# Overview of Drinking Water Monitoring Requirements

Community water supply (CWS) monitoring requirements will vary based on the source of water, population served, and their specific water quality/chemistry. Violation of regulations, new regulations, and/or contaminant detections may trigger additional monitoring requirements or change the monitoring frequency.

A CWS can download their most current monitoring schedules at:

http://www.epa.state.il.us/water/compliance/drinking-water/sdwis/index.html

It is recommended that each CWS operator or sample collector periodically (at least quarterly) download a new schedule since monitoring schedules can change frequently. If you have any questions or need more detail, call the Drinking Water Compliance Unit at 217/785-0561.

The following is a very brief overview of the different monitoring programs.

## Coliform Monitoring

The requirements for this program are detailed in **Chapter 3** of this Handbook.

All water supplies are required to monitor the distribution system at least monthly for coliform bacteria. The number of samples required is based on the population served. Chlorine exempt facilities are required to monitor twice a month or bi-weekly. The Field Operations Section (FOS) determines the frequency and number of finished samples at the time of the Engineering Evaluation. In addition to the distribution system and finished samples, raw water samples are required to be tested for total coliform and *E. coli* monthly from each well.

## Lead and Copper Monitoring

The requirements for this program are detailed in **Chapter 4** of this Handbook.

All supplies must collect lead and copper samples from distribution locations that have been approved by the IEPA. All samples must be collected from the consumer's kitchen or bathroom tap. The frequency and number of samples is determined by the population served and past sample results.

Routine distribution and entry point water quality samples (WQS) monitoring is required if a supply has installed corrosion control treatment for lead and copper and have had a past action level exceedance. The frequency and number of samples is determined by the population served, source of water, type of treatment, and past sample results. Those supplies required to monitor WQS must follow Illinois EPA approved sample protocol which is system specific.

## Disinfectants and Disinfection Byproducts Rules

The requirements for this program are detailed in **Chapter 10** of this Handbook.

This rule includes monitoring requirements for Total Trihalomethanes (TTHMs), Haloacetic Acids (HAAs), Bromate, Bromite, Chlorite, and Chlorine dioxide. The number and type of samples are based on water source, type of disinfectant used, and the population served. The frequency and sampling duration is also determined by the actual test result/contaminant concentrations.

Surface water supplies are also required to monitor for Total Organic Carbon (TOC) and Alkalinity. Initially, one "paired" (one raw and one finished) TOC/alkalinity sample is required per plant per month. After two years, the system may qualify for reduced monitoring depending on the levels found.

## Surface Water Treatment Rules

This Chapter of the Handbook is not yet completed.

Turbidity monitoring and residual disinfectant monitoring are required for all surface water supplies. Sampling locations and frequency are determined by a system specific sampling protocol approved by the Illinois EPA.

## Inorganic Chemicals (IOCs) Monitoring

The requirements for this program are detailed in **Chapter 7** of this Handbook.

All surface and mixed supplies must monitor annually each entry point. All groundwater supplies must monitor each entry point triennially. The following is the current list of IOCs that require monitoring:

## Asbestos Monitoring

The requirements for this program are detailed in **Chapter 7** of this Handbook.

Supplies that have asbestos-cement pipe within the distribution system and have an aggressive water quality index less than 12 must monitor once every nine years. Quarterly monitoring will be required if any sample result exceeds 7 million fibers per liter.

## Fluoride Monitoring

The requirements for this program are detailed in **Chapter 7** of this Handbook.

All supplies that add fluoride are required to monitor at each entry point daily using an approved test kit. On a monthly basis, a split sample is to be collected. One portion of the split sample is to be analyzed by a certified laboratory, while the other portion is to be analyzed on site using an approved test kit. Supplies with naturally occurring fluoride must monitor annually.

## Nitrate/Nitrite Monitoring

The requirements for this program are detailed in **Chapter 7** of this Handbook.

Initially, all surface supplies are required to collect four consecutive nitrate quarterly samples per entry point. If any of the four results exceed one-half of the MCL, quarterly sampling must continue. If all of the four results are below one-half of the MCL, sampling will be reduced to annual monitoring. Each year, all ground water supplies must collect one nitrate sample per entry point. If the sample result exceeds one-half of the MCL, quarterly sampling will be required until it is determined the contaminant is reliably and consistently below the MCL.

Surface and ground water supplies must collect one **nitrite** sample per entry point every three years. If the sample result exceeds one-half of the MCL, quarterly sampling will be required until it is determined the contaminant is reliably and consistently below the MCL.

## Synthetic Organic Chemicals (SOCs) Monitoring

The requirements for this program are detailed in **Chapter 6** of this Handbook.

Initial SOC monitoring requires collection of four consecutive quarterly samples at each entry point for all surface and ground water supplies. For surface supplies with no SOCs detections, sampling is reduced to one annual spring (April - June) sample per entry point. For groundwater supplies serving 3,300 people or less with no SOCs detections, sampling is reduced to one sample per entry point every three years. Sampling is reduced to two samples per entry point every three years for supplies serving more than 3,300 people. If at any time an SOC is detected, quarterly monitoring must be resumed at that entry point until it is determined the contaminant is reliably and consistently below the MCL. Ground water supplies that qualify for a vulnerability waiver may further reduce monitoring. Surface supplies cannot qualify for a SOC vulnerability waiver.

