Perchlorate:

Sampling Requirements for Public Water Systems

Revised August 1, 2007

Massachusetts Department
of
ENVIRONMENTAL PROTECTION

The Perchlorate Regulations
for Public Drinking Water
Became Effective on:

July 28, 2006

Who must monitor for perchlorate?

All Community (**COM**) and Non-Transient-Non-Community (**NTNC**) public water systems will be required to conduct routine monitoring for perchlorate beginning in the calendar year starting January 1, 2007.

In addition, the new source approval process requires initial perchlorate analyses for all new sources, including Transient-Non-Community (TNC) sources.

What is the Maximum Contaminant Level (MCL) for Perchlorate?

The MCL for Perchlorate is 0.0020 milligrams per liter (mg/L) (2.0 parts per billion (ppb)).

MassDEP will review and revise, as necessary, the perchlorate MCL within 6 years of its promulgation.

What is the Initial Sampling Schedule for Perchlorate?

Groundwater sources: monitor once during the month of April 2007 and once during the month of September 2007.

Surface water sources: monitor for four consecutive quarters beginning in the first quarter of the 2007 calendar year.

What if Some or All of My Sources are Located Outside of Massachusetts ?

All Massachusetts public water systems are required to conduct compliance monitoring sampling for any of the regulated drinking water contaminants that are routinely required by MassDEP that are not adequately regulated by another state.

Sources Outside of Massachusetts (continued)

Since none of the states that abut Massachusetts currently require routine monitoring for perchlorate, the system must collect drinking water samples for perchlorate analysis at the designated entrance point to their system.

Are Grandfathered Data Allowed?

Acceptable monitoring data collected after January 1, 2004 may be used with MassDEP's approval to satisfy the initial sampling requirements.

However, all systems will be required to collect at least one sample round per year beginning with the 2007 calendar year.

What is the Long Term Monitoring Frequency for Perchlorate?

The sampling frequency may be reduced to once per year after the initial monitoring period if all sample results indicate perchlorate concentrations less than 0.0010 mg/L.

What Happens if My Samples Exceed the Perchlorate MCL?

- Take a confirmation sample within 24 hours of the system's receipt of written notification (includes e-mail, fax, or letter) of the sample results.

  Systems that are unable to take a confirmation sample within 24 hours of the system's receipt of written notification of the analytical results, shall immediately contact MassDEP for further direction. (cont'd)

Exceeding the MCL (continued)

- Report the initial sample result that exceeded the MCL to the applicable regional office of MassDEP within seven (7) days.
- Obtain written results of the confirmation sample from the laboratory within three (3) days of sampling.
- Report the confirmation sample results to MassDEP within three (3) days of the receipt of the written notification of the sample results.

What Results are used for Compliance Calculations?

The Compliance Calculation is based upon the average of the initial and confirmation samples, rounded to the nearest 0.0001 mg/l. MassDEP may allow or require additional sampling.

Unlike many other Inorganic Contaminants (IOCs), perchlorate compliance is **not** determined by the Running Annual Average (RAA) method.

What if the Results of My Sampling do not Exceed the MCL but are Greater than 0.0010 mg/L, MassDEP's Minimum Reporting Level?

If the perchlorate concentration of any one sample is equal to or greater than 0.0010 mg/L, the repeat monitoring frequency for any public water system will then be on a quarterly basis for at least one year.

What will be the sampling frequency after my system has had a compliance calculation that exceeds the MCL?

MassDEP shall determine the sampling frequency after a system's compliance calculation has exceeded the perchlorate MCL.

Perchlorate Samples Must be Collected using the Sterile Sampling Technique

Samples must be filtered using the sterile sampling technique to remove microbes that could potentially remove perchlorate from the sample.

Sterile Sampling Technique (continued)

The sterile sampling technique includes the use of:

- sterile sample bottles
- disposable, single-use, syringes (silicone-free)
- disposable, single-use, 2-micron (μm) filters (use of sterile, single-use, pre-filters may be necessary depending upon particulate content of sample)
- It also includes leaving a headspace in the collection bottle of at least 1/3 the total volume of the bottle to prevent anaerobic conditions during sample storage.

Sterile Sampling Technique (continued)

The full description of the sampling method is included in the laboratory analytical method descriptions for EPA Methods 314.1, 331, and 332. It is not included in the EPA Method 314.0 description but EPA and MassDEP still require it for that method.

Your laboratory should be able to assist you with question regarding the sterile sampling technique requirements.

What Minimum Reporting Level (MRL) Must Be Used for the Analysis of Perchlorate?

The recent changes to the Drinking Water Regulations (310 CMR 22.00) introduce the term “Minimum Reporting Level” (MRL) for perchlorate analysis.

MassDEP will only accept perchlorate results for which the laboratory reported MRL is no greater than 0.0010 mg/L.

What are the Acceptable Laboratory Analytical Methods for the Analysis of Perchlorate in Drinking Water?

1. EPA method 314.0, revision 1.0, November 1999 as modified to achieve the MRL of 0.0010 mg/L (Ion Chromatography);
2. EPA Method 314.1 (Ion Chromatography);
3. EPA Method 331.0 (Liquid Chromatography Electrospray Ionization Mass Spectrometry (LC/MS or LC/MS/MS)); and,
4. EPA Method 332.0, (Ion Chromatography with Suppressed Conductivity and Electrospray Ionization Mass Spectrometry (IC/MS or IC/MS/MS)).

