Laboratory Update *Bulletin*

Ministry of the Environment

Safe Drinking Water Branch

A newsletter for Licensed Drinking Water Testing Laboratories

Issue # 2 – August 2010

Overgrown Bacteria

Although several different definitions of "overgrown bacteria" exist amongst environmental microbiological testing laboratories, the common definition cites "… *the crowding and/or confluent and/or non-identifiable microbial growth on a plate.*" Recently, the Ministry of the Environment expanded the list of qualifiers in eDWIS addressing **NDOG (NO DATA; OVERGROWN)**. The summary of new qualifiers is provided in Table 1.

Should a licensed laboratory perform total coliform background analyses, clearly identifies and detects >200 CFU/100mL TCB colonies on a microbial plate, there is **NO REQUIREMENT** to verbally or electronically report these results as "adverse" or "NDOGxx" to the appropriate authorities.

Where an observation of "over-crowding/confluent/non-identifiable microbial growth" is detected on a plate relating to analyses under the SDWA, licensed laboratories **ARE REQUIRED** to report the results to the appropriate parties specifically noting such observations for the determination of corrective actions by the authorities.

The purpose of this update is to provide clarification on how the ministry interprets certain sections of the Safe Drinking Water Act, 2002 (SDWA) and the Health Protection and Promotion Act and their regulations in order that all licensed laboratories have a common understanding of the requirements, that no laboratory is mistakenly deemed out of compliance, and to ensure safe drinking water in Ontario. The following technical clarifications have been approved by the Assistant Director, Safe Drinking Water Branch, Drinking Water Management Division, Ministry of the Environment and as such, by way of this bulletin, shall be considered for the purpose of assessing compliance until such time that this bulletin is amended or revoked. Laboratory Update Bulletin, Issue #1 - June 2004, is revoked.

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Table 1

QUALIFIER	QUALIFIER MEANING	OLD STATUS IN eDWIS	NEW STATUS IN eDWIS	AFFECTED PARAMETERS	MEDIA
NDOGN	NO DATA; TOTAL COLIFORM PLATE OVERGROWN W/NONTARGET	Exceedance flag only for TC	Exceedance flag for EC and TC; no data	EC and TC	DC
NDOGT	NO DATA; TOTAL COLIFORM PLATE OVERGROWN WITH TARGET	Exceedance flag only for TC	Exceedance flag for EC or TC; no data	EC or TC; the target may be different depending upon the agar used	DC
NDOGEC	NO DATA; E. COLI PLATE OVERGROWN	Not available	Exceedance for EC; no data	EC only	EC selective media only; EC MUG
NDOGTC	NO DATA; TOTAL COLIFORM PLATE OVERGROWN	Not available	Exceedance for TC; no data	TC only; TC selective media only	mEndo
NDOGHPC	NO DATA; HPC PLATE OVERGROWN WITH TARGET	Not available	No exceedance; no data	HPC	_

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Immediate Reporting of Adverse Test Results

In the Ministry's Laboratory Bulletin Issue #1 (June 2004), the term "**immediate**", with respect to adverse test results was interpreted as "for the purpose of reporting adverse drinking-water quality results means the process of reporting the adverse result is initiated when authorized for release, without delay from any another action and in accordance with an MOE approved procedure. The laboratory must have a written procedure for authorization of an adverse test result for release, which shall be inspected by MOE to ensure it is acceptable."

All licensed laboratories are required to document and incorporate the following polices:

- There must be no **undue delay** during the analytical processing of a drinking-water sample at a licensed laboratory (see Table 2 below).
- Once an adverse test result is accepted by qualified staff of a licensed laboratory, there must be **no undue delay by any other activity** in reporting the adverse test result to the Local Medical Officer of Health (LMOH) at the Public Health Unit, the Ministry of the Environment - Spills Action Centre (MOE-SAC), and the associated drinking-water system (DWS) owner/operator as appropriate.

