

# TapTalk

Technical guidance for owners and operators of Delaware's public water systems

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## Safe Drinking Water Act Rules: The Radionuclide Rule

*Adapted and edited from the Radionuclide Rule, by Kevin Cottman*

The Radionuclide Rule's purpose is to help improve public health by reducing the exposure of radionuclides. The Office of Drinking Water has reviewed all of its water systems and has determined that no systems are vulnerable to manufactured nuclides. Radionuclides are found in air, water, soil, and living things; therefore, trying to avoid them completely is impossible. People are exposed to background levels of radiation constantly, through building materials (such as granite), airborne radon, and cosmic radiation from outer space. Interestingly, even some foods may have low levels of radiation.

Radionuclides enter drinking water through the erosion or chemical weathering of naturally occurring mineral deposits. Human activity, such as mining, industrial activities, or military activities that use or produce man-made radioactive materials can also contribute to their presence in water. Research suggests that long-term exposure to radionuclides in drinking water may cause cancer and long-term exposure to uranium in drinking water may result in kidney damage.

The Environmental Protection Agency (EPA) focused the rule on four contaminants: combined radium-226/228, gross alpha, gross beta and photon emitters, and uranium. Based on research, the EPA set the maximum contaminant level (MCL) for combined radium-226/228 at 5 pCi/L, gross alpha at 15 pCi/L, beta/photon emitters at 4 mrem/yr, and uranium at 30 µg/L. Additionally, the detection limit for gross alpha is 3 pCi/L, radium-226 is 1 pCi/L, radium-228 is 1 pCi/L, and uranium is 1 µg/L.

All community water systems started their monitoring of the four contaminants in December 2003 and had the monitoring completed by the end of December 2007. The initial monitoring required four consecutive quarters of sampling at each Distribution Entry Point (DEP). After the first two quarters of sampling, the state could wave the final two quarters if the results were below the detection limit on both samples.

Compliance for radionuclides is based on a Running Annual Average (RAA). The RAA is calculated first by averaging each quarter together if more than



### Spring 2017

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# A Message from the New Administrator, Keith Mensch

It's a year of transition. A new presidential administration brings a new EPA administrator, a new governor's administration brings a new Department of Health and Social Services cabinet secretary, and the retirement of the program administrator for



Delaware's Office of Drinking Water (ODW) brings a new program administrator. That's where I come in.

I was selected as program administrator for ODW, and accepted the position, effective February 20, 2017. I spent

much of my career in the field of environmental health, both in the public and private sectors. I will strive to apply the knowledge and experience from my career to ODW and to the public water systems in Delaware, so

they may continue to provide safe drinking water to their consumers.

2017 and the years to follow will be impactful on the drinking water community. A few issues on the horizon are: long-term revisions to the lead and copper rule, new software for drinking water data and associated electronic communications, infrastructure improvements via the Drinking Water State Revolving Fund, emerging contaminants, and cyber security. While ODW is tasked to regulate public drinking water, my goal is to also be a guide for the drinking water regulated community to navigate through these pending and sometimes complex issues.

I am excited to be in my new role and I look forward to working with everyone in the drinking water community. If you have any questions or concerns, do not hesitate to contact me at our office at 302-741-8630.

# Sampling and Sampling Schedules

by Keith Harrison

All public water systems are required to sample and test their drinking water on a regular basis. This requirement ensures that the drinking water is safe and meets state and federal drinking water standards. Sampling may occur monthly, quarterly, annually, every three years, every six years, or every nine years. The frequency of sampling is determined by the federal rule for which you are sampling.

The backbone of sampling is the schedule. Each water system will have a number of sample schedules that must be followed. The actual number of sample schedules is different for each water system and depends on the type of source water, whether the water system uses disinfection, etc. Public water system managers and certified water operators should be familiar with the sample schedules for their water systems. All sample schedules are located on a publicly accessible web page, Drinking Water Watch (DWW), <https://drinkingwater.dhss.delaware.gov/>.

The sample plan is another important element in relation to sampling and is required for all public water systems. It's a map of the system with a narrative or list of all the sample locations for three Safe Drinking Water Act rules: the Revised Total Coliform Rule, the Lead

and Copper Rule, and the Disinfection Byproducts Rule. With the exception of these rules, the sample collection locations do not need to be specified on a plan, as they are collected from the Distribution Entry Point.

Delaware is unique as state personnel collect a large portion of water samples for many of the state's public water systems. Nonetheless, each water system is responsible for ensuring compliance with the sample schedules. The responsible person for each water system must be familiar with the sample schedules and regularly check to verify compliance.

Compliance with sample schedules is evident upon review of the water quality report data generated from DWW. For example, if you know that your water system is on an annual schedule for a particular rule, then you would expect to see data results for that year. If you don't see results for that year, there are two possible explanations. The first possibility is that there were no detectable levels of contaminants in the drinking water (DWW does not report non-detections). The second is that the system is out of sampling compliance for that rule, and the water system should contact the Office of Drinking Water immediately at 302-741-8630.

# Waterborne Disease Spotlight — Copper Toxicity

by Keith Mensch

**Identification:** Copper poisoning occurs when inorganic copper is ingested or inhaled and enough is absorbed into the blood stream to surpass the body's natural ability to regulate it. Acute and chronic copper poisoning can occur. Acute copper poisoning generally occur at higher copper levels or in a susceptible individual.

