The Effluencer

VOL. 5

Wastewater Sampling Guide

Checklists for Wastewater Sampling

Before Sampling

- ☐ At least one month before you plan to take the sample, request a sampling kit from the lab.
- ☐ It is good practice to order at least three sample kits to have onsite as back up and for future sampling.
- ☐ Schedule the courier to come pick up samples the same day as sampling. Avoid shipping samples on a Friday or during the weekend if possible.

During Sampling

- ☐ Wear all the required PPE (disposable gloves, protective glasses, long sleeves, etc.) and follow safety protocols.
- ☐ On each sampling bottle or pail, write on the label the sample name, your name, the date and time you take samples, the sample type and required analysis.
  - E.g. Lagoon Effluent, John Doe, August 20, 2024, 10:30am, WW (wastewater), CBOD
- ☐ Sample at the final discharge point (FDP) of the wastewater system (the final sampling point location after the treatment process). If you have more than one FDP, sample at each point. If you have a lagoon, you can sample at a location other than the FDP if:
  - A representative sample of effluent can be collected as if it had been collected at the FDP, and
  - A licensed professional determines the location and procedure.
- ☐ If a container is being used to collect and pour the effluent sample into sampling bottles, use a clean container that has been triple rinsed with sample to be collected. Ensure the effluent is well mixed before pouring into the sampling bottles.
- ☐ If sampling from a valve, purge the line free of debris before sampling.
- ☐ Fill bottles to the recommended line identified on the bottle. If no line is identified, fill to the neck of the bottle.
- ☐ If collecting a sample for acute lethality testing:
  - Containers for storage and transportation of samples must be made of nontoxic material (e.g., polyethylene or polypropylene carboys or pails).
  - The containers must be new or thoroughly cleaned and dried, then triple rinsed with the sample to be collected.
  - Line the pail with a plastic bag, if possible. Fill as full as possible, remove the air from the plastic bag, tie it off, then seal (e.g., using a snap-on lid if the sample container is a pail).

- ☐ It is recommended to take a picture of the samples to have visual proof in the event there is an issue when the sample is analyzed.
- ☐ It is recommended to take notes and/or photos and make observations about the weather and the sampling conditions such as strong winds, heavy rain or snow, equipment deficiencies, algal blooms, etc.

After Sampling

- ☐ Put sample bottles in the fridge as soon as possible, ideally immediately after sample collection, and keep refrigerated until they are shipped. Samples must not be frozen.
- ☐ Fill out the Chain of Custody form sent from the lab (there is an example of a completed form to refer to in this package). Put the Chain of Custody form in a zip-loc bag and seal it.
- ☐ Pack the sample bottles and Chain of Custody form in the cooler with ice or freezer packs, make sure they are secure for transport, and send to the lab via courier.
- ☐ If shipping a container for acute lethality testing, during transport, samples should be kept in the dark and cold, at a temperature of 1 to 8° C, if more than two days are spent in transit.
- ☐ If being sent by airplane, notify the lab to pick up the samples at the airport.

Supply Checklist

- ☐ Sample bottles and containers/pail
- ☐ Ice or freezer packs
- ☐ Cooler
- ☐ Chain of Custody (COC) form
- ☐ Gloves
- ☐ Protective glasses
- ☐ Pen (for writing on COC)
- ☐ Clipboard
- ☐ Zip-loc bag
- ☐ Permanent marker (for labelling bottles)
- ☐ Packing tape
- ☐ Plastic materials to wrap bottles (i.e. bags or bubble wrap)
- ☐ Sampling tool to collect effluent sample (optional)

In Your Sample Kit

The Bottles and Their Purpose

***Important Notes**

- Samples should be shipped the same day they are taken or as soon as possible after, and kept cold between 1 to 8°C.
- Effluent limits outlined below are representative of the standards set by the *Wastewater Systems Effluent Regulations* (Regulations).
- Appearance and size of bottles may vary between labs.

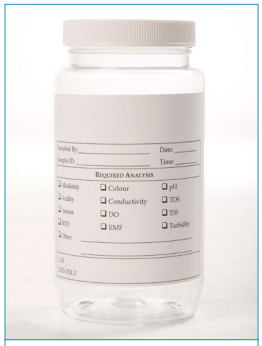
500 ml sample bottle

Carbonaceous Biochemical Oxygen Demand (CBOD)

CBOD is a laboratory test that measures the dissolved oxygen concentration consumed by microorganisms to break down organic matter. The CBOD test is one way to assess how much treated effluent impacts a waterbody. Effluent that is high in organic matter reduces the amount of available oxygen for fish and other aquatic life.

When sampling for CBOD, fill bottles to the recommended line identified on the bottle. If no line is identified, fill to the neck of the bottle.

Under the Regulations, the effluent should not exceed a concentration of 25 mg/L when averaged over a month, a quarter or a year, depending on the size and type of system.



500 ml sample bottle

Suspended Solids

Suspended solids are defined in the Regulations as any solid matter contained in effluent that is retained on a filter of 2.0 micrometre (µm) or smaller pore size. High amounts of suspended solids reduce the amount of available light in water that is needed for fish and other aquatic life. Suspended solids can also clog up spawning areas for fish and suffocate the eggs before they can hatch.