Licensed laboratory staff analyzing drinking-water samples must:

- Adhere to documented training requirements and policies for determining/comparing test results against the Ontario Drinking Water-Quality Standards (O. Reg. 169/03) and/or limits specifically cited in Ministry drinking-water legislation.
- Develop, document, and adhere to, laboratory policies/ procedures relating to the business processes described in Stages i-ix in Table 2.
- Document and adhere to the same immediate adverse test result reporting time-frames for chemical testing as are in place for microbiological testing and specify in laboratory policies and procedures (i.e. there must be no **undue delay** in the reporting of **any** adverse test results to the appropriate authorities).

Table 2
Stages/ Decisions – Recognition and Reporting Adverse Test Results by a Licensed Laboratory

	Stage	Controlling Lab Activity	Time Allowance	Statute
i	Receive and identify sample as drinking water	Staff resources	Holding time clock starts at time of sampling noted on Chain of Custody/ Submission form	O. Reg 248/03 s. 10(1)
ii	Process sample for analysis	Staff resources/ process	Process-time that the analysis requires	
iii	Analyze sample, record signal from instrument	Analyst/ analytical method run-time	Run-time the instrumentation requires	
iv	Convert instrument signal to concentration or other calculation	Analyst	(1) time the software/hardware requires (2) analyst interpretation/ verification of raw data, if necessary (direct reading vs calculation against calibration) (3) calculation of aggregated results	
v	Check that quality control (QC) meets specifications	Analyst/IT process	No delay by any other activity Information technology (IT) not allowed to delay the process	
vi	Approve and compare result against standard to determine if test result is adverse	Analyst/ Supervisor/IT process	No delay by any other activity Information technology (IT) not allowed to delay the process	
vii	Adverse test result immediately approved for release by analyst/ reported to supervisor	Analyst/ Supervisor approval	No delay by any other activity	
viii	Verbal report of adverse test result to LMOH, MOE-SAC, DWS owner/ operator, PHU as applicable	Staff resources	No delay by any other activity	SDWA, c.32, s. 18 (1) and (4), 18.1 (1) and (3).
ix	Written report of adverse test to LMOH, MOE-SAC, DWS owner/ operator, PHU as applicable	Staff resources	No greater than 24 hours from verbal report (section viii) (where only verbal report is required)	O. Reg. 170/03 16-7, (2), O. Reg. 243/07 s.6 (1), O. Reg. 318/08 4-5 (1)

Duplicate Data

The following guidance is for licensed laboratories which analyze drinking water samples in duplicate:

- Ensure that all quality control (QC) criteria is appropriately documented and understood by analysts.
- Ensure that prescribed QC criteria are met when analyzing regulated drinking-water samples.
- Ensure that duplicate analyses are not averaged for the purpose of notification and reporting under the SDWA.
- Ensure that an Adverse Water Quality Incident (AWQI) is reported to the appropriate authorities if found in either the first or second aliquot of a duplicated drinking-water analysis (see Table 3).
- Laboratories shall not differentiate between a sample and the associated duplicate sample (second sample) with respect to notification and reporting of duplicate results for drinking water analyses.
- Where an AWQI is reported to MOE-SAC/LMOH/DWS owner/operator for one aliquot of a sample where 2 aliquots were tested by the microbiological Presence/ Absence (P/A) technique and a confirmed positive in the second aliquot is observed after the first aliquot has been reported, **DO NOT** report the second aliquot result to MOE-SAC/ LMOH/DWS owner/operator. The second aliquot result is **NOT** uploaded to the MOE eDWIS or MOHLTC LRMA.