**Symptoms:** Acute exposure can cause nausea, vomiting, diarrhea, abdominal pains, and headaches. Extreme acute exposure and chronic exposure to elevated copper levels can cause gastrointestinal bleeding and liver and kidney damage.

**Occurrence:** Copper poisoning is ranked sixth on the Centers for Disease Control and Prevention's list of top 10 causes of public water system outbreaks.

**Sources of Exposure:** Primarily due to corrosive water leaching copper from piping and plumbing fixtures; food, primarily from cooking in copper vessels; and air (smelting/industrial).

**Modes of Exposure:** Ingesting copper-contaminated food and water, or inhaling of copper fumes and particles generated from smelting or burning materials with copper.

## Radionuclide Rule — from page 1

one sample per quarter was collected. All four quarters are averaged together to determine the RAA. The average is rounded to the nearest whole number. The monitoring frequency for each water system is determined by the RAA.

The information below can be used to calculate the monitoring frequency of gross alpha, combined radium-226/228, and uranium:

1. If the RAA is less than the defined detection limit, the sampling frequency is one sample every nine years.
2. If the RAA is greater than the detection limit, but less than or equal to half the MCL, the sampling frequency is one sample every three years.
3. If the RAA is greater than half the MCL, but less

**Susceptibility:** Infants younger than age 1 and individuals with Wilson's Disease have increased susceptibility due to lacking the ability to properly regulate copper in the body, reducing the transport of copper to bile and subsequent excretion.

### Preventive Measures:

- For drinking water: replace copper pipes and plumbing fixtures containing copper, treat corrosive water, and cold-water flush drinking water taps, if recommended.
- Enforce occupational health and ambient air quality standards.
- Limit the use of uncoated copper cookware to non-acidic foods.

**Drinking Water Facts:** Copper is typically only found in source water in trace quantities. Copper levels can increase through the distribution system. Copper leaches into drinking water from copper piping and plumbing fixtures when the water is corrosive or heated. The U.S. Environmental Protection Agency's Action Level (90th percentile) for copper is 1.3 mg/L. Although acute toxicity levels can vary from person to person, outbreaks and studies have shown that a copper level in drinking water as low as 4 mg/L can induce symptoms including headache, nausea, vomiting, and diarrhea due to copper toxicity.

than or equal to the MCL, the sampling frequency is one sample every three years.

4. If the RAA is greater than the MCL, the sampling frequency is one sample every quarter.

Only water systems that are deemed vulnerable to contamination from manufactured radionuclides are required to test for gross beta emitters, tritium, and strontium-90. The frequency of compliance sampling is quarterly for gross beta emitters and is annually for Tritium and strontium-90. If the RAA is less than or equal to 50 pCi/L, the system may reduce the monitoring frequency for all three contaminants to once every three years. When the RAA is greater than 50 pCi/L, the water must be tested for 179 individual nuclides. Compliance is achieved through calculations used to determine the maximum millirem (dose of energy) exposure.



# Miss Utility of Delmarva

Know what's below. Call before you dig. IT'S THE LAW!

Delaware law requires anyone digging to give notice of at least two full business days (not counting weekends or holidays), prior to the day they plan to start work. This law includes professional excavators, as well as property and homeowner's contractors.

Call Miss Utility of Delmarva at 811 or 800-282-8555, visit [www.missutilitydelmarva.com](http://www.missutilitydelmarva.com), or visit any time of the day or night and follow these steps:

1. **WAIT** for the site to be marked with paint, flags, or stakes by the utility line owners.
2. **RESPECT THE MARKS.**
3. **DIG WITH CARE.** This means hand digging within two feet on either side of any marked area.



## Approved Sampler/Tester (AST) Training

Approved samplers/testers are certified by the Office of Drinking Water to conduct routine water sampling and water quality analyses. Approved samplers/testers work under the direction of a fully licensed water operator. During training, participants will learn about waterborne bacteria and the Total Coliform Rule that regulates bacteria in drinking water. They will also learn about other chemicals and compounds that may enter drinking water. The focus of the approved sampler/tester trainings is to help participants understand drinking water regulations in relation to public health. Educational Contact Hours (ECHs) are offered for these trainings.

### Training Locations:

Dover: Office of Drinking Water, 43 S. DuPont Hwy., Dover, DE 19901.

Milford: Delaware Rural Water Association, 210 Vickers Drive, Milford, DE 19963

### Approved Sampler/Tester (AST) Trainings

Email registration is required for all. Send registration requests to [keith.harrison@state.de.us](mailto:keith.harrison@state.de.us).

### AST Basic, 9:00 a.m. to noon (3 ECHs) \*

The Basic course is a three-hour training for those new to the AST program.

June 8, 2017, Dover

July 13, 2017, Dover

August 10, 2017, Dover

September 14, 2017, Dover

October 10, 2017, 8:30 a.m., Milford

October 12, 2017, Dover

November 9, 2017, Dover

### AST Refresher, 9:00 a.m. to 10:30 a.m. (1.5 ECHs) \*

Bring your testing kit if you have one.

June 22, 2017, Dover

July 27, 2017, Dover

August 24, 2017, Dover

September 28, 2017, Dover

October 24, 2017, 8:30 a.m., Milford

October 26, 2017, Dover

November 30, 2016, Dover

\* Unless otherwise noted