorine residual to be measured and recorded at representative points in distribution system once per week

Chemistry: - sample each source of supply for general chemistry once per year
- sample each source of supply for detailed chemistry once per 3 years

Chlorinated supply, more than 5000 people served

Bacteria: -Total coliform / E.coli sampling of distribution system at least once every two weeks, total of 1 sample/1000 people / month
- sampling of each source of supply once per month
- chlorine residual to be measured and recorded at representative points in distribution system once per week

Chemistry: - sample each source of supply for general chemistry once per year
- sample each source of supply for detailed chemistry once per 3 years

Un-Chlorinated supply, less than 5000 people served

Bacteria: - Total coliform / E.coli sampling of distribution system at least once every week, total of 4 samples / month
- sampling of each source of supply once per week

Chemistry: - sample each source of supply for general chemistry once per year
- sample each source of supply for detailed chemistry once per 3 years

Sample Collection and Storage

Wastewater Samples

Carbonaceous Biochemical Oxygen Demand ($cBOD_5$)

1000mL plastic bottle (**D**)
Store at 0 - 10°C
48 hour maximum holding time

Bottle **(D)**
1000 mL

Total Suspended Solids (TSS)

1000mL plastic bottle (**D**)
24 hour maximum holding time

Faecal coliform bacteria

Fresh samples are required
250 mL sterile plastic bottle (**C**)
Store at 0 - 10°C
24 hour maximum holding time

Bottle **(C)**
250 mL

Drinking Water Samples

Total coliform / E.coli bacteria

Fresh samples are required
250 mL sterile plastic bottle (**A**)
Store at 0 - 10°C
24 hour maximum holding time

Bottle **(A)**
250 mL

General Chemistry

Fresh samples are required
250 mL plastic bottle (**B**)
Store at 0 - 10°C
24 hour maximum holding time

Bottle **(B)**
250 mL

Sample Bottles

A B C D

A 250 mL sterile plastic bottle pre-treated with sodium thiosulfate, used for collection of treated or untreated drinking water samples for analysis for total coliform / E.coli bacteria

B 250 mL plastic bottle used for collection of water and/or wastewater samples for chemistry analysis

C 250 mL sterile plastic bottle used for collection of wastewater samples for analysis for Faecal coliform bacteria. The tape on the cap of this bottle indicates that this bottle has been sterilized.

D 1000 mL plastic bottle used for collection of wastewater samples for analysis for $cBOD_5$, BOD_5 and TSS **Note: one 1000mL bottle provides sufficient sample for analysis for $cBOD_5$, and TSS.**

NOTE: ALL SAMPLE BOTTLES ARE AVAILABLE AT THE PEI ANALYTICAL LABORATORIES, 5TH FLOOR SULLIVAN BLDG., 16 FITZROY ST., CHARLOTTETOWN

Definitions

"Carbonaceous Biochemical Oxygen Demand" ($cBOD_5$) refers to the amount of oxygen required by aerobic microorganisms to decompose the organic matter in a sample of water, such as that polluted by sewage. Results of the $cBOD_5$ test are used to describe the potential of domestic and industry wastewaters to pollute surface waters. The range of possible readings can vary considerably: water from an exceptionally clear stream might show a $cBOD_5$ of less than 2 mg/L of water. Raw sewage may give readings in the hundreds and food processing wastes may be in the thousands.

"Detailed Chemistry" means a detailed chemical analysis of a drinking water quality sample for the chemicals listed in section 2 of Schedule C of the *Environmental Protection Act* Drinking Water and Wastewater Facility Operating Regulations.

"Effluent" refers to the wastewater (treated or untreated) that flows out of a facility.

"Escherichia coli (E. coli)" refers to one of the species of bacteria in the faecal coliform group. It is found in large numbers in the gastrointestinal tract and feces of humans and warm-blooded animals. Its presence is considered indicative of fresh faecal contamination, and it is used as an indicator organism for the presence of less easily detected pathogenic bacteria *(similar to faecal coliform - typically used in assessment of drinking water*).

"Faecal coliform" are bacteria found in the bodily waste of all warm blooded humans and animals. Most species are not capable of survival outside the body for a long period of time. Their presence in water indicates contamination by human sewage or animal droppings (*similar to E.coli - typically used in assessment of wastewater*).

"General Chemistry" means a general chemical analysis of a drinking water quality sample for the chemicals listed in section 1 of Schedule C of the *Environmental Protection Act* Drinking Water and Wastewater Facility Operating Regulations.

