

Drinking Water Information Letter 1/2014

Analysis of drinking-water for metals

Purpose

This letter sets out the requirements for the analysis of drinking-water samples for total metals that will come into force on April 1, 2014. These requirements supersede guidance provided in Drinking Water Information Letter 1/2012.

Scope

The scope of this letter is confined to those parameters classified as metals for which analysis is required in accordance with the terms and conditions attached to an Approval; a Code of Practice; or the Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems (2012) dealing with a drinking-water facility. This letter does not pertain to any other water-related analysis e.g. as set out in Groundwater Information Letter 1/2012 “Analysis of Groundwater Samples for Metals”.

This letter sets out the requirements under the authority provided in sections 17(2)(f) and (h) of the Potable Water Regulation for the handling of samples and analysis for metal parameters that may be present in drinking water samples. Authority for Directors to issue a notice is given in section 17(2).

Approval holders (including registration holders) who are responsible for procuring laboratory services are required to ensure that the requirements set out in this letter are met for all drinking-water samples analysed for any metal parameter where the sample has been taken **on or after April 1, 2014**.

Background

Drinking-water parameters classified as metals in the Guidelines for Canadian Drinking Water Quality (GCDWQ) must be analysed for the presence of total metals.

This letter sets out the analytical requirements for the analysis of total metals in drinking-water samples and the requirements to be followed in preserving drinking-water samples that will subsequently be analysed for total metals.

Detail

(i) Total Metals Analysis

Total metals are defined as “the concentration of analyte determined either by “direct analysis” of an unfiltered acid preserved drinking-water sample with turbidity of <1 NTU, or by analysis of an unfiltered aqueous sample following digestion with hot dilute mineral acid(s)” (US EPA 200.8).

Digestion of drinking-water samples prior to analysis of total metals is to be conducted using US EPA Method 200.2, or an equivalent digestion procedure approved by the Drinking Water Specialist, Alberta Environment and Sustainable Resource Development that employs hot dilute nitric and hydrochloric acids.

Digestion of drinking-water samples prior to analysis of total mercury may alternatively be conducted using US EPA Method 1631 Revision E, or an equivalent digestion procedure approved by the Drinking Water Specialist, Alberta Environment and Sustainable Resource Development that employs bromine monochloride oxidation or US EPA Method 245.7.

Drinking-water samples that have been confirmed by measurement to have turbidity levels less than 1 NTU may be analyzed directly, without prior digestion, provided that samples have been preserved in accordance with the requirements below, and provided that turbidity results are recorded and maintained for audit purposes. Turbidity measurements in support of this option may be conducted using either a preserved or raw sample aliquot. Mercury-specific test methods utilizing cold vapour atomic absorption or atomic fluorescence still require digestion/oxidation, since this is a necessary component of these test procedures.

(ii) Sample Preservation Requirements

Drinking-water samples requiring analysis for total metals (excluding mercury) are to be collected in containers constructed of plastic (e.g. high density polyethylene), or fluoropolymer. Samples should be preserved in the field with nitric acid to pH < 2. If field preservation is not possible, samples may be preserved with nitric acid to pH < 2 within 7 days of collection, provided the sample is allowed to equilibrate in its original container for at least 16 hours prior to sub-sampling or analysis. Analysis must be completed within 6 months of sampling.

Drinking-water samples requiring analysis for total mercury are to be collected in containers constructed only of glass or fluoropolymer. Samples must be preserved in the field with hydrochloric acid to pH < 2. If field preservation is not possible, samples may be preserved with bromine monochloride within 48 hours of collection, provided the sample is allowed to equilibrate in its original container for at least 24 hours prior to sub-sampling or analysis. Samples for mercury analysis must be completed within 28 days of sampling.

Enquiries

Enquiries on this letter should be addressed to the Drinking Water Specialist, Provincial Programs Branch, Alberta Environment and Sustainable Resource Development (Dr. Donald Reid, Donald.Reid@gov.ab.ca, telephone number 780-644-8061).

References:

US EPA Method 200.2, Sample Preparation Procedure for Spectrochemical Determination of Total Recoverable Elements, National Exposure Research Laboratory, Office of Water, US EPA, Cincinnati, OH, October 1999.

US EPA Method 200.8, Rev 5.5, Determination of Trace Elements in Waters and Wastes by Inductively Coupled Plasma-Mass Spectrometry, Office of Water, US EPA, Washington, DC, October 1999.

US EPA Method 245.7, Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, Revision 2.0, Office of Science and Technology, Office of Water, US EPA, Washington, DC, February 2005.

US EPA Method 1631 Rev E, Mercury in Water by Oxidation, Purge and Trap, and Cold Vapor Atomic Fluorescence Spectrometry, Office of Water, US EPA, Washington, DC, August 2002.