

Revised Total Coliform Rule Compliance Template 2016



This Template was created in partnership with SCDHEC and SCRWA staff. We would like to thank all that participated in the effort by providing feedback and expertise. We hope this template assists SC water utilities in their compliance efforts with the 2016 Revised Total Coliform Rule.

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Revised Total Coliform Rule Compliance Standard Operating Procedures

System Name:

Date approved:

Approved by:

Revision dates:

System Specific Information

Utility Name:

System Number:

Address:

Primary Contact Name:

Phone Number:

Email:

Number of Taps:

Population Served:

Required minimum number of routine samples:

Source:

Sample Collector:

System

OR

Contract Laboratory

Sample Analysis:

System

OR

Contract Laboratory

Contract Laboratory Contact Information (if applicable):

Name:

Address:

Phone Number:

Email:

These procedures have been developed in order to comply with State Drinking Water Standard R.61-58.17, Revised Total Coliform Rule, which uses coliform sampling to initiate a find and fix approach to address potential fecal coliform contamination in the distribution system.

The following standard operating procedure (SOP) contains the following components in accordance with the rule:

- A sample siting plan that identifies total coliform sampling sites and sample collection schedule that is representative of water throughout the distribution system. The purpose of the sample siting plan is to ensure that bacteriological contamination cannot persist undetected in the distribution system.
 - Address / location table of routine and repeat sample sites
 - Map of distribution system with system specific information indicated as needed.
 - Applicable sampling schedule
 - Routine
 - Repeat
 - Contact information of system personnel or contracted entity performing the sampling
 - Contact information of Laboratory completing the analysis
- Sample collection protocol
- Compliance reporting and public notification procedures of analysis results
- Level 1 & 2 Assessment completion if needed
- Recordkeeping

Sample Siting Plan Protocols

Protocol for Sample Site Selection

Sample sites have been chosen to ensure adequate representation of water throughout the distribution system. The number of samples collected and frequency of collection is based on population served. As indicated below, the following distribution system characteristics have been considered during the site selection process:

- Areas of the distribution system with different water ages
- Areas reflective of different water sources or areas where there is an interface between multiple sources of water
- Areas representing cross connection hazards
- Areas primarily sourced by finished water storage facilities
- Areas comprised of different water main materials (i.e. CLDIP or PVC)
- Areas representing low water flow conditions
- Areas representing low or no chlorine residuals
- Areas representing low water pressures
- Areas representing supplemental (booster) disinfection stations
- Areas representing water supply to critical/sensitive facilities (e.g. schools, daycares, hospitals)
- Areas reflecting varying population densities
- **Add any additional system specific protocol here**

Samples were not considered to be viable from sites with the following appurtenances.

- Faucets that point upward (i.e. drinking water fountains)
- Faucets that are corroded or have leaking packing material
- Swivel-type faucets
- Faucets that have threads on the inside of their spouts
- Faucets that contain aerators or screens (aerators or screens should be removed with care)
- Faucets that are close to or below ground level
- Faucets that are dirty or surrounded by excessive foliage or taps that are dirty, corroded, or are leaking
- A hose or other attachment to a faucet
- Faucets that are supplied water through a point of use or whole house treatment system
- **Add any additional system specific protocol here**

Routine Sampling Schedule

To ensure that sample results are truly representative of water quality, samples will be taken at regular intervals throughout the month rather than within a single day or week.

OR

The system is a groundwater system serving a population less than 4900 therefore samples may be taken within one day.

Required minimum number of routine samples to be collected:

Actual number of routine samples that will be collected:

All samples sites will be sampled monthly

OR

Samples will be taken on rotational schedule, while maintaining the minimum required number of routine samples monthly. The number of sampling sites on the rotating schedule has been chosen to ensure all sample sites will be sampled at least every 3 months.

****If any sample taken is total coliform positive, the system will determine whether the sample is E. Coli positive and initiate repeat sampling.**

****Refer to the Notification Section of this SOP for information on SCDHEC Compliance Reporting and Public Notification requirements due to E. Coli positive results.**

Repeat Sampling Schedule

The system will collect a set of no fewer than three repeat samples within 24 hours of being notified of a total coliform positive result.

All repeat samples will be taken on the same day.

The system will collect an additional set of repeat samples within 24 hours until total coliforms are not detected in one complete round of sampling, the MCL for E. Coli is violated or an Assessment is triggered.

E. Coli MCL Violations

When any of the conditions below are identified the system is in violation of an E. Coli MCL:

- There is an E. Coli positive repeat sample following a total coliform positive routine sample.
- There is 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.
- The system fails to test for E. Coli when any repeat sample tests positive for total coliform.

Level 1 Assessment Triggers

Triggers for conducting Level 1 Assessments are as follows:

- The system exceeds 5.0% total coliform-positive samples for the month.
(For systems of populations greater than 33,000 taking 40 or more samples per month)

OR

- The system has two or more total coliform-positive samples for the month.
(For systems under 33,000 population taking fewer than 40 samples per month)
- Failure to take every required repeat sample following any single total coliform-positive sample.