"Influent"refers to the wastewater received at a wastewater treatment facility and includes waste from homes, businesses and industry; a mixture of water and dissolved and suspended solids.

"Total Coliform" are a group of bacteria found in soil, on vegetation and in large numbers in the intestine of warm-blooded animals, including humans. Water is not a natural medium for coliform organisms and their presence in water is indicative of some type of contamination. Most coliform bacteria are not disease-causing organisms, but they serve as an indicator of the sanitary conditions of the water supply.

"Total Suspended Solids (TSS)" are solids in water that can be trapped by a filter. TSS can include a wide variety of material, such as silt, decaying plant and animal matter, industrial wastes, and sewage. High concentrations of suspended solids can cause many problems for stream health and aquatic life.

"Wastewater Chemistry" refers to wastewater treatment plant effluent analysis for ammonia, total phosphorous and total nitrogen.

Request Forms for Water and/or Wastewater Sample Analysis

The requirements for completion of requisition forms for water and wastewater sample analysis are as follows:

I. **Print neatly.**

II. Sample date and time **must** be entered.

III. Sampler's **full name** and contact phone number **must** be entered.

IV. Use full names (versus initials) for sample identification. Ensure proper name and correct spelling is used.

V. Sample location should include the **specific location** where the sample was collected (Example: Well #3, Brackley). Further information to identify the sample location should be entered in the field notes section.

VI. The **"Client Information"** section of the form **must** be completed.

VII. The "Notes" section of the form should be used for specific information relative to the sample that the sampler feels is important to the analysis and should appear on the printed report (i.e. reason for sampling, etc.).

VIII. Complete form(s) as indicated on attached **"SAMPLE FORMS"** - Page 8 and Page 10.

IX. If a water sample is from a source that **is not** in service, ensure that the check box on the form is marked correctly.

Further Recommendations for Drinking Water Sampling

A. Sample early in the week (i.e. don't sample on Friday unless in the case of an emergency).

B. **Do not** sample from a single site (recommend a minimum of two samples).

C. If you collect a sample from the **well(s)** be sure to collect a sample from **at least two location on the system (home, business, etc)**.

D. For chlorinated systems, **confirm** the free chlorine residual at the **time** and **location** of sample collection and record the residual level on the requisition form.

Prince Edward Island
CANADA

Environment, Energy and Forestry
PEI Analytical Laboratories

Request for Drinking Water Analysis
Drinking Water Supply Utility
(Systems supporting five or more locations)

Sections A, B and C MUST be completed in full. Please print.

A) Analysis Requested	**Laboratory Use Only**	
X Bacteria O Chemical	**LIMS #:**	
Other (please specify):	**Date Rec.:**	**Time Rec.:**
Sample Date: 15 / 3 / 11 (dd/mm/yy)	**Lab Tech:**	**S or NS:**
Sample Time: 9:30 (hour) X a.m. O p.m.		
Is this a tourist establishment? O Yes X No		
Sampler's Name: Mike Hammer	Sampler's Telephone: 393-1234	

B) Sample Information

Name of Utility: Possum Lake Water & Sewer Utility	
Name of Facility: Possum Lake Water System	
Sample location (civic address): 22 Green Street	Sample Point: Kitchen tap
Community: Possum Lake	Cl Residual 0.2 mg/L
Is this line X in service or ☐ out of service? **Check one.**	

C) Client Information (results to be sent to)

Name: Possum Lake Water & Sewer Utility	Attention (if required): Red Green
Mailing Address: 15 Trout Lane	
	Community: Possum Lake
Postal Code: C1C 2V3	Telephone: 393-1246

Notes (specific sample point, other applicable information)

Routine monitoring sample

Samples must be delivered to an Access PEI Centre by 3:30 p.m. (12 noon on Fridays) on the same day you take the sample.
Check the reverse side for a drop-off site near you.

Laboratory Use

Type	Total Coliform	*E.coli*	B. G.	Ps. Aeruginosa	Faecal Coliforms	HPC	Other
Result							
Technician							

Total Coliform, *E.coli*, B.G. Ps. Aeruginosa, Staphylococcus spp, - CFU/100 mL; HPC – CFU/1 mL

Personal information on this form is collected under section 31 (c) of the *Freedom of Information and Protection of Privacy Act* R.S.P.E.I. 1988, c. F-15.01 as it relates directly to and is necessary for a request for water analysis and will be used for the purpose of contacting the client and maintaining departmental records. If you have any questions about this collection of personal information, you may contact the Director of Water Management Division, 11 Kent Street, Jones Building, Charlottetown, PE C1A 7N8 (902) 368-5044.

