



Reference

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
ONE CONGRESS STREET SUITE 1100
BOSTON, MASSACHUSETTS 02114-2023**

Memorandum

Date: 30 July 2002

From: Todd Borci, RPM, Region 1 Office of Site Remediation and Restoration
Nora Conlon, Ph.D., QA Chemist, Region 1
Steve DiMattei, QA Chemist, Region 1

To: Region 1 RPMs

Subj: Using EPA Method 314.0 Ion Chromatography for Perchlorate Analysis to Meet Low Level Reporting Limits in Aqueous Samples

This memorandum is meant to address recent inquiries regarding the low-level reporting of perchlorate in aqueous samples. As background information, perchlorate can exist as the solid salts of ammonium, potassium, or other metals. Approximately 90% of perchlorate produced by U.S. manufacturers has been for use as an oxidizer in solid rocket fuel. The remaining 10% is used in military and civilian explosives and pyrotechnics (which includes items such as flares and smoke grenades). Perchlorate is used in the explosive train of numerous high explosive and training military munitions.

Under the Safe Drinking Water Act (SDWA), perchlorate was listed on the Contaminant Candidate List (CCL) in 1998. The CCL is a list of contaminants which are not subject to any proposed national primary drinking water regulation, are known or anticipated to occur in public water systems, and may require regulation under the SDWA. Since 2001, all large water supply systems and many smaller systems have been monitoring for perchlorate as required by the Unregulated Contaminant Monitoring Rule (UCMR) of the SDWA. The data generated by the new UCMR will be used to evaluate and prioritize contaminants, including perchlorate, on the the CCL.

Current Reference Dose (RfD) Information

At the time of publication, EPA Headquarters guidance was to utilize a Reference Dose (RfD) range of 0.0001 mg/kg-day to 0.0005 mg/kg-day for perchlorate-related assessment activities. This range, if utilized in the standard Drinking Water Equivalency Level (DWEL) equation to assess adult drinking water exposure (70 kg person drinking 2 L/day), would equate to cleanup or action levels in the range of 4 to 18 ug/L. Based on these cleanup levels, EPA Method 314.0, as published in March 2000, was developed to achieve a Reporting Limit (RL) of 4.0 ug/L which supports this RfD.

Pending RfD Revisions

In early 2002, EPA released for public review and comment its revised draft toxicity assessment for perchlorate. The public and peer review period has closed and EPA is currently evaluating



those comments received. The revised draft RfD for perchlorate contained in that document is 0.00003 mg/kg-day. The revised draft RfD, if utilized in the standard DWEL equation (70 kg person drinking 2 L/day), would equate to a cleanup or action level of 1 ug/L. Reportedly, the earliest date that the revised RfD could be finalized is fall of 2002.

Using Method 314.0 to Achieve Low Level Reporting Limits

Due to the uncertainty of when and at what level the final perchlorate RfD will be established, numerous environmental site managers are interested in detecting perchlorate in aqueous samples at concentrations of 1 ug/L and below. EPA Method 314.0 has been successfully modified and is currently achieving this goal at the Massachusetts Military Reservation (MMR) site in Region I.

As stated previously, EPA Method 314.0 was developed to achieve a RL of 4.0 ug/L supported with a Method Detection Limit (MDL) of 0.53 ug/L. Currently the National Guard Bureau (NGB), one of the MMR Responsible Parties, is utilizing two separate commercial laboratories to analyze aqueous samples for perchlorate using a modified EPA Method 314.0 to achieve Reporting Limits (RLs) of 1.0 ppb and MDLs as low as 0.35 ppb. Concentrations between the MDL and the RL are reported as estimated (J) values. An estimated (J) value means the compound is positively present, but tentatively quantified.

To ensure reliability of data to support the 1.0 ug/L RL, the following requirements have been instituted:

- (1) The lowest initial calibration standard must be at 1.0 ug/L
- (2) A MDL study must be performed using the 1.0 ug/L calibration standard.
- (3) A daily 0.5 ug/L "MDL check standard" must be run on the instrument. This check standard is used to verify that the instrument can distinguish the 0.5 ug/L standard from the instrument noise each day. This standard is not part of the initial calibration.
- (4) Method Blank contamination cannot exceed the MDL. This requirement applies to pretreatment cartridge contamination as well.
- (5) The recommended Laboratory Control Sample (LCS) and Matrix Spike (MS) spiking solution concentration is 10 ug/L as opposed to the traditional 50 ug/L solution concentration.

Regarding any questions on the above subject or procedures, please feel free to contact the following individuals:

Steve DiMattei, EPA Region 1 Chemist, (617) 918-8369, dimattei.steve@epa.gov

Nora Conlon, EPA Region 1 Chemist, (617) 918-8335, conlon.nora@epa.gov

Todd Borci, RPM, MMR Project Team, (617) 918-1358, borci.todd@epa.gov