The Revised Total Coliform Rule

A Guide for Small Public Water Systems

Office of Water (4606M)

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DISCLAIMER

This guide is intended to provide information to assist small public water systems serving 1,000 or fewer persons in complying with the requirements of the Revised Total Coliform Rule (RTCR). This guide is not a substitute for applicable legal requirements, nor is it a regulation itself. Thus, it does not impose legally binding requirements on any party, including EPA, states or the regulated community. While EPA has made every effort to ensure the accuracy of the discussion in this guide, the obligations of the regulated community are determined by statutes, regulations and other legally binding requirements. In the event of a conflict between this document and any statute, regulation or other legally binding requirement, this document would not be controlling.

Although this document describes suggestions for complying with the RTCR requirements, the guidance presented here may not be appropriate for all situations and alternative approaches may provide satisfactory performance.

Mention of trade names or commercial products does not constitute an EPA endorsement or recommendation for use.

Interested parties are free to raise questions and objections to the guide and the appropriateness of using it in a particular situation. EPA may decide to revise this guide without public notice and comment period to reflect the changes to EPA's approach to implementing the RTCR or to clarify or update text.

About This Document

This document aims to assist small water systems serving 1,000 or fewer persons in complying with the requirements of the Revised Total Coliform Rule (RTCR). It is divided into four parts, **Parts A, B, C** and **D**.

Part A, **The Revised Total Coliform Rule, An Overview**, gives concise information about the requirements of the RTCR and is intended as a quick reference resource.

Part B, **The Revised Total Coliform Rule, In Detail**, presents the requirements of the RTCR in more detail than **Part A** and is intended to provide a deeper understanding of the rule.

Part C, Compliance Checklist, provides a checklist to help water systems determine their compliance with the rule.

Part D, Appendices, presents the different routine monitoring frequencies available to water systems, if the drinking water primacy agency allows reduced monitoring. It presents the criteria systems must comply with to remain on or qualify for reduced monitoring, and the conditions that will trigger a system to go to a more frequent monitoring schedule.

Each part is designed as a stand-alone document and can be used independently of the other parts of the guide.

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Part A

The Requirements of the RTCR

An Overview

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A. The Requirements of the RTCR, an Overview

A.1. Is this guide for me?

THE REVISED TOTAL COLIFORM RULE (RTCR) REQUIREMENTS PRESENTED IN THIS DOCUMENT

The requirements presented here are the federal requirements of the RTCR. Drinking water primacy agencies may have additional requirements specific to their programs. Systems should check with their primacy agency to make sure they are complying with all their RTCR requirements.

The guide is designed for use by public water systems serving 1,000 or fewer persons to help them comply with the requirements of the Revised Total Coliform Rule (RTCR).

Primacy agencies and technical assistance providers may also benefit from reading this guide.

This part of the guide summarizes the key requirements of the RTCR. For a more comprehensive discussion of the rule, water systems can review **Part B** of this guide.

Systems should check with their drinking water primacy agency to determine if there are other requirements specified by the primacy agency with which they need to comply.

What Is a System Type?

It is important for water systems to determine their system type, as requirements vary depending on whether they are a community water system or non-community water system, a system that uses ground water or surface water, and whether or not they are a seasonal system. Systems should check with their drinking water primacy agency if they are not sure about their proper classification.

A.2. What is the RTCR?

The RTCR is one of the national primary drinking water regulations that protect the safety of drinking water in the U.S. It protects public health by limiting the levels of certain microbial organisms in drinking water. The RTCR is a revision of the 1989 Total Coliform Rule, which systems must comply with until March 31, 2016 (unless the drinking water agency starts to implement the RTCR earlier). **Starting no later than April 1, 2016, all systems must comply with the requirements of the RTCR**.

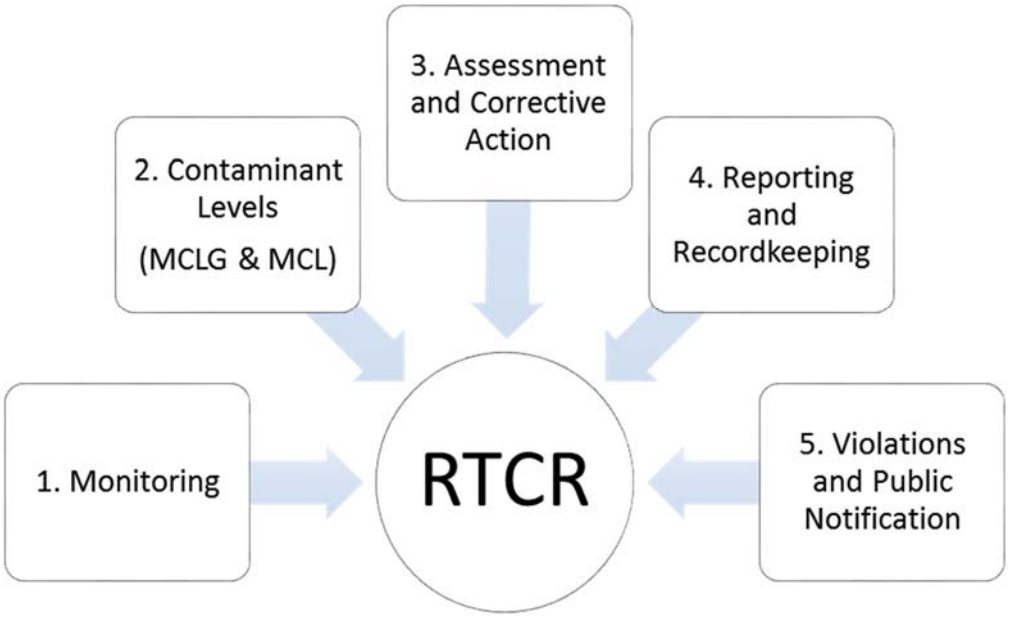
The RTCR requires systems to monitor for the presence of **total coliforms** and ***E. coli*** in drinking water. Total coliforms are a group of closely related bacteria that are natural and common inhabitants of soil and surface waters. Their presence in drinking water suggests that there has been a breach or failure in the water system (for example, a hole in the pipe); and pathogens, which are disease-carrying organisms, may have entered the drinking water. *E. coli*, on the other hand, is a type of bacteria that is a subset of total coliforms, most often fecal in origin (that is, from human or animal wastes). The presence of *E. coli,* therefore, can indicate that the water has been contaminated with fecal waste, which can contain pathogenic organisms.

The RTCR sets a maximum contaminant level (MCL) for *E. coli*. The MCL is the level with which systems must comply. In addition, certain levels of total coliforms in the water can trigger the system to perform an assessment of their infrastructure and sampling practices, as explained later in this guide.

A.3. What does the RTCR require of water systems?

The requirements of the RTCR can be grouped into the following five categories. All water systems must comply with these requirements. These requirements are discussed in greater detail throughout this section.

Figure A-1. The RTCR Requirements



A.3.1. Monitoring

Public water systems must regularly monitor for the presence of total coliforms and *E. coli* in their water based on a **sample siting plan**. The water system must develop a sample siting plan that identifies when and where the samples will be taken. Samples must be taken in a location that is representative of the water quality in the distribution system (each water sample must be at least 100 ml in volume). The sample siting plan is subject to drinking water primacy agency review and revision.

What Steps Do I Need to Take?

1) Develop a sample siting plan that has your schedule and location of water samples.

2) Take a sample of your water on a regular basis and have it tested for the presence of total coliforms. This is your routine sample.

3) If your routine sample is total coliform-positive: (a) have it tested for *E. coli* and (b) take repeat samples within 24 hours of being notified of the positive result.

4) Have your repeat samples analyzed for total coliforms and, if positive, for *E. coli*.

See Figure A-3 for an illustration of the steps.

Compliance Samples

1) Routine samples– These are water samples that water systems are required to take on a regular basis – whether that frequency is annually, quarterly, or monthly – to monitor for the presence of total coliforms. A water sample that is positive for total coliforms must be further tested for the presence of *E. coli.* State-certified laboratories generally test positive total coliform samples for *E. coli* automatically, but water systems should check to be sure this is completed. A positive sample may also require additional sampling the next month, as described below.

If necessary, systems should check with their drinking water agency to determine the minimum number and frequency of total coliform samples they need to take (that is, one every month, one every three months, one every year, etc.). Systems can also check with

their drinking water primacy agency to determine if their existing sample siting plan needs to be revised.

Systems on a quarterly or annual monitoring schedule may be required to take routine samples more frequently.

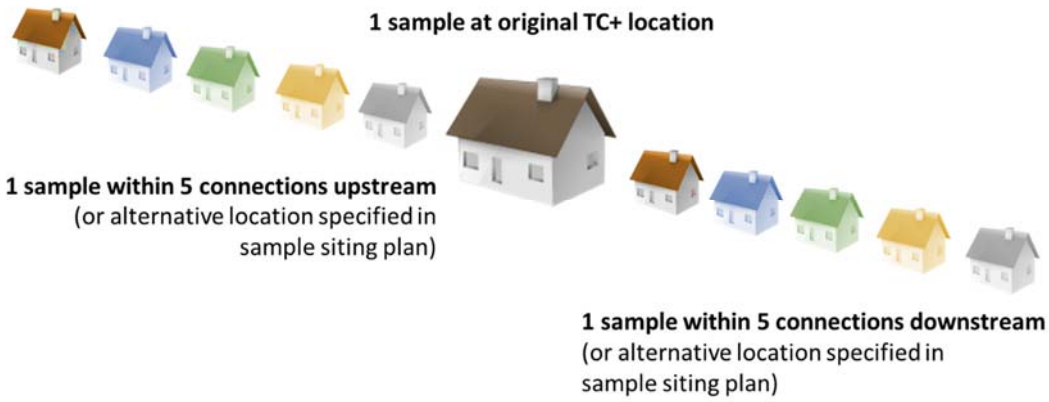
- The system must collect three **routine samples the month following a total coliform-positive sample**. It must continue to do so until all the samples are total coliform-negative or it has been informed by its primacy agency that it needs to take samples on a monthly basis rather than on a quarterly or annual basis.
- The RTCR specifies certain conditions that will require a system to take samples more frequently. For example, a system on annual or quarterly monitoring with test results repeatedly showing the presence of total coliforms or *E. coli* in its water may be required to take samples on a monthly basis. These conditions are found in **Part C** of this guide, under Items J to M of the Compliance Checklist.

2) Repeat samples– These are follow-up samples that water systems are required to take each time a routine sample is positive for total coliforms. Repeat samples, like routine samples, must be tested for the presence of total coliforms, and if positive, for the presence of *E. coli.* State-certified laboratories generally do this automatically but water systems should check to be sure it is completed. Water systems must collect **three repeat samples** (each water sample must be at least 100 ml in volume) within **24 hours** after being notified of the total coliform-positive sample result. **Figure A-2** shows where the repeat samples must be taken. For systems with only a single service connection, the drinking water primacy agency may allow the system to take the repeat samples over a period of three consecutive days (one sample for each day) or collect a larger volume repeat sample(s) in one or more sample containers of any size, as long as the total volume collected is at least 300 ml.

Special Purpose Samples

Special samples are collected during repairs, responses to complaints, or for other maintenance reasons. Collection of these types of samples is often necessary to ensure that coliforms have not entered the distribution system as a result of events such as installation of new mains, main break repairs, or routine maintenance. **Special samples are not included in compliance or assessment trigger calculations**.