Groundwater Systems

The system utilizes groundwater as the source, therefore in addition to the three repeat samples, a triggered source sample will be taken within 24 hours of notification of a total coliform-positive sample. For each individual coliform-positive sample, a separate source sample will be taken at all wells that were in use at the time that the total coliform-positive sample was collected. The triggered source sample will be collected prior to any treatment.

Wholesale groundwater systems

The following is a sampling requirement due to notification from consecutive system of total coliform positive result.

When a production or wholesale groundwater system receives notice from a purchasing / consecutive system of a total coliform positive sample, the production/wholesale groundwater utility will sample for E. Coli at all groundwater sources active during the time of the purchasing system's initial total coliform positive sampling.

****If any sample taken is total coliform positive, the system will determine whether the sample is E.Coli positive and initiate repeat sampling.**

****Refer to the Notification Section of this SOP for information on SCDHEC Compliance Reporting and Public Notification requirements due to E. Coli positive results.**

Repeat Sample Siting Plan

Three repeat samples will be collected for each Total Coliform positive result.

- One will be collected at the Total Coliform positive location.
- One will be collected within 5 service connections upstream of the Total Coliform positive location.
- One will be collected within 5 service connections downstream of the Total Coliform positive location.

If there are any alternative fixed repeat sampling locations (if not within 5 service connections location must be approved by SCDHEC in advance) specifically chosen they are indicated below:

OR

All repeat sampling locations have been specifically chosen at fixed locations (if not within 5 service connections location must be approved by SCDHEC in advance) as indicated in the below chart. All repeat samples have been chosen as described in the Protocol for Sample Site Selection section above.

Site Number		Site Address	Description	Lat. / Long.
Repeat Site Number	Upstream / Downstream			
	Upstream / Downstream			

Groundwater Systems

The system utilizes groundwater as the source, therefore in addition to the three repeat samples, a triggered source sample will be taken within 24 hours of notification of a total coliform-positive sample. For each individual coliform-positive sample, a separate source sample will be taken at all wells that were in use at the time that the total coliform-positive sample was collected. The triggered source sample will be collected prior to any treatment.

All well information and sample locations are indicated in the table below:

Source Name / Number	Source Sample Location

System Distribution Sample Siting Map

A system distribution sample siting map (attached) has been developed with all of the following information as applicable.

- Entry points*
- Well sites for groundwater sources*
- Interconnections*
- Tanks*
- Distribution treatment facilities*
- Routine sample sites*
- Fixed repeat sample sites (if applicable)*
- Pressure zones
- Hydrants/blow offs
- Pipe Sizes / materials

Sample Collection Protocol

If the system collects sample, insert collection procedures here or attach as a SOP addendum.

If the system uses a contract laboratory for sample collection include their SOP here or attach as an addendum.

Groundwater Systems (remove if not a groundwater system)

Trigger source sample will be collected prior to any treatment.

EXAMPLE: Sample container preparation and transport procedures.

Standard procedures include, but are not limited to, the following:

- Sample containers must be sterilized plastic or non-corrosive glass bottles or plastic bags with a capacity of at least 120 mL to allow at least a 1-inch head space. (Refer to EPA Lab Certification Manual, Fifth Edition, Jan 2005);
- 0.008% sodium thiosulfate added to sample container to neutralize any residual chlorine in the water sample.
- The sample container should be capped and sterilized by dry or moist heat. Presterilized plastic bags or bottles containing sodium thiosulfate are available commercially.
- The standard sample volume for total coliform analyses, regardless of approved analytical method used, is 100 ml + 2.5ml;
- Preserve sample by cooling to less than 10 degrees Celsius;
- The maximum holding time is 30 hours.
- To more effectively address public health concerns, samples should be analyzed as soon as possible upon receipt by the testing laboratory.

EXAMPLE: Sample collection procedures

Standard procedures include, but are not limited to, the following:

- Prep the cold water sample tap by swabbing the tap with a chlorine solution or alcohol, or by flaming the tap (appropriate for metal taps only).
- Flush the prepped cold water tap long enough to obtain a representative sample, approximately 4 - 5 minutes of running time is necessary to replace the water in a typical service line (50 feet of ¾ inch service line), and to ensure that any residual chlorine solution or alcohol is rinsed away from the tap before the actual sample is collected. A flushed sample is representative of the water flowing from the water main versus water that has only been in contact with interior plumbing materials, i.e. first draw sample;
- Adjust the flow rate to the width of a pencil and maintain a steady flow during sample collection;
- Determine and record the residual disinfectant level before collecting the microbiological sample
- Wear latex gloves and avoid touching the cap or rim of the sample bottle;
- Ensure that the sample container does not touch the faucet;
- Collect a flushed sample from the prepped cold water tap;
- Refrigerate or place samples on ice immediately after sample collection;
- Retain completed chain of custody record for all samples collected.