Table 3

Duplicate Data Reporting Criteria	Laboratory Notification to Appropriate Parties	Uploading Duplicate Data to MOE eDWIS and MOHL-TC LRMA
Both Results are AWQI	• Inform MOE-SAC/ LMOH/ PHU/DWS owner/operator (as appropriate) that the sample was tested twice • Duplicate results are BOTH AWQI • Request that MOE-SAC/ PHU note in MOE eDWIS/ MOHL-TC LRMA that the samples were analyzed in duplicate and that the HIGHER result of two results be identified as the AWQI	Upload the HIGHER result in MOE eDWIS/MOHL-TC LRMA
ONE Result is AWQI and the other is non-AWQI	• Inform MOE-SAC/ LMOH/ PHU/ DWS client that the sample was tested twice and that one result is AWQI • Request that MOE-SAC/PHU note in MOE eDWIS/MOHL-TC LRMA that the sample was tested twice by the lab and one result was AWQI	Upload the AWQI result to MOE eDWIS/ MOHL-TC LRMA
BOTH Results are non-AWQI	No notification required	Upload a result in MOE eDWIS/ MOHL-TC LRMA

Data Reporting

The ministry requires that data reported to the laboratory's clients for samples analyzed under the SDWA meet the following requirements:

- be produced by appropriate licensed and accredited analytical methods;
- be numerically identical to any data reported to SAC/ LMOH/ DWS owner/operator and uploaded to DWIS/ LRMA;
- meet the MOE reporting detection limit (RDL) requirements where applicable;
- be expressed in appropriate and defensible significant figures; and,
- be expressed by two to three significant figures for the expression of chemical data.

The ministry expects that the process or system that reports data for the purpose of complying with the requirements of the SDWA be validated with respect to transmission error and content.

- analytical results provided for the purposes of the SDWA should be reported down to the licensed method's method detection limit (MDL) value but are not required to be;
- analytical results must be reported down to the MOE Reporting Detection Limit (RDL); and,
- analytical results provided to proficiency testing (PT) programs required for accreditation purposes or provided by the MOE **must** be reported down to the method's MDL value.

The ministry requires that laboratories have procedures in place to ensure that data transfer mechanisms and routines, both manual and electronic, are checked for errors.

Schedule 13-5 of O. Reg. 170/03 requires increased frequency of sampling if an analytical result obtained for any of the parameters listed in Schedules 23 or 24 exceeds one

half of the Maximum Allowable Concentration (MAC). The Ministry has set the reporting detection limit (RDL) for three organic parameters, Benzo[a]pyrene, Terbufos and Aldicarb at 50 per cent or more of the MAC, due to the limitations of current analytical methods to achieve lower detection limits. For these parameters, a licensed laboratory must be able to achieve a method detection limit (MDL) at least equal to the RDL. A positive result above their MDL would trigger increased frequency of sampling, but a result equal to their MDL would not.

MOE RDL requirements are not intended to imply reporting increments or number of required significant figures

Sample Drop-off Depots

Definition

Sample drop-off depots have been defined as "any location under the direction of the laboratory that is offsite from a licensed laboratory where drinking water samples from more that one registered drinking water system are deposited, collected and held for shipping to the Drinking Water Testing Laboratory."

There may be activities at this location for receipt and storage, including but not limited to, security and temperature control, maintenance, issue of sampling supplies and staffing. If the location is staffed, there may be activity for the reception and assessment of samples.

The ministry requires that samples collected for the purpose of complying with the requirements of the SDWA left at sample drop-off depots:

- be traceable to a particular drop-off depot
- be secured against loss or tampering
- be protected against extremes of temperature and kept cool and
- be accompanied by a chain of custody or submission form approved by the Director.

Chain of Custody/Submission Forms

The minimum requirements for approval by the Director for a chain of custody or submission form are that they contain the following fields and that they be traceable as to origin and laboratory approval status. These requirements may be assessed at the laboratory at the time of inspection.

Chain of custody/submission forms which are Director-approved meet the following criteria:

- Drinking Water System name, number, and physical address
- Drinking Water System contact name, and telephone number
- Identification of the laboratory, including name, address, telephone number
- Identification of the regulation that applies to the sample(s)
- Sampler identification – name and signature
- Samples submitted by – name and signature
- Sample location name
- Sample location type (DWIS location, water type - raw, treated, distribution)
- Date and time of sampling
- Chlorine residual
- Requested parameters (i.e. *E. coli*, metals)
- Laboratory reception - signature, date, time and
- Unique identifier for the form.

