By Kristin M. Safran and Barbara L. Marteney

drinking water contaminants under scrutiny

MONITOR IN THE PRESENT AND PREPARE FOR THE FUTURE

Drinking water contaminants play an important role in the water industry. A successful business must look to the future and prepare for the inevitable. National Testing Laboratories, Ltd. (NTL) is continuously identifying and tracking high profile contaminants that may impact the industry. This article will discuss four contaminants currently found on NTL's short list—Arsenic, Bromate, MTBE and Perchlorate. This list was compiled based on the following criteria: 1) Contaminants currently being studied by the federal government (EPA or FDA) and/or any states for regulation and/or review of established limits; 2) Contaminants that are the subject of recent news articles and/or stories involving water quality; and 3) Recent reports indicating there may be detections of the contaminant in public water supplies and/or bottled water.

This article provides basic information on each of these parameters including:

- What is it?
- Where does it come from?
- What are the potential health effects?
- What are the established and/or proposed regulatory limits?
- What analytical methods are available?

Arsenic

Arsenic is a naturally occurring inorganic known to be present in many water sources. Arsenic can also be found as a result of contamination from defoliants, soil fumigants, wood treatment compounds and industry activities such as petroleum, textile and metal manufacturing.

Studies indicate that arsenic is a potential carcinogen resulting in skin, bladder and lung cancers. The EPA Maximum Contaminant Level (MCL) was originally set at 50 ppb; however, the MCL has been lowered to 10 ppb—effective January, 2006. Lowering of this MCL received much debate with some public water supplies arguing that the level of 10 ppb was too low and that removal down to that level would not be cost effective. Other critics say the 10 ppb limit was too high to be protective of public health. This debate continues as some states have, or are in the process of establishing, their own public health goals and drinking water limits for arsenic. An example of this is California's established Public Health Goal of 4 parts per trillion for arsenic.

There are several methods available to analyze for arsenic. Most laboratories doing drinking water work use methods that allow for a lower reporting limit of 1 to 2 ppb. Currently, some laboratories may be able to achieve lower detection levels to the 0.1 ppb. There is no published method currently available to detect arsenic in the 4 parts per trillion range.

Bromate

Bromate is an oxidizer for foods such as flour, barley for beer making and fish paste. It can be found in water as a by-product of ozonating water containing naturally occurring bromide. Bromate also can potentially be found in waters treated by chlorine dioxide and then exposed to sunlight.

Some studies have shown that bromate is a potential carcinogen that impacts the kidneys at very low levels. As a result, bromate is regulated by the EPA with a maximum contaminant level of 10 ppb. The FDA standard of quality for Bromate is also 10 ppb.

The only method currently approved for bromate analysis is EPA method 300.1 by ion chromatography, which has a typical reporting limit of 5 ppb. Other methods, EPA has proposed but not yet approved, have a lower reporting limit of 1 ppb. New methods are in the process of being developed which may enable detections in the sub ppb range.

MTBE

Methyl-tertiary-butyl-ether (MTBE) is a volatile organic chemical used since the late 1970's. MTBE was added to gasoline to reduce air pollution. Unfortunately, MTBE is extremely water soluble and migrated into water aquifers from leaking underground gasoline storage tanks. It can cause an unpleasant taste and odor in water at low levels and is a potential carcinogen.

While the EPA has no formal MCL for MTBE, they have issued an advisory limit of 20 to 40 ppb for taste and odor concern. EPA stated they believed this level would also provide adequate level of safety. MTBE is on EPA's Contaminant Candidate List (CCL) to be potentially regulated in the future. Some states have, or are in the process of establishing their own regulatory limits for MTBE. For example, California has established an MCL of 14 ppb with a secondary MCL for taste and odor concerns at 5 ppb. MTBE can be analyzed by

GC/MS to a lower reporting level of approximately 0.5 ppb.

Perchlorate

Perchlorate is an oxidant found in rocket fuels, flares and fireworks. The highest levels of perchlorate contamination, discovered to date, appear to be on the west cost in states such as California, Nevada and Arizona. However, perchlorate has also been detected in at least 20 other states. Some studies indicate perchlorate may inhibit the production of growth hormones in fetuses and young children. Other studies show that high levels may cause thyroid cancer. There is much debate about risk levels.

Perchlorate is currently on the Candidate Contaminant List and under intense review for regulation by the EPA. The EPA is waiting for the National Academy of Science report on the toxicity of perchlorate scheduled to be released by the end of this year. In the interim, some states are in the process, or have already established, their own guidelines and limits for perchlorate. For example, Massachusetts is requiring all public water supply sources and in-state bottled water producers to test for perchlorate.

Currently, the only approved method for perchlorate is method 314 by ion chromatography with an LRL of 4 ppb. However, newer methods and modifications to method 314 are in the process of being approved. These new methods have reportable detection levels ranging from 0.01 to 1 ppb.

Conclusion

There are thousands chemicals in the environment, but less than 200 have been identified as a concern for drinking water and have established regulatory limits. The scientific community is continuously identifying new potential contaminants that may be present in drinking water; performing studies and literature reviews to assess the levels at which those contaminants may present a health concern; developing methodologies for analysis of the contaminants at the desired levels; and establishing reasonable monitoring requirements and regulatory limits for those contaminants in drinking water.

Bottled water producers are advised to educate themselves on these and other potential high profile contaminants. This will enable them to adequately assess the risk contaminants pose to their products as well as quickly respond to any customer or media questions regarding their products in the future. Get more information at www.epa.gov/safewater or at the BevExpo, Sept. 28 in Tampa.

About the Authors
Kristin M. Safran and Barbara L. Marteney of National Testing Laboratories, Ltd., specialize in consulting with bottled water companies regarding testing requirements and bottled water quality. They can be reached at 800-458-3330, ext. 215 (Safran) and ext. 217 (Marteney). WQP

LearnMore!
For more information related to this article, go to www.wqpmag.com/lm.cfm/wq090412

For more information on this subject, write in 1012 on the reader service card.