Chlorine residual analysis

Chlorine residual analysis will be taken by a certified lab, at the same time and location as the microbiological sample collection and recorded.

The system practices disinfection using gas or hypo chlorination and hence will perform a free **or** total chlorine residual test.

OR

The system practices disinfection using chloramines and hence will perform a free **or** total chlorine residual test.

Repeat sample collection

Repeat samples within the distribution system will be taken within 24 hours of being notified of the routine total coliform positive result at repeat site sampling locations listed above.

Repeat samples will be continued to be collected within 24 hours of previous positive repeat sample results until all repeat samples are total coliform negative, the MCL for E. Coli is violated or until an assessment is triggered.

Compliance Reporting and Public Notification

SCDHEC notification

When a sample is E. Coli positive or when the system learns of an E. Coli violation (described below) the system will notify SCDHEC by the end of the day that the system is notified of the test result or violation. During normal business hours SCDHEC Bureau of Water staff can be reached at 803-898-4300. If after business hours or on holidays and weekends, the SCDHEC 24 hour hotline: 888-481-0125 will be utilized.

If the system is required to correct sanitary defects as determined by either a Level 1 or Level 2 Assessment, SCDHEC will be notified when each scheduled corrective action is completed.

Purchasing groundwater system notification of total coliform positive result

When a sample is total coliform positive the purchasing system is responsible for notifying the production utility or wholesale system of the positive sample within 24 hours.

Selling groundwater system notification of E.Coli positive result

When a sample is E. Coli positive the selling groundwater system is responsible for notifying ALL purchasing water systems of the positive sample within 24 hours.

Tier 1 Public Notification triggers

When there is an E. Coli violation (described below), the public will be notified within 24 hours, in accordance with the utility's Tier 1 public notification procedures.

E. Coli MCL Violations

When any of the conditions below are identified the system is in violation of an E. Coli MCL:

- There is an E. Coli positive repeat sample following a total coliform positive routine sample.
- There is 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.
- The system fails to test for E. Coli when any repeat sample tests positive for total coliform.

Tier 2 Public Notification triggers

When there is a treatment technique violation (described below), the public will be notified within 30 days, in accordance with the utility's Tier 2 public notification procedures.

Treatment Technique Violations

- Failure to conduct the required Assessment.
- Failure to conduct the required corrective action as determined by the Assessment.

Tier 3 Public Notification triggers

When there is either a monitoring or reporting violation (described below), the public will be notified within 12 months, in accordance with the utility's Tier 3 public notification procedures.

Monitoring Violations

- Failure to take all required routine or additional routine samples.

- Failure to test for E. Coli following a total coliform positive routine sample.

Reporting Violations

- Failure to submit required monitoring results or Assessment report.
- Failure to notify SCDHEC of an E. Coli positive sample by the end of the day that the system is notified of the E. Coli positive sample.

Level 1 & 2 Assessment Triggers and Procedures

Level 1 & 2 Assessments are conducted in order to identify the possible presence of sanitary defects in the distribution system and/or poor or inadequate sample collection protocols.

Level 1 Assessments

Triggers

Triggers for conducting Level 1 Assessments are as follows:

- The system exceeds 5.0% total coliform-positive samples for the month.
(For systems of populations greater than 33,000 taking 40 or more samples per month)

OR

- The system has two or more total coliform-positive samples for the month.
(For systems under 33,000 population taking fewer than 40 samples per month)
- Failure to take every required repeat sample following any single total coliform-positive sample.

Procedures

The system will conduct a Level 1 Assessment, utilizing the DHEC Level 1 Assessment Form and submit the completed Level 1 form to SCDHEC within 30 days. Required components of the Assessment are the following:

- Description of any sanitary defects detected
(It is possible for the form to note that no sanitary defects were identified.)
- Description of any corrective actions completed
- Proposed timetable for any corrective actions not already completed.

Notification

If a system is required to correct sanitary defects as determined by either a Level 1 or Level 2 Assessment, SCDHEC must be notified when each scheduled corrective action is completed.

Level 2 Assessments

Triggers

- E. Coli MCL violation
- A second level 1 Assessment trigger within a rolling 12 month period.

Procedures

The system will have SCDHEC or arrange to have an SCDHEC authorized entity conduct a Level 2 Assessment and submit the completed Level 2 form to SCDHEC within 30 days. Required components of the Assessment are the following:

- Description of any sanitary defects detected
(It is possible for the form to note that no sanitary defects were identified.)
- Description of any corrective actions completed
- Proposed timetable for any corrective actions not already completed.

Notification

If a system is required to correct sanitary defects as determined by either a Level 1 or Level 2 Assessment, SCDHEC must be notified when each scheduled corrective action is completed.

Recordkeeping

The system will maintain all sampling results and Assessment Forms for a period no less than 5 years.