



TESTMARK Laboratories Ltd.

Committed to Quality and Service

elements

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introducing “elements”

Testmark’s New Technical Bulletin

After a wonderful 5-year run, we are retiring our biannual Testmark Newsletter and replacing it with Elements, a slimmed-down biannual bulletin aimed at providing technical information and updates for our clients. In an internet-based age susceptible to information-overload, we feel there is value in trimming the fat and presenting the facts. We hope you enjoy the read!

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New Federally Proposed Wastewater Systems Effluent Regulations Coming Into Effect Soon



background:

In 2010, the federal government published their proposed Wastewater Systems Effluent Regulations under the Fisheries Act. These proposed regulations, which have been under public review and have been developed in consultation with the Canadian Council of Ministers of the Environment (CCME) over the past several years, are likely to be finalized in the spring of 2011.

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overview:

The objective of the proposed Regulations is to reduce the risks to ecosystem health, fisheries resources and human health by decreasing the level of harmful substances deposited through wastewater effluent. The deleterious substances addressed in the proposed Regulations include Biochemical Oxygen Demand (BOD), Total Suspended Solids (TSS), total residual chlorine and un-ionized ammonia.

The proposed Regulations apply to any wastewater system that has the capacity to deposit a daily effluent volume of 10m³ or more from its final discharge point, and that deposits a deleterious substance (as defined by under subsection 36(3) of the Fisheries Act) to surface water. It does not apply to systems located north of the 54th parallel, or those in the Northwest Territories and Nunavut.

The proposed Regulations will be implemented through a phased approach. Effluent monitoring requirements, record-keeping, reporting requirements and the option to allow for temporary or transitional authorizations to be applied for and issued would come into effect the day the Regulations are registered. The requirement to meet the effluent quality standards would come into force 24 months later, with the exception of the standard for total residual chlorine, which would come fully into force over three years. The proposed Regulations will also require the owner or operator of a wastewater system to conduct environmental effects monitoring studies if the water within 100m of the final discharge point is comprised of 10% or more of that effluent.

the nuts and bolts:

- The proposed effluent standards (based on quarterly or average concentrations) are:
 - BOD ≤ 25 mg/L
 - TSS ≤ 25 mg/L
 - Total residual chlorine (field parameter) ≤ 0.02 mg/L
 - Un-ionized ammonia ≤ 1.25 mg/L @ 15°C ± 1 °C
 - Requirements to install, maintain and calibrate monitoring equipment and to monitor the volume and composition of the effluent, with sampling frequencies determined based on the annual average daily volume of effluent deposited (quarterly if the annual average daily volume of effluent is $\leq 17,500$ m³, monthly if $> 17,500$ m³)
 - Approximately 200 wastewater systems that meet the effluent standards would also be required to conduct environmental effects monitoring (EEM) testing (i.e. acute lethality toxicity testing using Rainbow Trout)
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- Owners/operators may apply for a transitional authorization within 18 months to secure a risk-based timeline to meet the national effluent standards. Wastewater systems posing a high risk would be required to meet the effluent quality standards within 10 years, medium risk within 20 years and low risk within 30 years
 - Owners/operators may apply for a temporary authorization to deposit un-ionized ammonia in excess of the proposed standards under specific circumstances, or for bypass events

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how we can help:

- Testmark Laboratories is accredited by CALA to provide testing as required under this proposed Regulation, including acute toxicity testing using Rainbow Trout;
- Testmark is one of only a handful of labs in Canada that is accredited for full-service environmental testing as well as toxicity testing under one roof. This becomes important if the results of your toxicity test show an adverse response (i.e. a fish mortality) and allows us to drill down to the possible source of the contamination using the same sample that the toxicity test was run on. Remember that separate sampling events may yield different results, so it is advantageous to test the original sample in these cases;
- Testmark's Regulation Reports can highlight exceedances under this Regulation to better-help you manage your data;
- Testmark is pursuing accreditation for the pH Stabilization toxicology method (EPS 1/RM/50) which can be used as an effective tool in those cases where the un-ionized ammonia levels are shown to be lower (don't exceed 1.25 mg/L @ 15°C) and the client would like to investigate the possible effects of pH drift on their sample.



need more information?

Call our Customer Service Team at 1-888-282-0422 or email us at customer.service@testmark.ca. Read more about the proposed Regulation by visiting <http://canadagazette.gc.ca/rp-pr/p1/2010/2010-03-20/pdf/g1-14412.pdf> (refer to page 479).



Amended Record of Site Condition – Are you Ready?

July 1, 2011 is coming. Fast. If you haven't taken stock of the amended Record of Site Condition (as amended by O. Reg. 511/09) below is a quick snapshot of highlights:

- Updated chemical standards (± 120 changes) based on newer science
- Implementation of a Modified Generic Risk Assessment (Tier 2) which allows for site-specific considerations; web-based tool available
- New criteria tables that allow for shallow soil sites others located within 30m of a waterbody
- Six new parameters of interest (1-4 dioxane, total boron, dichlorodifluoromethane, hexane, trichlorofluoromethane, uranium)

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Technical Talk: BOD and CBOD and COD

A routine test for those involved in the sewage treatment industry, Biochemical Oxygen Demand or BOD is the standard method for measuring the consumption of oxygen by respiring bacteria. Put another way, it is a measure of the amount of “food” (organic material) that bacteria can oxidize. The test is performed over 5 days and involves measuring the oxygen limits before and after the time period. The final result indicates the potential of that sample to cause oxygen-depletion in a water body due to the presence of both carbonaceous and nitrogenous wastes. With more nutrients available to the bacteria, more oxygen will be consumed. Similar to the testing of microbiological organisms such as E. coli in drinking water samples, the test is not meant to provide a precise extrapolation to an entire system, instead it is intended as more of an indicator test of the general organic quality of the water – an indicator of the success of the treatment process. Some ballpark readings one might expect would be BOD results < 1 mg/L in a pristine river, around 2-8 mg/L in a moderately polluted river, around ≤ 20 mg/L in effluent from a three-stage municipal sewage treatment plant, and ≥ 200 mg/L from raw sewage.



Carbonaceous Biochemical Oxygen Demand or CBOD is similar to BOD but in this case a nitrification inhibitor is added at the start of the process to eliminate nitrifying bacteria from the sample, thereby measuring the impact from carbonaceous demand only. The reason you may want to suppress the effects of nitrifying bacteria are in instances where the nitrification of ammonia may not be complete (i.e. you have an incomplete conversion of ammonia to nitrate), or where levels of amines or ammonia are high, all of which can lead to a false BOD reading. Both the BOD and CBOD tests are not exhaustive and represent the oxygen depletion over a short period of time. Interestingly enough the 5 day duration for the tests has no real theoretical grounding and instead is based on the fact that the test was developed in Great Britain in the early 1900s and 5 days was about the maximum amount of time it took for water from a British river to flow to the sea. And you thought science wasn't subjective!

Now consider Chemical Oxygen Demand or COD. It is similar to BOD and CBOD testing in that it provides a measure of the relative oxygen-depletion effect of a waste contaminant, but unlike BOD and CBOD which require bacteria to perform oxidation, COD measures the total amount of all chemicals in the water that can be oxidized. In other words, COD recognizes that not all oxygen in water is depleted by biochemical processes. It accounts for the oxygen demand from such chemical reducers as sulfide and nitrite.

Typically, the COD value is larger than the BOD value, which in turn is normally larger than the CBOD value. In data sets where the COD values are much larger than the BOD values, it suggests that the compounds in the sample may not be easily biodegraded.