Figure A-2. Location of Repeat Samples



Sending Samples to the Laboratory

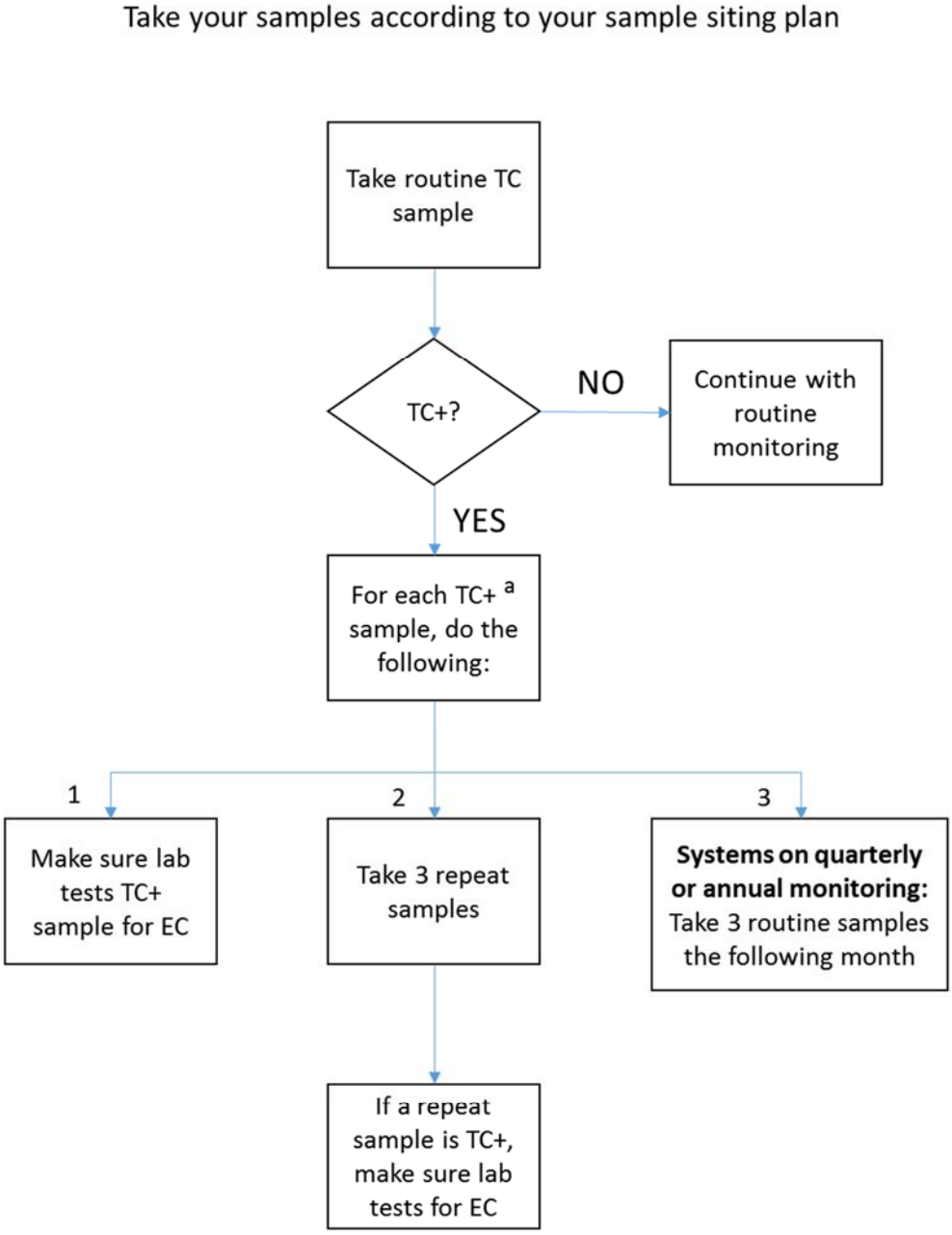
Systems must send their samples to a laboratory certified by the primacy agency for testing. Send the sample(s) as soon as possible, keeping in mind that the laboratory must start the tests within 30 hours of sample collection. EPA encourages (but does not require) that samples be shipped below 10°C (50°F). This temperature may be achieved by carefully packing the water samples in ice. Care should be taken when packing samples to avoid freezing. The laboratory may invalidate frozen samples.

In general, systems follow the sequence outlined in **Figure A-3** when complying with the monitoring requirements of the RTCR.

Compliance Tips

- Have your sample siting plan in an accessible place. Keep it up to date.
- Have sampling kits available and ready to use when you need to sample your water.
- Contact your drinking water agency if you have any questions about RTCR requirements.

Figure A-3. Diagram Showing the RTCR Monitoring Requirements



TC – total coliforms; **TC+** - total coliform-positive
EC – *E. coli*; **EC+** - *E. coli*-positive

[a] If you operate a ground water system not providing 4-log treatment of viruses, collect source water samples to comply with the Ground Water Rule.

Additional Requirements for Seasonal Systems

A **seasonal water system** is a non-community water system that starts up and shuts down operations at the beginning and end of each operating period. Examples are parks, campgrounds, fairgrounds and ski resorts.

I operate a seasonal system. What other requirements do I need to comply with?

1) Completion of primacy agency-approved start-up procedures before serving water to the public.

2) Certification to the primacy agency of completion of start-up procedures.

3) Designation in sample siting plan of vulnerable time period to take sample, if monitoring quarterly or annually.

Typical examples of seasonal systems

Start-up Procedures

Seasonal systems are required to complete start-up procedures at the beginning of each operating season before serving water to the public. Some examples of start-up procedures that a drinking water primacy agency may require of seasonal systems include the following:

Flushing all pipes

Cleaning all water storage tanks

Disinfecting

Inspecting and repairing components

Collecting samples

Certification of Completion of Start-up Procedures

Seasonal systems are required to certify to the drinking water primacy agency that they have completed the start-up procedures. Each primacy agency will have different methods of certification. Systems should check with their drinking water primacy agency to determine how they will complete the certification process.

Sampling During the Vulnerable Time Period

Seasonal systems on a quarterly or annual monitoring period must state in their sample siting plan the time period when they will take their routine sample. This period is based on site-specific conditions. Consider, for example, when the demand for water is the highest, when the source water is most vulnerable to contamination (for example, during the wet season), or when there is a source of contamination that might affect the area surrounding the well (for example, spreading of animal waste for fertilizer). The system must have the sample siting plan approved by the drinking water primacy agency and the system must monitor during the period identified in the sample siting plan.

Tips for Seasonal Systems

- Check with your drinking water primacy agency to determine what start-up procedures you need to complete ahead of your opening for the season.
- Submit your certification of completion of start-up procedures as required by your drinking water primacy agency.
- Contact your drinking water primacy agency if you have any questions about RTCR requirements.

A.3.2. Contaminant Levels (MCLG and MCL)

Maximum contaminant level goal (MCLG)

Level of contaminant in drinking water below which there is no known or expected risk to health. It is a goal that allows for a margin of safety.

Maximum contaminant level (MCL)

Highest level of contaminant that is allowed in drinking water. It is set as close to the MCLG as feasible using the best available technology and taking cost into consideration. The MCL is the level the systems must comply with.

MCLG for *E. coli*

The MCLG for *E. coli* is set at **zero**.

MCL for *E. coli*

The MCL for *E. coli* is based on the results of the routine sample and its associated repeat samples. The system is out of compliance with the MCL if:

- The system has an ***E. coli*-positive repeat** sample following a **total coliform-positive routine** sample.
- The system has a **total coliform-positive repeat** sample following an ***E. coli*-positive routine** sample.
- The system fails to take all required repeat samples following an *E. coli*-positive routine sample.
- *E. coli* analysis is not completed when any repeat sample tests positive for total coliforms.

Compliance Tips

- Always take three repeat samples within 24 hours of being notified that your routine sample is total coliform-positive.
- Make sure that your laboratory is testing for *E. coli* when a sample is total coliform-positive.
- Contact your drinking water primacy agency if you have any questions about the requirements.

A.3.3. Assessment and Corrective Action

The RTCR requires an assessment or an investigation of the water system when certain conditions occur. There are two levels of assessments. A Level 1 assessment is a basic examination of the system. The Level 2 assessment is a more comprehensive and more in-depth examination of the system compared to a Level 1 assessment. Any problem (referred to as sanitary defects) found during the assessment must be corrected. The assessment and corrective action(s) must be completed within a required timeframe.

How do I comply with the assessment and corrective action requirements of the RTCR?

1) Determine if you have triggered either a Level 1 or Level 2 assessment.

2) Determine who can conduct the assessment and what assessment form to use.

3) Make sure that the assessment is conducted as soon as practical.

4) Correct any sanitary defects identified during the assessment.

5) Complete the assessment form and submit it to the drinking water primacy agency within 30 days of learning of the trigger.

Sanitary Defects

A sanitary defect (1) could provide a path for microbial contaminants to enter the distribution system or (2) indicates an existing failure or failure that could happen soon in a protective barrier (for example, treatment, practice, or structure) that is already in place. Examples include the following three scenarios:

Cracks on a storage tank | Rat droppings around the wellhead | Seal on wellhead not watertight

Photos courtesy of Nevada Division of Environmental Protection

Level 1 Assessment Triggers

A Level 1 assessment is required (triggered) when either of the following conditions occurs:

- Two or more total coliform-positive samples in the same sampling period (include the results of all routine and repeat samples)
- Not all required repeat samples are collected after a routine total coliform-positive sample

Level 2 Assessment Triggers

A Level 2 assessment is required (triggered) when any of the following conditions occurs:

- An *E. coli* MCL violation
- A second Level 1 assessment is triggered within a rolling 12-month period
- For systems on an annual monitoring frequency, a Level 1 assessment is triggered in two consecutive years

Persons Allowed to Conduct a Level 1 Assessment

A responsible party of the public water system can conduct a Level 1 assessment. The water system should consult with their drinking water primacy agency to determine who in their water system can conduct the assessment.

Persons Allowed to Conduct a Level 2 Assessment

The Level 2 assessment must be conducted by someone approved by the drinking water primacy agency, which could be primacy agency staff or a third party (such as an outside contractor). In some circumstances, it could be conducted by one of the system's staff or management with the required qualification(s) specified by the drinking water primacy agency.

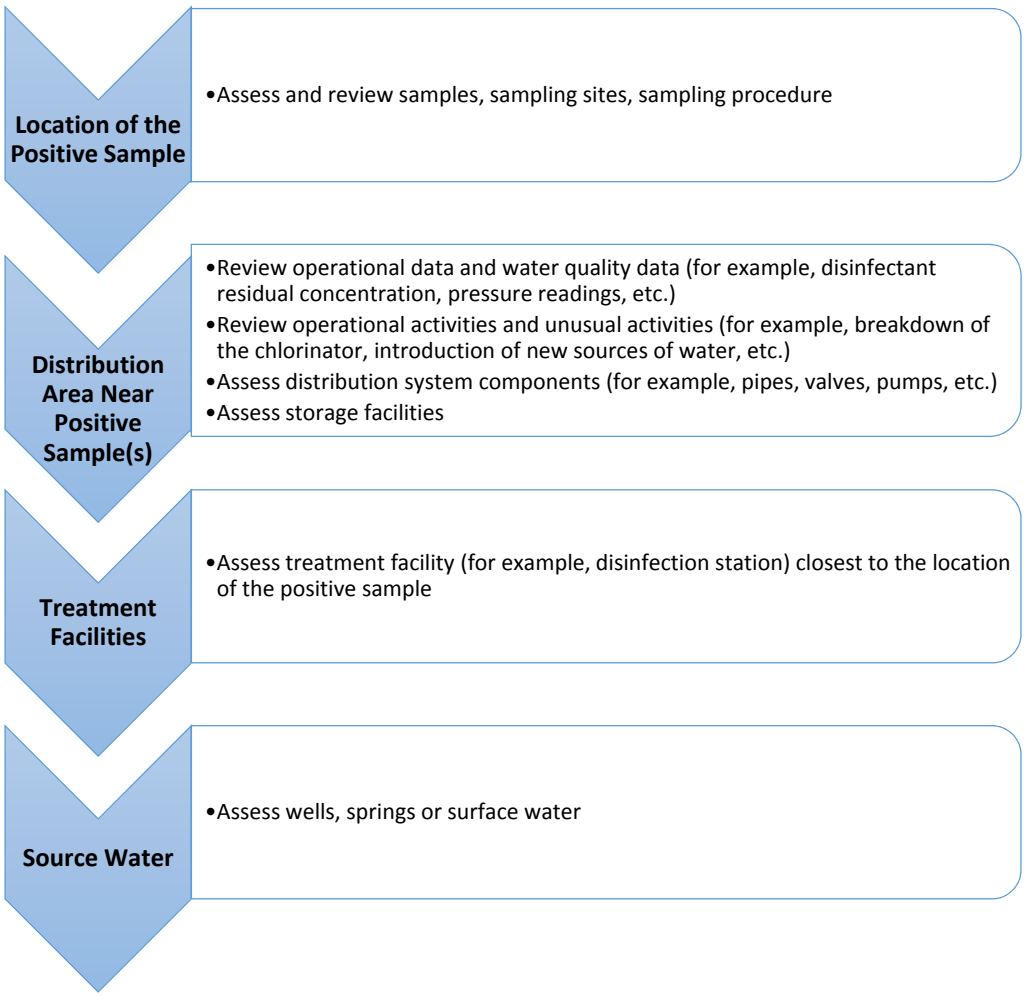
Assessment Forms

Water systems should check with their drinking water primacy agency to determine which assessment forms they are required to use and complete and where to submit them.

Conducting a Level 1 or Level 2 Assessment

Figure A-4 shows steps that the assessor can follow when conducting either assessment. Depending on the layout or the design of the system, not all elements may be present.

Figure A-4. Suggested Steps in Conducting a Level 1 or Level 2 Assessment



Timeline for Completing a Level 1 or Level 2 Assessment

A system must complete a Level 1 or Level 2 assessment, correct any sanitary defects found and submit the assessment form to the drinking water primacy agency **within 30 days** after learning that it has triggered the assessment. If there are corrective actions not completed at the time of the submission of the form, the system must also include a timetable for completing the rest of the corrective actions and report to their drinking water primacy agency when each outstanding corrective action has been completed.

Tips for Preparing for an Assessment

- Determine who can conduct a Level 1 and Level 2 assessment.
- Be familiar with the state's required forms and submittals.
- Create a standard operating procedure (SOP) for what to do when sampling results trigger an assessment.
- Understand which data source(s) to use to fill out the various sections of the form.
- Contact your drinking water primacy agency if you have any questions about the requirements.

A.3.4. Reporting and Recordkeeping

Systems need to report certain information to their drinking water primacy agencies within a required timeframe and keep certain records. **Table A-1** lists the items to report and **Table A-2** lists the records to keep.

