



Regulatory Review

1. Which one of the following correctly describes how RTCR protects public health? (Choose only one).
 - a. Identifies conditions under which special purpose samples are noncompliant
 - b. Dictates the temperature at which samples from seasonal water systems must be shipped, and mandates penalties for noncompliance
 - c. Mandates that seasonal systems designate an appropriate MCL for *E. coli* at the beginning of each operating season, prior to serving water to the public
 - d. Requires systems to assess their infrastructure and sampling practices when total coliforms exceed prescribed levels

2. Which statement is ***not*** true about a water system's responsibilities under the RTCR requirements? (Choose only one).
 - a. Reporting/record-keeping guidelines require lab samples to be shipped at 40° Fahrenheit (4.44° C), or below
 - b. Monitoring guidelines require systems to develop a sample siting plan that identifies when and where samples will be taken.
 - c. Assessment and Corrective Action guidelines require systems to fix sanitary defects found via a Level 1 and/or Level 2 assessment
 - d. Violations and Public Notification guidelines require systems to report drinking water violations to their primacy agency within prescribed timeframes

3. After routine monitoring, your system finds one TC+ sample. What is your immediate next step? (Choose only one).
 - a. Call the Primacy Agency to inform them where the TC+ sample was found
 - b. Submit a completed Level 2 assessment form to the Primacy Agency
 - c. Notify the public about potential drinking water quality issues
 - d. Take 3 repeat samples within the next 24 hours

4. Your system has found one routine sample to be TC+. In which one of the following cases is a Level 1 Assessment triggered? (Choose only one).
 - a. One additional TC+ sample is found during the same sampling period
 - b. The TC+ sample that is sent to the lab is shipped below 4.44° C (40° F)
 - c. You fail to collect 3 special-purpose samples during the next 48 hours
 - d. The MCL for *E. coli* is above the accepted level of compliance

5. Your system has found one routine sample to be TC+. You've had no Level 1 assessment triggers in the previous 12-month period. In which one of the following cases would a Level 2 Assessment be triggered for this situation? (Choose only one).
 - a. One additional TC+ sample is found during the same sampling period
 - b. The TC+ sample that is sent to the lab is shipped below 4.44° C (40° F)
 - c. Some repeat samples that are required are not collected
 - d. The MCL for E. coli is above the accepted level of compliance

6. Assume that within one sampling period, a TC+ routine sample from your system is found to be *E. coli*-positive. Which one of the following is true in this situation? (Choose only one).
 - a. You must report the results to officials in your state's drinking water primacy agency within 48 hours
 - b. The *E. coli*-positive result has triggered a Level 1 Assessment for your system
 - c. The *E. coli*-positive result has triggered a Level 2 Assessment for your system
 - d. You must notify the public within 10 days of your *E. coli*-positive result

7. The maximum residual disinfectant level (MRDL) for chlorine or chloramines is ___ mg/L.
 - a. 1.0
 - b. 5.0
 - c. 0.0
 - d. 4.0

8. ___% of all waterborne disease originates from distribution system issues.
 - a. 10
 - b. 20
 - c. 30
 - d. 50

Disinfection Overview

9. Which types of disinfection provides protection in the distribution system?
 - a. Chlorine and Ozone
 - b. Chloramines and UV
 - c. Chlorine and Chloramines
 - d. Ozone and UV

10. Chlorine levels _____ over time in the distribution system.
 - a. stay the same
 - b. increase
 - c. decay
 - d. double

11. What is the multi-barrier principle (sometimes called “multi-barrier approach”)?
- A combination of various procedures, processes and tools that collectively prevent or reduce drinking water contamination from source to tap
 - The water purification system in a self-contained device that is used by people without access to potable water supplies
 - A water safety plan promoted by the World Health Organization as the most effective way to maintain a safe supply of drinking water for the public
 - A drinking water standard that is maintained and regulated by the Environmental Protection Agency

Coliform Sample Collection

12. All of the following are correct sample collection steps **except**:
- Refrigerate or ice the samples
 - Assemble Sampling Supplies
 - Open cold water tap and immediately collect sample
 - Adjust flow to about the width of a pencil
13. The purpose of a sample siting plan is to:
- Publish metrics regarding pathogen levels in the municipality’s public water system
 - Identify conditions that require public notification of excessive chlorine residuals
 - Ensure that collected samples are representative of a system’s water quality
 - Facilitate communication between the public water system and private citizens
14. Why is it important for public water systems to test for total coliforms?
- Total coliform detection is a warning sign that the public water system may be vulnerable to fecal contamination
 - To provide information on the yearly risk assessments that public water systems must submit to the Primacy Agency
 - To determine whether use of a Colilert© Test would provide more accurate readings over time
 - Coliform detection is an important step in determining whether the public water system should improve their chain-of-custody procedures