Form # A04 (Jan 2011) 11EN15-30007

White - Office Copy Yellow - Micro Lab Copy Pink - Chem Lab Copy Gold - Client Copy

Water Sample Collection Procedure

There are two analysis bottles available:

- Bacteria Analysis – The bottle for bacteria analysis is a sterile clear plastic bottle with a tamper-evident cap. This bottle contains sodium thiosulfate which is a white powder that neutralizes any chlorine which may be present in a sample.
- Chemistry Analysis – The bottle for chemistry analysis is a white plastic 250 ml bottle with a white cap.

Please use the appropriate bottle(s) for the type of analysis which is being requested. The PEI Analytical Laboratories staff reserves the right to refuse samples collected in bottles not supplied by the lab, samples with an odour of chlorine, or samples containing foreign material.

For both types of analysis, use the following guidelines for sample collection:

1. Select an indoor faucet, if possible, to take the sample.
2. Remove the strainer from the tap, if present, and let the cold water run at full flow for five minutes; then back off the flow to a steady slow stream.
3. Remove the cover and fill the bottle to the neck or the fill line, being careful not to touch it to the faucet. Also, please ensure that you do not touch the inside of the cap as this will contaminate the sample. Once the sample is collected from the tap, **it must be kept below 10°C during storage and transport.**
4. Complete the Request Form for Drinking Water Analysis for Drinking Water Supply Utility on the reverse of this instruction sheet. **Deliver the sample to the Microbiology Laboratory or an Access PEI Centre by 3:30 p.m. (12 noon on Fridays)** on the same day you take the sample. Check the schedule below to see what days samples are picked up at your local Access PEI site.

Depending on the type of analysis being requested, notification time for the results will vary. Bacteria sample results are typically available within a few days. A printed report will be mailed out.

There will be a charge for the Drinking Water Analysis according to the following schedule:

Bacteria **$27.50 + GST ($1.38) = $28.88**
Includes: Total coliform and E. coli

Chemistry **$55 + GST ($2.75) = $57.75**
Includes: Barium, Cadmium, Calcium, Chloride, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Nitrate, pH, Phosphorous, Potassium, Sodium, Sulphate, Zinc, Alkalinity

Periodic sampling of your water, especially for bacteria, can help detect potential problems with your well. If, however, you suspect your well has become contaminated, it is recommended that you boil your water or use an alternate source of water until sample results indicate that it is safe.

If you have any questions, please call 368-5044 or toll-free **1-866-368-5044.**

Drinking Water Sample Drop-off Sites

Access PEI Site	Monday	Tuesday	Wednesday	Thursday	Friday
O'Leary	●	●	●	●	●
Tignish		●			
Alberton		●			
Wellington		●			
Summerside	●	●	●	●	●
Charlottetown *(Riverside Drive)*	●	●	●	●	●
Souris		●	●	●	
Montague	●		●		●
Microbiology Laboratory (16 Fitzroy Street, Charlottetown)	●	●	●	●	●
Cavendish VIC (seasonal – May to September)	●	●	●	●	●

Prince Edward Island CANADA

Environment, Energy and Forestry

PEI Analytical Laboratories

Request for Wastewater, Surface Water or Recreational Water

LIMS # _____

Please complete sections A, B, C and D. Please print.

A) Sample Type *(Check one only)*	B) Analysis Requested *(Check all that apply)*
Wastewater	☐ COD ☒ cBOD ☒ TSS
☐ WWTP ☒ Lagoon	☒ Faecal Coliform ☐ BOD
☐ Influent ☒ Effluent	☐ Chlorophyll ☐ Bacteria
☐ Mixed liquor	☒ Wastewater chemistry *
Recreational Water	☐ General chemistry *
☐ Fresh ☐ Salt ☐ Pool	☐ Nitrate ☐ Ammonia
Surface Water	☐ TN ☐ TP
☐ Fresh ☐ Salt	☐ Other _____
☐ Other _____	* Parameter list is on reverse.