Table A-1. Items Water Systems Need to Report

What to report	When to report to the drinking water primacy agency
Monitoring results	Within the first 10 days following either the end of the month the monitoring was completed, or the end of the required monitoring period, whichever is sooner. The system does not need to report this in the case where the state laboratory does the analysis and submits the results directly to the primacy agency.
E. coli-positive routine sample	By the end of the day when the system is notified of an *E. coli*-positive routine sample, unless the system is notified of the result after the primacy agency office is closed and the primacy agency does not have either an after-hours phone line or an alternative notification procedure. In this case, the system must notify the agency before the end of the next business day.
E. coli MCL violation[1]	By the end of the day when the system learns of an *E. coli* MCL violation, unless the system learns of the violation after the primacy agency office is closed and the primacy agency does not have either an after-hours phone line or an alternative notification procedure. In this case, the system must notify the primacy agency before the end of the next business day and notify the public within 24 hours of the violation.
Coliform treatment technique violation[1]	No later than the end of the next business day after the system learns of the violation. The public must be notified within 30 days.
Monitoring violation[1]	Within 10 days after the system learns of the violation. The public must be notified within a year of the violation.
Completed assessment form	Within 30 days after learning that the system has triggered an assessment.
Corrective action(s) not completed when assessment form was submitted	When corrective action is completed.

[1] Violations are discussed in **Section A.3.5** of this guide.

What to report	When to report to the drinking water primacy agency
Seasonal systems – certification of completion of primacy agency-approved start-up procedure	Prior to serving water to the public.
Certification of compliance with public notice requirements	Within 10 days of completing the public notification (whether initial notification or repeat notification).
Failure to comply with any of the requirements of the RTCR not already mentioned above	Within 48 hours of failing to comply with the requirement.

Table A-2. Records Water Systems Need to Keep

Records	Period of Time to Keep Records
Monitoring results	No less than 5 years.
Assessment forms[2] and documentation of corrective actions completed[3]	No less than 5 years after completion of the assessment and corrective action(s).
Repeat samples taken that meet drinking water primacy agency criteria for extension of 24-hour period for collection	No less than 5 years.
Copies of public notice (PN) issued and certification of compliance with PN regulations	No less than 3 years after issuance.
Sample siting plans	No less than 5 years (same period as records of microbiological analyses).

[2] Water systems should keep completed assessment forms regardless of who conducted the assessment.
[3] Or other available documentation of sanitary defects and corrective actions. EPA recommends that the system keep any photos, receipts, sample results, etc., related to assessments and corrective actions.

A.3.5. Violations and Public Notification

Systems that fail to perform a requirement are in violation of the rule. Some violations require a public notification, as shown in **Table A-3.** Systems should check with their drinking water primacy agency about the required language for public notices.

Table A-3. List of Violations and the Required Public Notification

Violation	Public Notification
***E. coli* MCL** • **Routine** total coliform-positive; **repeat** *E. coli*-positive • **Routine** *E. coli*-positive; **repeat** total coliform-positive • **Routine** *E. coli+*; system fails to take all **repeat** samples • **Repeat** total coliform-positive; sample not tested for *E. coli*	Tier 1 (issued within 24 hours)
Treatment technique • System fails to conduct the required assessment within required timeframe after exceeding a trigger. • System fails to complete required corrective action within required timeframe after identifying a sanitary defect. • Seasonal system fails to complete primacy agency-approved start-up procedure prior to serving water to the public.	Tier 2 (issued within 30 days)
Monitoring • System fails to collect all required routine or additional routine samples in a compliance period. • Routine total coliform-positive; sample not tested for *E. coli*	Tier 3 (issued within a year)
Reporting • System fails to submit monitoring report or completed assessment form after properly conducting monitoring or assessment in a timely manner. • System fails to notify its primacy agency of an *E. coli*-positive sample in a timely manner. • Seasonal system fails to submit certification of completion of a primacy agency-approved start-up procedure.	Tier 3 (issued within a year)

Part B

The Requirements of the RTCR In Detail

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Glossary of Terms

Clean compliance history – Clean compliance history, for the purposes of the Revised Total Coliform Rule (RTCR), is a record of no maximum contaminant level (MCL) violations under the Total Coliform Rule (TCR) and RTCR, no monitoring violations under the TCR and RTCR and no coliform treatment technique trigger exceedances or treatment technique violations under the RTCR. Clean compliance history is used as one of the criteria water systems must comply with to be eligible for a reduced monitoring frequency, if the drinking water primacy agency allows it.

Sanitary defect – A defect that could provide a pathway of entry for microbial contamination into the distribution system or that is indicative of a failure or imminent failure in a barrier that is already in place. Examples of sanitary defects can be a missing well seal, a hole in a pipe or a missing screen for a storage tank vent.

Seasonal system – A non-community water system that is not operated as a public water system on a year-round basis and starts up and shuts down at the beginning and end of each operating season. Typical examples are parks, campgrounds, fairgrounds and ski areas.

Treatment technique – A required process intended to reduce the level of a contaminant in drinking water. In the RTCR, the treatment technique includes the assessment and corrective action requirements of the rule.

List of Acronyms

CCR	Consumer Confidence Report
CFR	Code of Federal Regulations
CWS	Community Water System
EC	*Escherichia coli* or *E. coli*
EC+	*E. coli*-positive
GW	Ground Water
GWR	Ground Water Rule
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
NA	Not Applicable
NCWS	Non-community Water System
O&M	Operation and Maintenance
PN	Public Notification
POE	Point of Entry
POU	Point of Use
PWS	Public Water System
RTCR	Revised Total Coliform Rule
SOP	Standard Operating Procedure
SW	Surface Water
TC	Total Coliforms
TC+	Total Coliform-positive
TCR	Total Coliform Rule

B. The Requirements of the RTCR in Detail

B.1. Introduction

B.1.1. Is this guide for me?

THE REVISED TOTAL COLIFORM RULE (RTCR) REQUIREMENTS PRESENTED IN THIS DOCUMENT

The requirements presented here are the federal requirements of the RTCR. Drinking water primacy agencies may have additional requirements specific to their programs. Systems should check with their primacy agency to make sure they are complying with all their RTCR requirements.

This guide is designed for use by public water systems (PWSs)[4] serving 1,000 or fewer persons to help them comply with the requirements of the RTCR.

Primacy agencies and technical assistance providers may also benefit from reading this guide.

Readers who want a quick reference material regarding the requirements of the RTCR can refer to **Part A** of this guide. **Part B** goes into more detail on the requirements of the rule.

What Is A System Type?

It is important for water systems to determine what their system type is, as requirements vary depending on whether they are a community water system or non-community water system, a system that uses ground water or surface water, or additionally if they are a seasonal system. Systems should check with their drinking water primacy agency if they are not sure about their proper classification.

[4] "System," "PWS" and "water system" are used interchangeably in this document. Aircraft PWSs, which are covered under the Aircraft Drinking Water Rule (40 CFR part 141, subpart X), are excluded from having to comply with the RTCR. The use of "PWS" and its variants in this document, therefore, only refers to those water systems that are covered by the RTCR, which excludes aircraft PWSs.

B.1.2. What will water systems learn from this guide?

Public water systems have the important job of ensuring the safety of the drinking water provided to their customers. This guide aims to help water system personnel do their job by providing information about the RTCR and how to comply with it. In this guide, PWSs will learn about:

- The different requirements of the RTCR in the areas of (1) contaminant levels, (2) monitoring, (3) assessment and corrective action, (4) reporting and recordkeeping and (5) violations and public notification with which systems need to comply.
- The importance of monitoring drinking water to ensure its quality and protect public health.
- The importance of doing assessments of the system when certain trigger events occur signaling the possible presence of contamination.
- The importance of correcting any defects found during the assessment.
- Preventing the future occurrence of contamination that could lead to waterborne disease by complying with the requirements of the RTCR.

B.1.3. What is the RTCR?

The RTCR[5] is a National Primary Drinking Water Regulation under the Safe Drinking Water Act that protects public health by limiting the levels of certain microbial organisms in drinking water. It is a revision of the Total Coliform Rule (TCR), which has been in effect since 1989. **Water systems must comply with the RTCR beginning April 1, 2016.**

The RTCR retains the objectives and the basic monitoring requirements of the TCR, and a maximum contaminant level (MCL) for *E. coli*[6]. It requires water systems to periodically collect samples of water and have them analyzed for the presence of bacteria called total coliforms. Additional actions are required depending on the results of this periodic monitoring. The RTCR

[5] The requirements of the RTCR can be found in 40 CFR part 141, subpart Y.
[6] The acute MCL for *E. coli* is retained in the RTCR with additional conditions. See **Section B.2** of this guide.

offers greater flexibility for drinking water systems and greater opportunity for public health protection by the addition of new requirements. The changes include the following:

- The maximum contaminant level goal (MCLG) and MCL[7] for total coliforms in drinking water have been replaced with a requirement for water systems to conduct an assessment of their system if certain conditions (for example, presence of *E. coli* or repeated presence of total coliforms) indicate that they might be vulnerable to contamination, and to correct any problems identified during the assessment. The RTCR refers to the assessment and corrective action part of the rule as the treatment technique requirements.
- Small systems need to follow specific criteria to remain on or qualify for a reduced monitoring schedule, if the drinking water primacy allows reduced monitoring (see **Part D** of this guide).
- Small systems monitoring less frequently than monthly that experience specific events indicating non-compliance or high vulnerability to contamination are required to increase their monitoring. For example, a system on quarterly monitoring that has an *E. coli* MCL violation must begin monthly monitoring the month following the violation (see **Part D** of this guide).
- Seasonal systems, such as parks, campgrounds, fairgrounds and ski resorts, are required to comply with new requirements to minimize the risk of microbial contamination associated with the depressurization of the distribution system during the off-season.

The detailed requirements of the RTCR are further discussed in the following sections of **Part B** of this guide. Copies of the Federal Register Notice (February 13, 2013) of the RTCR can be downloaded from the Public Docket website at http://www.regulations.gov (search for EPA-HQ-OW-2008-0878-0298 and EPA-HQ-OW-2008-0878-0301).

[7] The MCLG is the level of contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety and are non-enforceable public health goals. The MCL is the highest level of a contaminant that is allowed in drinking water. MCLs are set as close to MCLGs as feasible using the best available treatment technology and taking cost into consideration. MCLs are enforceable standards.

B.1.4. Why is ensuring safe drinking water important?

If the water supply becomes contaminated, consumers can become seriously ill. Contaminated drinking water is one of the oldest known public health concerns. Preventing waterborne disease is one of the primary objectives of any drinking water system. Although waterborne disease outbreaks are relatively uncommon in the United States, they do occur. In most cases, the results are diarrhea, cramps, nausea and other symptoms. But in some cases – particularly among the young, the elderly and persons with weakened immune systems – waterborne diseases can lead to severe illness or death.

Regulated public water systems are required, under the Safe Drinking Water Act, to provide water that meets federal standards to their customers. Operators, one of the most important assets of any public water system, should take many steps to ensure that the public is provided with safe drinking water. One of the most important steps is to regularly test for coliform bacteria. The risk of waterborne disease is greatly reduced when the water system is designed and operated to provide multiple barriers of protection. The key barriers are:

- Source water protection (for example, proper well design, construction, maintenance)
- Treatment (for example, filtration, chlorination)
- Distribution system integrity (for example, water lines and storage facilities in good condition)

Complying with the RTCR will improve public health protection by helping to ensure that these barriers are in place.

B.2. Contaminant Level Requirements (MCLG and MCL)

B.2.1. What are the contaminants addressed by the RTCR?

What will I learn from this chapter?

- Contaminants of concern addressed by the RTCR
- The levels of these contaminants in drinking water that water systems must comply with

Maximum contaminant level goal (MCLG)

Level of contaminant in drinking water below which there is no known or expected risk to health. It includes a margin of safety.

Maximum contaminant level (MCL)

Highest level of contaminant that is allowed in drinking water. It is set as close to the MCLG as feasible using the best available technology and taking cost into consideration. The MCL is the level the systems must comply with.

The RTCR addresses the presence of **total coliforms** and ***E. coli*** in drinking water. The presence of these contaminants can indicate the (1) presence of pathways (for example, a pipe leak or an unprotected cross connection) that can introduce other contaminants into the system and the (2) vulnerability of the system to fecal contamination. Fecal contamination can contribute to the spread of disease.

By monitoring for total coliforms and *E. coli* and complying with the rest of the RTCR requirements (such as performing assessments and corrective actions), the risk from other chemical and microbial contaminants will be reduced as well.

Total coliforms are a group of closely related bacteria that commonly live in soil and surface waters (such as lakes and rivers). Their presence in the drinking water suggests that: (1) there has been a breach, failure, or other change in the condition of the water system; and (2) that pathogens could have entered into the drinking water.

Pathogens are organisms that can cause disease. Many different pathogens may be present in water. It is not practical or possible to test for them all individually. Instead, systems rely on monitoring for

indicator organisms. The RTCR uses total coliforms as the first indicator organism (see **Section B.2.2** of this guide for further discussion). Coliform bacteria may or may not be harmful themselves, but their presence indicates that other harmful organisms may also be present.