Distribution System Infrastructure

15. All of the following are solutions to dead ends in a distribution system, **except**:
- Pipe Loops
 - Flushing program
 - Flushing valves
 - Increasing chlorine residual

16. Opening and closing of valves can impact water quality in which one of the following ways:
- Affect water flow and release slugs of biofilm or metal in the water
 - Unintentionally increase the microorganisms in the water
 - Prevent contamination via cross-connections
 - Water stratification with high temperatures that encourage microorganism growth
17. Which one of the following can improve the quality of water in storage?
- Limiting the number and type of baffles
 - Hydraulic modeling
 - Configuration of inlet/outlet locations
 - Height of the storage tank
18. Which one of the following accurately describes a cross-connection where a backflow event could occur?
- A dishwasher connected to an airgap installed on the sink
 - A garden hose attached to an outside faucet on one end, with the other end in the swimming pool
 - Vertical clearance between a faucet and the flood-level rim of the sink
 - An irrigation system that uses water from a potable source, and has a backflow device installed

Distribution Water Quality

19. Chlorine is most effective between pH ____ and ____?
- 1.5 – 3.5
 - 3.5 – 5.5
 - 5.5 – 7.5
 - 7.5 – 9.5
20. If customers complain their water tastes or smells like a rotten egg, _____ is likely the cause.
- Hydrogen sulfide
 - Di- and trichloramines
 - algae
 - excess chlorine
21. Rapid decay of chlorine may indicate _____?
- Hydraulic modeling needs to be performed
 - A distribution system problem that should be investigated
 - Lead and copper issues in your distribution system
 - Your system's pH level is neither acidic nor basic

22. Heterotrophic Plate Count:
- Indicates the types of organisms present in your system
 - Is a general indicator of your system's health
 - Has not been found useful for water quality management purposes
 - Provides you with helpful information about the source of system pathogens

Flushing

23. There are _____ steps to an effective flushing program.
- Three
 - Four
 - Five
 - Six
24. What should you do to minimize customer complaints about your utility's flushing operations?
- Never perform unidirectional flushing at night
 - Notify the public prior to any flushing event
 - Flush from end of distribution system to source, minimizing residential impact
 - Submit a flushing plan to your municipality and obtain approval
25. Why is a flushing program important, even though customers may complain and perceive it as a waste of their water and tax dollars?
- Flushing helps to eliminate non-potable water from the system; without regular flushing operations, utility customers would be at greater risk for health problems
 - You should not flush if there are many customer complaints; instead, you should consider abandoning the program
 - Regular flushing maintains overall health of pipes, valves, and other distribution system infrastructure
 - So that your system can determine where continuous blow-offs can be used to address the source of water quality issues
26. Which one of the following answers lists the four steps utilities should take to develop a flushing program?
- Answer (a):
 - Determining the appropriateness of flushing as part of your utility's maintenance program
 - Planning and management of the flushing program
 - Implementation of the flushing program, and collection of program data
 - Evaluating and revising the flushing program
 - Answer (b):
 - Assessing potential for community cooperation with program objectives
 - Determining whether to use conventional or unidirectional flushing
 - Using hydraulic modeling to determine the plan and sequence of flushing
 - Evaluating the potential for non-revenue water loss

- c. Answer (c):
 - i. Submitting the program plan to the primacy agency for approval
 - ii. Analyzing the potential for water hammer events
 - iii. Contacting media representatives to inform them of the program and obtain public comment
 - iv. Determining local issues unique to your area that would negatively impact your flushing program
- d. Answer (d):
 - i. Identifying the location of cross-connections in your system
 - ii. Mapping traffic patterns and possible safety concerns
 - iii. Establishing a pilot flushing program to estimate water used
 - iv. Identifying where to partially open hydrant valves to avoid water quality impacts

Main Breaks and Cross Connections

27. The first 3 steps when disinfecting new pipe are:

1. Flush the line to remove particulates
2. Chlorinate
3. Flush to remove chlorinated water

Which one of the following is the 4th step in this process?