There may be occasions when a laboratory is asked to accept, by a client, the use of a chain of custody form or sample submission form that is not generated by the laboratory for the submission of drinking water samples. Under O. Reg. 248/03, the form of these records of acceptance must be approved by the Director.

Fulfillment of this requirement is assessed as part of the laboratory licensing and inspection process. If the laboratory agrees to use a client-generated chain of custody or submission form it must:

1. Review and pre-approve the chain of custody form as being fit for the laboratory's use for drinking water samples.
2. Retain documentation of having done so and
3. Be prepared to have the client chain of custody form assessed at the next inspection.

Reporting Adverse Water Quality Results in the Event of Suspected Laboratory Sample Contamination/Interferences

Where a licensed laboratory reasonably believes that an adverse result may be erroneous due to laboratory sample interference/contamination, but not as a result of QC failure, **the laboratory shall**:

a. Document all details relating to the possibility of result error on the analyst worksheet, logbook, final reports, etc.
b. Report the adverse result to all appropriate parties as required, indicating that the result is *PROVISIONAL UNTIL FURTHER NOTICE* due to the possibility of interferences/contamination associated with the result.
c. If the issue is not resolved within 24 hours, a written report is required providing details in writing to all appropriate parties.
d. **Immediately** take and document steps to investigate the possibility of interferences/contamination, requesting a re-sample, if necessary.
e. Keep MOE-SAC/PHU/LMOH/DWS owner/operator updated on the laboratory's internal investigation providing a completion time where warranted.
f. Once the result has been confirmed, notify all parties (MOE-SAC, PHU, LMOH and the DWS owner/operator) of the confirmed result and, where applicable, the reason for the error/contamination.
g. Record all steps taken in the appropriate documents.

Correcting Erroneous Data Reported to the MOE or MOHLTC

Where a lab has reported erroneous data the lab shall:

1. Document all details pertaining to the erroneous data
2. Contact appropriate parties, where applicable.
   a. If the erroneous result was reported as an Adverse Water Quality Incident, verbally contact SAC, DWS owner/operator and LMOH, where appropriate, and **RETRACT** the erroneous result. Provide details about the error and the correct result.
   b. Provide written notification to the appropriate parties indicating the retraction of the erroneous data directly on the ministry's "Notice of Adverse Test Results and Other Problems and Notice of Issue Resolution at Drinking Water Systems" form. Include the correct result.
3. If the data has been uploaded to ministry databases the lab shall:

MOE eDWIS:

Contact the Help Desk at **opssd@ontario.ca** or by calling the help desk at **1-888-677-4873**. Request the removal of the erroneous data, including the sample submission ID that used to upload all erroneous results. Upload correct results and any other results that were inactivated within the submission ID to eDWIS. The Help Desk can also assist for issues such as data correction (delete lab sample submission(s)), upload issues, DWIS technical assistance or regulatory requirements.

NOTE: All results uploaded under the submission ID will be inactivated in DWIS.

NOTE: A new submission ID must be used to upload the results. We encourage labs to use the same submission ID used to upload the original data appended with an A, i.e., original submission ID 123456 will be re-uploaded as submission ID 123456A.

MOHLTC LRMA:

Log onto LRMA and toggle the "ignore" button to "TRUE". Upload the correct result under a new submission ID.

If necessary contact the LRMA help desk at **iphissupport.moh@ontario.ca** or by calling **1-866-272-2794**

Testing and Reporting of Aggregated Parameters

The SDWA requires that licensed laboratories hired to perform regulated drinking water analyses are required to report all of their regulated data to DWIS within 28 days of data approval.

In the case where aggregated parameter data are to be reported to eDWIS, the Ministry requires that the "total" sum of the aggregate be reported, not individual parameters. Laboratories licensed and hired to perform the analyses of various aggregated parameters (i.e. Aldrin + Dieldrin, DDT + metabolites, etc.) must be licensed to analyze ALL parameters of that specific aggregated test.