When sampling for suspended solids, fill bottle to the recommended line identified on the bottle. If no line is identified, fill to the neck of the bottle.

Under the Regulations, the effluent should not exceed a concentration of 25 mg/L when averaged over a month, a quarter or a year, depending on the size and type of system.

250 ml sample bottle

Un-ionized Ammonia (NH_3) (Optional)

Note: *Owners or operators of wastewater systems are not required to report results for un-ionized ammonia, however it is recommended to test for this occasionally to be sure the system's effluent is within the required limits.*

Un-ionized ammonia is considered deleterious to fish. As pH and temperature increase, the amount of un-ionized ammonia in the effluent also increases. Un-ionized ammonia is also dangerous to freshwater organisms and can harm aquatic life.

There will likely be a small amount of sulfuric acid in the bottle; be sure to fill the bottle to the recommended line identified on the bottle. Do not overflow the bottle. If the acid comes in a separate vial, make sure to leave enough space in the bottle to add the acid to your sample and gently shake the bottle once the bottle cap is secured to mix the sample. Follow safety precautions when handling (i.e. gloves and goggles). **Indicate to the lab** that the sample must be tested using the pH of the effluent adjusted to 15 °C ±1 °C.

Under the Regulations, the un-ionized ammonia concentration in the effluent should not exceed a maximum concentration of 1.25 mg/L, expressed as nitrogen (N), at 15°C ± 1°C.

20 L plastic bucket

Acute Lethality Testing (Optional if Your System Deposits Less Than or Equal to 2,500 m^3/day)

Note *that while effluent deposited cannot be acutely lethal, small systems ≤2500m^3/day are not required to do acute lethality testing. For more information on acute lethality testing under the Regulations, review this Acute Lethality factsheet*[1].

To determine whether effluent is acutely lethal to fish, request that the lab perform a **Single or Multi Concentration Rainbow Trout Test**, **with or without pH stabilization**. This test exposes juvenile rainbow trout to effluent in temperature-controlled and aerated plastic tanks to assess whether the effluent is acutely lethal to fish.

For single-concentration tests, sample volumes of 20 to 40 L or more are normally required. For multi-concentration tests, sample volumes of 60 to 100 L or more are normally required.

Line the 20L bucket(s) with the plastic bag provided. Fill as full as possible, remove the air from the plastic bag, tie it off, place the bucket lid back on and seal.

Under the Regulations, effluent cannot be acutely lethal to fish. Effluent is considered acutely lethal when at 100% concentration (undiluted) it kills more than 50% of the rainbow trout subjected to it during a 96-hour period.

[1] https://www.canada.ca/en/environment-climate-change/services/wastewater/system-effluent-regulations-reporting/overview/acute-lethality.html

For Additional Information

Visit the Wastewater website at Canada.ca/wastewater

If the information you need is unavailable on our website, please contact Environment and Climate Change Canada at eu-ww@ec.gc.ca.

Disclaimer

This information does not in any way supersede or modify the *Wastewater Systems Effluent Regulations* or the *Fisheries Act*, or offer any legal interpretation of those Regulations or Act. Where there are any inconsistencies between this information and the Regulations or Act, the Regulations or Act take precedence, respectively. A copy of the Regulations is available at the following website: https://laws-lois.justice.gc.ca/eng/Regulations/SOR-2012-139/FullText.html

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Chain of Custody (COC) / Analytical Request Form

Report To	Contact and company name below will appear on the final report
Company:	Green Bay
Contact:	John Doe
Phone:	555-666-7777
	Company address below will appear on the final report
Street:	20 Green Bay Lane
City/Province:	Green Bay, Ontario
Postal Code:	

Invoice To		
	Same as Report To	☑ YES ☐ NO
	Copy of Invoice with Report	☑ YES ☐ NO
Company:		
Contact:		

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)

Quality Control (QC) Report with Report: ☐ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax:

Email 3:

Note here if you would prefer to be sent the results by fax, mail or email

Invoice Distribution

Select Invoice Distribution: ☐ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax:

Email 2:

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business days)

- 4 day [P4-20%] ☐
- 3 day [P3-25%] ☐
- 2 day [P2-50%] ☐

EMERGENCY

- 1 Business day [E - 100%] ☐
- Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information		Oil and Gas Required Fields (client use)	
Account # / Quote #:		AFE/Cost Center:	PO#
Job #:	WSER	Major/Minor Cod	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	

Lab Work Order # (lab use only):	Lab Contact:	Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	CBOD	TSS	WSER Unionized Ammonia	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
	Lagoon Effluent	2-Aug-24	10:30am	WW	3					

For type of service request, put R for Regular

This should be the same name that appears on the sample bottles

WW stands for Wastewater

The number of containers you are sending back

Example

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Please use pH of the effluent adjusted to 15°C ± 1°C to calculate un-ionized ammonia.

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen	o		SIF Observations	Yes	o	No	o
Ice Packs	o	Ice Cubes o	Custody seal intact	Yes	o	No	o
Cooling Initiated		o					

INITIAL COOLER TEMPERATURES ºC				FINAL COOLER TEMPERATURES ºC			

SHIPMENT RELEASE (client use)			AL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
John Doe	August 2, 2024	2:30pm						

The time the samples leave your possesion to be shipped.