Escherichia coli (E. coli), the second indicator organism, is a type of bacteria that is a subset of total coliforms, most often fecal in origin. Detection of *E. coli* can indicate that the system is contaminated with fecal waste. Fecal wastes may contain pathogenic organisms that are harmful to humans when ingested. Fecal contamination could be caused by a number of factors including main breaks, cross-connections, or compromised sources. Immediate steps to inform and protect consumers may be necessary, as noted further in **Section B.6** of this guide.

B.2.2. How does the RTCR address these contaminants of concern?

The RTCR sets limits on the presence of *E. coli* and total coliforms in drinking water that are protective of public health and requires water systems to monitor regularly in the distribution system. The monitoring requirements are discussed in the next section, **Section B.3** of this guide.

For *E. coli*, the RTCR establishes a **maximum contaminant level goal (MCLG)** of zero and a **maximum contaminant level (MCL)**[8] based on its presence in the distribution system. The following box describes when the *E. coli* MCL has been exceeded. Further discussion about the *E. coli* MCL violation is presented in **Section B.6** of this guide.

[8] The MCLG for *E. coli* is found in 40 CFR 141.52 while the MCL for *E. coli* is found in 40 CFR 141.63.

Conditions that will result in an *E. coli* MCL violation

An *E. coli*-positive repeat sample following a total coliform-positive routine sample.

A total coliform-positive repeat sample following an *E. coli*-positive routine sample.

Failure to collect all required repeat samples following an *E. coli*-positive routine sample.

Failure to test for *E. coli* when any repeat sample is total coliform-positive.

For total coliforms, EPA requires water systems to conduct an assessment of their system when they exceed a specified frequency of total coliform occurrence. For water systems serving 1,000 or fewer persons, an assessment will typically be required when a system has two or more total coliform-positive samples in the same month. Failure to take repeat samples following a routine total coliform-positive sample will also trigger an assessment. Any sanitary defects identified during an assessment must be corrected by the water system. Conducting assessments and completing corrective actions are part of the treatment technique requirements of the RTCR and could prevent future incidences of contamination and exposure to fecal contamination and waterborne pathogens.

EPA has removed the MCLG and MCL for total coliforms previously set in the TCR; therefore, under the RTCR, public notification is no longer required when the system has two or more total coliform-positives in a month.

The assessment and corrective action requirements are discussed further in **Section B.4** of this guide.

Compliance Tips

- Always take three repeat samples within 24 hours of being notified that your routine sample is total coliform-positive.
- Make sure that your laboratory is testing for *E. coli* when a sample is total coliform-positive.
- Contact your drinking water primacy agency if you have any questions about the requirements.

B.3. Monitoring Requirements

This chapter provides guidance on implementing the monitoring requirements[9] of the RTCR. It also goes over the additional requirements for seasonal systems.

What will I learn from this chapter?

- The types of samples water systems need to take under the RTCR
- What a sample siting plan is
- Where samples can be taken
- Consequences of monitoring results
- Additional requirements for seasonal systems

Monitoring Requirements at a Glance

1) Develop a sample siting plan that sets out schedule and location of water samples.

2) Take **routine water samples** on a regular basis and have them tested for the presence of total coliforms.

3) If the routine sample is total coliform-positive: (a) have it tested for ***E. coli*** and (b) take **repeat samples**.

4) Have the repeat samples analyzed for total coliforms and, if positive, for *E. coli*.

B.3.1. What does the RTCR require?

Systems are required regularly to test samples of their finished water in the distribution system for the presence of total coliforms. Each water sample must be at least 100 ml in volume. Depending on the results of the routine sampling, systems may be required to test additional samples for total coliforms and further test these samples for the presence of *E. coli.* Systems can refer to **Section B.3.2** of this guide for a more detailed discussion of the types of samples that systems must take.

Systems must have a **sample siting plan** that identifies when and where to collect samples from the distribution system. The locations must be representative of the quality of the water in the distribution system. Systems will find additional discussion of the sample siting plan in **Section B.3.3** of this guide.

There are special procedures systems will want to follow for taking samples to help ensure they are representative of the water in the system. Systems should check with their drinking water primacy agency

[9] The general monitoring requirements are found in 40 CFR 141.853 while system-specific monitoring requirements are found in 40 CFR 141.854 to 141.857.

or their certified laboratory regarding the proper way to take samples. Remember that all coliform samples must be submitted quickly to a laboratory certified by the primacy agency in order to meet the RTCR testing requirements.[10]

Sending Samples for Testing

Systems must send their samples to a laboratory certified by the primacy agency for analysis. Send the samples as soon as possible, keeping in mind that the laboratory must start the tests within 30 hours of sample collection. EPA encourages (but does not require) that samples be shipped below 10°C (50°F). The temperature may be achieved by carefully packing the water samples in ice. Care should be taken when packing samples to avoid freezing. The laboratory may invalidate the frozen samples.

B.3.2. What types of samples must water systems take?

As mentioned previously, water systems are required to take routine samples of their water and test them for the presence of total coliforms. The presence of total coliforms triggers additional sampling of the water and testing for the presence of *E. coli.* This section discusses the different types of samples that systems must take under the RTCR.

- Routine samples – **Section B.3.2.1**
- Additional routine samples (for systems monitoring quarterly or annually) – **Section B.3.2.2**
- Repeat samples – **Section B.3.2.3**
- Testing for *E. coli* – **Section B.3.2.4**

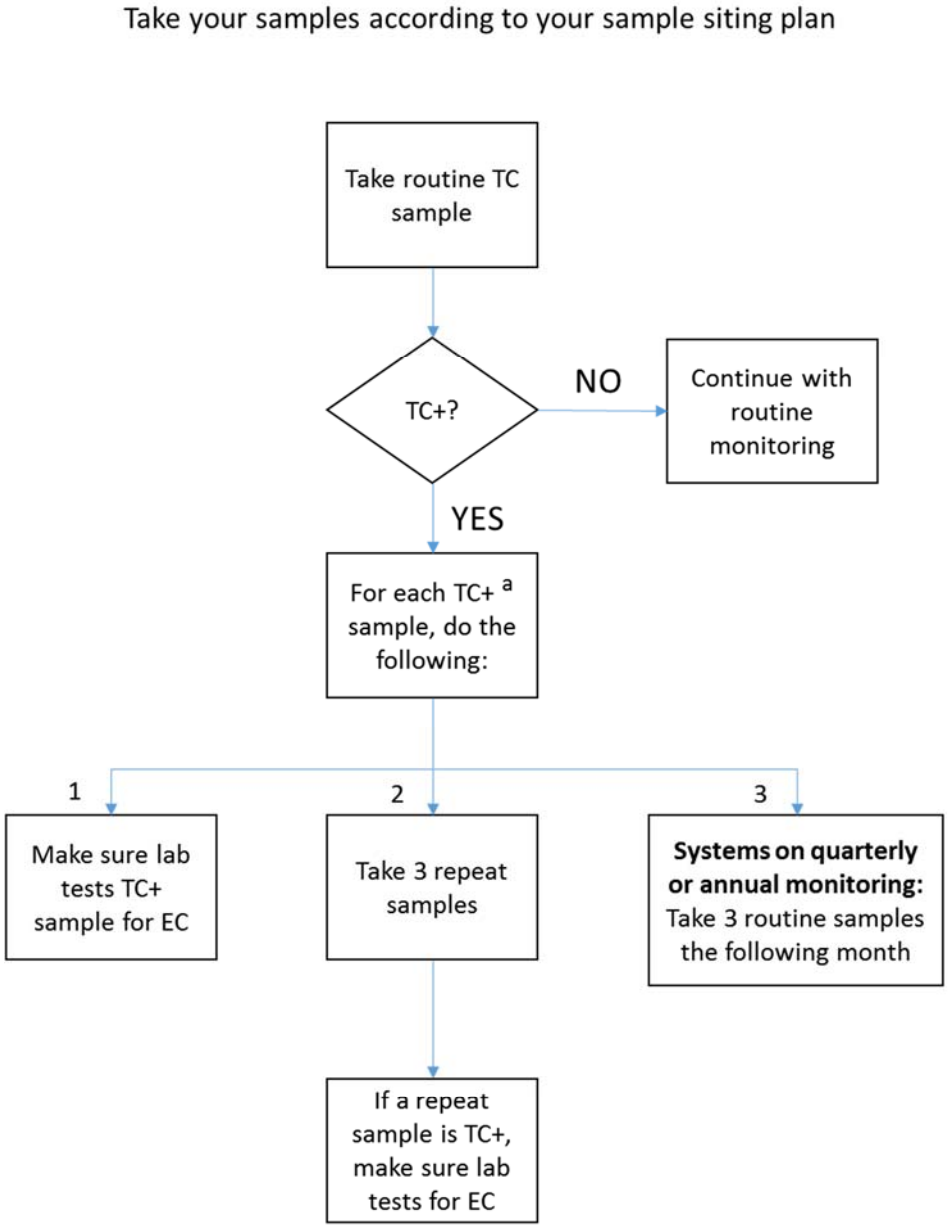
In general, systems follow the sequence outlined in **Figure B-1** when complying with the monitoring requirements of the RTCR.

[10] Analytical methods and laboratory certification requirements are found in 40 CFR 141.852.

Result of Routine and Repeat Samples

Systems must include the results of all routine and repeat samples taken during the monitoring period to determine whether they triggered an assessment, violated the *E. coli* MCL or both.

Figure B-1. Diagram Showing the RTCR Monitoring Requirements



TC – total coliforms; **TC+** - total coliform-positive
EC – *E. coli*; **EC+** - *E. coli*-positive

[a] If you operate a ground water system not providing 4-log treatment of viruses, collect source water samples to comply with the Ground Water Rule.

Special Purpose Samples

Special samples are collected during repairs, responses to complaints, or for other maintenance reasons. Collection of these types of samples is often necessary to ensure that coliforms have not entered the distribution system as a result of events such as installation of new mains, main break repairs, or routine maintenance. **Special samples are not included in compliance or assessment trigger calculations.**

B.3.2.1. Routine samples

These are samples that systems are required to take on a regular basis. This could be monthly, quarterly or annually, as allowed by the drinking water primacy agency. **Systems should check with their drinking water primacy agencies if they are not familiar with their required routine monitoring schedule.**

The primacy agency may allow systems to monitor less frequently than their baseline frequency[11] if they meet certain criteria. On the other hand, if systems are monitoring either quarterly or annually, certain conditions will trigger them to monitor more frequently. To go back to a less frequent monitoring schedule, systems will need to meet certain criteria. **Table B-1** gives a summary of the monitoring frequency that is available for each system type under the federal requirements of the RTCR. Water systems can go to **Part D** of this guide to see the criteria for qualifying for and staying on reduced monitoring and the conditions that can trigger them to go to an increased monitoring frequency. Systems should check with their drinking water primacy agency to determine if they are allowed to monitor at a reduced monitoring frequency.

[11] The baseline frequency is the regular monitoring frequency based on water system type as defined in the drinking water primacy agency regulation.

Additional total coliform samples for surface water systems not practicing filtration

In addition to their monthly routine sample, surface water systems that do not practice filtration are also required to take additional coliform samples when the turbidity level of their source water exceeds 1 NTU. **Systems must collect the sample near the first service connection within 24 hours of exceeding 1 NTU**.

Systems must include these total coliform samples in determining whether they have exceeded the *E. coli* MCL or triggered an assessment.

Table B-1. Routine Monitoring Frequency for Systems Serving ≤ 1,000 Persons

System Type[12]	Increased Frequency	Baseline Frequency	Reduced Frequency	See Appendix
NCWS GW non-seasonal or year-round	1 / month	1 / quarter	1 / year	D.1
NCWS GW seasonal	NA	1 / month	1 / quarter or 1 / year	D.2
NCWS SW	NA	1 / month	NA	--
CWS GW	NA	1 / month	1 / quarter	D.3
CWS SW	NA	1 / month	NA	--

B.3.2.2. Additional routine samples

A system on a less-than-monthly monitoring schedule (for example, quarterly or annually) must take at least **three routine total coliform samples the month following a total coliform-positive routine sample**, unless the drinking water primacy agency notifies the system otherwise. These samples are referred to as "additional routine samples" because they are more than the usual number of samples that systems must take. These samples must be included in determining whether an assessment is required (see **Section B.4.4.1** and **Section**

[12] NCWS – Non-community water system; CWS – Community water system; GW – ground water source; SW – surface water source; NA – not applicable.

B.4.4.2 of this guide) or the *E. coli* MCL has been exceeded (see **Section B.6.1** of this guide) for the month in which they were collected.

Additional Routine Samples: An Example

System A takes one sample every quarter. The routine sample it took in January (for the 1st quarter of the year) turned out to be total coliform-positive. In addition to testing the total coliform-positive sample for *E. coli*, the system is also required to take three (additional) routine samples in February. If one or more of the three samples is total coliform-positive, it will continue to collect three (additional) routine samples in March. System A will continue to collect the additional routine samples until total coliforms are not detected in its system or the rest of the monitoring results trigger the system into an increased monitoring frequency.