## Volatile Organic Chemicals (VOCs) Monitoring

The requirements for this program are detailed in **Chapter 5** of this Handbook.

Initial SOC monitoring requires collection of four consecutive quarterly samples at each entry point for all surface and ground water supplies. If no VOCs are detected, sampling is reduced to annually. After the three annual samples, supplies may further reduce to once every three years. If at any time a VOC is detected, quarterly monitoring will be initiated until it is determined the entry point is reliably and consistently below the MCL. Ground water supplies that qualify for a vulnerability waiver may further reduce monitoring. Surface supplies cannot qualify for a VOC vulnerability waiver.

## Radionuclide Monitoring

The requirements for this program are detailed in **Chapter 8** of this Handbook

Initially, both surface and ground water supplies must monitor quarterly for combined radium and gross alpha for a year (in some cases, this can be reduced). Follow-up monitoring frequency is dependent on the results of initial samples.

Most drinking water sources have very low levels of radioactive contaminants ("radionuclides"), most of which are naturally occurring, although contamination of drinking water sources from human-made nuclear materials can also occur. Most radioactive contaminants are at levels that are low enough to not be considered a public health concern. At higher levels, long-term exposure to radionuclides in drinking water may cause cancer. In addition, exposure to uranium in drinking water may cause toxic effects to the kidney.

To protect public health, USEPA has established drinking water standards for several types of radioactive contaminants combined radium 226/228 (5 pCi/L); beta emitters (4 mrem/year); gross alpha particle (15 pCi/L); and uranium (30 µg/L).

## Unregulated Contaminant Monitoring Rule (UCMR)

This Chapter of the Handbook is not yet completed.

All large water systems (serves > 10,000 people) that have their own source of water AND a USEPA randomly-selected number of small systems that have their own source of water are required to periodically monitor for a set list of contaminants that are not yet regulated. With each UCMR cycle of monitoring, the contaminants change.

USEPA uses the UCMR to collect data for contaminants suspected to be present in drinking water, but that do not have health-based standards set under the Safe Drinking Water Act (SDWA). Every five years EPA reviews the list of contaminants, largely based on the Contaminant Candidate List and determines whether or not additional monitoring or studies are needed.

## Groundwater Rule (GWR)

The requirements for this program are detailed in **Chapter 9** of this Handbook.

The U.S. Environmental Protection Agency (EPA) published the Ground Water Rule (GWR) on November 8, 2006. One goal of the GWR is to provide increased protection against microbial pathogens, specifically bacterial and viral pathogens, in public water systems that use ground water. Instead of requiring enhanced disinfection for all ground water systems (GWSs), the GWR establishes a risk-targeted approach to identifying GWSs that are susceptible to fecal contamination. GWS currently monitor each well once a month for total coliform and *E. coli*.

**Operator Certification (OpCert)**

The requirements for this program are detailed in **Chapter 14** of this Handbook.

Drinking water operator certification is critical for the protection of public health and the maintenance of safe, optimal, and reliable operations of water treatment and distribution facilities. In order to safeguard the health and well being of the populace, every community water supply in Illinois must have on its operational staff at least one person "certified" as competent as a water supply operator under the provisions of the Public Water Supply Operations Act. This Chapter discusses the certification process.

## Protecting Drink Water – The Multiple Barrier Approach

Drinking water professionals have long known that the most effective way to protect consumers from the risk of contamination and waterborne disease is through a multiple barrier approach. This approach sets up a series of technical and managerial barriers that ensure a safe drinking water supply and guard against waterborne disease outbreaks.

For each of these barriers, you can choose from a number of options to improve your system and further protect the health of your customers. Your best option will depend on the unique challenges and opportunities facing your system.

The multiple barrier approach provides "defense in depth" against waterborne pathogens and chemical contaminants that can cause a variety of illnesses and conditions, some of them potentially fatal. By erecting barriers against these contaminants at each step in the process from raw, untreated source water to the delivery of treated finished water, system owners and operators can protect the health and well being of the people who rely on them for potable water.

(1) Source Water Barriers: Selecting and protecting the best source of supply.

(2) Treatment Barriers: Installing treatment methods, implemented by a certified operator, that will improve the quality of the source water.

(3) Storage and Distribution Barriers: Constructing, operating, and maintaining well-engineered storage facilities and distribution systems.

(4) Monitoring and Public Information Barriers: Providing consumers with information on water quality and health effects.

*Small Systems and the Multiple Barrier Approach*

Small systems face many challenges in providing safe, reliable, and affordable drinking water. Implementation of effective multiple barriers of protection will require technical, financial, and managerial resources which some systems may lack. Such systems will benefit from State "Capacity Development" programs. Through these programs systems will have access to assistance in developing the financial capabilities and the institutional knowledge and structures to reliably and consistently apply multiple barriers of protection.