In order for laboratories to meet their reporting obligations, the SDWA requires that the "total" analyses be done at one laboratory licensed to test all of the aggregated parameters.

Currently, the accreditation bodies do not accredit calculated parameters, although the MOE will licence them.

Uncertainty and Reporting Adverse Test Results

Estimation of the analytical uncertainty of a measurement is a requirement of ISO/IEC 17025:2005 – *General Requirements for the Competence of Testing and Calibration Laboratories* and must be available if requested by the client. However, uncertainty does not provide a basis for either reporting or not reporting adverse test results. The reported result must be reported where it qualifies as an adverse test result.

Licensed laboratories shall report adverse water quality results as per the drinking water legislation without any regard to calculated uncertainty estimations.

Recent Changes in O. Reg. 248/03

Please note, on December 14, 2009 the MOE amended O. Reg. 248/03 to expand the definition of tests at drinking water systems that do not require a drinking water testing licence (Reg. 248/03 s. 2).

Also the Ministry of the Environment introduced a new form entitled "**Notification Form for Drinking Water Testing Research and Method Development**" (Form 2052E) in accordance with Section 5 of O. Reg. 248/03. This form allows organizations to perform research and method development on drinking water provided that they inform the Ministry of the Environment.

Adverse Reporting Change in O. Reg. 170/03

The adverse reporting period for sodium and fluoride made under Schedule 16-3 s. 1 (8) and (9) ii was recently amended from a 60 month adverse reporting period to 57 months.

Co-located Samples under O. Reg. 243/07

Facilities are co-located if more than one school, private school or day nursery share the same plumbing. In most cases, facilities that share a building can be considered co-located. Co-located facility operators may share a single set of samples, provided that the sampling is being done properly.

The operator who has agreed to flush and/or take samples for all facilities is referred to as the primary facility operator. For example, if a school and a day nursery are co-located, the school (primary facility) may take one set of samples to satisfy the sampling requirements of both the school and the day nursery. The day nursery is referred to as the secondary facility.

When a decision is made to share samples among multiple facilities, all participants should submit an updated Registration and Laboratory Services Notification form to the MOE.

Sample results submitted by co-located facilities should only report to the primary facility DWS number. If the test result for a shared sample exceeds the Drinking Water Quality Standard for lead, the Notice of Lead Exceedance Test Results (LEN) form should be sent to the primary operator. Likewise, when the laboratory submits the LEN to MOE-SAC and uploads the results to eDWIS, only the primary DWS number should be referenced.

Please note that the following MOE documents have been rescinded and replaced with this document:

- **Adverse reporting of "overgrown bacteria" (dated July 12, 2006)**
- **Laboratory Inspection Report – Amendment (Immediate Reporting of Adverse Test Results) (dated February 6, 2006)**
- **Ministry of the Environment (MOE) Duplicate Data Reporting Protocol For Licensed Laboratories Analyzing Ontario Drinking-Water Samples (version 1.0 March 2005)**
- **Upcoming Ministry Laboratory Inspections – Cycle 7 (dated June 20, 2007)**
- **Cycle 7 Inspection 2007-2008 (dated June 7, 2007)**
- **Important Notice to All Licensed Laboratories – Requirement Retraction (dated March 10, 2005)**
- **Reporting Adverse Water Quality Results in the Event of Suspected Laboratory Sample Contamination/ Interferences (dated June 10, 2006)**
- **Chain of Custody Approved by the Director (dated May 17, 2007)**
- **Interim Bulletin, O. Reg. 252/05, Non Residential and Non Municipal Seasonal Residential Systems That Do Not Serve Designated Facilities (dated June 30, 2005)**
- **Laboratory Update Bulletin, Issue #1 (dated June 2004)**
- **New Drinking Water Licence Condition and Request for Information dated (March 24, 2006)**
- **New Licence Condition (dated October 24, 2005)**