B.3.2.3. Repeat samples

These are follow-up water samples that water systems are required to take each time a routine sample is positive for total coliforms.[13] **Repeat samples must be collected within 24 hours** after the system receives notification of a total coliform-positive sample. Repeat samples help to identify the source and characterize the extent of the coliform contamination within the system.

Systems are required to take **three repeat samples for each routine total coliform-positive sample** detected. The repeat samples must be identified in the sample siting plan and must be taken at the following **locations**:

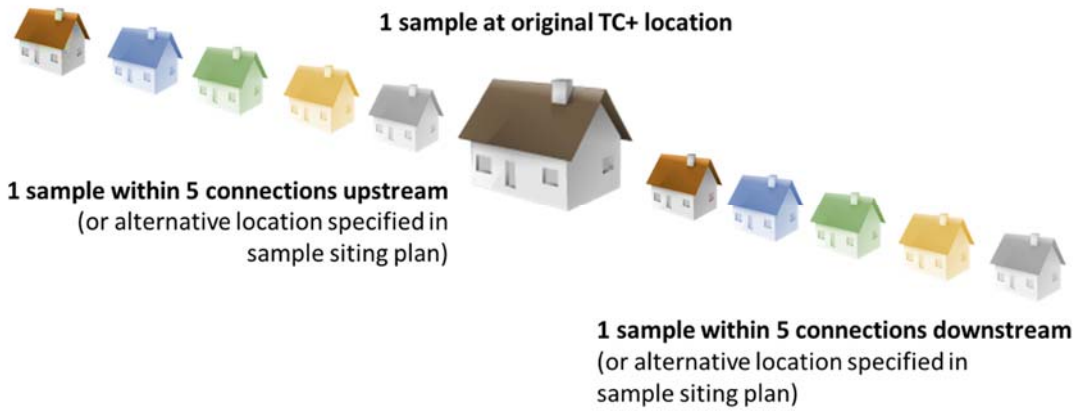
- One at the same sampling tap as the original total coliform-positive sample (TC+)
- One at a tap within five service connections upstream of the original sampling site (or at an alternative location identified in the sample siting plan
- One at a tap within five service connections downstream of the original sampling site (or at an alternative location identified in the sample siting plan)

Systems have the flexibility to propose the two alternative locations to their drinking water primacy agency if they think that these locations best verify and determine the extent of

[13] Repeat monitoring requirements are found in 40 CFR 141.853 and 141.859.

potential contamination of the distribution system (for example, near a storage tank) rather than having to sample within five connections upstream and downstream of the total coliform-positive (TC+) sample location. Systems that do not wish to propose alternative sampling locations may stay with the default locations of within-five-connections-upstream-and-downstream of the total coliform-positive sample location.

Figure B-2. Location of Repeat Samples



For systems with a single service connection, the drinking water primacy agency may allow the system to collect the required set of repeat samples over a consecutive three-day period or to collect a larger volume repeat sample(s) in one or more sample containers of any size, as long as the total volume collected is at least 300 ml. Systems must identify repeat monitoring locations and should include procedures in their sample siting plans.

Dual-Purpose Samples

Ground water systems with only one well that are required to conduct triggered source water monitoring under the Ground Water Rule (GWR), **with written drinking water primacy agency approval**, can take one or more of their repeat samples at the location where they will

take their GWR-triggered source water sample. They can count that same sample as both a repeat sample under the RTCR and a triggered source water sample under the GWR (also known as a **dual-purpose sample**). Note that since the sample is for compliance for both the RTCR and the GWR, there are consequences under both rules for having an *E. coli*-positive result. See **Table B-2** below. Systems should contact their drinking water primacy agency if they have any questions.

Table B-2. Consequences of Getting an *E. coli*-positive Result with a Dual-Purpose Sample

Number of Dual-Purpose Samples Taken	Result	Consequences under the RTCR	Consequences under the GWR[14]
1	EC+	MCL violation	• Take corrective action if directed by the drinking water primacy agency; or • Collect five additional source water samples
2 or 3	1 EC+	MCL violation	• Take corrective action if directed by the drinking water primacy agency; or • If two or more dual purpose samples were taken at the approved location, the system must contact its drinking water primacy agency to determine the number of additional source water samples required
2 or 3	≥ 2 EC+	MCL violation	• Corrective action required

[14] The Ground Water Rule requirements are found in 40 CFR 141.402(a).

B.3.2.4. Testing for E. coli

Any routine or repeat sample that is positive for total coliforms must be further tested for the presence of *E. coli*.[15] The certified laboratory should perform this analysis when any of the routine or repeat samples is total coliform-positive. The presence of *E. coli* in the water signifies that fecal contamination may be present in the distribution system; therefore, additional actions are required from the system (for example, primacy agency notification of result and possibly public notification). The reporting and public notification requirements are discussed in **Section B.5** and **Section B.6** of this guide, respectively.

B.3.3. What is a sample siting plan?

A sample siting plan[16] designates the locations of the sampling sites and schedule of sampling. All systems are required to develop a sample siting plan. It specifies where in the building or distribution system samples will be taken in order to ensure that they are representative of the water supplied to every consumer.

Having a written sample collection protocol helps ensure that all sampling is done correctly, even when the system personnel changes. The sample siting plan must identify the specific sample locations for each monitoring period's routine samples, repeat samples when required, and the three sites where "additional routine samples" would be collected the month following a total coliform-positive sample for those systems that are allowed to monitor quarterly or annually.

The details of the sample siting plan depend on the characteristics of the system and on the requirements of the drinking water primacy agency. **Contact the primacy agency to see if there are any required forms or if there are specific elements that need to be included in the sample siting plan in addition to those suggested in this document.** When preparing a sample siting plan, consider the following:

[15] The *E. coli* requirements are found in 40 CFR 141.858.
[16] The requirements for sample siting plans are found in 40 CFR 141.853(a).

- The location and type of water sources, treatment facilities, storage tanks, pressure stations and service connections.
- The location of dead-end pipes, loops and other areas of the piping system's configuration.
- Cross-connection hazards.
- Areas of low water pressure and slow water movement.
- Varying population densities.

When do I need primacy agency approval of my sample siting plan?

In general, the system must make the sample siting plan available for primacy agency review and revision. The system should check with its primacy agency to determine whether it has to submit the sample siting plan for the agency to review, possibly revise and approve before the system can begin sampling.

Primacy Agency Review of Sample Siting Plans

Sample siting plans are subject to drinking water primacy agency review and revision. Systems should check with their primacy agencies to determine the process for review and revision of sample siting plans. In particular situations, primacy agency approval is necessary before systems can begin sampling.

In the following situations, the system is required to submit the sample siting plan to the primacy agency for review, and in certain cases, approval.

- **Use of alternative repeat sampling locations** (instead of using locations five connections upstream and downstream of the original total coliform-positive sample). When using alternative repeat sampling locations, the system must submit the sample siting plan to the primacy agency. The primacy agency may modify the plan as needed before the system can begin sampling.
- **Seasonal systems allowed to conduct monitoring less frequently than once a month** – Seasonal systems on less than monthly monitoring frequency must specify in their sample siting plan the time period when they will take their routine sample (see **Section B.3.6** of this guide for further

discussion). The primacy agency must approve the sample siting plan before the system can begin sampling.

- **Use of dual purpose samples** – Systems allowed to take dual purpose samples (see **Section B.3.2.3** of this guide for further discussion) must have their sample siting plan approved by the primacy agency before the system can take dual purpose samples.

B.3.4. Where can water systems take their samples?

The sample locations should be selected carefully so that representative samples for the entire system can be obtained, whether the system consists of one building or multiple buildings. It is especially important to identify and include in the sample siting plan the areas that may adversely affect the microbiological quality of the water. Systems should consider varying sample site locations throughout the year to better represent water quality throughout the distribution system. **Sampling locations** to consider include:

- Main line
- Areas of low water pressure and slow water movement
- Branch line
- Dead-end pipe
- Near a storage tank

Faucets and specially installed sampling taps are the two most common types of sampling sites. If faucets are to be used, each faucet should be examined carefully to ensure its suitability.

Some examples of **unsuitable sites** are:

- Swivel-type faucets that have a single valve for hot and cold water.
- Faucets that have leaky packing material around the stem.
- Faucets such as janitorial or commercial sinks, where bacterial contamination is likely.
- Faucets close to or below ground level.
- Faucets that point upward.
- Faucets that have threads on the inside of their spouts.

- Faucets that have aerators. (If such faucets are to be used, the aerators must be removed before a sample is collected.)

For locations of the repeat samples, systems should refer to **Section B.3.2.3** of this guide.

B.3.5. What do the water system's sampling results mean?

Depending on the results of the monitoring during a sampling period (could be either a month, a quarter, a year or other period that the primacy agency specifies), a system might have to conduct an assessment, get triggered into an increased monitoring schedule (if system is on a reduced schedule), incur a violation or all of the above. For discussion of when a system triggers an assessment, see **Section B.4.4.1** and **Section B.4.4.2** of this guide. The conditions that trigger a violation are in **Section B.6** of this guide. Systems should check with their primacy agency to determine if they are also triggered to an increased monitoring schedule.

It is also important that systems take all their required samples, as failure to do so could also result in an assessment trigger or a violation.

B.3.6. Are there requirements specific to seasonal systems?

Complying with primacy agency-approved start-up procedures

Seasonal systems[17] must comply with **primacy agency-approved start-up procedures** before serving water to the public. This is to ensure that no contamination is present in the water that might have entered the system when it was not in operation. Seasonal systems should check with their primacy agency to determine which procedures they need to conduct and complete for their particular system. Start-up procedures may include the following:

- Flushing the system
- Cleaning water storage tanks
- Inspection and repair of system components
- Disinfection

[17] Seasonal system-specific requirements are found in 40 CFR 141.854(i), 141.856(a)(4) and 141.857(a)(4).

- Water sample collection

Certifying completion of start-up procedures to the primacy agency

After completing the start-up procedures, seasonal systems are also required to **certify to their primacy agency that they have completed the start-up procedure**. Systems should check with their primacy agency to determine how they will need to complete their certification process.

Sampling during the vulnerable period

Seasonal systems on a quarterly or annual monitoring period must state in their sample siting plan the time period when they will take their routine sample. This period is based on site-specific conditions. Consider, for example, when the demand for water is the highest, when the source water is most vulnerable to contamination (for example, during the wet season), or when there is a source of contamination that might affect the area surrounding the well (for example, spreading of animal waste for fertilizer). The primacy agency must approve the sample siting plan and the system must monitor during the period identified in the sample siting plan.

B.4. Assessment and Corrective Action Requirements

What will I learn from this chapter?

- The importance of conducting assessment and corrective actions
- The conditions that trigger a Level 1 or Level 2 assessment
- What to do when an assessment is triggered
- What to do after an assessment

Assessment and Corrective Action Requirements at a Glance

1) Determine if you have triggered either a Level 1 or Level 2 assessment.

2) Determine who can conduct the assessment and what assessment form to use.

3) Make sure the assessment is conducted as soon as practical.

4) Correct any sanitary defects identified during the assessment.

5) Complete the assessment form and submit it to the primacy agency within 30 days of learning of the trigger.

This chapter provides guidance on implementing the assessment and corrective action requirements[18] of the RTCR.

B.4.1. What does the RTCR require?

The RTCR requires an assessment of the water system if monitoring results (for example, repeated presence of total coliforms) indicate that the system might be vulnerable to contamination. The RTCR also requires the system to correct any problems identified during the assessment. Additional information about conducting an assessment and completing a corrective action can be found in the *Revised Total Coliform Rule Assessments and Corrective Actions Guidance Manual.* [19]

B.4.2. Why does the RTCR require assessment and corrective action?

The RTCR aims to increase public health protection through the identification and reduction of defects that could either (1) provide pathways that allow fecal contamination and waterborne pathogens to enter into the distribution system; or (2) indicate a failure or imminent failure in a barrier that is already in place. Performing assessments will also help identify problems with the sampling practices.

[18] The assessment and corrective action requirements are found in 40 CFR 141.859.

[19] The *Revised Total Coliform Rule Assessments and Corrective Actions Guidance Manual (Interim Final) EPA-R-14-006* is available for download from the Public Docket at http://www.regulations.gov (search for EPA-HQ-OW-2008-0878-0322).

This proactive approach is intended to prevent serious contamination by early identification and correction of problems. The RTCR uses the term **sanitary defects** to refer to these problems.

B.4.3. What are examples of sanitary defects?

