

Ministry of the Environment

Safe Drinking Water Branch

Laboratory Licensing and
Compliance Program

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Ministère de l'Environnement

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July 13, 2010

MEMORANDUM

TO: Drinking Water Licensed Laboratories

FROM : Jennifer Koene
Laboratory Licensing and Compliance Program Supervisor, (SDWB)
Dan Toner
Assistant Director, (LaSB)

RE: Microcystin Reporting Guidance for Licensed Laboratories

This memorandum serves as an update to the memorandum issued on April 23, 2010.
Ensure the changes have been made in all documentation.

Cyanobacteria, commonly known as "blue-green algae", are not true algae but are a type of photosynthetic bacteria commonly found in fresh water bodies throughout the world. When conditions are favourable, growth accelerates and cyanobacteria accumulate within the surface water body as a "bloom" or as a blue-green "scum" on the water's surface. The "blooms" are a seasonal phenomenon, usually occurring in the late summer and early fall.

Several species of cyanobacteria have the ability to create toxins. These include microcystin-LR, a very potent hepatotoxin which may cause damage to the liver. Toxins are contained within the cell and are released to the water when the cell wall is broken either due to death and decomposition of the cell or from chemical dissolution or mechanical abrasion.

The Ministry of the Environment has received several drinking water licence applications for approval to employ the ELISA (Enzyme Linked Immunosorbent Assay) method for the analysis of microcystins in treated drinking water. Although the methodology can detect microcystins at low concentrations, it cannot identify individual microcystins (i.e. microcystin-LR) and due to additional compounds or metabolites in the sample, microcystin results may be "masked". The ELISA methodology may be used as a screening technique (for treated water) but only if carried out in a laboratory under controlled conditions.

The Ministry's Laboratory Services Branch is currently the only laboratory licensed to perform the analysis of microcystin-LR by Liquid Chromatography – (Electrospray Ionization) Tandem Mass Spectrometry [LC-(ESI) MS/MS].

The maximum acceptable concentration for microcystin-LR under the Ontario Drinking Water Quality Standard is 1.5 µg/L (O. Reg. 169/03, Schedule 2).

Henceforth, drinking water testing laboratories that receive Ministry licensure to employ the ELISA methodology must adhere to, adopt and document the following requirements as appropriate.

A. Private Drinking Water Samples Collected Under the SDWA

- Where a licensed laboratory analyzes a drinking water (DW) sample from an unregulated drinking water system (DWS) for microcystin using ELISA, the laboratory shall:
 - a. Report the results of the analysis to the client, **and**
 - b. Report the results of the analysis which are greater than or equal to (\geq) **1.5 µg/L** to the Local Medical Officer of Health (LMOH).

B. Samples Collected Under Ontario Regulation 170/03

- Where a licensed laboratory analyzes a raw DW sample from a regulated DWS for microcystin using ELISA the laboratory shall report the result to the DWS owner/operator or interested authority.
- Where a licensed laboratory analyzes a treated or distribution DW sample from a regulated drinking water system (DWS) for microcystin using ELISA, and the result is **less than (<) 1.5 µg/L**, the laboratory shall:
 - Report the result to the DWS owner/operator. In the case of a Designated Facility, the interested authority should be notified as well.
- Where a licensed laboratory analyzes a treated or distribution DW sample from a regulated DWS for microcystin using ELISA, and the result is **greater than or equal to (\geq) 1.5 µg/L**, the laboratory shall immediately:
 - a. Verbally report (and document) a provisional adverse result to the Ministry's Spills Action Centre (SAC) indicating that the result is **PROVISIONAL MICROCYSTIN-LR UNTIL FURTHER NOTICE**.
 - i Request that SAC note the result as "PROVISIONAL microcystin-LR" in the DWIS-AWQI comments field;
 - ii Provide SAC with all information pertaining to the sample, including DWS name and number, contact information, sample location, etc.
 - b. Verbally report (and document) a provisional microcystin-LR result to the LMOH indicating that the result is **PROVISIONAL MICROCYSTIN-LR UNTIL FURTHER NOTICE**.

- c. Verbally report (and document) a provisional microcystin-LR result to the DWS owner/operator indicating that the result is **PROVISIONAL MICROCYSTIN-LR UNTIL FURTHER NOTICE**.
- d. Within one business day contact one of the following Laboratory Services Branch (LaSB) staff below to make arrangements for the sample to be sent to LaSB for CONFIRMATION analysis of microcystin-LR. The samples must be accompanied by the LaSB "MOE * LIMS Drinking Water Sample Submission and Chain of Custody for Confirmation of a Screening Analysis" (Form# 2054) and a copy of the original chain of custody. The remainder of the **1 litre** sample must be received at LaSB **within 7 days of the sample date**.

Janet Mills (416-235-5831)

Dan Toner (416-235-6310)

- Once the Ministry's Laboratory Services Branch (LaSB) receives a regulated DW sample from a licensed laboratory and has obtained a result for microcystin-LR, the LaSB shall immediately:
 - a. Follow up the provisional microcystin-LR results (with the original AWQI #) to the licensed laboratory, SAC, LMOH, and DWS owner/operator.
 - b. Report the exceedance (as per the legislation) if the sample result(s) exceed the maximum acceptable concentration of **1.5 µg/L** for microcystin-LR as per O. Reg. 169/03, Schedule 2.

C. Samples Collected Under Ontario Regulations 318/08 and 319/08

- Where a licensed laboratory analyzes a raw DW sample from a regulated small drinking water system (SDWS) for microcystin using ELISA the laboratory shall report the result to the SDWS owner/operator.
- Where a licensed laboratory analyzes a treated or distribution DW sample from a small drinking water system (SDWS) for microcystin using ELISA, and the result is **less than (<) 1.5 µg/L**, the laboratory shall:
 - a. Report the result to the SDWS owner/operator.
- Where a licensed laboratory analyzes a treated or distribution DW sample from a SDWS for microcystin using ELISA, and the result is **greater than or equal to (≥) 1.5 µg/L**, the laboratory shall immediately:
 - a. Verbally report (and document) a provisional microcystin-LR result to the LMOH indicating that the result is **PROVISIONAL MICROCYSTIN-LR UNTIL FURTHER NOTICE**. Provide the LMOH with all information pertaining to the sample, including SDWS name and number, contact information, sample location, etc.
 - b. Verbally report (and document) a provisional microcystin-LR result to the SDWS owner/operator, indicating that the result is **PROVISIONAL MICROCYSTIN-LR UNTIL FURTHER NOTICE**.

- c. Within 1 business day, contact one of the following Laboratory Services Branch (LaSB) staff below to make arrangements for the sample to be sent to LaSB for CONFIRMATION analysis of microcystin-LR. The samples must be accompanied by the LaSB "*MOE * LIMS Drinking Water Sample Submission and Chain of Custody for Confirmation of a Screening Analysis*" (Form# 2054) and a copy of the original chain of custody. If the AWQI # is not available at the time of contact with LaSB, notify LaSB when the number is received. The remainder of the **1 litre** sample must be received at LaSB **within 7 days of the sample date**.

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- Once the Ministry's Laboratory Services Branch (LaSB) receives a regulated DW sample from a licensed laboratory and has obtained a result for microcystin-LR, the LaSB shall immediately:
 - a. Follow up the provisional microcystin-LR results (with original AWQI#) to the licensed laboratory, LMOH and SDWS owner/operator.
 - b. Report the exceedance (as per the legislation) if the sample result(s) exceed the maximum acceptable concentration of **1.5 µg/L** for microcystin-LR as per O. Reg. 169/03, Schedule 2.