The Effluencer

VOL. 6

Determining Average Daily Effluent Volume

The *Wastewater System Effluent Regulations* (Regulations) require the determination of the total daily volume of effluent deposited via all the final discharge points of the wastewater system (Section 7). Volumetric data is used to calculate the overall average daily effluent volume which determines monitoring and reporting requirements for each system.

Note that the volumes measured at the influent can be used for the average daily effluent volume. The Regulations allow for this as some systems have a flowmeter installed at the front end of their treatment facilities.

The methods allowed to determine the daily volume depend on the type and size of wastewater system.

Continuous Wastewater Systems

Owners or operators of wastewater systems discharging continuously must determine, for each final discharge point, the volume of effluent for each day effluent is deposited:

- for small systems depositing less than or equal to 2,500 cubic meters (m^3) per day by either:
  - using monitoring equipment that provides:
    - a continuous measure of the volume of influent or effluent deposited at the final discharge point, or
    - a measure of the rate of flow of influent or effluent deposited at the final discharge point upon which the daily volume can be estimated;
    - the rate of flow has to be measured every day;
  - using a method of estimation, if the system was issued a transitional authorization;
    - must be based on generally accepted engineering practices with a margin of error of ±15%.

Note: The continuous measure of the volume of effluent is the preferred method.

- For systems depositing more than 2,500 cubic meters (m^3) per day:
  - by using monitoring equipment that provides a continuous measure of the volume of influent or effluent deposited at the final discharge point.

How to Estimate the Daily Volume Based on Flow Rate

1. For each day, measure the rate of flow of influent or effluent and the duration of deposit in any chosen unit of measure.
2. Calculate the volume by multiplying the measured rate of flow (from step 1) by the duration of the deposit on that day.
3. Convert the units to cubic meters (m^3), if applicable.

Example:

1. Influent flow rate: 1,100 L/min & duration of deposit: 18.5 hours;
2. Calculate volume: Volume = 1,100 L/min x 18.5 h x 60 min/h = 1,221,000 L;
3. Convert to cubic meters (m^3): 1,221,000 L x 1 m^3/1,000 L = 1,221 m^3.

Examples of equipment needed for each type of measure:

- To measure continuous volume: flowmeter device (example: ultrasonic flowmeter totalizer);
- To measure the rate of flow: an open channel (example: Parshall flume);
  - The rate of flow could also be measured by using a bucket and stopwatch method using calibrated instruments.

Equipment Calibration

Monitoring equipment must be properly maintained and calibrated in accordance with the recommendations of the manufacturer or licensed professional (section 9). If this is not possible, the equipment must be calibrated at least once in every calendar year, but at least five months apart.

- If a licensed professional prepared a calibration procedure, it must be documented and available onsite.

Intermittent Wastewater Systems

Owners or operators of intermittent wastewater systems must determine, for each final discharge point, the volume of effluent for each day effluent is deposited by either:

- using monitoring equipment that provides either:
  - a continuous measure of the volume of influent or effluent deposited at the final discharge point;
  - a measure of the rate of flow of influent or effluent deposited at the final discharge point upon which the daily volume can be estimated;
    - the rate of flow has to be measured every day;
    - see above an example of daily volume calculation based on flow rate.
- using a method of estimation;
  - must be based on generally accepted engineering practices with a margin of error of ±15%.

Example of an Accepted Method for Estimating Volume of Effluent Deposited (for Intermittent Systems)

The owner or operator of a lagoon takes the following steps each time there is a discharge event.

1. Take the following measurements (in metres): the length and width dimensions of the lagoon cell as well as the water levels before and after discharge.
2. Calculate the difference in water levels before and after discharge.
3. Multiply the length by the width by the difference in water levels to estimate of the volume of effluent deposited, in cubic metres (m^3).

Measurements for length and width can be obtained by using a digital mapping tool or taking ground measurements.

There are resources that can help calculate the volume estimate:

- Agriculture and Forestry : Applications & Tools-Gov AB

The following resources provide information on flow measurement:

- US EPA Wastewater Flow Measurement
- Sampling Guide for Environmental Analysis, Book 7-Quebec

How to Calculate the Average Daily Effluent Volume

1. Determine the volume of effluent deposited via each of the final discharge points, for each day during the calendar year when effluent was deposited.
2. Calculate the sum of all the daily volumes of effluent determined above.
3. Divide the total by the number of days in the calendar year (365, except for leap years).

Example (for intermittent systems):

1. Determine the volume of effluent deposited via the final discharge point during the two discharge events held during the calendar year (Event 1: 40,000 m^3, Event 2: 33,000 m^3).
2. Do the sum of the effluent volumes discharged from the lagoon = 73,000 m^3.
3. Calculate the annual average daily volume of effluent = 73,000 m^3 ÷ 365 days = 200 m^3.

Note: The average daily volume only needs to be calculated once for the identification report. In subsequent monitoring reports, the online reporting Effluent Regulatory Reporting Information System (ERRIS) will automatically calculate the average daily effluent volume based on the total volume reported from the previous year.

One-time Default Measurement

If the average daily volume of effluent deposited via the final discharge points of a wastewater system cannot be determined for a previous calendar year, the system's average design rate of flow of influent can be used to estimate it (section 8). This situation may arise, for example, if a new wastewater system comes into operation and no previous monitoring data is available. The default measurement can also be used if the flowmeter breaks down and volume measurements are not recorded while it is being repaired.

Default measurement can only be used once. You must determine the average daily volume of effluent using the methods indicated above for all subsequent years.

Record Keeping

Records must be made without delay and kept on site. Records must be kept for at least five years (sections 21 and 22).

Records must be kept at least five years after the wastewater system is decommissioned or the monitoring equipment ceased to be used.

Monitoring Equipment

You must record the following information on the monitoring equipment (section 17):

- a description of the equipment, including its type, for example: open channel equipped with a portable flow monitoring device that measures the height of the effluent as it passes over the weir;

- manufacturer's specifications, year of manufacture and model number;
- each date of calibration and its degree of accuracy;
- the date on which the equipment was installed and, if applicable, the date on which it ceased to be used for monitoring and was replaced;
- the manufacturer's recommendations for its operation, maintenance and calibration, with supporting documents if available;
- if the monitoring equipment is calibrated in accordance with the recommendations of a licensed professional, the calibration procedure that is prepared, signed and certified by the licensed professional.

Volume of Effluent

You must record the following information related to the volume of effluent deposited from each of the final discharge points of a wastewater system:

- date of each day that effluent was deposited.
- daily volume (m^3) of effluent for each day that effluent was deposited, if that volume is determined by a continuous measurement.
- estimated daily volume (m^3) based on the measured rate of flow and the calculations used to estimate the volume.
- estimated daily volume (m^3) for a wastewater system that based the volume of effluent on generally accepted engineering practices.

Reporting

You must include the average daily effluent volume in the Identification Report in the Effluent Regulatory Reporting Information System (ERRIS). In your annual or quarterly monitoring reports, you must report the total amount of effluent deposited during the reporting period. ERRIS will automatically calculate the average daily effluent volume for each reporting year based on the volumes submitted in the previous calendar year.

Systems that do not deposit in a given year are not required to measure and report volumes for that year. They are still required to submit monitoring reports stating they did not discharge during the reporting period.

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

EC24117
Cat. No.: En14-495/6-2024E-PDF
ISBN: 978-0-660-72848-3

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