Sanitary defects can allow the entry of microbial contamination into the distribution system. Examples of sanitary defects include:

Cross connection and backflow issues

- Required cross connection control devices not in place or not operating properly
- Unprotected cross connection
- Unauthorized connections to water mains

Operational issues

- Inadequate disinfection during and after pipe repair or replacement activities
- Failure to monitor and replace chlorine supply

Distribution system issues

- Failure to maintain adequate pressure or occurrence of low pressure event
- Pump failure
- Improper flushing or lack of flushing programs
- Improper construction of new, replaced, or renovated lines or service connections

Storage issues

- Overflow, vents, hatches and other penetrations not configured, screened, or sealed properly
- Holes in tanks that could allow entry of insects or small animals
- Bladder pressure tanks that can become waterlogged
- Inadequate inspection and maintenance of storage facilities
- Inadequate disinfection during and after pipe repair or replacement activities

Source water issues

- Cracks or holes in well seals or casings
- Leaking sewer lines or septic tanks
- Sewage overflow upstream of the source
- Lack of wellhead protection
- Unsanitary conditions at the wellhead
- Contamination during pump or motor repair or replacement
- Watertight seal at wellhead not present

Disinfection issues

- Inability to maintain required residual throughout the distribution system
- Failure of chlorination equipment
- Improper settings on chemical feed
- Failure in redundant disinfection
- Loss of power

Figure B-3. Examples of Sanitary Defects

Cracks on a storage tank | Rat droppings around the wellhead | Seal on wellhead not watertight

Photos courtesy of Nevada Division of Environmental Protection

B.4.4. What types of assessments are required under the RTCR?

There are two types of assessments that may be triggered under RTCR, a **Level 1 assessment** and a **Level 2 assessment**. A Level 2 assessment is triggered by conditions that pose a more immediate and more severe public health risk compared to conditions that trigger a Level 1 assessment. The Level 2 assessment is a more detailed assessment than a Level 1 assessment and may involve more effort and resources. The two levels of assessment recognize the difference in the severity of the situation and the varying level of effort required for the assessment.

If the results of total coliform monitoring trigger the need for an assessment under both the Ground Water Rule (GWR) and the RTCR, it might be possible to combine the assessments required under both rules into one assessment, as long as the combined assessment complies with the requirements of both rules. Systems should check with their primacy agency before performing such combined assessments.

Completing the Assessment and Assessment Form

Regardless of whether a Level 1 or Level 2 assessment is required, the assessment must be completed and the assessment form submitted to the primacy agency within **30 days** of the system learning that an assessment has been triggered.

B.4.4.1. What is a Level 1 assessment?

A Level 1 assessment is a basic examination of the source water, treatment, distribution system and relevant operational practices. It is intended as a self-assessment and will be performed by a responsible party of the water system in most cases. However, systems should consult additional experts if they think that they need assistance to properly conduct the assessment.

A Level 1 assessment is triggered by the following events:

1. Two or more total coliform-positive samples (routine and repeat samples factor into this determination) in the same sampling period; or
2. Failure to take every required repeat sample after any single routine total coliform-positive sample.

Preparing for an Assessment

Water systems should be familiar with the forms and required submittals so that they are prepared for an assessment in advance, should one be required. For example, systems may wish to create a standard operating procedure (SOP) for what to do when coliform results trigger an assessment. When developing the SOP, systems should verify with their primacy agency whether there is a specific version of the assessment form that needs to be used, and understand which data source(s) they can use to fill out the various sections.

B.4.4.1.1. Why is it important to conduct a Level 1 assessment?

The purpose of performing either a Level 1 or Level 2 assessment is to **enhance public health protection** by identifying the presence of sanitary defects that allow contamination to enter into the system. Performing assessments will also help identify any problems with the sampling practices.

Identifying and correcting sanitary defects early will provide some assurance that the water system has addressed issues that may compromise public health. While the Level 1 assessment is intended to be a basic and a relatively simple assessment, it should be conducted thoroughly to capture the possibility that there may be multiple sanitary defects. In some cases, the assessor may not find a sanitary defect despite conducting a thorough assessment.

Ideally, a well-performed Level 1 assessment with appropriate corrective action(s) will **prevent most systems from developing conditions that lead to fecal contamination or a Level 2 assessment**. Assessments can also help water systems learn how to improve their daily operations.

A system that fails to conduct a Level 1 assessment incurs a treatment technique violation that disqualifies the system from having a clean compliance history (that is, no history of RTCR violations within the last 12 months). Hence, the system's ability to stay on or qualify for a reduced monitoring frequency (if the drinking water primacy agency allows reduced monitoring) is affected. Also, if the system has a treatment technique violation, it will be required to issue a Tier 2 public notice. See **Section B.6** of this guide for a discussion of the public notification requirements of the RTCR.

B.4.4.1.2. Who conducts a Level 1 assessment?

A Level 1 assessment can be conducted or managed by a party that is responsible for and knowledgeable about the water system. This should be someone with sufficient knowledge of the system to answer the questions in the Level 1 assessment form or to gather correct information from others who work for the system. The system may also seek assistance from external parties who have experience managing or assessing public water systems, if

desired. For example, external assistance may be provided by primacy agency personnel, a certified operator from a similar system, a circuit rider, consultant or other utility expert. **Systems should check with their drinking water primacy agency to determine if they have the appropriate person conducting the Level 1 assessment.**

B.4.4.1.3. How is a Level 1 assessment documented?

The water system must use a Level 1 assessment form to document the assessment. The form must be completed and submitted to the drinking water primacy agency within **30 days** after the system learns that it has triggered an assessment. **Systems should check with their primacy agency to determine what Level 1 assessment form to use.**

The primacy agency makes the final determination on the adequacy and completeness of information provided in the assessment. The primacy agency will review the assessment form and if it determines that the assessment is insufficient, it will consult with the system on follow-up efforts that may be required.

B.4.4.1.4. How is a Level 1 assessment conducted?

Systems should check with their drinking water primacy agency to obtain the required assessment form. At a minimum the assessor should review the following items when conducting the assessment:

- Unusual events that may have affected water quality (for example, loss of pressure)
- Any changes in the maintenance and operation of the distribution system
- Condition of the source water and changes in treatment
- Existing water quality monitoring data
- Inadequacies in sample sites, sampling protocol and sample processing

Table B-3 provides a list of the typical elements that the assessor should review or consider when conducting a Level 1 assessment. Take note that not all of these elements will be applicable to all water systems. It might be the case that the system does not have any treatment process or an extensive distribution system. In this case, the assessment will only focus on those elements that are present in the

system such as the source water (for example, wells) and the limited distribution system. If the system is a school, a church or any type of building with its own source of water and the water is used only within the building, then an assessment of the pipes inside the building is also warranted.

Completing the Assessment and Assessment Form

The assessor should read and complete the entire assessment form provided by the state, even if the assessor believes he or she understands why the assessment was triggered. The assessment might identify multiple causes or other sanitary defects that the assessor did not know existed. **Table B-3** may provide additional assistance in completing the state assessment form.

Table B-3. Typical Items to Evaluate and Consider When Conducting a Level 1 Assessment

Items to Evaluate and Consider	Reviewed and checked? (If applicable)
1. Sample site – What is the condition or location of the tap? – What is the regular use of the connection?	
2. Sample collection protocol – Was the sampling protocol followed and reviewed – for example, was tap flushed, aerator removed, fresh sample bottles used, and the sample stored and shipped properly?	

Items to Evaluate and Consider	Reviewed and checked? (If applicable)
3. Occurrence of possible causal events prior to the collection of total coliform samples, for example: – Were there interruptions in the treatment process? – Were there reported loss of pressure events? – Were there operation and maintenance activities that could have introduced total coliforms? – Was there reported vandalism or unauthorized access to facilities? – Were there reported visible indicators of unsanitary conditions? – Was there a firefighting event, flushing operation, sheared hydrant, etc.?	
4. Recent operational changes to the system – Were new sources introduced? – Were there treatment or operational changes? – Were there potential sources of contamination (for example, low pressure, high turbidity, loss of disinfection)?	
5. Distribution System – Was there an occurrence of low or negative pressure? – Is there a cross connection? – What is the condition of the pump station? – What is the condition of air relief valves? – What is the condition of backflow prevention devices? – What is the condition of pipes and valves?	
6. Storage Tank – What is the condition of the tank? – What is the condition of the screens, access opening, vent, drain overflow? – Is the tank secured to prevent unauthorized access? – What is the status of operation and maintenance (O&M) procedures?	
7. Treatment Process – Were there interruptions in treatment (for example, loss of disinfection, filter malfunction, etc.)? – What is the condition of point of entry (POE) or point of use (POU) treatment units? – Are there softeners? – What is the status of O&M procedures?	

Items to Evaluate and Consider	Reviewed and checked? (If applicable)
8. Source – Well – What is the condition of the well cap, well seal or well casing? – Is the vent screened? – Are there air gaps? – Are there cross connections?	
9. Source – Spring – What is the condition of the spring development? – What is the condition of the spring box? – Is the spring secured to prevent unauthorized access?	
10. Source – Surface Water Supply – Has there been heavy rainfall? – Has there been rapid snowmelt?	

B.4.4.2. What is a Level 2 assessment?

A Level 2 assessment is a more detailed examination of the system, its operational practices and monitoring program and results. The elements of a Level 2 assessment are the same as those of a Level 1 assessment, but each element is investigated in greater detail. This is because the incidents that trigger a Level 2 assessment are of a more critical nature and may result in direct public health impact. A Level 2 assessment will likely include field investigations, additional sampling and additional inspections of facilities beyond those performed in a Level 1 assessment. It may involve the engagement of additional parties and expertise. Generally, the Level 2 assessment will not be conducted by the water system. It will mostly likely be conducted by the drinking water primacy agency or by a party approved by the drinking water primacy agency.

A Level 2 assessment is triggered by the following:

1. An *E. coli* MCL violation; or
2. A second Level 1 trigger within a rolling 12-month period; or

3. For systems on approved reduced annual monitoring, a Level 1 treatment technique trigger in two consecutive years.

B.4.4.2.1. Why is it important to conduct a Level 2 assessment?

The purpose of performing a Level 2 assessment is to **enhance public health protection** by identifying the presence of sanitary defects so they can be addressed. It is especially important that they are conducted, given that they are triggered by events that either (a) pose a potential immediate acute public health threat (that is, trigger associated with the presence of *E. coli*) or (b) may pose a potential serious health impact because of the persistence of the contamination (that is, a second Level 1 trigger).

EPA anticipates that a Level 2 assessment triggered by the presence of *E. coli* may be more involved than the Level 2 assessment following a trigger in which there is no *E. coli* present, given the different level of potential of public health concern.

A system that fails to conduct a Level 2 assessment incurs a treatment technique violation that disqualifies the system from having a clean compliance history (that is, the system no longer has "no record of RTCR violations" within the last 12 months). Hence, the system's ability to stay on or qualify for a reduced monitoring frequency (if the drinking water primacy agency allows reduced monitoring) is affected. Also, if the system has a treatment technique violation, it will be required to issue a Tier 2 public notice. See **Section B.6** of this guide for a discussion of the public notification requirements of the RTCR.

B.4.4.2.2. Who is responsible for conducting a Level 2 assessment?

Since a Level 2 assessment is triggered by a more significant event, the Level 2 assessment is a more comprehensive assessment and must be conducted by a party approved by the primacy agency due to the higher level of complexity. **The approved party conducting the assessment could be the primacy agency itself or a third party, such as a circuit rider or representative from a county health district. In some circumstances, it could be conducted by one of the system's staff or management with the required qualifications specified by the**

primacy agency. If needed, systems should check with their drinking water primacy agency to determine who will conduct the assessment.

Though the Level 2 assessment must be performed by someone approved by the primacy agency, **the system is ultimately responsible for making sure that the assessment is conducted properly and completely**.

B.4.4.2.3. How is a Level 2 assessment documented?

Similar to a Level 1 assessment, the assessor must document the assessment using a **Level 2 assessment form**. Systems should check with their primacy agency to obtain the required assessment form. The form must be completed and submitted to the primacy agency within **30 day**s after the system learns that the trigger has been exceeded. The primacy agency will determine whether the Level 2 assessment was properly conducted and the assessment form properly completed.

B.4.4.2.4. How is a Level 2 assessment conducted?

A Level 2 assessment looks at the same elements as a Level 1 assessment, but in more detail and depth. At a minimum, the assessor should review the following items when conducting the assessment:

- Unusual events that may have affected water quality (for example, loss of pressure)
- Any changes in the maintenance and operation of the distribution system
- Condition of the source water and changes in treatment
- Existing water quality monitoring data
- Inadequacies in sample sites, sampling protocol and sample processing

Conducting the Level 2 Assessment

Although the Level 2 assessment must be performed by someone approved by the primacy agency, **the system is ultimately responsible for making sure that the assessment is conducted properly and completely**. In all likelihood, the system and the approved assessor will have to work closely together to compile and review all the information relevant to the successful completion of the assessment at the water system.

B.4.5. What happens if the assessor identifies a sanitary defect during an assessment?

The water system must correct all sanitary defects identified during a Level 1 or Level 2 assessment. The system should consult with its primacy agency as necessary and as early as possible to complete corrective actions that the primacy agency will consider to be sufficient. All the sanitary defects identified must be described in the assessment form.

In addition, the form must also include all completed corrective actions and a proposed timetable for corrective actions that are yet to be completed when the form is due to the primacy agency (which is 30 days from when the system learns of the assessment trigger).

B.4.6. What if the assessor did not identify a sanitary defect?

It is possible that even after conducting an assessment, the assessor cannot conclusively link the cause of the positive sample to a given sanitary defect due to the complexity of the distribution system configuration and transport of contaminants throughout the system. In this case, the water system must document this conclusion in its assessment form. The primacy agency may require the system to provide supporting documents to back up its conclusion.