Which Laboratories are MassDEP approved for the analysis of Perchlorate in drinking water?

For a list of MassDEP approved labs go to:

http://www.mass.gov/dep/water/drinking/wespub03.htm and select the document under the heading "List of DEP-Approved Perchlorate Laboratories". MassDEP will be changing the laboratory certification regulations to formally certify for the analysis of perchlorate.

Can My System Apply to MassDEP for a Waiver from the Monitoring Frequencies for Perchlorate?

Systems will not be eligible for Monitoring Waivers until the next compliance monitoring period (2008-2010). MassDEP will provide waiver applications for the 2008-2010 monitoring period in the fall of 2007. (cont'd)

Waivers (continued)

Waiver applications will have to meet these conditions:

1. A system must take a minimum of one sample while the waiver is effective;
2. Surface water systems must have monitored annually for at least three years and groundwater systems must have conducted a minimum of three rounds of monitoring; and,
3. Systems must demonstrate that all previous analytical results were less than the MCL. (cont'd)

Waivers (continued)

MassDEP shall approve or deny a waiver application based on land use issues, reported concentrations from all previous monitoring, the degree of variation in reported concentrations, and other factors that may affect perchlorate concentrations. Monitoring Waivers for perchlorate will only remain in effect during the 2008 through 2010 compliance monitoring period.

What if My Perchlorate Results Exceed the MCL, is My System Required to Issue Public Notification?

When the average of the compliance samples, rounded to the nearest 0.0001 mg/l, exceeds 0.0020 mg/l, the supplier shall report the results to MassDEP and shall complete a Tier 1 public notification. A failure to take a confirmation sample within 24 hours of the system's receipt of written notification of the initial sample result also requires a Tier 1 public notification. The requirements for a Tier 1 public notification are found in MassDEP's Drinking Water Regulations, 310 CMR 22.16.

What are the Public Notification Requirements if my System has a monitoring and testing procedure violation?

Monitoring and testing procedure violations, other than those described on the preceding slide, require a Tier 3 public notification. The requirements for a Tier 3 public notification are also found in 310 CMR 22.16.

What is the standard health effects language required for public notification of a perchlorate violation?

"Perchlorate interferes with the normal function of the thyroid gland and thus has the potential to affect growth and development and could cause brain damage and other adverse effects, particularly in fetuses and infants."

What are my Consumer Confidence Reporting Requirements for Perchlorate Detects?

The highest perchlorate concentration detected above the laboratory reported MRL must be published in the Consumer Confidence Report.

What is the Best Available Technology (BAT) to Achieve Compliance with the MCL for Perchlorate if My System Needs to Treat to Meet Compliance?

The BAT for perchlorate is Ion Exchange.

How can you reduce the risk from sources of perchlorate contamination?

Develop the following Best Environmental Management Practices (BMP) with your local agencies:

- BMP for fireworks displays
- BMP for blasting operations
- BMP for reducing perchlorate from treatment chemicals.

Summarized BMP for Fireworks Displays:

1. Request low (or no) perchlorate-containing fireworks.
2. . Remove all visible shell debris encountered during the search at first light.
3. Appropriately remove and dispose of all "duds" and "misfires" and contain and/or promptly address runoff in cases where water is used to douse duds or misfired materials. (cont'd)

Fireworks BMP (continued)

4. Keep displays as far away from public and private drinking water supply sources and their recharge areas as possible. If possible, keep them outside of Zone IIs and Interim Wellhead Protection Areas (IWPAs) for public supply wells and Zone Bs of public surface water sources.

Summarized BMP for Blasting Operations:

1. Determine the perchlorate content of blasting agents and explosives to be used.

2. To the extent practical, avoid the use of perchlorate-containing explosive products when surface or groundwater can be affected with particular attention to Zone IIs, IWPAs, and Zone Bs. (cont'd)

Blasting BMP (continued)

3. When the use of perchlorate-containing products is necessary take reasonable steps to prevent and address misfires. In cases where explosives or blasting agents are washed or removed from a borehole following a misfire, reasonable efforts should be made to collect and properly manage or dispose of perchlorate-containing materials. In all cases, the safety of workers and the general public is of paramount concern.

BMP for the use of hypochlorite in water treatment plants:

Perchlorate is a breakdown product of hypochlorite. The concentration of perchlorate tends to increase as the product ages. The general BMP for perchlorate is to take steps to minimize the age of the product being used. For instance, purchase no more than a few months' supply and use older product first to prevent extended storage times.

Where Can I Find Additional Information about Perchlorate on the Internet?

- Visit MassDEP's perchlorate page at:
http://www.mass.gov/dep/water/drinking/percinfo.htm

- Visit EPA's perchlorate page at:
http://www.epa.gov/safewater/ccl/perchlorate/perchlorate.html

- Visit the World Health Organizations home page at the following address and type "perchlorate" in the search engine provided near the top of the page.
http://www.who.int/en/

Who Should I Contact at MassDEP for More Information?

Western Regional Office: Mike McGrath
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