- a. Notify the state
- b. Flush again
- c. Refill and test for coliform
- d. Wait 24 hours before resuming service

28. Which of the following is an example of a reactive response to water quality challenges such as main breaks and cross connections?

- a. Systematic flushing of the system
- b. Prioritizing mains that need replacement
- c. Including main break repair costs in the Capital Improvement Plan
- d. Implementing cross-connection control devices

29. Which of the following is an example of a cross-connection that could endanger public health?
- a. A 5 mg/L residual that remains 24 hrs after chlorination
 - b. A garden hose with one end connected to an outside water spigot, and the other end in your swimming pool
 - c. An air gap that is twice the diameter of the water supply outlet but not less than one inch, at minimum
 - d. An atmospheric vacuum breaker (AVB) assembly that consists of a polyethylene float

Source Water Protection:

30. What is a source water assessment program?
- a. An annual water quality assessment/rating of utilities' source water protection efforts
 - b. A program that addresses a public water system's capability to protect drinking water sources from contamination
 - c. A program that prescribes treatment techniques for source water contaminants
 - d. A program that determines and advises on recreational uses of surface water lakes
31. Which of the following is **not** the responsibility of a state source water assessment program?
- a. Identifying land areas that provide water to each public drinking water source in the state
 - b. Inventorying existing and potential sources of contamination in delineated areas
 - c. Remediating contaminants in domestic wells serving single households
 - d. Determining each drinking water system's susceptibility to contamination
32. Who is required to have a source water assessment program?
- a. Large municipalities
 - b. Mobile home parks
 - c. Well users
 - d. All of the above
33. Why should these assessments be reviewed?
- a. To determine if there are any changes
 - b. To document a new drinking water source
 - c. To reevaluate likelihood of contamination
 - d. All of the above
34. Which of the following are potential threats to a community's source water? (choose any that apply)
- a. Road salting activities
 - b. Septic systems
 - c. Stormwater runoff
 - d. Agricultural activities

35. Obtaining total coliform samples from taps with household point-of-use devices is:
- Never acceptable
 - Always acceptable
 - Acceptable if you remove the device
 - Acceptable if you flush the tap first
36. You should never rinse out the total coliform sample collection bottle prior to collection because:
- This is not true; you should always rinse out the TC sample collection bottle at least 2-3 times prior to collection
 - It increases the likelihood that the DPD agent will adhere to the inside of the bottle and will therefore not mix well with the sample
 - The bottle contains a dechlorination agent, and rinsing will yield false results
 - The Colorimeter will be unable to measure the results and will return a zero reading
37. After placing a free chlorine residual sample in the Colorimeter, how long should you wait between the time you press the Measure button, and taking the measurement?
- 4-5 minutes
 - 3-6 minutes
 - 2-3 minutes
 - 1 minute
38. After placing a total chlorine residual sample in the Colorimeter, how long should you wait between the time you press the Measure button, and taking the measurement?
- 4-5 minutes
 - 3-6 minutes
 - 2-3 minutes
 - 1 minute
39. Why should you wipe chlorine residual sample vials with a Chem-wipe or lint-free cloth prior to placing in a Colorimeter?
- You must ensure that no dechlorination agent adheres to the outside of the vial
 - It is important to eliminate fingerprints, scratches, bubbles or anything that could interfere with results
 - Thoroughly cleaning the vial enables you to better line it up in the Colorimeter
 - To ensure that the vial is at room temperature prior to placing in the Colorimeter

40. Lining up chlorine residual sample vials in a consistent manner in the Colorimeter serves what purpose?
- It is not necessary to line up the chlorine residual sample vials consistently
 - It is a helpful strategy to use so that you don't forget to zero the Colorimeter
 - It facilitates a better mixture between the DPD reagent and the sample
 - It helps to ensure that results are more repeatable and precise
41. Chlorine residual mapping:
- Is reactive rather than proactive, and wastes valuable system resources
 - Helps discover patterns and locations where there may be real/potential water quality problems
 - Should never be done when there has been a main break with depressurization
 - Is not a useful method to determine whether public health protection may be compromised
42. A contour map is:
- The end-product of a chlorine residual mapping exercise
 - A map obtained from the U.S. Weather Service that shows weather patterns
 - A type of map that applies only to wastewater systems
 - A map developed by professional surveyors that is useful but not necessarily to scale