When a system does not identify a sanitary defect during an assessment, EPA recommends several actions the system might consider performing after the assessment is completed. Examples of these actions include flushing, increasing disinfectant residual, collecting additional investigative samples, examining whether samples were collected from appropriate sample sites and re-training staff or sampler on proper sampling procedures.

The RTCR also identifies a list of "best technologies, treatment techniques, or other means" (also known as best available technologies or BATs) to help systems comply with the rule (see 40 CFR 141.63(e) of the RTCR). These include protection of wells from fecal contamination by appropriate placement and construction, maintenance of a disinfectant residual, proper maintenance of the distribution system (e.g., flushing programs, proper operation and maintenance of storage tanks, cross connection control), filtration and disinfection, and compliance with the state wellhead protection program. Water systems may

choose to take advantage of these BATs when they trigger an assessment in order to avoid future triggers or violations, even if they are unable to find a likely cause or sanitary defect.

B.4.7. What is the timeline for completing the assessments and the corrective actions?

Water systems must complete the assessment or have the assessment completed as soon as practical after they learned that they triggered an assessment. **The completed assessment form must then be submitted to the primacy agency for review within 30 days after the system learns that it has triggered an assessment.** Remember that the assessment form must include any sanitary defect identified and the corrective actions taken to address the defect.

The primacy agency determines the completeness of the assessment and the assessment form. The primacy agency may consider the assessment insufficient if it was not fully executed (for example, the conditions at the well were not fully assessed) or if it was incomplete (for example, not all of the required elements were examined). The primacy agency may then require the system to resubmit a revised assessment. Systems must make sure they resubmit the form by the due date specified by the primacy agency.

B.4.8. What happens if all corrective actions have not been completed by the time the assessment form is due to the drinking water primacy agency?

If there are corrective actions that are not completed or cannot be completed by the time of submission of the assessment form (for example, in the case where parts need to be ordered and may take longer than 30 days to be delivered and installed), the water system must inform the primacy agency and propose a schedule for the completion of the unfinished corrective actions. The proposed timetable must be included in the assessment form.

The water system must complete the corrective action(s) according to a schedule agreed upon by both parties and notify the primacy agency when each scheduled corrective action is completed.

B.4.9. What happens if the water system did not do an assessment or did not complete the corrections?

A system incurs a treatment technique violation if it fails to conduct an assessment or complete the corrective action(s) within the required time period. As discussed in **Section B.4.4.1.1** and **Section B.4.4.2.1** of this guide, having a treatment technique violation affects the ability of a system to stay on or qualify for reduced monitoring, if the primacy agency allows reduced monitoring.

Note that triggering an assessment is not a violation in itself but failing to conduct an assessment is a violation.

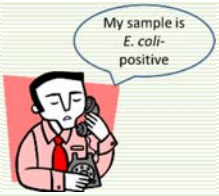
Systems should also make sure that they submit their completed assessment form within the required time period. Failure to do so will result in a reporting violation. See **Section B.6** of this guide for a discussion of the different types of violations and their associated types of public notification that systems must issue afterwards.

B.5. Reporting and Recordkeeping

B.5.1. What do water systems need to report to their primacy agencies?

What will I learn from this chapter?

- The information that needs to be reported to the primacy agency
- When to report these information to the primacy agency



- What records to keep and for how long to keep them

Systems are required to report certain items to their primacy agencies as part of their compliance with the RTCR. These items are listed in **Table B-4**. Each of these items has a specified time period. These requirements are found in 40 CFR 141.31 and 40 CFR 141.861(a).

Table B-4. Items Water Systems Need to Report

What to Report	When to Report to the Primacy Agency
Monitoring results	Within the first 10 days following either the end of the month the monitoring was completed, or the end of the required monitoring period, whichever is sooner. The water system does not need to report this in the case where the state laboratory does the analysis and submits the results directly to the primacy agency.
E. coli-positive routine sample	By the end of the day when the water system is notified of an *E. coli*-positive routine sample, unless they are notified of the result after the primacy agency office is closed and the primacy agency does not have either an after-hours phone line or an alternative notification procedure. In this case, the water system must notify the primacy agency before the end of the next business day.
E. coli MCL violation[20]	By the end of the day when the water system learn of an *E. coli* MCL violation, unless they learn of the violation after the primacy agency office is closed and the primacy agency does not have either an after-hours phone line or an alternative notification procedure. In this case, the system must notify the primacy agency before the end of the next business day and notify the public within 24 hours of the violation.
Coliform treatment technique violation[20]	No later than the end of the next business day after the water system learns of the violation. The public must be notified within 30 days.
Monitoring violation[20]	Within 10 days after the water system learns of the violation. The public must be notified within a year of the violation.
Completed assessment form	Within 30 days after learning that the water system has triggered an assessment.
Corrective action(s) not completed when assessment form was submitted	When corrective action is completed.
Seasonal systems – certification of completion of primacy agency-approved start-up procedure	Prior to serving water to the public.
Certification of compliance with public notice requirements	Within 10 days of completing the public notification (whether initial notification or repeat notification).
Failure to comply with any of the requirements of the RTCR not already mentioned above	Within 48 hours of failing to comply with the requirement.

[20] Violations are discussed in **Section B.6** of this guide.

B.5.2. What records do water systems need to keep?

Under the RTCR, water systems are required to keep records of their monitoring results and work done as part of assessments (40 CFR 141.861(b)). 40 CFR 141.33 has additional recordkeeping requirements that systems must comply with and are shown in **Table B-5**.

Table B-5. Records Water Systems Need to Keep

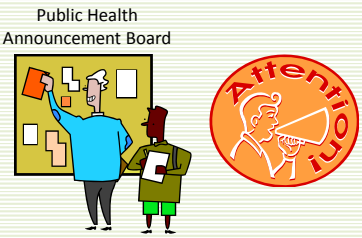
Records	Period of Time to Keep Records
Monitoring results	No less than 5 years.
Assessment forms[21] and documentation of corrective actions completed[22]	No less than 5 years after completion of the assessment and corrective action.
Repeat samples taken that meets drinking water primacy agency criteria for extension of 24-hour period for collection	No less than 5 years.
Copies of public notifications (PN) issued and certifications of compliance with PN regulations	No less than 3 years after issuance.
Sample siting plans	No less than 5 years (same period as records of microbiological analyses).

[21] Water systems should keep completed assessment forms regardless of who conducted the assessment.
[22] Or other available documentation of sanitary defects and corrective actions. EPA recommends that the water system keep any photos, receipts, sample results, etc., related to assessments and corrective actions.

B.6. Violations and Public Notification Requirements

What will I learn from this chapter?

- The different types of violations that systems can incur if they do not comply with the RTCR requirements
- The required public notification for each type of violation



Water systems incur violations if they do not comply with the requirements of the RTCR. Some violations require public notification,[23] that is, water systems need to notify the public if they did not comply with certain requirements of the RTCR. The type of public notification depends on the severity of the violation.

Violation	**Public Notification (PN)**
E. coli MCL	Tier 1
Treatment Technique	Tier 2
Monitoring	Tier 3
Reporting	Tier 3

Section B.6.1 of this guide lists the conditions that define the violations. **Section B.6.2** of this guide describes the different tiers of PN. **Section B.6.3** of this guide briefly discusses the Consumer Confidence Report.

B.6.1. What types of violations can a water system incur under the RTCR?

The following are the types of violations water systems can incur under the RTCR:

1. ***E. coli* MCL Violation** – occurs if any of the following events happens:
   - *E. coli*-positive repeat sample following a total coliform-positive routine sample.

[23] Violations under the RTCR are found in 40 CFR 141.860. Public notification requirements are found in 40 CFR 141.202(a), 141.203(b)(2) and 141.204(a).

- Total coliform-positive repeat sample following an *E. coli*-positive routine sample.
- Failure to collect all required repeat samples following an *E. coli*-positive routine sample.
- Failure to test for *E. coli* when any of the repeat samples is total coliform-positive.

Boil Water Advisories

In addition to requiring a Tier 1 public notification, an *E. coli* MCL violation may also trigger a boil-water advisory. Water systems should consult with their primacy agency on requirements for boil-water advisories.

2. **Treatment Technique Violation** – occurs when any of the following events happens:
   - Failure to conduct the required assessment after exceeding a trigger.
   - Failure to complete the required corrective action after identifying a sanitary defect.
   - Failure of a seasonal system to complete the drinking water primacy agency-approved start-up procedure prior to serving water to the public.

3. **Monitoring Violation** – occurs when any of the following events happens:
   - Failure to collect all required routine or additional routine samples in a compliance period.
   - Failure to test for *E. coli* following a total coliform-positive routine sample.

4. **Reporting Violation** – occurs when any of the following events happens:
   - Failure to submit a monitoring report or completed assessment form after a system properly conducts monitoring or assessment in a timely manner.

- Failure to notify the primacy agency following an *E. coli*-positive sample in a timely manner.
- Failure to submit certification of completion of a primacy agency-approved start-up procedure by a seasonal system.

B.6.2. What are the different tiers of public notification?

The following gives a brief description of the different tiers of public notification. Notices must be provided to persons served by the water system and not just customers billed.

Issuing Public Notifications

More information on public notification including example language can be found at EPA's website: http://water.epa.gov/lawsregs/rulesregs/sdwa/publicnotification/index.cfm. Water systems should consult with their primacy agency to determine the contents of the public notification.

1. **Tier 1 Public Notification** – Results from violations and situations with significant potential to have serious adverse effects on human health.

   Water systems are required to issue a Tier 1 public notification as soon as practical but **no later than 24 hours** after learning of an *E. coli* MCL violation. The notification must be delivered by broadcast media, posting of a notice in a conspicuous location, hand delivery of notifications, or other methods approved by the primacy agency that will reasonably reach affected customers within a 24-hour period.

2. **Tier 2 Public Notification** – Results from violations and situations with potential to have serious adverse effects on human health not requiring Tier 1 public notification.

   Water systems are required to issue a Tier 2 public notification as soon as practical but **no later than 30 days** after learning of a treatment technique violation. For community water systems, the notification may be made in writing by mail or other direct delivery.

Non-community water systems may post the notice in conspicuous locations. Posted notices about the violation must remain in place for no less than seven days, even if the situation has been resolved.

3. **Tier 3 Public Notification** – Results from violations and situations not requiring Tier 1 or Tier 2 public notification.

   Water systems are required to issue a Tier 3 public notification **within one year** of learning of a monitoring violation or reporting violation. Community water systems may provide Tier 3 public notification using the annual Consumer Confidence Report. Non-community water systems, which are not required to issue a Consumer Confidence Report, must provide public notification using other forms or methods consistent with the requirements of the RTCR (for example, posting or mailing out individual notifications). Non-community water systems should consult with their primacy agency to determine which methods are appropriate.

B.6.3. Which water systems are required to issue a Consumer Confidence Report (CCR)?

In addition to public notification triggered by violations (if there are any), community water systems are also required to issue an annual report called the Consumer Confidence Report (CCR)[24] or water quality report to their customers that contains information about the sources used (that is, rivers, lakes, reservoirs, or aquifers), any detected contaminants, and compliance and educational information. Examples of information related to the RTCR that must be included in the CCR include the total number of *E. coli*-positive samples and number of assessments and corrective actions. The CCR is due to customers by July 1st of each year. Community water systems should check with their primacy agencies to determine the format and other required information that need to go in the CCR.

[24] CCR requirements are found in 40 CFR 141.151 and 141.153(h)(7).

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Part C

RTCR Compliance Checklist

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C. RTCR Compliance Checklist

What do I do if I have a …?

This section provides a checklist of actions systems must take if they have a violation or certain events occurred (for example, a total coliform-positive sample, an *E. coli*-positive sample or an assessment trigger) during their monitoring period. Systems must take appropriate actions to protect public health in a timely manner, for example, notify the drinking water primacy agency, issue public notification, conduct an assessment, monitor at a more frequent rate, etc. **EPA recommends that systems go through the entire checklist,** excluding the items that are not applicable to them – for example, for community water systems, skip the items that are specific to non-community water systems.

Table C-1. List of Items to Check to Determine Compliance

ITEMS TO CHECK	YES	NO
A. Do you have a total coliform-positive routine sample?		
If you answered yes, take the following action(s):		
▪ Take 3 repeat samples within 24 hours of being notified of your result. Send these samples to the lab immediately.		
▪ Make sure that your lab tests the total coliform-positive routine sample for the presence of *E. coli.*		
If you answered no, continue with your routine monitoring.		
B. Do you have a total coliform-positive repeat sample?		
If you answered yes, take the following action(s):		
▪ Make sure that your lab tests the total coliform-positive routine sample for the presence of *E. coli.*		
C. Do you have an *E. coli*-positive routine sample?		
If you answered yes, take the following action(s):		
▪ Notify your drinking water primacy agency by the end of the day when you learn of the positive result, or by the end of the next business day if you learn of the positive result after the agency office is closed and the agency has no after-hours notification system.		