Laboratory Use Only	
Lab Tech:	
Date Received:	
Time Received:	☐ S or ☐ NS
Ref to:	
Project/Watershed:	
Station ID:	

C) Client Information

Name: **Possum Lake Water & Sewer Utility**	Tel: **394-1256**
Mailing Address: **15 Trout Lane**	
Community: **Possum Lake**	Postal Code: **C1C 2V3**

D) Sample Information

Sampler: **Red Green**	Sample Date: **March 15, 2011**	Sample Time: 9 : 30 (a.m) p.m.	
Sample Point – ***be as specific as possible*** **Lagoon outfall**			Cl Residual _____mg/L
Community: **Possum Lake**		Lat./Easting:	Long./Northing:

E) Notes (specific sample point, other applicable information)

Routine monitoring sample after UV lights

Deliver to PEI Analytical Laboratories (5th floor Sullivan, 16 Fitzroy Street, Charlottetown) by 3 p.m., Monday to Friday. Please contact the laboratory prior to collecting a BOD/cBOD sample as these are analysed on specific days only. Check reverse for sample handling/holding instructions.

Laboratory Use Only												
Type	**TC**	**EC**	**HPC**	**P. aeru**	**Ent.**	**FC**	**BOD**	**cBOD**	**COD**	**TSS**	**Chl a**	**Other**
Result												
Tech.												

TC, EC, P. aeru, Ent and FC – CFU/100 mL BOD, cBOD, COD and TSS – mg/L Chl a – ug/L HPC - CFU/1ml

(Jan 2011)

11EN15-29985

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General Sampling Requirements

- Use sample bottles provided by the PEI Analytical Laboratories [5th floor, Sullivan Building, 16 Fitzroy Street, Charlottetown or by calling (902) 368-5700]. The PEI Analytical Laboratories staff reserves the right to refuse samples collected in bottles not supplied by the lab, samples with an odour of chlorine, or samples containing foreign material.
- Sample bottles are to be filled allowing a small headspace of about 1", unless otherwise advised.
- Sample should be refrigerated or placed on ice (in a cooler) immediately following collection and until delivery to the laboratory.
- The Handling/Sampling Instructions given below do not apply if samples are to be used for legal purposes. For advice on handling legal samples, please contact the PEI Analytical Laboratories.
- Wastewater samplers should refer to the ***Water and Wastewater Sample Collection and Analysis*** manual prepared by the Water Management Division of the PEI Department of Environment, Energy and Forestry, tel: (902) 368-5000.
- Metal analysis requires field filtering.

Handling/Sampling Instructions (holding times are the maximum recommended)

Analysis Requested	Water Type	Parameters Included	Bottle	Maximum Holding Time
TSS, BOD, cBOD or COD	All		1,000 ml polypropylene	TSS – 7 days BOD – 48 hours COD – 24 hours
Chlorophyll a	Surface Water (Fresh or Salt)		500 ml polypropylene (brown)	2 days (protect from light)
Bacteria	Pools	total coliform, E. coli, Ps. aeroginosa	200 ml sterile container (treated with sodium thiosulfate if chlorine residual)	24 hours. (6 hours preferred)
	Salt Water Beaches	enterococci	200 ml sterile polypropylene	24 hours (6 hours preferrred)
	Freshwater Beaches or Fresh Surface Water	faecal coliform	250 ml sterile polypropylene	24 hours (6 hours preferred)
	Wastewater	faecal coliform	250 ml sterile polypropylene	24 hours (6 hours preferred)
Wastewater Chemistry	Wastewater	ammonia, total nitrogen, total phosphorus	250 ml disposable polypropylene	24 hours
General Chemistry	Surface Water (Fresh or Salt)	alk, pH, nitrate, Cl, Cr, Ba, Ca, Cd, Cu, Fe, K, Mn, Mg, Na, Ni, P, Pb, sulfate, Zn	250 ml disposable polypropylene	24 hours
Total Nitrogen, Total Phosphorus, Ammonia, Nitrate	Surface Water (Fresh or Salt)		250 ml disposable polypropylene	24 hours

IMPORTANT

Transportation of samples to the lab is the responsibility of the sampler. Samples must be properly packaged and labeled to ensure proper preservation and safe delivery.

Note: **Hold samples at 0 - 10°C during transport.**
Maximum holding times for each type of analysis are stated, but the fresher the sample, the more accurate the results.

Drinking water samples and wastewater samples can not be transported to the lab in the same cooler.

It is not necessary to call for results.

If there is a problem, you will be contacted.

The lab has a limited capacity to analyze wastewater samples for $cBOD_5$.

Therefore, to ensure that your sample can be analyzed as requested, it is essential that you call the lab directly at **894-0272** to arrange the date and time before you collect a wastewater sample

PEI ANALYTICAL LABORATORIES
5TH FLOOR, SULLIVAN BLDG.
16 FITZROY ST.
CHARLOTTETOWN PE