ITEMS TO CHECK	YES	NO
D. Do you have an *E. coli* MCL violation?		
▪ An *E. coli*-positive repeat sample following a total coliform-positive routine sample.		
▪ A total coliform positive repeat sample following an *E. coli*-positive routine sample.		
▪ Failure to collect all required repeat samples following an *E. coli*-positive routine sample.		
▪ Failure to test for *E. coli* when any of the repeat samples is total coliform-positive.		
If you answered yes to any of the items in "D" above, take the following action(s):		
▪ Report the violation to your drinking water primacy agency as soon as practical but no later than 24 hours after learning of the violation.		
▪ Notify the public by issuing a Tier 1 public notification as soon as practical but no later than 24 hours after learning of the violation.		
▪ Make sure a Level 2 assessment is conducted. See Item F.		
▪ If you are on quarterly or annual monitoring, go to monthly monitoring beginning the following month.		
E. Did you trigger a Level 1 assessment?		
▪ Two or more total coliform-positive samples in the same sampling period (include results of both routine and repeat samples).		
▪ Failure to take every required repeat sample after any single routine total coliform-positive sample.		
If you answered yes to any of the items in "E" above, take the following action(s):		
▪ Check with your drinking water primacy agency to determine who can conduct a Level 1 assessment and which forms to use.		
▪ Conduct the Level 1 assessment, correct all sanitary defects found and submit form to your drinking water primacy agency within 30 days of learning of the trigger.		
F. Did you trigger a Level 2 assessment?		
▪ An *E. coli* MCL violation.		
▪ A second Level 1 trigger within a rolling 12-month period.		
▪ For systems on approved reduced annual monitoring, a Level 1 treatment technique trigger in two consecutive years.		
If you answered yes to any of the items in "F" above, take the following action(s):		
▪ Check with your drinking water primacy agency to determine who can conduct a Level 2 assessment and which forms to use.		
▪ Conduct the Level 2 assessment, correct all sanitary defects found and submit form to your drinking water primacy agency within 30 days of learning of the trigger.		
G. Do you have a treatment technique violation?		
▪ Failure to conduct a required assessment within the required time period.		
▪ Failure to perform corrective actions within the required timeframe.		
▪ Seasonal system: Failure to complete a primacy agency-approved start-up procedure.		
If you answered yes to any of the items in "G" above, take the following action(s):		

ITEMS TO CHECK	YES	NO
▪ Report the violation to your drinking water primacy agency no later than the end of the next business day after you learn of the violation.		
▪ Notify the public by issuing a Tier 2 public notification as soon as practical but no later than 30 days after learning of the violation.		
H. Do you have a monitoring violation?		
▪ Failure to take all required routine and additional routine samples.		
▪ *E. coli* not analyzed following a total coliform-positive routine sample.		
If you answered yes to any of the items in "H" above, take the following action(s):		
▪ Report the violation to your drinking water primacy agency within 10 days of learning the violation.		
▪ Notify the public by issuing a Tier 3 public notification within a year of learning of the violation.		
I. Do you have a reporting violation?		
▪ Failure to submit the monitoring report at the end of the monitoring period after system properly conducts monitoring.		
▪ Failure to submit the assessment form within required timeframe after system properly conducts an assessment.		
▪ Failure to notify your drinking water primacy agency of an *E. coli*-positive sample within the required timeframe.		
▪ Failure of a seasonal system to certify to the drinking water primacy agency that they have completed the start-up procedure before serving water to the public.		
If you answered yes to any of the items in "I" above, take the following action(s):		
▪ Notify the public by issuing a Tier 3 public notification within a year of learning of the violation.		
J. If you are a non-community water system (including seasonal systems) on a quarterly monitoring schedule, did any of the events occur?		
▪ A Level 2 assessment or two Level 1 assessments are triggered in a rolling 12-month period.		
▪ An *E. coli* MCL violation.		
▪ A coliform treatment technique violation.		
▪ Two monitoring violations in a rolling 12-month period.		
▪ One monitoring violation and one Level 1 assessment in a rolling 12-month period.		
If you answered yes to any of the items in "J" above, take the following action(s):		
▪ Begin monthly monitoring the month following the trigger event(s).		
K. If you are a non-community water system (including seasonal systems) on an annual monitoring schedule, did any of the following events occur?		
▪ Level 2 assessment or two Level 1 assessments are triggered in a rolling 12-month period.		
▪ An *E. coli* MCL violation.		
▪ A coliform treatment technique violation.		

ITEMS TO CHECK	YES	NO
If you answered yes to any of the items in "K" above, take the following action(s):		
▪ Begin monthly monitoring the month following the trigger event(s).		
L. If you are a non-community water system (including seasonal systems) on an annual monitoring schedule, did the following event occur?		
▪ A monitoring violation.		
If you answered yes to any of the items in "L" above, take the following action(s):		
▪ Begin quarterly monitoring the calendar quarter following the trigger event(s).		
M. If you are a community water system on a quarterly monitoring schedule, did any of the following events occur?		
▪ Loss of certified operator.		
▪ A Level 2 assessment or two Level 1 assessments triggered in a rolling 12-month period.		
▪ An *E. coli* MCL violation.		
▪ A coliform treatment technique violation.		
▪ Two monitoring violations in a rolling 12-month period.		
If you answered yes to any of the items in "M" above, take the following action(s):		
▪ Begin monthly monitoring the month following the trigger event(s).		

Part D

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D. Appendices

D.1. Routine Monitoring Frequency for Non-Seasonal Ground Water Non-Community Water Systems Serving ≤ 1,000 Persons (40 CFR 141.854)

Baseline frequency: one sample per calendar quarter

Reduced frequency: one sample per year

Increased frequency: one sample per month or one sample per quarter

Water system should check with their drinking water primacy agency to determine if they are allowed to reduce their monitoring frequency below their baseline monitoring frequency.

REDUCED MONITORING

Quarterly to Annual

The primacy agency may allow a system to monitor less frequently than once per quarter to once per year if the system meets the following criteria:

1. A clean compliance history for a minimum of 12 months;
2. The most recent sanitary survey shows that the system is free of sanitary defects or has corrected all identified sanitary defects, has a protected water source and meets approved construction standards; and
3. An annual site visit from the primacy agency within the last 12 months and system has corrected all identified sanitary defects. A voluntary Level 2 assessment can be substituted for the annual site visit.

INCREASED MONITORING

Quarterly to Monthly

The system must increase to monthly monitoring from quarterly monitoring if any of the following conditions occur:

- A Level 2 assessment or two Level 1 assessments are triggered in a rolling 12-month period
- An *E. coli* MCL violation
- A coliform treatment technique violation
- Two RTCR monitoring violations in a rolling 12-month period
- One RTCR monitoring violation and one Level 1 assessment in a rolling 12-month period

Annual to Monthly

The system must increase to monthly monitoring from annual monitoring if any of the following conditions occur:

- A Level 2 assessment or two Level 1 assessments are triggered in a rolling 12-month period.
- An *E. coli* MCL violation.
- A coliform treatment technique violation.

Annual to Quarterly

The system must return to quarterly monitoring from annual monitoring if the following condition occurs:

- One RTCR monitoring violation.

RETURN TO QUARTERLY OR ANNUAL MONITORING AFTER BEING TRIGGERED INTO MONTHLY MONITORING

Monthly to Quarterly

The primacy agency may reduce a system's monitoring frequency to no less than quarterly monitoring if the system demonstrates that it meets the following criteria:

1. Within the last 12 months, a completed sanitary survey or a site visit by the primacy agency or a voluntary Level 2 assessment by a party approved by the primacy agency, be free of sanitary defects and have a protected water source.

2. A clean compliance history for a minimum of 12 months.

Monthly or Quarterly to Annual

The primacy agency may reduce a system's monitoring frequency to no less than annual monitoring if the system demonstrates that it meets the following criteria:

1. The criteria for reduced monitoring from monthly to quarterly.
2. An annual site visit by the primacy agency and correction all identified sanitary defects. A voluntary Level 2 assessment by a party approved by the primacy agency may be substituted for the primacy agency annual site visit in any given year.
3. Has in place or has adopted one or more additional enhancements to the water system barriers to contamination.
    - Cross connection control, as approved by the primacy agency.
    - An operator certified by an appropriate primacy agency certification program or regular visits by a circuit rider certified by an appropriate primacy agency certification program.
    - Continuous disinfection entering the distribution system and a residual in the distribution system in accordance with criteria specified by the primacy agency.
    - Demonstration of maintenance of at least a 4-log removal or inactivation of viruses as provided for under § 141.403(b)(3) of the Ground Water Rule.
    - Other equivalent enhancements to water system barriers as approved by the primacy agency.

D.2. Routine Monitoring Frequency for Seasonal Ground Water Non-Community Water Systems Serving ≤ 1,000 Persons (40 CFR 141.854(i))

Baseline frequency: one sample per month

Reduced frequency: one sample per calendar quarter or one sample per year

Increased frequency: one sample per month or one sample per quarter

Water system should check with their drinking water primacy agency to determine if they are allowed to reduce their monitoring frequency below their baseline monitoring frequency.

REDUCED MONITORING

Monthly to Quarterly

The primacy agency may reduce a system's monitoring frequency to no less than quarterly monitoring if the system demonstrates that it meets the following criteria:

1. An approved sample siting plan that designates the time period for monitoring based on site-specific considerations (for example, during periods of highest demand or highest vulnerability to contamination). Compliance samples must be collected during this time period.
2. Within the last 12 months, a completed sanitary survey or a site visit by the primacy agency or a voluntary Level 2 assessment by a party approved by the primacy agency, be free of sanitary defects and have a protected water source.
3. A clean compliance history for a minimum of 12 months.

Monthly or Quarterly to Annual

The primacy agency may reduce a well-operated system's monitoring frequency to no less than annual monitoring if the system demonstrates that it meets the following criteria:

1. Meet the criteria for reduced monitoring from monthly to quarterly.

2. An annual site visit by the primacy agency and correction of all identified sanitary defects. A voluntary Level 2 assessment by a party approved by the primacy agency may be substituted for the primacy agency annual site visit in any given year.
3. Has in place or has adopted one or more additional enhancements to the water system barriers to contamination.
    - Cross connection control, as approved by the primacy agency.
    - An operator certified by an appropriate primacy agency certification program or regular visits by a circuit rider certified by an appropriate primacy agency certification program.
    - Continuous disinfection entering the distribution system and a residual in the distribution system in accordance with criteria specified by the primacy agency.
    - Demonstration of maintenance of at least a 4-log removal or inactivation of viruses as provided for under § 141.403(b)(3) of the Ground Water Rule.
    - Other equivalent enhancements to water system barriers as approved by the primacy agency.

RETURN TO MONTHLY OR QUARTERLY

Quarterly to Monthly

The system must return to monthly monitoring from quarterly monitoring if any of the following conditions occur:

- A Level 2 assessment or two Level 1 assessments are triggered in a rolling 12-month period.
- An *E. coli* MCL violation.
- A coliform treatment technique violation.
- Two RTCR monitoring violations in a rolling 12-month period.
- One RTCR monitoring violation and one Level 1 assessment in a rolling 12-month period.

Annual to Monthly

The system must return to monthly monitoring from annual monitoring if any of the following conditions occur:

- A Level 2 assessment or two Level 1 assessments are triggered in a rolling 12-month period.
- An *E. coli* MCL violation.
- A coliform treatment technique violation.

Annual to Quarterly

The system must return to quarterly monitoring from annual monitoring if the following condition occurs:

- One RTCR monitoring violation.

D.3. Routine Monitoring Frequency for Ground Water Community Water Systems Serving ≤ 1,000 Persons (40 CFR 141.855)

Baseline frequency: one sample per month

Reduced frequency: one sample per calendar quarter

Water system should check with their drinking water primacy agency to determine if they are allowed to reduce their monitoring frequency below their baseline monitoring frequency.

REDUCED MONITORING

Monthly to Quarterly

The primacy agency may reduce the monitoring frequency of a well-operated system to no less than once per quarter if the system meets the following criteria:

1. Compliance with the primacy agency-certified operator provisions.
2. A clean compliance history for a minimum of 12 months.
3. The most recent sanitary survey shows that the system is free of sanitary defects (or has an approved plan and schedule to correct them and is in compliance with the plan and the schedule), has a protected water source and meets approved construction standards.
4. Meet at least one of the following criteria:
    - An annual site visit by the primacy agency that is equivalent to a Level 2 assessment or an annual Level 2 assessment by a party approved by the primacy agency and correction of all identified sanitary defects (or an approved plan and schedule to correct them and is in compliance with the plan and schedule).
    - Cross connection control, as approved by the primacy agency.
    - Continuous disinfection entering the distribution system and a residual in the distribution system in accordance with criteria specified by the primacy agency.

- Demonstration of maintenance of at least a 4-log removal or inactivation of viruses as provided for under § 141.403(b)(3) of the Ground Water Rule.
- Other equivalent enhancements to water system barriers as approved by the primacy agency

Return to Monthly

The system must return to monthly monitoring from quarterly monitoring if any of the following conditions occur:

- Loss of certified operator.
- A Level 2 assessment or two Level 1 assessments triggered in a rolling 12-month period.
- An *E. coli* MCL violation.
- A coliform treatment technique violation.
- Two RTCR monitoring violations in a rolling 12-month period.